

Acquired brain injury is any damage to the brain that occurs after birth and can cause a change in the brain's activity and functional ability.

Acquired brain injuries occur daily in the United States. They can be traumatic (caused by external forces to the head) or non-traumatic (caused by a lack of oxygen to the brain, pressure from a tumor, a viral infection, and more). The purpose of this document is to describe the prevalence of emergency department (ED) visits among Vermont residents who sought care at a Vermont or New Hampshire hospital where an acquired brain injury was one of the reasons for seeking care. This document also summarizes acquired brain injury-related deaths among all Vermont residents that occurred in 2022.

Data Highlights

- There were 189 ED visits for acquired brain injuries per 10,000 Vermonters in 2022.
- Non-traumatic brain injuries related to respiratory diseases and substance use have been increasing since 2016.
- Traumatic brain injuries ED visits are more likely to be among those younger than 25 years old.
- 15% of all deaths in Vermont are brain injury related.

In 2022, 75% of acquired brain injury ED visits were due to non-traumatic causes.

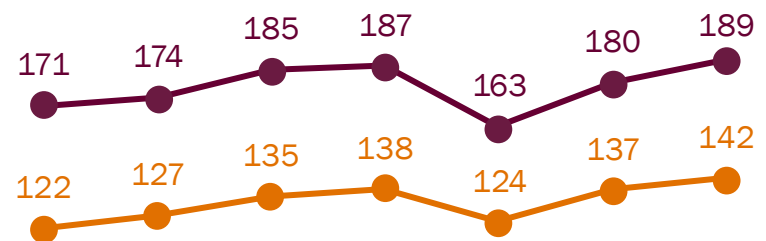
There were 12,252 brain injury-related ED visits in 2022. This is a rate of 189 ED visits per 10,000 Vermonters. The rate of ED Visits for acquired brain injuries increased 10% from 2016 to 2022. This increase was driven by a rise in non-traumatic brain injuries. The rate of traumatic brain injuries remained stable over this period.

Did you know?

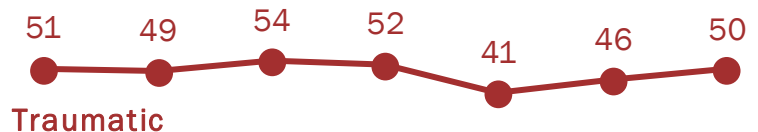
A non-traumatic brain injury can have similar health effects as a traumatic brain injury but are 3x as common as traumatic brain injuries.

The Rate of Brain Injury-related ED Visits per 10,000 Vermonters (Any diagnosis)

All acquired brain injuries



Non-traumatic



2016 2018 2020 2022

The top cause for a non-traumatic brain injury-related ED visits was a stroke while for traumatic brain injuries it was a fall.

Top causes of brain injury ED visits in VT in 2022	
Non-traumatic	Traumatic
1. Stroke (41%)	1. Fall (36%)
2. Encephalopathy (31%)	2. Motor Vehicle (18%)
3. Anoxia (17%)	3. Sport or exercise (16%)
4. Brain tumor (7%)	4. Assault (6%)

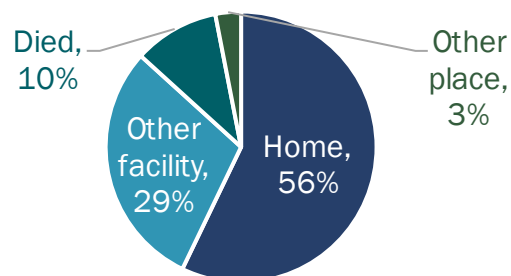
Most ED visits for a non-traumatic brain injury were admitted for an inpatient stay. There was no difference in discharge placement for traumatic and non-traumatic inpatient stays.

71% of non-traumatic ED visits and **17% of traumatic** ED visits for brain injuries were admitted for an inpatient stay.

In 2022, the average length of stay* at a Vermont hospital for a non-traumatic brain injury was **8 days** compared to **11 days** for a traumatic brain injury.

*The length of stay analysis was only calculated among VT residents who sought care at a VT hospital.

Place of Discharge for Inpatient Visits for All Brain Injuries in 2022

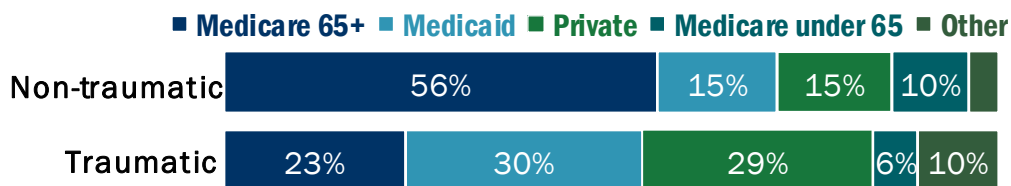
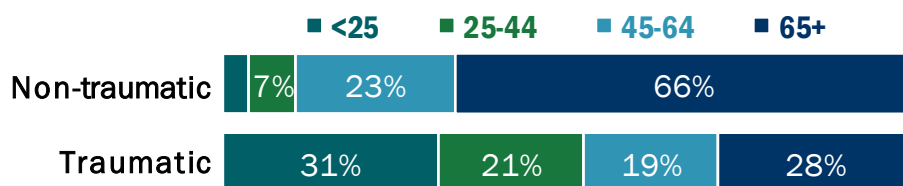


Other facility includes another acute hospital, skilled nursing facility, intermediate care facility or other facility.

