SEX, GENDER, AND TRAUMATIC BRAIN INJURY

A Path To Recovery and Care

October 2024 Version

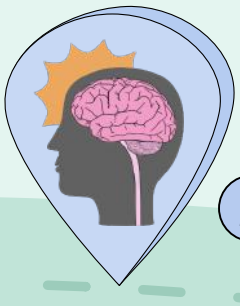
Summary infographic: a roadmap to navigate this resource

Traumatic brain injury is a common injury in Canada and in the world. Nearly half of all people will experience a brain injury in their life. It is important to understand this injury and how it affects people and their families.

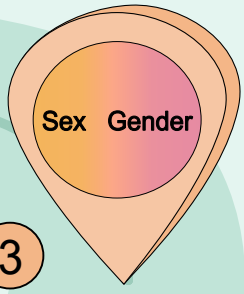
This series of infographics explores sex and gender effects in traumatic brain injury. It is meant to support a person with brain injury and their family seek and provide care that suits their needs.

Follow the path to learn more about each topic.

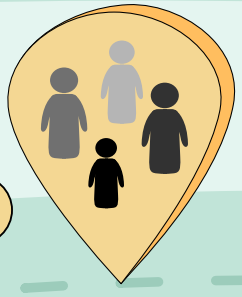
1 Why should I get informed about traumatic brain injury?



2 What is a traumatic brain injury and how can I recognize it?

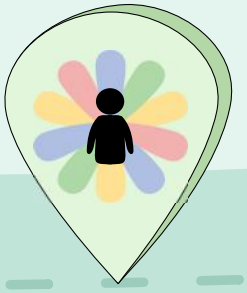


3 Why do sex and gender matter in traumatic brain injury?

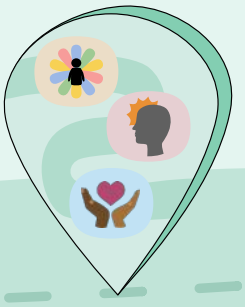


4 How does traumatic brain injury affect roles and relationships?

5 What supports are important after a traumatic brain injury?



6 What is intersectionality in traumatic brain injury?



7 How does traumatic brain injury affect a person's life?

① Why should I get informed about traumatic brain injury?

Facing a brain injury or caring for a loved one who is injured is often challenging. It may feel overwhelming to receive new information during this time.

However, this resource has the potential to support you and your family during recovery.

About this series

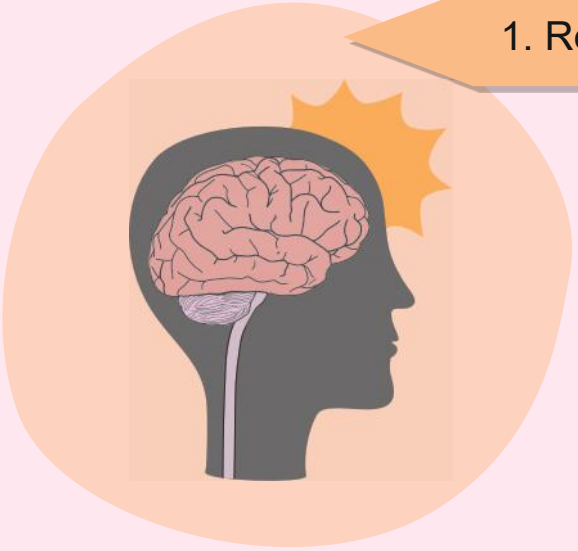
The need for this resource emerged from conversations with many people with brain injury and their families, like yourself.

People shared with us their life stories and what information they would like to receive.

We hope you find this resource helpful.

Learning about brain injury can help you...

1. Recognize injury signs and seek care early



Traumatic brain injury does not always leave a visible physical injury. If a person does not see they are injured, they may ignore it.

Being informed allows a person and their family to recognize signs of brain injury and seek care early.

2. Set expectations for care during recovery

A person who cannot carry out the roles they had before the injury often needs support.

Knowing what to expect after a brain injury may help families discuss what care is needed and plan for recovery.

3. Reduce fear, distress, and anxiety

The changes caused by a brain injury can be overwhelming. It is difficult to predict how long it will take to recover.

Support at home is essential for well-being and recovery.

4. Identify available resources and services

People can find resources and support through brain injury organizations.

Advocacy is important to ensure that a person with brain injury can access the services they need.

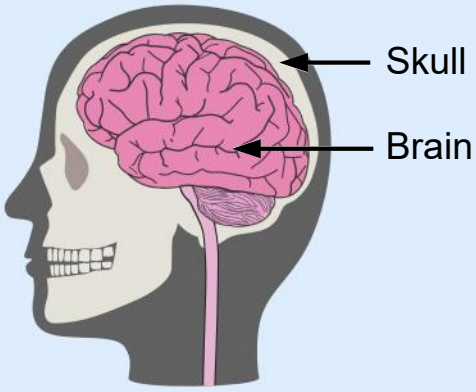
You can advocate for yourself or on behalf of someone you love.

A brain injury can affect a person and those around them in many ways, both in the short and long term. It is important to learn about brain injury, common challenges during recovery, and the meaning of quality care.

② What is traumatic brain injury and how can I recognize it?

The human body is very complex. Its many organs work together to sustain life and determine a person's health.

The brain is the control center for all organs. It is protected by a hard bone called the skull. However, the brain can still be injured.

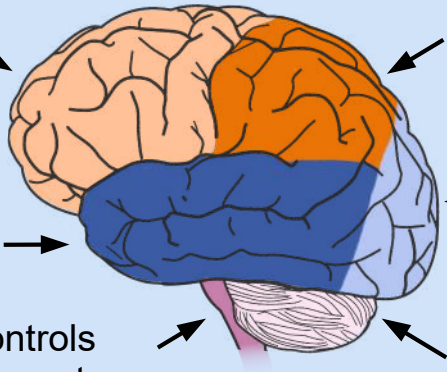


What is a traumatic brain injury?

