

Traumatic Brain Injury in Utah

2000-2003

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Executive Summary

The Utah Department of Health (UDOH), through a collaborative agreement with the Centers for Disease Control and Prevention, collects traumatic brain injury (TBI) information for the state of Utah through review of Hospital Discharge Data and Vital Statistics Data. A large random sample of cases is selected, and a full medical record review is conducted to collect additional information on those cases. This report provides a brief overview of TBI in Utah—including incidence, etiology, intention of injury, type of care administered, discharge disposition and payment source information.

During the four-year period 2000-2003, Utahns sustained a total of 8,370 traumatic brain injuries that were severe enough to result in acute care hospitalization and/or death. Of those, 1,776 died as a result of the TBI. That is an average of one TBI-related death and five severe but non-fatal cases of TBI per day. Nearly twice as many males as females experienced a traumatic brain injury during the period.

Age-specific incidence rates were highest among those 15-24 years of age (115.5 per 100,000 persons), 75-84 years of age (272.5 per 100,000 persons), and for those over age 85 (525.1 per 100,000 persons). “Falls and fall-related injury” was the leading cause of TBI in those age 60 and over (70.1 percent for males, 82.0 percent for females), while “Motor vehicle and other transport” injury was the cause of the majority of TBIs in those younger than 60 (57.0 percent for males, 63.6 percent for females).

Among cases sampled for this report, self-inflicted unintentional injuries were the most common type of TBI-related injury for males (71.7 percent) and for females (82.0 percent). However, for males, the percentage of intentional injuries inflicted by others was more than three times that for females (13.6 and 4.2 percent, respectively). The percentage of TBIs sustained as a result of an apparent suicide attempt was also nearly three times higher for males (2.6 percent) than for females (1.0 percent).

During the study period, 4,403 males and 2,612 females were hospitalized for treatment of a traumatic brain injury. Another 1,047 males and 287 females died as a result of a TBI prior to being admitted to a hospital. Individuals admitted to the emergency department are not considered “hospital inpatient.” Patients treated and released from the emergency department did not meet the case definition and were not included in surveillance.

The majority of all TBI cases that had a known discharge disposition were sent to a home for self-care or other assistance (57.8% for males and 61.5% for females). Also, approximately one-fifth (24.3% for males, 15.5% for females) of all TBI subjects died before admission or during hospitalization due to the injury.

The most common sources of payment for a TBI were private or employer insurance or an HMO (52.0 percent). Government programs provided payment for 28.8 percent, and 7.4 percent were “self-pay” cases.

Introduction

It is estimated that 1.5 million Americans sustain a traumatic brain injury (TBI) each year, and that 5.3 million people live with long-term TBI-related disability.[1] While many who sustain a TBI die as a result of the injury, many more survive to live the remainder of their lives with some loss of function.

TBI may cause problems with:

- Cognition—concentration, memory, judgment, and mood;
- Movement abilities—strength, coordination, and balance;
- Sensation—tactile sensation and special senses such as vision;
- Emotion—instability and impulsivity.[2]

Preventing TBI begins with understanding its causes and contributing factors, which is the purpose of surveillance. TBI surveillance in Utah began in 1990 under the Utah Department of Health, Bureau of Epidemiology. From 1993 to 1997, the project was conducted by the Disabilities Prevention Program; since 1997, it has been maintained by the Violence and Injury Prevention Program.

In 1995, the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, published “Guidelines for Surveillance of Central Nervous System Injury,” a manual to establish standards for collecting TBI and spinal cord injury (SCI) data.

In 1996, Congress enacted Public Law 104-166, the Traumatic Brain Injury Act of 1996, which authorizes state surveillance systems to obtain information on the number of people affected by traumatic brain injury (TBI), the causes of these injuries, and their severity. Utah is one of 12 states currently receiving federal funds to conduct surveillance.

Injury surveillance is the first step in understanding and combating TBI, but analyzing and sharing the findings of that surveillance is equally important. This report is intended to educate and inform readers about the major causes and contributing factors of TBI in Utah. In addition, the TBI Surveillance Project provides data and information in support of specific prevention programs. The authors believe that increased awareness and information will lead to effective policies and actions to reduce the terrible cost of TBI to individuals, families and communities in Utah.



Results and Graphs

Results and Graphs

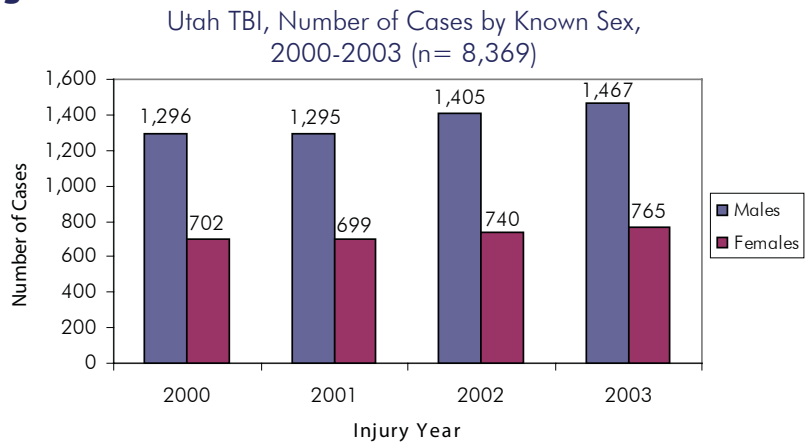
From 2000 to 2003, there were 8,370 cases* of traumatic brain injury (TBI) among Utah residents that resulted in either acute care hospitalization or death. The average annual number of cases over this period was 2,093, or 174 cases per month. (Figure 1)

*Including one case of unknown gender and one of unknown age.

During the study period, males sustained nearly twice as many TBIs as females (65.3% male, 34.7% female. (Figure 2) Nationally, the Centers for Disease Control and Prevention reports that males have sustained 75% percent of TBIs since 1989.[3]

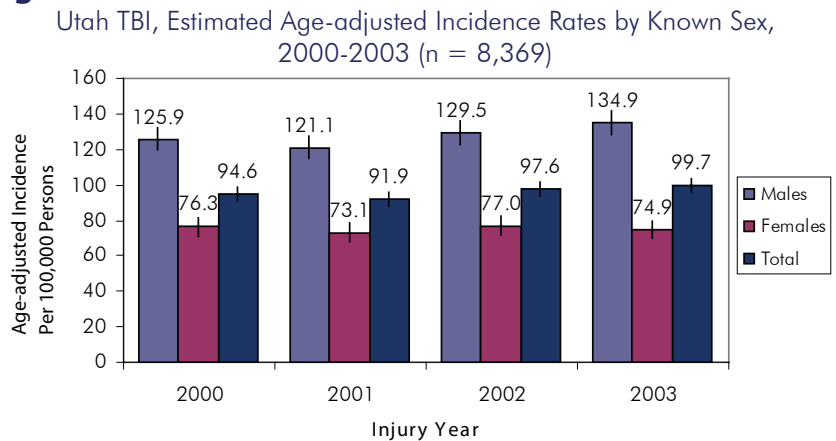
The overall age-adjusted incidence rate for TBI in Utah during 2000-2003 was 96.0 per 100,000 persons, with a rate of 128.0 per 100,000 for males and 75.3 per 100,000 for females. (Figure 2) These rates are lower than those for the nation, as the CDC reports that, for the period 1995-2001, the overall U.S. age-adjusted rate for TBI was 103.6 per 100,000 population. [4]

Figure 1.



