



# A Comparison of Suicides in Public Safety Personnel With Suicides in the General Population in Ontario, 2014 to 2018

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**Abstract:** *Background:* There is conflicting evidence on the suicide rates of different public safety personnel (PSP). There have been few studies that compare suicides in PSP with the general population and none that have used a detailed comparison of coroner records. *Aims:* The current study estimates suicide rates among different PSP and compares PSP suicides with the general population. *Method:* We identified coroner records of PSP suicides from January 2014 to December 2018 and compared each one to two matched general population controls. *Results:* We identified 36 PSP suicides and 72 general population controls. Police had a higher suicide rate than other PSP groups. PSP were more likely to die by firearm, be separated/divorced or married, die in a motor vehicle, have problems at work, and have a PTSD diagnosis. PSP were less likely to die by jumping. *Limitations:* The study may have not identified all PSP suicides. Apart from the cause of death, data in coroner records are not systematically collected, so information may be incomplete. *Conclusion:* PSP suicides appear different than the general population. Death records need to have an occupation identifier to enable monitoring of trends in occupational groups, such as PSP.

**Keywords:** public safety personnel, suicide, coroner, police, case control study

Public safety personnel (PSP) is a broad term primarily used in Canada that “encompass people with specialized training who are employed to ensure the safety and security of the public” (Heber et al., 2023). The boundaries of what occupations and who in these occupations are included in the term public safety personnel are often unclear. For this paper, we include sworn police officers, firefighters both full time and voluntary, paramedics, public safety communicators, and corrections officers. PSP are chronically exposed to potentially psychologically traumatic events (PPTE; Charles et al., 2011; Stanley et al., 2018; Weiss et al., 2010). The combination of recurrent exposure (Weiss et al., 2010), sleep disruptions (Charles

et al., 2011), insufficient social supports (Haugen et al., 2017), compromised care-seeking behaviors (Haugen et al., 2017), unhelpful organizational responses to PPTE (Konyk et al., 2021), and access to lethal means (O’Hara et al., 2013), increasing PSP risk for developing mental health disorders and dying by suicide. However, there are also many protective factors including team cohesion and a strong sense of belonging, social support, and a clear purpose including specialized training (SAMHSA, 2018). The purpose of this study is to examine suicide rates of different PSP and the characteristics of their suicide compared to the general population using information from coroner records in Ontario, Canada.

There is conflicting evidence on whether PSP have higher rates of suicide than the general population. A systematic review completed in July 2015 found 63 studies on suicidal thoughts and behaviors among police officers, firefighters, and paramedics (Stanley et al., 2016). The review found generally elevated rates of suicidal thoughts and attempted suicide among PSP as compared to the general population. In studies where PSP suicide rates were lower than the general population, it was hypothesized that this could be due to PSP being generally healthier compared to the general population. A 2021 study focused on suicides in law enforcement officers, including retired police officers, in 26 states found a higher rate of suicides compared to others who had been employed during their lifetime (Violanti & Steege, 2021). A study of Arizona paramedics compared to the general population found that after adjusting for gender, age, race, and ethnicity paramedics had a higher odds of suicide compared to the general population (OR = 1.39; 95% CI 1.06–1.82; Vigil et al., 2019). However, a 2022 study of Australian national coronial data of emergency service workers found no evidence for an increased risk of suicide in these workers compared to other occupations once age, sex, and year of death were accounted for (Petrie et al., 2023).

