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National Trauma Registry Analytic Bulletin

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Hospitalizations Due to Suicide Attempts and Self-Inflicted Injury in Canada, 2001-2002

This report provides a descriptive analysis of hospitalizations and in-hospital deaths due to suicide attempts and self-inflicted injury in Canada. The data source for this bulletin is the Hospital Morbidity Database (HMDB). The HMDB is an administrative database that is managed by the Canadian Institute for Health Information (CIHI) and captures all acute care hospitalizations in Canada.

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1. Background

Suicide and self-inflicted injuries are serious and result in decreased workforce contributions, increased cost to the health care system and death. The World Health Organization (WHO) reported that there are approximately 873,000 annual deaths worldwide due to suicide¹. Various factors have been shown to be associated with suicide attempts and deaths, such as gender², depression³, chronic illnesses^{4,5}, work status⁶, geography and ethnicity^{7,8}.

In Canada during 2001 there were 3,688 deaths due to suicide⁹. However, considerably more suicide attempts occur each year². The current study investigates hospitalizations due to suicide attempts and self-inflicted injury in Canada during fiscal 2001-2002.

2. Methods

2.1 Data Source and Definitions

Table 1 shows the International Classification of Disease version 9 (ICD-9) External Cause of Injury codes (E Codes) that identify suicide attempts and self-inflicted injury. Individuals discharged from hospital during fiscal year 2001-2002 (April 1, 2001 to March 31, 2002) where the first recorded E Code was in this range were the basis of analysis.

Table 1: Attempted Suicide External Cause of Injury Codes (E Codes)

E Code	E Code Definition
E950	Suicide and self-inflicted poisoning by solid or liquid substances
E951	Suicide and self-inflicted poisoning by gases in domestic use
E952	Suicide and self-inflicted poisoning by other gases and vapours
E953	Suicide and self-inflicted injury by hanging, strangulation, and suffocation
E954	Suicide and self-inflicted injury by submersion (drowning)
E955	Suicide and self-inflicted injury by firearms and explosives
E956	Suicide and self-inflicted injury by cutting and piercing instruments
E957	Suicide and self-inflicted injury by jumping from high place
E958	Suicide and self-inflicted injury by other and unspecified means

Hospitalization data presented in this bulletin were identified in the Hospital Morbidity Database (HMDB), which captures information on patients who were discharged or died in all acute care facilities in Canada. HMDB is an administrative database that is managed by the Canadian Institute for Health Information (CIHI). Data originally submitted to CIHI using the ICD-10-CA^{*} classification system were converted to ICD-9 codes, using conversion tables created at CIHI. This conversion permitted national comparisons at the lowest common denominator since several provinces and territories (New Brunswick, Quebec, Ontario, Manitoba, Alberta, Northwest Territories, Nunavut) were still coding in the ICD-9 coding system during 2001. In some cases where a direct one-to-one conversion was not possible, the conversion tables used a best "force fit" of codes, which may compromise comparability.

Cases in the HMDB database do not necessarily represent unique persons since a person can be admitted to hospital more than once within a fiscal year. Percentages reported in this bulletin may not sum to 100% due to rounding.

3. Results

3.1 Overview

In Canada during fiscal year 2001-2002, there were 23,112 hospitalizations due to suicide attempts and self-inflicted injury. This represents a crude injury rate of 7.42 per 10,000 persons. By contrast, data from Statistics Canada shows that there were 3,688 deaths due to suicide in 2001⁹. This represents a difference of 19,424 suicide attempts that did not result in death.

As shown in Table 2, the majority of hospitalizations (62%, n = 14,263) were female, had an average age of 36 years and an average in-hospital stay of one week. Finally, the majority of hospitalizations (82%, n = 18,800) were discharged home.

Table 2: Characteristics of Hospitalizations Due to Suicide Attempts, 2001-2002

	Attempted Suicide Hospitalizations
Total Cases	23,112
Crude Rate per 10,000*	7.42
Females (%)	14,263 (62%)
Age (years)	
Mean (Std. Dev)	35.5 (14.9)
Median	35.0
Length of Stay (days)	
Total No. Days	169,235
Mean (Std. Dev)	7.3 (14.9)
Median	3.0
In-hospital Deaths (%)	324 (1%)
Discharge Disposition (% of total discharged alive)**	
Home (incl. with support)	18,800 (82%)
Another acute care facility	2,211 (10%)
Left against medical advice	1,317 (6%)
Continuing care	91 (0.4%)
Transferred to other	369 (2%)

* Denominator used to calculate the unadjusted rate is Statistics Canada population estimate for October 1, 2001.