Source: UDOH TBI/SCI Surveillance Project

Figure 2.

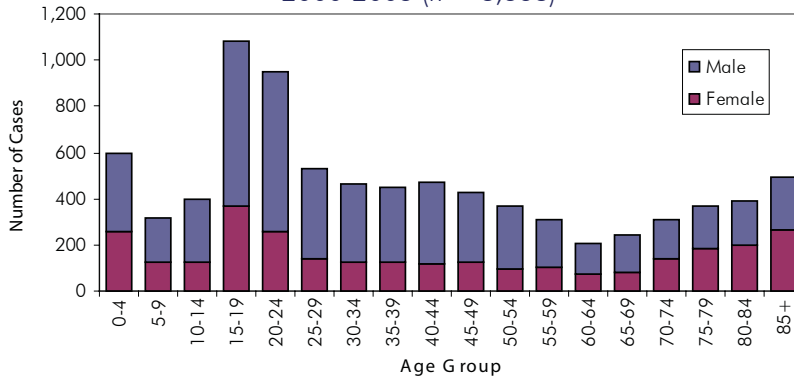


Source: UDOH TBI/SCI Surveillance Project

Results and Graphs

Figure 3.

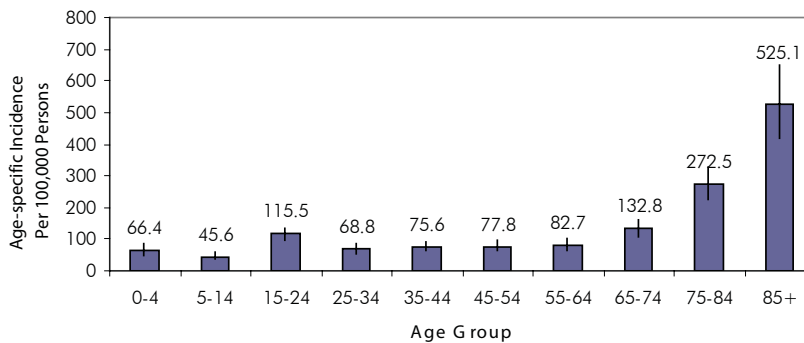
Utah TBI, Number of Cases by Known Sex and Known Age, 2000-2003 (n = 8,368)



Source: UDOH TBI/SCI Surveillance Project

Figure 4.

Utah TBI, Age-specific Incidence Rate by Age Group, 2000-2003 (n = 8,369)



Source: UDOH TBI/SCI Surveillance Project

Males and females experience the highest numbers of TBIs between the ages of 15 and 29. (Figure 3) However, when incidence is calculated by rate, seniors aged 85 and older and aged 74-85 suffer the highest rates of TBI per capita, respectively. (Figure 4)

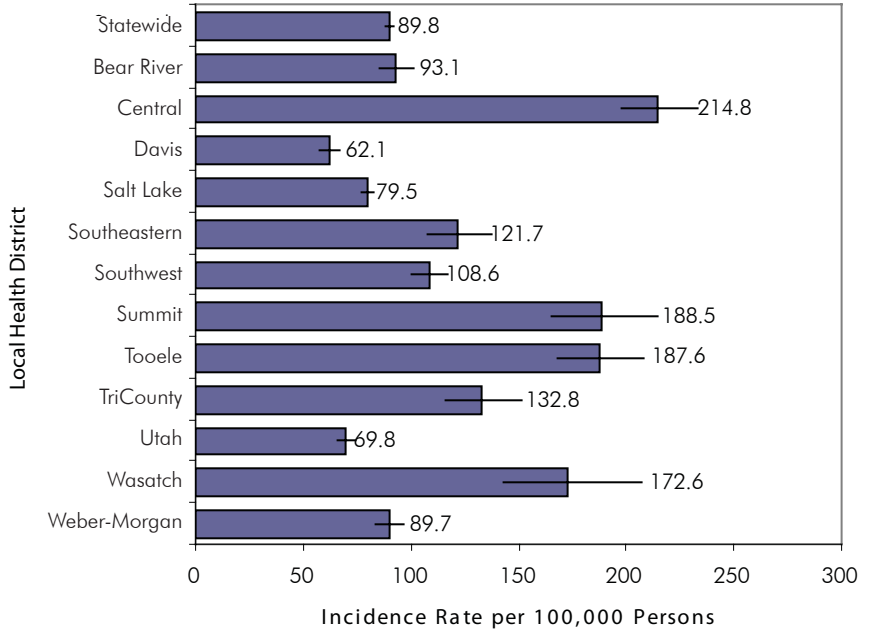
Results and Graphs

Figure 5 depicts statewide TBI incidence rates by local health district (LHD) of occurrence. The highest rate is found in the Central Utah LHD; the lowest is in Davis County.

Utah's rural areas show a notably higher risk for TBI than urban areas. Urban LHDs include Davis County, Salt Lake Valley, Weber-Morgan and Utah County. Of the cases where county of injury was known, the overall incidence of TBI in rural Utah is 122.53 per 100,000 population, which is 53 percent higher than urban Utah's rate of 79.64 per 100,000 population. (Figure 6)

Figure 5.

Utah TBI, Incidence Rates by Local Health District of Occurrence, 2000-2003 (n = 3,653)

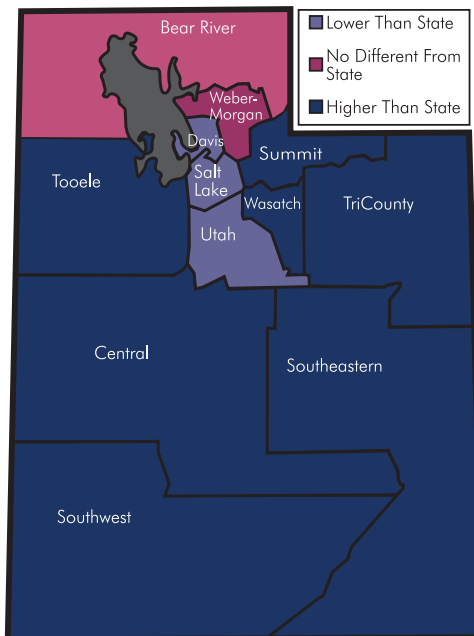


Source: UDOH TBI/SCI Surveillance Project

Note: This graph does not include the 4,717 cases which had unknown LHD of injury.