Suicide methods and possible precipitants of suicide in PSP have been reported in a few studies. A Web of Science search based on the Stanley 2016 review identified a study of Brazilian Federal Highway Police, which found 91% of suicides were by firearm in officers of whom 57% had worked for 10 or more years and 66% were married (Marins et al., 2023). An analysis of suicides among first responders from the National Violent Death Reporting System in the United States between 2015 and 2017 found most suicides were in law enforcement officers (58%) with 21% in firefighters, 18% in paramedics, and 2% in communication officers. Compared to the general population suicides, first responders were more likely to have served in the military (23% vs. 11%) and used a firearm as the method of suicide (69% vs. 44%). Some risk factors for suicide including previous suicide attempts and alcohol and substance abuse were significantly lower among first responders (Carson et al., 2023). A study of male Portuguese police officers between 2005 and 2014 found that 87% of suicides used a firearm, which was usually the service weapon (88%; Costa et al., 2019). A web surveillance of police suicides in the United States found between 126 and 141 suicides a year in 2008, 2009, and 2012 (O'Hara et al., 2013). Most suicides were among men (92%) who usually used a firearm (91.5%). Personal problems occurred in 83%, and work-associated legal problems in 13%.

There is currently limited research available on suicide within Canadian PSP. The one exception is a large-scale national survey conducted by Carleton et al. (2018) which explored, among other areas, suicidal ideation, planning, and

attempts among Canadian PSP. The study results indicated a substantial proportion of PSP reported past-year or lifetime suicidal ideation (10.1% and 27.8%, respectively), suicidal planning (4.1% and 13.3%, respectively), and suicide attempts (0.3% and 4.6%, respectively). However, the sample was self-selected, and the survey was only completed by 5,148 of the approximately 250,000 Canadian PSP (about 2%) who were invited to participate (Carleton et al., 2018).

There have been no previous studies that have used detailed examinations of coroner's records to investigate PSP suicides. The purpose of a death investigation by a coroner is to determine the medical cause of death and (in Ontario) whether the death was by natural causes, accident, homicide, suicide, or undetermined. The record of the death investigation varies but usually includes police reports, toxicology and postmortem reports, any suicide notes, information on health service contacts, and a summary by the coroner. However, recording of information is not standardized, and some information, such as ethnicity and gender, is not usually recorded given the difficulty in assessing this after death. Previous suicide research using coroner records in the general population emphasizes the potentially rich information in the records but also notes the inconsistency of recording (Simkin et al., 2012).

The current study was designed to address some of the literature gaps by describing suicide deaths among Ontario PSP, including estimated rates for different PSP groups, and to assess differences in characteristics of suicides between PSP and the general population. The study results are reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Von Elm et al., 2007). The completed checklist is provided in Electronic Supplementary Material 1 (ESM 1).

## Method

### Study Design

We defined PSP suicides as PSP who were serving at the time of their death, who died by suicide in Ontario, Canada, between 2014 and 2018. General population suicides were defined as members of the general population (that is non-PSP) who died by suicide in Ontario during the same period.

### Setting and Identification of Records

First, we identified currently serving PSP, defined as police (i.e., municipal, provincial, Royal Canadian Mounted Police, Parliamentary protection), paramedics,

firefighters (i.e., full-time, part-time, volunteer), and correctional workers who had died by suicide with a home address in Ontario between January 1, 2014, and December 31, 2018.

The provincial coroner does not categorize or keep a registry of suicides by occupation. Accordingly, records of PSP suicides had to be manually identified. Methods of identification included searching online obituary databases; searching online Ontario newspapers for suicides of PSP; contacting PSP advocacy groups (including Boots on the Ground, Wounded Warriors and Tema Conter Memorial Trust); asking for names from a provincial PSP mental health community of practice; contacting community organizations through Facebook and social media; and asking provincial associations, chief organizations (e.g., the Ontario Association of Paramedic Chiefs), and unions if they could identify any relevant suicides. We also presented the preliminary results of this study to several PSP groups around Ontario. These deaths were then confirmed by a member of the Office of the Chief Coroner of Ontario (OCC) to be a PSP suicide before being included in the study.

Once a PSP record was identified for inclusion, a member of the OCC randomly identified two comparator records for inclusion. Comparator records included suicides from the general population from the coroner records. The general population records were matched by age (within 5 years), sex, year of death, coronial region, and employment status (i.e., employed or on sick leave as applicable). Records determined to be retired or past PSP at the time of death were excluded. Any general population record determined to be an active PSP during chart review was reclassified as a PSP record, and a replacement comparator record was identified.

