

# Suicide and Self-Inflicted Injury

Every 10 hours, an Ontarian commits suicide – more than three-quarters of these deaths are males. Every day, 26 Ontarians are hospitalized with self-inflicted injuries – almost two-thirds of these hospitalizations are females.

## Results

In Ontario, there were 2,911 suicides from 1997-1999, representing approximately 25% of all injury deaths in the province (Table 1). The number of suicides increased by 8% over the three-year period, compared to a 13% increase for all other causes of injury death.

There were 47,462 self-inflicted injury hospitalizations in Ontario over the five-year period from 1997/98-2001/02 (Table 2). Self-inflicted injuries accounted for about 12% of all injury hospitalizations in Ontario. There was a 7% decrease in the number of self-inflicted injury hospitalizations over the five-year period, compared to a 1% decrease for all other injury hospitalizations. About 1% of persons admitted to hospital with a self-inflicted injury died during their hospital stay (Appendix A, Table A1). In-hospital deaths are included in all hospitalization analyses.

Different patterns of self-inflicted injury were observed by age and sex for deaths versus hospitalizations. About 78% of suicides occurred among males, with peaks observed among young males 19 years of age and adult males 37-40 years of age (Figure 1). Conversely, about 62% of self-inflicted injury hospitalizations occurred among females, with peaks seen among teenagers 15-17 years of age and adults 34-42 years of age (Figure 2). Detailed numbers for suicides and self-inflicted injury hospitalizations by age group and sex are provided in Table A2 of Appendix A.

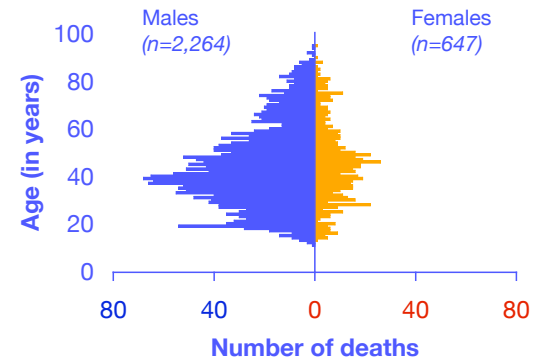
**Table 1. Suicides by year (Ontario, 1997-1999)**

Calendar Year	Number of deaths
1997	929
1998	975
1999	1,007
<b>Three year total</b>	<b>2,911</b>

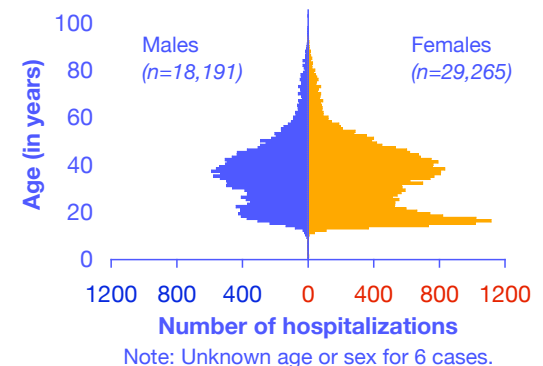
**Table 2. Self-inflicted injury hospitalizations by year (Ontario, 1997/98-2001/02)**

Fiscal Year	Number of hospitalizations
1997/98	10,020
1998/99	9,489
1999/00	9,340
2000/01	9,325
2001/02	9,288
<b>Five year total</b>	<b>47,462</b>

**Figure 1. Suicides by age and sex (Ontario, 1997-1999)**



**Figure 2. Self-inflicted injury hospitalizations by age and sex (Ontario, 1997/98-2001/02)**



**Table 3. Suicides and self-inflicted injury hospitalizations by month**

Month	Deaths (1997-1999)		Hospitalizations (1997/98-2001/02)	
	Number	% of total	Number	% of total
January	244	8	3,914	8
February	239	8	3,687	8
March	281	10	4,094	9
April	252	9	4,134	9
May	311	11	4,224	9
June	277	10	4,161	9
July	269	9	4,028	9
August	241	8	3,850	8
September	250	9	3,905	8
October	185	6	3,890	8
November	202	7	3,973	8
December	160	5	3,602	8
<b>Total</b>	<b>2,911</b>	<b>100</b>	<b>47,462</b>	<b>100</b>

