

# FALL-RELATED INJURIES

Anyone can fall and a fall can change one's life. A 78-year-old woman was living in a long-term care facility. Her children felt better knowing she was living in a facility with full-time care. One day, the woman rolled out of her bed and broke her hip. This severe injury caused her to become permanently bed-ridden and depressed.

A five-year old boy was enjoying recess on the school playground when he fell from the jungle gym. He fell only five or six feet but suffered a traumatic brain injury when his head hit the blacktop surface below.

A healthy 39-year-old woman arriving home from work fell on the sidewalk in front of her house. To some it would appear that her only injury was some bruising, when in fact the fall damaged her confidence and her fear of falling again affected her activities of daily living.

## Defining The Problem

Unintentional falls are a significant cause of injury, most significantly affecting the young and the old. For the U.S. in 2000, falls were the leading cause of injury from birth to age 14 and for ages 35 years and older. It was the third leading cause of injury for ages 15-34 years.<sup>1</sup>

Falls (including slips and trips) are prevalent among elders, and can lead to severe consequences. It is estimated that one out of every three community-dwelling seniors falls each year.<sup>2</sup> This high rate would not pose a serious problem if these falls resulted in superficial injury. But falls in elders have very serious consequences. They are the leading cause of injury death among people older than 64 years.<sup>3</sup> In 1998, almost 10,000 elders died from fall-related injuries.<sup>1</sup>

Young children and athletes also have a high incidence of falls, but are more resilient to recovering from injuries than elders. Nevertheless, falls inflict an appreciable toll on the younger population. Infants tend to fall from furniture, baby walkers, and stairs. Older children fall more often from playground equipment.

## Goals

### Reduce deaths from falls

HP 2010 Goal	3.0 per 100,000
OH 1999	4.3
US 1999	4.8

Data source: National Vital Statistics System (NVSS), CDC, NCHS.

### Reduce hip fractures among adults 65 years and older

HP 2010 Goal females	416 per 100,000
HP 2010 Goal males	474
OH	identify baseline
US 1999 females	1056
US 1999 males	593

Data source: National Hospital Discharge Survey (NHDS), CDC, NCHS.

## Data

Falls were the second leading cause of unintentional injury deaths in the United States in 1998, accounting for 12,595 deaths.<sup>1</sup> Falls in the home lead to 9,300 deaths, with the majority of victims being over the age of 65.

The Ohio data for 1998-2000 unintentional injuries shows that falls are second only to motor vehicle crashes with a rate of 5.0 per 100,000. The mortality rate from falls increases significantly with age. The Ohio data for 1998-2000 injury mortality shows that falls are third behind motor vehicle and other transportation related injuries.

The mortality rate from falls increases significantly with age. The Ohio data for 1998-2000 falls mortality by age is displayed in Figure 1 on the following page.

## Older People

One of every three people 65 years and older falls each year and older adults are hospitalized for fall-related injuries five times more often than they are for injuries from other causes. Of those who fall, 20-30% suffer moderate to severe injuries that reduce mobility and independence, and increase the risk of premature death.

Falls are the most common cause of trauma-related hospital admissions among older adults.<sup>5</sup> Sattin and colleagues report that 42% of elders who fell required hospitalization.<sup>6</sup> Their average length of stay was 11.5 days. Twenty three percent of injury related emergency department (ED) visits were for falls. Elders comprised 20% of these visits, almost twice the rate as would be expected.<sup>7</sup>

Fall-related injuries are a major health threat for nursing home residents. Older people who live in nursing homes where around the clock staff are present to provide care fall more frequently than older adults who live in the community. In a typical 100-bed nursing home, 100-200 falls are reported each year, and many go unreported. Approximately 50% of nursing home residents aged 65 and over fall each year, and nearly 1,800 die annually as a result of their falls. About 10 to 20 percent suffer injuries, and 6 percent sustain fractures.



Of all fall-related injuries, hip fractures cause the greatest number of deaths, and lead to the most severe health problems. Women sustain 75-80% of all hip fractures. People who are 85 years or older are 15 times more likely to experience hip fractures than are people between the ages of 60-65.

Seniors who sustain a fall-related injury often enter a nursing facility or rehabilitation center for short-term rehabilitation. That population has a 70% chance of permanent placement in a long-term care facility.

Falls are the leading cause of injury death among people older than 64 years.

## Children

In 1998, falls killed 120 children ages 14 and younger in the U.S. More than 2.5 million children under fifteen years old are treated annually at hospital emergency departments for fall-related injuries. More than half of fall-related injuries among children occur among ages 5 and under; mostly in the home.