Figure 6.

Utah TBI, Risk of TBI by Local Health District of Occurrence, 2000-2003 (n = 3,653)



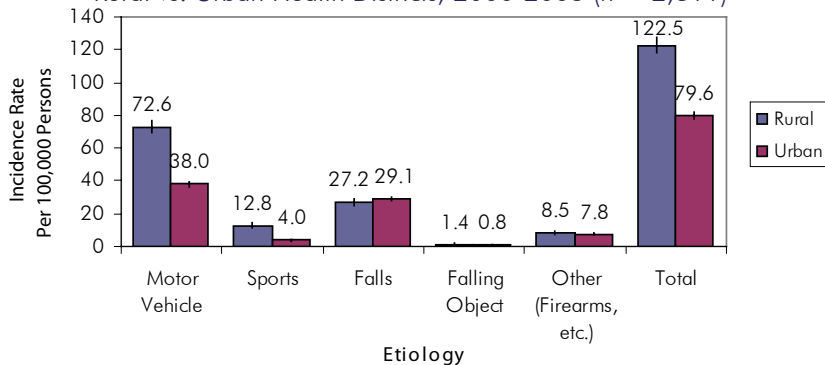
Source: UDOH TBI/SCI Surveillance Project

Percentage for a local health district was considered different from the state percentage if its 95% confidence interval did not include the state percentage.

Results and Graphs

Figure 7.

Utah TBI, Incidence Rate by Etiology and Occurrence, Rural vs. Urban Health Districts, 2000-2003 (n = 2,811)



Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 4 cases with unknown LHD of injury occurrence and 1,679 cases with unknown etiology.

Data on cause (etiology) come only from sampled cases.

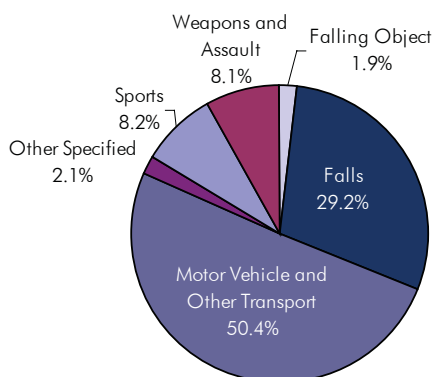
“Sampled cases” are a subset of cases where additional data are collected from hospital records abstraction.

When the data are analyzed by etiology, rural Utah’s rate of motor vehicle-related TBI is nearly twice that of urban Utah (72.6 versus 38.0 per 100,000 population). In addition, sports-related TBI rates are more than three times higher in rural than urban Utah (12.8 versus 4.0 per 100,000 population). In contrast, TBIs caused by falls occur at similar rates across the state. (Figure 7)

In both male and female sampled cases, the leading causes of TBI were “Motor vehicle and other transport” (males 50.4%, females 47.7%) and “Falls” (males 29.2%, females 41.6%). (Figures 8 and 9)

Figure 8.

Utah TBI, Category of Etiology of Injury in Males, 2000-2003 (n = 2,691)

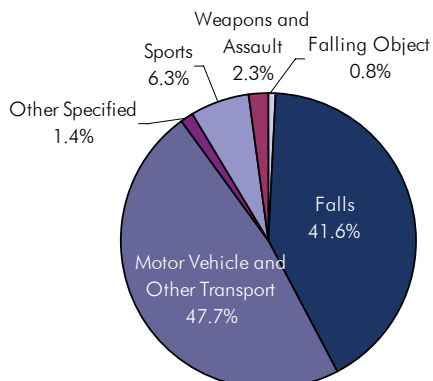


Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 142 male cases with unknown etiology and 1 case with unknown sex.

Figure 9.

Utah TBI, Category of Etiology of Injury in Females, 2000-2003 (n = 1,582)



Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 78 female cases with unknown etiology and 1 case with unknown sex.

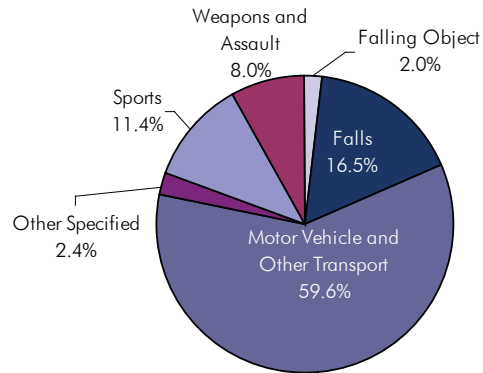
Results and Graphs

Among males aged 0-29 and 30-59, "Motor Vehicle and Other Transport" was the leading cause of TBI (59.6% and 52.8%, respectively); falls were the leading cause (70.1%) among the "60 and over" age group. (Figures 10-12)

Among males under age 60, "Weapons and assault" (most commonly firearms) are a significant contributor to TBI. They constitute 8.0% of all TBIs in the 0-29 age group and 11.7% in the 30-59 age group.

Figure 10.

Utah TBI, Etiology of Injury in Males Age 0-29, 2000-2003 (n = 1,345)

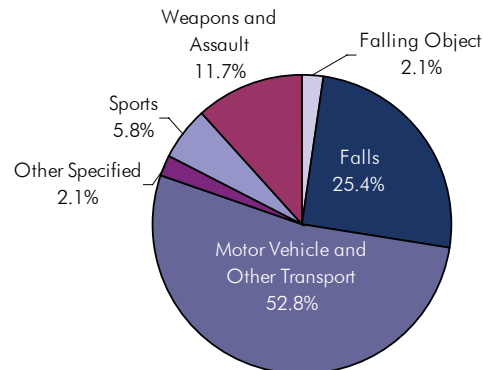


Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 65 cases for males age 0-29 with unknown etiology and 1 male case with unknown age.

Figure 11.

Utah TBI, Etiology of Injury in Males Age 30-59, 2000-2003 (n = 846)

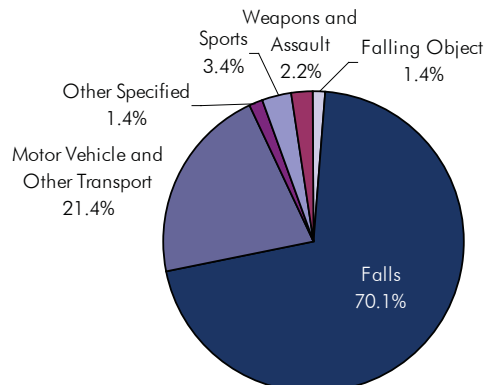


Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 44 cases for males age 30-50 with unknown etiology and 1 male case with unknown age.

