

MORTALITY DUE TO UNINTENTIONAL FALLS AMONG OLDER ADULTS

Acknowledgement

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Executive Summary

- Falls are the biggest burden of unintentional injury mortality among adults aged 65 and older in Northern Health (NH);
 - Deaths due to an unintentional fall numbered approximately 610 per year;
- Rates of mortality due to unintentional falls differed by geography, sex and age groups:
 - NH had a slightly higher rate compared to British Columbia;
 - The Northwest (NW) Health Service Delivery Area (HSDA) had the highest rates in the north;
 - Mortality rates among females are 7% higher than males;
 - Adults aged 85 and older die as a result of an unintentional fall over seven times higher than those aged 65 to 69;
- The majority of falls are of unspecified cause, while slips and trips on the same level (e.g.: fall from bumping against object, stumbling on an object, etc.) accounted for over 12% of falls;
- The home was the most common location for a fall to occur at 48%;
- The most common injury resultant from a fall leading to death was a hip fracture (37%).

Deaths Due to Falls

Overview and Geography

Falls represent the largest burden of unintentional injury-related mortality among older adults in Northern Health (NH), with an average of 21 deaths per year. Between 2001 and 2022, the mortality rate due to unintentional falls among adults aged 65 and older was three times greater than the next most common specified causes of unintentional injury in NH (Figure 1). Mortality rates due to falls during this period were 62.7 per 100,000 in NH compared to 58.2 per 100,000 in BC. During this time frame, the Northwest (NW) Health Service Delivery Area (HSDA) had the highest rate of falls-related deaths at 72.2 per 100,000, whereas the Northern Interior (NI) and Northeast (NE) had rates of 58.1 and 62.2 per 100,000, respectively (Table 1). Females had slightly higher rates of mortality due to unintentional falls in NH; however, this varied by HSDA with females in the NW having lower rates than males (Figure 2).

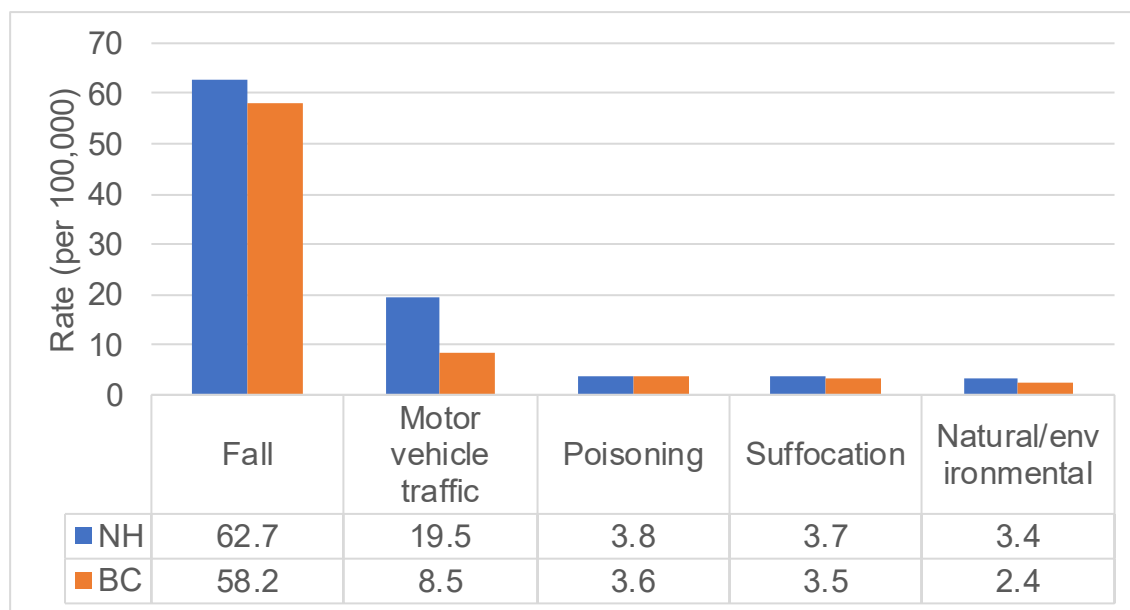


Figure 1. Mortality rates due to unintentional injuries, most common causes, NH and BC; 2001-2022 (combined).

