

Older Adult Crash Prevention: Strategies that Work

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Abstract: Older adult drivers are at great risk for motor vehicle crashes that result in high rates of injury and death. More than 7,000 Americans 65 and older die in motor vehicle crashes each year and another 246,000 suffer nonfatal injuries. This article presents a review of the literature of older adult driver crash prevention. Specifically, the following questions are addressed: 1) What are reasons older adults stop driving? 2) Are alternative transportation programs safe and effective? 3) What are effective methods of older adult crash prevention? Health professionals should work with families of older adults to reduce older adult crashes and promote safe, reliable alternative transportation options.

Introduction

Currently, 12% of the US population is over age 65 years (Centers for Disease Control and Prevention [CDC], 2008). By 2030, the older adult population is expected to increase by more than 50% with one in five Americans over age 65 (CDC, 2008). A number of issues need to be addressed regarding an aging population, such as motor vehicle crashes among older adults and alternative transportation programs. Research indicates that older adults depend upon automobiles for transportation (CDC, 2000), and traffic safety statistics indicate that older drivers are at an increased risk for crashes that lead to injury and death. Drivers over the age of 65 years have higher crash death rates per mile than all other age groups except teen drivers (CDC, 2002). In fact, more than 7,000 Americans age 65 years and older die in motor vehicle crashes each year and another 246,000 suffer nonfatal injuries (CDC, 2002).

Currently, older adult drivers comprise 14% of driver fatalities, 14% of vehicle occupant fatalities,

and 20% of all pedestrian fatalities (Lyman et al. 2002; National Highway Transportation and Safety Association [NHTSA], 2005). Older adult drivers are also more likely to be involved in motor vehicle crashes during the day, close to home and with another vehicle, and on average, three of four crashes involving older adult drivers involve another car (NHTSA, 2006). In motor vehicle crashes, the older adult driver is found to be at fault in most cases (Young, 2001). Overall, older adult males are more likely than older adult females to be involved in a motor vehicle crash (Young, 2001), while Native Americans and African-Americans over the age of 65 are more likely than other races and ethnicities to die as a result of a motor vehicle crash (Stevens & Dellinger, 2002).

Previous research suggests older adult drivers are at risk for crashes due to physical disabilities, chronic medical problems, and cognitive impairment (Lyman, McGwin, & Sims, 2001). A multitude of additional factors increase the risk of automobile crashes among older adults including medical conditions, decreases in visual acuity, and

the engineering of roads and road signs (Cobb & Coughlin, 1997). Decreases in motor functioning are cited as an important reason many older adults cease driving. Slower reaction times and other age-related decreases can impair an elderly driver's ability to operate an automobile in a safe manner. Often, the elderly driver recognizes their own limitations and takes steps to reduce the risk of crashes by limiting driving (Dellinger et al., 2001).

Evidence that driving ability deteriorates with age has resulted in an increasing need to identify appropriate methods of driving assessment (Dulisse, 1997; Waller, 1991). Currently, identification of risky driving and intervention for older adult drivers remains difficult, so health professionals need to focus on older adult driving as an increasing health concern. Although there are programs focusing on older adult driving, a collaborative effort is necessary to address the needs of both driving and non-driving older adults.

As many older adults must limit or cease driving, community transportation programs are established to meet the transportation needs of older adults (Roper & Mulley, 1996). Many effective programs address a variety of components and often transport older adults to various locations including doctors' offices, senior centers, and grocery stores. However, there are significant limitations to most community programs. Most importantly, transportation is limited to daytime hours and weekday operations, significantly restricting older adult mobility (Roper et al., 1996).

Purpose

The purpose of this article is to explore the issues of older adult driving, crash prevention efforts, and alternative transportation options for those over 65 years of age. This article was developed

based on a comprehensive review of the literature, a comprehensive search of reputable online sources, and input from older adult health professionals. In addition, a special emphasis was placed on analyzing programs, program components, and program needs related to older adult driving. This paper provides a review of the literature pertaining to issues of older adult driving and will examine the following questions:

- 1) What are reasons older adults stop driving?
- 2) Are alternative transportation programs safe and effective?
- 3) What are effective methods of older adult crash prevention?

Reasons Older Adults Stop Driving

Age-related medical conditions and vision problems are the most common reasons older adults cease driving (Table 1) (CDC, 2002). Older adult drivers may experience decreases in perception and judgment processes, motor abilities, and visual acuity. General declines in vision and conditions such as cataracts create difficulties for the older adult driver and place them at increased risk for motor vehicle crashes. Additionally, falls within the previous year and general physical frailty increases the risk of crashes and related deaths and injuries among older drivers.