Figure 12.

Utah TBI, Etiology of Injury in Males Age 60+, 2000-2003 (n = 499)



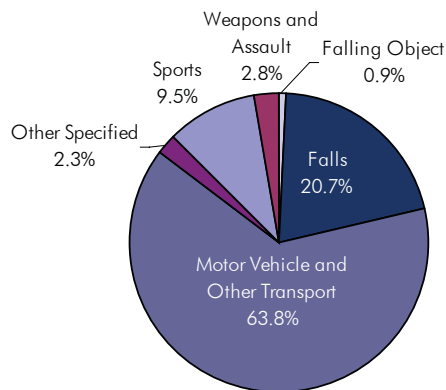
Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 33 cases for males age 60+ with unknown etiology and 1 male case with unknown age.

Results and Graphs

Figure 13.

Utah TBI, Etiology of Injury in Females Age 0-29, 2000-2003 (n = 702)



Source: UDOH TBI/SCI Surveillance Project sampled cases

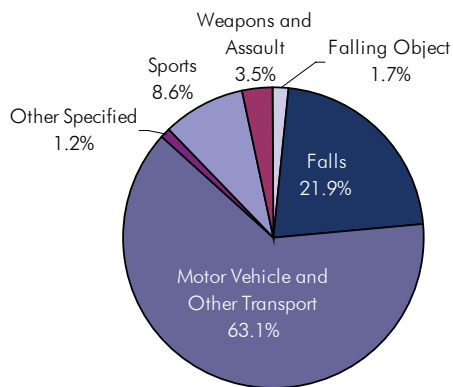
Note: There are 28 cases for females age 0-29 with unknown etiology.

Among females “0 to 29” and “30 to 59” years of age, “Motor Vehicle and Other Transport” was the leading cause of TBI (63.8% and 63.1%, respectively). Among those “60 and over,” 82.0% of the TBIs were sustained in falls.

Sports also contribute to a significant number of TBIs among women under age 60 (9.5% of injuries in the 0-29 age group and 8.6% in the 30-59 age group). (Figures 13-15)

Figure 14.

Utah TBI, Etiology of Injury in Females Age 30-59, 2000-2003 (n = 347)

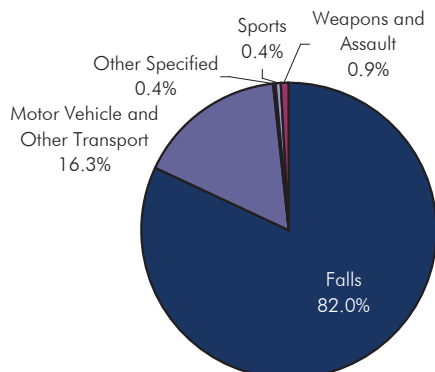


Source: UDOH TBI/SCI Surveillance Project sampled cases

Note: There are 19 cases for females age 30-59 with unknown etiology.

Figure 15.

Utah TBI, Etiology of Injury in Females Age 60+, 2000-2003 (n = 533)



Source: UDOH TBI/SCI Surveillance Project sampled cases

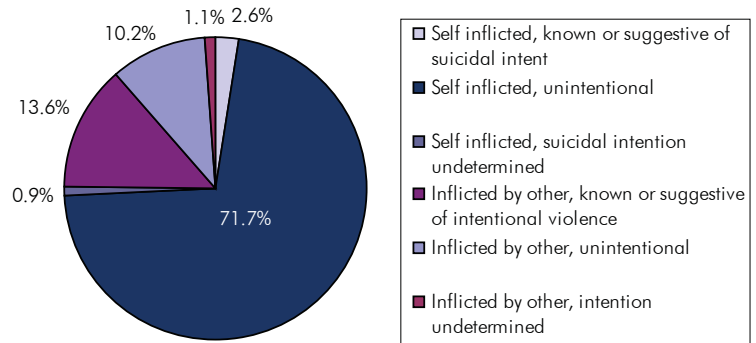
Note: There are 31 cases for females age 60+ with unknown etiology.

Results and Graphs

While the majority of TBIs are classified as “unintentional,” some result from deliberate self-harm or assault. Of the 2,163 sampled cases with known intent variable, 44 (36 males, 8 females) were classified as “self-inflicted, known or suggestive of suicidal intent.” Another 220 (187 males, 33 female) were classified as “inflicted by other, suggestive of intentional violence.” (Figures 16-17)

Figure 16.

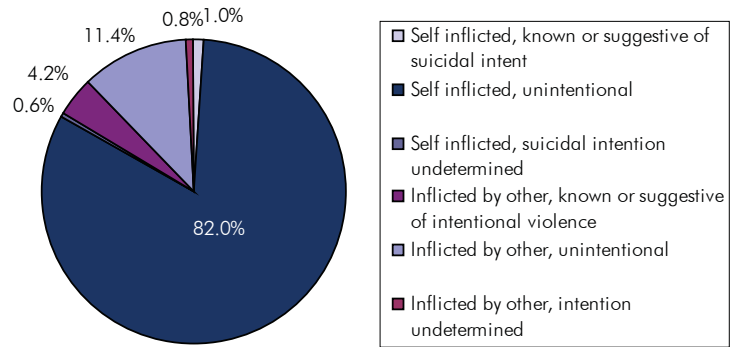
Utah TBI, Known Intention of Injury in All Sampled Males, 2000-2003 (n = 1,380)



Source: UDOH TBI/SCI Surveillance Project sampled cases

Figure 17.

Utah TBI, Known Intention of Injury in All Sampled Females, 2000-2003 (n = 783)

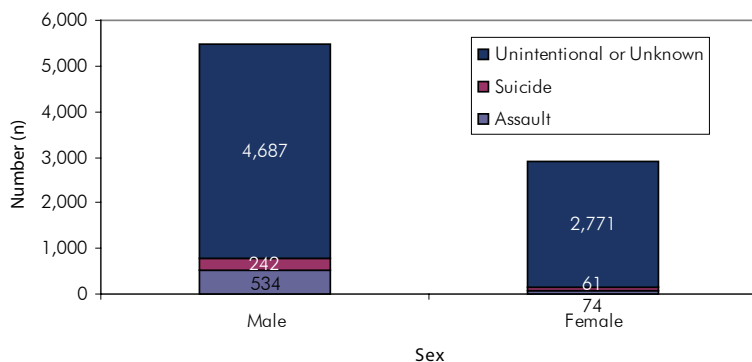


Source: UDOH TBI/SCI Surveillance Project sampled cases

Results and Graphs

Figure 18.

