

**COMPdata Monthly Monitor - Montana**  
**September 2004**  
**Traumatic Brain Injury**

**Hospital Diagnosis and Treatment**

Traumatic brain injury (TBI) occurs when a sudden physical assault causes damage to the brain. Concussion, depressed or penetrating skull fractures, brain contusions, and hematomas are among the various types of TBIs. Because the severity of a TBI can range from a mild concussion to the extremes of deep coma or death, hospitals must be prepared to provide immediate and appropriate care for the TBI patient. Research in recent years has demonstrated that all neurological damage does not occur at the moment of injury, but rather evolves over the ensuing minutes, hours, and days.

Emergency Medical Services (EMS) are integral to both the immediate and long term survival and/or disability of the patient. A host of rapid decisions are necessary in the case of a brain-injured patient that depend on the capabilities of the Emergency Medical Technicians and those of the local hospitals. Equally important are the prehospital management of the patient and the identification and transportation to the most appropriate hospital to provide advanced treatment. Ideally a trauma center is available, one having the necessary medical personnel, a CT scanner, an operating room, intracranial pressure monitoring, and intensive care unit.<sup>1</sup> In many instances life-sustaining measures such as stopping internal bleeding and relieving intracranial pressure require the skills of a neurosurgeon. The greater distance brain injured patients must travel for care, the more likely it is they will sustain significant long-term disability or even death.

**Prevention Through Patient and Community Education**

A quick examination of the major causes of TBI demonstrates that hospitals have the opportunity to influence the incidence of TBIs through patient and community education.

- Half of all TBIs are transportation accidents involving automobiles, motorcycles, bicycles, and pedestrians. These accidents are the major cause of TBI in people under age 75.
- For those 75 and older, falls cause the majority of TBIs.
- 20 percent of TBIs are due to violence, such as firearm assaults and child abuse.
- Another 3 percent are due to sports injuries.
- One half of all TBI incidents involve alcohol use.<sup>2</sup>

Hospitals can be influential advocates in the community for education and laws promoting helmet use for motorcycles and other open motorized vehicles, bicycles, scooters, skateboards, snowboards, etc. Other areas of concern include playground safety and seatbelt laws. Hospitals, in partnership with their local community health prevention experts and departments, can play a role in educating local scholastic and athletic organizations regarding the immediate care of injured athletes. Elderly patients and their families can be taught a number measures to use to prevent falls. New parents need to know the severe effects caused by shaking a baby and protecting the baby from falls. Depending on the nature of your local community, there may be other opportunities to be involved in TBI prevention as it relates to activities such as horse back riding, snowmobiling, and mountain hiking and climbing.

### **Traumatic Brain Injury in Montana Inpatients**

Montana hospitals in 2003 found that 1,073 or 1.3% of their inpatients were diagnosed with some form of TBI (ICD-9 diagnosis codes 800-801.99, 803-804.99, 850-854.19) as either a principal or secondary diagnosis (all inpatient statistics here exclude newborns and obstetric cases - Major Diagnostic Categories 14 and 15). For the 1,073 patients who had a TBI diagnosis, it was the principal diagnosis for 67.1% of them.

In 58 cases the patient had both a principal TBI diagnosis and one or more secondary TBI diagnosis. There were 353 patients who had a TBI secondary diagnosis and some other type of principal diagnosis. The most frequent principal diagnosis for these patients was "Rehabilitation procedures not elsewhere classified" (22.1%). These cases most likely represent follow-up admissions for TBI patients. For the vast majority of the other TBI patients who had a different principal diagnosis, that diagnosis represented some other traumatic injury or occurrence, such as fractures of the facial areas, fractures of major bones, injuries to major organs, convulsions, abuse, and blood loss.

The number of total cases with TBI increased from 1,038 in 2000 to 1,073 in 2003, a 3.4% change. Looking at TBI as the principal diagnosis shows an increase of 11.8%, from 644 in 2000 to 720 in 2003.

General Statistics. The following hospital statistics explore in more detail the incidence of TBI in Montana inpatients discharged in 2003 (again, all statistics exclude newborns and obstetric patients).