Ontario had a population of 14.3 million in 2018. Organization of PSP within the province is complex; for example, there are municipal, provincial, federal, and indigenous police. Of the 25,000 police officers in Ontario, in 2018, most (18,000) were municipal police with 5,500 provincial police and 1,700 federal and other police. More

than half the firefighters are voluntary, with most fire-fighting being done by volunteers outside the main towns. Estimated numbers of police, paramedics, firefighters, and correctional workers in Ontario were obtained from Statistics Canada (<https://www150.statcan.gc.ca/n1/en/pub/85-002-x/2019001/article/00015-eng.pdf?st=LF3-Abju>), the Ontario Paramedic Association (<https://www.ontarioparamedic.ca/>), the Ontario Association of Fire Chiefs (<https://www.oafc.on.ca/about>), and the Ontario Ministry of the Solicitor General ([https://www.auditor.on.ca/en/content/annualreports/arreports/en19/2019AR\\_v3\\_en\\_web.pdf](https://www.auditor.on.ca/en/content/annualreports/arreports/en19/2019AR_v3_en_web.pdf)), respectively.

## Data Extraction

Once the PSP and general population records had been identified, study staff members conducted data collection for all eligible records at the OCC using an electronic case report form and a detailed data extraction standard operating procedure. The data collected are outlined in Table 1.

## Data Analysis

All statistical analyses were conducted using IBM SPSS Version 28. To characterize the participant sample, descriptive statistics were provided for continuous variables and absolute values with percentages for categorical variables. Odds ratios (ORs) with 95% confidence intervals are presented. Fisher's exact test was used for comparisons where either PSP or the general population records had fewer than four cases.

## Results

We identified a total of 36 PSP and 72 matched general population individuals who died by suicide in Ontario

**Table 1.** Variables collected from coroner records

Characteristic	Data collected
Demographics	Age at death, date of death, region of death, sex, sexual orientation, marital status, parental status, living circumstances, employment
Medical history	Psychiatric and medical history, pregnancy/postpartum, history of self-harm and suicide attempts, substance misuse
Adverse life events	Bereavement, employment/financial difficulty, intimate relationship breakup, interpersonal conflicts, medical stressors, police/legal stressors
Suicide details	Place of death, method (including details), toxicology, suicide note and details, access of suicide information (library, internet, social media)
Health service use	Documented access of hospital presentation/admission in 30 days prior, access of mental health or nonmental health services in the 12 and 24 months prior to death; presentation (to any health service) for self-harm; presentation (to any service) for substance misuse

**Table 2.** Estimated annual suicide rates for public safety personnel compared to the general population in Ontario 2014–2018

Personnel	PSP suicides 2014–2018	Estimated number of PSP in Ontario	Estimated annual suicide rate
General population			10.4/100,000
Police	22	25,000	17.6/100,000
Firefighters	9	31,000 (includes 18,000 volunteers)	5.8/100,000
Paramedics	4	11,000	7.3/100,000
Correctional workers	1	7,000	2.9/100,000

Note. PSP = public safety personnel.

between January 1, 2014, and December 31, 2018. There were no PSP records identified in the matched general population records. Among the 36 PSP records, 61% (22/36) were police officers, 25% (9/36) were firefighters, 11% (4/36) were paramedics, and 3% (1/36) were correctional workers. Between January 1, 2014, and December 31, 2018, the Ontario general population suicide rate averaged 10.4/100,000 (Statistics Canada, 2022). Table 2 shows the estimated annual suicide rate for the four PSP groups. Police had a higher rate of death by suicide at 17.6/100,000 compared to other PSP groups.