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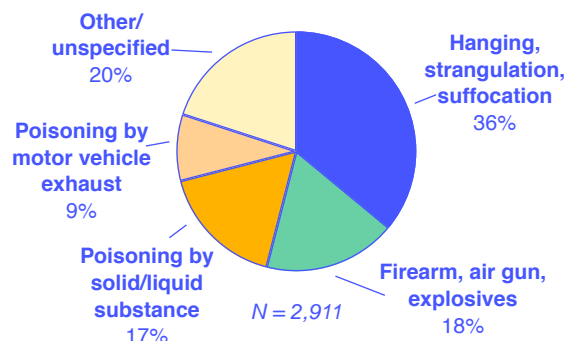
The highest number of suicides occurred in May and the lowest was observed in December (Table 3). The number of self-inflicted injury hospitalizations was consistent by month.

Hanging, strangulation, or suffocation was the most common means of suicide, followed by firearm, air gun, or explosives, and then poisoning by a solid or liquid substance (Figure 3). Detailed numbers for the method or means of suicide by age group are provided in Table A3 of Appendix A.

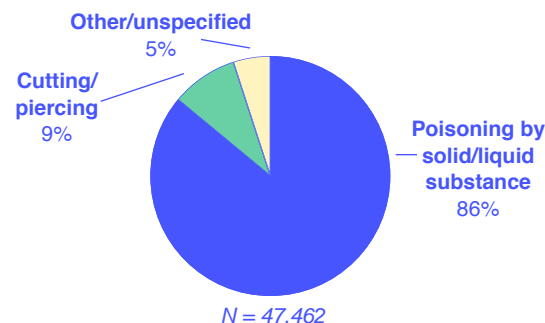
Poisoning by a solid or liquid substance accounted for approximately 86% of self-inflicted injury hospitalizations, followed by cutting or piercing (Figure 4). Detailed numbers for the method or means of self-inflicted injury hospitalizations by age group are provided in Table A4 of Appendix A.

The longest lengths of hospital stay were observed for self-inflicted injury by means of jumping from a high place (average 20.5 acute care hospital days) and jumping or lying before a moving object (average 20.1 acute care hospital days) (Table 4).

**Figure 3. Method/means of suicide (Ontario, 1997-1999)**



**Figure 4. Method/means of self-inflicted injury hospitalization (Ontario, 1997/98-2001/02)**



**Table 4. Average length of hospital stay by method/means of self-inflicted injury (Ontario, 1997/98-2001/02)**

Method/means of self-inflicted injury	Number of cases	Average length of stay
Jumping from a high place	332	20.5 days
Jumping or lying before a moving object	112	20.1 days
Submersion (drowning)	49	14.3 days
Firearm, air gun, explosives	159	13.1 days
Poisoning by other gas/vapor	114	10.0 days
Hanging, strangulation, suffocation	713	9.5 days
Cutting/piercing	4,217	9.4 days
Poisoning by motor vehicle exhaust	357	8.5 days
Poisoning by solid/liquid substance	40,636	6.0 days
Other/unspecified	773	13.2 days
<b>All self-inflicted injuries</b>	<b>47,462</b>	<b>6.7 days</b>

**Table 5. Comparison of suicides and self-inflicted injury hospitalizations in Ontario by region of residence**

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
<b>Deaths (1997-1999)</b>								
Number	402	257	368	338	655	437	407	2,911
Average number/year	134	86	123	113	218	146	136	970
Rate per 100,000 <sup>a</sup>	8.8	7.2	6.1	6.0	8.2	9.1	15.0	8.2
Average age (in years)	45.2	46.9	45.0	43.6	45.2	44.2	42.4	44.5
% male	79.9	80.2	76.6	81.7	70.2	78.9	82.6	77.8
<b>Hospitalizations (1997/98-2001/02)</b>								
Number	6,722	4,930	7,333	7,193	8,432	5,847	6,648	47,462
Average number/year	1,344	986	1,467	1,439	1,686	1,169	1,330	9,492
Rate per 100,000 <sup>a</sup>	92.2	89.2	72.3	77.9	66.4	76.2	156.6	83.4
Average age (in years)	35.5	36.3	34.6	36.1	36.8	36.0	32.6	35.4
% male	39.9	41.4	37.1	37.0	38.1	37.8	37.3	38.3

a. Annual age-standardized rate per 100,000 population.

