



Child maltreatment and repeat presentations to the emergency department for suicide-related behaviors^{☆,☆☆}

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ABSTRACT

Objectives: To identify factors associated with repeat emergency department (ED) presentations for suicide-related behaviors (SRB) – hereafter referred to as repetition – among children/youth to aid secondary prevention initiatives. To compare rates of repetition in children/youth with substantiated maltreatment requiring removal from their parental home with their peers in the general population.

Methods: A population-based (retrospective) cohort study was established for children/youth with a first ED SRB presentation at risk for repetition in the Province of Ontario, Canada between 1 January 2004 and 31 December 2008. Children/youth legally removed from their parental home because of substantiated maltreatment ($n = 179$) and their population-based peers ($n = 6,305$) were individually linked to administrative health care records over time to ascertain social, demographic, and clinical information and subsequent ED presentations for SRB during follow-up. These children/youth were described and their repetition-free probabilities over time compared. To identify factors associated with repetition we fit multivariable, recurrent event survival analysis models stratified by repetition and present unadjusted and adjusted hazard ratios (HRs) and 95% confidence intervals (CIs).

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Results: Children/youth with substantiated maltreatment (as noted) were two times more likely to have repetition than their peers after adjustments for social, demographic, and clinical factors (conditional on prior ED SRB presentations). A number of these factors were independently associated with repetition. No one factor distinguished between having a first and second repetition nor was more strongly associated with repetition than another. **Conclusions:** The risk of repetition is higher in children with substantiated maltreatment (as noted) than their peers. No one factor stood out as predictive of repetition. Implications for secondary prevention initiatives include a non-selective approach, sensitive to family difficulties and the need to better contextualize repetition and harness data linkages.

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Introduction

Background

In a previous study (Rhodes et al., 2012) we introduced resiliency as “the ability to maintain or regain mental health, despite experiencing adversity” (Herrman et al., 2011, p. 259). We underscored the need for ongoing environmental support (Afifi & MacMillan, 2011; Wekerle, Waechter, & Chung, 2012), in the form of provider and system level linkages between the health and child welfare sectors to prevent the need for presentations to the emergency department (ED) for suicide-related behaviors (SRB) in children/youth. In this study, we focus on ways in which repeat presentations to the ED for SRB in children/youth may be prevented.

SRB are defined as (fatal or non-fatal) self-inflicted injuries or self-poisonings with suicidal, undetermined or no suicidal intent (Silverman, Berman, Sanddal, O’Carroll, & Joiner, 2007a, 2007b). Both survey and health service data show non-fatal SRB peak in adolescence (Bethell & Rhodes, 2009; Colman et al., 2004; Corcoran, Keeley, O’Sullivan, & Perry, 2004; Hawton & Harriss, 2008a). The strongest predictor of contacting health services after SRB among adolescents is suicidal intent (Ystgaard et al., 2009). For children/youth who present to the ED with non-fatal SRB, about one quarter will repeat in the following year (Hulten et al., 2001; Stewart, Manion, Davidson, & Cloutier, 2001; Vajda & Steinbeck, 2000). Further, their risk of subsequent mortality is 3 to 4 times higher than expected, particularly for suicide (10–20 times higher) (Hawton & Harriss, 2007; Reith, Whyte, Carter, & McPherson, 2003).

Intervention studies aimed at preventing SRB in children/youth, including ED initiated ones, have been inconclusive, conceivably because of methodological weaknesses (Newton et al., 2010; Robinson, Hetrick, & Martin, 2011). Intervention trials in adults with SRB recruited from the ED have not demonstrated a reduction in the proportion who repeat; however, among those who do repeat, the number of repetitions were reduced (Bennewith et al., 2002; Carter, Clover, Whyte, Dawson, & D’Este, 2007). A more recent trial in adults with ED SRB presentations, found the proportion of those with a subsequent ED SRB presentation was reduced, but only among those who had presented to the ED for SRB in the past (Hatcher, Sharon, Parag, & Collins, 2011). Together these trials provide hope that programs can reduce ED SRB presentations but also raise questions about why those with a first ED SRB presentation do not seem to respond to interventions as well as those with a prior presentation. As many of the adults (age 16 or more) in these trials may have first presented to the ED with SRB as children/youth, we seek to better understand repetition over time in the pediatric population from the perspective of developing secondary preventive strategies.

Few studies have followed children/youth presenting to the ED for SRB over time to identify factors associated with repeat ED SRB presentations. Further, as children/youth in these hospital-based studies were not linked to their health care records outside of their study hospital(s), first and repeat presentations may not have been fully captured, potentially biasing associations. Also, as youth with prior SRB have a shorter time to repetition than those with a first SRB (Hulten et al., 2001), this baseline difference in risk (hazard function) needs to be taken into account when estimating associations with repetition (Bergen, Hawton, Waters, Cooper, & Kapur, 2010). Still, there were some common findings: repetition did not differ by sex (Hawton & Harriss, 2008b; Hulten et al., 2001; Reith, Whyte, & Carter, 2003; Stewart et al., 2001; Vajda & Steinbeck, 2000), but was more frequent among those who saw a mental health professional in the past (Stewart et al., 2001), or had a mental illness, particularly drug or alcohol abuse or non-affective psychoses (Vajda & Steinbeck, 2000; Reith, Whyte, & Carter, 2003; Reith, Whyte, Carter, & McPherson, 2003). Repetition was also more common among those with a history of childhood abuse (Stewart et al., 2001; Vajda & Steinbeck, 2000). In the latter (Canadian) study of 224 children/youth (ages 7–19) with a first suicidal (ideation, plan or attempt) ED presentation, 14.4% were Crown wards (described below) and were about twice as likely to return to the ED for mental health reasons within 6 months. Three-quarters of these returns were for a suicide attempt (Stewart et al., 2001). Accordingly, we seek to identify factors associated with repeat ED SRB presentations, (hereafter referred to as repetition), among children/youth first presenting to the ED with SRB in a large population-based sample. We hypothesize that Crown wards will be at greater risk for repetition than their peers (Stewart et al., 2001), despite adjustments for sociodemographic and clinical factors (conditional on prior ED SRB presentations). In addition to the factors noted above, we control for aspects of the ED SRB presentation and place of residence as these factors may reflect, in part, the use of the ED for regular ambulatory care (Rhodes et al., 2012).

Materials and methods

Study design and setting

This is a population-based (retrospective) cohort study of children/youth with a first ED SRB presentation at risk of repetition in the Province of Ontario, Canada between 1 January 2004 and 31 December 2008. This study was approved by the Research Ethic Boards of St. Michael's Hospital and Sunnybrook Health Sciences Center, and data access granted under the umbrella of a data sharing agreement between the Ontario Ministry of Children and Youth Services and the Institute for Clinical Evaluative Sciences.

