If you have experienced a traumatic brain injury (TBI) you may feel overwhelmed and discouraged. You probably have questions about the future and about whether things can get better.

This booklet can help. It has information and resources to help you know what to expect if you have or have had a TBI.

As you read, keep in mind that this booklet doesn’t replace the instructions you might receive from your healthcare providers. Always follow their directions and go to them with questions and concerns.
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What is Traumatic Brain Injury (TBI)?

Traumatic brain injury — also known as TBI — is any kind of injury to the brain. TBIs may be mild or severe. This injury disrupts the normal work of the brain. TBIs may cause swelling, bleeding, and pressure on the brain. The location of the injury can help doctors know what signs to watch for.

What are the causes of TBI?

A TBI can happen with a closed or open head injury. A closed head injury means the skull was not broken open. With an open head injury, something has hit the skull and the brain is exposed. Sometimes, an object that hits the skull may enter the brain. TBIs may be caused by:

• Falls
• Motor vehicle crashes
• Getting hit by an object that may or may not be moving
• Being attacked with a hard object or having a gunshot wound to the head

What are the main signs of TBI?

Signs of a TBI can be mild to severe. They will depend on how much harm there is to the brain. In mild cases (also known as concussions), people may not think clearly, or be awake and alert for only a short time. Severe cases may result in long-term changes in mental or physical state. People may not be awake or respond to commands. Some severe cases result in coma or even death.
Other signs and symptoms of TBI may include:

- Headache
- Throwing up
- Changes in the size of pupils (the black part of your eye) or pupils are not the same size
- Seizures
- Feeling dizzy or passing out
- Bloody fluid draining from the nose, mouth, or ears
- Broken bones in the skull or face
- Problems with moving, seeing, hearing, tasting, or smelling
- Personality changes
- Confusion
- Difficulty with attention
- Agitation
How Can I Reduce the Risk or Effects of a TBI?

After a brain injury, the risk of a second injury is 3 times greater. After a second injury, the risk of a third injury is 8 times greater.

There are things you can do to prevent TBIs in the future:

- **Do not drive when you are taking medications** for pain or medications that cause you to be sleepy. Do not drink alcohol and drive. Do not drive when you are tired.
- **Always wear a seatbelt** when you drive or ride in a car.
- **Wear proper protective equipment** when you play sports.
- **Wear a helmet** when riding a motorcycle, bicycle, skateboard, roller skates, or when skiing, snowboarding, or doing other similar activities.
- **Stay away from risky activities** that may cause falls.
- **Wear hard hats and protective gear** if you work in construction or other dangerous jobs or if you work on ladders or in high places.
- **Keep guns stored unloaded and locked** inside a cabinet or safe.
Common TBI Symptom Triggers

There are common triggers that may make some TBI symptoms or behaviors worse. The more that you are aware of these triggers, the easier it can be to prevent some of these problems:

• **Lighting.** Limit exposure to bright lights. This includes TVs, mobile devices, and laptops. Keep your sleep and wake cycles as normal as possible. Keep lights on during the daytime, and lights dimmed or off at nighttime.

• **Noise.** While in the hospital, there are noises that can affect or trigger you. Be aware of heart, oxygen, and fluid monitors that may have alarms going off throughout the day. Overhead announcements, nursing staff, and visitors can cause too much noise at times. If this causes too much stress, ask your caregiver to assist with playing music, quieting the alarms, or moving you to a quiet room away from noisy work stations.

• **Physical.** “Physical” concerns can cause stress and can become a trigger for you. Physical concerns may include tiredness, pain, getting too hot or too cold, hunger, and having sudden bowel or bladder needs. Be aware of these physical concerns, and take care of them early on. While in the hospital, make your caregivers aware of your physical concerns. Other physical concerns may include an IV (intravenous) line, NG (nasogastric) tube, Foley catheter, tracheostomy, or ventilator that is attached to your body.