Utah TBI, Assault and Suicide Cases by Sex, 2000-2003 (n= 8,369)

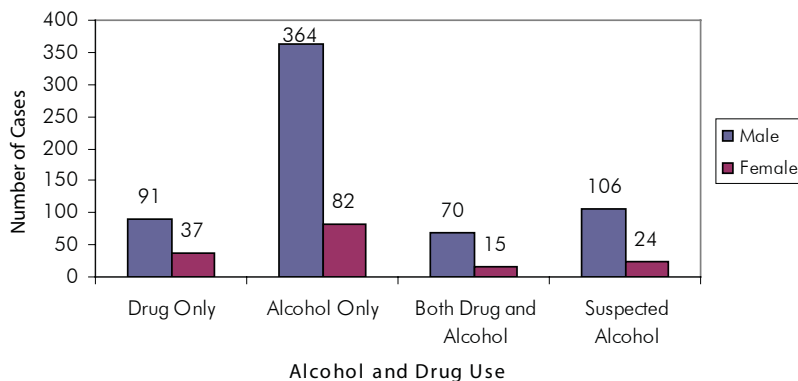


Source: UDOH TBI/SCI Surveillance Project

Of traumatic brain injuries sustained through intentional violence, the majority are the result of assault. A total of 608 TBIs (7.2 percent) were the result of an assault. Another 303 TBIs (3.6 percent) were self-inflicted; most were by firearm. Among females, the number of suicides and assaults was similar; among males, assaults outnumbered suicides by more than two to one. (Figures 18)

Figure 19.

Utah TBI, Number of Cases by Alcohol and/or Drug Use by Sex, 2000-2003 (n=1,197)



Source: UDOH TBI/SCI Surveillance Project

This report also looked at cases of traumatic brain injury in which alcohol and/or drugs were involved. Of the 1,197 patients who were tested for the presence of alcohol and/or drugs, 659 (55.1%) tested positive. Medical records indicate another 130 patients were suspected to have been under the influence of alcohol at the time of the injury, but no blood samples were available. (Figure 19)

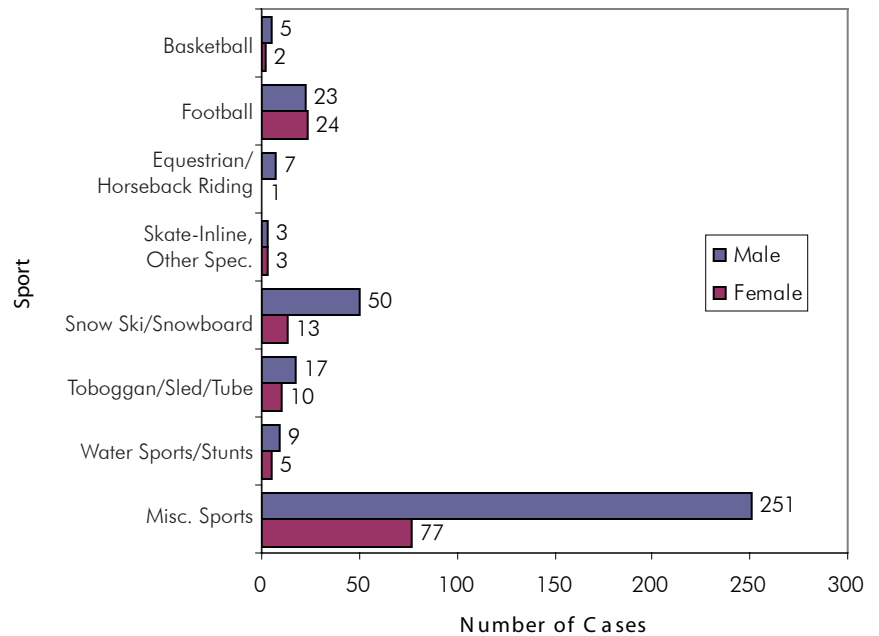
Results and Graphs

Sports, especially those that are considered high-risk, are a significant contributor to TBI, particularly among males. During the period studied, 365 males (6.7%) sustained an injury in a sport-related activity. Snow ski/snowboard, football, toboggan/sled/tube, water sports/stunts and equestrian/horseback riding were the most common activities that resulted in a TBI for males.

Among the 135 females (4.6%), football, snow ski/snowboard, toboggan/sled/tube and water sports/stunts were the most common causes. (Figure 20)

Figure 20.

Utah TBI, Number of Cases by Sport and Sex, 2000-2003 (n = 500)



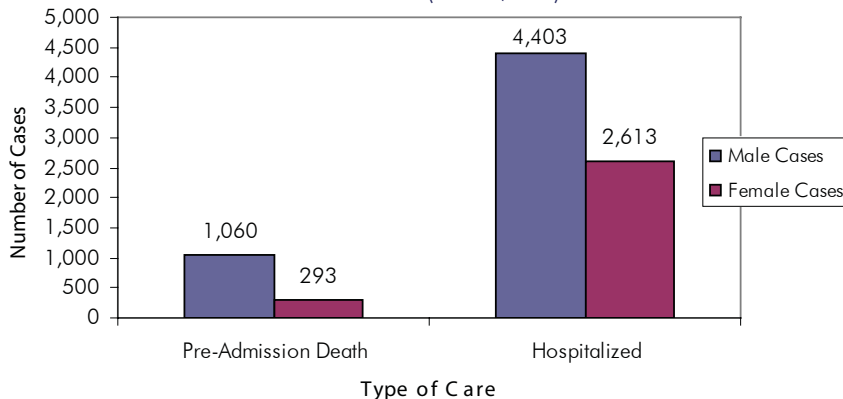
Source: UDOH TBI/SCI Surveillance Project

Note: Categories are different than those reported elsewhere and may not be consistent.

Results and Graphs

Figure 21.

