Ontario

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Traumatic Brain Injury and Concussion

Brain Health in Ontario Project

ONTARIO BRAIN INSTITUTE
INSTITUT ONTARIEN DU CERVEAU

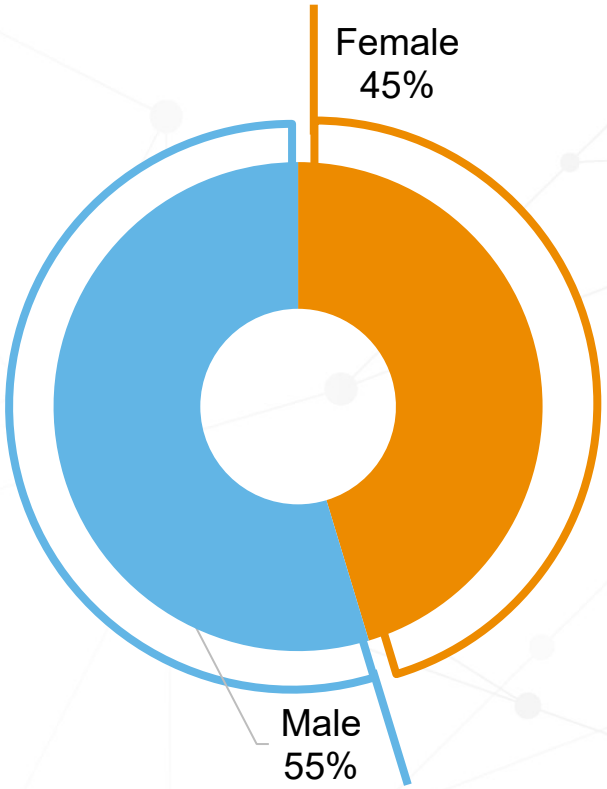
WELCOME TO BRAIN CENTRAL

Traumatic Brain Injury including Concussion

- Traumatic brain injury (TBI) is a form of acquired brain injury where there is disruption of brain function due to a traumatic event. This can occur when the head is struck or strikes an object, or undergoes rapid acceleration and deceleration movements. Traumatic brain injury is usually classified as mild which includes concussion, moderate or severe.

- There are many causes of traumatic brain injury (e.g., falls, sport-related injuries, motor vehicle accidents). It occurs among persons of all ages but some individuals are more susceptible than others, in particular children, teenagers and seniors.
- Males are at a greater risk than females. Traumatic brain injury can occur as a single isolated event, but it can also occur repeatedly especially in certain sports (e.g., boxing, hockey, football).
- The symptoms of traumatic brain injury depend on the location and extent of the damage to the brain. While loss of consciousness may result from traumatic brain injury, it is a common misconception that loss of consciousness must occur to have traumatic brain injury.
- A person with mild traumatic brain injury may experience head pain, disorientation, dizziness, nausea and vomiting. There may be visual problems, sleep disruption, mood changes or lapses in memory. The same symptoms are amplified in moderate traumatic brain injury. Severe traumatic brain injury involves additional disorders of consciousness, weakness, seizures, coma, and even death. The long-term consequences of the injury may be apparent immediately or not until long after the event.
- The best treatment for traumatic brain injury is prevention. While much research has gone into studying treatments for traumatic brain injury, no specific treatment exists. Instead, the management of traumatic brain injury focuses on supportive care, rehabilitation and helping the individual adapt to the injury. The impact on a person's quality of life and the whole family varies depending on the extent and severity of the injury.

