

HOSPITALIZATIONS DUE TO UNINTENTIONAL FALLS AMONG OLDER ADULTS

Acknowledgement

We would like to thank all the dedicated people who contributed to this report, including those who collected and provided the data, reviewed the drafts, and provided input throughout the development of this report.

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Created: March 2024

Revisions:

Table of Contents

List of Figures.....	4
List of Tables.....	5
Highlights.....	6
Falls Hospitalizations.....	7
Overview and Geography.....	7
Falls by Age Group.....	8
Falls by Time and Seasonality.....	9
Cause of Falls.....	11
Location of Falls.....	12
Injuries from Falls.....	14
Summary.....	15
Technical Notes.....	16
Data Sources.....	16
Data Notes.....	16
Appendix – Definitions.....	17
Cause of Falls.....	17
Place of Occurrence.....	17

List of Figures

Figure 1. Hospitalization rates due to unintentional injuries, most common causes, NH and BC; 2002-2019 (combined).	7
Figure 2. Hospitalization rates due to unintentional falls by HSDA and sex, NH and BC; 2002-2019 (combined).	8
Figure 3. Hospitalization rates due to unintentional falls by age group, NH and BC; 2002-2019 (combined).	9
Figure 4. Hospitalization rates due to unintentional falls by HSDA, NH and BC; 2002-2019 (combined).	10
Figure 5. Hospitalization rates due to unintentional falls by month, NH and BC; 2002-2019 (combined).	10
Figure 6. Hospitalization rates of the most common causes of unintentional falls by sex, NH and BC; 2002-2019 (combined).	12
Figure 7. Hospitalization rates of the most common locations of unintentional falls by sex, NH and BC; 2002-2019 (combined).	13

List of Tables

Table 1. Number (%), rate (per 100,000), LOS (days) and cost (millions \$) of unintentional falls hospitalizations by HSDA, NH; 2002-2019 (combined).	7
Table 2. Number, rate (per 100,000), LOS (days) and cost (millions \$) of unintentional falls hospitalizations by age group, NH; 2002-2019 (combined).	8
Table 3. Number (%) and rate (per 100,000) of the most common causes of unintentional falls causing hospitalization by sex, NH and BC; 2002-2019 (combined).	11
Table 4. Number (%) of the most common causes of unintentional falls causing hospitalization by age group, NH; 2002-2019 (combined).	12
Table 5. Number (%) and rate (per 100,000) of the most common locations of unintentional falls causing hospitalization by sex, NH and BC; 2002-2019 (combined).	13
Table 6. Number (%) of the most common locations of unintentional falls causing hospitalization by age group, NH and BC; 2002-2019 (combined).	14
Table 7. Number (%) of the most common injuries of unintentional falls causing hospitalization by sex, NH and BC; 2002-2019 (combined)..	14

Highlights

- Falls are the biggest burden of unintentional injury among adults aged 65 and older;
 - Hospitalizations numbered approximately 610 per year, resulting in a cost of 9.6 million dollars per and over ten thousand days in hospital;
- Rates of hospitalization due to unintentional falls differed by geography, sex and age groups:
 - Northern Health (NH) had a slightly higher rate compared to British Columbia (BC);
 - The Northwest (NW) Health Service Delivery Area (HSDA) had the highest rates in the north;
 - Females are hospitalized at a rate 70% higher than males;
 - Adults aged 85 and older are hospitalized at a rate over seven times higher than those aged 65 to 69;
- Slips and trips on the same level (e.g.: fall from bumping against object, stumbling on an object, etc.) accounted for over half (56%) of falls hospitalizations;
- The home was the most common location for a fall to occur at 61% of falls hospitalizations;
- The most common injury resultant from a fall was a hip fracture, accounting for 44% of falls hospitalizations.

Falls Hospitalizations

Overview and Geography

Falls represent the largest burden of injury-related hospitalizations among older adults in NH. Between 2002 and 2019, the rate of hospitalization due to unintentional falls were upwards of 16 times higher than the next most common specified causes of unintentional injury in NH (Figure 1). Rates of hospitalizations due to falls during this period were 1937.9 per 100,000 in NH compared to 1750.8 per 100,000 in BC. Total hospitalizations in NH between 2002 and 2019 numbered 10,966 at an estimated cost of 173M \$CAD (~9.6M / year) and resulted in a total length of stay (LOS) in hospital of 181,809 days (Table 1). During this time frame, the NW HSDA had the highest rate of falls-related hospitalizations at 2,492.2 per 100,000, whereas the Northern Interior (NI) and Northeast (NE) were similar ~1700 / 100,000 (Table 1).

