

At-a-glance

Injury hospitalizations in Canada 2018/19

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Abstract

National injury hospitalization statistics are essential for understanding the burden and pattern of injuries. This paper used the Discharge Abstract Database to analyse injury hospitalizations in Canada (excluding Quebec) for fiscal year 2018/19. The results show that unintentional injuries were the eighth leading cause of hospitalization compared to all other diseases and conditions. For unintentional injury-related hospitalizations, in rank order, the leading causes were falls, suffocation, motor vehicle traffic crashes, poisonings, struck by/against, and fire/hot object/smoke. However, the rankings were different across age groups.

Keywords: *injury hospitalizations, leading causes, unintentional injuries, self-inflicted injuries, assault, falls*

Introduction

An injury is defined as the transfer of energy to human beings at rates and in amounts above or below the tolerance of human tissue.^{1,2} Injuries can be grouped according to external cause, which is a rough representation of the main energy types: falls (mechanical); motor vehicle traffic crashes (MVT) (mechanical); struck by/against (mechanical); poisonings (chemical); suffocation (asphyxiation, too little energy); fire/hot object/smoke (thermal/chemical); and others (various energy types).

Injuries can also be classified as either unintentional or intentional. Unintentional injuries are those not caused on purpose or with intention to harm such as when someone trips and falls or is involved in a traffic accident.^{3,4} Intentional injuries result from a deliberate act of harm to oneself (self-inflicted) or another person (assault).³ When the intent is unclear, the injury is classified as undetermined intent. The intent and external cause provide insights into the mechanism of injuries that are fundamental for injury prevention.

Injuries are a public health concern, claiming 4.9 million lives worldwide in 2016⁵ and resulting in many more hospitalizations, emergency department visits and doctors' appointments.⁶ In Canada in 2018, 17 843 people died from injuries,⁷ and in fiscal year 2017/18, there were more than 269 000 injury-related hospitalizations.⁸ The economic burden associated with injuries in 2010 was around CAD 27 billion.⁹

Establishing a broad understanding of current injury burden and pattern in Canada is foundational for injury prevention efforts. Parachute, a national injury prevention organization, uses such information to set its strategic priority areas¹⁰ and to form the basis for reports on economic burden and cost of injury.⁹ Our 2019 paper showed that unintentional injuries were the first or second leading cause of death among 1–44 year olds and suicide was the second leading cause for those aged 15–34 years.¹¹

Hospitalization statistics are essential to understanding injury burden including non-fatal events. Injury and trauma emergency

Highlights

- National injury hospitalization statistics are essential for understanding the burden and pattern of injuries, including non-fatal events, in Canada and informing prevention strategies.
- In fiscal year 2018/19, unintentional injuries were the eighth leading cause of hospitalizations overall compared to all other diseases and conditions. They were ranked ninth or higher among causes of hospitalization for every age group except children aged less than 1 year old.
- Falls were the leading cause of hospitalization in every age group for unintentional injury-related hospitalizations.

department and hospitalization statistics for fiscal year 2017/18, published by the Canadian Institute for Health Information (CIHI), provide Canadian injury hospitalization rates by province/territory and hospitalization counts for specific injuries based on cause and intent.⁸ In a 2013 study, the Public Health Agency of Canada (PHAC) presented national injury hospitalization statistics from another perspective: PHAC ranked the hospitalizations for certain injury groupings (unintentional, self-inflicted and assault) compared to other diseases or conditions.¹² That study also compared the hospitalizations associated with major external causes of injuries.¹³ Presenting the data in this way allows a clear understanding of the relative burden of the major injury groupings, which can complement the CIHI statistics.

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The objective of this paper is to update the previous tables using the most current data available for Canada (2018/19, Quebec excluded). The information presented in this paper is intended to illustrate the burden and pattern of injury-related hospitalizations to inform injury-prevention initiatives.

Methods

Our data source was the Discharge Abstract Database (DAD) 2018/19 from CIHI, which does not include Quebec hospitals. For this study, we selected only discharges from acute inpatient institutions, which we refer to as hospitalizations. A total of 2 587 663 acute inpatient records with a discharge date between 1 April 2018 and 31 March 2019 were kept after excluding stillbirths, cadavers and duplicates. The number of records represented the discharge count, not the number of individual patients.