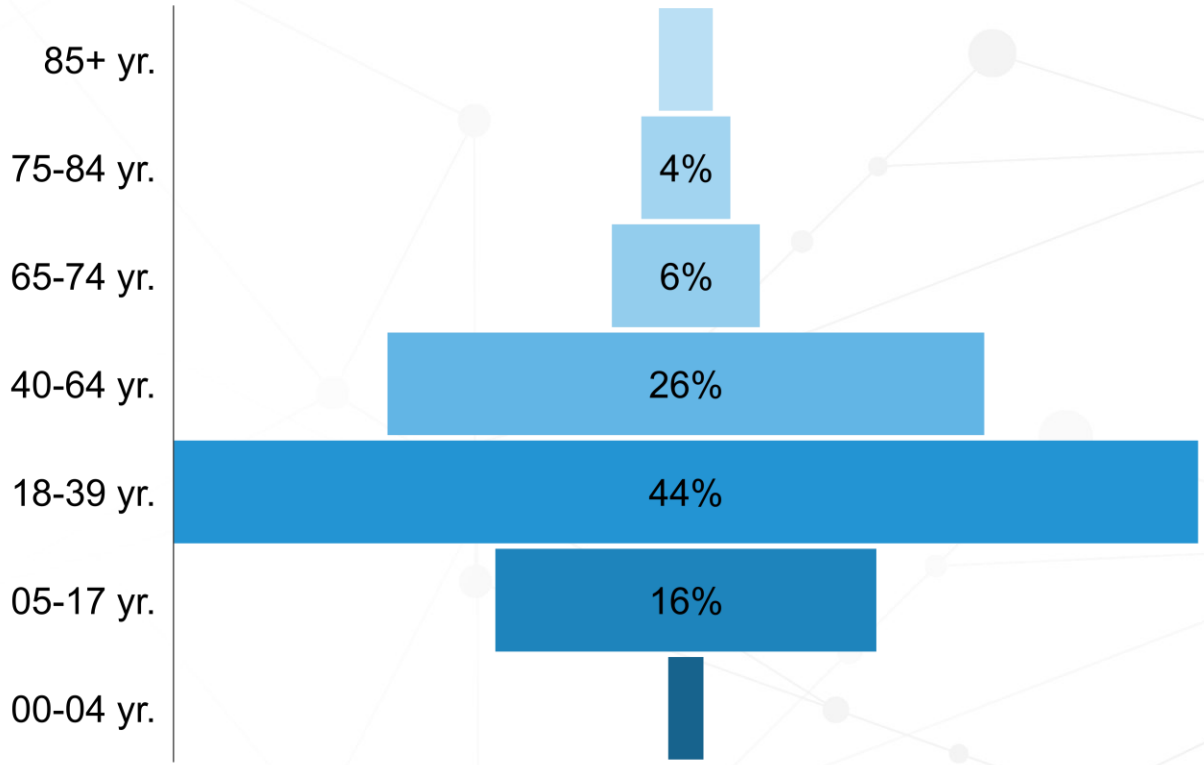
Demographics: Sex distribution



On April 1, 2019 males accounted for 55% of the 1,475,726 Ontarians identified with a TBI or concussion.

*Note, years represent the fiscal year. For example, 2019 is from April 1, 2019 to March 31, 2020.

Demographics: Age distribution



On April 1, 2019 the majority of people with a TBI or concussion were between the ages of 18 and 39 years, with 87% of people being under the age of 65. The mean age of a person with a TBI or concussion was 37 ± 21 years.