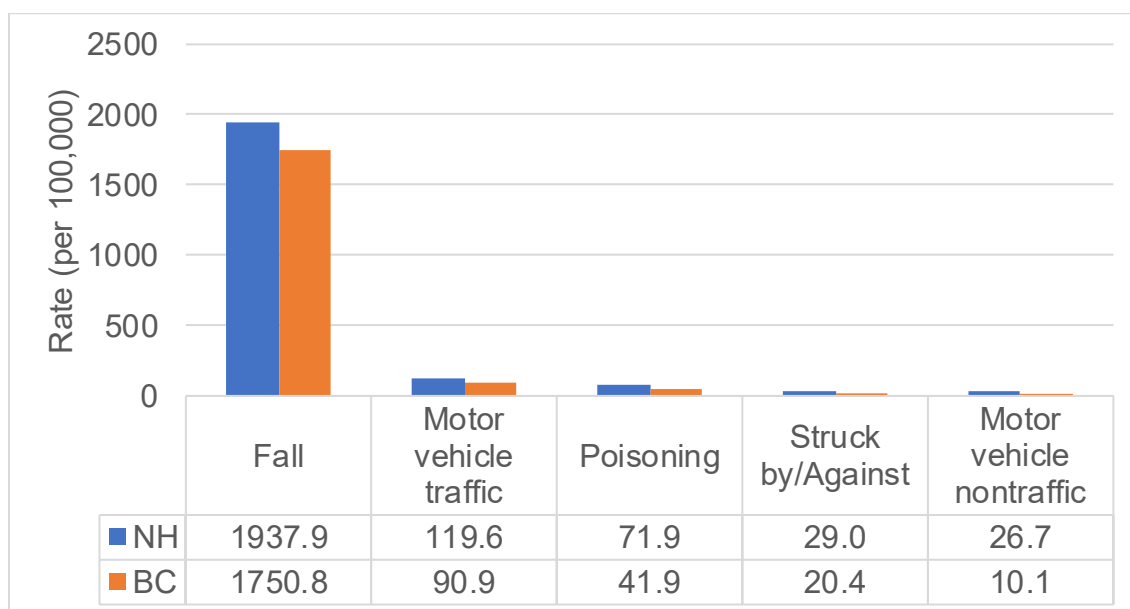


Figure 1. Hospitalization rates due to unintentional injuries, most common causes, NH and BC; 2002-2019 (combined).

Table 1. Number (%), rate (per 100,000), LOS (days) and cost (millions \$) of unintentional falls hospitalizations by HSDA, NH; 2002-2019 (combined).

HSDA	Number (%)	Rate	LOS	Cost
NW	3,803 (34.7)	2,492.2	50,979	49.1
NI	5,389 (49.1)	1,739.5	97,082	93.4
NE	1,774 (16.2)	1,714.6	33,748	30.4
NH	10,966	1,937.9	181,809	172.9

