

## **Supplemental Digital Content**

Behavioral Risk Factor Surveillance System (BRFSS)

BRFSS (<https://www.cdc.gov/brfss/index.html>) is an annual, population-based nationally representative telephone survey of non-institutionalized U.S. adults, age 18 and older, that collects state data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. BRFSS uses a disproportionate stratified sample design for respondents who complete the survey by landline and a random sample design for those who complete the survey by cellphone. The BRFSS also uses iterative proportional fitting to weight the data. BRFSS data is de-identified and is considered exempt from human subjects review by CDC's Institutional Review Board. Every state administers the same set of core questions with additional selected optional modules or state-added questions.

Questions about TBI are not a part of the core questions, and any data is added by individual states as an optional, post-survey module. Below is data collect from individual states in more recent years (2016 to present [whatever data was publicly available on the individual state's BRFSS website]).

#### *Past 12 Month TBI Prevalence Estimates*

##### Connecticut 2017,2019

In 2017, Connecticut included one state-added question about 12-month TBI prevalence:

1. In the last 12 months, has a doctor or other health professional told you that you have suffered a traumatic brain injury or concussion?

#### *Lifetime TBI Prevalence Estimates*

##### Iowa 2020, 2021, 2022, 2023

In 2020, 2021, and 2022, Iowa included one state-added question about lifetime concussion prevalence.

The respondents first provided a definition of concussion: "A head injury, or concussion, is an injury to

the brain or skull that may have been caused by, but not limited to, a bump or blow to the head, injury from an explosion or blast, or injury to the head from a car accident or crash.” The respondent was then asked:

1. Have you ever had a head injury?

In 2023, Iowa will include one state-added question about lifetime TBI prevalence. The respondents are first prompted by this text: “For these next questions, please think about injuries you have had during your entire lifetime, especially those that affected your head or neck. It might help to remember times you went to the hospital or emergency room. Think about injuries you may have received from a car or motorcycle wreck, bicycle crash, being hit by something, falling down, being hit by someone, playing sports, or an injury during military service.” The respondent will then be asked:

1. Thinking about any head injuries you have had in your lifetime, were you ever knocked out or did you lose consciousness?

#### Maryland 2021

In 2021, Maryland included state-added questions about lifetime TBI prevalence. Lifetime TBI prevalence was assessed using the Modified Ohio State University (OSU) TBI Screen-Short Version.<sup>1,2</sup> A respondent is asked a series of questions:

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck? Think about any childhood injuries you remember or were told about.
2. In your lifetime, have you ever injured your head or neck in a car accident or from a crash with another moving vehicle like a bicycle, motorcycle, or All-Terrain-Vehicle (ATV)?

3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock, playing sports, or on the playground)?
4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, from being shaken violently, or being shot in the neck or head?
5. In your lifetime, have you ever been nearby when an explosion or a blast occurred? Think about any military combat- or training-related incidents or prior work-related incidents (for example, construction).

If the respondent answered yes to any of the above head injury questions, the respondent was then asked the following questions to assess if they would be classified as having sustained a TBI in their lifetime:

1. Were you ever KNOCKED OUT or did you LOSE CONSCIOUSNESS from any of the injuries you reported above?
2. If you were not knocked out by any of these injuries, did any of them cause you to be dazed or confused, or create a gap in your memory?

All respondents were also asked the following question to assess head injury:

1. Have you ever had a period of time in which you experienced MULTIPLE REPEATED BLOWS or impacts to your head – for example a history of physical abuse, playing sports, or during military duty?

#### Missouri 2018

In 2018, Missouri included a state-added question about lifetime TBI prevalence:

1. In your lifetime, have you ever experienced a bump, blow, or jolt to the head that caused you to feel dazed, confused, or lose consciousness?

### Nebraska 2019, 2021

In 2019 and 2021, Nebraska included state-added questions about lifetime TBI prevalence. Lifetime TBI prevalence was assessed using the Modified Ohio State University (OSU) TBI Screen-Short Version.<sup>1,2</sup> A respondent is asked a series of questions:

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck? Think about any childhood injuries you remember or were told about.
2. In your lifetime, have you ever injured your head or neck in a car accident or from a crash with another moving vehicle like a bicycle, motorcycle, or All-Terrain-Vehicle (ATV)?
3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock, playing sports, or on the playground)?
4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, from being shaken violently, or being shot in the neck or head?
5. In your lifetime, have you ever been nearby when an explosion or a blast occurred? Think about any military combat- or training-related incidents or prior work-related incidents (for example, construction).