Utah TBI, Type of Care by Sex,
2000-2003 (n = 8,369)



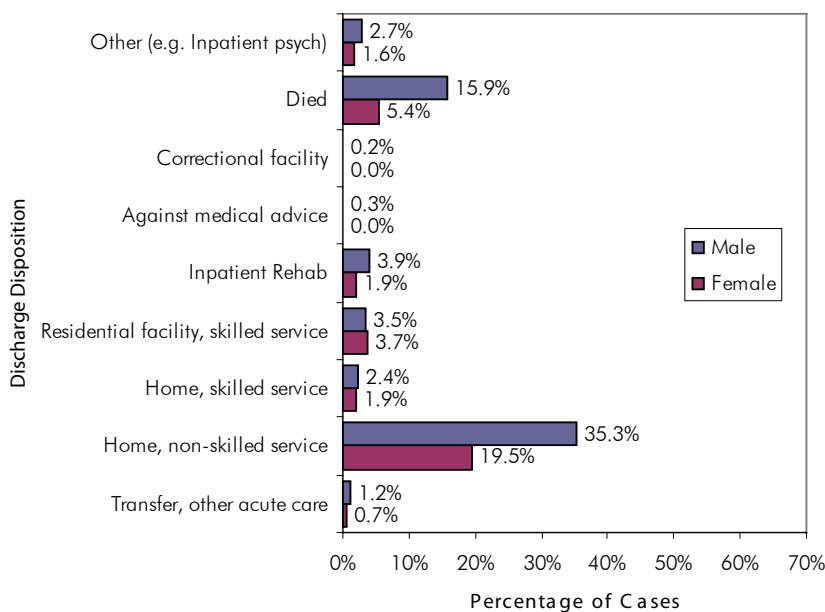
Source: UDOH TBI/SCI Surveillance Project

Of all Utahns who sustained a TBI, the vast majority (83.8%) were hospitalized. The remaining 16.2% died prior to admission. (Figure 21)

Discharge disposition specifies where the patient went after being discharged from the hospital, and includes in-hospital deaths and transfers to other medical, psychiatric or correctional facilities. The number of in-hospital deaths is 279 males and 162 females. When combined with pre-admission deaths, the total TBI mortality rate was 21.2% (n = 8,354). When analyzed by gender, 24.3% of males and 15.5% of females died as a result of TBI. (Figure 22)

Figure 22.

Utah TBI, Discharge Disposition by Sex,
2000-2003 (n = 8,354)



Source: UDOH TBI/SCI Surveillance Project

Note: Includes all TBI patients, not just those who were hospitalized.

Among the 5,455 males for whom discharge disposition was known, the majority (57.8%) were discharged to a home with or without skilled services and 24.3% died. Of the 2,899 females with known discharge disposition, 61.5% were discharged to a home with or without skilled services and 15.5% died. (Figure 22) Regarding payment source (n = 6,811), 63.1% of

Results and Graphs

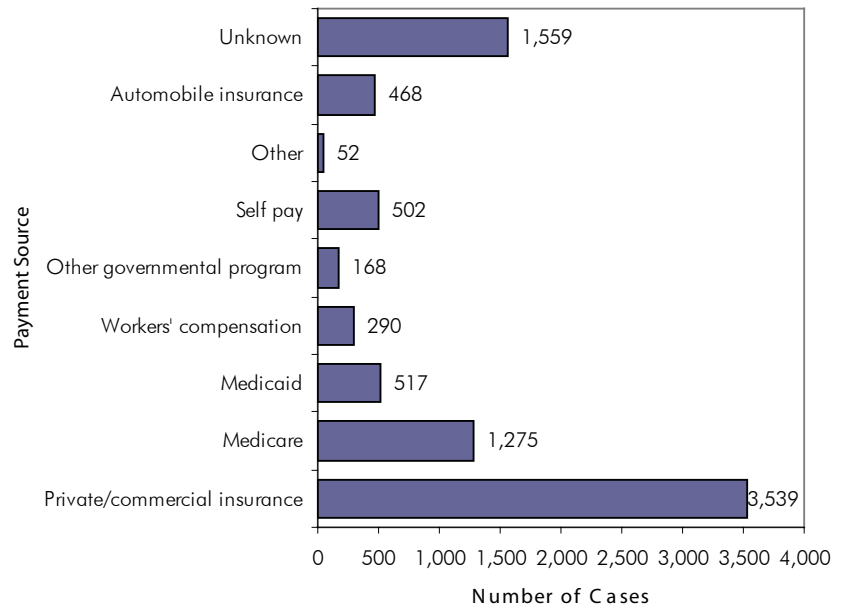
TBI costs were paid by an insurance company (private, commercial, or auto) or workers' compensation, 28.8% were paid through government programs, and 7.3% were self-pay. The remaining 0.8% include miscellaneous methods of payment such as charitable funds. (Figure 23)

The average charge for inpatient hospitalization related to TBI was \$19,248 per case for the period studied. In 2003, treatment was costliest for males aged 0 to 29 at \$31,220 per case and for females aged 30-59 at \$26,743 per case.

In comparison, the total average charge for all injury inpatient treatment (not just TBI) in Utah for the same period was \$13,600 for males and \$12,100 for females. (Figure 24)

Figure 23.

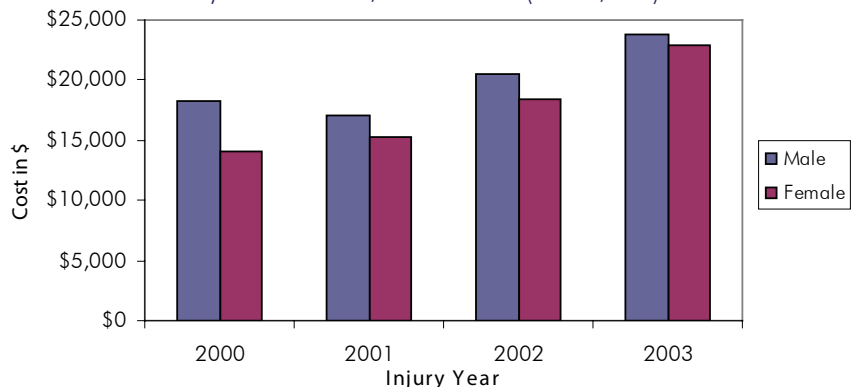
Utah TBI, Source of Known Payment for Services, 2000-2003 (n = 6,811)



Source: UDOH TBI/SCI Surveillance Project

Figure 24.

Utah TBI, Average Charge* for Inpatient Hospitalization by Year and Sex, 2000-2003 (n = 7,015)



Source: UDOH TBI/SCI Surveillance Project

Note: *Average dollars for hospital services for which patients were billed. Charge may differ from the actual payment that hospitals received.

Conclusions

Traumatic brain injury is a significant public health threat in Utah. The majority of TBIs among young people are sustained in motor vehicle crashes, while older adults are injured most often in falls. Adults over age 65 suffer the highest rates of TBI and males sustain nearly twice as many TBIs as females. At an average of 174 new TBIs every month, these injuries cost millions of dollars to treat and have lifelong consequences for victims and their families.

The data included in this report indicate marked differences in the causes of TBI in areas across the state, with significantly higher rates of injuries occurring in rural counties. Motor vehicle and sports injuries are higher in rural areas, while fall rates are the same regardless of population density. Overall, rural Utah's TBI rate is 53% higher than that of urban areas, and the rural motor vehicle-related TBI rate is twice as high as the urban rate.

Also of note is the proportion of TBIs (10.9%) that are sustained in suicide attempts and violent assaults. In both categories, young males are the most frequent victims.