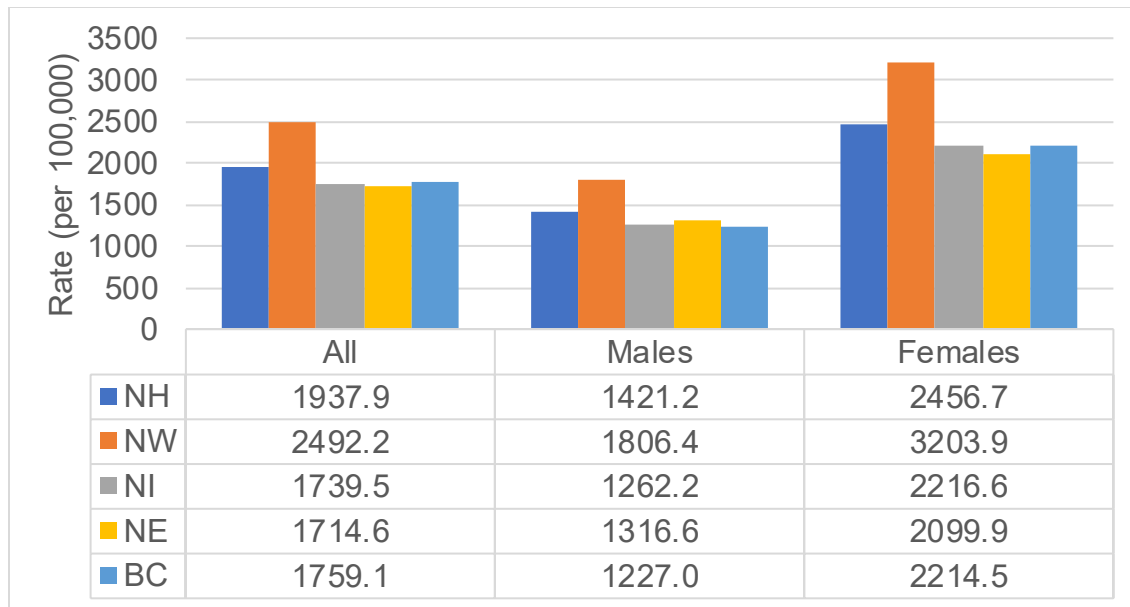


Figure 2. Hospitalization rates due to unintentional falls by HSDA and sex, NH and BC; 2002-2019 (combined).

Falls by Age Group

The risk of falling increases with increased frailty, which is often associated with increased age; subsequently hospitalization rates due to unintentional falls increase with age. Adults aged 85 and older are hospitalized at a rate over seven times higher than those aged 65 to 69 (Table 2). As the number and rate of hospitalizations increase, so do the cost and LOS (see Data Notes). For instance, between 2002 and 2019, the cost of hospitalizations due to unintentional falls among females aged 65 to 69 was approximately ten million dollars, whereas the cost among those aged 85 and older was roughly 47 million dollars. Similarly, LOS among these populations were nearly 9,000 days and 55,000 days, respectively. Rates among all age groups in NH were higher than BC, with the largest disparity among 65 to 69 years (Figure 3).

Table 2. Number, rate (per 100,000), LOS (days) and cost (millions \$) of unintentional falls hospitalizations by age group, NH; 2002-2019 (combined).

Age Group	Males				Females			
	#	Rate	LOS	Cost	#	Rate	LOS	Cost
65-69	809	748.2	8,686	10.5	941	965.8	8,779	9.8
70-74	713	935.2	9,192	10.8	989	1,389.8	12,182	12.8
75-79	807	1,609.3	11,671	11.7	1,247	2,551.8	18,428	17.6
80-84	790	2,713.9	14,957	13.6	1,474	4,324.6	23,817	21.7
85+	910	4,577.0	19,270	17.3	2,286	7,416.5	54,827	46.9

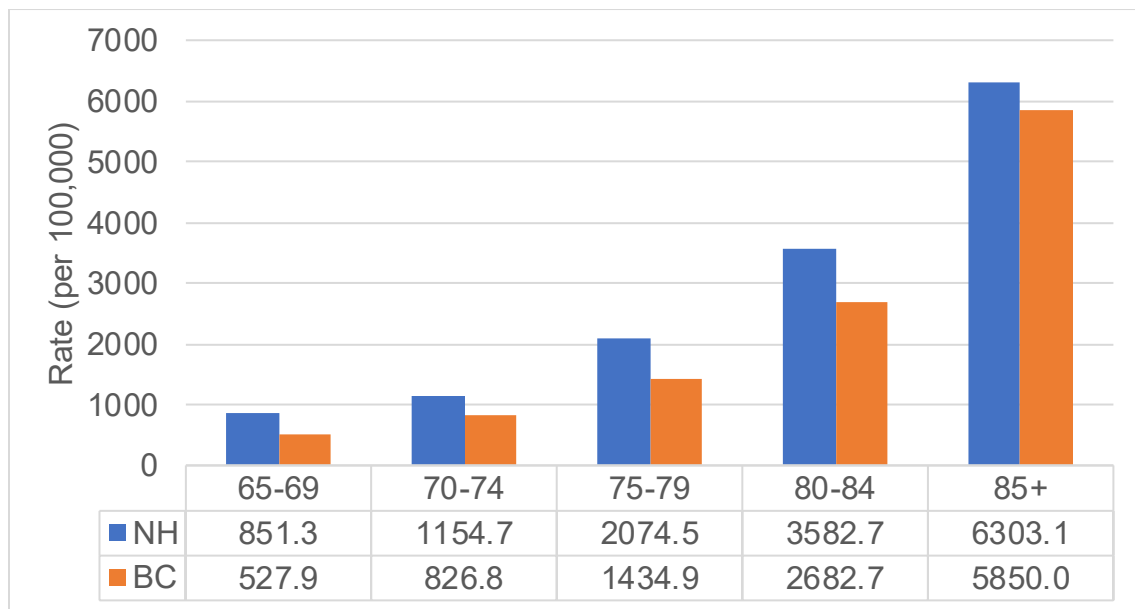


Figure 3. Hospitalization rates due to unintentional falls by age group, NH and BC; 2002-2019 (combined).