Selection of participants

This study cohort is drawn from a larger population-based cohort of children/youth ($n=1,039,229$) created from the Ontario Registered Persons Data Base (RPDB) (Rhodes et al., 2012). Coverage of children and youth in the RPDB is near 98% owing to universal medical coverage (Iron, Zagorski, Sykora, & Manuel, 2008). This larger cohort consisted of almost all Ontario residents aged 12–17 years (inclusive) as of 1 January 2004, from which we examined 6,505 children/youth with a first ED SRB presentation up until 31 December 2008. See Rhodes et al. (2012) for a fuller description of the creation of the cohort and inclusion/exclusion criteria. From this group, we excluded $n=19$ who did not survive their first ED SRB presentation and $n=2$ who were no longer residents of Ontario according to their postal code and health card information just prior to their presentation ($n=2$). Using the unique identifier in the RPDB, the remaining $n=6,484$ were individually linked to their health service records to identify repetition until the end of their follow-up. End of follow-up occurred after a move out of the province; death or December 31, 2010 (and was conditional on the number of repetitions in the analysis – see below). Thus, the age at end of follow-up varied between 12 and 24 years. The mean and median lengths of follow-up (in days) were 1798 and 1886 days (about five years for both).

Outcome measure

Repeat ED SRB presentation(s) was the outcome variable, identified in the National Ambulatory Care Recording System (NACRS) (Canadian Institute for Health Information, 2008). SRB was defined according to any diagnostic codes for self-inflicted injury or poisoning as per the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA): X60–84. Repetition was classified as 1 or 2 or more over time. Less than 15% of the sample had more than 2 repetitions.

Social, demographic, and clinical characteristics

For each individual, the following study variables were examined (before or at) the start of two possible intervals: (i) the time from the first ED SRB presentation to the first repetition and (ii) the time between the first repetition and the second repetition.

Crown wards (versus peers) were identified for time (i) in a separate provincial data base with 95% linked to the RPDB (Rhodes et al., 2012). These children and youth would have had their maltreatment legally substantiated defined in the Child and Youth Family Services Act, (Child and Family Services Act, 1990; The Ontario Ministry of Children and Youth Services, 2011), through a court proceeding, resulting in their becoming permanent wards of the Crown and placed in the care of a Children's Aid Society (CAS) with full guardianship responsibilities (Ontario Association of Children's Aid Societies, 2011). A child/youth can become a Crown ward any time between birth up to age 16. In this sample, less than 5% were under the age of 5 when they became Crown wards. Children and youth becoming wards before age 16 remain a Crown ward until age 18 unless the wardship is closed (e.g., due to legal adoption). The CAS works to find permanent homes for these children and youth. Legal adoptions tend to occur within 24 months of the Crown ward court-order date. All Crown wards were active and therefore, under age 18 at the time of their first ED SRB presentation (Table 1). Among the 60 Crown wards at risk for repetition at the start of time (ii) $n=6$ (10%) were aged 18 years or more; however, we retained them as Crown wards in the analysis. Peers were selected as never being/becoming Crown wards from June 1990 onwards (Rhodes et al., 2012).

Age in years and sex were obtained from NACRS at the start of (i) and (ii).

Community size and neighborhood income quintile were defined using postal code information from the RPDB, last quarter before time (i) and (ii) and the Statistics Canada Postal Conversion File (Wilkins, 2009). Using this information, each cohort member's residence was assigned to its dissemination area, a small relatively stable geographic unit and the smallest standard unit for which census data are produced (Statistics Canada, 2011), and described accordingly. At time (i), there were 18 (10%) Crown wards with incorrect postal codes which identified their CAS agency rather than their residence. For 13 of these individuals, the CAS agency postal codes were used to indicate residency because these individuals had contact(s) with hospitals within a year of their presentation in the same municipality as their CAS agency. Residency for the remaining five individuals was assigned a missing value. Some additional missing neighborhood income information in Crown wards and peers occurred as the postal code information was insufficient to assign them to an income quintile (Table 1). At time

Table 1

Study sample characteristics at (or before) the first emergency department (ED) suicide-related behavior (SRB) presentation.

| | Crown wards (N = 179) | | | Peers (N = 6,305) | | |
|---|-----------------------|-------|---------------|-------------------|-------|---------------|
| | N | % | 95% CI | N | % | 95% CI |
| Social, demographic and clinical factors | | | | | | |
| Sex (female) | 115 | 64.25 | (57.23,71.27) | 4553 | 72.21 | (71.1,73.32) |
| Age (years) | | | | | | |
| 12–13 | 10 | 5.59 | (2.22,8.96) | 299 | 4.74 | (4.22,5.26) |
| 14 | 30 | 16.76 | (11.29,22.23) | 791 | 12.55 | (11.73,13.37) |
| 15 | 37 | 20.67 | (14.74,26.6) | 1323 | 20.98 | (19.97,21.99) |
| 16 | 52 | 29.05 | (22.4,35.7) | 1861 | 29.52 | (28.39,30.65) |
| 17–18 | 50 | 27.93 | (21.36,34.5) | 2031 | 32.21 | (31.06,33.36) |
| Community size | (n = 5 missing) | | | (n = 0 missing) | | |
| ^b 1,500,000+ | 25 | 14.37 | (9.16,19.58) | 1681 | 26.66 | (25.57,27.75) |
| 500,000–1,499,999 | 21 | 12.07 | (7.23,16.91) | 842 | 13.35 | (12.51,14.19) |
| 100,000–499,999 | 54 | 31.03 | (24.16,37.9) | 1917 | 30.4 | (29.26,31.54) |
| 10,000–99,999 | 27 | 15.52 | (10.14,20.9) | 802 | 12.72 | (11.9,13.54) |
| ^b <10,000 | 47 | 27.01 | (20.41,33.61) | 1063 | 16.86 | (15.94,17.78) |
| Neighborhood income quintile | (n = 6 missing) | | | (n = 41 missing) | | |
| 5 (highest) | 30 | 17.24 | (11.61,22.87) | 1176 | 18.65 | (17.69,19.61) |
| 4 | 37 | 21.26 | (15.16,27.36) | 1204 | 19.1 | (18.13,20.07) |
| 3 | 24 | 13.79 | (8.65,18.93) | 1214 | 19.25 | (18.27,20.23) |
| 2 | 40 | 22.99 | (16.72,29.26) | 1357 | 21.52 | (20.5,22.54) |
| 1 | 42 | 24.14 | (17.76,30.52) | 1313 | 20.82 | (19.81,21.83) |
| Mental disorder | | | | | | |
| Depressive | 21 | 11.73 | (7.02,16.44) | 1039 | 16.48 | (15.56,17.4) |
| Adjustment | 18 | 10.06 | (5.65,14.47) | 499 | 7.91 | (7.24,8.58) |
| ^b Conduct or oppositional defiant | 11 | 6.15 | (2.63,9.67) | 117 | 1.86 | (1.53,2.19) |
| ^a Schizophrenia or psychotic | <6 | – | – | 15 | 0.24 | – |
| Alcohol or substance use | 6 | 3.35 | (0.71,5.99) | 257 | 4.08 | (3.59,4.57) |
| Other mental disorders, | 22 | 12.29 | (7.48,17.1) | 690 | 10.94 | (10.17,11.71) |
| ^b Possible mental disorder | 83 | 46.37 | (39.06,53.68) | 1946 | 30.86 | (29.72,32.0) |
| ^{b,a} Unknown | 18 | 10.06 | (5.65,14.47) | 1742 | 27.63 | (26.53,28.73) |
| Nature of first ED SRB presentation | | | | | | |
| Method | | | | | | |
| ^b Poisoning only | 67 | 37.43 | (30.34,44.52) | 1335 | 21.17 | (20.16,22.18) |
| ^b Cut/pierce only | 83 | 46.37 | (39.06,53.68) | 4444 | 70.48 | (69.35,71.61) |
| Cut/pierce & poisoning | 0 | – | – | 60 | 0.95 | (0.71,1.19) |
| ^b Other only or multiple | 29 | 16.20 | (10.8,21.6) | 466 | 7.39 | (6.74,8.04) |
| Acuity | | | | | | |
| ^b 1 & 2: resuscitation or emergent | 46 | 25.7 | (19.3,32.1) | 2665 | 25.70 | (41.08,43.51) |
| 3: urgent | 86 | 48.04 | (40.72,55.36) | 2737 | 43.44 | (42.21,44.66) |
| 4: semi-urgent | 40 | 22.35 | (16.25,28.45) | 791 | 12.55 | (11.74,13.37) |
| 5: non-urgent | 7 | 3.91 | (1.07,6.75) | 108 | 1.71 | (1.39,2.03) |