The diagnoses in DAD 2018/19 were coded in ICD-10-CA (the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada).¹⁴ To compare the burden of unintentional injuries, self-inflicted injuries and assault to other diseases or conditions, we used the most responsible diagnosis (MRD) variable to determine the cause of a hospitalization. If a record's MRD starts with an S or T, the record is defined as an injury record and further classified into unintentional injuries, self-inflicted injuries, assault, injuries with undetermined intent or others based on the external cause code in the diagnoses. If multiple external causes were found for one record, the classification was assigned following a priority order as assault, self-inflicted injuries, unintentional injuries, injuries with undetermined intent and others.

We conducted additional analyses for injury-related hospitalizations. To capture all hospitalization cases associated with injuries, we searched all external cause codes regardless of S or T code in MRD. We classified injuries based on intent and then external cause for unintentional injuries (falls, suffocation, MVT, poisonings, struck by/against, fire/hot object/smoke). We did not include complications of medical and surgical care; these were not the focus of this paper because their nature and prevention measures differ from that of most injuries.³ If a record was associated

with multiple injury groups, it was counted multiple times.

We used SAS Enterprise Guide version 7.1¹⁵ to compile the pooled and stratified (by sex and age) counts. The population estimates (Quebec excluded) on 1 October 2018 from Statistics Canada¹⁶ were used for crude rate calculation.

Results

Leading causes of all hospitalizations

The leading causes of all hospitalizations are presented in Table 1. Compared to all other diseases and conditions (including hospitalizations due to examinations, specific care, potential hazards and reproduction-related circumstances and not classifiable symptoms, signs and findings), unintentional injuries ranked eighth overall, seventh among males and ninth among females. For every age group except less than 1 year olds, unintentional injuries were ranked ninth or higher. They were among the top five for 1–34 year olds and those aged 80 years and over. Self-inflicted injuries were the ninth leading cause of hospitalizations for 15–19 year olds and tenth for 20–24 year olds.

Leading causes of injury-related hospitalizations

Table 2 shows that overall, males and females had similar rank order in hospitalization rates for unintentional injuries, but diverged for intentional injuries. Females displayed higher rates of hospitalizations associated with unintentional falls and self-inflicted injuries than males. In contrast, males showed higher rates of hospitalizations associated with unintentional suffocation, MVT, poisonings, struck by/against, fire/hot object/smoke and assault.

For all ages combined, the rankings of unintentional injuries by external causes (from highest to lowest) were falls, suffocation, MVT, poisonings, struck by/against and fire/hot object/smoke. Across the lifespan, the rate of hospitalization associated with falls increased sharply among those aged 65 years and over, jumping to 4 times and then 16 times as much as 45–64 year olds.

Aside from falls as the leading cause of hospitalizations associated with unintentional injuries in every age group, we can see variations in the ranking of other external causes across age groups.

Suffocation was the second leading cause for less than 10 year olds and those aged 45 years and over. MVT was the second leading cause for 15–44 year olds. Struck by/against was second for those aged 10–14 years.

Of note is that 15–24 year olds displayed a higher rate of hospitalization associated with self-inflicted injuries than unintentional falls. Those aged 20–24 years showed the highest rate of hospitalizations associated with assault.

Discussion

This paper presents the most up-to-date national injury hospitalization statistics to help understand the burden and pattern of injuries in Canada.

The results reveal that, overall, unintentional injuries were the eighth leading cause of hospitalizations in fiscal year 2018/19. Falls were the leading cause of hospitalizations related to unintentional injury across all age groups, particularly among seniors (65 years and over), with the rate jumping to 4 times and then 16 times as much as in middle age. The burden of seniors' falls on the Canadian health care system is substantial.⁹ Moreover, the aging of the baby-boom cohort increases the proportion of the population aged 65 and over. Ongoing surveillance of falls in this population is very important to understand the trend and develop effective prevention programs.¹⁷ The variations in the ranking of other unintentional injury groups across age groups highlight the significance of tailoring prevention efforts to specific age groups. They are the base for strategic planning and public messaging in injury prevention.^{10,18}

Self-inflicted injuries and assaults among young people are also an important public health concern. Self-inflicted injuries are used as a proxy for suicide attempts, and the high rate of hospitalizations associated with self-inflicted injuries among 15–24 year olds warrants further research. The group showing the highest rate of hospitalizations associated with assault were aged 20–24 years. These facts highlight the opportunity for prevention efforts among youth and young adults.^{19,20}