Falls by Time and Seasonality

The rate of hospitalizations due to unintentional falls was relatively stable between 2002 and 2019, showing some decline starting around 2015 (Figure 4). Similar patterns were observed in the NI and the NW; however, there was a slight increase in the NE beginning in 2014. With the exception of the NW, rates in NH HSDAs were similar to BC, which was largely stable during the 2002-to-2019-time frame.

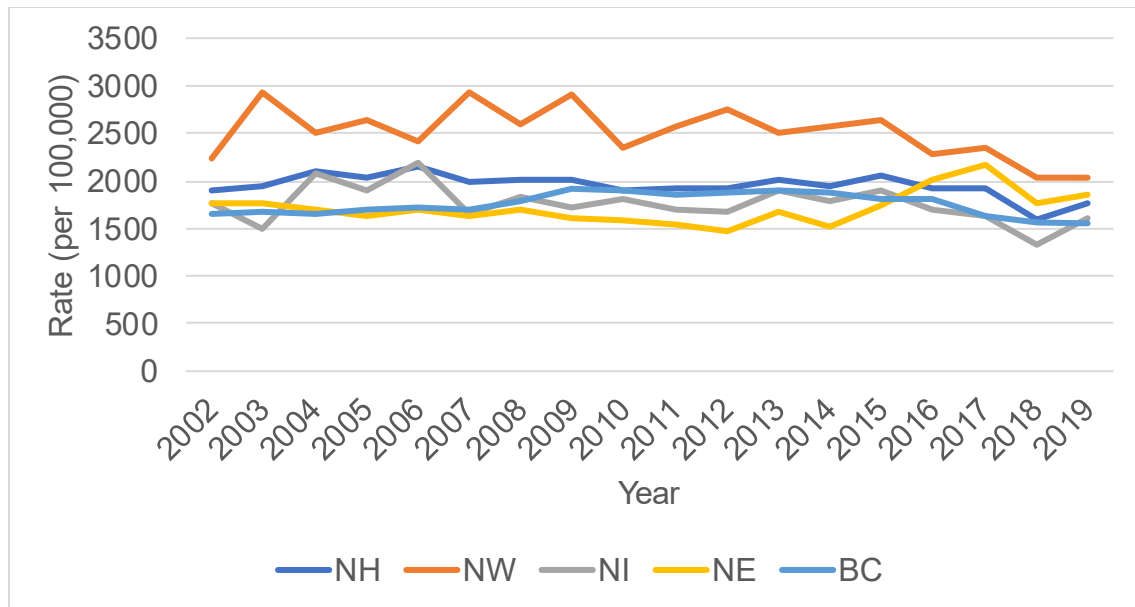


Figure 4. Hospitalization rates due to unintentional falls by HSDA, NH and BC; 2002-2019 (combined).

There is also some seasonality associated with hospitalizations due to unintentional falls: rates of hospitalizations increase during the winter months (November through February) compared to other times of year (Figure 5). This pattern is slightly more pronounced in the NW compared to other HSDAs.

