

INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants**

November 4, 2005

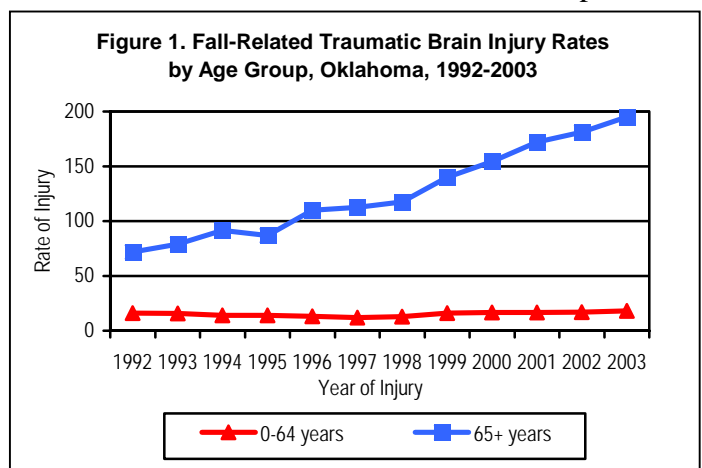
Fall-Related Traumatic Brain Injuries Among Adults 65 Years of Age and Older, Oklahoma, 1992-2003

Each year in the United States (U.S.), approximately 1.5 million people sustain a traumatic brain injury (TBI). Of these, 230,000 people are hospitalized, 50,000 die, and 80,000 to 90,000 become disabled. According to the Centers for Disease Control and Prevention, approximately 5.3 million people in the U.S. are living with a TBI-related disability.

Fall-related TBI is a major public health problem in aging populations. Arthritis, orthostatic intolerance, depressive symptoms, impairments in cognition, balance, gait, vision or muscle strength, and the use of four or more prescription medications are risk factors for falls in the elderly population. Some studies have shown that fall-related TBI has also been determined to be a predictor for earlier onset of dementia and Alzheimer's disease.

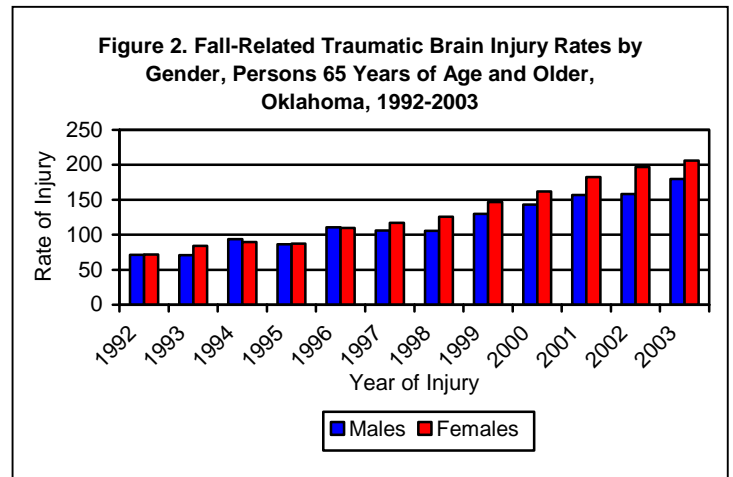
In Oklahoma, TBIs were mandated a reportable condition in 1991. Data regarding TBIs have been collected from all acute care hospitals in the state and from the Office of the Chief Medical Examiner since 1992. Initially, data were collected on persons with skull fractures and other intracranial injuries, including concussions, contusions, lacerations and hemorrhages. Unspecified head injuries were added in 1998 and certain optic injuries in 2001. During the 12-year time period from 1992 to 2003, 40,010 Oklahomans were hospitalized or died from a TBI. Of this total, 30% (12,174) of TBIs were related to falls, and of the fall-related TBIs, 56% (6,844) were sustained by persons 65 years of age and older. Among persons 65 years of age and older with a fall-related TBI, 13% (920/6,844) died and 49% (3,338/6,844) received post-acute care at a rehabilitation hospital, an intermediate care facility, a skilled nursing facility or through home health care after their discharge from the hospital.

The overall TBI rate for Oklahoma has increased from 1992 to 2003 by 12% (97.7 and 109.7 injuries per 100,000 population, respectively) and the fall-related TBI rate has increased 76% for the same time period (23.5 and 41.3 injuries per 100,000 population, respectively). Unlike persons under age 65 years whose rates of fall-related TBI were relatively stable throughout the study period, those 65 years and older showed a rate increase of 172% (71.7 injuries per 100,000 population in 1992 versus 195.0 injuries per 100,000 population in 2003) (Figure 1). Within the over 64 year age groups, the 75-84 year age group had the greatest number of injuries between 1992 and 2003 (2850/6844), followed by the 85 years and older age group (2419/6844), and the 65-74 year age group (1575/6844).