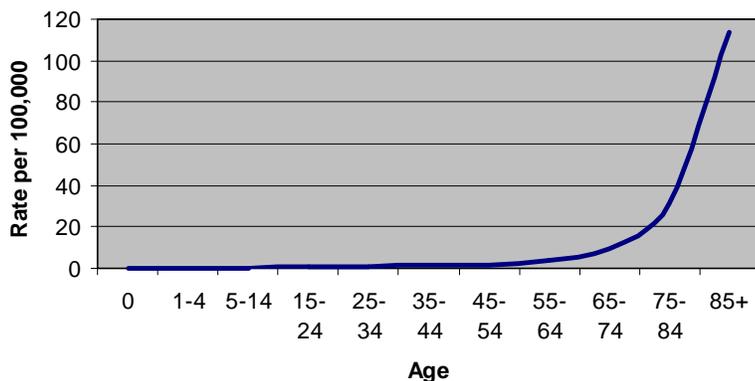
More than 150,000 children ages 14 and under require emergency department treatment for playground falls. Interestingly, in 1999, more than 7,500 children were treated for injuries sustained from bleacher falls.

Infant walkers are a special concern in this population. In 1999, an estimated 8800 children younger than 15 months were treated in hospital emergency departments in the United States for injuries associated with infant walkers. The vast majority of injuries occur from falls down stairs.<sup>8</sup>

Although falls are the most common cause of childhood injury, these injuries are rarely fatal, in contrast with a high rate of fall-related mortality among elders. Fatalities occur primarily when children fall from great heights (greater than two stories or 22 feet), or when the head of a child hits a hard surface, such as concrete. These include falls from roofs, windows, and balconies. These falls are far more significant in urban areas where there are multiple-story, often deteriorating, low-income housing units.

Figure 1

Ohio Falls Mortality Rate by Age, 1998-2000



## Costs & Consequences

Each year, nearly 20 children ages 14 and under die and an estimated 211,000 are treated in hospital emergency rooms for playground equipment-related injuries. Children age 5 to 14 account for 70 percent of these playground-related injuries. It is estimated that one-third of playground-related fatalities and 70 percent of injuries occur on public playgrounds. More than 70 percent of playground-related injuries involve falls to the surface and 9 percent involve falls onto equipment. Falls account for 90 percent of the most severe playground-related injuries (mostly head injuries and fractures) and one-third of fatalities. Head injuries are involved in 75 percent of all fall-related deaths associated with playground equipment. Lack of supervision is associated with 40 percent of playground injuries. Recent studies also have found that about 80 percent of playgrounds have unsuitable surfaces. Shock absorbing surfaces can help disperse the momentum of a falling body or head, thus, reducing the risk of life threatening injuries.

Children are more likely to die or be severely injured from window-related falls than falls associated with any other product. Each year, approximately 18 children ages 10 and under die from window fall-related injuries. An estimated 4,700 children ages 14 and under are treated in hospital emergency departments annually for injuries sustained from falling out of windows. Head injuries account for the majority of these injuries. The majority of window fall-related deaths (70 percent) occur during the spring and summer months. Children falling from windows are more likely to be male, under age 3 and playing unsupervised at the time of the fall.

In general, children ages 10 and under are injured from falls at a rate of about twice that of the total population. Preschoolers are at the greatest risk. Males are twice as likely as females to die from fall-related injuries. Black children age 14 and under have a fall-related death rate that is one and half times higher than that of white children. Low-income children are more likely to be injured from falls due to improper supervision and deficiencies in the environment, including aging or deteriorating housing.

### Other populations:

Falls in the occupational setting are an increasing concern. Data from the Census of Fatal Occupational Injuries has consistently shown that falls remain a major cause of mortality, both in Ohio and nationally. Additionally, OSHA has invested significant enforcement and consultative resources towards reducing falls in the workplace.

In 1994, the average direct cost for a fall injury was \$1,400 for a person over the age of 65. The total direct cost was \$20.2 billion. By 2020, the cost of fall injuries is expected to reach \$32.4 billion.

The cost of a hip fracture, including direct medical care, formal nonmedical care, and informal care provided by family and friends, was between \$16,300 and \$18,700 during the first year following the injury. Assuming 5% inflation and the growing number of hip fractures, the total annual cost may reach \$240 billion by the year 2040.

In 1999, Medicare paid for 89 percent of fall-related hospitalizations among people age 65 or older.

