Preventing Prison Suicide With Life-Trajectory-Based Screening

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We describe the application of a life-trajectory model of suicide to the prison setting and its implication for suicide risk detection. A model has been developed that describes two distinct trajectories culminating in suicide: one with large amounts of adversity early in life with a young age of suicide and another with chronic, gradually accumulating adversity with a later age of suicide. Support for applying the life-trajectory model to the prison population is found in prison-centric models of suicidal behavior and clinical profiles of individuals at high risk of suicide in prisons. We also describe how the life-trajectory model applies to two recent high-profile suicides within the Canadian prison system. Finally, we propose a screening tool based on the life-trajectory model to quantify an individual's adversity burden at intake and subsequently throughout incarceration. We describe how this proposed tool may improve detection of individuals with increased risk of suicide and describe the steps necessary for the development of this tool.

Suicide occurs in prison up to eight times more frequently than in the general population.[1] These rates have remained elevated despite numerous national and international groups working to reduce prison suicide.[2,3] Some groups have argued that we have reached the limit of what can be accomplished by studying risk factors measured at a single point in time[4,5] and advocate for studying suicide with a longitudinal understanding of an individual's development, life events, and biographical factors.[6] Previous work drawing on psychological autopsies of individuals who have taken their lives has identified distinct life trajectories leading to suicide in community-dwelling individuals.[7] These distinct trajectories were observed despite nearly identical traditional risk factors in both groups.[7]

Despite not having been applied to the prison context, we believe that this life-trajectory approach can be applied to the prison population. In support of this hypothesis we have drawn support from prison-centric models of suicidal behavior, and clinical profiles of individuals at high risk of suicide in prisons. We also describe how this model applies to two recent high-profile cases of prison suicide in the Canadian system: Ashley Smith and Eddie Snowshoe. These case studies are drawn from the public domain and the authors had no personal contact with either of these individuals. Finally, we propose a screening tool for suicide risk based on the life-trajectory model and describe the steps necessary for the development of this tool.

Case Summaries

Ashley Smith was first admitted to a youth correctional facility at age 14 in Eastern Canada for throwing crab apples at a postal worker. Over the next three years, she was in and out of youth correctional facilities and was involved in more than 800 security incidents and 150 incidents of self-harm.[8] When she turned 18, she was immediately transferred from a

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youth correctional facility to an adult one. She was transferred 17 times between eight institutions during the next 11 months. Many of these transfers were related to administrative problems including "cell availability, incompatible inmates and staff fatigue."[8] Much of the time Ms. Smith spent in custody was in solitary confinement or "administrative segregation" because of her frequent self-harming behavior.[8] This behavior continued until she died by asphyxiation from a self-made ligature while in solitary confinement and on suicide watch under direct observation of prison officers at age 19.

Around the time of Ashley Smith's death, Eddie Snowshoe, age 21, robbed a taxi driver in northern Canada of $45 at gunpoint. He was apprehended by police shortly afterward and sent to numerous correctional institutions in Alberta. In marked contrast to Ms. Smith, Mr. Snowshoe "generally presented as a polite, quiet individual with few noted behavioral concerns" (Ref. 9, p 8). However, over the next three years, Mr. Snowshoe intermittently engaged with rehabilitative programs but gradually became increasingly withdrawn and attempted suicide four times. Eventually, on August 13, 2010, on his fifth suicide attempt, Mr. Snowshoe died by hanging.[10]

Efforts to Reduce Prison Suicide

Prison and governmental efforts have reduced suicide rates in some jurisdictions by 50 to 60 percent since 1980.[11] This success results from correctional institutions using a multipronged approach emphasizing recognition, prevention, and intervention.[12] Prison suicide has increasingly been recognized as a public health problem, and prison services have directed greater policies and resources toward suicide prevention. For example, Correctional Services of Canada (CSC), the Canadian agency responsible for inmates serving sentences greater than two years, recently published an updated policy entitled, "Management of Inmate Self-Injurious and Suicidal Behavior,"[13] outlining the suicide prevention program in CSC.[14] A key component of the program is the mental health assessment at intake where an inmate is screened for suicide risk factors, such as signs of depression, previous suicide attempt, and recent loss.[14] If inmates are considered high risk during screening or at later points in their sentence, they are usually connected with appropriate mental health resources and may be placed on suicide watch,[15] including suicide-resistant cells (no

hanging points), suicide-resistant clothing (extremely difficult to tear), and closed-circuit television monitoring.[12] After the immediate suicide risk is mitigated, prison mental health workers can begin a clinical treatment program to reduce the individual's acute suicidality.[15]

