

Prevention at Work

Work-Related Traumatic Brain Injuries, Oklahoma, 2004-2007

General Information

Traumatic brain injury (TBI) is a leading cause of death and disability in the United States and is a significant contributor to the annual number of work-related deaths and injuries. These complex injuries have consequences rarely limited to a single deficit. Many survivors experience a constellation of symptoms and impairments that can result in a need for long-term rehabilitation and service utilization. TBI and resultant disabilities have profound impacts on the workplace, particularly in terms of cost, productivity, and personnel. With strong workplace safety policies and programs, TBIs can be prevented.

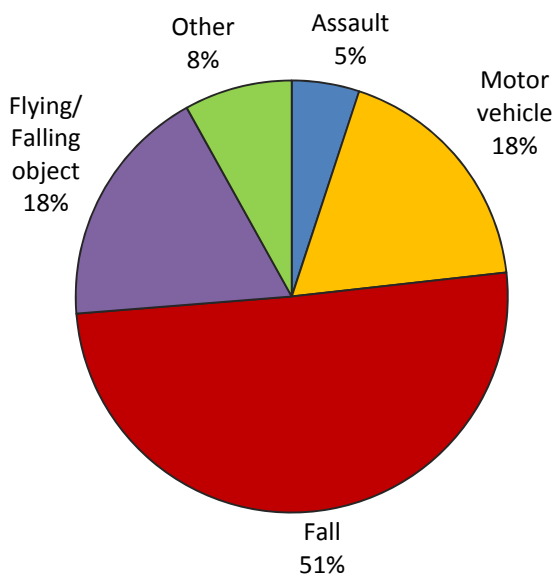
Approximately 5% of all TBI hospitalizations each year in Oklahoma are the result of work-related incidents; although, these injuries are likely undercounted due to limited documentation in the medical record. From 2004-2007, about 900 Oklahoma workers were hospitalized with a TBI sustained on-the-job; an even larger unknown number were treated in emergency departments, doctors' offices, and freestanding clinics, or did not seek medical care at all.

Of those hospitalized, the average length of the acute care stay was six days. While males comprise just over one-half of the civilian workforce in Oklahoma, they were overrepresented in this injury group (83% of hospital stays). The average age of injured workers was 45 years. Falls were the leading cause of work-related TBI (Figure 1). Approximately 70% of injured workers were discharged home; however, this does not guarantee a complete, sequelae-free recovery. Many survivors allowed to return home still need help and services from family, friends, community organizations, and employers. Over one-fifth of the hospitalized workers required assistance or further medical care upon discharge (i.e., home health care or placement in a skilled nursing facility, nursing home, or inpatient rehabilitation facility). An additional 5% died during their hospital stay. Another 100 workers died from a TBI prior to hospital admission.

Fall-Related TBI

- A 63-year-old casino employee slipped and fell on ice on a sidewalk at work. He was unconscious for approximately five minutes before being helped up by another employee. The worker was discharged home after two days in the hospital.
- A 25-year-old sanitation worker was standing on the back of a garbage truck holding onto a bar when the truck went around a corner and struck a bump in the road, causing him to fall approximately four feet. The worker rolled an additional 10 feet and presented to the hospital with altered mental status. After a four-day stay, he was discharged home to continue recovering from a skull fracture and intracranial lesion.
- A 55-year-old educational development worker fell 10-20 feet from a sky lift while working in a book depository. She was not using any safety equipment and landed on the warehouse's concrete floor, sustaining a skull fracture and brain hemorrhage. The worker died after two days in the hospital.
- A 29-year-old roofer was climbing a ladder at a construction site while carrying a bucket of roofing paint. He slipped and fell 18 feet to the ground, hitting

Figure 1. Causes of Work-related TBI, Oklahoma, 2004-2007



Prevention at Work

Work-Related Traumatic Brain Injuries, Oklahoma, 2004-2007

his head and several other body parts along the way. The worker was knocked unconscious, sustained a skull fracture, and spent six days in the hospital before being discharged with home health care.

