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Characteristics of railway suicides in Canada and comparison with accidental railway fatalities: Implications for prevention

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ABSTRACT

This study presents and compares the prevalence and characteristics of rail-related suicide and other railway fatalities in Canada over 10 years, from 1999 to 2008. The methodology involved in-depth data analysis of records from provincial coroner and medical examiner's investigations, railway company reports and Transportation Safety Board data. We identify physical risk factors and psychosocial descriptions of people who commit suicide and compared them to accidental (non-suicide) railway fatalities in order to identify at-risk populations and better target and elaborate railway suicide prevention strategies. We identified 460 accidental deaths and 428 suicides. Most people (94.7%) died on the site of the incident, although not always immediately. Canada does not have any specific locations with high incidence suicide or accidents clusters. We conclude that impairment of some type, by illness, substance abuse or intoxication, advanced age or immature youth, play an important role in a significant number of accidents, suggesting that more intense warnings of approaching trains may help prevent accidental deaths. Mental illness, although often being treated, is associated with the majority of suicide fatalities, and more than one-third of suicides occur on rails near psychiatric facilities, suggesting targeted prevention strategies in facilities near rails and at track locations in proximity to mental health facilities.

What is already known on this subject:

- In other countries we have basic data on location, time and date, gender, age and some basic epidemiological characteristics of railway fatalities, usually combining suicides and accidental fatalities in studies of collisions or Person Under Train (PUT) incidents.
- Hotspots for suicides have been identified in Europe, often near psychiatric facilities.

What this study adds:

- We provide more in-depth information on fatality victims from analyses of detailed coroners' investigations and industry reports on all railway fatalities in Canada over an extended period of ten years.
- We compare characteristics of deaths by suicide with accident fatalities in order to develop specific recommendations for prevention programmes that consider the specific characteristics of each type of fatality.
- Our approach provides a model for developing prevention strategies based upon in-depth comparative analyses of suicides and accident fatalities to adapt prevention approaches to characteristics unique to a country or location, and the different characteristics of people who die on railways by suicide and in accidental fatalities.

1. Introduction

In all countries with railways there are accidental deaths and people commit suicide by placing themselves in front of a moving train, except in places where access to the rails is completely

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blocked by physical barriers. Studies of railway suicides have shown that this method is used in a small but significant number of suicides, with important variations between countries. This study compares a large variety of characteristics of railway suicides in Canada over ten years with railway accidental deaths in order to provide information that may be useful in the development of prevention strategies.

2. Background

Railway accidents and suicides have been studied in three ways. The first approach has been to analyse together without distinguishing between them, suicides and accidents, under the term "trespassing," "collision" or "Person Under Train – PUT" incidents. Analyses using these categories do not provide information on the differences between accidents and suicides (Evans, 2011; Lerer and Matzopoulos, 1996; Ozdogan et al., 2006; Pelletier, 1997). The second approach has been to analyse only fatalities that are classified as suicides (Hudson, 1999; Baumert et al., 2006; Deisenhammer et al., 1997; Van Houwelingen and Beersma, 2001; Van Houwelingen et al., 2010, 2013; Erazo et al., 2004a). The third approach is to report on all railway fatalities and provide comparison data on environmental and personal variables for both accidents and suicides (Lin and Gill, 2009; Radbo et al., 2005; Rådbo et al., 2012; Silla and Kallberg, 2012; Gershon et al., 2008). These different approaches provide relevant data to help understand railway fatalities, although only the third approach provides information about the differences between suicides and accidents that may be helpful in the development of targeted preventive efforts for each type of fatality.

Research providing specific data on suicides in railway and urban transit systems is summarised in a systematic review by Mishara and Bardon (2016). Several studies have reported the incidence of railway suicides. In England and Wales, Hudson found an average of 164.8 railway suicides per year between 1994 and 1999 (Hudson, 1999). Radbo, Svedung, and Andersson found 48.3 railway suicides per year in Sweden between 2000 and 2002 (Radbo et al., 2005). In Turkey, there were 65.2 train suicides per year between 1997 and 2003 (Ozdogan et al., 2006), and in Germany, there were 955 railway suicides per year between 1997 and 2002 (Baumert et al., 2006).