If the respondent answered yes to any of the above head injury questions, the respondent was then asked the following questions to assess if they would be classified as having sustained a TBI in their lifetime:

1. Were you ever KNOCKED OUT or did you LOSE CONSCIOUSNESS from any of the injuries you reported above?

2. If you were not knocked out by any of these injuries, did any of them cause you to be dazed or confused, or create a gap in your memory?

All respondents were also asked the following question to assess head injury:

1. Have you ever had a period of time in which you experienced MULTIPLE REPEATED BLOWS or impacts to your head – for example a history of physical abuse, playing sports, or during military duty?

#### North Carolina 2016, 2017, 2018, and 2019

In 2016, North Carolina included one state-added question to determine lifetime TBI prevalence. The respondents were first provided a definition about injuries: “A brain Injury can result from a blow or jolt to the head caused by a fall, a motor vehicle accident, a sports injury, or an assault. A brain injury can also occur from a health problem like a tumor or a stroke.” The respondent was then asked:

1. Have you ever had a brain injury that limited you in any way for more than a week in any activities?

In 2017,<sup>3</sup> 2018,<sup>4,5</sup> and 2019, North Carolina included a state-added question about lifetime TBI prevalence. The respondents were first provided a definition about injuries: “For these next questions, please think about injuries you have had during your entire lifetime, especially those that affected your head or neck. It might help to remember times you went to the hospital or emergency room. Think about injuries you may have received from a car or motorcycle wreck, bicycle crash, being hit by something, falling down, being hit by someone, playing sports or an injury during military service.” The respondent was then asked:

1. Thinking about any injuries you have had in your lifetime, were you ever knocked out or did you lose consciousness?

Ohio 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023

Since 2016, Ohio has included state-added questions about lifetime TBI prevalence. Lifetime TBI prevalence was assessed using the Modified Ohio State University (OSU) TBI Screen-Short Version.<sup>1,2</sup> A respondent was first provided with a prompt: “These next questions ask about injuries that may have occurred anytime in your lifetime.” The respondent was then asked a series of questions:

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck? Think about any childhood injuries you remember or were told about.
2. In your lifetime, have you ever injured your head or neck in a car accident or from a crash with another moving vehicle like a bicycle, motorcycle, or All-Terrain-Vehicle (ATV)?
3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock, playing sports, or on the playground)?
4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, from being shaken violently, or being shot in the neck or head?
5. In your lifetime, have you ever been nearby when an explosion or a blast occurred? Think about any military combat- or training-related incidents or prior work-related incidents (for example, construction).

If the respondent answered yes to any of the above head injury questions, the respondent was then asked the following questions to assess if they would be classified as having sustained a TBI in their lifetime:

1. Were you ever KNOCKED OUT or did you LOSE CONSCIOUSNESS from any of the injuries you reported above?

2. If you were not knocked out by any of these injuries, did any of them cause you to be dazed or confused, or create a gap in your memory?

All respondents were also asked the following question to assess head injury:

1. Have you ever had a period of time in which you experienced MULTIPLE REPEATED BLOWS or impacts to your head – for example a history of physical abuse, playing sports, or during military duty?

#### Utah 2023

In 2023, Utah included a state-added question about lifetime TBI prevalence:

1. In your lifetime, have you ever experienced a bump, blow, or jolt to the head that caused you to feel dazed, confused, or lose consciousness?

#### Vermont 2020

In 2020, Vermont included a state-added question about lifetime TBI prevalence:

1. In your lifetime, have you ever experienced a bump, blow, or jolt to the head that caused you to feel dazed, confused, or lose consciousness?

#### **Supplemental Digital Content References**



1. Corrigan JD, Bogner J. Initial reliability and validity of the Ohio State University TBI identification method. *J Head Trauma Rehabil.* 2007;22(6):318-329.
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3. Waltzman D, Daugherty J, Sarmiento K, Proescholdbell S. Lifetime History of Traumatic Brain Injury With Loss of Consciousness and the Likelihood for Lifetime Depression and Risk Behaviors: 2017 BRFSS North Carolina. *J Head Trauma Rehabil.* Jul 22 2021;36(1):E40-E49. doi:10.1097/htr.0000000000000603
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5. Waltzman D, Sarmiento K, Daugherty J, Proescholdbell S. Examination of Behaviors and Health Indicators for Individuals with a Lifetime History of Traumatic Brain Injury with Loss of Consciousness: 2018 BRFSS North Carolina North Carolina Medical Journal. 2022;83(3):206-2