Note: Numbers for regions do not sum to Ontario total. Region of residence was outside of Ontario or unknown for 357 hospitalizations and 47 deaths; unknown age or sex for 6 hospitalizations.

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In Ontario, the annual age-standardized suicide rate was 8.2 per 100,000 population and the hospitalization rate for self-inflicted injury was 83.4 per 100,000 (Table 5). The highest rates of suicide and self-inflicted injury hospitalizations were seen in the North, almost twice the provincial rate. The lowest suicide rates were observed in Central East and Central West and the lowest hospitalization rate for self-inflicted injury was seen in Toronto. In terms of absolute numbers, the highest number of suicides was observed in Toronto and the lowest number was seen in Central South. The same regional pattern was observed for the number of self-inflicted injury hospitalizations.

Among all regions, the numbers and rates of suicide were higher among males whereas self-inflicted injury hospitalizations were higher among females (Appendix A, Tables A5 & A6). This pattern was observed for all age groups with the exception of self-inflicted injury hospitalizations among persons 60+ years of age where rates in some regions were higher among males. Regional data for suicides and self-inflicted injury hospitalizations by age group and sex are provided in Tables A5 & A6 of Appendix A.

## Discussion

Suicides and self-inflicted injuries resulting in hospitalization represent only a portion of self-directed violence. There are many more people who attempt suicide but only a minority of these people seek medical attention and a large part of the remainder go unnoticed.<sup>1</sup>

The results of this analysis outline that the numbers and rates of suicide are higher among males whereas the numbers and rates of self-inflicted injuries resulting in hospitalization are higher among females. Deaths most frequently result from hanging, strangulation, or suffocation, while poisonings are the primary cause of self-inflicted injury hospitalizations. Other Canadian studies have reported similar findings.<sup>2,3</sup>

Rates of suicide range worldwide with annual country estimates from 2.0-51.6 per 100,000 (Canadian rate: 15.0 per 100,000 in 1997).<sup>4</sup> The highest rates are seen in Eastern Europe and some of the lowest in Latin America. Recording and reporting of self-inflicted injury may vary between and within countries due to insufficient documentation or information to judge intent as well as reluctance to report due to religious or cultural values and stigma surrounding suicide.<sup>4,5</sup>

## References

1. Diekstra RF, GARNESFSKI N. On the nature, magnitude, and causality of suicidal behaviours: an international perspective. *Suicide Life Threat Behav* 1995;25:36-57.
2. Morrison P, Langlois S. Suicide deaths and suicide attempts [1979-1998]. *Health Rep* 2002;13:9-22.
3. Canadian Institute for Health Information (CIHI). *National Trauma Registry Analytic Bulletin: Hospitalizations Due to Suicide Attempts and Self-Inflicted Injury in Canada, 2001-2002*. Toronto: CIHI; 2004.
4. Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R, editors. *World report on violence and health. Chapter 7. Self-directed violence*. Geneva: World Health Organization; 2002. p. 189-212.
5. Rhodes AE, Links PS, Streiner DL, Dawe I, Janes S. Do hospital E-codes consistently capture suicidal behaviour? *Chronic Dis Can* 2002;23:139-45.

## Managing the risk

Early identification and treatment of individuals with multiple risk factors is of prime importance in the prevention of suicide and self-harm. A number of factors have been associated with self-directed violence including:

- ❖ Demographics (e.g., aboriginal ethnicity)
- ❖ Psychiatric factors (e.g., major depression, mood disorders)
- ❖ Biological markers (e.g., altered serotonin metabolites)
- ❖ Social/environmental factors (e.g., social isolation, poverty, unemployment)
- ❖ Personal life history (e.g., stressful life events, sexual/physical abuse, family history of suicide)

In terms of management, the *World Report on Violence and Health* recommends better psychiatric treatment, environmental modifications, and strengthening of community-based efforts as means of reducing suicidal behaviour. For practitioners, some strategies for prevention of suicide and self-harm include:

- ❖ Increasing awareness of the signs and symptoms associated with suicidal behaviour and where to go for help
- ❖ Advocating for controlled access to the means of suicide, such as changing drug packaging and limiting quantities
- ❖ Promoting community-based programs to reduce social isolation, such as centres for youth or older people
- ❖ Devising educational programs to reduce suicidal behaviour, such as interventions in the school or workplace that identify and refer those at increased risk
- ❖ Encouraging responsible media reporting of suicide to reduce the possibility of imitation

## For Further Information

World Health Organization—World Report on Violence and Health  
[http://www.who.int/violence\\_injury\\_prevention/violence/world\\_report/en/](http://www.who.int/violence_injury_prevention/violence/world_report/en/)

Blueprint for a Canadian National Suicide Prevention Strategy  
<http://thesupportnetwork.com/CASP/main.html>

Centre for Suicide Prevention (Includes a list of Ontario crisis centres)  
<http://www.suicideinfo.ca/>

SMARTRISK Catalogue of Best Practices  
<http://www.smartrisk.ca/ListingSections.aspx?dd=4&sd=207>

## Methods

Self-inflicted injuries were defined using codes E950-E958 in the International Classification of Diseases, 9th revision (ICD-9). Death data for the calendar years of 1997-1999 and hospitalization data for the fiscal years of 1997/98-2001/02 were used in this analysis. The source of death data was the Vital Statistics-Death Database at Statistics Canada. This database contains records on all deaths across Canada. The hospitalization data were obtained from the Discharge Abstract Database at the Canadian Institute for Health Information. This database contains data on hospital discharges across Canada. The hospitalization data include deaths that occurred in hospital. In this analysis, the term suicide was used to describe cases that resulted in death and the term self-inflicted injury hospitalization was used to describe cases of intentional self-harm that were admitted to an acute care hospital. Regions were defined according to the Ontario Ministry of Health Region Codes. Percentages may not add up to 100% due to rounding.

## Appendix A: Detailed Tables

**Table A1. Discharge status for self-inflicted injury hospitalizations (Ontario, 1997/98-2001/02)**

	Discharge status	
	Alive	Death in hospital
Number (%)	46,917 (99%)	545 (1%)
% male	38%	61%
Average age (in years)	35	50

Note: Unknown age or sex for 6 cases.

**Table A2. Number of suicides and self-inflicted injury hospitalizations by age group and sex (Ontario)**

Age group (in years)	Deaths (1997-1999)			Hospitalizations (1997/98-2001/02)*		
	Males	Females	Total	Males	Females	Total
<20	142	36	178	2,041	5,992	8,033
20-29	334	73	407	3,886	5,611	9,497
30-39	539	135	674	5,272	7,176	12,448
40-49	487	177	664	4,047	6,276	10,323
50-59	330	103	433	1,691	2,562	4,253
60-69	196	51	247	604	861	1,465
70+	236	72	308	650	787	1,437
<b>Total</b>	<b>2,264</b>	<b>647</b>	<b>2,911</b>	<b>18,191</b>	<b>29,265</b>	<b>47,456</b>

\* Unknown age or sex for 6 cases.

**Table A3. Number of suicides by age group and method/means of injury (Ontario, 1997-1999)**

Age group (in years)	Method/means of suicide					Total
	Hanging, strangulation, suffocation	Firearm, air gun, explosives	Poisoning by solid/liquid substance	Poisoning by motor vehicle exhaust gas	Other/ unspecified	
<20	102	31	9	6	30	178
20-29	181	59	48	29	90	407
30-39	258	78	117	70	151	674
40-49	211	105	145	72	131	664
50-59	123	94	82	46	88	433
60-69	75	74	45	13	40	247
70+	98	86	54	18	52	308
<b>Total</b>	<b>1,048</b>	<b>527</b>	<b>500</b>	<b>254</b>	<b>582</b>	<b>2,911</b>

**Table A4. Number of self-inflicted injury hospitalizations by age group and method/means of injury (Ontario, 1997/98-2001/02)**

Age group (in years)	Method/means of self-inflicted injury			Total
	Poisoning by solid/liquid substance	Cutting/piercing	Other/ unspecified	
<20	6,886	719	428	8,033
20-29	7,824	1,098	576	9,498
30-39	10,647	1,152	649	12,448
40-49	9,061	780	482	10,323
50-59	3,783	231	239	4,253
60-69	1,276	89	100	1,465
70+	1,154	148	135	1,437
<b>Total</b>	<b>40,631</b>	<b>4,217</b>	<b>2,609</b>	<b>47,457</b>

Note: Unknown age for 5 cases.