When the brain gets injured by a force from outside the body, such as a hit or push, it is called a traumatic brain injury or TBI.

Learning about the parts of the brain and what they do helps us understand changes that happen after a brain injury.

The six parts of the brain and their roles



Frontal lobe oversees motivation, personality, problem-solving

Parietal lobe interprets touch, sizes, shapes

Temporal lobe oversees memory, hearing, language

Occipital lobe interprets vision

Brain stem controls breathing, temperature, sleep, blood pressure

Cerebellum controls posture, balance, movement

Scientists still debate if differences in the brain between people reflect their biology, lived experiences, or both.

What scientists do agree on is that these differences play an important role in changes that happen after a brain injury.

What is injury severity?

Traumatic brain injuries can be classified as mild, moderate, or severe. A mild brain injury is often called concussion.

The **Glasgow Coma Scale (GCS)** is a common measure to determine severity. GCS scores are based on a person's ability to open their eyes, speak, move, or respond after injury.

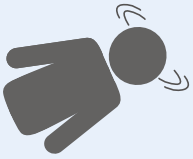
A lower score indicates a more severe brain injury, as shown below.

Mild: 14 -15	**Moderate:** 9 - 13	**Severe:** 3 - 8

Research shows...

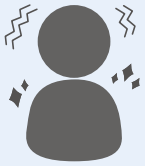
- Mild traumatic brain injuries account for more than 90% of all brain injuries.
- Even a mild brain injury can result in a range of immediate and lasting symptoms.

What are common immediate symptoms of traumatic brain injury?



Fainting or loss of consciousness

Nausea or vomiting



New problems with vision, smell, taste or speech

What are common lasting symptoms of traumatic brain injury?

Changes in learning and thinking

Concentration

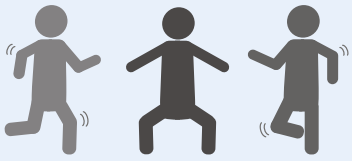
Memory

Changes in emotional response

Angry, grouchy

Sensitive

Changes in movement and physical ability



Each brain injury is unique. The symptoms a person experiences and their duration expand beyond injury severity and which parts of the brain were impacted. Recent research shows that symptoms are closely linked to a person's biology and lived experiences.

3 Why do sex and gender matter in traumatic brain injury?

A traumatic brain injury can happen to anyone. However, it may affect some people more than others based on their sex and gender.

What are sex and gender?

Sex	Gender
• Biological characteristics that separate people into groups, generally male and female. • Not all people fit into these two groups. • Sex is often assigned at birth.	• Roles and identities of boys, girls, men, women, and people who identify with other genders. • Non-binary people do not identify with categories of man or woman. • Gender is often shaped by social norms.
• Cisgender is a person whose gender aligns with their sex at birth (man = male and woman = female). • Transgender is a person whose gender does not align with their sex at birth.	

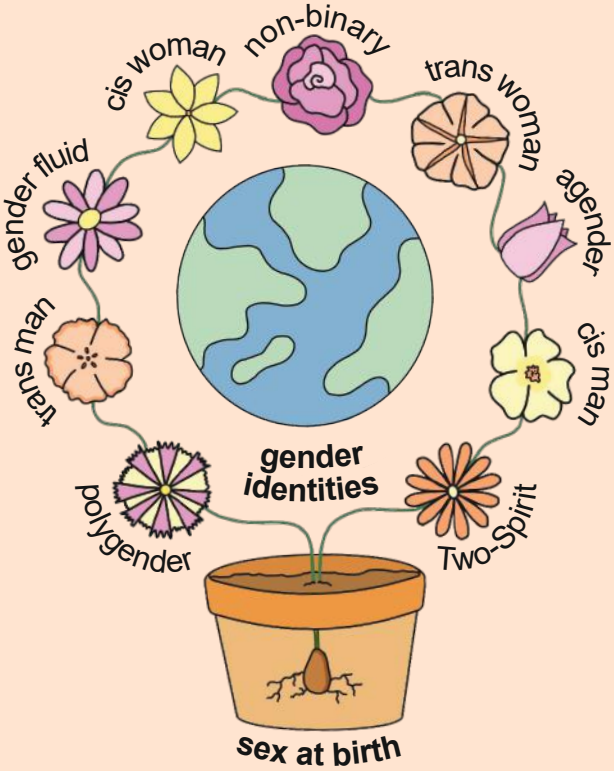
What is the binary view?