- An 81-year-old self-employed farmer was feeding cattle when he slipped and fell on some ice and hit his head. He had his wife come help him, but he continued his work. Five or six hours later, the farmer reported having a bad headache and told his wife that he needed to go to the hospital. While in the emergency department, the farmer went from being mildly confused to severely obtunded. He died in the hospital four days later with a subdural hemorrhage.
- A 51-year-old worker at an electric company had not been feeling well for about a week. While clocking in, he fainted, hitting his head when he fell to the concrete floor. The worker awoke to a number of people around him, but could not remember what happened. He spent two days in the hospital because of his head injury before being discharged home.
- A 24-year-old worker at a car dealership had a seizure and fell while at work. He had recently made the decision alone to discontinue his seizure medications. He had amnesia for events before and after his seizure and fall. He spent 10 days in the hospital with a skull fracture and brain hemorrhage.
- A 46-year-old drilling corporation employee was injured after falling into a six-foot deep hole. The worker was standing on a 3-foot by 12-foot board over the hole when the weight of some pipes broke the board. He temporarily lost consciousness and could not remember the event. He was able to get out and walk briefly, but then fell again. He was released home after three days in the hospital with a concussion.

Falling/Flying Object-Related TBI

- A 40-year-old news reporter was covering a festival when a storm came through the area. An event tent was blown down and the reporter was struck in the head by a steel pole. After being struck, he fell to the ground, hitting his head again. The reporter suffered a loss of consciousness, amnesia, a skull fracture, and an intracranial lesion. He spent one week in the hospital.
- A 48-year-old hobby store worker was injured when a 120-pound pallet of boxes fell on her. She was

knocked to the ground and lost consciousness. The worker spent three days in the hospital and was discharged home.

- A 47-year-old school baseball coach was pitching during practice when he was struck in the head by a line drive. The coach was dazed and experienced right arm numbness as the result of his concussion. He was discharged home after two days in the hospital.
- An 84-year-old rancher was corralling his cattle when one of the cows kicked a gate causing it to swing and hit him in the face. He briefly lost consciousness and spent three days in the hospital with skull and facial bone fractures.
- A 43-year-old oilfield worker was injured when a pipe fell and he was struck in the back of the head. He then fell backward, tripping over a bucket and some other pipes and falling to the ground. He spent three days in the hospital with a skull fracture and intracranial lesion.

Motor Vehicle/Equipment-Related TBI

- A 24-year-old deputy sheriff was driving his patrol car on the way to an emergency when he was involved in a highway speed motor vehicle crash. Another vehicle pulled out in front of him and he struck it broadside (T-bone crash). The sheriff was restrained and survived, but spent 13 days in the hospital and suffered amnesia from the incident.
- A 56-year-old semi truck driver was injured in a crash leaving a lease site when he lost control and the truck ran off the road and rolled onto its side. The driver was knocked unconscious for several hours. When he awoke, he used a cell phone to call an associate for help. When help arrived, the driver was still in the cab suspended by his seat belt. He spent four days in the hospital with a concussion.
- A 67-year-old rancher was injured when he was struck by a vehicle while driving an ATV. The rancher was feeding cows when he pulled onto a street and was hit. He was ejected from the ATV and found unconscious. When awakened, he was confused and did not recognize his family. The rancher was not wearing a helmet and suffered a skull fracture and intracranial lesion. He spent 16 days in acute care before transferring to inpatient rehabilitation.

- A 55-year-old state transportation worker was struck by a vehicle while working on foot as part of a highway road crew. He sustained multiple fractures all over his body and a concussion. After 40 days in the hospital, the worker was sent to inpatient rehabilitation.
- A 59-year-old garbage truck driver was injured after crashing his truck on a dirt road. The driver reported that the steering locked up, causing him to lose control and overturn the truck in a ditch. He was unrestrained. When the truck tipped, the driver fell into the passenger side of the vehicle and hit his head. He was able to kick out a window and crawl out. He was discharged home after two days in the hospital.
- A 69-year-old mechanic was injured while working on a two-ton pickup truck. The worker was standing in front of the truck on a three-foot platform. A coworker in the driver's seat of the truck started the engine, but his foot slipped off the clutch, causing the truck to jump forward and hit the mechanic. The mechanic fell and hit his head. He died from his injuries two days later.