Limitations

The population of Quebec constitutes 22.6% of the Canadian population.¹⁶ Our

TABLE 1
Counts and rates (per 100 000) of leading causes of all hospitalizations, by sex and age group, Canada (Quebec excluded), 2018/19

Rank	All ages ^a n (rate per 100 000)		Age groups n (rate per 100 000)										
	All sexes ^b	Male	Female	<1	1-9	10-14	15-19	20-24	25-34	35-44	45-64	65-79	80+
1	Examination, specific care, potential hazards and reproduction-related circumstances	167 538 (1171.7)	Pregnancy, childbirth and the puerperium	Examination, specific care, potential hazards and reproduction-related circumstances	19 943 (716.4)	Mental and behavioural disorders	Mental and behavioural disorders	Pregnancy, childbirth and the puerperium	Pregnancy, childbirth and the puerperium	Pregnancy, childbirth and the puerperium	Circulatory system diseases	Circulatory system diseases	Circulatory system diseases
	322 393 (1118.6)	303 560 (2090.3)	303 560 (2090.3)	192 431 (64 337.8)	15 373 (903.9)	6586 (418.5)	32 423 (3487.3) ^c	190 039 (9518.3) ^c	73 664 (3831.2) ^c	75 501 (965.1)	107 681 (2975.6)	85 913 (7115.3)	
2	Pregnancy, childbirth and the puerperium	Examination, specific care, potential hazards and reproduction-related circumstances	Examination, specific care, potential hazards and reproduction-related circumstances	Conditions originating from perinatal period	Unintentional injuries ^d	Digestive system diseases	Mental and behavioural disorders	Digestive system diseases	Digestive system diseases	Digestive system diseases	Digestive system diseases	Musculoskeletal and connective tissue diseases	Respiratory system diseases
	303 560 ^e	150 99 (1056.0)	171 260 (1179.3)	102 599 (34 303.2)	5952 (213.8)	4209 (267.5)	9763 (500.7)	20 039 (492.3)	24 147 (636.4)	74 904 (957.5)	68 017 (1879.6)	51 547 (4269.1)	
3	Circulatory system diseases	Digestive system diseases	Circulatory system diseases	Congenital anomalies	Symptoms, signs and findings not elsewhere classified	Unintentional injuries ^d	Digestive system diseases	Mental and behavioural disorders	Mental and behavioural disorders	Mental and behavioural disorders	Musculoskeletal and connective tissue diseases	Digestive system diseases	Unintentional injuries ^d
	285 321 (990.0)	120 747 (844.4)	117 778 (811.0)	12 610 (4216.1)	5038 (181.0)	2761 (175.4)	7665 (393.1)	19 000 (466.8)	15 854 (417.8)	53 156 (679.5)	59 809 (1652.8)	38 928 (3224.0)	
4	Digestive system diseases	Respiratory system diseases	Digestive system diseases	Respiratory system diseases	Infectious and parasitic diseases	Respiratory system diseases	Unintentional injuries ^d	Examination, specific care, potential hazards and reproduction-related circumstances	Genitourinary system diseases	Genitourinary system diseases	Neoplasms	Respiratory system diseases	Digestive system diseases
	238 438 (827.3)	102 745 (718.5)	117 676 (810.3)	9660 (3229.7)	4799 (172.4)	2045 (130.0)	4434 (227.4)	15 443 (379.4)	13 865 (365.4)	51 417 (657.3)	58 004 (1602.9)	35 240 (2918.6)	
5	Respiratory system diseases	Musculoskeletal and connective tissue diseases	Respiratory system diseases	Symptoms, signs and findings not elsewhere classified	Nervous system diseases	Symptoms, signs and findings not elsewhere classified	Examination, specific care, potential hazards and reproduction-related circumstances	Unintentional injuries ^d	Neoplasms	Respiratory system diseases	Neoplasms	Neoplasms	Symptoms, signs and findings not elsewhere classified
	196 240 (680.9)	71 957 (503.2)	93 488 (643.8)	4659 (1557.7)	4605 (165.4)	1822 (115.8)	4426 (227.0)	9319 (228.9)	9957 (262.4)	38 351 (490.2)	54 070 (1494.2)	31 679 (2623.7)	
6	Musculoskeletal and connective tissue diseases	Neoplasms	Musculoskeletal and connective tissue diseases	Infectious and parasitic diseases	Digestive system diseases	Examination, specific care, potential hazards and reproduction-related circumstances	Symptoms, signs and findings not elsewhere classified	Genitourinary system diseases	Examination, specific care, potential hazards and reproduction-related circumstances	Genitourinary system diseases	Genitourinary system diseases	Genitourinary system diseases	Examination, specific care, potential hazards and reproduction-related circumstances
	159 473 (553.3)	68 840 (481.4)	87 514 (602.6)	2583 (863.6)	4480 (160.9)	1524 (96.8)	2536 (130.1)	7338 (180.3)	9096 (239.7)	35 493 (453.7)	37 379 (1032.9)	30 807 (2551.4)	