- TBI was diagnosed as the principal condition in 720 inpatients or 0.9% of all inpatients.
- Of these patients, 17.9% were 17 years or younger, 53.2% were 18 to 64 years, and 28.9% were over 65. Of note is the fact that 19.9% of the TBI patients were 75 years or older, the cause of injury in this group most likely having been a fall.
- The majority of patients were males, 64.9% compared to 35.1% who were female.
- As expected, the majority of TBI patients were admitted through the emergency room (77.9%). Another 12.6% were admitted through a physician referral and 8.6% were transferred from another hospital.
- The admission type for nearly 70% of TBI patients was either emergency (62.8%) or trauma center (6.3%). Another 27.1% of the patients were considered urgent while only 3.6% were elective admissions.
- Only 3 out of 5 TBI patients were routine discharges to home or self-care (61.9%). Most of the rest were discharged or transferred to another facility or setting (27.2%), while 9.2% died in the hospital.
- The average length of stay for TBI patients was slightly more than two days longer than for all other patients not having TBI as the principal diagnosis (6.2 days versus 4.1 days). Reflecting the intense resources required to care for TBI patients, the average total charge was more than 100% higher (102.1%) than that for other patients (\$25,892 versus \$12,810).

## **Montana Inpatient Statistics from COMPdata**

All of the Montana inpatient statistics were derived from the Montana Hospital Association's COMPdata. We encourage you to use COMPdata to examine your hospital community area(s) regarding traumatic brain injury patients so that you might better understand the impact of traumatic brain injury on your care and treatment of your changing patient population and the resources needed to diagnose, treat, and manage the traumatic brain injury population.

### **Additional Information**

If you would like to develop the COMPdata reports that will provide similar statistics for your hospital or community, a training tool is available to guide you through the process. Click here to obtain the tool: <http://www.ihatoday.org/compdata/mttbtool.pdf>. For additional assistance on using the COMPdata system, contact the COMPdata Hotline at [compdata@ihastaff.org](mailto:compdata@ihastaff.org) or by telephone in Illinois at (630) 276-5851. If you are calling from outside of Illinois use our toll-free number of (866) 262-6222.

## **COMPdata Monthly Monitor - Montana September 2004 Traumatic Brain Injury**

### **APPENDIX**

#### **National Statistics and Trends**

Each year in the United States:<sup>3, 4</sup>

- Approximately 1.5 million people sustain traumatic brain injuries, ranging from mild to severe.
- 50,000 people die from TBIs.
- 230,000 are hospitalized due to TBIs and survive.
- More than 1 million are treated in emergency department for TBIs.
- An estimated \$56 billion is spent in direct and indirect costs as a result of all TBIs.
- 80,000 to 90,000 Americans experience onset of long-term disability from TBIs.
- More than 5 million people currently live with disabilities resulting from TBIs.

Traumatic brain injury is a particular public health problem in young people. Among children aged 0-14 years in the U.S, each year TBI results in an estimated:

- 3,000 deaths
- 29,000 hospitalizations
- 400,000 emergency department visits.<sup>5</sup>

Unintentional injury is the leading cause of death in children and TBI is the type of injury most often associated with death. The annual total of TBI-deaths is

- More than 6 times the number of deaths related to HIV/AIDS
- 20 times the number of deaths from asthma
- 38 times the number of deaths from cystic fibrosis.

From 1999 to 2001, the 10 leading causes of injury deaths for all ages include several that are related to TBIs. Of particular note are the 41,503 unintentional falls resulting in death, which

ranks third among all causes of injury deaths.<sup>6</sup>

### **Montana Statistics**

Among the leading causes of injury deaths in Montana from 1999 to 2001, those associated with traumatic brain injuries are:

- Unintentional motor vehicle traffic accidents (Rank-1st, 639 deaths)
- Suicide firearm (2nd, 336)
- Unintentional fall (3rd, 292)<sup>6</sup>

### **Current and Future Activities**

October 2004 is Brain Injury Awareness Month. More information is available from the Brain Injury Association of America (<http://www.biausa.org>)

The National Center for Injury Prevention and Control, a division of the CDC, maintains a profile for each state regarding TBI Data Collection. The profile for Montana notes that it is one of 28 states receiving CDC funding to conduct injury surveillance as part of an overall plan for injury control. The focus of the Core Capacity program is on the causes of injury rather than the nature of the injury itself. See <http://www.cdc.gov/ncipc/profiles/tbi/mt/default.htm> for more information about the Montana efforts.

The Traumatic Brain Injury Act is the only Federal law that specifically addresses the issues faced by people with TBI. The Act was reauthorized as part of the Children's Health Act of 2000 and provides funding of several programs in the CDC and the Health Resources and Services Administration (HRSA). The CDC programs focus on state surveillance studies, TBI incidence data and other prevention-related projects, including public education, awareness, and outreach campaigns. One set of HRSA programs are state grants for carrying out projects to improve health and community-based services for individuals with TBI and their families. The other HRSA efforts are the Protection and Advocacy Services state grants designed to protect the rights of individuals with TBI. More information on the Traumatic Brain Injury Act and its future funding can be found at <http://www.biausa.org>, click on "Government Relations."