Table 1. Number (%) and rate (per 100,000) of deaths due to unintentional falls by HSDA, NH; 2001-2022 (combined).

HSDA	Number (%)	Rate
NW	145 (31.3)	72.2
NI	234 (50.4)	58.1
NE	85 (18.3)	62.2
NH	464	62.7

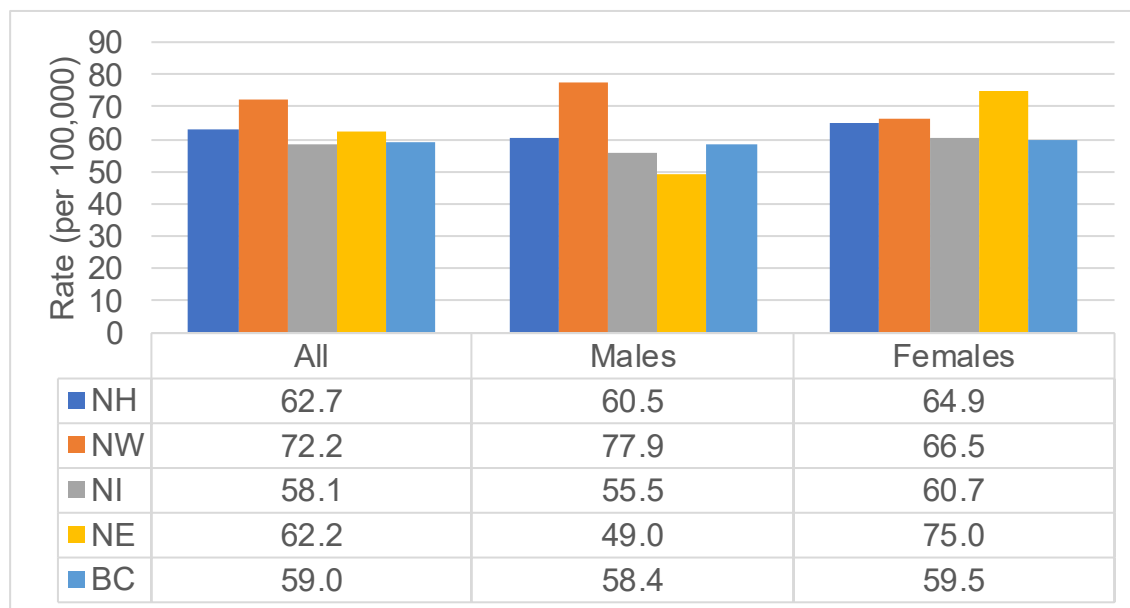


Figure 2. Mortality rates due to unintentional falls by HSDA and sex, NH and BC; 2001-2022 (combined).

Falls by Age Group

Mortality rates due to unintentional falls increase with age. Adults aged 85 and older die as a result of an unintentional fall at a rate over seven times higher than those aged 65 to 69 (Table 2). While overall rates among females are greater than males, when broken down by age groups female rates are slightly lower until aged 85+. While seemingly unlikely, this is a statistical paradox that suggests opposing trends when groups are analyzed together or separately. 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 and age specific rate (per 100,000) of deaths due to unintentional falls, NH; 2001-2022 (combined).