In addition, alcohol and drugs play a significant role in traumatic brain injury in Utah, with more than 50 percent of cases testing positive for one or more substances at the time of the injury.

The death rate among TBI victims varies by sex. For the period studied, 24.3% of males and 15.5% of females died from the injury either before they reached a hospital or during their stay. The average hospital charge for treatment of a TBI was \$19,248, and more than one-fourth (28.8%) of TBI treatment costs were picked up by government programs like Medicare and Medicaid.

Recommendations

Traumatic brain injuries are overwhelmingly preventable occurrences. Measures such as safe driving, using seat belts and child restraints, using the right helmet for the right sport, properly storing firearms, and removing fall hazards from the home can contribute to a reduction in TBI.

The Violence and Injury Prevention Program recommends the following:

Motor Vehicles

- Wear a seat belt on every ride
- Put children in the appropriate car seat or booster seat for their age and weight until they are at least 4'9" tall and weigh at least 80 lbs.
- Always secure children in the back seat
- Don't drive drunk, drugged or drowsy
- Wear a helmet on every motorcycle, ATV and snowmobile ride

Sports

- Wear the right helmet for all sports that pose a risk of head injury, including hockey, football, baseball, skiing, snowboarding, sledding, horseback riding, and bicycle, scooter and skateboard riding

Around the Home

- Check for loose carpeting, electrical cords, unsecured throw rugs, loose or missing handrails, and slippery surfaces in bathrooms
- Use a sturdy stepstool to reach overhead items
- Remove clutter from stairways and common pathways
- If older adults live in the home, install grab bars in the bath/shower area and beside the toilet
- Check older adults' medications for side effects that could lead to falling
- Place nightlights in bedrooms and bathrooms
- Store all firearms locked and unloaded and with ammunition in a separate location

Combined, these prevention measures have the potential to greatly reduce the personal and financial burden of traumatic brain injury in Utah.



Appendix

Data Sources and Clinical Case Definition

Data Sources

To ensure a complete morbidity data set, persons with cases of traumatic brain injury (TBI) discharged from hospitals in Utah were ascertained through two data sources within the UDOH: the Bureau of Epidemiology, Injury Registry, and the Office of Health Care Statistics (HCS), Hospital Discharge Database. Mortality cases were identified using death data from the UDOH, Office of Vital Records and Statistics. Once cases were identified, the three data sets were compiled into one database and unduplicated using personal identifiers.

Clinical Case Definition

A case of TBI (craniocerebral trauma)[3] is defined as either:

- An occurrence of injury to the head that is documented in a medical record, with one or more of the following conditions attributed to head injury:
 - Observed or self-reported decreased level of consciousness
 - Amnesia
 - Skull fracture
 - Objective neurological or neuropsychological abnormality
 - Diagnosed intracranial lesion
- An occurrence of death resulting from trauma, with head injury listed on the death certificate, autopsy report, or medical examiner's report in the sequence of conditions that resulted in death

The clinical definition of TBI excludes the following:

- Lacerations or contusions of the face, eye, ear, or scalp, without other criteria listed above
- Fractures of facial bones, without other criteria listed above
- Birth trauma
- Primary anoxic, inflammatory, infectious, toxic, or metabolic encephalopathies that are not complications of head trauma
- Cancer
- Brain infarction (ischemic stroke) and intracranial hemorrhage (hemorrhagic stroke) without associated trauma

International Classification of Diseases Codes

ICD Codes for Surveillance Years 2000-2003

Morbidity: (ICD-9)

| | |
|---------------|--|
| 800.0 – 801.9 | Fracture of the vault or base of the skull |
| 803.0 – 804.9 | Other and unqualified and multiple fractures of the skull |
| 850.0 – 854.1 | Intracranial injury including concussion, contusion, laceration and hemorrhage |
| 950.1 – 950.3 | Injury to the optic chiasm, optic pathways, and visual cortex |
| 959.01 | Head injury, unspecified |
| 995.55 | Shaken Infant Syndrome* |

Mortality: (The ICD-10 was implemented in 1999)

| | |
|--|---|
| S01.0 – S01.9 | Open wound of the head |
| S02.0, S02.1, S02.3, S02.7 – S02.9 | Fracture of the skull and facial bones |
| S04.0 | Injury to the optic nerve and pathways |
| S06.0 – S06.9 | Intracranial injury |
| S07.0, S07.1, S07.8, S07.9 | Crushing injury of head |
| S09.7 – S09.9 | Other unspecified injury of the head |
| T01.0 | Open wounds involving head with neck |
| T02.0 | Fractures involving head with neck |
| T04.0 | Crushing injuries of head with neck |
| T06.0 | Injuries of brain and cranial nerve with injuries of nerves and spinal cord at neck level |
| T90.1, T90.2, T90.4, T90.5, T90.8, T90.9 | Sequelae of injuries of head |

*This code was added in 2001

Population Denominators

Population Denominators

Population Data: Figures were taken from the Utah Department of Health Indicator-Based Information System (IBIS); general Utah population estimated.

IBIS NOTE: *“This module produces mid-year (July 1) estimates from the Governor’s Office of Planning and Budget (GOPB), generated by the Utah Process Economic and Demographic (UPED) model. These population estimates and projections are typically released each January with the Economic Report to the Governor. The data currently available in IBIS incorporate information from the 1990 and 2000 U.S. Census.*

For more information, see the Census Bureau Web site: www.census.gov, or the site for the Governor’s Office of Planning and Budget: www.governor.utah.gov/dea/.”

Rate Calculations

Incidence Rate per 100,000 persons:

$$\frac{\text{Number of Events of TBI} \times (100,000)}{\text{Population at Risk}}$$

Age-adjusted Incidence Rate:

$$\text{SUM} [(\text{Age-group Incidence Rate}) \times (\text{Population Standard Weight})[4]]$$

Data Limitations

Federal hospital data (e.g., Hill Air Force Base Hospital, etc.), Indian Health Services (IHS) data, and emergency department data are not included in Utah's TBI data surveillance.

Discharges to skilled nursing, whether to a home, residential care facility, or rehabilitation center, could be a result of other non-TBI related injuries sustained during the time of injury.

Individual etiology categories were condensed to illustrate large category groups for the purpose of creating easy-to-read graphs and may not show the exact, specific etiology for every injury.

Data graphs for the variables "Intent," "Etiology," "Discharge Disposition," "Type of Care" and "Payment Source" are compiled only for cases that were sampled. Non-sampled cases do not include these variables.

Population figures are estimated based on statewide figures from the Governor's Office of Planning and Budget. Age-adjusted incidence rates are based on 2000 standard population figures for the United States.

ICD-9, ICD-10, and E-coding may vary among Utah health care facilities.