The characteristics of PSP who died by suicide compared to those among the general population are described in Table 3. PSP who died by suicide had served for an average of 18 years ( $SD = 12.6$ ). PSP were three times more likely to be divorced or separated than those in the matched general population ( $OR = 3.1$ , 95%  $CI = 1.1$ – $8.7$ ,  $p = .03$ ). They were also more likely to be married with over half the suicides in PSP recorded as married compared to a third of those in the general population ( $OR = 2.4$ , 95%  $CI = 1.0$ – $5.3$ ,  $p = .04$ ). Compared to the general population, PSP were more than three times more likely to use a firearm to die by suicide ( $OR = 3.5$ , 95%  $CI = 1.3$ – $9.8$ ,  $p = .02$ ). Of the 11 PSP firearm deaths, 10 used a service weapon. However, most suicide deaths in both groups were by hanging (i.e., 50%, 18/36 for PSP; 41%, 30/72 for the general population), and the difference was not statistically significant. PSP were also more likely to die in their motor vehicle ( $p = .04$ ); specifically, 11% (4/36) of PSP deaths by suicide occurred in their motor vehicle.

Medical diagnoses were determined by interviewing relatives or friends of the deceased or contacting health providers that the coroner knew to be involved with the deceased. PSP were more likely to have a diagnosis of posttraumatic stress disorder (PTSD) at the time of death (19%, 7/36 vs. 0%, 0/72,  $p < .01$ ). A depression diagnosis was the most common diagnosis at the time of death in both groups, with no statistically significant difference between PSP and the general population.

PSP were three times more likely to have a history of employment stress recorded than the general population at a rate of 22% (8/36) compared to 8% (6/72),

respectively ( $OR = 3.1$ , 95%  $CI = 1.0$ – $9.9$ ,  $p = .05$ ). Police and legal issues, as well as a past-month intimate relationship breakup, were reported more often in PSP records, but the differences did not reach significance.

Contact with health services prior to death was rarely recorded in the coroner records. In each group, one person was recorded as being discharged from a mental health unit in the previous month, three had been to an emergency department in the month before death, and one person had an outpatient appointment with a psychiatrist. There were no statistically significant differences between the groups.

## Discussion

The current study of Ontario PSP suicide coroner records used a matched general population group and found that police have a higher suicide rate than the general population and than other PSP. Compared with people in the general population who died by suicide, PSP who died by suicide were more likely to (1) be divorced, separated, or married; (2) die in a motor vehicle; (3) use a firearm which was usually a service weapon; (4) have a PTSD diagnosis; and (5) have problems at work. PSP were less likely to die as a result of jumping than the general population. In contrast to the 22 recorded police suicides over five years, in the same period, only one Ontario officer died in the line of duty (Ontario Police Memorial Foundation, n.d.).

## Limitations

The current work has several limitations that offer directions for future research. First, although we made extensive efforts to create a list of PSP suicides, but we have likely missed some. Given the pervasive stigma around suicide, particularly among PSP, it is possible not all deaths by suicide were available for identification. This means that estimates of annual death by suicide rate for different PSP groups are best seen as the lowest estimates. This is likely to be a particular problem with voluntary firefighters who may