Age Group	Males		Females	
	Deaths	Rate	Deaths	Rate
65-69	30	21.3	14	10.9
70-74	27	27.1	17	18.0
75-79	36	55.1	31	47.5
80-84	42	112.4	42	96.1
85+	88	350.2	137	350.0

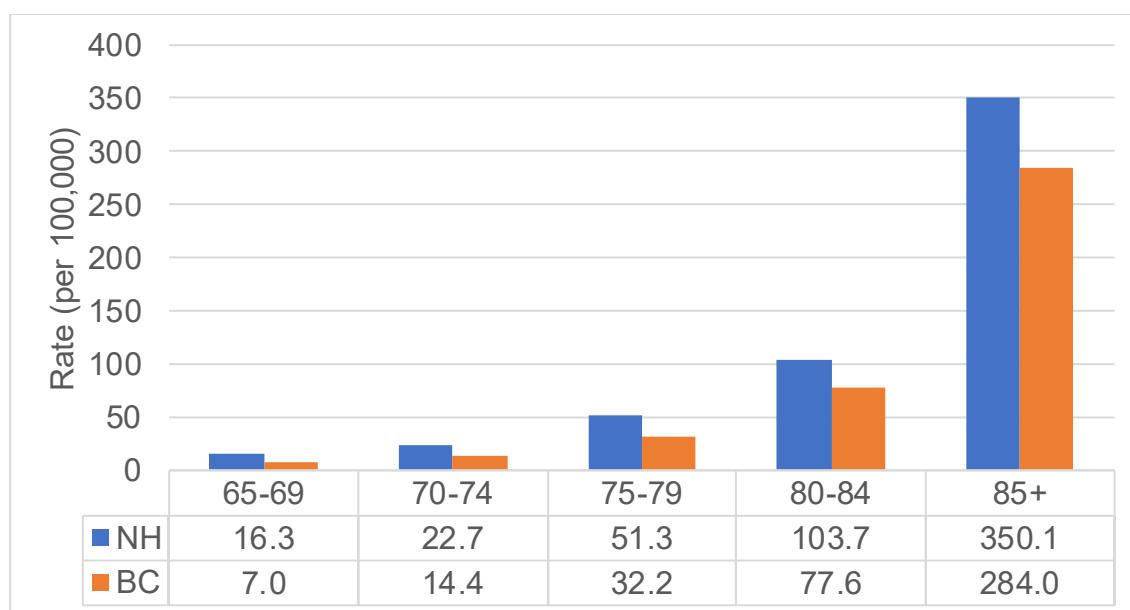


Figure 3. Mortality rates due to unintentional falls by age group, NH and BC; 2001-2022 (combined).

Falls over Time

During the late-2000s and early-2010s in both NH and BC, mortality rates began to increase, peaking circa 2011 (Figure 4). However, it is important to interpret these data with caution: the BC Injury Research and Prevention Unit (BCIRPU) conducted an analysis of falls-deaths data during this period and it was found that the rise in fall-related mortality was a result of the BC Coroners Service reporting practices¹.

Therefore, taking this into consideration, and some year-over-year variability due to the small numbers of deaths due to falls each year in NH, mortality rates due to unintentional falls were relatively stable in NH. The number of deaths per year by HSDA are too small to discern any pattern and are therefore not shown.