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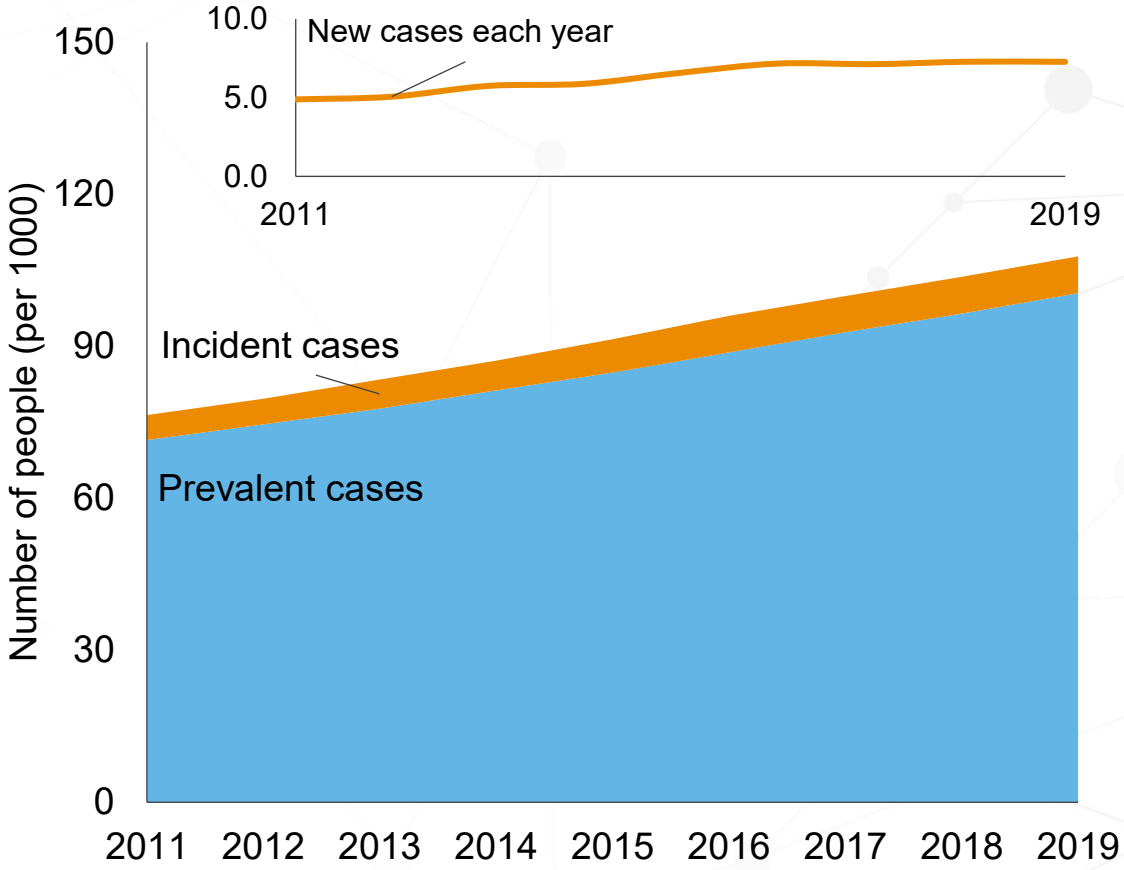
Prevalence and incidence over time



Incidence is the number of people newly diagnosed with a disorder within a given time period while prevalence is the number of people existing with the disorder at a given time.

The incidence and prevalence of Ontarians with a TBI or concussion are depicted in orange and blue, respectively. Between 2011 and 2019, incidence increased from 4.89 to 7.28 per 1000 people and prevalence increased from 71.49 to 100.45 per 1000 people.

In total, the number of people with a TBI or concussion increased from 949,761 in 2011 to 1,475,726 people in 2019.

