

# The Burden of Concussion in British Columbia

## Concussion

Concussions are the most common form of brain injury. Each year in British Columbia (BC), almost 600<sup>1</sup> people are hospitalized for a concussion, and approximately 14,500<sup>2</sup> visit the emergency department.

This number is most likely an underestimate of the true burden of concussion—this “invisible injury” is under-reported due to a lack of public education and awareness. Many concussions are seen in doctor’s offices and walk-in clinics, placing them outside of the standard hospital reporting data collection surveillance process, or some are ignored and are not reported at all.

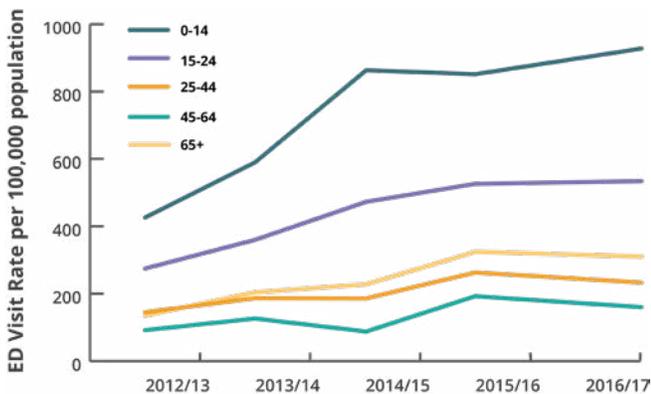
### What are the concussion emergency department visit annual trends by age and sex?

Between 2012/13 and 2016/17, British Columbian males aged 0 to 49 years-of-age had a higher rate of emergency department visits for concussion than females in the same age group, while females over the age of 50 had a higher rate than males.<sup>2</sup>

For all years, individuals aged 0 to 14 years-of-age had the highest rate of emergency department visits for concussion, followed by individuals 15 to 24 years. The lowest concussion-related emergency department visit rate was among those 45 to 64 years-of-age (Figure 1).

FIGURE 1

Emergency department visit rates for concussion, by age group, BC, 2012/13–2016/17

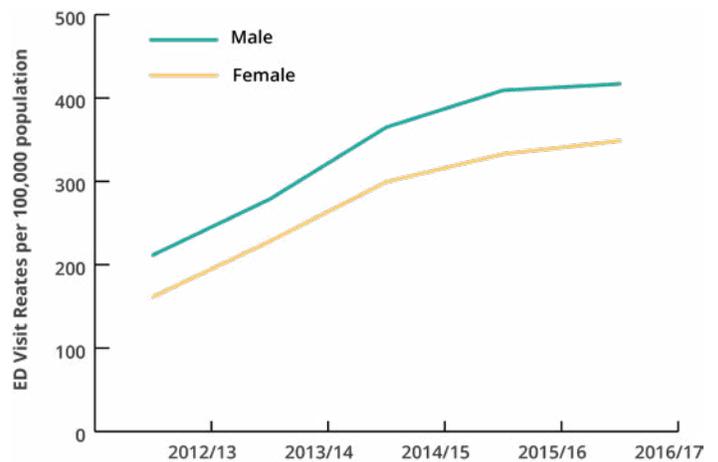


Source: National Ambulatory Care Reporting System, BC Ministry of Health, 2012/13- 2016/17

The rate of emergency department visits for concussion in BC increased between 2012/13 and 2016/17 (Figure 2). In recent years, improved concussion education and support for concussion protocols have likely led to an increase in recognition and diagnosis of concussion.

FIGURE 2

Emergency department visit rates for concussion, by sex, BC, 2012/13–2016/17



Source: National Ambulatory Care Reporting System, BC Ministry of Health, 2012/13- 2016/17