In Washington state alone, Medicare paid \$68.6 million in 1999 to treat fractures in people age 65 or older. Nearly all (97 percent) of those fractures were due to falls. Medicare spent approximately \$68 million for inpatient treatment, including care provided in hospitals, skilled nursing facilities, and home health care.

Falls by elders have psychosocial consequences. A fall can lead to decreased self-confidence, fear, and self-imposed activity limitation.<sup>9</sup>

Falls account for the largest share of injury costs for children ages 14 and under, accounting for more than one-fifth of all unintentional injury-related costs.

The total annual cost of fall-related deaths and injuries among children ages 14 and under is nearly \$44 billion



## Risk Factors for Fall-Related Injury

### Environmental factors:

- wet floors
- poor lighting
- clutter
- loose carpets
- lack of bathroom safety equipment
- poorly placed furniture
- improper playground surfacing
- improperly maintained playground equipment
- developmentally inappropriate playground equipment
- multilevel housing
- urban living

### Health factors:

- diseases of the heart, foot, eyes or muscles
- postural hypotension (dizziness upon standing)
- neurological conditions (Parkinson's disease, etc)
- arthritic diseases
- dementia and Alzheimer's disease
- depression
- lower-extremity weakness
- poor grip strength
- balance disorders
- visual impairments

### Lifestyle factors:

- alcohol abuse and use of multiple prescription medications (e.g. sedatives, antidepressants, and antipsychotics).
- improper footwear
- low income housing

### Institutional specific factors (e.g. nursing homes, etc.):

- improper bed height
- insufficient staffing to move residents safely, to assist to the bathroom, to answer call lights, to assist high-risk residents with ambulating, to supervise residents, etc.
- restraint use
- lack of restorative and rehabilitative nursing
- improperly maintained and fitted wheelchairs
- clutter
- medications, especially psychoactive drugs
- failure to properly train staff in lifting and handling techniques
- poor foot care
- weakness and gait problems associated with malnutrition and/or dehydration



## Child Care Center Policy Issues

The following policies apply to licensed child care centers.

### Ohio Administrative Code

#### 5101:2-12-15 Safe and sanitary equipment and environment safety

The center shall provide furniture, materials, equipment, and an environment which are safe.

Equipment, materials, and furniture shall be sturdy and safe, easy to clean and maintain, and free of sharp points or corners, splinters, protruding nails, loose or rusty parts, paint which contains lead or other poisonous materials, or other hazardous features as determined by the director's representative.

Children in care shall be protected from any items and conditions which threaten their health, safety, and well being, including but not limited to: protecting children from stoves, bodies of water, window covering pull cords, telephone cords, electrical cords/extension cords, asbestos, wells, traffic, employees' personal belongings and other hazards. If area rugs are used, they are to have a nonskid backing, and floor surfaces shall be maintained so as to not cause a tripping hazard. Lawnmowers and other equipment shall not be used when children are playing in the outdoor area.

Indoor swings (excluding infant swings), slides, climbers, and climbing apparatus shall not be placed over concrete, tile, or any



similarly hard surface. There shall be shock absorbent protective covering under and around this equipment. If climbing equipment is over three feet high, landing mats at least one and one half inches thick shall be used. The protective covering shall be used and placed according to manufacturers' guidelines.

#### 5101:2-12-16 Equipment and Materials

The center shall ensure that equipment, materials, and furnishings provided for both indoor and outdoor play are sufficiently varied and adequate to meet the developmental needs of the children and for the total number of children for which the center is authorized to serve. The center shall have enough play materials and equipment so that, at any one time in the daily program, each child the center is authorized to serve can be actively involved in play with developmentally appropriate equipment or materials.



## Existing Programs

The Ohio Department of Health's Division of Quality Assurance developed a Falls Protocol for nursing homes to properly assess residents and to put protections in place.

ODH and the Office of the State Long-Term Care Ombudsman distribute information to educate consumers about physical restraints.

Senior Safety Coalition in Allen and Auglaize Counties is a group started by local hospitals to do outreach and education about falls prevention. The group won an award for community contribution from the Area Agency on Aging.

There are many "monitoring" systems that serve as integral parts of fall prevention and restraint reduction programs in hospitals, long term care facilities and home health care situations all over the nation. The purpose is to monitor those consumers assessed to be at risk for falls and to alert their caregivers when immediate intervention is required. Use of physical restraints can often be greatly reduced while patient dignity is enhanced.

Australia has the National Falls for Older People Initiative 1999-2003, "Step Out With Confidence" program. This Initiative is part of the enhanced primary care package established to improve health outcomes and the quality of life for older Australians and those with complex care needs.