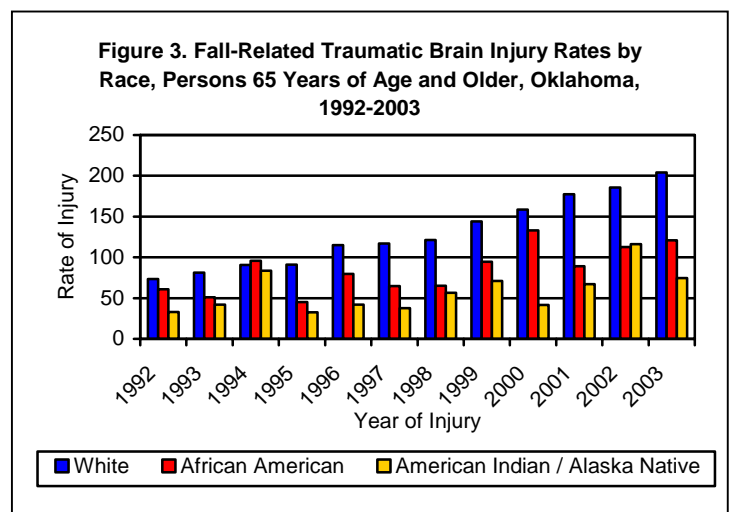


*The INJURY UPDATE is a report produced by the Injury Prevention Service, Oklahoma State Department of Health. Other issues of the INJURY UPDATE may be obtained from the Injury Prevention Service, Oklahoma State Department of Health, 1000 N.E. 10th Street, Oklahoma City, Oklahoma 73117-1299, 405/271-3430 or 1-800-522-0204 (in Oklahoma). INJURY UPDATES and other IPS information are also available at www.health.state.ok.us/program/injury.

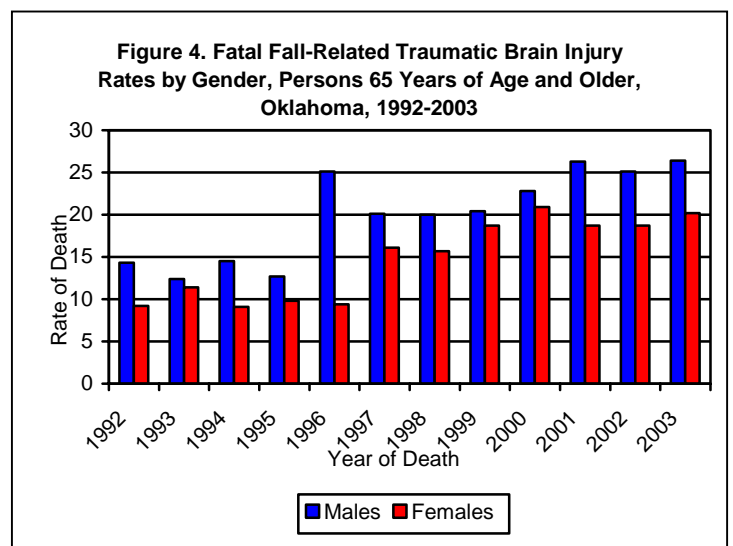
TBI rates for all ages and causes differed by gender, with males generally having a higher rate of injury. However, studies have shown that within the U.S. elderly population, females have a higher TBI rate than males. In Oklahoma, the fall-related TBI rate among males 65 years of age and older was 10% lower than the rate among females. For the 12-year time period, the fall-related TBI rate for females increased 187%, from 71.9 to 206.1 per 100,000 population, while the rate for males increased 152%, from 71.3 to 179.6 per 100,000 population (Figure 2).



Nationally and in Oklahoma, fall-related TBI rates among persons 65 years of age and older were highest among whites, followed by African Americans and American Indians/Alaska Natives. Rates in Oklahoma increased since 1992 for all races, particularly for whites whose rates steadily increased each year and rose 178% between 1992 and 2003 (73.3 to 203.9 per 100,000 population) (Figure 3).



From 1992 to 2003, the Oklahoma fall-related TBI mortality rate among persons 65 years of age and older doubled (11.3 and 22.8 injuries per 100,000 population, respectively), with the overall case fatality rate being 13% (920/6844). In Oklahoma, males over 64 years of age had a higher average fall-related TBI mortality rate than females (20.1 and 14.8 per 100,000 population, respectively) (Figure 4).



Of the persons 65 years of age and older that were hospitalized due to a fall-related TBI and survived (5924/6844), the length of hospital stay ranged from 1 to 100 days, with an average of 6.3 days. The annual average number of days hospitalized decreased from 7.6 days to 5.4 days from 1992 to 1997, but then showed a gradual increase to 6.6 days in 2003.

Of the reports that included information regarding where the fall occurred, 63% (3644/5792) showed the fall occurred in a home setting. Within the over 64 year age groups, the percentage of persons that sustained a fall-related TBI in a home setting decreased as the age groups chronologically increased, with the 65-74 year age group having 68% of injuries occurring in the home (894/1318), the 75-84 year age group having 66% (1599/2413), and the 85 years and older age group having 56% (1151/2061). Additionally, 24% of subjects (1398/5792) fell in a nursing home setting. Within the age groups, the percentage of persons that fell in a nursing home setting increased as the age groups chronologically increased, with the 65-74 year age group having 13% (172/1318), the 75-84 year age group

having 20% (472/2413), and the 85 years and older age group having 37% (754/2061). The male-to-female rate ratio for sustaining a fall-related TBI in a home setting is 1:1.1 (63.0 and 70.4 per 100,000 population, respectively), while the same ratio in a nursing home setting is 1:1.7 (18.6 and 30.9 per 100,000 population, respectively). In relation to survival, the male-to-female rate ratio for dying from a fall-related TBI sustained in a home setting is 1.5:1 (11.9 and 8.1 per 100,000 population, respectively), while the same ratio for the nursing home setting is 1:1 (3.7 and 3.8 per 100,000 population, respectively).