^a Among Crown wards, Schizophrenia or other psychotic disorders are included in Unknown to preserve privacy.

^b 95% Confidence Intervals do not overlap.

(ii), the level of missing information was much less in Crown wards (Table 2). In the multivariable analysis a total of $n = 51$ individuals with such missing data were excluded from the analyses at the outset.

Mental disorder (yes or no) was assessed at the time of the (i) first or (ii) 2nd ED SRB presentation extending back to two years beforehand within linked health care records as follows:

- o *ED mental health*: For each individual, all NACRS records were searched and flagged for the presence of one or more ICD-10-CA mental diagnoses at each ED presentation. As most had only one such diagnosis, the first was selected. For individuals transferred from one ED to another, diagnostic information was selected from the first ED contacted
- o *Inpatient mental health*: Diagnostic information (as above) was retrieved from the most responsible diagnostic field in the Canadian Institutes for Health Information Discharge Abstract Database (DAD). Also, identified were $n = 178$ (2.7%) individuals admitted to adult psychiatric beds captured separately in the Ontario Mental Health Reporting System (OMHRS).
- o *Outpatient mental health*: contact(s) were identified if one or more Ontario Health Insurance Plan (OHIP) records identified the physician as a psychiatrist and/or listed a mental health problem or procedure (Rhodes, Bethell, & Schultz, 2006; Rhodes et al., 2012; Steele, Glazier, Lin, & Evans, 2004).

Using the above variables, mutually exclusive categories were then created for analysis:

- o *Type of mental disorder*: the most recent diagnostic information available from either an ED Mental Health or Inpatient Mental Health DAD record was categorized into broad DSM-IV-TR groups (see Appendix for ICD diagnostic codes included).

Table 2

Factors associated with a repeat emergency department (ED) presentation for suicide-related behavior (SRB) among those with a first ED presentation for SRB.

| Risk of ED SRB repeat (1st & 2nd) | Unadjusted estimates (stratified by repetition) | | Adjusted estimates final model (stratified by repetition) | |
|---|--|-----------|--|-----------|
| | RR | 95% CI | RR | 95% CI |
| Crown ward versus peer | 2.34 | 1.87;2.94 | 2.00 | 1.59;2.53 |
| Sex (F vs. M) | 1.29 | 1.14;1.45 | 1.29 | 1.14;1.45 |
| Age | | | | |
| 12–13 (reference) | 1.0 | 1.0 | 1.0 | 1.0 |
| 14–15 | 0.75 | 0.62;0.90 | 0.77 | 0.63;0.93 |
| 16–18 | 0.65 | 0.54;0.78 | 0.70 | 0.58;0.84 |
| Income quintile | | | | |
| 1 (lowest) | 0.89 | 0.77;1.04 | 0.88 | 0.76;1.02 |
| 2 | 0.79 | 0.68;0.92 | 0.79 | 0.68;0.92 |
| 3 | 0.87 | 0.75;1.02 | 0.87 | 0.75;1.02 |
| 4 | 0.84 | 0.72;0.98 | 0.83 | 0.71;0.97 |
| 5 (highest) reference | 1.00 | 1.00 | 1.00 | 1.00 |
| Community size | | | | |
| 500,000–1,500,000+ | 0.96 | 0.85;1.08 | 1.00 | 0.88;1.12 |
| 100,000–499,999 (reference) | 1.00 | 1.00 | 1.00 | 1.00 |
| <10,000–99,999 | 1.09 | 0.96;1.24 | 1.16 | 1.02;1.31 |
| Mental disorder | | | | |
| Depressive | 1.73 | 1.48;2.03 | 1.72 | 1.46;2.01 |
| Adjustment | 1.31 | 1.06;1.62 | 1.26 | 1.02;1.56 |
| Conduct or oppositional defiant | 2.29 | 1.72;3.04 | 2.03 | 1.52;2.70 |
| Schizophrenia or psychotic | 2.43 | 1.20;4.91 | 2.33 | 1.15;4.76 |
| Alcohol or substance use | 1.26 | 0.95;1.67 | 1.24 | 0.93;1.65 |
| Other mental disorder | 1.66 | 1.39;1.98 | 1.59 | 1.33;1.90 |
| Possible mental disorder | 1.46 | 1.27;1.67 | 1.59 | 1.33;1.90 |
| Unknown (reference) | 1.00 | 1.00 | 1.00 | 1.00 |
| Method | | | | |
| Poisoning only | 0.69 | 0.61;0.77 | 0.75 | 0.66;0.84 |
| Cut/pierce only (reference) | 1.00 | 1.00 | 1.00 | 1.0 |
| Other or multiple | 0.81 | 0.67;0.97 | 0.87 | 0.72;1.06 |
| Acuity | | | | |
| 1 & 2: resuscitation or emergent | 0.88 | 0.80;0.98 | 1.02 | 0.91;1.14 |
| 3, 4 & 5: urgent, semi-urgent or non-urgent (reference) | 1.00 | 1.00 | 1.00 | 1.00 |

Previous chart abstraction studies indicate diagnostic fields in NACRS and the DAD are quite reliable (Canadian Institute for Health Information, 2008; Juurlink et al., 2006).

- o *Possible mental disorder*: included those with Outpatient Mental Health contact(s) or those with an OMHRS inpatient stay, where type of mental disorder information (above) was not available.
- o *Unknown*: for all others.