** Denominator is number of cases discharged alive.

Hospitalizations due to suicide attempts had a higher proportion of females (61.7%, 95%CI 61.1%-62.4%) compared to all other types of trauma combined (47.1%, 95%CI 46.9%-47.3%).

Hospitalizations due to suicide attempts also had a lower average age (35.5 years, 95%CI 35.3-35.7) than all other trauma (51.8 years, 95%CI 51.7-51.9) and a shorter length of hospital stay (7.3 days, 95%CI 7.1-7.5) than all other trauma (9.8 days, 95%CI 9.7-9.9). Further, of those hospitalizations discharged alive, a higher proportion of suicide attempts left against medical advice (6%, n = 1,317) compared to all other trauma (1%, n = 1,629).

3.2 Trend Analysis

As shown in Figure 1, the age-adjusted rate for hospitalizations due to suicide attempts has remained relatively stable from fiscal years 1998-1999 to 2000-2001, with a slight decrease in 2001-2002. The age-adjusted hospitalization rate in 2001-2002 was 7.6 per 10,000. This represents a 1% decrease compared to the rate for 1998-1999 (7.7 per 10,000 population).

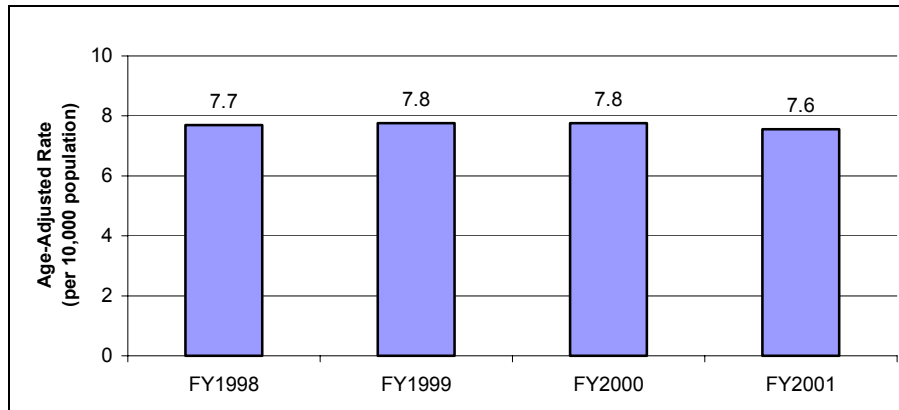


Figure 1: Age-Adjusted Suicide Attempt Rate (per 10,000 Population) by Fiscal Year*

*Rates have been directly age-standardized using Canada 1991 as the standard population. Population based on estimates from Statistics Canada

3.3 Age and Sex Analysis

Hospitalizations due to suicide attempts by age are shown in Figure 2. A distinct peak occurred at 15-19 years (14%, n=3,158). A second peak occurred at 35-39 years (14%, n=3,133). Hospitalizations decreased markedly among those 50 years of age and older, which collectively accounted for only 16% (n=3,614) of all hospitalizations due to suicide attempts.