• **Social Interactions.** Too many interactions with visitors or family members can trigger you. While in the hospital, your nurse may put a limit on visiting hours or the number of your visitors. When you’re at home, provide yourself with breaks and downtime. Limit the number of people that come to see you and the amount of time you spend with them.
The Pathway of TBI Care

Once you have a TBI, there is a care pathway that your doctor will recommend depending on the severity of your injury. You might go to the hospital first.

The event
There are many ways TBI can happen:
• A fall
• Motor vehicle accident
• Head injury
• Physical violence
• Sporting injury

Care at the hospital
You may need to receive care at specific areas of the hospital:
• Emergency Room
• Intensive Care Unit (ICU)
• Neuro/Medical/Surgical Unit

Therapy and consultation
You may need to receive different types of therapy and consultation in the hospital based on the severity of your symptoms, including:
• Therapy, including speech, occupational, or physical therapy
• Consultation from a licensed social worker who can help manage your pathway of care
Care after the hospital
You may need to receive additional care through Discharge and Outpatient facilities:
• Skilled nursing facility
• Neuro specialty rehabilitation
• Long-term acute care hospital
• Home with supportive care

Ongoing care
You may need to receive additional care:
• Therapy, including speech, occupational, or physical therapy
• Home health
• Neuro-psychological counseling

Supportive care
You may need to receive supportive or ongoing care:
• Traumatic brain injury support group
• Neuro-psychological counseling
• Social workers
• Vocational rehab
Community Resources

See below and at right where you can learn more and get additional help and information:

 Where can I learn more?

- Centers for Disease Control and Prevention (CDC) cdc.gov/traumaticbraininjury
- Brain Injury Association of America, Inc. biausa.org
- Brain Injury Resource Center headinjury.com
- Brain Trauma Foundation braintrauma.org
- Brain Injury Alliance of Utah biau.org
- Outpatient Neuro Rehabilitation Services To schedule in Utah, call 801-357-1270
Brain Injury Specialty Clinics

Salt Lake Valley Area

Intermountain TOSH Concussion Clinic
5770 South 250 East, Suite 475
Murray, UT 84107
801-314-2210

Intermountain Neurosciences Institute
5171 South Cottonwood St.,
Suite 810
Murray, UT 84107
801-507-9800
(Chronic concussion of 6 months or longer only)

Northern Utah

Intermountain Logan Concussion Clinic
1350 North 500 East
Logan, UT 84341
435-716-2800

McKay-Dee Orthopedic and Sports Medicine Clinic
3895 Harrison Blvd.
Ogden, UT 84403
801-387-7678
(Pediatric sports-related concussion only)

Southern Utah

Intermountain St. George Concussion Clinic
652 South Medical Center Dr.,
Suite 120
St. George, UT 84790
435-251-3600

Utah Valley Area

Intermountain Utah Valley Concussion Clinic
1157 North 300 West, Suite 201
Provo, UT 84604
801-357-1200

Utah Valley Sports Medicine American Fork
98 North 1100 East, Suite 103
American Fork, UT 84003
801-492-2330
Common Terms Used in TBI

There are common words and terms used to describe different aspects of TBI:

**CAM.** The CAM (Confusion Assessment Method) tool assesses the presence, severity, and changes of 9 signs and symptoms of delirium: Acute onset, inability to maintain attention, disorganized thinking, changes in the level of consciousness, confusion, memory problems, problems with awareness, problems with making desired movements, and changes in the sleep-wake cycle.

**Cognition.** The brain process involved in knowing, thinking, learning, and judging.

**Coma.** When a person is deeply unconscious because of injury or illness. A person in a coma cannot talk or move.

**Combativeness.** Attacking, unruly, or argumentative.

**Concussion.** A concussion, or mild traumatic brain injury (mTBI), happens when a sudden jolt or blow to the head disturbs the way your brain works. This can make you feel confused or disoriented and can cause you to lose consciousness or to have some memory loss.