Nature of ED SRB Presentation(s): The following variables were measured at the start of (i) and (ii) as noted.

Method was initially defined according to ICD-10-CA codes (in any NACRS diagnostic field) as poisoning only (X60–69); cut/pierce only (X78) or other only (X70–77; X79–84) or multiple: more than one of these methods (Hawton & Harriss, 2008b).

Acuity was defined according to the Canadian Triage and Acuity Scale (CTAS) as high: (1: resuscitation or 2: emergent) compared to lower scores: (3: urgent; 4: semi-urgent; or 5: non-urgent) (Beveridge et al., 1999; Murray, Bullard, & Grafstein, 2004; Warren, Jarvis, LeBlanc, & Gravel, 2008).

Data analysis

Frequencies and proportions (with 95% confidence intervals) were used to compare Crown wards with their peers on all study variables. Kaplan Meier (KM) estimates and curves and log rank tests were used to compare survival probabilities for Crown wards and peers in 2 risk sets or stratum (i) time to the first repetition in the full cohort and (ii) time to the second repetition among those with a first repetition (Hosmer & Lemeshow, 1999a). To identify factors associated with repetition we fit recurrent event survival analysis models (Hosmer & Lemeshow, 1999b; Kleinbaum & Klein, 2012). Specifically, we used stratified Cox regression modeling (where a stratum variable was used to track repetition level, i.e., 0, 1 or 2⁺) with time to repetition conditional on the prior ED SRB presentation in risk sets noted where time is set to zero at the start of (i) and (ii). A stratified model allows for the form of the underlying hazard function (time to repetition) to vary across the levels of repetition, such that only 1 effect estimate (adjusted for this variation) is fit for each study variable. First, we tested and found that together, all study variables, (i.e., adjusted for each other in each stratum), met the proportional hazards

assumption (Kleinbaum & Klein, 2012). Next, to determine whether an association between a study variable and repetition differed according to the first or second repetition, a non-interaction model was fit and compared to an interaction model, including stratum (repetition) by covariate interaction terms (using a likelihood ratio test) (Kleinbaum & Klein, 2012). As these two stratified models did not differ significantly from one another, we present unadjusted and adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) including all study variables for the stratified non-interaction model.

Results

Characteristics of study subjects

The proportions of Crown wards and peers at their first ED SRB presentation are shown (along with 95% CIs) for each of the study variables (Table 1). Based on non-overlapping 95% CIs Crown wards were more likely than peers to live in a small community, be diagnosed with a conduct or oppositional disorder and present with a SRB method other than cut/pierce injuries. However, Crown wards were less likely than peers to have high acuity presentations (level 1 or 2).

Repeat ED SRB presentations

Fig. 1 shows the time to first repetition by Crown ward status. As can be seen from the graph, the repetition free probability drops more quickly for Crown wards than their peers and the difference is statistically significant according to the Log rank test. The table underneath the graph provides some estimates comparing the two curves. For example, among Crown wards 25% had their first repetition within 401 days and 50% within 1689 days (4.6 years). Ten percent of peers repeated within a year. At 365 days, 76.2% of Crown wards were still at risk for a first repetition compared to almost 90% of peers. By 730 days, the estimates were 67.6% and 86.5% respectively. (The 95% CIs around these conditional probabilities between Crown wards and peers do not overlap at 365 or 730 days.)

Fig. 2 shows the same graph and table for those at risk for a second repetition (i.e., conditional on having had a first repetition). Again, Crown wards had a (2nd) repetition sooner than their peers. Among those with a first repetition 25% of Crown wards had a second repetition within 5 months (i.e., 140 days) and 25% of peers within about 1.5 years (536 days). At 365 days, 61.7% of Crown wards were at risk for a second repetition compared to 78.8% of peers. At 730 days, the estimates were 58.3% and 72.2% respectively. (The 95% CIs around these conditional probabilities do not overlap at 365 days.)

Associations with repeat ED SRB presentation(s)

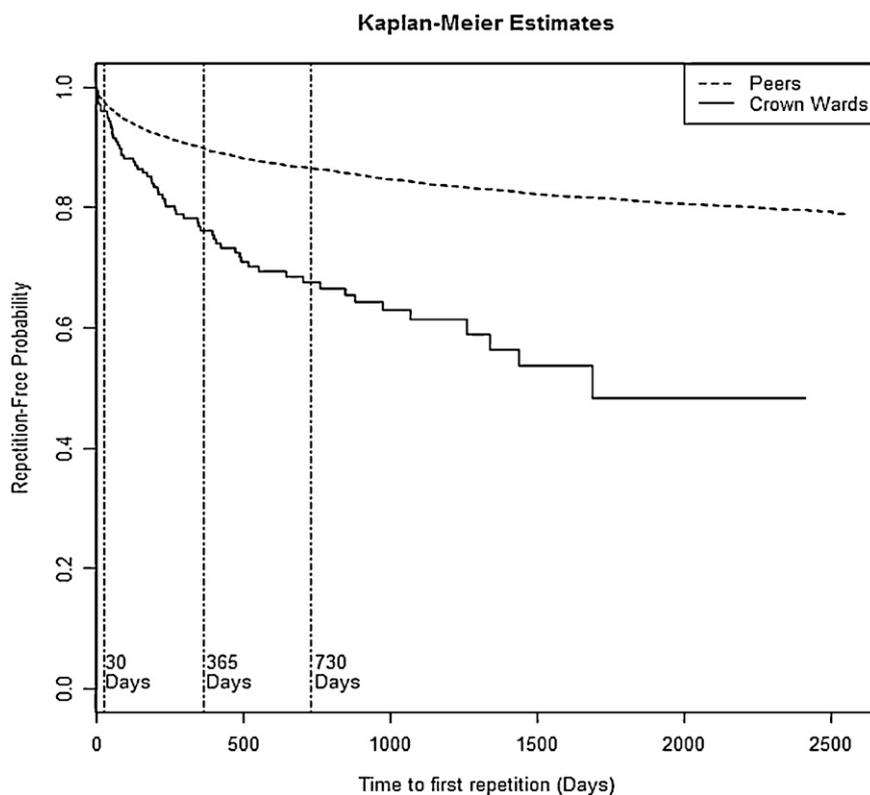
Table 2 shows the unadjusted (bivariate) and adjusted HRs for 1 or more repetitions using Cox regression stratified by repetition level. Crown wards were about 2 times more likely to have 1 or more repetitions than peers during follow-up and this effect remained in the adjusted model [adjusted HR: 2.0; (95% CI: 1.59; 2.53)]. In the adjusted estimates, female sex and residing in an areas with a smaller population size (<10,000–99,000) were positively associated with repetition as were all measures of mental disorder, except having an alcohol or substance use related disorder. Factors negatively associated with repetition were: self-poisoning (vs. cut/pierce injuries) and higher acuity presentations. Neighborhood income quintile did not contribute significantly to the model; however, when it was removed, the magnitude of the HR for Crown wards (vs. peers) dropped by about 15%. Thus, it was retained as a potential confounder of this association.