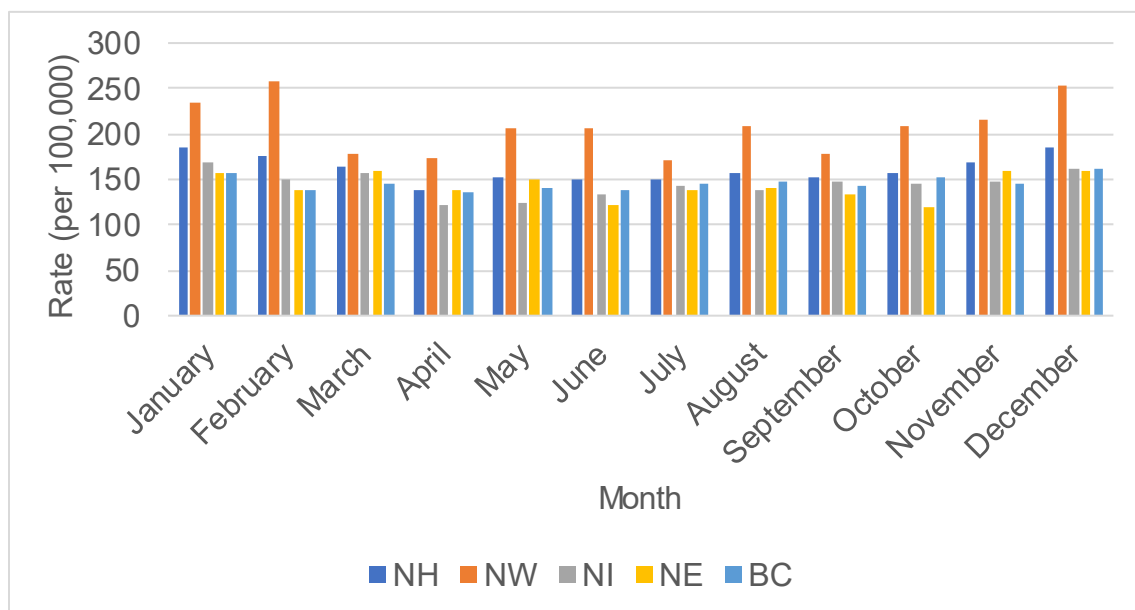


Figure 5. Hospitalization rates due to unintentional falls by month, NH and BC; 2002-2019 (combined).

Cause of Falls

The most common cause of an unintentional fall was a slip or trip of the same level, accounting for 56.3% of hospitalizations – this was similar between males and females in NH (Table 3). Unspecified causes accounted for roughly one in five hospitalizations in NH and one in four hospitalizations in BC. Falls from one level to another accounted for a slightly higher proportion of hospitalizations in NH compared to BC, in particular among males. Rates of falls among females for most causes (except one level to another) were nearly double that of males (Figure 6). The pattern of causes of falls was similar across HSDAs, though there was a slightly higher proportion of ‘unspecified falls’ in the NE at 24.7%. With increased age, the cause of falls also differed slightly: for instance, a higher proportion of falls among persons aged 65 to 69 occurred on steps/stairs and from one level to another compared to the oldest population group (Table 5).

Table 3. Number (%) and rate (per 100,000) of the most common causes of unintentional falls causing hospitalization by sex, NH and BC; 2002-2019 (combined).

Cause of Fall	Males		Females	
	NH			
	Number (%)	Rate	Number (%)	Rate
Same level, slip/trip	2,116 (52.6)	746.4	4,061 (58.5)	1,438.2
Unspecified	736 (18.3)	259.6	1,325 (19.1)	469.2
Steps/stairs	331 (8.2)	116.8	595 (8.6)	210.7
Furniture	260 (6.5)	91.7	529 (7.6)	187.3
One level to another	235 (5.8)	82.9	165 (2.4)	58.4
	BC			
Same level, slip/trip	33,337 (48.9)	595.6	82,429 (56.8)	1251.1
Unspecified	17,265 (25.3)	308.5	34,147 (23.5)	518.3
Steps/stairs	4,814 (7.1)	86.0	9,213 (6.3)	139.8
Furniture	4,752 (7.0)	84.9	10,413 (7.2)	158.0
One level to another	1,902 (2.8)	34.0	1,397 (1.0)	21.2