Despite interventions that are available once an individual has been identified as being at high risk of suicide, further reductions in prison suicide will require improved detection of these individuals. Although Ashley Smith is an unfortunate example of death by suicide while on suicide watch, such an occurrence is uncommon; only eight percent of suicides in the United States prisons occur during suicide watch.[16] Therefore, most individuals completing suicide in prison were not identified as an acute suicide risk, such as Eddie Snowshoe. Current tools for detecting acute suicide risk identify those at greatest risk of suicide. However, less than five percent of those detected attempt suicide.[17,18] The low positive predictive values (PPVs) of these tools are influenced by the low prevalence of suicide[19] and the high prevalence of risk factors.[20] Furthermore, current screening tools are based on traditional models of suicide that emphasize risk factors, often clinical, demographic, or psychosocial, that are identified at a single point in time.[18] These tools can miss the complex interaction of developmental history, life events, and biographical factors that may eventually culminate in suicide.[6] We propose that by incorporating life-trajectory information into prison screening, suicide risk assessment can be improved.

A Life-Trajectory Model of Suicide

The study of life events and its relationship to psychiatric disorders has a long history[21–24]; however, the life-trajectory approach has only recently been applied to the study of suicide.[7,25,26] The most recent life-trajectory study of suicide reported psychological autopsies of 214 individuals who died by suicide.[7] A panel of experts then divided an individual's life into five-year periods and came up with a measure of the psychological "adversity burden" experienced by that individual during a given period. The adversity burden was based on stresses and life events in 12 different life spheres: place of residence, parent–child relationship, emotional–romantic relationships, adult family life, episodes of personal difficulty, academic life, professional life, social life, dimensions of losses/separations/departures, other

Table 1 Comparison of Life Trajectory Model and High Risk Clinical Profiles

	Acute Trajectory/Pretrial	Chronic Trajectory/Incarcerated
Age of suicide completion	Younger (20–25 years)	Older (>30 years
Adversity burden	++++	++
Length of adversity burden	Short	Long
Event inciting suicide	Major: incarceration itself	Minor: conflict of some sort
Timing of suicide relative to incarceration	Early during incarceration[19]	Late in incarceration. Suicide risk increases with length of incarceration[1]

social adversity, protective factors, help seeking/services, and drug use.[7,25] Using discrete time-survival and growth-mixture modeling, the researchers found that a model with two distinct life trajectories provided the optimal fit for their data regarding trajectory of adversity burden over time in individuals who eventually completed suicide.[7]

In this life-trajectory model,[7] traditional risk factors (such as childhood family environment, major mental disorders, and personality disorders) were not significantly different among the identified trajectories. However, when change in adversity burden (as assessed by stresses in different life spheres) was assessed over time, two distinct trajectories became apparent. The first trajectory was an acute one that consisted of individuals who died younger (84% died of suicide by age 24) and had substantially higher adversity burdens early in life that were escalating and were present in most (or all) areas of life. Individuals on the acute trajectory accounted for 39 percent of deaths by suicide. The second trajectory was a chronic one that consisted of individuals who died at an older age and had a lower but more persistent adversity burden that was rated as low to moderate at the time of suicide. This chronic trajectory accounted for 61 percent of deaths by suicide.

The Life-Trajectory Model Applied to Prison Suicide

The life-trajectory model of suicide was developed by examining the lives of individuals who died by suicide in a community sample,[7] but we hypothesize that the life-trajectory approach can be applied to the prison population. Support for this hypothesis comes from two areas: similarities with an existing model of prison suicide and clinical profiles of individuals at high risk of suicide in correctional institutions.

The first line of support comes from similarities between the life-trajectory model and an existing model of prison suicide developed specifically for suicidal behavior during incarceration.[27] This model

did not seek to identify life trajectories leading to suicide, but it emphasized the contributory role of life events in eventual suicide, similar to the life-trajectory model. Life events common to both models include childhood trauma, emotional deprivation, and self-harm.[27] An important difference between the life-trajectory model[7] and the existing model of prison suicide[27] is that the latter uses severe self-harm rather than completed suicide as an outcome. However, there is evidence that severe self-harm provides an approximation of actual suicide.[28,29] Therefore, similarities in life course events between both models support applying the life-trajectory model to prison populations.

The second line of support comes from similarities between the life-trajectory model and clinical profiles of individuals known to be at elevated suicide risk in correctional institutions. The World Health Organization (WHO) has identified two distinct clinical profiles of individuals who complete suicide in correctional institutions: pretrial inmates, and prisoners with long-term sentences.[2] The first high-risk clinical profile is pretrial inmates in remand (individuals awaiting trial) who tend to be young, unmarried, first-time offenders, who are arrested for minor (often substance-related) offenses. These individuals tend to die by suicide during an early stage of confinement.[30] These inmates have a second period of elevated risk near the time of a court appearance, particularly when a guilty verdict is expected.[2] There are several similarities between individuals in this clinical profile and individuals who belong to the acute category of the life-trajectory model. These similarities are highlighted in Table 1.