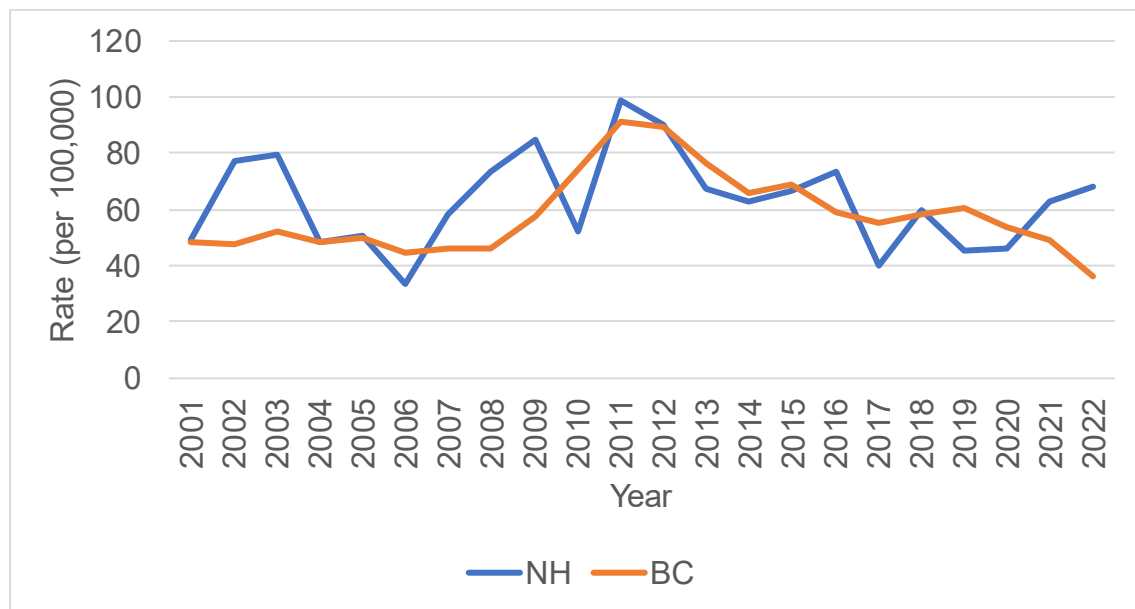


Figure 4. Mortality rates due to unintentional falls, NH and BC; 2001-2022.

Cause of Falls

The most common specified cause of an unintentional fall was a slip or trip of the same level, accounting for 11.7% of falls among males and 7.5% among females; this trend was similar between NH and BC (Table 3). Unspecified causes accounted for roughly 70% of unintentional falls resulting in death in NH. A higher proportion of females had unspecified falls. Falls off furniture, down steps/stairs, or from a wheelchair or other mobility device were the next most common causes of unintentional falls resulting in death. The proportion of falls from furniture and steps/stairs among males was higher in NH compared to BC. Except for unspecified falls, rates of falls among males were higher than females (Figure 5).

Table 3. Number (%) of the most common causes unintentional falls resulting in death by sex, NH and BC; 2001-2022 (combined).

Cause of Fall	NH		BC	
	Males	Females	Males	Females
Unspecified	135 (60.5)	189 (78.4)	2,992 (67.8)	3,834 (73.2)
Same level, slip/trip	26 (11.7)	18 (7.5)	414 (9.4)	429 (8.2)
Furniture	22 (9.9)	17 (7.1)	215 (4.9)	377 (7.2)
Steps/stairs	21 (9.4)	9 (3.7)	276 (6.3)	211 (4.0)
Wheelchair, walker	5 (2.2)	5 (2.1)	79 (1.8)	81 (1.5)