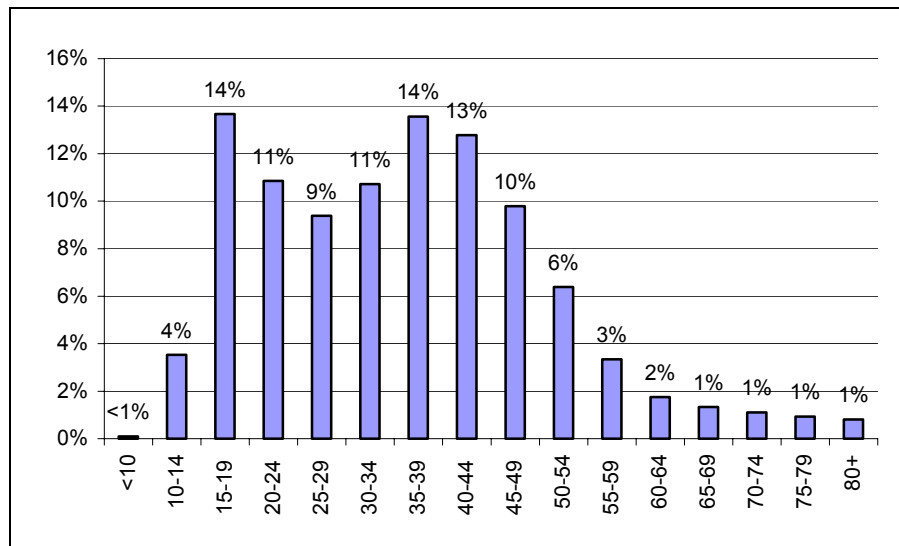


Figure 2: Hospitalizations Due to Suicide Attempts, by Age, 2001-2002

As shown in Figure 3, hospitalizations due to suicide attempts among females peaked at age 15-19 years (16%, n = 2,342), while males peaked at age 35-39 years (15%, n = 1,293). Further, there was a higher proportion of males than females among nearly all age groups 20 years or greater.

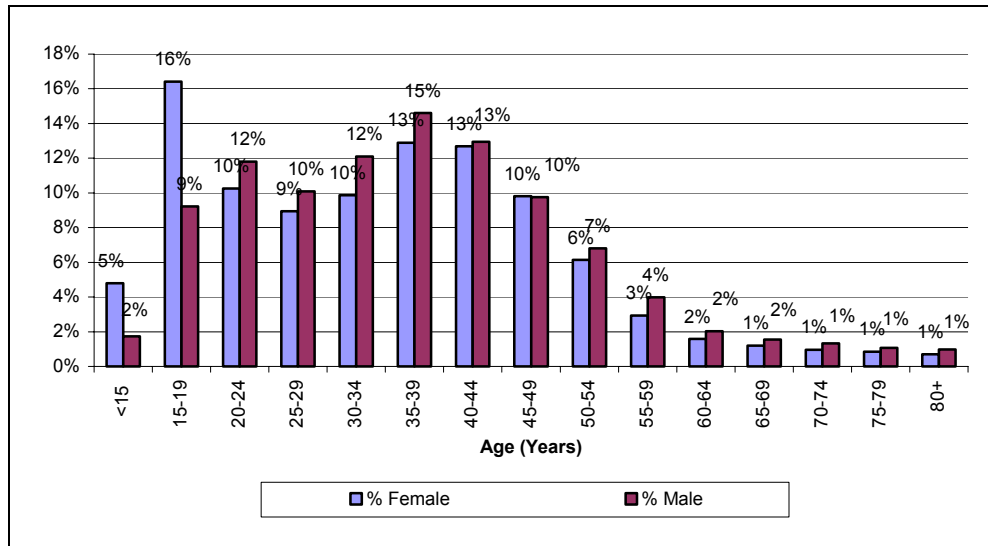


Figure 3: Hospitalizations Due to Suicide Attempts, by Sex and Age, 2001-2002

As shown in Appendix A, among those hospitalized due to suicide attempts, females had a higher age-standardized rate per 10,000 population (9.3, 95% CI 9.1-9.4) than males (5.8, 95% CI 5.7-5.9). Females (7.0 days, 95% CI 6.8-7.2) had a shorter average length of hospital stay than males (7.8 days, 95% CI 7.5-8.2), and a lower average age (34.5 years, 95% CI 34.2-34.7) than males (37.1 years, 95% CI 36.8-37.4). Finally, a higher proportion of females were discharged home (including with home support) (84%, n = 11,847) than males (80%, n = 6,953).

3.4 Method of Suicide Attempt

As shown in Figure 4, the leading method of suicide attempt was poisoning by a solid or liquid substance (83%, n = 19,203). This category includes poisoning by analgesics, antipyretics, antirheumatics, barbiturates, tranquilizers, agricultural/horticultural chemicals, corrosive and caustic substances, arsenic, and other/unspecified drugs, medicaments, solid, or liquids. Cutting and piercing (9%, n = 2,164) and hanging, strangulation and suffocation (2%, n = 554) were the next leading methods of attempted suicide among hospitalized cases.