**Confabulation** [kun-fab-yoo-LAY-shun]. The making up of experiences or situations in a detailed and believable way to cover up memory problems.

**Decerebrate** [dee-SER-uh-brit] posture (**decerebrate rigidity**). Abnormal body posture caused by an injury to the brainstem.

**Decorticate** [dee-KOR-ti-kayt] posture (**decorticate rigidity**). Abnormal body posture in which a person is stiff with bent arms, clenched fists, and legs held out straight. It occurs as a result of severe damage to the brain.

**Diffuse axonal** [AK-son-uhl] injury (**DAI**). This is a form of TBI that occurs when the brain rapidly shifts inside the skull during an injury. Large nerve fibers in many areas of the brain are severely damaged.
Disinhibition [dis-in-i-BISH-un]. Less ability to keep from acting on an impulse or desire.

Disorientation [dis-or-ee-en-TAY-shun]. Mental confusion concerning time, place, personal identity, and relationships.

Distractility [DIS-trak-TI-tee]. Inability to maintain attention; overreaction to stimuli.

Dysarthria [dis-AHR-three-uh]. Difficulty speaking because muscles don’t work well. Also called “slurred speech.”

Dysphagia [dis-FAY-jee-uh]. Difficulty in swallowing. It also includes difficulty in moving food from the mouth to the stomach. It also includes problems in positioning food in the mouth.

Emotional lability. Showing rapid, drastic, and inappropriate changes in emotional state (laughing, crying, and anger) without an obvious reason.

Glasgow Coma Scale (GCS). A standardized system used to measure the seriousness of a brain injury. The system involves 3 factors: Eye-opening, speaking, and movement. These 3 determinants are evaluated separately using a scoring system. The final score indicates the level of consciousness and degree of dysfunction. Scores run from a high of 15 to a low of 3. Persons are considered to have experienced a “mild brain” injury when their score is 13 to 15. A score of 9 to 12 is considered a “moderate” brain injury and a score of 8 or less is considered a “severe” brain injury.

Hemorrhage [HEM-er-ij]. Heavy bleeding.

Intracranial [in-truh-KRAY-nee-uhl] pressure (ICP). The pressure inside the brain. It is measured with a needle or bolt inserted into an area surrounding the brain.
**Intracranial pressure monitor.** A monitoring device to measure the pressure inside the brain. It consists of a small tube (catheter) attached to the person at the skull and is then connected to a transducer, which records the pressure.

**Perceptual deficits.** Less brain activity related to thinking, emotional responses, attention, or memory.

**Perseveration** [per-sev-uh-RAY-shun]. Repetition of the same words or movements regardless of the situation. A person keeps at a task that prevents them from turning their attention to new situations. It is a symptom of TBI indicating difficulty in controlling behavior in response to rapidly changing demands.

**Plasticity** [pla-STIS-i-tee]. When the brain and nerves adapt to changes to allow for more normal function.

**Post-traumatic amnesia** [am-NEE-zhuh]. Memory loss caused by brain damage or severe emotional injury.

**Ranchos Scale.** The Rancho Los Amigos Scale describes the levels or stages of recovery typically seen after a brain injury. See table below:

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<th>Ranchos Los Amigos Scale Levels</th>
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**Retrograde amnesia.** An inability to remember events before the accident; it may be for a specific time period or type of information.

**Richmond Agitation-Sedation Scale (RASS).** A medical scale used to measure the agitation or sedation level of a patient. The RASS can be used in all hospitalized patients to describe their level of alertness or agitation. It is, however, mostly used in mechanically-ventilated patients to avoid over and under-sedation.

**Traumatic brain injury (TBI).** This is an injury to the brain and can be mild, moderate, or severe.

**Vegetative [VEJ-i-tay-tiv] state.** A condition in which a person does not speak, follow commands, or make any meaningful responses.