Other place includes swing bed, to law enforcement, or left against medical advice.

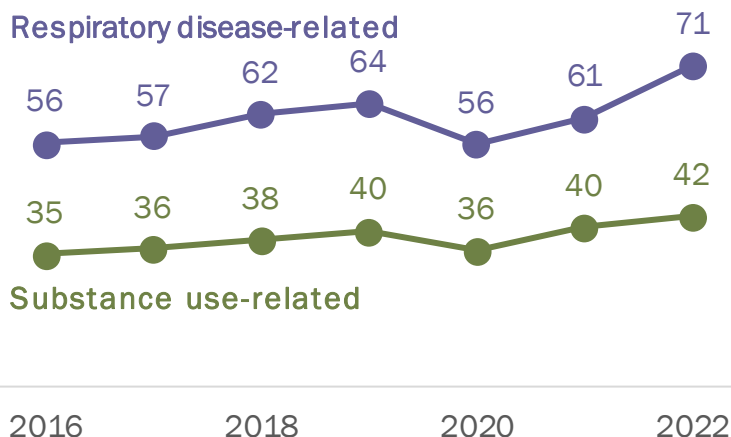
Non-traumatic brain injury ED visits were most common in adults 65+ and those insured with Medicare. Traumatic brain injury ED visits were more frequent in those under 25 and people insured by Medicaid or private insurance.

Prevalence of Age Group Among Brain Injury ED Visits



Acquired brain injuries related to respiratory diseases or substance use increased in 2022.

The number of brain injury ED visits per 10,000 Vermonters

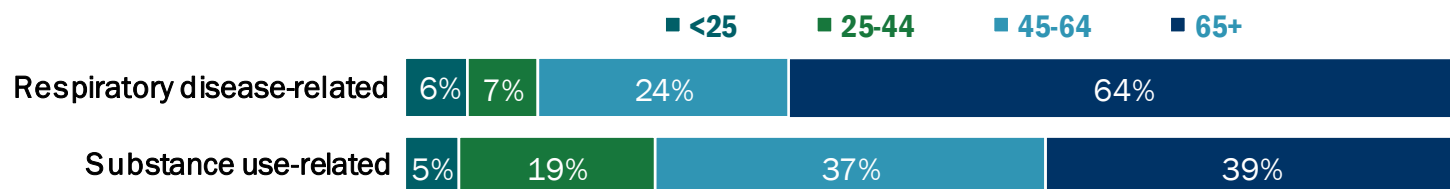


Oxygen loss from respiratory diseases or substance use can lead to a brain injury. Brain injury ED visits involving substance use or a respiratory disease both increased in 2022 compared to past years. The rate of respiratory disease-related brain injury ED visits was 71 per 10,000 Vermonters, an increase of 27% since 2016. The rate of substance use-related brain injury ED visits was 42 per 10,000 Vermonters, an increase of 20% since 2016.

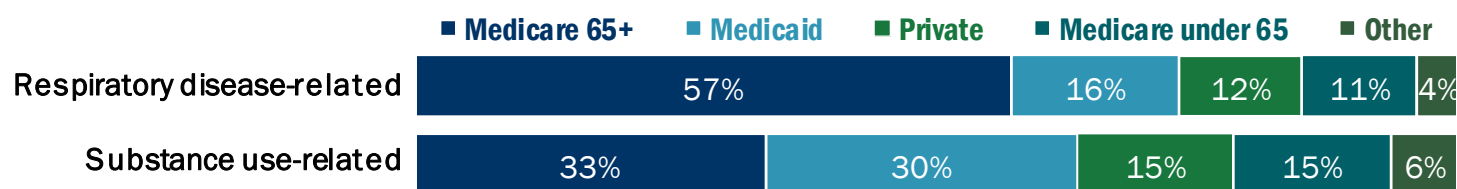
- **17% of respiratory disease-related brain injury ED visits included a diagnosis of COVID-19.**
- **27% of substance use-related brain injury ED visits involved alcohol.**

Most ED visits for brain injuries from respiratory disease occurred among older adults and Medicare recipients. Visits related to substance use were evenly divided between middle-aged and older adults, as well as between Medicaid and Medicare.

Prevalence of Age Group Among Specific Brain Injury ED Visits



Prevalence of Insurance Type Among Specific Brain Injury ED Visits



Other insurance type includes worker's compensation, other government insurance, self-pay, or no insurance.

1 in 7 deaths in 2022 had an acquired brain injury as a contributing cause.