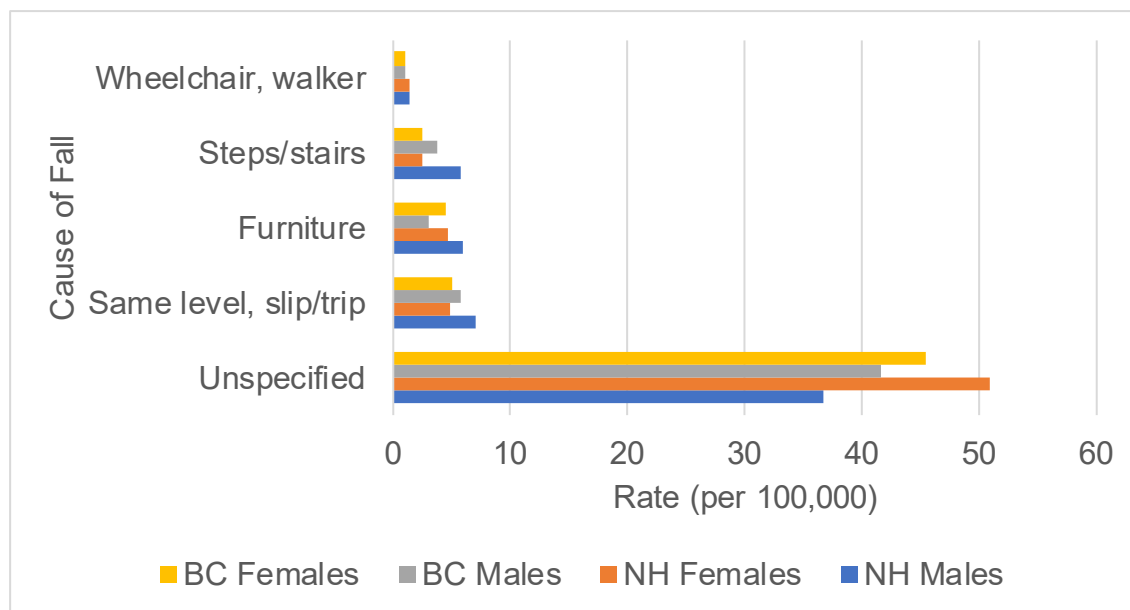


Figure 5. Mortality rates of the most common causes of unintentional falls resulting in death by sex, NH and BC; 2001-2022 (combined).

Due to relatively small numbers of falls by cause, it is difficult to examine trends among age groups. The most notable trend is an increased proportion of unspecified falls among older age groups (Table 4).

Table 4. Number (%) of the most common causes of unintentional falls resulting in death by age group, NH; 2001-2022 (combined).

Cause of Fall	Age group				
	65 - 69	70 - 74	75 - 79	80 - 84	85+
Unspecified	25 (56.8)	29 (65.9)	36 (53.7)	65 (77.4)	169 (75.1)
Same level, slip/trip	5 (11.4)	5 (11.4)	8 (11.9)	10 (11.9)	16 (7.1)
Furniture	*	*	6 (9.0)	*	27 (12.0)
Steps/stairs	*	5 (11.4)	14 (20.9)	*	*
Wheelchair, walker	0	0	*	*	6 (2.7)

Location of Falls

The most common place for a fall to occur is in the home at 40.7%. Males fell at home 42.2% of home compared to 39.4% of females (Table 5). The proportion of falls occurring at home was similar to the province, whereas the proportion of falls occurring in a residential institution was lower in NH compared to BC. In both NH and BC a higher proportion of females fell in a residential institution compared to males. By comparison, males had a higher proportion of falls, and a higher rate, occurring at 'other, specified' places (Figure 6).

Table 5. Number (%) of the most common locations of unintentional falls resulting in death by sex, NH and BC; 2001-2022 (combined).

Location of Fall	NH		BC	
	Males	Females	Males	Females
Home	94 (42.2)	95 (39.4)	1,878 (42.6)	1,853 (35.4)
Residential institution	42 (18.8)	60 (24.9)	983 (22.3)	1,894 (36.2)
Unspecified	27 (12.1)	47 (19.5)	473 (10.7)	623 (11.9)
Hospital, school, institution	18 (8.1)	23 (9.5)	249 (5.6)	240 (4.6)
Other, specified	29 (13.0)	9 (3.7)	281 (6.4)	175 (3.3)