Discussion

This study is unique as it examined factors associated with ED SRB repetition among children/youth with a first ED SRB presentation in a large, population-based sample covered by universal medical insurance. Our hypothesis that Crown wards would be at greater risk for repetition than their peers (~2 times) was supported after adjustments for social, demographic, and clinical factors (conditional on prior ED SRB presentations). While a number of these factors were independently associated with repetition (discussed below), no one factor, (including Crown ward status), stood out as predictive of a first and second repetition. Before discussing the implications for secondary preventive initiatives, we consider the study's limitations and compare our findings with others.

Limitations

Our outcome measure of ED SRB repetition is limited by the ICD coding system which does not (yet) identify suicidal intent but rather 'self-inflicted' poisonings or injuries. The need to refine these codes is well recognized (McKenzie et al., 2011). Further, diagnostic risk factor information (collected from ED and/or inpatient records) is based on clinical judgment not validated through expert review or standardized, structured interviews. Small cell sizes (privacy) prevented our reporting on every type of mental disorder and we were unable to examine mental disorder (or type) in those treated on an outpatient basis or untreated. The main advantages of the ED/inpatient diagnostic information is its reliability and real world nature, encompassing some 170 hospitals in Ontario. Thus, if a specific diagnostic group stood out as more vulnerable to repetition this is practical information hospitals can investigate further (e.g., for quality improvement efforts at local/regional levels).



| | Crown wards (n=179) | Peers (n=6305) |
|--|---|---|
| Repetition free probability after 1st ED SRB | | |
| First decile (time in days) | 74 | 362 |
| First quartile (time in days) | 401 | NA |
| Median (time in days) | 1,689 | NA |
| Conditional probability of no repetition at: | P (95% CI) | P (95% CI) |
| 30 days | 0.961 (0.933, 0.990) | 0.975 (0.971, 0.979) |
| 365 days | 0.762 (0.699, 0.829) | 0.899 (0.892, 0.907) |
| 730 days | 0.676 (0.604, 0.755) | 0.865 (0.857, 0.874) |
| Timing of 1st repetition | N=60 with 1 st repetition | N=1166 with 1 st repetition |
| Range | (0, 4.6 years) | (0, 6.9 years) |

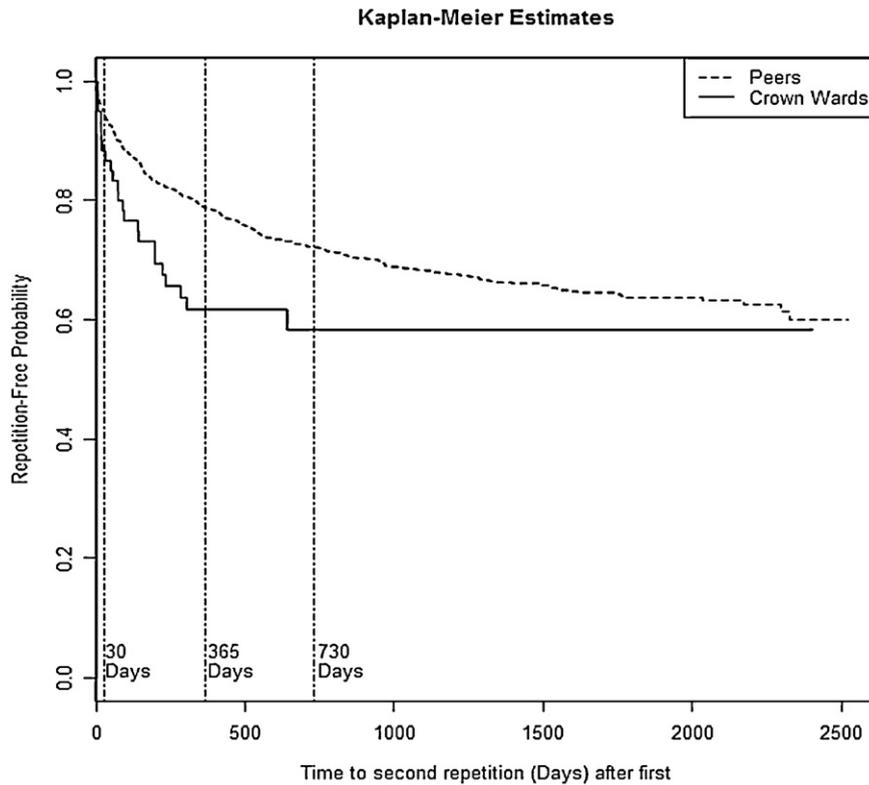
*Log-rank test difference between Crown wards and peers (p<0.0001) NA: Not applicable

Fig. 1. Survival curve for the time to the first repetition by Crown ward status among those with a first emergency department (ED) suicide-related behavior (SRB) presentation.

With respect to the child welfare population, Crown wards seem to be a subset with more serious maltreatment (Rhodes et al., 2012). Accordingly, our findings need to be replicated in the broader child welfare population and in other jurisdictions. Hospital records suggestive of child maltreatment could also be investigated (Schnitzer, Slusher, Kruse, & Tarleton, 2011). While the Crown ward registry used in this study is unique in its province-wide coverage over time, it lacks more comprehensive information; for example, on the nature of maltreatment, family background and ethnicity (Rhodes et al., 2012), or potential resilience promoting mechanisms. Working with these data provides an opportunity to directly influence those who collect and use these data to inform future investigations.

Comparison with other studies

Previous studies have shown that about a quarter of children/youth with ED SRB presentations will repeat within the following year (Hulten et al., 2001; Stewart et al., 2001; Vajda & Steinbeck, 2000). Our estimates (in peers) are more conservative, that is, among those with a first ED SRB, only about 10% of peers repeated within a year and among those with a repetition, about 25% would have another in about 1.5 years.



| | Crown wards (n=60) | Peers (n=1166) |
|---|-------------------------|-------------------------|
| Repetition free probability after 1st repetition | | |
| First quartile (time in days) | 140 | 536 |
| Median (time in days) | NA | NA |
| Conditional probability of no repetition after 1st repetition at: | P (95% CI) | P (95% CI) |
| 30 days | 0.883 (0.806, 0.968) | 0.945 (0.932, 0.958) |
| 365 days | 0.617 (0.503, 0.758) | 0.788 (0.765, 0.812) |
| 730 days | 0.583 (0.461, 0.737) | 0.722 (0.696, 0.749) |
| Timing of 2nd repetition after 1st repetition | | |
| Range | (0, 1.8 years) | (0, 6.4 years) |
| *Log-rank test difference between Crown wards and peers (p = 0.0187) NA: Not applicable | | |

Fig. 2. Survival curve for the time to the second repetition by Crown ward status among those with a first repetition.