The second high-risk clinical profile is sentenced prisoners who are usually older and incarcerated for violent crimes. These individuals tend to die by suicide after spending longer in custody (4–5 years). The suicide is often precipitated by conflict with other inmates, family, the institution's administration, or the institution itself.[2] Furthermore, suicide

risk increases with length of time incarcerated, with life-sentence inmates being at highest risk.[31,32] Table 1 highlights the similarities between individuals in this clinical profile and those belonging to the chronic trajectory of the life-trajectory model. In contrast to pretrial inmates in which the event inciting suicide is a major stressor (i.e., incarceration in a first-time offender), the event inciting suicide for the sentenced prisoner appears to be a less severe stressor (i.e., conflict with another inmate), similar to the adversity burden at time of death for individuals belonging to the chronic trajectory of the life-trajectory model. Individuals on the chronic trajectory are described as dying by suicide at a time when their adversity burden is low or moderate.[7] Given that clinical experience independently identified two distinct profiles of individuals with an elevated suicide risk that correlates with the two trajectories from the life-trajectory model, there is further support for applying the life-trajectory model to the prison population.

Returning to the case studies of Ms. Smith and Mr. Snowshoe, it appears that both of these individuals belonged to distinct life trajectories. Ms. Smith's life course fit the acute trajectory, as she demonstrated clear childhood psychopathology manifested by "challenging behaviors at an early age" and "unruly behavior" (Ref. 8, p 2). She also experienced extreme life stressors throughout her period of incarceration and demonstrated a dramatic decline. In contrast, Mr. Snowshoe more likely belonged to the chronic pattern of the life-trajectory model. He did not demonstrate the same level of early behavioral difficulties as Ms. Smith and did not experience the same extreme life stresses or resulting dramatic decline in mental health.[10] His adversity burden accumulated gradually as demonstrated by the fact that he showed a "gradual, declining, trend toward poorer decision-making and acting-out behavior" (Ref. 33, p 8).

Proposal for a Life-Trajectory–Based Suicide Screening Tool

We believe that the life-trajectory model of suicide offers an improved understanding of suicide and can serve as the theoretical foundation for development of a new suicide screening tool that can be incorporated into correctional services mental health screening to improve detection of suicide risk. Specifically, we propose that quantifying an individual's adversity burden over his life course by the use of a self-report tool based on the life-calendar method[24,34] may improve the detection of suicide risk. This tool would measure adversity burden over the course of an individual's life in five-year periods (i.e., 0–4 years, 5–9 years, and so forth) similar to prior retrospective studies.[7] In addition, this tool would also assess the adversity burden in the year before incarceration, as this period may be more relevant to suicidal behavior while incarcerated.[18] The periods suggested are based on published research[7,18] and must be empirically validated.

For each five-year interval this tool will rate the adversity burden in each of the 12 life spheres[6] on a three-point scale: 0, no/minimal burden; 1, moderate burden; and 2, severe burden. The exception to this scoring is the protective factors and help-seeking domains that will be scored on the following scale: 0, no protective factors/treatment; −2, moderate protective factors/treatment; and −4, significant protective factors/treatment. This scale reflects the fact that protective factors can counteract stresses in other life spheres.[35] However, the extent to which the factors are affected must be empirically validated. Application of the scales results in a total score quantifying adversity burden ranging from −8 to +24, where higher scores indicate greater burdens. To highlight the incremental utility of this proposed tool, Table 2 illustrates two hypothetical individuals with substantially different adversity burdens but whose different level of risk may not be detected based on traditional risk factors. The application of the proposed screening tool will be particularly effective in identifying individuals who have had an acute trajectory and who may have a higher suicide risk than that suggested by traditional risk factors. The screening tool can enable earlier interventions including psychotherapy/pharmacotherapy, closer observation, or modified environments.

For individuals initially identified as low risk by both traditional risk factors and the proposed screening tool they will then be screened at subsequent intervals with the same tool (or an abbreviated version) throughout their incarceration, to monitor adversity burden over time. A steadily increasing burden over time may suggest that an individual is proceeding along the chronic trajectory and that his risk of suicide may have increased over the course of incarceration. Repeated screening is important because the authors of the life-trajectory model comment that individuals on this trajectory may "fly un-

Table 2 Hypothetical Adversity Burden Quantification in the Year Before Incarceration