Continued on the following page

Rank	All ages ^a n (rate per 100 000)		Age groups n (rate per 100 000)										
	All sexes ^b	Male	Female	<1	1–9	10–14	15–19	20–24	25–34	35–44	45–64	65–79	80+
7	Neoplasms		Neoplasms	Genitourinary system diseases	Examination, specific care, potential hazards and reproduction-related circumstances	Nervous system diseases	Respiratory system diseases	Respiratory system diseases	Respiratory system diseases	Unintentional injuries ^d	Symptoms, signs and findings not elsewhere classified	Examination, specific care, potential hazards and reproduction-related circumstances	Genitourinary system diseases
	144 396 (501.0)	63 049 (440.9)	75 551 (520.3)	1702 (569.1)	2979 (107.0)	1346 (85.5)	2232 (131.2)	2407 (123.5)	5870 (144.2)	8792 (231.7)	28 568 (365.2)	35 011 (967.5)	26 161 (2,166.7)
8	Unintentional injuries ^d		Genitourinary system diseases	Digestive system diseases	Congenital anomalies	Musculoskeletal and connective tissue diseases	Genitourinary system diseases	Genitourinary system diseases	Respiratory system diseases	Circulatory system diseases	Examination, specific care, potential hazards and reproduction-related circumstances	Symptoms, signs and findings not elsewhere classified	Musculoskeletal and connective tissue diseases
	131 366 (455.8)	62 664 (438.2)	73 754 (507.9)	1457 (487.1)	2411 (86.6)	1341 (85.2)	1741 (102.4)	2278 (116.8)	5235 (128.6)	8706 (229.4)	28 373 (362.7)	33 864 (935.8)	23 160 (1918.1)
9	Genitourinary system diseases		Unintentional injuries ^d	Nervous system diseases	Genitourinary system diseases	Endocrine, nutritional and metabolic diseases	Self-inflicted injuries	Endocrine, nutritional and metabolic diseases	Endocrine, nutritional and metabolic diseases	Symptoms, signs and findings not elsewhere classified	Unintentional injuries ^d	Unintentional injuries ^d	Neoplasms
	128 670 (446.4)	60 851 (425.6)	68 309 (470.4)	997 (333.3)	1877 (67.4)	1237 (78.6)	1714 (100.8)	2052 (105.2)	4909 (120.6)	7367 (194.2)	27 435 (350.7)	29 178 (806.3)	20 848 (1726.6)
10	Symptoms, signs and findings not elsewhere classified		Symptoms, signs and findings not elsewhere classified	Skin and subcutaneous tissue diseases	Diseases of blood and blood-forming organs and certain disorders involving the immune mechanism	Genitourinary system diseases	Endocrine, nutritional and metabolic diseases	Self-inflicted injuries	Neoplasms	Respiratory system diseases	Mental and behavioural disorders	Infectious and parasitic diseases	Infectious and parasitic diseases
	123 974 (430.2)	55 873 (390.7)	63 119 (434.6)	853 (285.2)	1834 (65.9)	836 (53.1)	1662 (97.7)	1397 (71.7)	4188 (102.9)	6816 (179.6)	26 592 (339.9)	18 299 (505.7)	15 893 (1316.3)
ALL	2 587 663 (8978.3)	1 147 083 (8021.9)	1 440 264 (9917.8)	332 876 (111 294.4)	64 141 (2304.0)	28 918 (1837.6)	52 729 (3100.5)	78 896 (4046.3)	305 816 (7513.1)	210 494 (5547.3)	525 265 (6714.4)	577 323 (15 953.6)	411 203 (34 055.9)

Data source: Discharge Abstract database 2018/19 (Canadian Institute for Health Information).