### **References**

- 1 Brain Trauma Foundation. Guidelines for prehospital management of traumatic brain injury. New York, 2000. (<http://www.braintrauma.org>)
- 2 National Institute of Neurological Disorders and Stroke. Traumatic Brain Injury: Hope Through Research. September, 2002. (<http://www.ninds.nih.gov>)
- 3 Centers for Disease Control and Prevention. Facts: Magnitude of Traumatic Brain Injury and Mild Traumatic Brain Injury (In Heads Up: Brain Injury in Your Practice Tool Kit). Last reviewed by CDC: 9/23/2003 (<http://www.cdc.gov/tbi>)
- 4 Centers for Disease Control and Prevention. Traumatic Brain Injury: Incidence & Distribution. Last reviewed by CDC: 6/3/2004 (<http://www.cdc.gov/tbi>)

5 Centers for Disease Control and Prevention. Traumatic Brain Injury in the United States: Assessing Outcomes in Children: Summary and Recommendations from the Expert Working Group. Atlanta, GA. October 26-27, 2000.

6 Centers for Disease Control and Prevention. 10 Leading Causes of Injury Death. From CDC WISQARS system. (<http://www.cdc.gov/tbi>)

## Resources for Additional Information

### FOR HOSPITALS

For information on managing the care of traumatic brain injury patients, evidence-based clinical practice guidelines are available from the National Guideline Clearinghouse of the Agency for Healthcare Research and Quality at <http://www.guideline.gov>.

The main link to a wide variety of information on TBI at the CDC can be found at <http://www.cdc.gov/tbi>. At the top of the home page is a link to several valuable Fact Sheets. Also on the main page is a link to a TBI Tool Kit for Physicians, which is designed to assist providers in improving the clinical diagnosis and management of mild traumatic brain injury patients. The kit contains information for patients in both English and Spanish. The entire Tool Kit can also be ordered free of charge from the website.

The National Center for Injury Control and Prevention within the CDC is another good source of information and tools for providers (<http://www.cdc.gov/ncipc/>). Under “Unintentional Injury” on the home page is a link to “Fall-Related Injuries.” Within those pages you will find facts and statistical information on falls and TBI as well as links for brochures and other information you can share with patients, families, and other caregivers to help prevent falls, especially among the elderly.

The Brain Injury Association of America (<http://www.biausa.org>) is perhaps the leading non-governmental organization that focuses on many topics relating to TBI including research, statistics, treatment and rehabilitation, government relations and advocacy, and information especially for health care professionals. The Montana affiliate of the BIAA is the Brain Injury Association of Montana (<http://www.biamt.org>). On that site you will find news items, a calendar of special events, information on their many programs, and a listing of brain injury support groups within the Montana.

The National Institute on Disability and Rehabilitation Research (NIDRR) is a division of the U.S. Department Education and is the source of funding for the Traumatic Brain Injury Model System program and the TBI National Database. There are 16 model system sites throughout the country. Links to these and other resources of the NIDRR are found at <http://www.ed.gov/about/offices/list/osers/nidrr/index.html>). Click on “Programs and Projects” at bottom of the page for information on the model system sites and their activities. A direct link to the national data center for these projects is <http://www.tbindc.org>.

### FOR PATIENTS AND THE COMMUNITY

A number of resources on TBI for families and community groups can be found at the “Fact Sheets” link of the CDC TBI web site (<http://www.cdc.gov/tbi>). Information specifically designed

as "Patient Materials" can be found by clicking the link on the main TBI page entitled, "Heads Up: Brain Injury in Your Practice (TBI Tool Kit for Physicians)." Once on that page, there are sections with information for both Patients and Physicians. Material is available in English and Spanish and includes an excellent brochure for patients entitled "Facts About Concussion and Brain Injury: Where to Get Help." The entire Tool Kit can also be ordered free of charge from the website.

Among the information of value at the Brain Injury Association of America site (<http://www.biausa.org>) is a special section for children and parents; a survivors voice section which includes personal stories, a chat room, and other resources for families coping with TBI; and many other links and resources. The entire BIAA site is available in both English and Spanish.

The Dana Foundation is a private philanthropic organization, which among other activities has a special focus on brain and head injuries. The link to the "Brain Center" of Dana is <http://www.dana.org/brainweb>. Publications for the public and links to other brain injury resources are available there.

Of particular value to family and other informal caregivers of TBI patients is the Family Caregiver Alliance (<http://www.caregiver.org>). Aside from all of the useful material for caregivers regardless of the patient's condition, there is a section dedicated specifically to traumatic brain injury. This section which contains factual information and links to other resources for caregivers of TBI patients can be found by entering "TBI" in the search box at the top.

COMPdata is a product of the Illinois Hospital Association (IHA) and its affiliate AMR