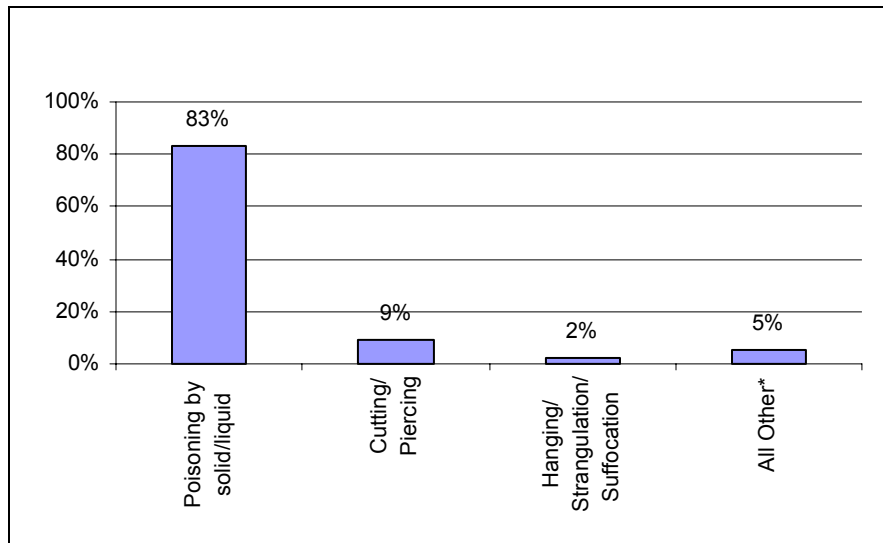


Figure 4: Methods of Suicide Attempts in Canada, 2001-2002

* See Table 1 for categories included in "All Other"

Among both females and males, the leading method of suicide attempt resulting in hospitalization was poisoning by a solid or liquid substance, though there was a higher proportion of females attributed to this cause (88%, n = 12,571) than males (75%, n = 6,632). Males were higher in all other leading methods of attempted suicide hospitalizations (Figure 5).

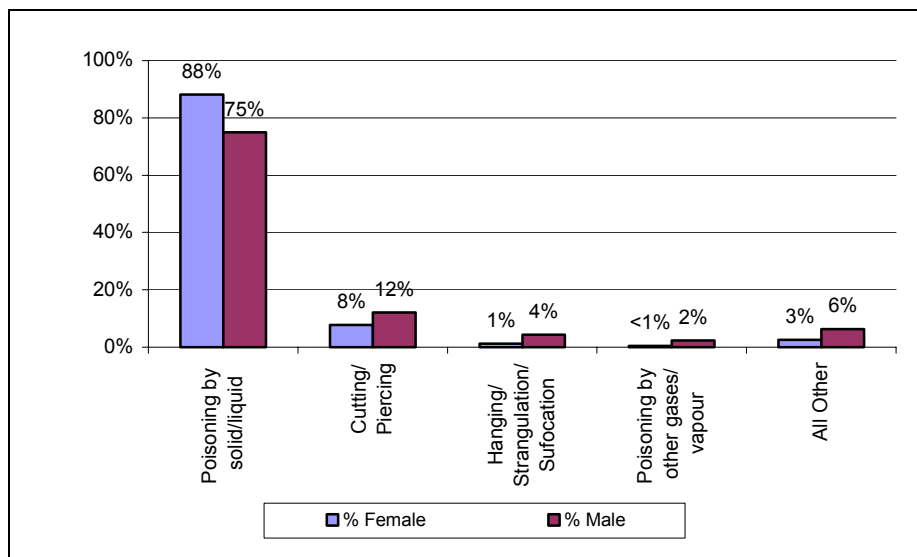


Figure 5: Cause of Attempted Suicide Hospitalization, Canada, 2001-2002

3.5 Suicide Attempts By Province/Territory

As shown in Figure 6, there is significant provincial/territorial variation in the age-standardized rates of suicide attempts resulting in hospitalization. The Territories had the highest rate (19.3 per 10,000 population, 95% CI 16.5-22.0), while Quebec had the lowest (4.6 per 10,000 population, 95% CI 4.4-4.8). However, caution should be taken when interpreting Territorial data due to low counts.