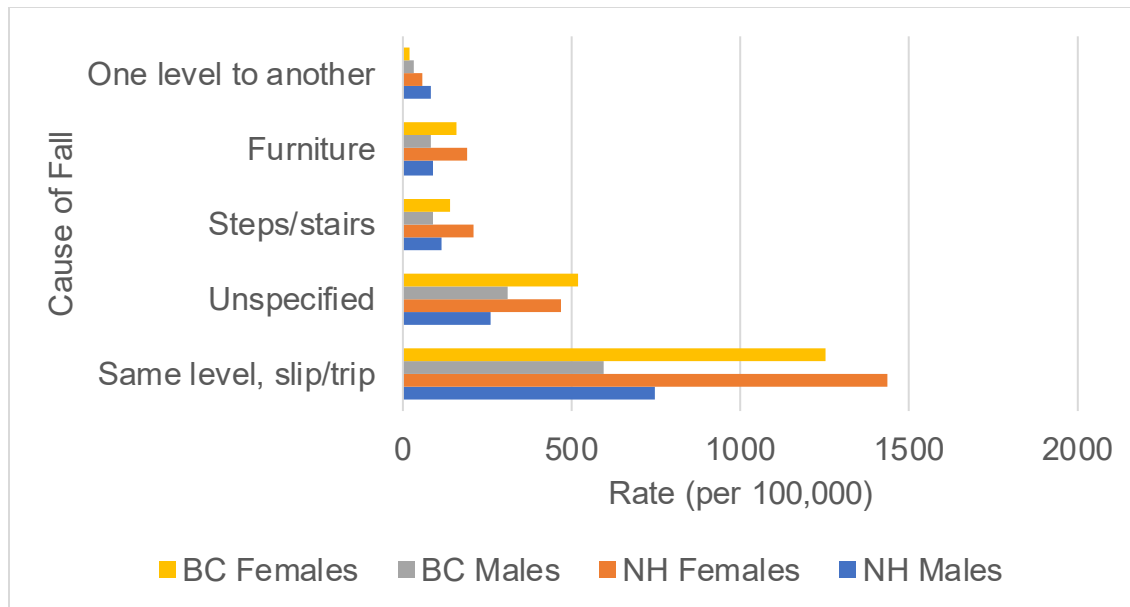


Figure 6. Hospitalization rates of the most common causes of unintentional falls by sex, NH and BC; 2002-2019 (combined).

Table 4. Number (%) of the most common causes of unintentional falls causing hospitalization by age group, NH; 2002-2019 (combined).

Cause of Fall	Age group				
	65 - 69	70 - 74	75 - 79	80 - 84	85+
Same level, slip/trip	880 (50.3)	953 (56.0)	1,210 (58.9)	1,315 (58.1)	1,819 (56.9)
Unspecified	265 (15.1)	282 (16.6)	341 (16.6)	442 (19.5)	731 (22.9)
Steps/stairs	230 (13.1)	182 (10.7)	183 (8.9)	171 (7.6)	160 (5.0)
Furniture	98 (5.6)	119 (7.0)	124 (6.0)	178 (7.9)	270 (8.4)
One level to another	129 (7.4)	70 (4.1)	84 (4.1)	55 (2.4)	62 (1.9)

Location of Falls

The most common place for a fall to occur is in the home at 60.5%; 57.8% of males fell at home compared to 62.1% of females (Table 5). This was slightly higher than the province, whereas the proportion of falls occurring in a residential institution was lower in NH compared to BC. In both NH and BC had a higher proportion of females fell in a residential institution compared to males. Males, by comparison had a higher proportion of falls occurring at schools or other institutions and public areas, and streets or highways. Similar to causes of falls, 'unspecified location' was more prevalent in the NE at 22.9% compared to 11.1% and 10.5% in the NW and NI, respectively. A higher proportion of falls among persons aged 65 to 69 occurred in an unspecified location compared to the eldest age cohort; conversely, a higher proportion of falls among adults

80 and older occurred in a residential institution, likely reflecting the living situations of this population (Table 6).

Table 5. Number (%) and rate (per 100,000) of the most common locations of unintentional falls causing hospitalization by sex, NH and BC; 2002-2019 (combined).

Location of Fall	Males		Females	
	NH			
	Hosp.	Rate	Hosp.	Rate
Home	2,329 (57.8)	821.5	4,307 (62.1)	1525.3
Unspecified	606 (15.0)	213.8	790 (11.4)	279.8
Residential institution	369 (9.2)	130.2	804 (11.6)	284.7
School/institution, public area	264 (6.6)	93.1	377 (5.4)	133.5
Street/highway	157 (3.9)	55.4	220 (3.2)	77.9
	BC			
Home	37,477 (51.9)	669.6	83,230 (54.7)	1263.2
Unspecified	10,610 (14.7)	189.6	16,511 (10.9)	250.6
Residential institution	8,252 (11.4)	147.4	25,427 (16.7)	385.9
School/institution, public area	3,855 (5.3)	68.9	5,974 (3.9)	90.7
Street/highway	3,298 (4.6)	58.9	6,217 (4.1)	94.4