From 2012/13 and 2016/17,

**concussion emergency department visit** had the average annual visit growth rate of

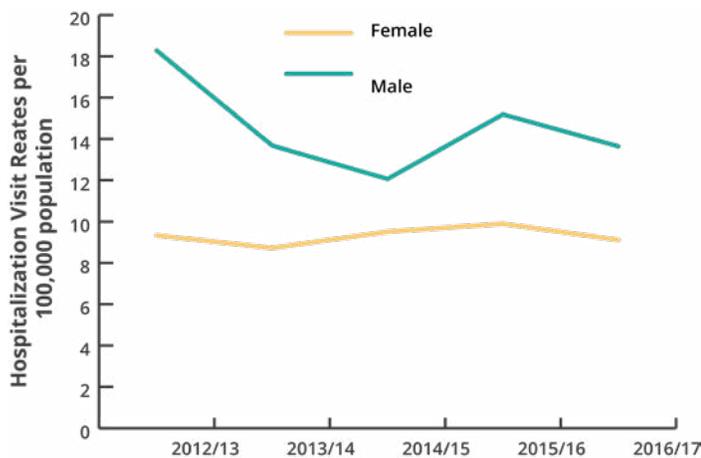


## What are the concussion annual hospitalization trends by age and sex?

The rate of hospitalization for concussion in BC varied more among males than among females between 2012/13 and 2016/17 (Figure 3). Males had a higher concussion hospitalization rate than females in nearly all age categories, with the exception of those less than 1 year of age and those 75 to 84 years of age.<sup>1</sup> Overall, rates of hospitalization for concussion were highest among older adults ages 85+.<sup>1</sup>

FIGURE 3

Hospitalization rates for concussion, by sex, BC, 2012/13–2016/17



Source: Discharge Abstract Database (DAD), Ministry of Health, BC, 2012/13 - 2016/17

The leading cause of concussion hospitalization was from falls. Other leading causes include from transport-related injuries and incidents where the individual was struck by an object (e.g., sports equipment).<sup>1</sup>

## Main causes of concussion hospitalization

by age are

falls



0-14 years

transport-related



15-54 years

falls



55+ years

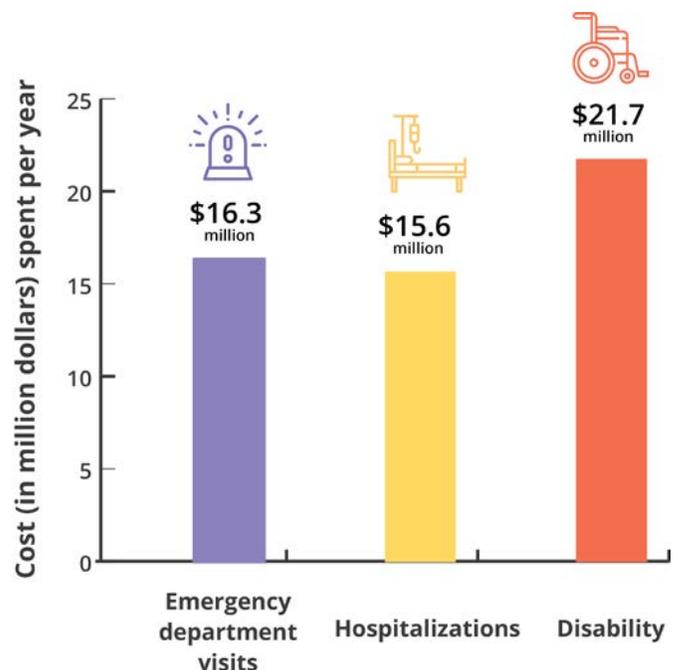
## Average annual rates of growth\* for concussion hospitalization by sex are

↓ 0.39% for females ♀

↓ 5.31% for males ♂

\*Average growth rate 2012/13-2016/17.

## What are the estimated health care costs\*\* of concussion in BC for 2019?



Source: Electronic Resource Allocation Tool, Parachute Canada, costs calculated by the BC Injury Research and Prevention Unit using 2016 data and estimating the current value for 2019 with CPI.

\*\* Health care costs are direct costs that pertain to goods and services used for the diagnosis, treatment, continuing care, rehabilitation and terminal care of patients who suffered concussion. They include costs incurred from expenditures of pharmaceutical drugs, rehabilitation treatment and other related costs over long periods of recovery. Moreover, the direct costs also include the cost of prostheses, appliances, eyeglasses, hearing aids and speech devices necessary to help the patient overcome or live with the impairments associated with concussion.

