
Preventing Falls In and Around Homes

Authors: Robert “Bobby” Grisso, Extension Engineer, Biological Systems Engineering, Virginia Tech; John Perumpral, Professor Emeritus, Biological Systems Engineering, Virginia Tech; Don Ohanehi, Research Scientist, Engineering Science & Mechanics, Virginia Tech; JD McCoy, Former Student, Biological Systems Engineering, Virginia Tech; and Kirk Ballin, Director, AgrAbility Virginia Project, Easter Seals UCP North Carolina & Virginia.

Introduction

Falls in and around homes are very common and often have the potential for life altering consequences. Irrespective of where they happen, falls are considered to be the leading cause of injury for hospital emergency room treatment. Irrespective of sex, race, and ethnicity, the mortality from falls increases dramatically with age. Often, among persons over the age of 65 years, they are also the primary cause for accidental deaths. Falls account for about 70% of the accidental deaths in persons over 75 years of age.

In 2009, 2.2 million older adults had experienced injuries from falls that required treatment in emergency rooms. Of this total, over 581,000 required hospitalization (CDC, 2011). Injuries from falls were found to be the leading cause of deaths among seniors over 72 and the second leading cause for those who are between 60-72 years of age (NSC, 2011). Falls are most common among children and adults over 65 years of age or older. Compared with children, seniors who fall are 10 times more likely to be hospitalized and eight times more likely to die as a result of a fall (Range, 1993).

More than 90% of the hip fractures are caused by falls and invariably these fractures occur in persons over 70 years of age. In 1996, more than 250,000 adults in the U.S. suffered fractured hips. The cost of hospitalization resulting from these injuries was in excess of \$10B.

Available data clearly illustrate the direct cost associated with falls in and around the homes is staggering. The data reinforces the fact that the elderly among us are the most vulnerable to such falls. Significant reduction in the number of falls minimizing the hospital expenditures, hardship, and possibly deaths are possible with the adoption of simple preventive measures. The overall goal of this fact sheet is to make the general public aware of the causes of falls and the precautionary steps they can take to prevent falls in and around the homes.

Who Falls?

Those who experience falls may be placed in one of three groups – children, adults of all ages in the work place, and adults (mostly elderly) in and around their homes. All falls may be placed in one of the two categories -- fatal or nonfatal.

Most fatal injuries result from falls from higher elevations. These types of falls are rare in and around homes. However, they are much more common in work places and workers in different types of industries account for a large majority of the fatal falls.

Nonfatal falls occur under varied circumstances in and around the homes and in the work places. In recent years, strict enforcement of new and existing regulations together with improved building codes have helped reducing the number of falls in work places.

Two groups that experience falls the most are children and seniors. These falls generally occur at the same level and usually they are nonfatal. However, hospitalization following falls is very common among seniors as discussed earlier. In and around the homes, falls from a higher elevation do occur periodically. Often these are due to varying reasons such as improper selection and use of equipment, and negligence. Even though falls in and around the homes may cause severe injury and hospitalization, they are rarely fatal.

Causes of Falls

The causes of falls may depend on where they happened and who has experienced the fall. To a large extent, it depends on whether the fall occurred in a work place or elsewhere. While a few of the causes associated with falls may be the same, they can be drastically different depending on whether the fall occurred in a work place or at home. The following are the possible causes of falls in and around the homes:

- Normal changes due to aging – poor eye sight and hearing
- Balance disorders, weakness, and arthritis
- Vertigo
- Confusion and cognitive impairment
- Central nervous system disorder
- Poor lighting
- Loose throw rugs
- Cluttered pathways
- Uneven walkways
- Loose wires on the floor
- Pets on the floor
- Medication and alcohol
- Improper selection and use of equipment for work at higher elevation

Types of Fall Injuries

Nonfatal falls may cause injury to multiple or isolated body parts. Approximately 20% of such falls results in multiple body part injuries and the rest in the injury of isolated body parts. The body parts that are most frequently affected are backs, hips, knees, ankles, and wrists. Most common

injuries resulting from nonfatal falls include the following:

- Sprains, strain or tear
- Fractures
- Bruises and concussions
- Soreness and pain

Preventing Falls

There are number of simple steps one can take to prevent falls in the home surroundings and they are listed below. This section also discusses the use of Assistive Technologies (AT) for preventing falls.