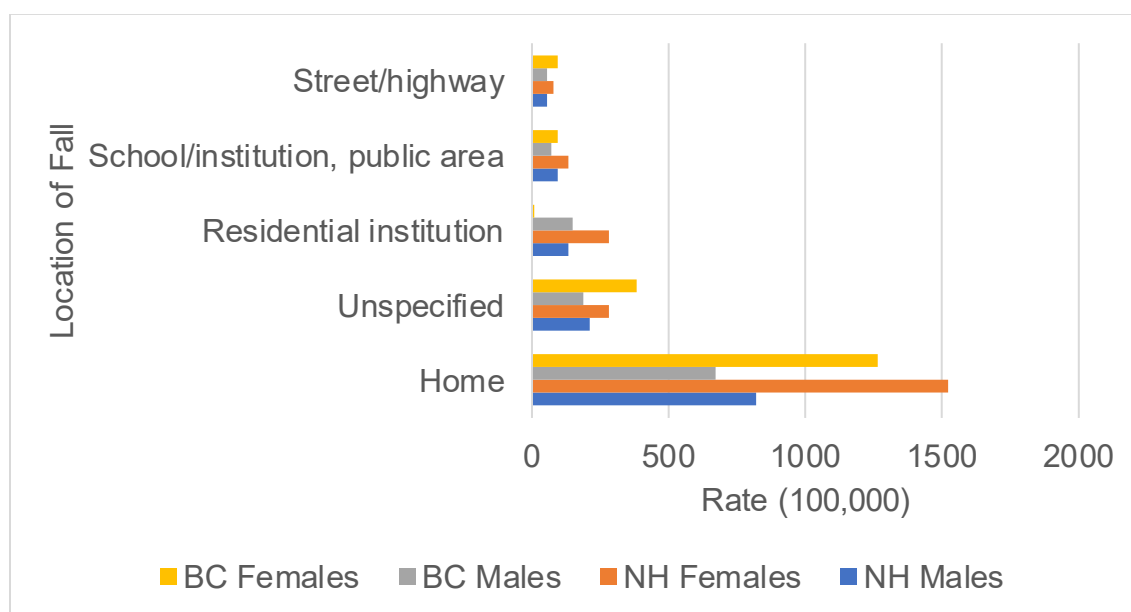


Figure 7. Hospitalization rates of the most common locations of unintentional falls by sex, NH and BC; 2002-2019 (combined).

Table 6. Number (%) of the most common locations of unintentional falls causing hospitalization by age group, NH and BC; 2002-2019 (combined).

Location of Fall	Age group				
	65 - 69	70 - 74	75 - 79	80 - 84	85+
Home	992 (56.7)	1,037 (60.9)	1,207 (58.8)	1,434 (63.3)	1,966 (61.5)
Unspecified	337 (19.3)	249 (14.6)	303 (14.8)	242 (10.7)	191 (8.3)
Residential institution	48 (2.7)	110 (6.5)	179 (8.7)	243 (10.7)	70 (18.6)
School/institution, public area	84 (4.8)	94 (5.5)	122 (5.9)	150 (6.6)	265 (6.0)
Street/highway	69 (3.9)	75 (4.4)	90 (4.4)	73 (3.2)	593 (2.2)

Injuries from Falls

Fractures account for the majority of injuries resulting from an unintentional fall at 75.7% and roughly 4,250 days in hospital per year (not shown). Specifically, fractures of the hip and thigh are the most common injury, accounting for 39.7% of hospitalizations due to unintentional falls among NH males and 46.6% among females. The proportion of hospitalization due to hip fractures were higher in NH compared to BC. Fractures of the knee/lower leg, shoulder/upper arm, and abdomen/pelvis were the next most common, and these were slightly more prevalent among females than males in both NH and BC. Males were more likely to suffer an intracranial head injury, accounting for 8.3% of hospitalizations due to unintentional falls in NH and 11.8% in BC. These injury types were the most common across all age groups; however, a higher proportion of persons aged 65 to 74 were likely to suffer from a fractured knee/lower leg (~11 – 17%), while a higher proportion of those aged 80 and older fractured their hip (~48 – 53%; not shown).

Table 7. Number (%) of the most common injuries of unintentional falls causing hospitalization by sex, NH and BC; 2002-2019 (combined)..