In the UK where falls are the leading cause of unintentional death, Active for Life is an evidence based falls prevention exercise video for use by older people who are at risk of falling. The patient pack comprises the video and a booklet detailing practical steps the user can take to improve home safety, reduce their risk of falling and of being injured if they fall.

The Centers for Disease Control and Prevention assessed programs that focus on extrinsic causes of falls, and they describe 18 exemplar programs of home assessment and modification.<sup>10</sup> Collectively, these projects show the value of falls prevention projects.

Allen County Sheriff's Department has a system for seniors at home whereby the consumer activates a special front porch light that flashes when they're hurt or in trouble which notifies the sheriff that they need help. They also have a computerized call back system where the consumer receives a call at a certain time every day and if the call isn't answered, they call one more time and then dispatch a sheriff to check on them.



The National SAFE KIDS Campaign is the first and only national nonprofit organization dedicated solely to the prevention of unintentional childhood injury — the number one killer of children ages 14 and under. More than 300 state and local SAFE KIDS coalitions in all 50 states, the District of Columbia and Puerto Rico comprise the Campaign.

The National Action Plan for the Prevention of Playground Injuries provides a blueprint for playground safety that focuses on designing age-appropriate playgrounds, providing proper surfacing under and around playgrounds, providing proper supervision of children on playgrounds, and properly maintaining playgrounds.

The large number of elder persons who fall, the increasing size of the elder population, and the myriad adverse effects that falls have on elders' lives have produced many projects designed to reduce falls by elders. Most of these projects have focused on intrinsic causes of falls. These include programs designed to improve balance, strength and nutrition. The projects that were most effective were those that took a multifactorial approach to falls prevention.<sup>11-15</sup> These projects tend to focus on preventing falls in people who have already fallen.

# Recommendations to Prevent Fall-Related Injury

## Improve surveillance

1. Create a statewide surveillance system and database for fall-related emergency department visits, hospitalizations and deaths.
2. Require the statewide trauma registry to collect data on isolated hip fractures.

## Evaluate programs

3. Form a statewide falls-prevention task force to review existing programs and issue recommendations for best practice.
4. Design a monitoring and evaluation framework to enable ongoing assessment of fall prevention programs.

## Target resources toward high-risk groups

5. Develop and implement a multifactorial fall prevention program targeted to parents and caregivers of young children to prevent falls from playgrounds, windows, furniture, stairs and walkers, and evaluate its effectiveness.
6. Develop and implement a multifactorial fall prevention program for elders. Include elders in the planning process.
7. Encourage health care providers to adopt a standardized fall risk assessment tool to screen individuals over the age of 65.
8. Implement a statewide awareness campaign to encourage elders to report falls to their health care providers.

## Expand training

9. Develop and promote fall prevention resources for pediatricians, geriatricians and other health professionals and improve distribution of existing resources, assessment tools and prevention strategies.
10. Encourage hospitals and medical schools to offer continuing education courses for physicians in fall-related injuries. The subject matter should include fall guidelines and the importance of referring at-risk, older patients, to effective fall prevention programs.

## Empower communities

11. Provide funding for and encourage regional and county needs assessments of older Ohioans concerning falls and their prevention.
12. Create a resource list and publicize existing, well-evaluated resources, assessment tools and prevention strategies to targeted groups such as schools, child care facilities, nursing homes and elder advocacy groups.
13. Mandate the installation of protective window guards on all windows not designated as emergency exits in all multiple-residence dwellings where children ages 10 and under reside.
14. Support the American Academy of Pediatrics position to ban the manufacture and sale of mobile infant walkers while promoting the use of stationary activity centers as an alternative.
15. Encourage the Ohio Department of Aging and its statewide network to provide education and falls prevention services to older citizens and their caregivers. Services should include preventive home visits for health and safety-related assessments and related referrals.
16. Encourage insurance companies to cover fall prevention programs and services in an effort to reduce health-care costs.
17. Enact legislation requiring new public and school playgrounds to be constructed according to the US Consumer Product Safety Commission's (CPSC) guidelines for playground surfacing and equipment. Encourage communities to renovate existing playgrounds accordingly.
  - The National Program for Playground Safety and the CPSC recommend the use of shock-absorbing, loose-fill materials such as pea gravel, wood fiber or synthetic surfaces. Asphalt, cement, dirt, grass and rocks surfaces should not be used unless they are a base for appropriate shock-absorbing surfaces.
  - Playground equipment guidelines have been developed by national organizations, however they are voluntary. Four states have enacted playground safety legislation based on the guidelines. Ohio should enact similar legislation.

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