- Use shoes with nonskid soles (Appendix A)
- Make sure the home is well lit
- Use night lights in the bedroom, bathroom, and hallway
- Remove throw rugs or fasten them to the floor with carpet tape. Tack down carpet edges
- Remove electrical cords lying across the pathway
- Install grab bars in bath tub, shower, and toilet area
- Use rubber mats in both tub and shower
- Take up floor mats when bath tub or shower is not in use
- Do not climb on stools or step ladders
- Use only nonskid floor wax
- Repair walkways and sidewalks to have a smooth surface
- Have your eyes checked every year for cataract, glaucoma, and other eye problems
- Have your hearing checked every two years
- See your doctor if you have foot pain or corn
- See your doctor right away if you feel dizzy, weak or unsteady on your feet
- Use a cane or walker always if recommended by your doctor
- Whenever you get up from the bed, sit on the side of the bed for a minute or two before you stand up. This will allow your blood pressure time to adjust and you will feel less dizzy
- If you need to go to the bathroom often at night, consider using a bedside commode
- Keep your body in good shape with regular exercises. Walking and other exercises to strengthen the muscles you use for walking and lifting are highly recommended
- Limit your alcohol consumption to two drinks or less
- When using ladders for jobs around homes, select a ladder suited for the job and use it appropriately. (Appendix B)

Conclusions

Falls are the leading cause of injuries that require treatment in emergency rooms. For people over 65, falls are the primary cause of accidental death. Significant reduction in treatment costs and hardship are possible with the adoption of simple preventive steps.

References

- CDC (Centers for Disease Control and Prevention). 2011. Preventing Falls: What Works: A CDC Compendium of Effective Community-based Interventions from Around the World. http://www.cdc.gov/HomeandRecreationalSafety/images/CDC_Guide-a.pdf
- Grisso, R.D., J. Perumpral, S.C. Mariger, D.E. Suttle, K. Funkenbush, and K. Ballin. 2007. Arthritis and Farming. Virginia Cooperative Extension, Publication Number 442-083, <http://pubs.ext.vt.edu/442/442-083/442-083.html>
- Kendzior, R.J. 2010. *Fall Aren't Funny: America's Multi-Billion-Dollar Slip-and-Fall Crisis*. Government Institutes, Lanham, MD, pp224.
- NSC (National Safety Council). 2011. Protecting Ourselves from Slips, Trips and Falls. http://www.nsc.org/safety_home/Resources/Pages/Falls.aspx
- Range, J.W. 1993. The cost of injury. *Emergency Medical Clinic North America*. 11:241-253 <http://www.mayoclinic.com/health/stretching/HQ01447>

National Resources (Accessed July 7, 2011):

- AgrAbility National Project. <http://agrability.org/>
- CoachLift. www.coachlift.com
- Disabled Dealer. <http://www.disableddealer.com>
- Life Essentials. <http://www.lifeessentialswb.com/controls.html>
- Foundation for Rehabilitation Equipment & Endowment (FREE). <http://www.free-foundation.org/>
- National Center for Chronic Disease (CDC) Prevention and Health Promotion. <http://www.cdc.gov>

Virginia Resources (Accessed July 7, 2011):