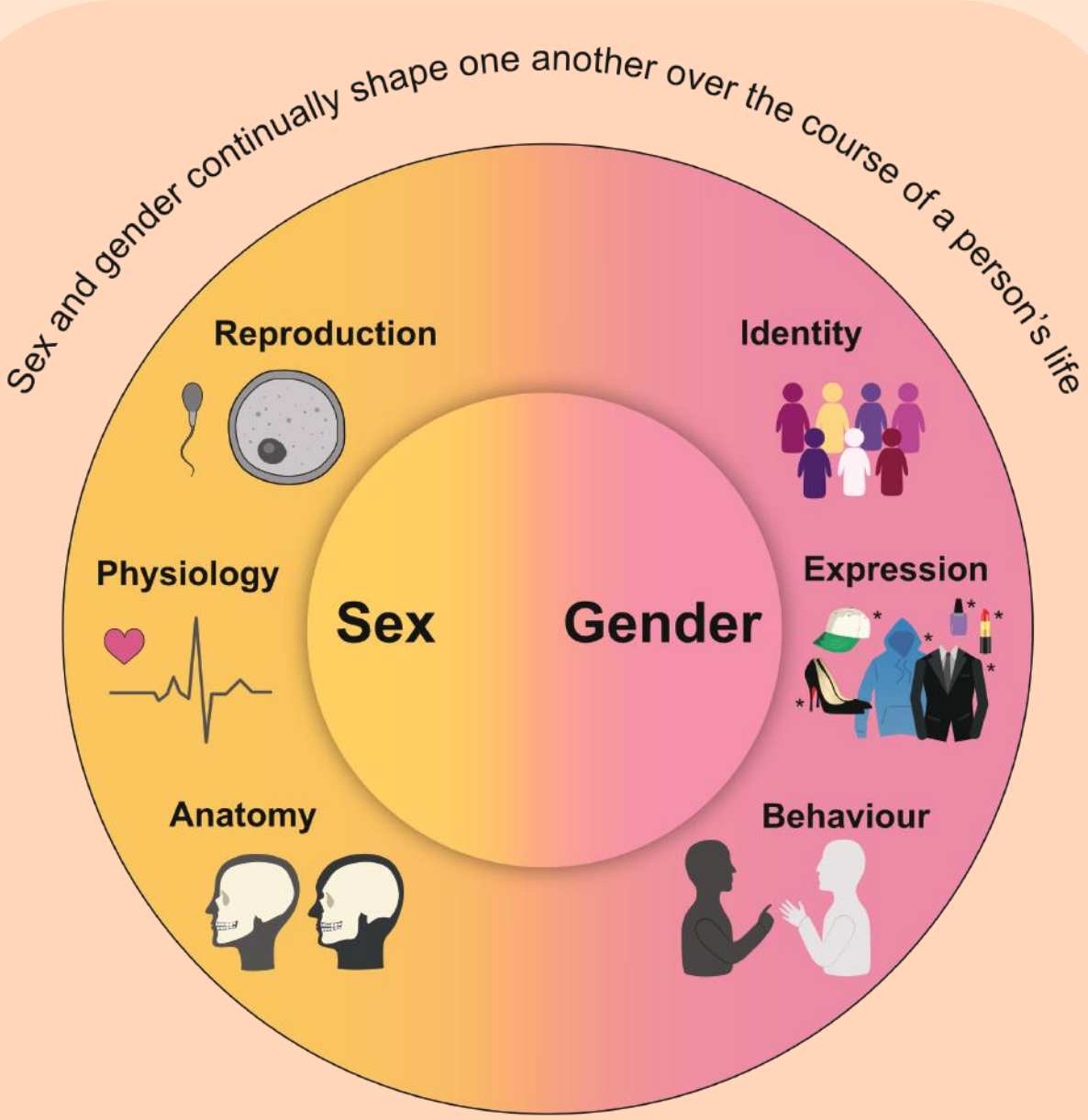
The binary view of sex and gender states that there are only two sexes (male, female) and two genders (man, woman). It does not capture the diversity that exists among people.

What is sex and gender diversity?

Sex and gender diversity refer to the range of biological and social characteristics that make each person unique.

There are many ways to describe sex and gender. The image shows some of the gender diversity that exists.





Differences in brain injury experience may also arise from:

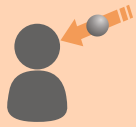
Relationships **Roles** **Resource distribution** **Power relations**

It is difficult to separate the effects of sex from the effects of gender in a person with brain injury. However, research helps us understand how sex and gender shape injury cause and circumstance, care seeking and receiving, and biological responses to injury.

* Images indicated with an asterisk were sourced from *Pixabay*. As per their license, no credit is required. *https://pixabay.com/service/license/*

Injury cause and circumstance

Gender may influence how people get a brain injury based on their roles and relationships. This is confirmed by research on the causes and circumstances of injury, as shown below.

Cause of brain injury:		Men	Women
	Hit by an object when...	operating machinery	supporting patients/clients
	Falling from...	a height	ground level
	Car collision as a...	driver	pedestrian
	Hit when exposed to...	social violence	domestic violence

Research outside the field of brain injury shows that **transgender people**, **non-binary people**, and **people who do not conform to gender norms** are more affected by violence than cisgender people.

This may put them at greater risk of brain injury.

Take action: preventing a brain injury

- Wear a helmet when there is risk of falling objects or when practicing sports.
- Install handrails, improve lighting, and remove tripping hazards.
- Drive responsibly and wear a seatbelt.
- Whenever possible, avoid situations where you feel unsafe or at risk of physical assault.

Most research presents results on men and women. We need research that goes beyond the binary view and includes people of all gender identities.

Care seeking and receiving

Gender may influence how people seek and receive care after a brain injury. This is confirmed by research on care seeking and receiving linked to social norms and expectations.

Care seeking and receiving	Men	Women
Reporting injury	less likely to report	more likely to report
Seeking medical attention	delay in care seeking	care seeking early when unwell
Following care recommendations	more often leaving hospital against medical advice	more often adhering to care recommendations
Perceived quality of care	complete support when caregiver is a woman	limited emotional support when caregiver is a man

Research outside the field of brain injury shows that **transgender people**, **non-binary people**, and **people who do not conform to gender norms** more often face discrimination in healthcare.

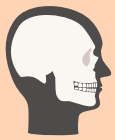
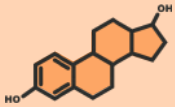
This may cause delays in seeking care, lack of trust, and fear to disclose their gender. The care they receive often does not meet their sex- and gender-specific needs.

Take action: removing barriers to quality care

- Do not let gender norms influence your decision to report injury and seek care.
- Provide care that meets a person's unique needs based on their sex and gender.
- Confront norms that disadvantage some people more than others in accessing quality care.
- Know your rights and advocate for justice in healthcare.

Biological responses to injury

Sex may influence how each person's body responds to a brain injury based on their biology. Research shows differences in the likelihood of experiencing...

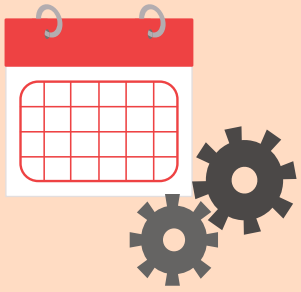
Male	Female	Due to biological differences in:
surgery on skull	neck injury along with brain injury	 Bone and muscle characteristics
post-injury stroke	multiple organ symptoms	 Genetics and metabolism
changes in testosterone levels	changes in estrogen levels	 Hormones

A person with brain injury may experience hormonal changes, since the injury can affect the brain's ability to regulate hormone levels in the body.