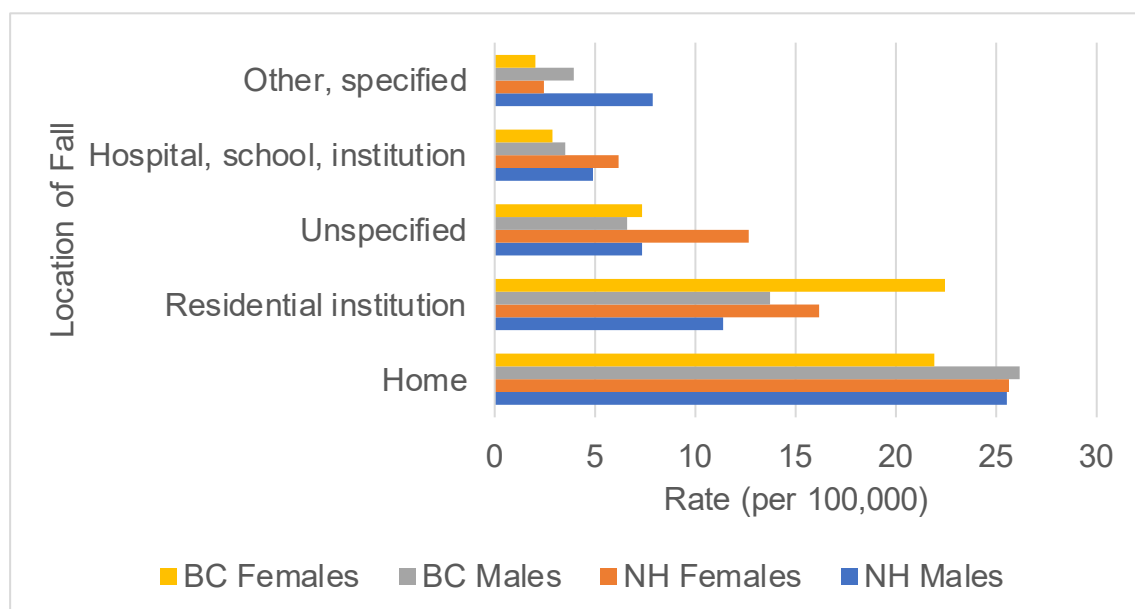


Figure 6. Mortality rates of the most common locations of unintentional falls resulting in death by sex, NH and BC; 2001-2022 (combined).

Falls among persons aged 65 to 69 occurred most commonly in the home, at hospital or at another specified location (Table 6). For adults aged 80 and older, the most common location of a fall occurred in a residential institution or in an unspecified location (Table 6).

Table 6. Number (%) of the most common locations unintentional falls resulting in death by age group, NH and BC; 2001-2022 (combined).

Location of Fall	Age group				
	65 - 69	70 - 74	75 - 79	80 - 84	85+
Home	22 (50.0)	21 (47.7)	29 (43.3)	35 (41.7)	82 (36.4)
Residential institution	*	*	14 (20.9)	14 (46.7)	69 (30.7)
Unspecified	*	7 (15.9)	9 (13.4)	17 (20.2)	39 (17.3)
Hospital, school, institution	6 (13.6)	5 (11.4)	*	9 (10.7)	18 (8.0)
Other, specified	7 (15.9)	6 (13.6)	9 (13.4)	6 (7.1)	10 (4.4)

Injuries from Falls

Fractures account for the majority of injuries resulting from an unintentional fall at 56.9%. Specifically, fractures of the hip and thigh are the most common injury, accounting for 33.6% of deaths from unintentional falls among NH males and 46.6% among females (Table 7). The proportion of deaths due to hip fractures were similar in NH and BC. Intracranial injuries were the next most prevalent injury. Males in NH were more likely to suffer an intracranial head injury accounting for 26.9% of deaths due to unintentional falls compared to 19.5% among females. Similar to hip fractures, the proportion and rate of fractures to the abdomen/pelvis was higher among females compared to males (Figure 7). Due to the small numbers of deaths when dividing by age groups, it is difficult to determine trends; however, fractures of the hip and thigh and intracranial injuries were the most common injuries across all age groups.

Table 7. Number (%) of the most common injuries of unintentional falls resulting in death due to by sex, NH and BC; 2001-2022 (combined).

Nature of Injury	NH		BC	
	Males	Females	Males	Females
Fracture, hip/thigh	75 (33.6)	96 (39.8)	1,399 (31.7)	2,102 (47.7)
Intracranial injury, head	60 (26.9)	47 (19.5)	1,275 (28.9)	1,105 (25.1)
Missing	12 (5.4)	13 (5.4)	166 (3.8)	192 (4.4)
Fracture, abdomen/pelvis	6 (2.7)	17 (7.1)	122 (2.8)	327 (7.4)
Fracture, thorax	12 (5.4)	10 (4.1)	179 (4.1)	170 (3.9)