In a prior study, we demonstrated that Crown wards were about 5 times more likely to have a first ED SRB presentation than their peers (Rhodes et al., 2012). In this study of repetition, our findings are consistent with Stewart et al. (2001), that is, Crown wards were about twice as likely to return to the ED for SRB, (after adjustments). Together, these studies imply that while the overall risk of an ED SRB presentation is higher in Crown wards than peers (likely due to their exposure to adverse experiences, e.g., maltreatment), the difference is strongest at the first such presentation. This may suggest that the risk for an ED SRB presentation increases substantially in the subset of peers with a first ED SRB presentation, relative to Crown wards. Further, although death was not an outcome in this study, the proportion censored for deaths in the analysis was higher in peers than in Crown wards. Among those at risk for repetition, Crown wards may benefit from added supports/services arranged by the CAS in contrast to their peers. Others have found that among the problems preceding an ED SRB presentation in those under age 15, more than three-quarters were having difficulties with family relationships (Hawton & Harriss, 2008b).

With respect to demographic factors associated with repetition, unlike others (Hawton & Harriss, 2008b; Hulten et al., 2001; Reith, Whyte, & Carter, 2003; Reith, Whyte, Carter, & McPherson, 2003; Stewart et al., 2001; Vajda & Steinbeck, 2000)

we found sex differences; in particular, girls were more likely to repeat than boys. Further, our study indicated that repetition occurred more frequently in younger (aged 12–13) than older (aged 14–18) children/youth. While speculative, it is possible that legal guardians, (i.e., parents of peers or the CAS for Crown wards), were better able to direct girls and those younger into care than boys and those older, who may pose a physical threat and/or legally opt out of treatment. Smaller community size (<10,000–99,000) persons was also positively associated with repetition which may reflect lack of access to outpatient mental health care (Ryan, Riley, Kang, & Starfield, 2001) and/or differences in the underlying risk in these populations on factors, such as ethnicity, related to higher suicide rates in rural children/youth (DesMeules et al., 2006).

Like others, we found that those who saw a mental health professional (Stewart et al., 2001) and received a mental disorder diagnosis (Reith, Whyte, & Carter, 2003; Reith, Whyte, Carter, & McPherson, 2003; Vajda & Steinbeck, 2000) were more likely to repeat. However, we did not find that non-affective psychoses or alcohol or substance use disorders were more strongly associated with repetition than other mental disorders (Reith, Whyte, & Carter, 2003; Reith, Whyte, Carter, & McPherson, 2003; Vajda & Steinbeck, 2000). In fact, alcohol and substance use disorders were not associated with repetition in our sample. Our findings may have diverged for several reasons. For example, there were too few children and youth diagnosed with schizophrenia or other psychotic disorders at their first ED SRB presentation to study their association with repetition (Table 1). Further, differences in the sample characteristics and ascertainment of mental disorders may be a contributing factor. One study examined repetition to a single, inner city tertiary hospital (Vajda & Steinbeck, 2000) and another restricted their study sample to self-poisonings and included accidental and undetermined self-poisoning (rather than just self-inflicted self-poisonings) (Reith, Whyte, & Carter, 2003; Reith, Whyte, Carter, & McPherson, 2003). Our estimates of alcohol and substance use disorders are much lower than observed in these studies (i.e., ~4% vs. 14–35%) (Reith, Whyte, & Carter, 2003; Reith, Whyte, Carter, & McPherson, 2003; Vajda & Steinbeck, 2000) but closer in magnitude to estimates of misuse or recent use among ED SRB presentations in those under age 15 (Hawton & Harriss, 2008b). Of note, Stewart et al. (2001) found that intoxication at the initial presentation was negatively associated with repetition. They suggested that for these children/youth, their initial experience may have been subjectively negative as ED staff may not have taken their suicidal risk seriously.

Implications

In this study, we sought to better understand ED SRB repetition over time in the pediatric population to contribute to secondary prevention initiatives. Below we offer some insights drawing from this study and the broader literature on SRB in children/youth.

First, like others (Olfson, Gameroff, Marcus, Greenberg, & Shaffer, 2005; Vajda & Steinbeck, 2000), we found children/youth who present to the ED with SRB have a high prevalence of mental illness (Table 1). As no one mental illness stood out as predictive of a first or second repetition, given their greater frequency [in this and another such population-based study (Olfson et al., 2005)], it may be tempting to target depressive disorders. However, this approach may be insufficient. It has been argued that in order to reduce suicidal behavior, family difficulties and non-suicidal self-injury also need to be acted on (Brent, 2011; Wilkinson, Kelvin, Roberts, Dubicka, & Goodyear, 2011). We would note that Crown wards did differ somewhat from their peers diagnostically. Further, despite outpatient mental health referrals, adherence has been found more problematic for them than their peers (Stewart et al., 2001). Others have found that among children/youth admitted to an inpatient psychiatric setting, those in foster care were more likely to exhibit externalizing disorders than those not in foster care (Persi & Sisson, 2008). Thus, non-selective approaches, that is, offered to all children/youth who first present to the ED with SRB (Owens, Horrocks, & House, 2002), sensitive to family difficulties (Hawton & Harriss, 2008b) and possible child maltreatment (Rhodes et al., 2012) are merited. Herein, study/treatment teams can work more closely with social workers, child welfare agencies and/or child maltreatment teams.

Second, there is a need to better contextualize repetition (Owens & Kapur, 2011) as it is an indicator of suicide risk, particularly in females (Zahl & Hawton, 2004). Factors positively associated with repetition (i.e., younger age, female, first presentation of lower acuity, small community size), may indicate an inability to access outpatient care when needed. Further, their needs may not be met when they present to the ED for SRB. Some may benefit from additional supports/services that include family members (Rotheram-Borus, Piacentini, Cantwell, Belin, & Song, 2000). In a similar vein, it is important to consider the context for those less likely to repeat (i.e., those older; boys; first presentation of higher acuity). Their lack of repetition does not necessarily mean that their needs have been met and their circumstances improved. A concern is some may not be engaged in after care despite their high risk for suicide.

Third, future prevention studies can (passively) follow those at risk for SRB (and their outcomes) by conducting linkages with ongoing population-based data registries. In such a study, all ED SRB events could be captured over time (longer than typical in an intervention study), extending knowledge on how an intervention influences such (rare) SRB events. Population-based registries could also be used to learn more about those who would not consent to participate in an intervention study [e.g., those presenting for the first time (Hatcher et al., 2011)] but would consent to (passive) record linkage. Where population-based registries do not exist, linkages could be undertaken within (smaller) higher risk populations and viewed favorably by such populations and data custodians within the framework of testing an intervention.