Notes: ICD-10-CA codes for defining the causes: A00.0–B99 (infectious and parasitic diseases); C00.0–D48.9 (neoplasms); D50–D89 (diseases of blood and blood-forming organs and certain disorders involving the immune mechanism); E00.0–E90 (endocrine, nutritional and metabolic diseases); F00.0–F99 (mental and behavioural disorders); G00.0–G99.8 (nervous system diseases); I00–I99 (circulatory system diseases); J00–J99.8 (respiratory system diseases); K00.0–K93.8 (digestive system diseases); L00–L99.8 (skin and subcutaneous tissue diseases); M00.0–M99.9 (musculoskeletal and connective tissue diseases); N00.0–N99.9 (genitourinary system diseases); O00.0–O99.8 (pregnancy, childbirth and the puerperium); P00.0–P96.9 (conditions originating from perinatal period); Q00.0–Q99.9 (congenital anomalies); R00.0–R99 (symptoms, signs and findings not elsewhere classified); Z00.0–Z99.9 (examination, specific care, potential hazards and reproduction-related circumstances); S00.0–S98.3 and V01.0–X59.9, Y85.0–Y86 (unintentional injuries); S00.0–T98.3 and X60–X84, Y87.0 (self-inflicted injuries); S00.0–T98.3 and X85–Y09, Y87.1 (assault); S00.0–T98.3 and Y10–Y34, Y87.2 (injuries with undetermined intent); S00.0–T98.3 and Y35.0–Y84.9, Y88.0–Y89.9 (other injuries).

Shading indicates data related to injuries.

^a All ages include those whose age was unknown (2 records for all causes).

^b All sexes include males, females and other sexes (316 records for all causes).

^c The rate is based on female population only.

^d Unintentional injuries do not include complications of medical and surgical care.

^e A rate is not applicable.

TABLE 2
Counts and rates (per 100 000) of leading causes of injury hospitalizations, by sex and age group, Canada (Quebec excluded), 2018/19

	All ages n (rate per 100 000)		Age groups n (rate per 100 000)									
	All sexes ^a	Females	<1	1-9	10-14	15-19	20-24	25-34	35-44	45-64	65-79	80+
All injuries (excluding complications of medical and surgical care) ^b	225 208 (781.4)	111 108 (777.0)	1479 (494.5)	6977 (250.6)	4235 (269.1)	7935 (466.6)	8561 (439.1)	16 327 (401.1)	15 099 (397.9)	45 683 (584.0)	50 600 (1398.3)	68 312 (5657.6)
Unintentional injuries (excluding complications of medical and surgical care) ^b	203 600 (706.4)	100 318 (701.6)	1418 (474.1)	6876 (247.0)	3171 (201.5)	4460 (262.3)	5536 (283.9)	12 072 (296.6)	11 902 (313.7)	40 849 (522.2)	49 440 (1366.2)	67 876 (5621.5)
Falls	116 318 (403.6)	47 113 (329.5)	389 (130.1)	3246 (116.6)	1201 (76.3)	993 (58.4)	1288 (66.1)	3127 (76.8)	3839 (101.2)	19 631 (251.0)	32 145 (888.3)	50 459 (4179.0)
Suffocation	27 182 (94.3)	16 625 (116.3)	196 (65.5)	509 (18.3)	126 (8.0)	176 (10.3)	350 (18.0)	872 (21.4)	979 (25.8)	4852 (62.0)	7684 (212.3)	11 438 (947.3)
Motor vehicle traffic crashes	12 718 (44.1)	7777 (54.4)	15 (5.0) ^c	212 (7.6)	175 (11.1)	788 (46.3)	1178 (60.4)	1936 (47.6)	1554 (41.0)	3641 (46.5)	2106 (58.2)	1113 (92.2)
Poisonings	9770 (33.9)	5191 (36.3)	80 (26.7)	501 (18.0)	120 (7.6)	478 (28.1)	643 (33.0)	1572 (38.6)	1322 (34.8)	2818 (36.0)	1464 (40.5)	772 (63.9)
Struck by/against	5054 (17.5)	3655 (25.6)	26 (8.7) ^c	325 (11.7)	411 (26.1)	531 (31.2)	340 (17.4)	675 (16.6)	536 (14.1)	1077 (13.8)	581 (16.1)	552 (45.7)
Fire/hot object/smoke	1889 (6.5)	1216 (8.5)	55 (18.4)	307 (11.0)	43 (2.7)	37 (2.2)	106 (5.4)	188 (4.6)	174 (4.6)	536 (6.9)	326 (9.0)	117 (9.7)
Self-inflicted	13 661 (47.4)	4925 (34.4)	0 (0)	5 (.1)	921 (58.5)	2842 (167.1)	1931 (99.0)	2201 (54.1)	1762 (46.4)	3011 (38.5)	754 (20.8)	234 (19.4)
Assault	6509 (22.6)	5046 (35.3)	75 (25.1)	82 (2.9)	81 (5.1)	504 (29.6)	976 (50.1)	1793 (44.0)	1214 (32.0)	1368 (17.5)	260 (7.2)	156 (12.9)
Undetermined intent	2809 (9.7)	1573 (11.0)	7 (.1)	27 (1.0) ^c	88 (5.6)	226 (13.3)	281 (14.4)	502 (12.3)	440 (11.6)	831 (10.6)	288 (8.0)	119 (9.9)
Legal intervention / war	113 (0.4)	97 (0.7)	- ^d	- ^d	- ^d	- ^d	10 (0.5) ^e	36 (0.9) ^e	24 (0.6) ^e	38 (0.5)	- ^d	- ^d