Loss of consciousness in a TBI patient is an indicator of the severity of the injury. Of the reports that included information regarding loss of consciousness, 44% (1001/2303) of persons 65 years of age and older that survived a fall-related TBI did lose consciousness after the fall. Within the over 64 year age groups, the percentage of patients that lost consciousness after the fall decreased as the age groups chronologically increased, with the 65-74 year age group having 53% (315/594), the 75-84 year age group having 43% (402/936), and the 85 years and older age group having 37% (284/773).

CASE BRIEFS

- A 65-year-old man was stepping off the curb in front of a grocery store when he fell and hit his head on the pavement. He lost consciousness, and a computed tomography (CT) scan revealed that he suffered a skull fracture and a hemorrhage. The man also experienced weakness in his lower extremities and had cognitive deficits. After being hospitalized for 16 days, he was discharged to an inpatient rehabilitation facility.
- An 89-year-old woman that lived in an assisted living center was walking in the cafeteria when she stumbled and fell, hitting her head on the floor. She did not lose consciousness, but a CT scan revealed that she suffered a hemorrhage. She was in the hospital for three days, and then returned to the assisted living center.
- An 84-year-old woman fell at her home and hit the back left side of her head on her kitchen cabinets. She did not lose consciousness, and was in the hospital for four days. She was discharged to a skilled nursing facility due to suffering neurological sequelae and having generalized weakness and the inability to walk.
- A 79-year-old woman was in the check-out lane at a grocery store. As she was writing her check, she suddenly felt dizzy and fell to the floor, hitting her head on the floor. In the hospital, her physician discovered that her dizziness was due to inflammation of the internal ear. She was in the hospital for seven days and was discharged home with a good recovery.
- A 71-year-old man was climbing into the attic to put away Christmas decorations when he fell off the attic ladder. The man fell approximately eight feet, and struck his head on the attic ladder on the way down. The man suffered a fracture at the base of his skull and was in the hospital for four days before being discharged home.
- An 80-year-old woman was doing her laundry when she fell and hit her head on the washing machine. The woman did not lose consciousness initially and in the emergency room, her consciousness level was assessed as not being impaired. However, a CT scan revealed a subdural hematoma, and the woman remained hospitalized until she died two weeks later.
- A 77-year-old man was taking a bath and fell when he was getting out of the bathtub, hitting his head on the edge of the tub. His wife helped him get into bed, and the next morning he was unresponsive. At the hospital, it was discovered that he had suffered an intracranial hemorrhage. The man died later that day.

FALL PREVENTION

Falls can lead to death or disability, especially among older adults. Persons 65 years of age and older should take precautions to prevent falls, especially during high risk time periods, which are the month after a hospital discharge, during episodes of acute illness, and during exacerbations of chronic illnesses. The following are suggestions for preventing falls:

Environmental Factors

- Make sure that carpet edges are securely fastened to the floor, and remove small area and throw rugs; also assure that floorboards are all securely fastened and that irregular surfaces are leveled.
- Avoid using floor wax or use only non-skid wax.
- Remove and reduce items in hallways and pathways, such as rugs, clutter, and low furniture.
- Use nightlights to illuminate bedrooms, bathrooms, hallways, and stairways.
- Install lights and handrails in stairways.
- Remove cords and wires from the floor and have telephone and electrical cords placed out of walkways, preferably attached to walls or floorboards.
- Have grab bars installed in the bathtub/shower and toilet areas; also use rubber mats and a shower seat in the bathtub/shower and install a raised toilet seat.
- Have cracks and uneven surfaces in exterior steps and sidewalks repaired.
- Have bushes trimmed so they do not extend over sidewalks or walkways.
- Hire a “handyman” to do yard work, install seasonal decorations, and perform minor home repair work.

Behavioral Factors

- Keep muscles strengthened through daily exercise and/or walking; if necessary, attend a professionally supervised balance and gait training class.
- Wear flat shoes with non-skid soles.
- Do not stand on chairs or furniture and have someone help with jobs that require climbing.
- Limit or discontinue alcohol intake.
- Have a personal emergency-response system or a telephone that is accessible from the floor.

Health-Related Factors

- Review medications (both prescription and over-the-counter) with a health care provider to assure all are necessary, or if a reduction in the number or dosages is achievable.
- Have a health care provider check for difficulties with balance and gait and check blood pressure for hypotension (which can cause dizziness or light-headedness) during health care exams.
- Have an annual eye exam to check for vision changes, cataracts, glaucoma, or other eye problems.

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