- Centers for Independent Living (CIL's) <http://www.brilc.org/>
- Department of Rehabilitative Services (DRS) <http://www.vadrs.org/>
- Easter Seals UCP North Carolina & Virginia <http://nc.eastersealsucp.com/>
- Virginia AgrAbility Project <http://www.agrability.ext.vt.edu>
- Virginia Assistive Technology Partnership (VATS) <http://www.vats.org/>
- Virginia Disability Service Agencies <http://www.vadsa.org/>
- Virginia Farm Bureau Safety (FB) <http://www.vafb.com/>
- Woodrow Wilson Rehabilitation Center (WWRC) <http://www.wwrc.net/>

Acknowledgments

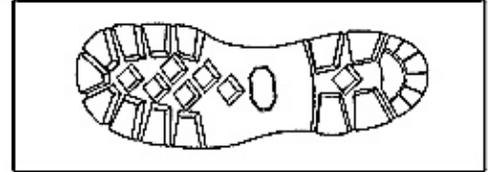
The authors would like to express their appreciation for inputs from: John Massale, Biological Systems Engineering and Jeremy Smith, Mechanical Engineering, at Virginia Tech. This fact sheet resulted from an Extension Project (project number 2006-41590-03436) supported by the Cooperative State, Research, Education, and Extension Service (CSREES) of U.S. Department of Agriculture.

APPENDIX A SHOES

Different types and styles are readily available in stores. One must recognize that all shoes sold in stores are not slip resistant. For example, shoes with rubber soles with treads will be more slip resistant than shoes with leather sole. Selecting the right kind of shoes particularly for seniors can make a big difference in preventing slips and falls.

When selecting shoes for the work place, one should consider the protection they can provide in addition to its slip resistance. The foot wear selected should be compatible with the type of work as well as the work surroundings. Shoes or boots worn when engaged in agricultural operations should have the following features:

- The soles and heels should be slip-resistant.
- The toe of the shoe should resist crushing injuries.
- The shoe should support the ankle.



The cleat-design is ideal on slippery surfaces because of the suction or squeezing action it can provide. The softer soles are better on slippery indoor surfaces. For outdoor uses, harder soles with more rugged cleats are preferred.

APPENDIX B LADDERS

A ladder is one of the simplest most easy-to-use tools in the construction industry. However, accident data show that more than 160,000 people make emergency-room visits annually due to ladder accidents alone. Misuse and abuse of ladders in the workplace by working men and women in America have been identified as the primary causes of these accidents. Most ladder accidents can be avoided with proper selection of ladders and by strictly adhering to ladder safety rules. The following are the general safety rules for all ladders:

- Read the manufacturer's instructions. Follow the guidelines that help you use ladders more safely and effectively.
- Make sure that the ladder being used is rated to carry the combined weight of the user and the material being installed.
- Choose the right ladder for the job. For example, if the ladder is to be used near a power line, use a wooden or fiberglass ladder to reduce the risk of electric shock.
- Before purchasing the ladder, make sure the ladder meets the safety standard. Always look for the UL mark.
- Inspect the ladder carefully before stepping on the first rung. Make sure that the ladder has been well maintained and the rungs are clean and all parts are intact. Never climb on a slippery or shaky ladder.
- Set the ladder correctly. When planting the base of any ladder, place all feet on a firm, level surface, not on rocks or boards. Make sure that the devices that hold the front and the back sections of a step ladder (spreaders) are completely open and locked before any weight is placed on the ladder.
- When using an extension ladder, do not place the ladder at a very steep angle.
- Always use a ladder that is tall enough for the job at hand. A large number of ladder accidents are the results of using a ladder that is too short.
- Do not carry weight while climbing a ladder. Use a tool belt or let someone hand the items to you.

- When climbing the ladder up and down, face the ladder and keep your body centered between both side rails.
- While up on a ladder, do not over reach. Make sure that your weight is evenly distributed.
- Move or close the ladder only after the user and equipment are off the ladder.
- Never use a ladder when under the influence of alcohol, on drugs, or medication, or in ill health.

For a more detailed listing of ladder safety rules, the readers are referred to:

<http://www.elcosh.org/en/document/163/d000170/ladder-safety.html>