Data source: Discharge Abstract database 2018/19 (Canadian Institute for Health Information).

Note: ICD-10-CA codes for the injury groups: V01.0-Y36.9, Y85.0-Y87.2, Y89.0-9 (all injuries); V01.0-X59.9, Y85.0-Y86 (unintentional injuries); W00-W19 (falls); W75-W84 (suffocation); X40-X49 (poisonings); Y02-Y04(1), Y02-Y04(.9), V09.2, V12-V14(3-9), V19(4-6), V20-V28(3-9), V29(4-9), V30-V79(4-9), V80(3-5), V81-Y82(1), V83-Y86(0-3), Y87(0-8), V89.2 (motor vehicle traffic crashes); W20-W22, W50-W52 (struck by/against); X00-X19 (fire/hot object/smoke); X60-X84, Y87.0 (self-inflicted injuries); X85-Y09, Y87.1 (assault); Y10-Y34, Y87.2, Y89.9 (undetermined intent); Y35.0-Y36.9, Y89.0-1 (legal intervention/war).

^a All sexes include males, females and other sexes (28 records for all injuries).

^b ICD-10 codes for complications of medical and surgical care: Y40-Y84, Y88.

^c The rate is not reliable.

^d The cell count is less than 5.

^e The rate should be interpreted with caution.

data source was the DAD from CIHI, which does not include Quebec hospitalization data. The Quebec Ministry of Health and Social Services provided hospitalization statistics by sex (no age group breakdown) through MED-ÉCHO,²¹ while our analyses require micro-level data.

Second, to compare the burden of injuries with other diseases and conditions, we used both MRD (S, T codes) and external cause codes to identify injury cases. This method classifies records whose external cause was the underlying cause for their non-injury MRD into non-injury cases. Therefore, it undercounts the injury cases. It also indicates that we should not expect the equal numbers of unintentional, self-inflicted and other injuries between Table 1 and 2.

In addition, the method of data analysis can affect ranking. To accurately monitor the trend in injury hospitalizations, consistent case definitions and procedures to compile and report data are necessary. We aim to do more work in this area.

Conclusion

Overall, unintentional injuries were the eighth leading cause of hospitalization among all causes. For unintentional injury-related hospitalizations, in rank order, the leading causes were falls, suffocation, MVT, poisonings, struck by/against, and fire/hot object/smoke. However, the rankings were different across age groups. The updated injury hospitalization information is critical for understanding the burden and pattern of injuries in Canada.

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Conflicts of interest

All authors declare no conflicts of interest.

Authors' contributions and statement

All authors have read and approved of the content of this article. XY was involved in conceptualization, data analysis, interpretation and manuscript preparation. RS, SM and WT were involved in conceptualization, data interpretation and manuscript preparation.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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