Injury Data 101: How do we present the burden of injury?

This factsheet is the fifth in a series on injury and injury data in British Columbia (BC). Visit injuryresearch.bc.ca/data for more information on data in BC.

Data visualizations

Data visualizations are graphical representations of information and data. The purpose is to simplify complex data and transform it into easily understandable visuals, and communicate data effectively to the public for injury prevention, control, and decision-making.

How can injury data visualization be beneficial?

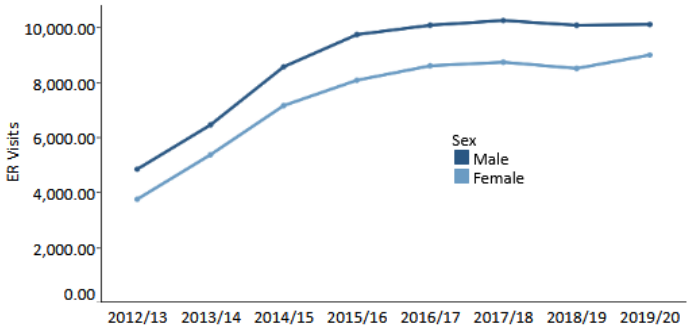
- Easily draw valuable insights, trend and patterns of injury cause, risks and protective factors
- Easily make comparison between different regions and groups
- Identify high-risk activities and high-risk age groups for injury

There are many ways to present injury data, it is important to understand the purpose of the injury visualization before selecting a visualization method for presenting injury data.

Common injury visualization types

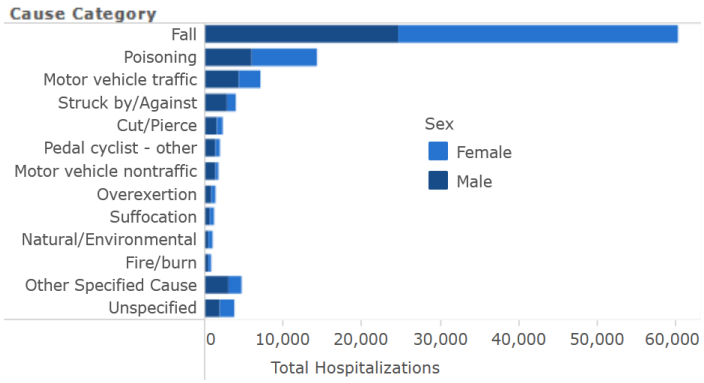
- **Line Chart:** Used to illustrate trends for continuous data, such as time. For example, it is effective in visualizing the trend or pattern of ER visit for concussion over years. We can see a steep rise in ER concussion visits from 2012-2015, but it plateaus and remains fairly constant from 2016-2019.

Concussion-related ER Visits, by Fiscal Year, Years, BC, 2012/13-19/20



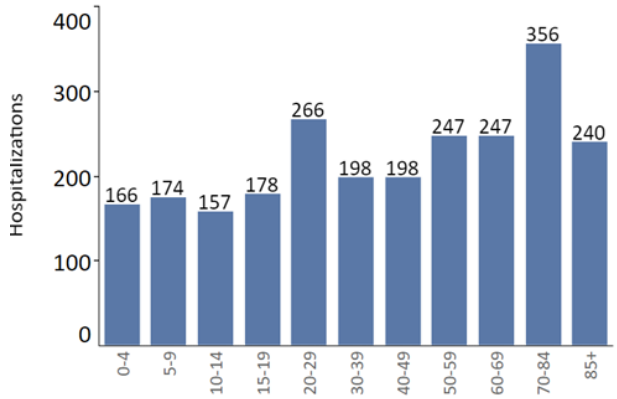
Retrieved from Visualization for Concussion-related ER Visits, B.C. Injury Research and Prevention Unit, 2021. https://injuryresearch.bc.ca/idot/data-visualizations/concussion-related-emergency-room-visits/

- **Bar Chart** or **Column Chart**: Used to compare categorical data, such as age group, sex, cause of injury, or type of injury. The bar chart is presented horizontally (categories on the y-axis and values on the x-axis) while the column chart is presented vertically (values on the y-axis and categories on the x-axis). For example, it can be used to present the number of hospitalizations related to the various causes of injury by gender. We can quickly see falls are a major reason for hospitalizations.