Cost figures derived from the hospitalization database may not reflect the true total costs for a particular TBI hospitalization because of DRG miscoding, variations of reporting costs among hospitals and other factors.

Data Tables

Table 1.
Number of Cases of TBI by Age Group and Local Health District of Occurrence, Utah 2000-2003 (n = 3653)

| Age Group | Bear River | Central | Davis | Salt Lake | Southeastern | Southwest | Summit | Tooele | TriCounty | Utah | Wasatch | Weber/ Morgan | Statewide |
|-----------|------------|---------|-------|-----------|--------------|-----------|--------|--------|-----------|------|---------|------------------|-----------|
| 0-4 | 11 | 9 | 32 | 86 | 6 | 17 | 6 | 7 | 7 | 41 | 1 | 16 | 239 |
| 5-14 | 23 | 30 | 14 | 84 | 13 | 26 | 5 | 12 | 10 | 42 | 5 | 12 | 276 |
| 15-24 | 64 | 80 | 65 | 307 | 21 | 65 | 35 | 43 | 30 | 131 | 20 | 70 | 931 |
| 25-34 | 20 | 33 | 29 | 189 | 16 | 31 | 11 | 28 | 4 | 59 | 5 | 34 | 459 |
| 35-44 | 24 | 28 | 31 | 161 | 18 | 26 | 16 | 19 | 15 | 34 | 9 | 37 | 418 |
| 45-54 | 39 | 20 | 28 | 120 | 8 | 23 | 18 | 21 | 9 | 42 | 3 | 39 | 370 |
| 55-64 | 13 | 20 | 15 | 84 | 5 | 18 | 3 | 13 | 3 | 27 | 2 | 22 | 225 |
| 65-74 | 17 | 14 | 17 | 85 | 9 | 29 | 1 | 2 | 10 | 28 | 3 | 24 | 239 |
| 75-84 | 8 | 12 | 21 | 102 | 8 | 39 | 7 | 3 | 6 | 40 | 3 | 41 | 290 |
| 85+ | 9 | 10 | 20 | 62 | 9 | 16 | 3 | 1 | 2 | 41 | 0 | 33 | 206 |
| Total | 228 | 256 | 272 | 1,280 | 113 | 290 | 105 | 149 | 96 | 485 | 51 | 328 | 3,653 |

Table 2.
Average Population by Age Group and Local Health District, Utah, 2000-2003 (n=3653)

| Age Group | Bear River | Central | Davis | Salt Lake | Southeastern | Southwest | Summit | Tooele | TriCounty | Utah | Wasatch | Weber/ Morgan | Statewide |
|-----------|------------|---------|-----------|-----------|--------------|-----------|---------|---------|-----------|-----------|---------|------------------|-----------|
| 0-4 | 56,506 | 23,453 | 97,776 | 338,768 | 16,487 | 55,319 | 9,370 | 19,817 | 14,574 | 185,011 | 6,345 | 76,843 | 900,269 |
| 5-14 | 95,107 | 49,760 | 185,778 | 593,970 | 37,259 | 97,692 | 20,597 | 32,979 | 30,455 | 278,358 | 12,217 | 138,546 | 1,572,718 |
| 15-24 | 123,454 | 53,793 | 186,326 | 34,233 | 37,329 | 112,752 | 19,067 | 31,765 | 30,170 | 367,648 | 11,493 | 146,400 | ,754,430 |
| 25-34 | 88,632 | 29,738 | 143,754 | 08,118 | 22,713 | 77,177 | 18,052 | 29,176 | 18,664 | 286,176 | 9,587 | 119,967 | 1,451,754 |
| 35-44 | 63,872 | 32,091 | 37,598 | 519,800 | 27,806 | 67,445 | 22,866 | 24,823 | 21,616 | 168,497 | 9,804 | 112,639 | 1,208,857 |
| 45-54 | 54,084 | 30,786 | 12,860 | 441,600 | 28,461 | 63,163 | 20,945 | 19,051 | 20,153 | 129,438 | 8,115 | 97,493 | 1,026,149 |
| 55-64 | 33,222 | 21,490 | 65,912 | 55,068 | 18,119 | 48,557 | 10,201 | 11,613 | 13,417 | 78,305 | 4,684 | 61,082 | 621,670 |
| 65-74 | 23,943 | 16,696 | 42,207 | 154,671 | 12,752 | 47,009 | 4,268 | 7,236 | 9,745 | 52,054 | 3,155 | 43,585 | 417,321 |
| 75-84 | 15,548 | 11,080 | 24,592 | 06,016 | 8,756 | 32,898 | 1,791 | 4,306 | 5,316 | 33,726 | 1,741 | 31,323 | 277,093 |
| 85+ | 6,543 | 4,140 | 7,282 | 36,841 | 3,031 | 10,096 | 479 | 1,183 | 1,550 | 12,391 | 561 | 9,795 | 93,892 |
| Total | 60,911 | 273,027 | 1,004,085 | 3,689,085 | 212,713 | 612,108 | 127,636 | 181,949 | 165,660 | 1,591,604 | 67,702 | 837,673 | 9,324,153 |

Table 3.
Percent of Cases of TBI and Percent of Population by Local Health District, Utah 2000-2003 (n=3653)

| | Bear River | Central | Davis | Salt Lake | Southeastern | Southwest | Summit | Tooele | TriCounty | Utah | Wasatch | Weber/ Morgan | Statewide |
|-----------------------|------------|---------|-------|-----------|--------------|-----------|--------|--------|-----------|-------|---------|------------------|-----------|
| Percent of Population | 6.0% | 2.9% | 10.8% | 39.6% | 2.3% | 6.6% | 1.4% | 2.0% | 1.8% | 17.1% | 0.7% | 9.0% | 100.0% |
| Percent of TBI Cases | 6.2% | 7.0% | 7.4% | 35.0% | 3.1% | 7.9% | 2.9% | 4.1% | 2.6% | 13.3% | 1.4% | 9.0% | 100.0% |

Table 4. Local Health District by County

| Local Health District | Counties |
|-----------------------|------------|
| Bear River | Box Elder |
| | Cache |
| | Rich |
| Central | Beaver |
| | Juab |
| | Millard |
| | Piute |
| | Sanpete |
| | Sevier |
| | Wayne |
| Davis | Davis |
| Salt Lake Valley | Salt Lake |
| Southeastern | Carbon |
| | Emery |
| | Grand |
| | San Juan |
| Southwest | Garfield |
| | Iron |
| | Kane |
| | Washington |
| Summit | Summit |
| Tooele | Tooele |
| TriCounty | Daggett |
| | Duchesne |
| | Uintah |
| Utah | Utah |
| Wasatch | Wasatch |
| Weber-Morgan | Weber |
| | Morgan |

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