Nature of Injury	NH		BC	
	Males	Females	Males	Females
Fracture, hip/thigh	1,601 (39.7)	3,231 (46.6)	23,541 (32.6)	59,816 (39.3)
Fracture, knee/lower leg	242 (6.0)	621 (9.0)	3,514 (4.9)	10,672 (7.0)
Fracture, shoulder/upper arm	180 (4.5)	527 (7.6)	3,275 (4.5)	10,663 (7.0)
Fracture, abdomen/pelvis	224 (5.6)	450 (6.5)	5,745 (8.0)	16,180 (10.6)
Intracranial injury, head	335 (8.3)	195 (2.8)	8,530 (11.8)	6,809 (4.4)

Summary

Falls represent a significant burden of injury and illness among adults aged 65 and older, accounting for the highest rates of hospitalization for all injuries among this age group. Hospitalization rates among older age groups (80+) are significantly higher than younger age groups and rates among females were also significantly greater than males. In general, the rates of hospitalization due to unintentional falls declined in NH between 2002 and 2019, though still much higher than other causes of injury. Slips and trips on the same level, occurring in the home, were the most common cause and location for a fall resulting in hospitalization. Finally, hip fractures – a substantial injury – accounted for nearly half of all falls-related hospitalizations.

Technical Notes

Data Sources

- Data for BCIRPU Injury Data Online Tool, 2024. Discharge Abstract Database (DAD), 2002-2019. Ministry of Health. Retrieved Dec 2023 – Feb 2024: <https://www.injuryresearch.bc.ca/idot/>

Data Notes

- Calendar years: 2002 – 2019;
- Age: 65+;
- Sex: Male, female - We acknowledge that both the gender and sex values do not reflect the full spectrum of gender identity and we continue to work towards improving the data collection and reporting of sex and gender;
- Level of care: Acute;
- Cause/sub-cause of injury: Unintentional falls; including falls on same level, and from various heights and objects, fall or dropped while being carried, fall involving wheelchair, ice skates, skis, skateboard, etc., fall due to pushing or collision with other person, diving or jumping into water (if injury other than drowning);
- Falls from animals, burning buildings, fire, water (with drowning), machinery, transport vehicles, and falls onto sharp objects;
- Unless specified as rates for a specific age group (eg.: 65 – 69), rates are calculated using the 65+ population;
- Hospital length of stay is based on each hospitalization and the number of days spent in hospital;
- Hospitalization costs are calculated by applying the cost of a standard hospital stay to the “resource intensity weights”. Resource intensity weights are used to measure the relative cost associated with different procedures and demographic characteristics of an individual;
- British Columbia (BC) comparison data does not include Northern Health (NH);
- Unless specified (e.g.: rates per year/age group), rates calculated are an average of 2001 – 2022 and adults aged 65+.

Appendix – Definitions

Cause of Falls

- **Furniture** – fall from:
 - fall from bed, chair or other furniture (includes: changing table).
- **One level to another** – fall from:
 - out of or through building or structure (includes: balcony, bridge, building, flag-pole, railing, roof, tower, turret, viaduct, wall, window); fall from tree or cliff; diving or jumping into water causing injury other than drowning or submersion; other fall from one level to another including cavity, cherry picker, dock, haystack, hole, lifting, mobile elevated work platform, pit, quarry, shaft, sky life, tank, well.
- **Same level, slip/trip** – fall from:
 - from bumping against object; from or off toilet (or from bathtub or shower stall); slipping tripping and stumbling; other fall on same level due to collision with, or pushing by, another person; fall while being carried or supported by other persons.
- **Steps/stairs** – fall from:
 - escalator; incline; involving ice or snow on stairs and steps; ramp; carrying a person up and down stairs.

Place of Occurrence

- **Home** – includes:
 - apartment, boarding-house, residential caravan [trailer] park, farmhouse, home premises, house (residential), noninstitutional place of residence; private driveway to home, garage, garden to home, yard to home; swimming-pool in private house or garden.
- **Residential institution** – includes:
 - children's home, dormitory, home for the sick, hospice, military camp, nursing home, old people's home, orphanage, pensioner's home, prison, reform school.
- **School other institution and public area** – includes:
 - building (including adjacent grounds) used by the general public or by a particular group of the public such as: assembly hall, campus, church, cinema, clubhouse, college, court-house, dancehall, day nursery, gallery, hospital, institute for higher education, kindergarten, library, movie-house, museum, music-hall, opera-house, post office, public hall, school, theatre, university, youth centre.
- **Street/highway** – includes:
 - curb, freeway, motorway, pavement, road, sidewalk

Unspecified for falls and place or occurrence would mean that there was no specified information available to identify these.