Retrieved from Visualization for Injury Related Hospitalizations in B.C., 2017/18-2019/20, B.C. Injury Research and Prevention Unit. https://injuryresearch.bc.ca/idot/data-visualizations/injury-related-hospitalizations-bc/

Hospitalizations for Concussion, by Age Group, BC, 2015/16-2019/20.

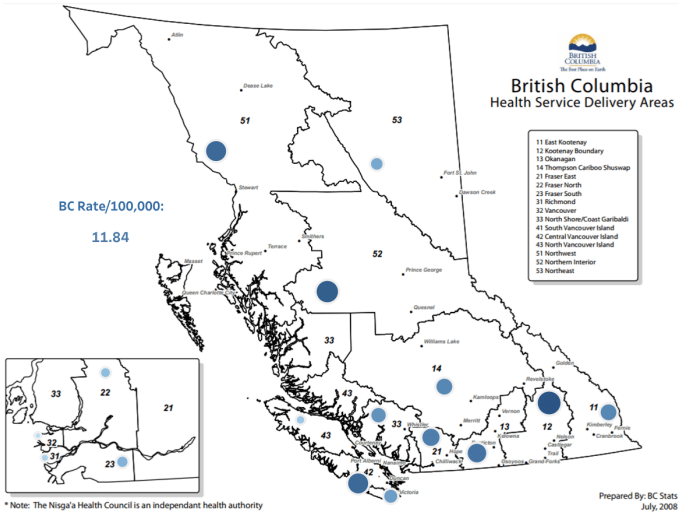


We see the 70-84 age group jump out as higher risk for concussion.

Retrieved from Visualization for Concussion-related Hospitalizations, B.C., 2009/10-2019/20, B.C. Injury Research and Prevention Unit, 2021. https://injuryresearch.bc.ca/idot/data-visualizations/hospitalization-rate-for-concussion/

- **Geographical Map**: Used to illustrate differences in injury data across different regions, such as health authority and health service delivery area. In the example below, different colours or shades are used to represent the different distribution of hospitalization for concussions in different health service delivery areas. The larger and darker dots indicate higher frequencies of hospitalizations in those specific health service delivery areas. HSDA 12, 52 jump out as having highest rates.

Hospitalization Rate/100,000 for Concussion, by Health Service Delivery Area, All Years, All, 2012/13-2016/17

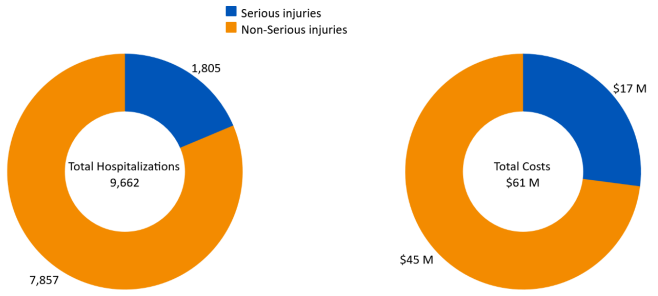


Retrieved from Visualization for Concussion-related Hospitalizations, B.C., 2009/10-2019/20, B.C. Injury Research and Prevention Unit, 2021. https://injuryresearch.bc.ca/idot/data-visualizations/hospitalization-rate-for-concussion/

- **Pie-Chart/Donut Chart**: Used to show the proportions of categorical data, such as the cause of injury, and the severity of injury. For example, it can be used to present the proportion of hospitalization cost for both serious and non-serious injuries in B.C. We see the number of serious injuries accounting for a small portion of total injury hospitalizations, but a much larger proportion of the total costs.

Proportion of Hospitalizations, BC, 2017/18-2019/20

Proportion of Hospitalization Costs, BC, 2017/18-2019/20



Retrieved from Visualization for Children and Youth Serious Injury Indicator, B.C., B.C. Injury Research and Prevention Unit. https://injuryresearch.bc.ca/data/child-and-youth-serious-injury-indicator/

- **Table**: Used to present information through a combination of text and numbers. To present the economic burden of injury, tables are commonly used to show the direct costs, indirect costs, and social costs associated with different outcomes, such as hospitalizations, emergency department visits, and fatalities. For example, the table below represents the direct cost to the health system and society, by injury intent and injury outcome across B.C. Using a table, we can present a lot of data concisely.