Transgender people with brain injury may need additional care if they are undergoing procedures that influence hormone levels. This includes hormone therapy and surgical removal of ovaries or testes, which are organs that produce hormones.

Take action: considering biology in recovery

- Seek care and build habits to strengthen bones and muscles.
- Learn how hormonal changes are linked to many aspects of health and well-being.
- Work with your healthcare team to monitor hormonal levels and address concerns.



Each person has a unique set of biological and social characteristics that are reflected in brain injury cause, care seeking and receiving, and biological responses. Care that considers each person's characteristics and needs is essential to promote the best possible recovery journey.

④ How does traumatic brain injury affect roles and relationships?

Roles, relationships, and gender

Each person holds many roles in their family and community.

During their life, a person also builds relationships with people around them.

Roles

Relationships

In the past, roles and relationships were often set based on a binary view of gender. In other words, there were clear expectations of how men and women should act.

Today, the expectations are less strictly defined in many societies. However, some families and communities still hold on to traditional views on gender in roles and relationships.

What happens after a traumatic brain injury?

After a brain injury, a person may not be able to act as they did before. Often, family members must learn how to perform roles they did not do before. Changes to established roles can be overwhelming and put stress on relationships.

For example, a person may not be able to drive or take care of finances after the injury.

This means a family member may need to step in to help with these tasks.

It is important to recognize gender in established roles and relationships. This allows a person to revisit their ability to meet expectations after injury and adapt to new relationship dynamics.

Lived experiences of traumatic brain injury

Each person's brain injury journey is unique. Hearing stories of people who went through similar situations can help us feel connected and not left alone. In the quotes below, people with brain injury and family members share their lived experiences.

"I couldn't help, couldn't cook. I was the cook of the household. Couldn't clean. Couldn't listen to them."

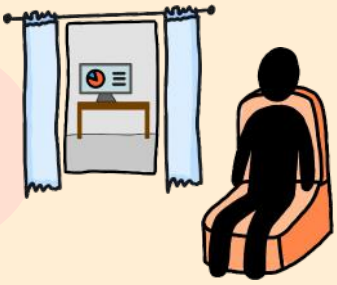
– Person with mild brain injury

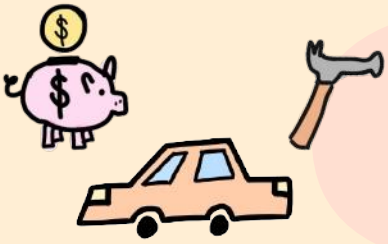
"Emotionally and physically and sexually, we've lost a lot. We've just grown to adapt, and try our best to do what we can with what we have now. It was hard at first... Now, we're working at it."

– Family member of a person with mild brain injury

"I don't feel as useful as... I was before. Like I'm not working right now... And sometimes there's a lot of things I can't do obviously, right?"

– Person with moderate brain injury





"[They have] done most of the money stuff, the highway driving, and the manual fix-it things... I'm having to learn some things right now."

– Family member of a person with severe brain injury

Take action: navigating changes after brain injury

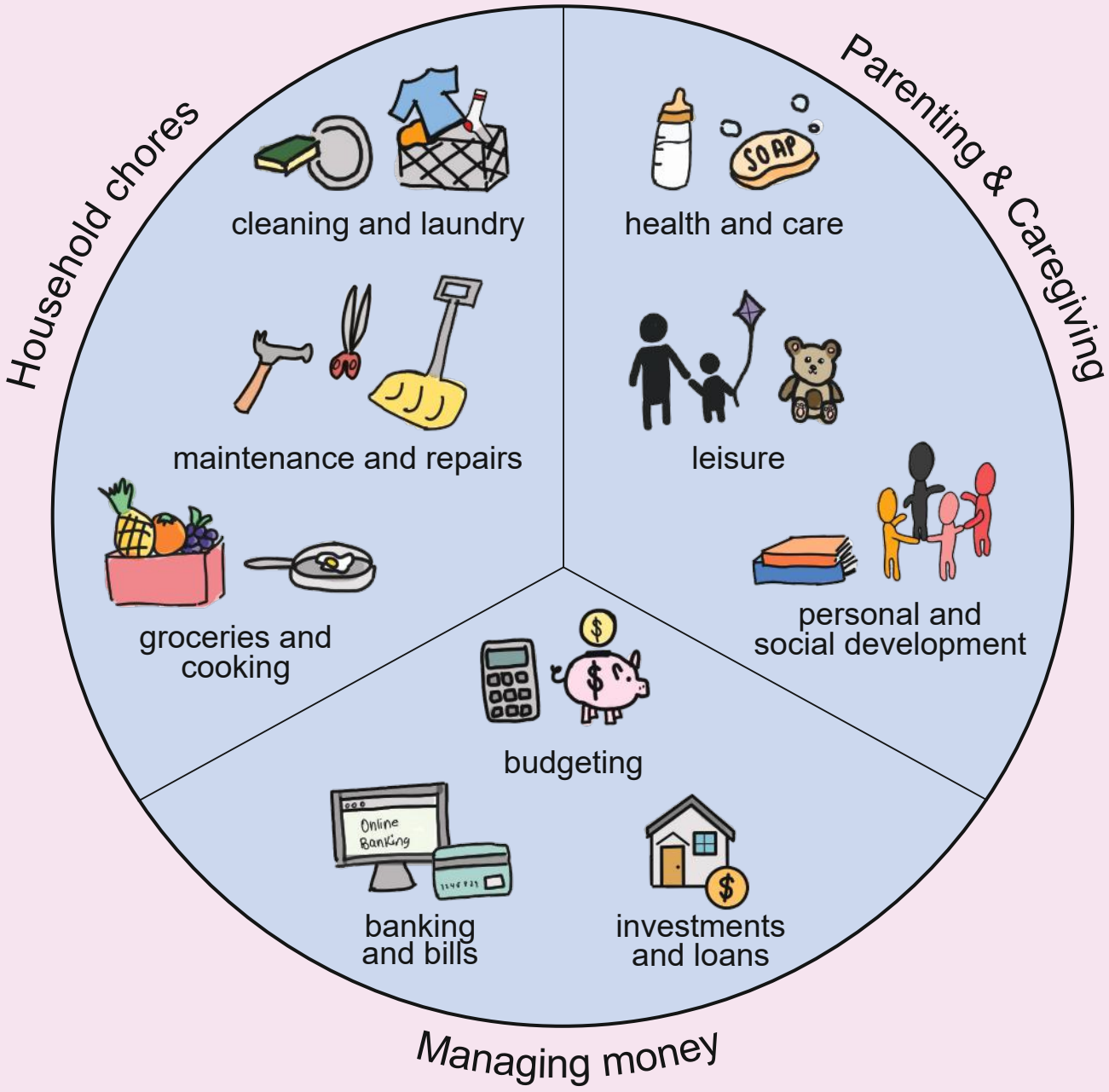
- Be patient with yourself and others as you adjust to changes in roles and relationships.
- Discuss challenges you are facing and seek support that meets your gender-specific needs.
- Be open to growth by learning new roles and strengthening your relationships.