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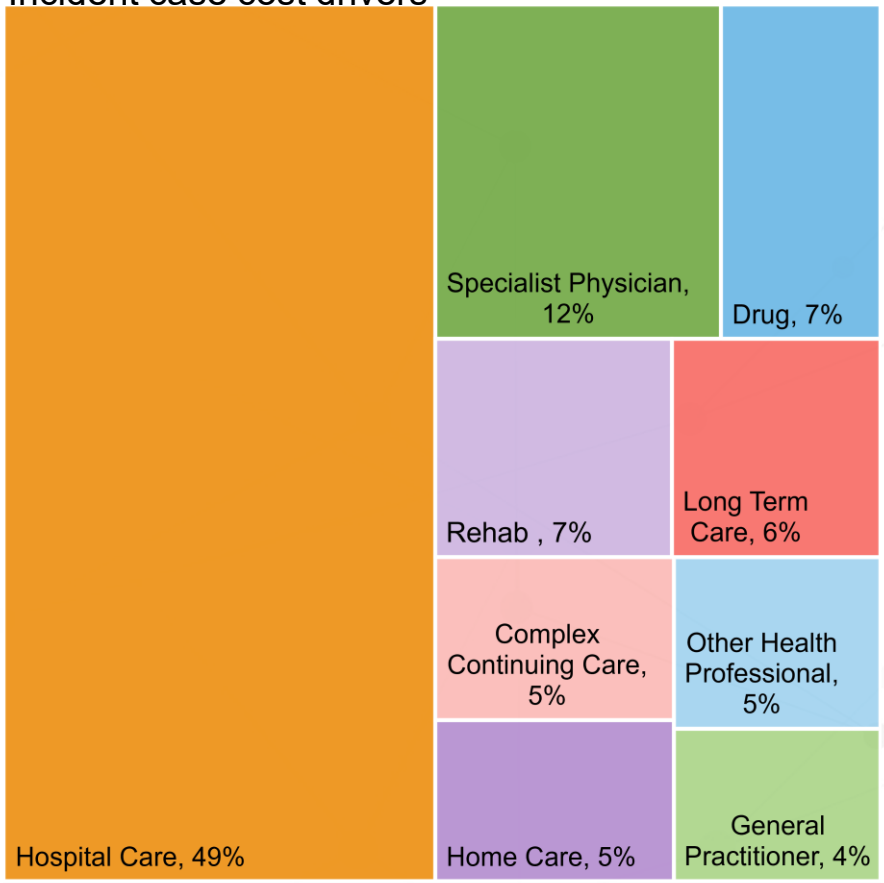
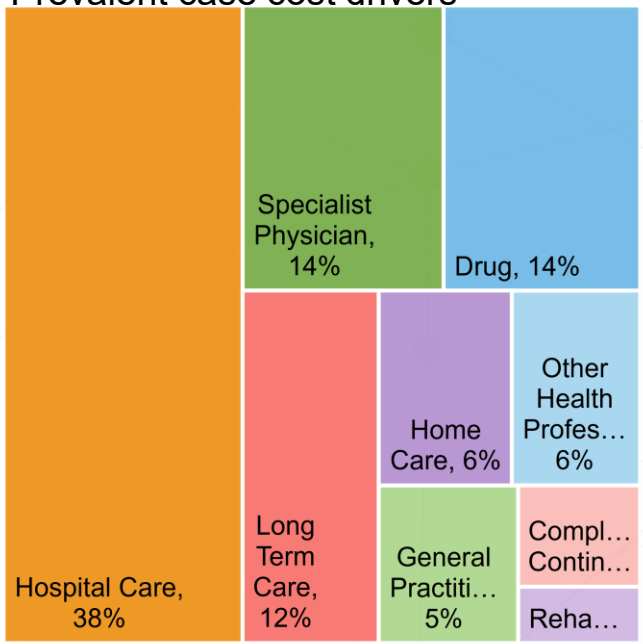
Cost Drivers: Incident vs. prevalent

Incident case cost drivers



Prevalent case cost drivers



*Cost drivers examined include: Hospital care, home care, general practitioner, specialist physician, other health professional, drug cost, rehab, complex continuing care, and long term care.

Cost Drivers: Incident vs. prevalent

In 2019, the average total cost to the health system for an Ontarian with a TBI or concussion was 1.8X more for an incident case than a prevalent case. Cost relationship is indicated by total box size. The largest cost driver of incident and prevalent cases was attributable to hospital care at 49% and 38% of all health care costs respectively.

The average total health care costs for a person with a TBI or concussion (prevalent case) for 1 year are 1.4X higher for adults and 2X higher for seniors compared to the average Ontarian.