Direct Costs in Millions ($000,000s) by Injury Intent, Injury Outcome and Cost Type, British Columbia, 2018

	Unintentional	Intentional/Inflicted	Undetermined	Total
Deaths	$53	$5	$0	$59
Hospitalizations	$740	$60	$6	$805
ED Visits	$1,129	$50	$6	$1,185
Disability	$636	$15	$1	$652
Total	$2,558	$130	$12	$2,701

Retrieved from Cost of Injury for Total Costs in Millions ($000,000s) by Injury Intent, Injury Outcome and Cost Type, British Columbia, 2018, B.C. Injury Research and Prevention Unit. https://www.costofinjury.ca/bc/costs-to-the-health-system-and-society

Data visualization and interpreting how data is presented

When you open a data visualization, it is important to know how to interpret the injury data.

Interpreting data visualizations requires an understanding of how the data are presented, such as frequencies, proportions, and rates

- Frequencies = In injury prevention, frequency usually refers to the number of new cases or events
- Proportions = Percentages
- Rate = number / 100,000 population (typically)

Rates are often presented as "per 100,000 population". However, they can just as easily be:

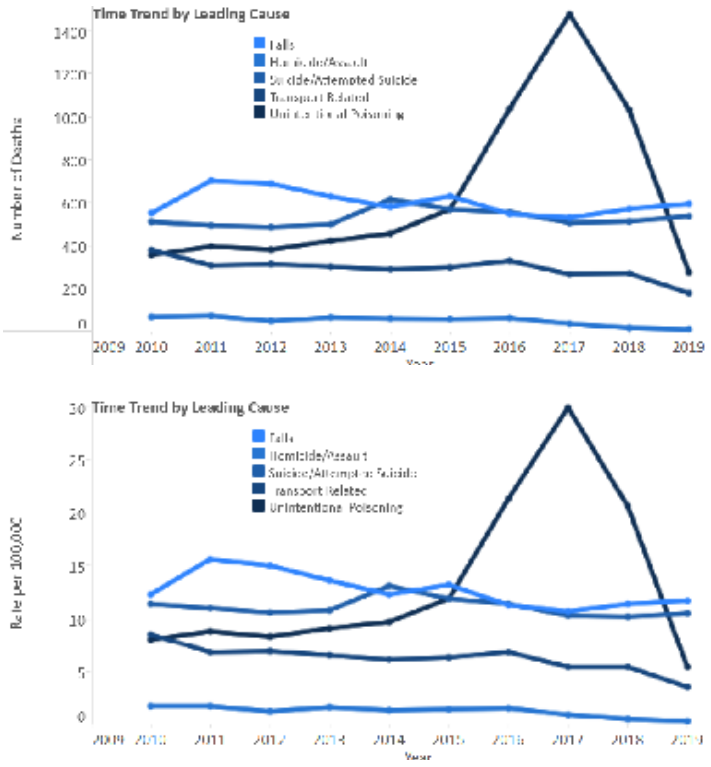
- Per 1,000 population
- Per 10,000 population
- Per 1,000,000 population
- Etc.

The denominator selected should be appropriate to the data being presented.

Describing a rate at a global scale may be best presented "per million people", whereas a rate at a school may be best presented "per 1000 children."

Data visualization and interpreting the label on the axis

For example, at first glance, it may appear that these two graphs are identical due to their similar trends and titles. However, when you look closely, you will find the y-axis labels differ. As a result, the interpretation of the visualizations will be different. The top visualization is labeled "Number of Deaths," while the bottom visualization labeled "Rate per 100,000." This difference significantly influences how the information is understood.



Retrieved from Visualization for Injury Deaths in B.C., 2010-2019, B.C. Injury Research and Prevention Unit. https://injuryresearch.bc.ca/idot/data-visualizations/injury-related-deaths-bc/