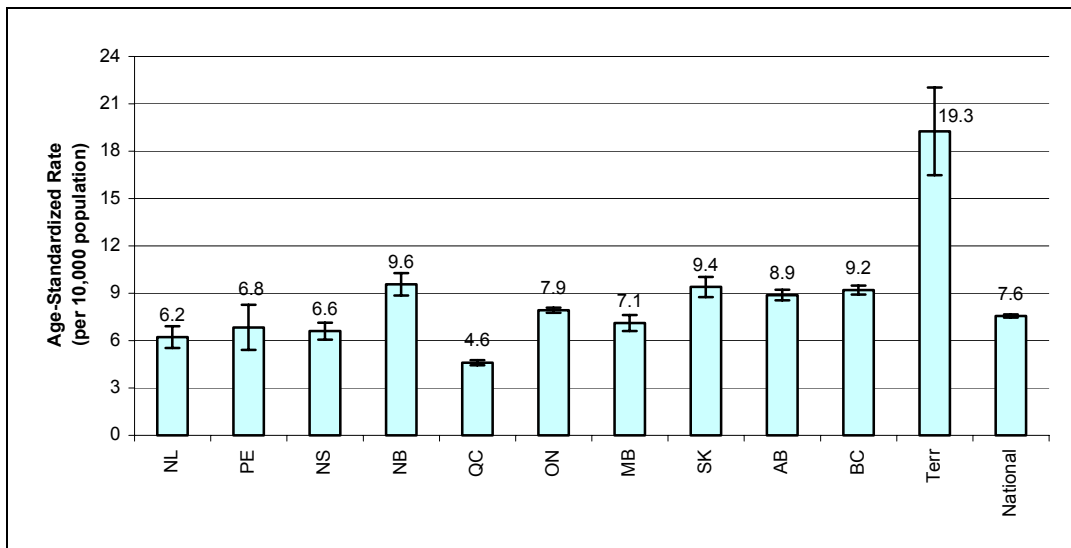


Figure 6: Age-Standardized Rates of Hospitalization Due to Suicide Attempts, by Province, 2001-2002* +

*Rates have been directly age-standardized using Canada 1991 as the standard population. Population based on estimates from Statistics Canada.

+ Note that "I" represents 95% confidence intervals.

The proportion of females varied by province, ranging from 79% in the Yukon to 56% in Nova Scotia. Average length of hospital stay was the highest in Newfoundland and Labrador (11 days) and lowest in Nunavut (2 days). Finally, average age varied from 38 years in Quebec to 27 years in Nunavut. Further provincial/territorial comparisons are shown in Appendix B.

3.6 Month of Injury Occurrence

The peak month of hospitalization due to suicide attempts was May (8.8%, n = 2,027), followed by July (8.6%, n = 1,996) and April (8.6%, n = 1,986) (Figure 4). The lowest proportion of admissions occurred in February (7.9%, n = 1,834) and December (7.8%, n = 1,814).

4. Summary and Limitations

During 2001-2002 there were 23,112 hospitalizations due to suicide attempts and self-inflicted injury in Canada, or 7.4 hospitalizations per 10,000 population. This corresponds to 169,235 days spent in acute care hospitals, an average of one week spent in hospital.

The current study did not investigate completed suicides, but rather suicide attempts. The epidemiology of completed suicides differs from suicide attempts, largely due to gender differences. Data from Statistics Canada⁹ shows that there were 3,688 completed suicides in 2001. In contrast to the findings of the current study, the majority of completed suicides were male (78%, n = 2,869). Further, the leading method among completed suicides was hanging, strangulation, and suffocation among males (43%, n = 1,230) and poisonings among females (45%, n = 366). These data also show age-related differences between completed and attempted suicides. Among completed suicides where age is known (3,233), the overall peak age occurred between 45 and 49 years of age (14%, n = 457)⁹. Conversely, among attempted suicides the peak age was 15-19 years of age (14%, n = 3,158). However, this age group accounted for only 6% of the completed suicides.

Langlois and Morrison² investigated attempted and completed suicides among Canadian persons aged 10 years and older in 1998. Data from the Vital Statistics Database and the Hospital Morbidity Database were used as the basis of analysis. Consistent with the current study, this study found that age-standardized hospitalization rates due to attempted suicide were higher among females than males, and the rate peaked earlier for females (15-19 years) than males (20-29 and 30-44 years). Conversely, they found that completed suicides rates for males were nearly four times higher than for females, and females peaked later in life (45-59 years for females vs. 30-44 years for males). In both studies poisoning was the leading method of attempted suicide hospitalization, while Langlois and Morrison showed that suffocation (hanging, strangulation) was the leading cause among completed suicides.

Finally, of note, the current study showed significant provincial/territorial variation: a nearly four-fold difference between the highest age-standardized rate in the Territories and the lowest in Quebec. Langlois and Morrison also found Quebec to have the lowest hospitalization rate. However, Langlois and Morrison found that Quebec had nearly the highest rate of completed suicides, second only to the Territories.