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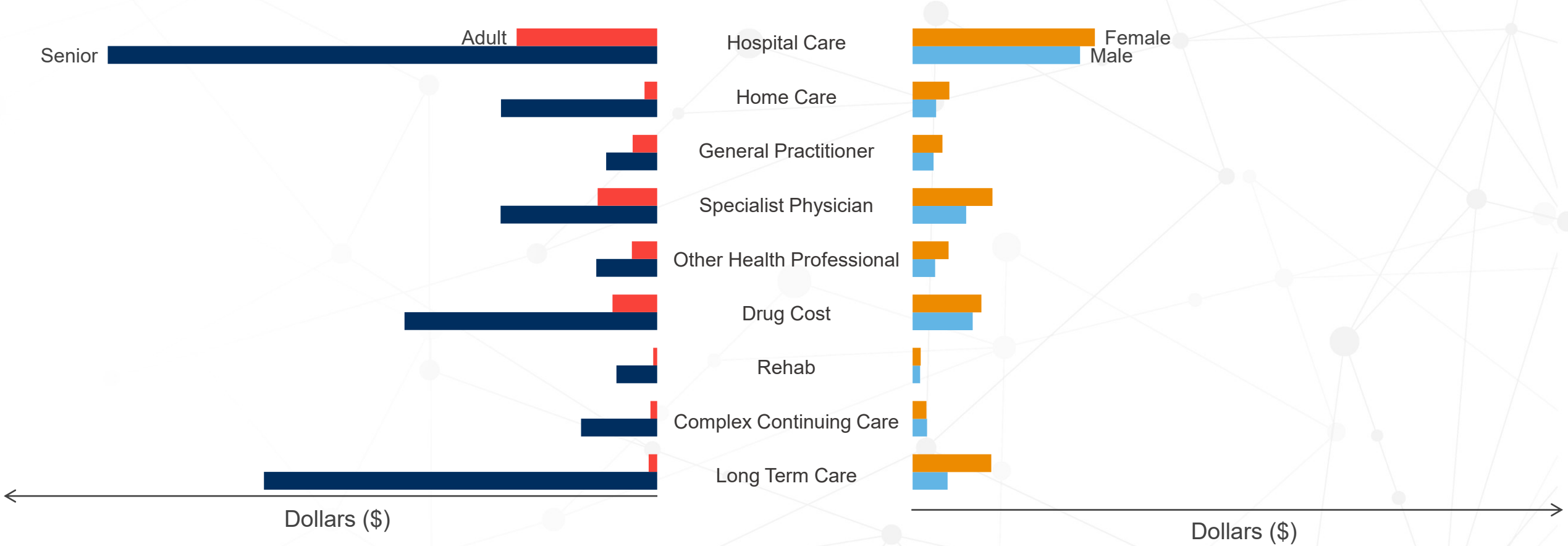
*Cost drivers examined include: Hospital care, home care, general practitioner, specialist physician, other health professional, drug cost, rehab, complex continuing care, and long term care.

Cost Drivers vary by age and sex for prevalent cases



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Cost Drivers vary by age and sex for prevalent cases

Overall, health care costs (in Canadian dollars, 2019) for people with a TBI or concussion are higher for the senior population (65+ years) compared to adults (18 - 64 years) and are higher for females than males. The cost drivers, those services that drive health care costs, vary depending on age and sex. Amongst adults and seniors, hospital care accounts for the largest cost driver at 43% and 32% of all costs respectively. Hospital care is also the largest cost driver in both females and males representing 34% and 41% of the health care costs respectively.