Appendix.

| DSM-IV-TR diagnoses | ICD-10-CA codes |
|---|---|
| Schizophrenia or psychotic disorders | F20, F22–F25, F28, F29, F53.1, F21 |
| Alcohol or substance related disorders | F10, F11–F19, F55 |
| Depressive disorders | F32, F33, F53.0 |
| Adjustment disorder | F43.2, F43.8, F43.9 |
| Conduct disorder or oppositional defiant disorder | F91.0, F91.1, F91.2, F91.8, F91.9, F92, F91.3 |
| Other mental disorders | |
| Bipolar disorder | F30, F31 |
| Mood disorders – other | F34, F38, F39 |
| Dementia | F00–F03 |
| Amnesic disorder | F04 |
| Delirium | F05 |
| Disorders secondary to general medical condition | F06, F07, F09, F80.3 |
| Anxiety disorders | F40, F41, F42, F43.0, F43.1 |
| Dissociative disorders | F44.0, F44.1, F44.2, F44.3, F48.1 |
| Somatoform and factitious disorders | F45, F48.0, F48.8, F48.9, F59, F68.0, F68.1 |
| Eating disorders | F50 |
| Sleep disorders | F51 |
| Sexual and gender identity disorders | F52, F64–F66 |
| Personality disorders | F60–F62, F21, F68.8, F69 |
| Impulse disorders | F63 |
| Mental retardation | F70–F73, F78, F79 |
| Communication disorder | F80.0, F80.1, F80.2, F80.8, F80.9, F98.5, F98.6 |
| Learning disorders | F81, F83 |
| Motor coordination disorders | F82 |
| Developmental disorders | F84, F88, F89 |
| Attention-deficit/hyperactivity disorder | F90 |
| Tic disorders | F95 |
| Elimination disorders | F98.0, F98.1 |
| Feeding and eating disorders of infancy and early childhood | F98.2, F98.3 |
| Other disorders of infancy, childhood, or adolescence | F93, F94, F98.9, F99 |

References

- Afifi, T., & MacMillan, H. (2011). Resilience following child maltreatment: A review of protective factors. *Canadian Journal of Psychiatry*, 56(5), 266–272.
- Bennewith, O., Stocks, N., Gunnell, D., Peters, T. J., Evans, M. O., & Sharp, D. J. (2002). General practice based intervention to prevent repeat episodes of deliberate self-harm: Cluster randomised controlled trial. *British Medical Journal*, 324(7348), 1254–1257.
- Bergen, H., Hawton, K., Waters, K., Cooper, J., & Kapur, N. (2010). Psychosocial assessment and repetition of self-harm: The significance of single and multiple repeat episode analyses. *Journal of Affective Disorders*, 127, 257–265.
- Bethell, J., & Rhodes, A. (2009). Identifying deliberate self-harm in emergency department data. *Health Reports*, 20(2), 1–9.
- Beveridge, R., Clarke, B., Janes, L., Savage, N., Thompson, J., & Dodd, G. (1999). Canadian Emergency Department Triage and Acuity Scale: Implementation guidelines. *Canadian Journal of Emergency Medicine*, 1(3S), S2–S28.
- Brent, D. (2011). Nonsuicidal self-injury as a predictor of suicidal behavior in depressed adolescents. *American Journal of Psychiatry*, 168(5), 452–454.
- Canadian Institute for Health Information. (2008). *CIHI data quality study of Ontario emergency department visits for 2004–2005: Volume II of IV – Main study findings*. Ottawa.
- Carter, G. L., Clover, K., Whyte, I. M., Dawson, A. H., & D'Este, C. (2007). Postcards from the EDge: 24-month outcomes of a randomised controlled trial for hospital-treated self-poisoning. *British Journal of Psychiatry*, 191, 548–553.
- Child and Family Services Act, R.S.O. (1990). Child and Family Services Act, R.S.O. <http://www.e-laws.gov.on.ca/html/statutes/english/elaws.statutes.90c11.e.htm>
- Colman, I., Yiannakoulis, N., Schopflocher, D., Svenson, L., Rosychuk, R., & Rowe, B. (2004). Population-based study of medically treated self-inflicted injuries. *Canadian Journal of Emergency Medicine*, 6(5), 313–320.
- Corcoran, P., Keeley, H., O'Sullivan, M., & Perry, I. (2004). The incidence and repetition of attempted suicide in Ireland. *European Journal of Public Health*, 14, 19–23.
- DesMeules, M., Pong, R., Lagacé, C., Hen, D., Manuel, D., Pitbaldo, R., Bollman, R., Guernsey, J., Kazanjian, A., & Koren, I. (2006). *How healthy are rural Canadians? An assessment of their health status and health determinants*. Ottawa, Ontario: Canadian Institute for Health Information.
- Hatcher, S., Sharon, C., Parag, V., & Collins, N. (2011). Problem-solving therapy for people who present to hospital with self-harm: Zelen randomised controlled trial. *British Journal of Psychiatry*, 199(4), 310–316.
- Hawton, K., & Harriss, L. (2008). How often does deliberate self-harm occur relative to each suicide? A study of variations by gender and age. *Suicide and Life-Threatening Behavior*, 38(6), 650–660.
- Hawton, K., & Harriss, L. (2007). Deliberate self-harm in young people: Characteristics and subsequent mortality in a 20-year cohort of patients presenting to hospital. *Journal of Clinical Psychiatry*, 68(10), 1574–1583.
- Hawton, K., & Harriss, L. (2008). Deliberate self-harm by under-15-year-olds: Characteristics, trends and outcome. *Journal of Child Psychology and Psychiatry*, 49(4), 441–448.
- Herrman, H., Stewart, D., Diaz-Granados, N., Berger, E., Jackson, B., & Yuen, T. (2011). What is resilience? *Canadian Journal of Psychiatry*, 56(5), 258–265.
- Hosmer, D., Jr., & Lemeshow, S. (1999a). Descriptive methods for survival data. In John Wiley & Sons (Ed.), *Applied survival analyses* (pp. 27–86). New York.
- Hosmer, D., Jr., & Lemeshow, S. (1999b). Other models and topics. In John Wiley & Sons (Ed.), *Applied survival analyses* (pp. 307–353). New York.
- Hulten, A., Jiang, G. X., Wasserman, D., Hawton, K., Hjelmeland, H., De Leo, D., Ostamo, A., Salander-Renberg, E., & Schmidtke, A. (2001). Repetition of attempted suicide among teenagers in Europe: Frequency, timing and risk factors. *European Child and Adolescent Psychiatry*, 10(3), 161–169.
- Iron, K., Zagorski, B., Sykora, K., & Manuel, D. (2008). Living and dying in Ontario: An opportunity for improved health information. ICES investigative report. http://www.ices.on.ca/file/Living_and_dying_in_Ontario_March19-08.pdf
- Juurlink, D., Preyra, C., Croxford, R., Chong, A., Austin, P., Tu, J., Laupacis, A. (2006). Canadian institute for health information discharge abstract database: A validation study. http://www.ices.on.ca/file/cihi_dad_reabstractors_study.pdf