Other studies estimated the proportion of the total number of annual suicides which are suicides by train. Table 1 summarises the proportions reported in these studies. The proportions seem to have remained stable over time in countries where two studies have been conducted.

Few studies calculated a railway suicide rate. Baumert et al. found that railway suicides increased in the German railway system by 10% in the ten years between 1991 (0.9 per 100,000 population per year) and 2000 (1.0 per 100,000), which contrasts with a decrease overall in suicides in Germany during the same time period (from 17.5 to 13.5 per 100,000) (Baumert et al., 2006). In Germany, railway suicides represented 5% of all suicides in 1991 and 7.35% in 2000.

Table 1
Proportion of total suicides that are on railways by country.

Country	Proportion of total suicides that are on railways (%)	Authors (year)
Europe		
Netherlands	12.4	Deisenhammer et al. (1997)
	10–14	Van Houwelingen and Beersma (2001)
Germany	7.0	Baumert et al. (2006) and Deisenhammer et al. (1997)
Sweden	6.2	Deisenhammer et al. (1997)
England	5.0	Deisenhammer et al. (1997) and Clarke (1994)
Austria	5.7	Deisenhammer et al. (1997)
Denmark	3.1	Lindekilde and Wang (1985)
Other areas		
Canada	3	Transport Canada (1996)
Japan	6.3	Deisenhammer et al. (1997)
Australia	2.0	De Leo and Krysinska (2008)

The most frequent hypothesis explaining the choice of a train as a suicide method concerns accessibility. Kerkhof suggested that since the Netherlands are very densely populated and have a dense railway network with tracks widely accessible throughout the country, this may explain their higher proportion of total suicides that involve railways (Kerkhof, 2003).

An analysis of 192 cases of fatal train-person collisions in Sweden during the three years from 2000 to 2002 found that 30% of suicides occurred in station areas and 55% were in other locations away from stations but still within urban areas (Radbo et al., 2005). In Sweden, most suicides occur during the daytime, which the authors explain in terms of the higher density of daytime train traffic.

2.1. Characteristics of persons who commit suicide by train

Although there are significant variations by country and region in characteristics of railway suicides, most research has not identified differences between railway suicides and suicides by other means and accidental rail fatalities have not been compared to suicides (Mishara and Bardon, 2016). According to Radbo et al. (2005) in Sweden, the ratio of male to female suicides on the railway is 2.6–1 which is comparable to the ratio in the general Swedish population (2.5–1). However the mean age for railway suicides in Sweden is 43 compared to the mean age for all suicides in Sweden of 51. Kerkhof reported that railway suicide victims tend to be younger than persons who use other methods, mostly men between age 20 and 59 (74%) (Kerkhof, 2003). The demographics characteristics of persons who die by railway suicide is similar in Turkey (Ozdogan et al., 2006). The majority are between age 25 and 60.

In Germany there are suicide peaks in April and September with lower rates in December for men. However for women no significant seasonal variations were observed (Erazo et al., 2004a). This result has not yet been confirmed in other countries. An analysis by van Houwelingen and Beersma showed that railway suicides in the Netherlands occur more often during the day, shortly after sunset or early in the morning (Van Houwelingen and Beersma, 2001).

2.2. Psychiatric diagnosis and clustering around psychiatric institutions

Researchers who have studied the relationship between psychiatric diagnosis and railway and metro suicides in Western countries have found a high incidence of diagnosed mental illness. In the county of Fyn, Denmark, in a study comparing railway suicides to other methods, the authors found a higher proportion of train suicides being psychiatric patients (81%) compare to those who used other suicide methods (38%) (Lindekilde and Wang, 1985). Mishara, in a study of the coroner's investigation of the 129 persons who committed suicide in the Montreal metro from 1986 to 1996, found that 73% could be identified as having received inpatient psychiatric treatment and 27% residing in a mental health treatment facility at the time of death (Mishara, 1999). An investigation of a small number of suicides in Brisbane, Australia found that 57% had been treated for schizophrenia, 57% were psychiatric inpatients at the time of the death and 48% of the deaths occurred close to the regional psychiatric hospital (Emmerson and Cantor, 1993). Although available data are limited and research methodologies may not be comparable, it is possible that the prevalence