Assault-Related TBI

- A 37-year-old female was working at a minimart when she was assaulted by a customer who had been yelling. The worker was struck on the head with a bottle and later found unconscious on the floor. The worker spent two days in the hospital before being discharged home.
- A 51-year-old convenience store owner was shot in the forehead during a robbery. He survived, spending only three days in the hospital with a skull fracture and brain contusion.
- A 24-year-old pizza delivery driver was robbed and assaulted as he got out of his car to make a delivery. He was struck in the head with an unidentified object and kicked in the chest. He lost consciousness briefly, but was able to drive himself to another location for help. He suffered a skull fracture and spent four days in the hospital.
- A 72-year-old retail store owner was assaulted by two men posing as customers. The woman was hit on the head with a pipe and choked. The men stole the contents of her purse and money from the cash register. She lost consciousness for an unknown length of time and spent two days in the hospital with a concussion and amnesia.

Other Causes of TBI

- A 17-year-old male was working with his father on the family's ranch. While working with livestock, he bumped his head on the pole of a gate. He developed blurred vision, a headache, and nausea and vomiting. He spent four days in the hospital with the head injury before being discharged home.
- A 36-year-old driver/mechanic for a trucking company was working on a truck near a pulley pump system. Somehow he got caught and dragged by the pulley into the transmission of the semi truck. The worker's clothing became entangled in some high velocity turning parts within the machine. Eventually, he was thrown to the ground. He lost consciousness and suffered amnesia as a result of his intracranial lesion.

Prevention

Preventing work-related TBI requires a variety of strategies due to the numerous ways an injury can occur. Above all, employers should develop, implement, and enforce a comprehensive written safety program in the language and literacy level of all workers and provide safety training to ensure workers understand all policies and procedures and are adept at recognizing and mitigating workplace hazards. Furthermore, depending on the work being performed, worksite conditions may change and new hazards may evolve. Routinely, a competent person should conduct a hazard analysis of the worksite and all employees' tasks. Revisions to safety programs and trainings should be made as needed.

All workers must be aware of factors that could impair their judgment or abilities and take the steps necessary to keep themselves and their coworkers safe (even if that means staying home from work or reassigning tasks). Factors to consider include the effects of prescription and over-the-counter medications (individual and combined), inclement weather, physical and mental fatigue or illness, and poor time management (e.g., rushing to complete work), among others.

Prevention at Work

Work-Related Traumatic Brain Injuries, Oklahoma, 2004-2007

Although not comprehensive, the following are some leading ways to prevent TBI at work.

Falls

- Use fall protection systems (e.g., personal fall arrest systems, guardrails, safety nets) when working at elevations of six feet or more.
- Ensure erected scaffolding conforms to current regulatory requirements.
- To prevent slips and trips, ensure workplaces have sufficient amounts of either natural or artificial lighting and have floors that are stable, level, not slippery, and free of debris/obstructions.
- Guarding and signage should be present to warn workers of areas where hazards cannot be completely eliminated.

Falling/flying objects

- Avoid being positioned under elevated loads.
- Wear a hard hat when working in areas where there is a potential of head injury from flying or falling objects.
- Consider the use of tag lines to stabilize loads being lifted, lowered, or positioned.
- Slings, chains, and other means of lifting or moving materials must be rated for the capacity of the load.
- Nonessential workers should remain clear of areas where loads are being hoisted or moved; involved equipment operators and ground personnel must maintain communication and visual contact with one another.

Prepared by:

Tracy Wendling, MPH

Injury Prevention Service

Oklahoma State Department of Health

Motor vehicles/equipment

- Always wear a seat belt whenever in a moving motor vehicle.
- Inspect the vehicle, adjust mirrors, seats, and controls, and clean lights and windows before operating. Any vehicle not in safe operating condition should be taken out of service until maintenance is performed.
- Do not use a cell phone or other handheld device while driving and do not become distracted by other passengers or things (e.g., radio, food/drink, etc.).
- Wear a helmet if work involves the use of motorcycles, bicycles, scooters, or all-terrain vehicles (ATV).
- Minimize occurrences of pedestrians working in the same area as motorized vehicles and machinery. Diligently follow an internal traffic control plan, use spotters/guides, and maintain communication between operators and workers on foot.

Assaults

- Conduct a physical security survey to assess the layout and design of the work premises and the need for security measures, such as lighting, cameras, guards, and alarms.
- Recognize and report threatening or violent behavior; make use of employee assistance programs.
- Closely follow established procedures for handling money, valuable property, or unstable/volatile individuals.
- Consider not working alone and increasing the physical distance between workers and customers, if possible.