**Table 3.** Public safety personnel compared to matched general population controls

Variable	PSP ( <i>n</i> = 36)	Matched general population controls ( <i>n</i> = 72)	OR (95% CI)	<i>p</i>
Sex, <i>n</i> (%)				
Male	35 (97)	70 (97)		
Female	1 (3)	2 (3)		
Age, years, <i>M</i> ( <i>SD</i> )	44 (8.9)	44 (8.9)		
Years of service, <i>M</i> ( <i>SD</i> )	18 (12.6)	—	—	—
PSP sector, <i>n</i> (%)				
Police	22 (61)	—	—	—
Firefighters	9 (25)	—	—	—
Paramedics	4 (11)	—	—	—
Correctional workers	1 (3)	—	—	—
Marital status, <i>n</i> (%)				
Married	20 (56)	25 (35)	2.4 (1.0–5.3)	.04
Single	4 (11)	16 (22)	Fisher's exact test	.19
Divorced/separated	10 (28)	8 (11)	3.1 (1.1–8.7)	.03
Parental status <i>n</i> (%)				
No children	4 (11)	7 (10)	1.2 (0.3–4.3)	.82
Children < 18 years of age	11 (31)	11 (15)	2.4 (0.9–6.4)	.07
Place, <i>n</i> (%)				
Own home	19 (53)	51 (71)	0.5 (0.2–1.1)	.07
Workplace	2 (6)	0 (0)	Fisher's exact test	.11
Rural outdoors	6 (17)	7 (10)	1.9 (0.6–6.0)	.30
Motor vehicle	4 (11)	1 (1)	Fisher's exact test	.04
Other	5 (11)	13 (18)	0.7 (0.2–2.2)	.58
Method, <i>n</i> (%)				
Overdose	1 (3)	11 (15)	Fisher's exact test	.06
Hanging	18 (50)	30 (41)	1.4 (0.6–3.1)	.41
Firearm	11 (31)	8 (11)	3.5 (1.3–9.8)	.02
Drowning	1 (3)	3 (4)	Fisher's exact test	1.00
Gassing asphyxiation	3 (8)	5 (7)	Fisher's exact test	1.00
Jumping	0 (0)	10 (14)	Fisher's exact test	.03
Other	2 (6)	5 (7)	Fisher's exact test	1.00
Suicide note, <i>n</i> (%)	18 (50)	24 (33)	2.0 (0.9–4.5)	.10
Diagnosis (%)				
Any PTSD diagnosis	7 (19)	0 (0)	Fisher's exact test	< .01
Any depression diagnosis	17 (47)	40 (56)	0.7 (0.3–1.6)	.40
Depression diagnosis alone	12 (33)	40 (56)	0.4 (0.2–0.9)	.03
Depression and PTSD diagnoses	5 (14)	0 (0)	Fisher's exact test	<.01
PTSD alone	2 (6)	0 (0)	Fisher's exact test	.11
Alcohol abuse	8 (22)	12 (17)	1.4 (0.5–3.9)	.48
Drug abuse	1 (3)	11 (15)	Fisher's exact test	.06
Self-harm in past month	3 (8)	5 (7)	Fisher's exact test	1.00
Chronic pain	6 (17)	4 (6)	Fisher's exact test	.08
Source of stress (%)				
Employment stress	8 (22)	6 (8)	3.1 (1.0–9.9)	.05

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Table 3. (Continued)

Variable	PSP (n = 36)	Matched general population controls (n = 72)	OR (95% CI)	p
Financial stress	5 (14)	10 (14)	1.0 (0.3–3.2)	1.00
Intimate relationship breakup in the last month	6 (17)	3 (4)	Fisher's exact test	.06
Interpersonal conflict in last year	10 (28)	18 (25)	1.2 (0.5–2.8)	.76
Police/legal stressor	6 (17)	7 (10)	1.9 (0.6–6.0)	.30
Contact with health services				
Discharge from mental health unit in the last month	1 (3)	1 (1)	Fisher's exact test	1.00
Emergency department attendance	3 (8)	3 (4)	Fisher's exact test	.39
Contact with a psychiatrist	1 (3)	1 (1)	Fisher's exact test	1.00

Note. OR = odds ratio. PSP = public safety personnel.

be identified by their primary occupation rather than their firefighting role. Second, data collection and recording in coroner records are not systematic. Coroners' processes are designed to determine the cause of death, so mechanistic details regarding a suicide are comprehensive, but rationale for a suicide is less complete. The absent data are especially pronounced for health service use, which is rarely recorded. We were only able to identify an individual characteristic if it was recorded in the coronial record. The records did not identify the absence of characteristics, for example, that an individual did not attend the emergency department in the month before death. Therefore, caution is needed when treating the absence of evidence the same as evidence of absence. We tried to control for differences in what is routinely recorded by matching for coronial region, but comparisons for medical history and diagnosis especially should be treated with caution. Third, the study numbers are small, which would have limited statistical power to detect relatively smaller important differences. There were several differences which just failed to achieve statistical significance at the 0.05 level, such as PSP who died by suicide having more children under the aged of 18 at home, being less likely to have a diagnosis of drug abuse, and being more likely to suffer from chronic pain than the general population.