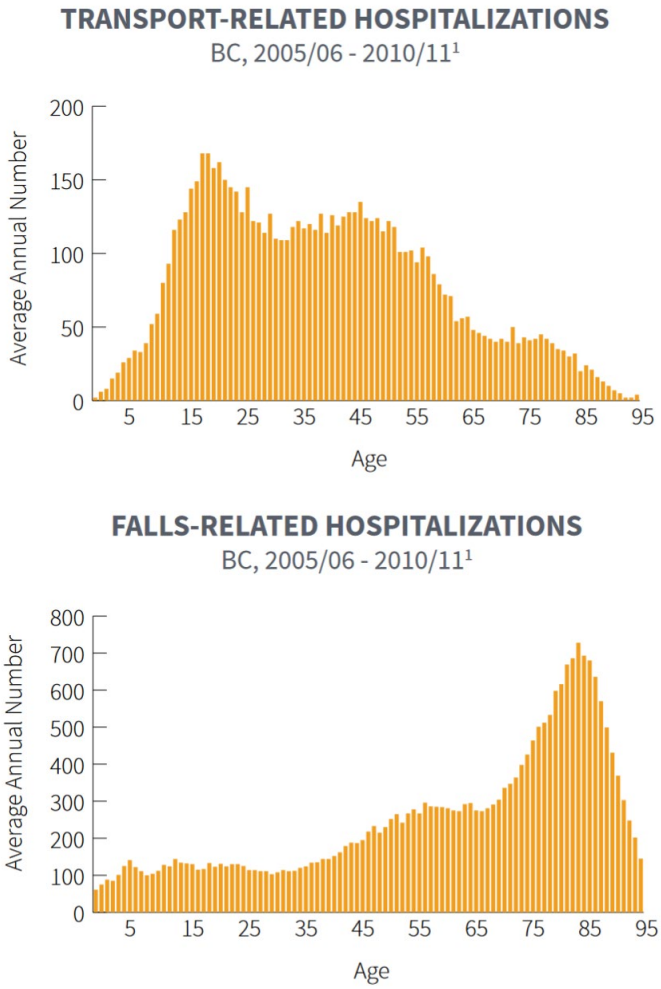
Interpretation:

- Top: The number of falls-related deaths in 2011 is around 700.
- Bottom: The rate for falls-related deaths is 15.6 deaths per 100,000.

Data visualization and interpreting the scale on the axis

Viewing a chart without the proper context or explanation can lead to false conclusions about the data.

For example, while the difference in the distribution of the frequency of transport-related versus fall-related hospitalizations by age is easily seen using these column charts, the scales are quite different. At first glance, it might look like the burden of injury for transport-related hospitalizations is far greater than that of fall-related hospitalizations. However, the maximum number of hospitalizations for transport is below 200 cases, whereas the maximum for falls exceeds 700 cases.



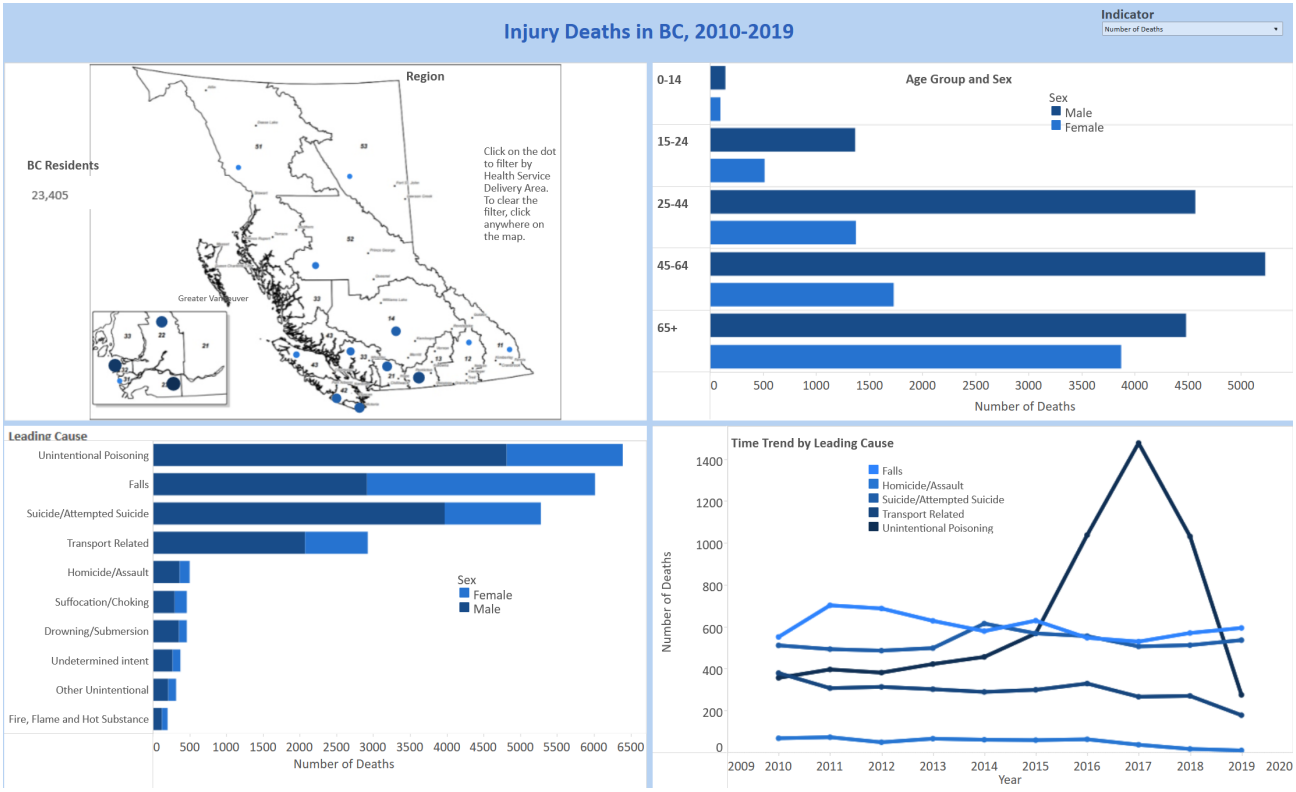
Retrieved from British Columbia Injury Research & Prevention Unit. (2015). Casebook 2015 [PDF document]. Injury Research and Prevention Unit. https://www.injuryresearch.bc.ca/wp-content/uploads/2021/07/BCIRPU-Casebook-2015.pdf