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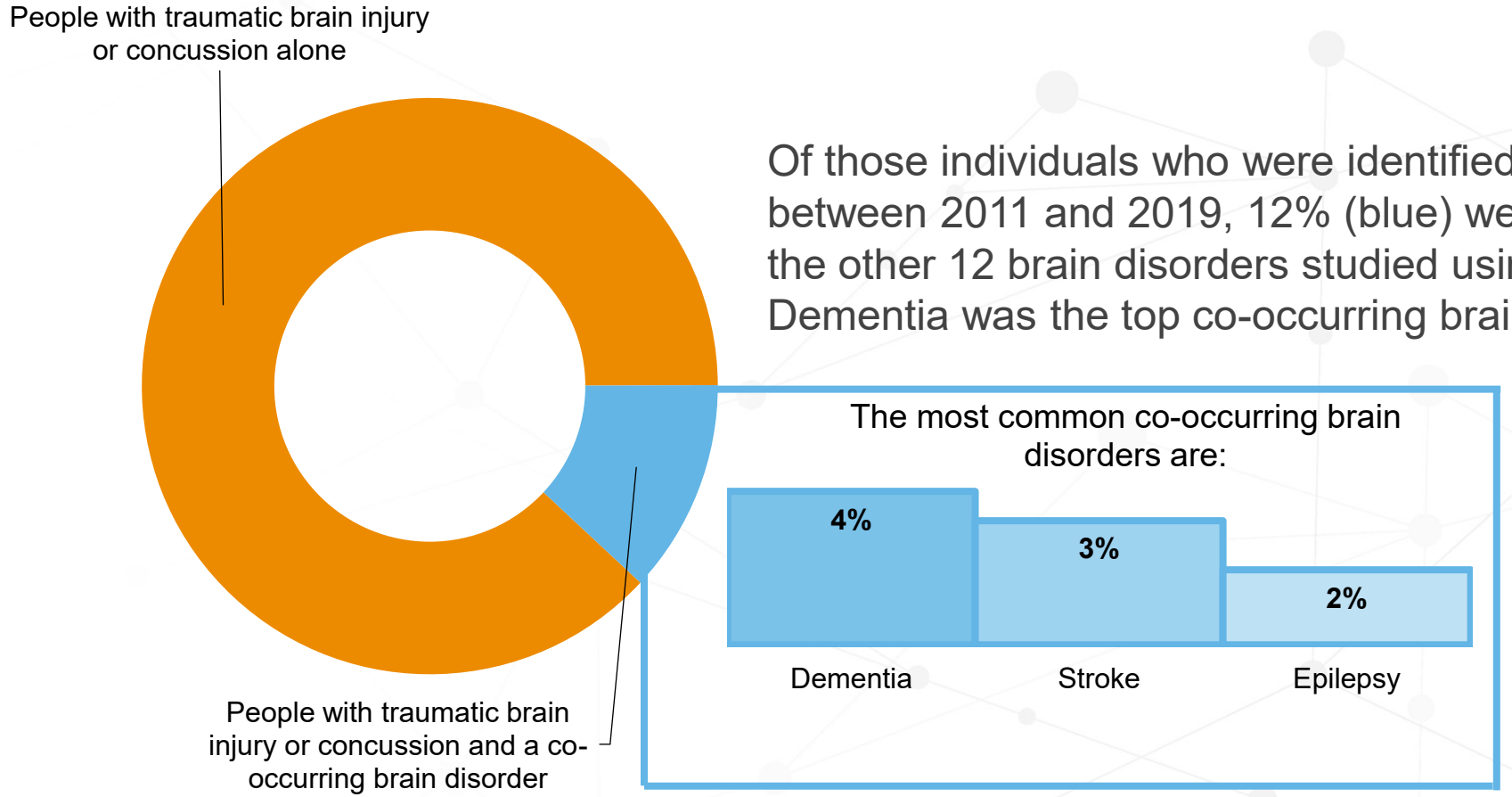
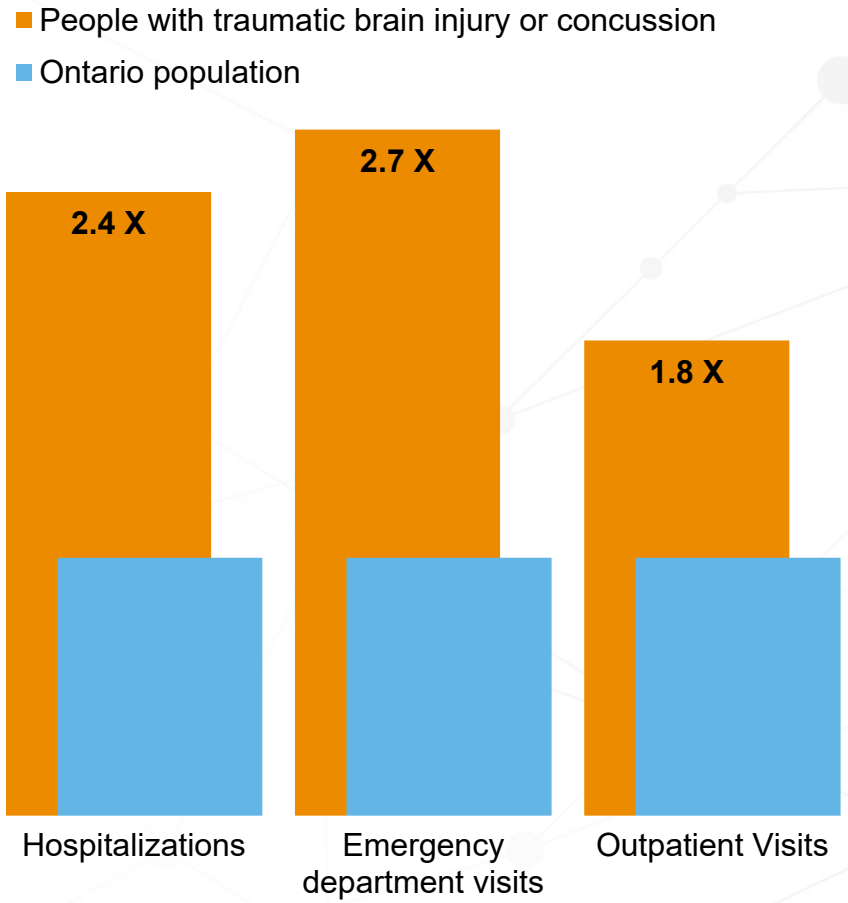
Co-occurring brain disorders