We have included the suicide rate for the general population in Ontario as a comparison for the different PSP occupational rates. However, comparing PSP suicide rates with the general population rate is problematic. The general population is different demographically to PSP who are employed, of working age, and with the proportion of men and women varying within the different PSP occupations.

The current study results suggest PSP suicides are different from suicides in the general population in several ways. First, PSP groups may differ from each other, with police having higher rates of death by suicide than other groups. Differences in deaths by suicide across PSP sectors may help explain the conflicting literature regarding relative suicide rate among PSP. The increased rate of death

by suicide among police may be related to ready access to lethal means, as previously suggested (Costa et al., 2019). Second, work identity is an important factor (Ricciardelli et al., 2020), and workplace stressors that threaten identity (for example, removal of use of force certification from police; Carleton et al., 2018) may be more common than for the general population. Finally, there appears to be an increased prevalence of PTSD among PSP relative to the general population, which might be influenced by health professional expectations or provincial legislation (Bill 163, Supporting Ontario's First Responders Act, Posttraumatic Stress Disorder, 2016). The legislation requires diagnoses other than PTSD to have a proven link to work before a PSP can get coverage from their workplace or health insurance. Although PTSD is a substantial problem, major depressive disorder (MDD) appears more common in both the current study and previous work (Carleton et al., 2018).

Suicide prevention programs usually involve a combination of improving mental health literacy, better identification of mental disorders in primary care, improved care for people at high risk, and restricting access to means. This study and previous work (e.g., Carson et al., 2023; O'Hara et al., 2013) suggests that for PSP restricting access to firearms should be an important part of suicide prevention. However, removing access to firearms may also threaten identity, so any such restriction will need to be done judiciously. Additional collaborative efforts and research are needed to develop tailored and nuanced solutions for mitigating death by suicide among PSP. Second, workplace and organizational factors might be redesigned to better support members with workplace stress, such as assessing interactions with performance management actions or threats to PSP identity. Organizational factors that promote social support and psychologically safe leadership could be important factors for reducing suicide risk among PSP.

The current study is restricted to one province in Canada with its own unique collection of PSP organizations. However, the role of PSP in Ontario is likely common for PSP in other high-income countries, which supports generalizability of the

current results. Future studies should use larger samples from more diverse settings, preferably with an ability to link coroner records with health service records. Coroner records could also be standardized and include employment codes, facilitating much-needed research to help PSP, and other occupational groups at increased risk for suicidal ideation, planning, attempts, and death.

## Conclusions

This study sought to assess suicide rates among different PSPs as well as the characteristics of their suicide compared to the general population in Ontario, Canada, from 2014 to 2018. This study shows that not only are PSP suicides different from the general population, they may also be substantially different between PSP groups. Future research is needed to explore these differences in larger samples and in diverse settings. Data collection in this study was complicated by inconsistencies in the coroner records. Death records would benefit from an occupational identify to enable the monitoring of trends in occupational groups of interest, such as PSP. Additional research is needed to assess the health service use of PSP prior to suicide death.

## Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at <https://doi.org/10.1027/0227-5910/a000953>.

**ESM 1.** Completed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.

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## Conflict of Interest

The authors have no conflict of interest to declare.

## Publication Ethics

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investigation; Rabia Zaheer, investigation. All authors approved the final version of the article.

## Open Data

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to ethical restrictions.

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## Correction to Hatcher et al. (2024)

The article entitled “A comparison of suicides in public safety personnel with suicides in the general population in Ontario, 2014 to 2018” by S. Hatcher et al. (*Crisis*, <https://doi.org/10.1027/0227-5910/a000953>) has now been published as an open access article with “© The Author(s)” under a CC BY-NC 4.0 license.

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