Data dashboards

Like the dashboard of a car, data dashboards display at-a-glance summary information using a collection of visualizations. They can tell the injury story by using a set of visuals focused on a specific topic.

Data dashboards usually have interactive features that allow users to apply filters to the data and focus only on the relevant information. For example, if you only want to look at the particular data related to a specific health delivery area, just click on the health delivery area you are interested in. Then the rest of charts will automatically update to show information only related this health delivery area.

The data dashboard on the following page provides information on injury-related deaths in British Columbia from 2010 to 2019. It includes details on the location of these incidents in B.C., a breakdown of the deaths by age groups and gender, as well as the leading cause of the injury deaths.



Retrieved from Visualization for Injury Deaths in B.C., 2010-2019, B.C. Injury Research and Prevention Unit. https://injuryresearch.bc.ca/idot/data-visualizations/injury-related-deaths-bc/

A comprehensive injury data dashboard usually includes the following types of information:

- Trend Identification: Injury patterns overtime.
- Category Comparisons and Demographic Information: Comparison among gender, age groups, region, etc.
- Rate Calculation: Computes injury rate for a specific population, such as hospitalization rate per 100,000 population .

Injury data dashboards typically offer a selection of indicators to choose from, including:

- Total counts: This indicator includes figures of injury-related incidents, such as total hospitalizations, emergency department visits, or fatalities.
- Average counts: This indicator includes the average number of injury-related incidents. It provides more standardized view by considering changes over time.
- Rate per 100,000 population: This indicator normalizes the injury data relative to the population size. It provides meaningful comparison across different regions and demographics.

Where is our injury visualization dashboard located?

Most of the B.C. injury-related death, hospitalizations and emergency department visits dashboard can be found at: https://www.injuryresearch.bc.ca/idot/data-visualizations/

The cost of injury in B.C. visualizations and report can be found at: https://www.costofinjury.ca/bc/cost-of-injury-in-british-columbia

The B.C. visualizations are created using a software called Tableau. When you open a dashboard, you will notice two buttons at the bottom right-hand corner, as shown below.

The first button indicates that the visualizations can be download as image, PDF, or PowerPoint format.

The second button indicates the visualizations are often best viewed in full screen.

Injury-related data can be extracted from the iDOT (Injury Data Online Tool): https://www.injuryresearch.bc.ca/idot/

RESOURCES

BCIRPU Injury Data Online Tool (iDOT) Visualizations: https://www.injuryresearch.bc.ca/idot/data-visualizations/

iDOT: https://www.injuryresearch.bc.ca/idot/

Cost of Injury: https://costofinjury.ca/

The British Columbia Casebook for Injury Prevention: https://www.injuryresearch.bc.ca/wp-content/uploads/2021/07/BCIRPU-Casebook-2015.pdf