- Kleinbaum, D., & Klein, M. (2012). Recurrent event survival analysis. In M. Gail, K. Krickberg, J. M. Samet, A. Tsiatis, & W. Wong (Eds.), *Survival analysis. A self-learning text* (3rd ed., pp. 363–423). New York: Springer.
- McKenzie, K., Fingerhut, L., Walker, S., Harrison, A., & Harrison, J. E. (2011). Classifying external causes of injury: History, current approaches and future directions. *Epidemiological Reviews*, 34, 4–16.
- Murray, M., Bullard, M., & Grafstein, E. (2004). Revisions to the Canadian Emergency Department Triage and Acuity Scale implementation guidelines. *Canadian Journal of Emergency Medicine*, 6(6), 421–427.
- Newton, A., Hamm, M., Bethell, J., Rhodes, A. E., Bryan, C., Tjosvold, L., Ali, S., Logue, E., & Manion, I. (2010). Pediatric suicide-related presentations: A systematic review of mental health care in the emergency department. *Annals of Emergency Medicine*, 56(6), 649–659.
- Olfson, M., Gameroff, M. J., Marcus, S. C., Greenberg, T., & Shaffer, D. (2005). Emergency treatment of young people following deliberate self-harm. *Archives of General Psychiatry*, 62(10), 1122–1128.
- Ontario Association of Children's Aid Societies. (2011). Your children's aid. Child welfare report 2009/10. <http://www.oacas.org/pubs/oacas/papers/oacaschildwelfarereport2010.pdf>
- Owens, C., & Kapur, N. (2011). Interventions for self-harm: Are we measuring outcomes in the most appropriate way? *British Journal of Psychiatry*, 197, 502–503.
- Owens, D., Horrocks, J., & House, A. (2002). Fatal and non-fatal repetition of self-harm. Systematic review. *British Journal of Psychiatry*, 181, 193–199.
- Persi, J., & Sisson, M. (2008). Children in foster care: Before, during and after psychiatric hospitalization. *Child Welfare*, 87(4), 79–99.
- Reith, D. M., Whyte, I., & Carter, G. (2003). Repetition risk for adolescent self-poisoning: A multiple event survival analysis. *Australian and New Zealand Journal of Psychiatry*, 37(2), 212–218.
- Reith, D. M., Whyte, I., Carter, G., & McPherson, M. (2003). Adolescent self-poisoning: A cohort study of subsequent suicide and premature deaths. *Crisis – The Journal of Crisis Intervention and Suicide Prevention*, 24(2), 79–84.
- Rhodes, A., Bethell, J., & Schultz, S. (2006). Primary mental health care. Chapter 9. Primary Health Care in Ontario: A practice atlas. <http://www.ices.on.ca/file/PC.atlas.chapter9.pdf>
- Rhodes, A., Boyle, M., Bethell, J., Wekerle, C., Goodman, D., Tonmyr, L., Leslie, B., Lam, K., & Manion, I. (2012). Child maltreatment and onset of emergency department presentations for suicide-related behaviors. *Child Abuse & Neglect*, 36, 542–551.
- Robinson, J., Hetrick, S., & Martin, C. (2011). Preventing suicide in young people: Systematic review. *Australian and New Zealand Journal of Psychiatry*, 45(3), 3–26.
- Rotheram-Borus, M. J., Piacentini, J., Cantwell, C., Belin, T. R., & Song, J. (2000). The 18-month impact of an emergency room intervention for adolescent female suicide attempters. *Journal of Consulting and Clinical Psychology*, 68(6), 1081–1093.
- Ryan, S., Riley, A., Kang, M., & Starfield, B. (2001). The effects of regular source of care and health need on medical care use among rural adolescents. *Archives of Pediatric and Adolescent Medicine*, 155(2), 184–190.
- Schnitzer, P., Slusher, P., Kruse, R., & Tarleton, M. (2011). Identification of ICD codes suggestive of child maltreatment. *Child Abuse & Neglect*, 35, 3–17.
- Silverman, M., Berman, A., Sanddal, N., O'Carroll, P. W., & Joiner, T. E. (2007). Rebuilding the Tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors. Part 2: Suicide-related ideations, communications and behaviors. *Suicide and Life-Threatening Behavior*, 37(3), 264–277.
- Silverman, M., Berman, A., Sanddal, N., O'Carroll, P., & Joiner, T. (2007). Rebuilding the Tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors. Part I: Background, rationale and methodology. *Suicide and Life-Threatening Behavior*, 37(3), 248–263.
- Statistics Canada. (2011). Geographic units: Dissemination area (DA). http://geodepot.statcan.ca/2006/Reference/COGG/LongDescription_e.jsp?GEO.LEVEL=35&REFCODE=10&TYPE=L
- Steele, L., Glazier, R., Lin, E., & Evans, M. (2004). Using administrative data to measure ambulatory mental health service provision in primary care. *Medical Care*, 42, 960–965.
- Stewart, S. E., Manion, I. G., Davidson, S., & Cloutier, P. (2001). Suicidal children and adolescents with first emergency room presentations: Predictors of six-month outcome. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40(5), 580–587.
- The Ontario Ministry of Children and Youth Services. (2011). Reporting child abuse and neglect. <http://www.children.gov.on.ca/htdocs/English/topics/childrepsaid/reportingabuse/index.aspx>
- Vajda, J., & Steinbeck, K. (2000). Factors associated with repeat suicide attempts among adolescents. *Australian and New Zealand Journal of Psychiatry*, 34(3), 437–445.
- Warren, D., Jarvis, A., LeBlanc, L., & Gravel, J. (2008). Revisions to the Canadian Triage and Acuity Scale pediatric guidelines (PaedCTAS). *Canadian Journal of Emergency Medicine*, 10(3), 224–232.
- Wekerle, C., Waechter, R., & Chung, R. (2012). Contexts of vulnerability and resilience: Childhood maltreatment, cognitive functioning and close relationships. In M. Ungar (Ed.), *The social ecology of resilience: A handbook of theory and practice* (pp. 187–198). New York: Springer.
- Wilkins, R. (2009). PCCF+Version 5E user's guide (Geocodes/PCCF) automated geographic coding based on the Statistics Canada Postal Code Conversion Files.
- Wilkinson, P., Kelvin, R., Roberts, C., Dubicka, B., & Goodyear, I. (2011). Clinical and psychosocial predictors of suicide attempts and nonsuicidal self-injury in the adolescent depression antidepressants and psychotherapy trial (ADAPT). *American Journal of Psychiatry*, 168(5), 495–501.
- Ystgaard, M., Arensman, E., Hawton, K., Madge, N., van Heeringen, K., Hewitt, A., de Wilde, E. J., De Leo, D., & Fekete, S. (2009). Deliberate self-harm in adolescents: Comparison between those who receive help and those who do not. *Journal of Adolescence*, 32, 875–891.
- Zahl, D. L., & Hawton, K. (2004). Repetition of deliberate self-harm and subsequent suicide risk: Long-term follow-up study of 11,583 patients. *British Journal of Psychiatry*, 185, 70–75.