5 What supports are important after a traumatic brain injury?

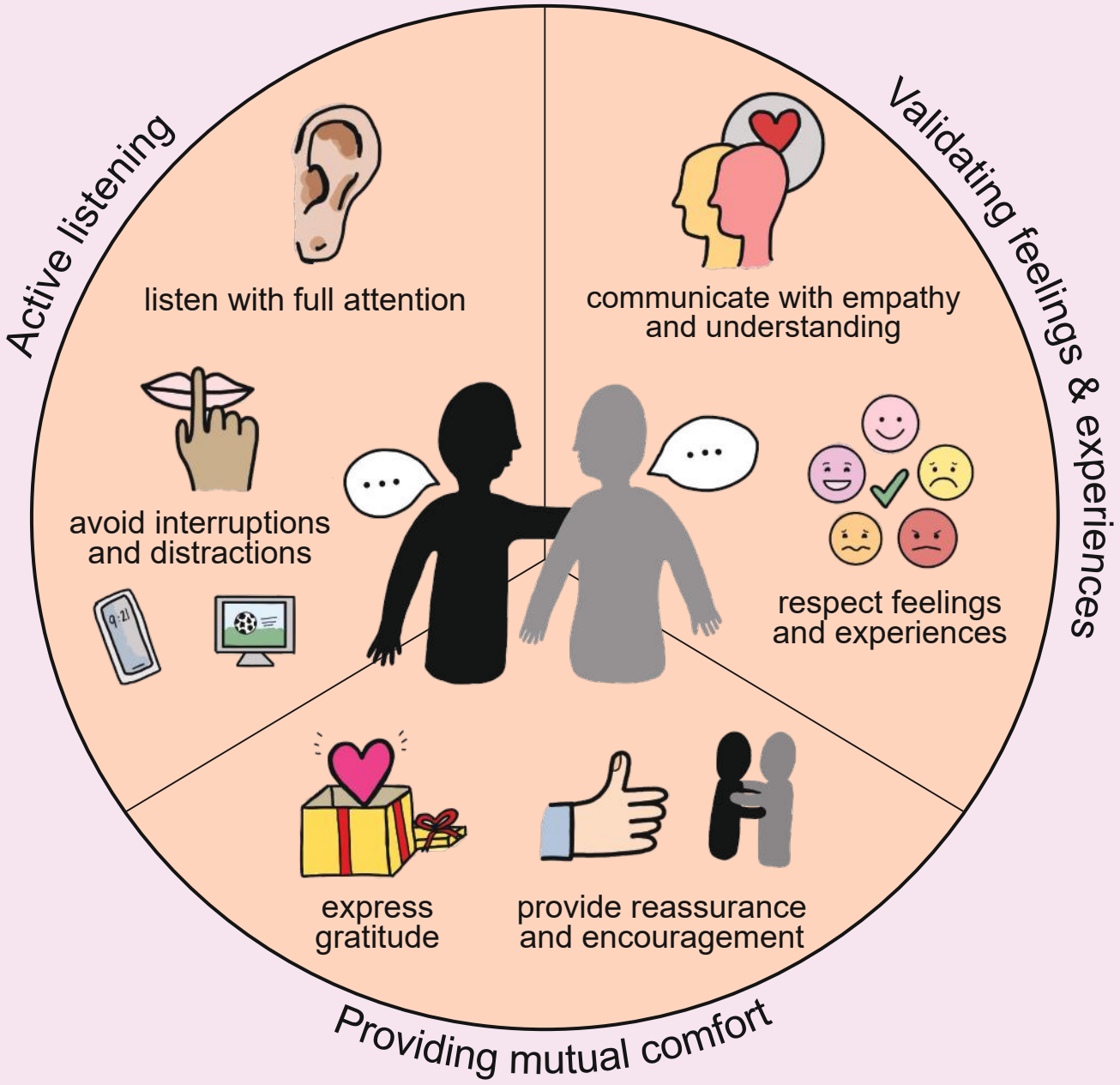
The consequences of brain injury make it difficult for a person to act as they did before. As a result, their relationships with people around them may also change.

During this time, a person with brain injury and their family need support. Two types of support at home are task-based support and emotional support.

Task-based support means helping out with daily tasks. Examples are household chores, parenting and caregiving, or managing money.



Emotional support means showing care and kindness through actions and words. It is a way to express respect and appreciation.