In 2022, there was 1,078 deaths where at least one of the contributing causes of deaths was an acquired brain injury. This accounts for 15% of all Vermont resident deaths which is the same percentage as in 2016 when 15% of all deaths also included a brain injury as a cause. Most (93%) deaths caused by a brain injury were from non-traumatic causes while 7% of the deaths included a traumatic cause. Strokes were the most common cause listed, accounting for 58% of all brain injury deaths in 2022.

Among all deaths caused by a brain injury, 627 were stroke-related while...

- 169 were from brain tumors
- 165 were related to diabetes
- 78 were related to a fall
- 60 were related to COVID-19
- 52 were related to dementia

Brain injury deaths related to substance use were more likely to be among men than women and happen at a younger age among both sexes.

In 2022, non-traumatic brain injury-related deaths were evenly split between the sexes while traumatic brain injury-related were slightly lower among men (45%) and respiratory disease-related were slightly higher (54%). The median age at death was similar for non-traumatic, traumatic, and respiratory disease-related brain injuries among both sexes at around 80 years old. However, substance use-related brain injury deaths had a younger median age at 73 years old and were more likely to be among men than women.

	% of deaths that were male	Overall median age at death
Non-traumatic	50%	79
Traumatic	45%	80
Substance use-related	60%	73
Respiratory disease-related	54%	79

The Vermont Brain Injury Program

The Vermont Department of Disabilities, Aging and Independent Living's [Brain Injury Program](#) provides rehabilitation and life skills training services to Vermonters with a moderate to severe brain injury. The goal of the program is to support individuals in reaching their optimal level of functioning and to successfully maintain or return to living and working in their chosen community.

Learn more about the Department of Disabilities, Aging & Independent Living Brain Injury Program at [Traumatic Brain Injury Program | Adult Services Division](#)

Phone: 802-241-0294

For more information about the data used here, contact AHS.VDHPDPA@vermont.gov

Vermont Uniform Hospital Discharge Data Set (VUHDDS): Hospital and emergency department discharge data are collected from in-state hospital. Only Vermont residents who seek care at Vermont hospitals were used in the analysis of this dataset. This analysis included all acquired brain injury diagnoses where the condition in question is listed as any of the twenty available diagnosis codes.

New Hampshire Public Use Hospital Discharge Data Set: All hospitals licensed by the New Hampshire Department of Health and Human Services (NH DHHS) under RSA He-C 151:2 are required by law to report patient-level discharge information to DHHS. Discharges are also collected from select rehabilitation hospitals, rehabilitation and psychiatric units within acute care hospitals, and free-standing ambulatory surgical treatment centers that are part of a hospital. This data was filtered to only include inpatient and/or ED discharges of Vermont residents who sought care at a New Hampshire hospital with at least one diagnosis code related to an acquired brain injury.

Definition of acquired brain injury in hospital discharge data by ICD-10-CM codes:

Non-traumatic brain injury: A80-A89, B00.4, B01.0-B01.1, B02.0-B02.2, B05.0-B05.1, B06.0-B06.09, B37.5, B94.1, C70, C71, C79.3, C79.4, D32.0, D33.0-D33.3, D42.0, D43.0-D43.3, E10.1, E11.0, E13.0, E13.1, E15, G00-G07, G09, G91-G93, G99.8, I60-I69, T71, T75.1, R09.0, R29.1

Traumatic brain injury: S02.0-S02.3, S02.7-S02.9, S07.1, S06, T90

Respiratory disease-related, including COVID-19: J00-J99, U00-U49 with at least one diagnosis code from traumatic or non-traumatic brain injury

Substance use-related: T36-T65, F1, Y90 with at least one diagnosis code from traumatic or non-traumatic brain injury

Vermont Vital Statistics: The Vermont Department of Health vital statistics system tracks Vermont resident deaths. The Department of Health also receives abstracts for Vermont resident deaths that occur in other states. This analysis included all Vermont residents deaths, regardless of the state they died in, and included all cause acquired brain injury. All cause related to a condition refers to when it is listed as any of the twenty possible mortality codes.

Definition of acquired brain injury cause of death in vitals data by ICD-10 (mortality) codes:

Non-traumatic brain injury: A80-A89, B00.4, B01.0-B01.1, B02.0-B02.2, B05.0-B05.1, B06.0-B06.09, B37.5, B94.1, C70, C71, C79.3, C79.4, D32.0, D33.0-D33.3, D42.0, D43.0-D43.3, E10.1, E11.0, E13.0, E13.1, E15, G00-G07, G09, G91-G93, G99.8, I60-I69, T71, T75.1, R09.0, R29.1

Traumatic brain injury: S02.0-S02.3, S02.7-S02.9, S07.1, S06, T90

Respiratory disease-related, including COVID-19: J00-J99, U00-U49 with at least one diagnosis code from traumatic or non-traumatic brain injury

Substance use-related: T36-T65, F1, Y90 with at least one diagnosis code from traumatic or non-traumatic brain injury