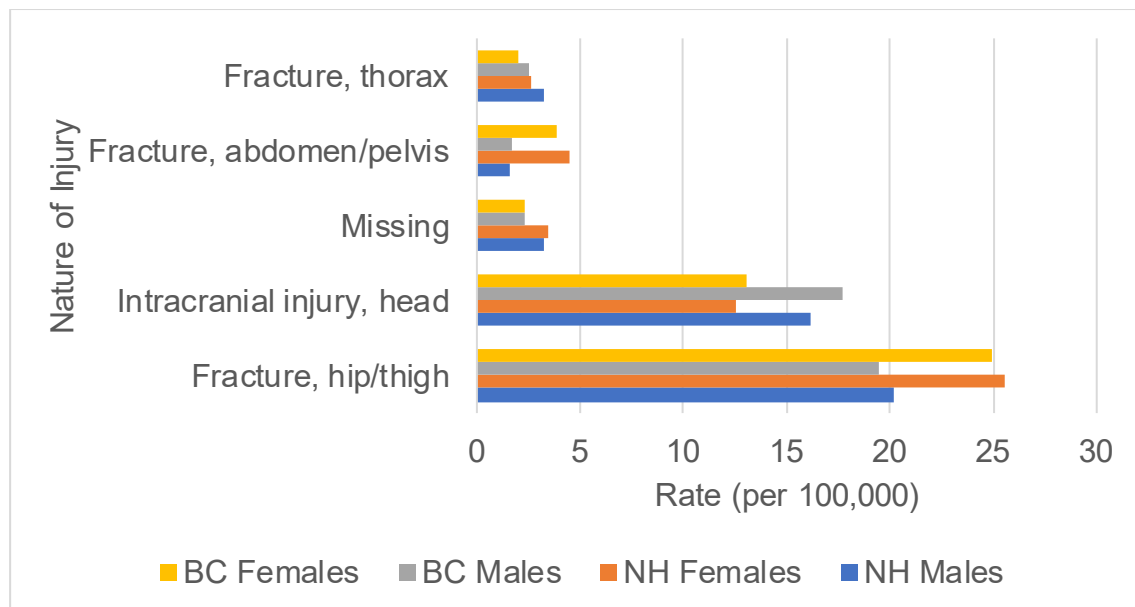


Figure 7. Mortality rates of the most common injuries of unintentional falls resulting in death by sex, NH and BC; 2001-2022 (combined).

Summary

Falls represent a significant burden of unintentional injury mortality among adults aged 65 and older, accounting for the highest rates of mortality for all unintentional injuries among this age group. Mortality rates among older age groups (80+) are significantly higher than younger age groups and rates among females were only slightly higher than males. The BC Coroners service found that the rise in mortality in the early 2010s was a result of a coding process change and therefore it is difficult to assess changes in rates over time. Where specified, slips and trips on the same level and falls occurring in the home were the most common cause and location for a fall resulting in death. Finally, hip fractures accounted for a third of all falls-related deaths.

Technical Notes

References

- Joshi A, Rajabali F, Turcotte K, et al. Fall-related deaths among older adults in British Columbia: cause and effect of policy change. *Inj Prev*, 2019;0:1–5.
[doi:10.1136/injuryprev-2019-043280](https://doi.org/10.1136/injuryprev-2019-043280)

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: 2001 – 2022;
- 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;
- Deaths for more recent years may still be under investigation and therefore not included. Caution should be made when examining trends for more recent years as these will be under-reported;
- 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).
- **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.
- **Wheelchair** – fall from:
 - Wheelchair, walker

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.
- **Other specified places** – includes:
 - beach, campsite, canal, caravan site NOS, derelict house, desert, dock NOS, forest, harbour, hill, lake, marsh, military training ground, mountain, park (amusement) (public), parking-lot and parking-place, pond or pool, prairie, public place NOS, railway line, river, sea, seashore, stream, swamp, water reservoir, zoo.
- **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.
- **Hospital, school, institution** – 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.

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