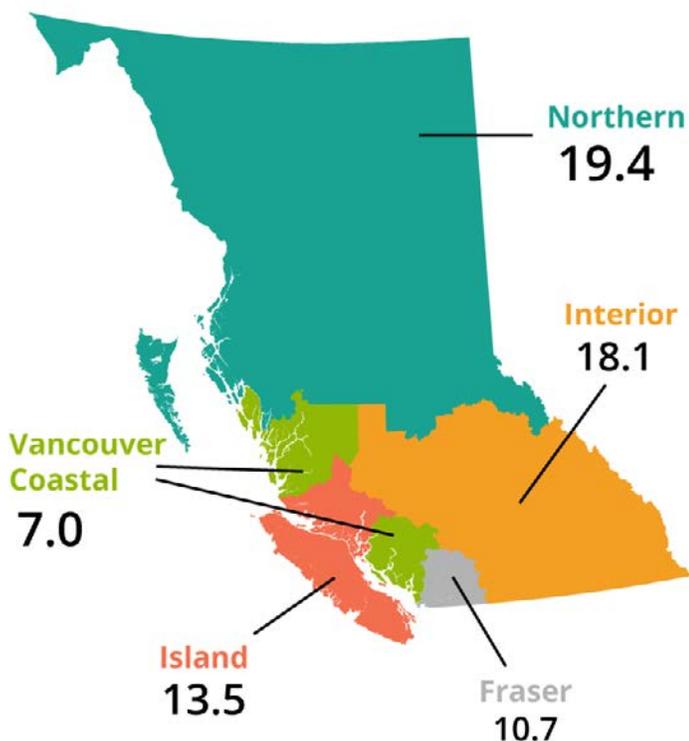
**Note:** These costs are an underestimate as concussions are underreported. Costs incurred by patients who are seen in walk-in clinics, doctor's offices or treated at home are not included.

## Which health authorities have the highest rate of concussion hospitalizations?

The highest rate of concussion hospitalizations occurred in the Northern Health Authority, while the lowest rate occurred in the Vancouver Coastal Health Authority (Figure 4). The majority of concussion hospitalizations in each of region of the province were caused by a fall.

FIGURE 4

Age standardized concussion hospitalization rates per 100,000 by health authority, BC, 2012/13–2016/17



Source: Discharge Abstract Database, Ministry of Health, BCIRPU Injury Data Online Tool, 2018.

## For more information on concussion data:

### Concussion Hospitalizations and Emergency Room Visits Dashboard

These visualizations provide a visual overview of trends and patterns of concussion hospitalizations and emergency room visits.

- [Concussion hospitalization data](#)
- [Concussion emergency visits data](#)

### Injury Data Online Tool (iDOT)

The iDOT© is an easy-to-use, menu-driven system that makes injury data available to injury prevention practitioners and professionals, as well as the public. It is an effective and efficient way for users to access injury data including mortality, morbidity, traffic accidents, and sports.

### The Concussion Awareness Training Tool (CATT)

CATT is a free online resource providing concussion training and resources for target audiences, including medical professionals, coaches, players and participants, parents and caregivers, school professionals, and workers and workplaces.

## References

1. 5-Year average 2012/13 to 2016/17. Discharge Abstract Database (DAD), Ministry of Health, BCIRPU Injury Data Online Tool (iDOT).
2. National Ambulatory Care Reporting System (NACRS). Ministry of Health. Retrieved from Visualization for Concussion-related ER visits, BC Injury Research and Prevention Unit, 2019.
3. Walsh SS and Jarvis SN. Measuring the frequency of “severe” accidental injury in childhood. *J Epi Com Health* 1992;46:26-32.
4. Chevalier S, Choiniere R, Ferland M, Pageau M, Sauvageau, Y. *Community Health Indicators: Definitions and Interpretations*. Ottawa: Canadian Institute for Health Information, 1995.

## Data Limitations

- Concussions are under-reported and coded inconsistently between hospitals. Concussion is not always clearly defined in databases and may be captured as a minor traumatic brain injury (mTBI), or sometimes as a head injury (which may include other injuries not involving the brain).
- Hospitalization data can vary over time and geographic areas for factors such as accessibility to treatment, and medical and administrative decisions that may affect the number of hospitalizations and length of hospital stays.<sup>3,4</sup>
- Emergency department data for concussion visits is an underestimation of the true burden of concussion, as many concussion cases are seen at physicians’ offices, medical walk-in clinics, or are not treated at all. Emergency department data were not available for some sites in BC, and are known to be underreported in Northern BC.

**Erratum:** A previous version of this factsheet had an error in the top-right infographic on page 2 and to the age range on page 1, paragraph 3.