The findings reported in the current study may underestimate the true number of hospitalizations due to suicide attempts and self-inflicted injury. A study by Rhodes et al¹⁰ showed that the use of E Codes, such as those used in this study, underestimated the prevalence of intentional poisoning by as much as 63% when compared to an assessment by a trained physician. This is due to poisonings being coded under unintentional or undetermined, rather than being attributed to attempted suicide. Intentional poisoning was the leading cause of attempted suicide and self-inflicted injury in the current study. Thus it is possible that the number of hospitalizations due to suicide attempts and self-inflicted injuries in Canada may be higher than the number reported here.

5. References

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Appendix A: Characteristics of Hospitalizations Due to Suicide Attempts by Sex, 2001-2002

	Females	Males	Total
Total Cases (% total)	14,263 (62%)	8,849 (38%)	23,112
Age-Standardized Rate per 10,000** (95%CI)	9.3 (9.1-9.4)	5.8 (5.7-5.9)	7.6 (7.5-7.7)
Age (years)			
Mean (Std. Dev)	34 (14.9)	37 (14.6)	35.5 (14.9)
Median	34	36.0	35.0
Length of Stay (days)			
Mean (Std. Dev)	7 (13.7)	8 (16.6)	7.3 (14.9)
Median	2	3	3.0
Inhospital Deaths (%)	118 (1%)	206 (2%)	324 (1%)
Discharge Disposition (% total discharged alive)*			
Home (incl with support)	11,847 (84%)	6,953 (80%)	18,800 (82%)
Another acute care facility	1,267 (9%)	944 (11%)	2,211 (10%)
Left against medical advice	765 (5%)	552 (6%)	1,317 (6%)
Continuing care	47 (0.3%)	44 (1%)	91 (0.4%)
Transferred to other	219 (2%)	150 (2%)	369 (2%)

* Denominator is number cases discharged alive within respective sex.

**Rates have been directly age-standardized using Canada 1991 as the standard population. Population based on estimates from Statistics Canada.

Appendix B: Percent Female, Mean Age and LOS by Province for Hospitalizations Due to Suicide Attempts, 2001-2002

Province	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	NT	NV	YK	National
# Hospitalizations	317	91	601	706	3,425	9,344	783	878	2,728	4,049	76	57	57	23,112
Percent Total	1.4	0.4	2.6	3.1	14.8	40.4	3.4	3.8	11.8	17.5	0.3	0.2	0.2	100.0
Age-Standardized Rates (per 10,000)**	6.2	6.8	6.6	9.6	4.6	7.9	7.1	9.4	8.9	9.2	19.25*			7.6
Lower 95% CI	5.5	5.4	6.1	8.8	4.4	7.8	6.6	8.8	8.5	8.9	16.47*			7.5
Upper 95% CI	6.9	8.3	7.1	10.3	4.8	8.1	7.6	10.0	9.2	9.5	22.03*			7.7
Gender														
# Female	200	59	336	417	1983	5867	522	533	1635	2578	54	34	45	14263
% Females	63.1	64.8	55.9	59.1	57.9	62.8	66.7	60.7	59.9	63.7	71.1	59.6	78.9	61.7
Age (years)														
Mean	34.6	35.5	35.7	36.2	37.9	35.8	32.7	31.3	33.9	35.3	28.5	26.8	36.1	35.5
Std. Deviation	15.3	15.9	14.7	14.1	14.9	14.9	15.1	13.9	14.3	15.0	10.9	10.5	12.8	14.9
Median	34.0	35.0	35.0	36.0	38.0	36.0	30.0	30.0	33.0	34.0	26.5	24.0	39.0	35
Length of Stay (days)														
Mean	10.5	8.3	7.5	8.1	9.2	6.7	7.7	5.8	8.9	6.1	2.9	1.6	4.3	7.3
Std. Deviation	20.0	10.7	16.5	15.2	18.8	12.7	19.0	11.3	15.6	14.4	3.2	1.0	6.3	14.9
Median	3.0	4.0	3.0	3.0	3.0	3.0	2.0	2.0	3.0	2.0	2.0	1.0	2.0	3
Leading Method of Suicide Attempts														
Poisoning by Solid/Liquid (E950) (%)	91	91	84	84	75	86	80	86	81	84	83	82	77	83
* Note: Territories grouped together to calculate age-standardized rates due to small cell sizes.														
** Note: Rates have been directly age-standardized using Canada 1991 as the standard population. Population based on estimates from Statistics Canada.														