Life Sphere	Individual With Low Adversity Burden	Individual With High Adversity Burden
Place of residence	0, stably housed	2, often homeless
Parent–child relationship	1, has not had any contact with parents	1, has not had any contact with parents
Emotional-romantic relationship	1, infrequent, unstable relationships	2, no romantic relationships
Adult family life	2, unstable, chaotic	2, unstable, chaotic
Episodes of personal difficulty	0, no recent difficulties	2, was recently assaulted
Academic life	1, completed high school with difficulty	2, did not finish high school, has learning disability
Professional life	0, has had consistent employment	2, has not maintained employment
Social life	1, has some friends	2, does not endorse having any friends
Dimensions of loss/separation/departures	1, ended a romantic relationship	1, loss of pet
Other social adversity	0, no significant social changes	0, no significant social changes
Protective factors	−2, hopes to regain job & relationship	0, does not have any goal for future
Help seeking/services	−2, sporadic substance use treatment	0, not interested in any treatments
Drug use	1, uses marijuana weekly	2, daily use of multiple substances
Total adversity burden score	4	18

der the radar" of clinicians assessing suicide risk, necessitating close scrutiny.[7] There are no empirical data to guide the decision on intervals between screening, but the most common interval in life-course research is one year.[36,37] Future work is needed to determine the optimal interval between screening and to identify the magnitude or rate of increase in adversity burden that necessitates intervention.

Steps in Developing a Life-Trajectory Suicide-Screening Tool

There are several steps to be completed before the development of our proposed tool that assesses suicide risk in incarcerated individuals by quantifying adversity burden. The first step is to perform a psychological autopsy study of completed prison suicides to verify that the two distinct life trajectories leading to suicide, which have been identified in the community,[7,25,26] are also found in the prison population. Following this process, a self-report ques-

tionnaire that will function as the screening tool must be developed and then validated with the semi-structured interview approach previously used.[7,25,26] Its psychometric properties and optimal cutoff points will also have to be determined empirically. Of note, self-assessment of the adversity burden, rather than expert assessment, may improve accuracy, as recent suicide models suggest that an individual's perception of burden is a key component in suicidal behavior.[38,39]

In parallel with the development of this tool, it is also important to conduct empirical testing of the underlying assumption of the proposed screening tool, which is that increased adversity burdens are predictive of increased rates of suicide. We will test this assumption using data already collected by the CSC that will allow us to estimate adversity burdens over the life course in a large number of prison inmates (Table 3). Given the nature of the data collected, we will be able to consider only the following periods for measurement of adversity burden: child-

Table 3 Intake Information at Correctional Services Canada and Relationship to Life-Trajectory Model

Childhood	Adolescence	Adult	Peri-Arrest
• Family violence (PR)	• Less than high school diploma (AL)	• Unstable job history (PL)	• Social assistance previous years (PL)
• Limited attachment to family unit (PR)	• Less than grade 10 or equivalent (AL)	• Absent employment history (PL)	• Limited positive leisure activities (OSA)
• Negative relationship with parents (PR)	• Youth court appearances (EPD)	• Financial instability (OSA)	• Limited community attachment (SL)
• Abuse (PR)		• Victim of spousal abuse (AF)	• Use of community resources (PF)
		• Adult court appearances (EPD)	• Unemployed at arrest (PL)
			• Unstable housing past year (POR)

Life spheres measurable by data available from Correctional Services Canada: parent–child relationship (PR), place of residence (POR), adult family life (AF), episodes of personal difficulty (EPD), academic life (AL), professional life (PL), social life (SL), other social adversity (OSA), and protective factors (PF).
Unmeasurable life spheres: emotional–romantic relationships; dimensions of losses, separations, and departures; help-seeking/use of services, and drug use.

hood (0–12 years), adolescence (12–18 years), adulthood (>18 years), and peri-arrest (1 year before arrest). As well, there are insufficient data to measure the adversity burden in all 12 life spheres. However, this method will still allow us to develop an estimate of adversity burden so that we can attempt to determine whether increased adversity burdens are associated with suicide. We will also be able to examine the adversity burdens and life trajectories of individuals who engage in nonlethal self-injurious behavior, for which data have not been collected.

Conclusion

This work describes how a life-trajectory model of suicide that was developed in the community also applies to individuals in prison. Support for this notion comes from prison-centric models of suicidal behavior and clinical profiles of individuals at high risk of suicide in prison. However, applying the model to the prison population ultimately requires empirical validation. The life-trajectory model suggests that suicide is the culmination of two distinct trajectories: one group that has significant adversity burdens early in life with a young age of suicide and another group that has a less severe but more chronic adversity burden with an older age of suicide. We have proposed a new screening tool to detect suicide risk in prison, which is based on the life-trajectory model, and have also outlined steps necessary for its development. We believe that this screening tool, once developed, has the potential to more accurately detect individuals at increased risk of suicide who may be missed by traditional screening tools. The improved detection that results may ultimately help prevent future tragedies such as the deaths of Ashley Smith and Eddie Snowshoe.

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