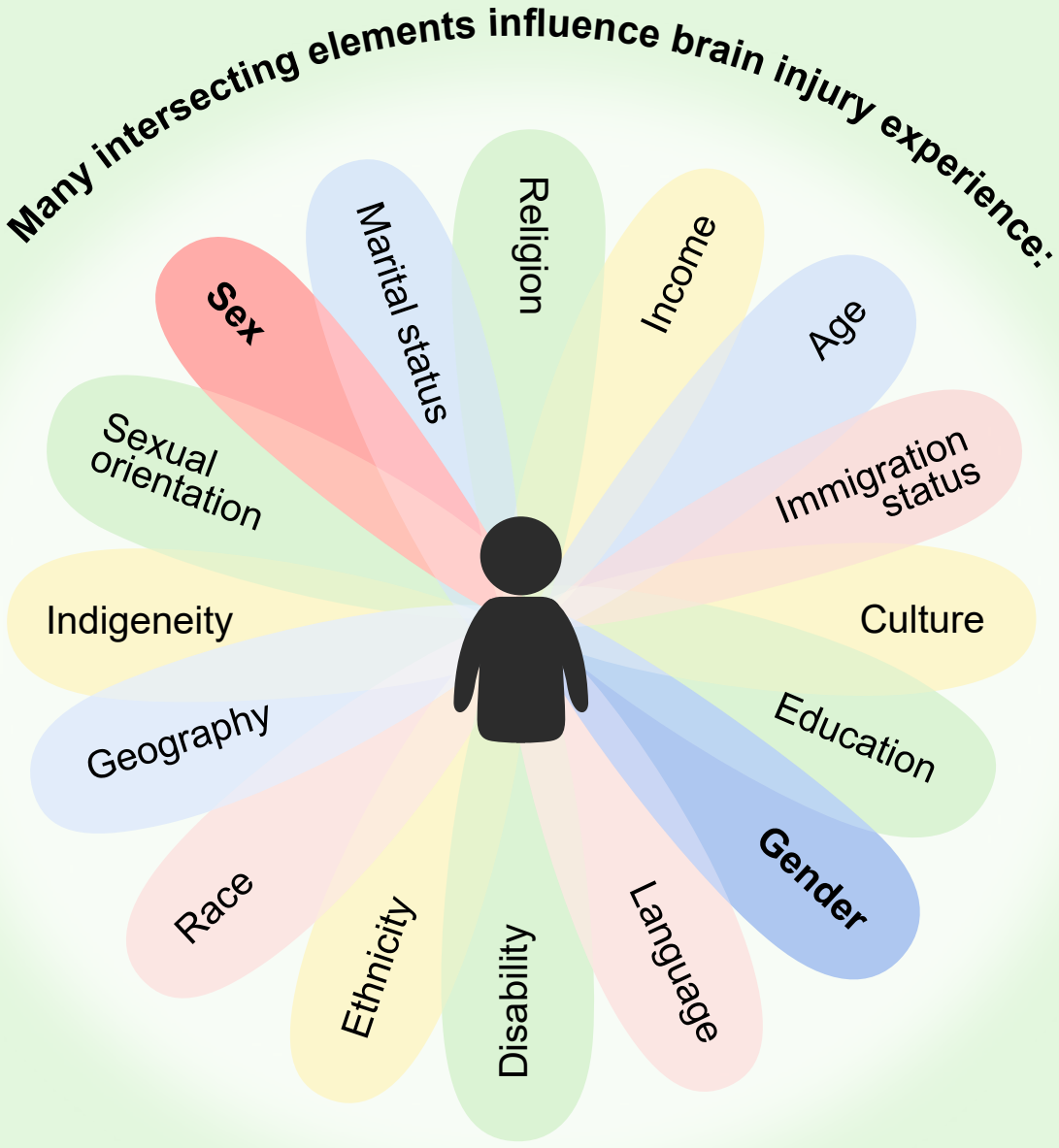
Each person has unique needs after brain injury. If a person does not receive the support they are looking for, they may feel lonely. This can cause frustration, fear, and helplessness.

It is important to be honest about the support you need. Open communication helps you and your family find the best way to care for each other.

Together, a person with brain injury and their family can create a supportive space that meets task-based and emotional needs.

6 What is intersectionality in traumatic brain injury?

Many elements intersect to make each person who they are and shape their life in unique ways. This is often referred to as **intersectionality**.



Sex and gender are not the only elements that form a person's identity. In addition to sex and gender, these elements include race, income, age, and more.

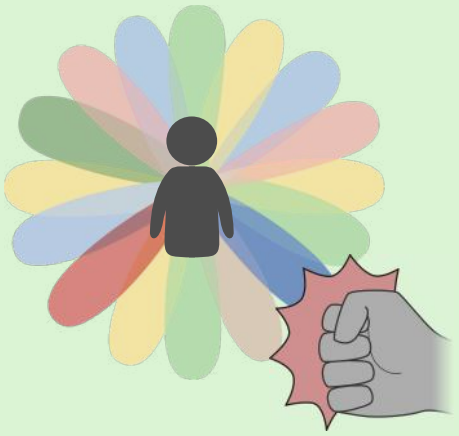
How does intersectionality affect brain injury experience?

Many factors work together to shape a person's life before and after injury. The examples below show how intersecting elements affect how a person get a brain injury and their access to care.

Intersectionality in brain injury cause

People are often treated differently based on their **race**, **sexual orientation**, **gender**, and other factors. This may make it harder for some people to access resources and meet their basic needs.

In such cases, people are more likely to be exposed to violence and face a brain injury due to assault.



Intersectionality in access to care

A person may face challenges to reach a hospital if they live in a distant area and cannot drive after brain injury. They may not have family or friends to drive them.

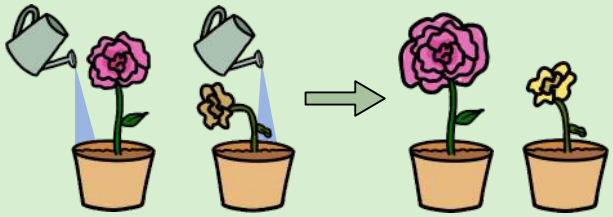
The combined effect of their **place of residence**, **disability**, and **support system** creates barriers for them to receive care.