Of those individuals who were identified as having a TBI or concussion between 2011 and 2019, 12% (blue) were also identified as having one of the other 12 brain disorders studied using health administrative data. Dementia was the top co-occurring brain disorder, with 4% of those with a brain injury also having dementia, followed by 3% having had a stroke, and 2% with epilepsy.

*Note, years represent the fiscal year. For example, 2019 is from April 1, 2019 to March 31, 2020.
*Note, other brain disorders studied include: non-malignant brain tumour, benign brain tumour, dementia (incl. Alzheimer's disease), epilepsy, motor neuron disease, multiple sclerosis, parkinsonism, schizophrenia, spina bifida, spinal cord injury, stroke, and traumatic brain injury & concussion.

Mental Health and addictions service use



Of those individuals who were identified as having a TBI or concussion in 2019, their visit rates for mental health and addictions related services were between 1.8X to 2.7X greater than the general Ontario population, depending on visit type.

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Additional study information

Brain Disorder	Evidence Grade	Reference	Algorithm	ICD-09 (CM) codes	ICD-10 codes	OHIP Dx codes	ODB drugs name	OMHRS codes	Age Restriction
Traumatic brain injury including concussion	II	Accepted algorithm	1 hospitalization record or 1 emergency department visit record or 1 outpatient physician claim: FP/GP, pediatrician, or specialist (spec='18' '19' '23' '24' '31')	3102, 8001, 8003, 8011, 8013, 8026, 8027, 8031, 8033, 8041, 8043, 850, 851, 852, 853, 854, 9071, 925	F072, S020, S021, S023, S027, S028, S029, S06, S07, T020, T060, T905	850, 854	N/A	N/A	None

Brain health in Ontario project main page: www.braininstitute.ca/BrainHealth
Methods and Considerations: www.braininstitute.ca/brainhealth-methodology

Publication information