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**Table A5. Annual rate of suicide and self-inflicted injury hospitalization in Ontario by age group, sex, and region of residence**

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
<b>Death Rate per 100,000 (1997-1999)<sup>a</sup></b>								
<b>Males</b>								
<20 years	2.7	1.7	2.4	2.6	1.9	3.2	9.9	3.1
20-39 years	18.7	15.3	11.2	13.7	14.7	18.4	29.4	16.5
40-59 years	20.9	17.5	13.2	13.9	18.2	21.1	31.3	18.6
60+ years	17.0	15.7	15.2	12.5	15.8	18.4	33.1	17.4
<b>Females</b>								
<20 years	0.3	0.2	0.5	0.9	0.2	1.2	3.4	0.8
20-39 years	4.0	2.2	2.6	1.8	6.0	4.3	5.6	4.0
40-59 years	6.4	5.6	4.8	3.9	7.9	6.7	9.3	6.2
60+ years	3.5	3.8	4.8	3.0	5.2	2.9	1.9	3.9
<b>Hospitalization Rate per 100,000 (1997/98-2001/02)<sup>a</sup></b>								
<b>Males</b>								
<20 years	28.2	26.9	23.3	22.0	15.3	20.6	69.4	26.1
20-39 years	124.2	120.3	86.7	93.4	75.6	92.8	211.2	103.6
40-59 years	83.0	88.9	60.0	72.9	69.2	71.7	103.5	75.7
60+ years	32.7	34.2	28.2	28.5	29.8	23.7	30.4	29.7
<b>Females</b>								
<20 years	79.6	75.3	71.1	72.1	61.4	70.7	184.3	80.4
20-39 years	167.2	149.2	124.0	137.6	113.5	138.4	303.7	146.5
40-59 years	124.1	121.9	105.1	114.9	91.9	106.2	179.2	114.3
60+ years	28.1	30.7	31.1	36.0	29.5	26.2	38.9	31.0

a. Annual age-specific rate per 100,000 population by sex.

Note: Region of residence was outside of Ontario or unknown for 357 hospitalizations and 47 deaths; unknown age or sex for 6 hospitalizations.

**Table A6. Number of suicides and self-inflicted injury hospitalizations in Ontario by age group, sex, and region of residence**

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
<b>Deaths (Total Number from 1997-1999)</b>								
<b>Males</b>								
<20 years	17	8	21	21	17	20	37	142
20-39 years	124	76	108	108	189	131	113	873
40-59 years	120	77	101	101	164	130	113	817
60+ years	60	45	52	46	90	64	73	432
<b>Females</b>								
<20 years	<5	<5	<5	7	<5	7	12	36
20-39 years	26	11	25	14	77	30	21	208
40-59 years	37	25	37	28	77	42	33	280
60+ years	16	14	20	13	39	13	5	123
<b>Hospitalizations (Total Number from 1997/98-2001/02)</b>								
<b>Males</b>								
<20 years	298	208	343	300	231	213	423	2,041
20-39 years	1,366	996	1,406	1,255	1,624	1,099	1,306	9,158
40-59 years	821	673	801	926	1,074	760	635	5,738
60+ years	195	166	167	181	285	140	113	1,254
<b>Females</b>								
<20 years	804	555	994	937	881	699	1,074	5,992
20-39 years	1,786	1,208	1,980	1,853	2,436	1,594	1,846	12,787
40-59 years	1,234	934	1,416	1,468	1,530	1,145	1,080	8,838
60+ years	215	190	225	273	370	197	171	1,648

Note: Numbers less than 5 are not presented. Numbers for regions do not sum to Ontario total. Region of residence was outside of Ontario or unknown for 357 hospitalizations and 47 deaths; unknown age or sex for 6 hospitalizations.