It is important to pay attention to the many factors that shape a person's injury experience. That way, it may be possible to remove barriers to care and reduce the risk of brain injury for all people.

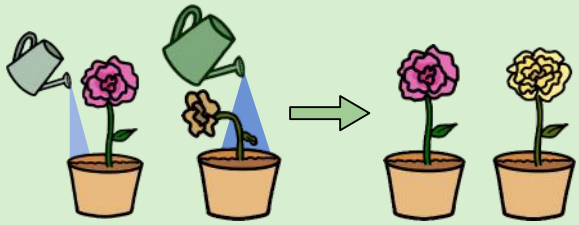
People's life circumstances are **not equal**. Because of that, it is important to ensure that care meets each person's unique needs and that all people can access it. This is known as **equity in healthcare**.

What is the difference between equality and equity?

Equality is giving each person the same resources regardless of their needs.

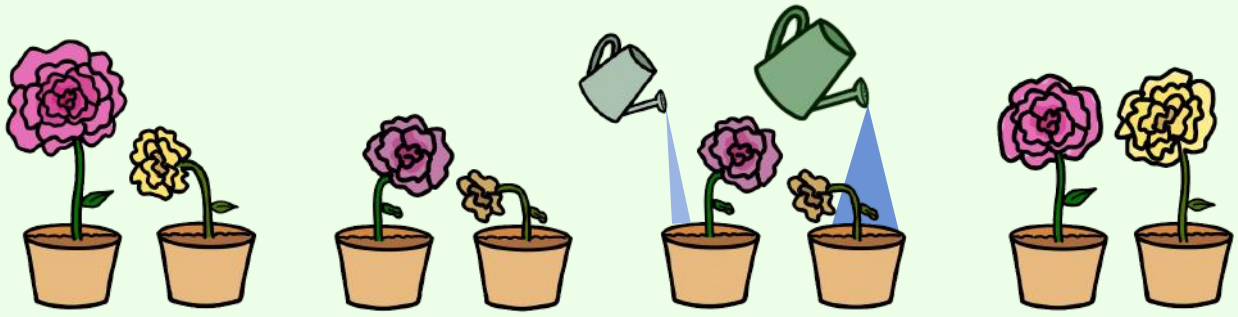


Equity is giving each person resources based on their needs to reach the same outcome.



What is equality and equity in brain injury?

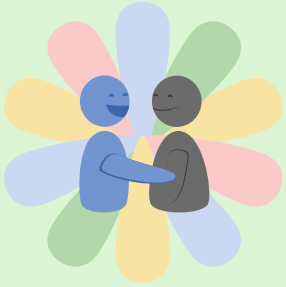
The image below shows that people's lives before injury are not equal. To ensure equity in recovery, the type and level of support should meet each person's unique needs.



Life before injury | Injury event | Recovery journey | Injury outcome

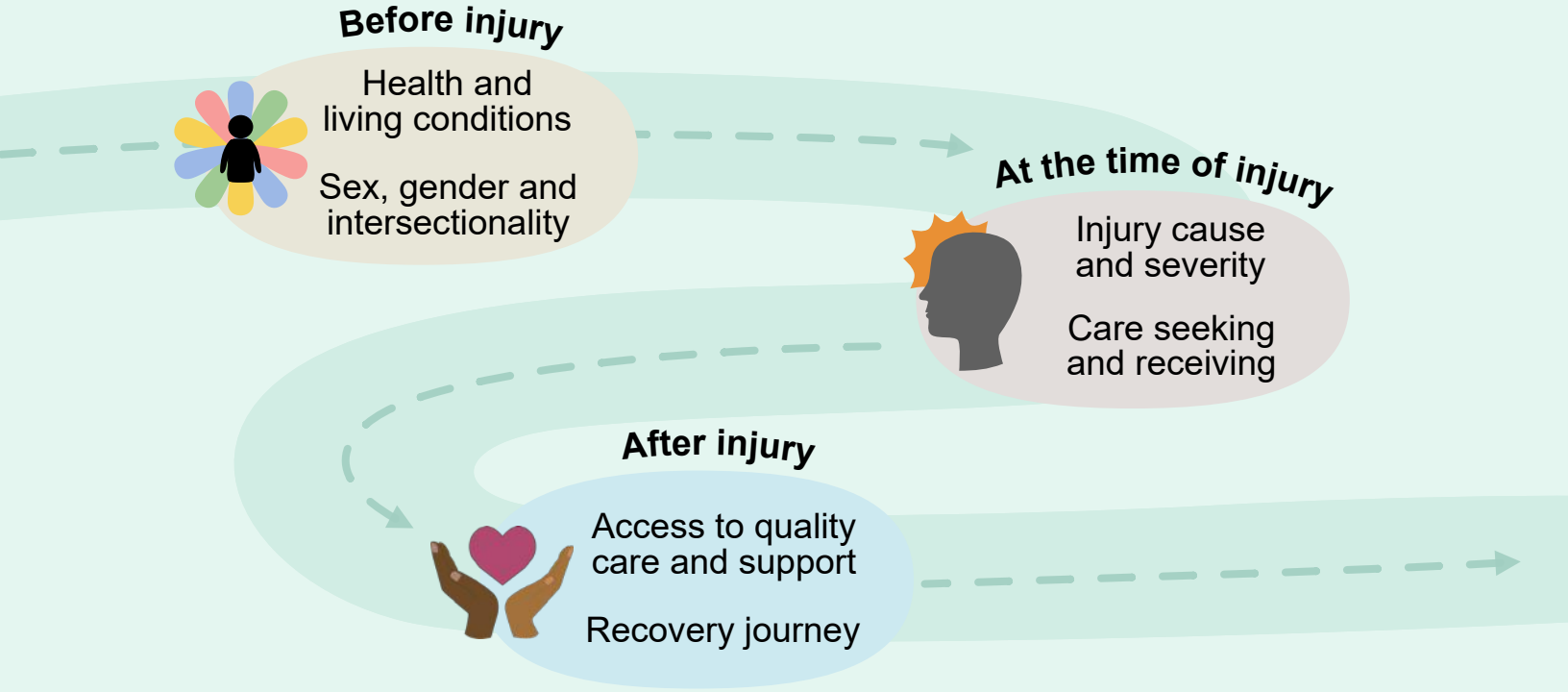
Take action: addressing intersectionality in brain injury

- Seek services and resources that align with a person's identity and needs.
- Respect and value all people regardless of their identity.
- Advocate for equity in access to quality care and support.



7 How does traumatic brain injury affect a person's life?

It is important to know a person's life **before** traumatic brain injury to understand what happens to them **at the time** of injury and **after**. The path below shows that these three time points are interconnected.



Many people with brain injury and their family members ask questions about what to expect after injury:

"I just wanna be able to understand stuff that I'm going through..."

– Person with brain injury

"I would love to know if there is a connection between gender and a brain injury and… how long it would take them to recover..."

– Family member of a person with brain injury

Each person comes to the injury with unique life circumstances. Because of that, each person's injury and path to recovery is unique.

Before injury

A person's health and living conditions before brain injury can influence if and how they get injured.

"...brain injuries can happen for so many different reasons and we can be mad at the reasons or we can start to understand what it is."

– Person with brain injury

The table below shows how a person's health and living conditions before injury are related to two common causes of brain injury.

Health and living conditions before injury* *The bigger the word, the stronger the link between the condition and injury cause	
Stroke Cardiovascular conditions Diabetes Disorders of older persons	Substance abuse Mental health disorders Sharp object & machinery injuries Schizophrenia
 **Falls**	 **Assault**

Research has shown that health and living conditions before injury are not the same based on sex, gender, and intersecting elements. This means that the risks each person is exposed to are not the same.

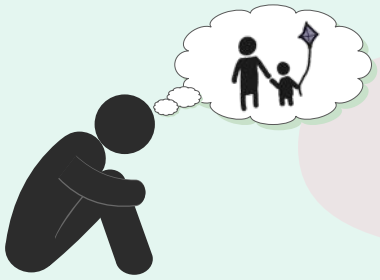
"Say you have got 10 bike injuries – and 10 bike injuries causes moderate injuries. Which is more likely to be in the bike accident? Is it male or female?"

– Person with brain injury

It is important to know and address the risks a person faces based on their health and living conditions before injury. This way, it may be possible to prevent a brain injury from happening.

After injury

Brain injury often results in significant changes to a person's life. These changes may also affect those around them.



"I feel like my life is completely upside down. Like it's completely different now..."

– Person with brain injury

Research shows that what happens after a brain injury should not be viewed in isolation from life before and at the time of injury. For example, the table below shows that the same health conditions pose different risks of dementia based on a person's sex.

Conditions related to risk of dementia after brain injury*

*The bigger the word, the greater the risk of dementia if a person has that condition

Male persons	Female persons
Depression	Tobacco smoking
Tobacco smoking	Depression
Diabetes	Diabetes
Cerebrovascular disease	Cerebrovascular disease
Sleep disorder	Sleep disorder
Heart failure	Heart failure

The table above is based on data that is binary (male/female). This limits our ability to explain why the same risks affect people differently. Research that captures both sex and gender diversity may answer this question.

Understanding a person's life before and at the time of injury is essential to provide quality care and minimize possible negative consequences after a brain injury.

A note from the creators

While life after injury may come with many changes, there are resources to support you during this time.

We hope this resource helped you understand brain injury better, recognize the role of sex and gender in recovery, and promote quality care.

Three takeaway messages

A brain injury happens suddenly. It affects a person and people close to them in many ways.

It is difficult to predict how long it will take a person to recover because of many factors that influence a person's life before, during, and after injury.

1. Each person is unique.

We all have our own biological (sex) and social (gender) strengths and vulnerabilities.

2. Each brain injury is unique.

Injury cause, severity, and damaged brain areas influence how a person feels and recovers.

3. Each person's support system is unique.

Access to quality care and support at home are essential to regain abilities and promote well-being.

Sex and gender play important roles in shaping a person's life before, at the time, and after brain injury. Care that considers the unique characteristics of each person, their injury, and support system is essential to meet the needs of people and their families.

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Creators and Reviewers

This material was developed at the KITE Toronto Rehabilitation Institute University Health Network (UHN) by Thaisa Tylinski Sant'Ana and Dr. Tatyana Mollayeva.

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Disclosure

This material should be used for educational purposes only. It is meant as a source of information for people with traumatic brain injury and their families.

UHN strives to use gender-inclusive language in all resources. We recognize there are limits to applying inclusive language when published studies, research, and other source material use binary terms. This infographic includes gendered terms used in source material. As language continues to change in health research, we will reassess and update our content.

Additional Resources

Resource	Website
Abused and Brain Injured	www.abitoolkit.ca/
Acquired Brain Injury Lab	www.abiresearch.utoronto.ca/
Brain Injury Canada	www.braininjurycanada.ca/en/
Centers for Disease Control and Prevention	www.cdc.gov/traumaticbraininjury/
Love Your Brain	www.loveyourbrain.com/education-advocacy
Model Systems Knowledge Translation Center	www.msktc.org/about-model-systems/TBI
Ontario Brain Injury Association	www.obia.ca/

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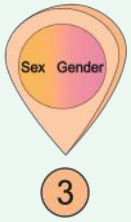

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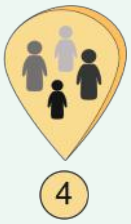

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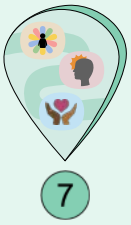

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Thank you for reading this infographic series on sex and gender topics in traumatic brain injury. This resource was last updated in October 2024.