The following was identified as a typical chain of events regarding age-related changes in driving (CDC, 2000): 1) Physical and mental changes lead to reductions in skills needed for safe driving, 2) Age-related physical and mental changes lead to a reduction in driving (e.g. driving shorter distances, not driving at night) while also increasing the risk of crashes, 3) Reductions in driving lead to a reduction in senior mobility, and 4) Reductions in mobility lead to quality of life consequences, including reduced activity levels.

Many steps can be taken to prevent crashes related to medical and vision problems. First, states that mandate vision screenings have fewer

Table 1. Medical Conditions that Impair Driving
(Young, 2001)

Heart Disease
Alzheimer's Disease
Lung Disease
Parkinson's Disease
Stroke
Alcohol Abuse
Depression
Diabetes
Musculoskeletal Disorders (e.g. arthritis)
Vision disorders such as cataracts

fatal crashes among older adults than those states that do not require vision tests (NHTSA, 2002). Identifying older adults who may suffer from vision problems can contribute to reduced motor vehicle crashes. Next, screening and testing programs that assess older adults' driving skills can detect any cognitive or behavioral problems that make drivers vulnerable to crashes (Dissanayake et al., 2002). Also, screening programs help older drivers assess their own skills and make decisions regarding driving behavior.

As stated previously, older adults tend to limit driving because of age-related decreases in driving performance. It is important to note that older adults often recognize the need to stop driving on their own. However, it is usually family members, caregivers, or physicians who insist that older adults give up driving altogether. Older adults who stop driving share one or more of the following characteristics (Johnson, 2002):

- They have spouses or significant others who drive.
- They live with children or have children in the area.
- They have sufficient financial resources to purchase transportation.
- They are heavily involved with a religious institution.
- They live in communities with viable non-driving transportation options.
- They are physically able to use public transportation.
- They have reduced their activities and their expectations to fit their present circumstances.

What It Means to Reduce or Stop Driving

Often, older adults are dependent on driving as a means of transportation (Cobb, 1998). As such, the end of driving may affect personal independence for most older adults (Johnson, 2002). The majority of older adults expect decreases in overall quality of life as they will be dependent on others for transportation, and, most report lower levels of happiness after they stop driving. Additionally, driving cessation can impact one's sense of personal identity. Older drivers feel their driver's license is an aspect of their personal identity as driving gives older adults a sense of personal freedom.

Once older adults stop driving, they spend a great deal of time planning how they will get around (Johnson, 2002). Non-driving older adults need to schedule when they go, where they will go, and how long it will take once they get to their destination. Furthermore, depending on others adds to an older adults' uncertainty (e.g. when to schedule doctors appointments) and increases their waiting time. All of these factors may impact older adults' quality of life.

Importance of Physicians and Caregivers

Family members, caregivers, and primary care physicians play an important role in an older adult's decision to stop driving. Studies have

found that 20% of drivers who fail skill assessment tests refuse to stop driving (McKnight & Urquijo, 1993). Physicians, family members, and caregivers can be enlisted to help convince unsafe drivers to give up driving. Family members and caregivers can also provide transportation options to older adults. Therefore, it is imperative for these key individuals to be knowledgeable about older adult crash prevention as well as alternative transportation programs.

Research suggests that physicians seek out information concerning older adult drivers (NHTSA, 1999) through motor vehicle departments, professional journals, professional societies, continuing education, and conferences. However, they are less likely to seek out information from state and local health departments. Since health departments are valuable sources of information, targeting physicians with information is important because they do not utilize these organizations. Most physicians need additional information regarding medical conditions and medications that impair driving. Physicians should be encouraged to take driving histories of older adult drivers. Questions should include incidences of getting lost, crashes, traffic tickets, recent changes in driving behavior, and time of day the older adult is most likely to drive. The primary care physician should be encouraged to look for attention, memory, and reasoning difficulties.

In addition, caregivers and family members may identify behavioral impairments or functional limitations that can impede driving abilities in older adults (NHTSA, 1999). However, research suggests that, the average family member does not seek help for older adult drivers until one year after driving problems are recognized (National Council on Aging, 2003). Targeting these groups with educational campaigns is important; families need to know action steps to take if a problem occurs with an older adult

driver. An in-car assessment by a driver rehabilitation specialist or professional driving instructor can determine the existence of a problem (LePore, 2000). Also, an Unsafe Driving Checklist (Table 2) has been developed for families who suspect a problem with an older driver (Carr, 2000). Caregivers and family members may be reached in a variety of ways including posters, brochures, websites, speaking engagements, local television and radio programs, and newspaper articles. Also, targeting individuals who work with caregivers and family members may be helpful. These include apartment managers (especially at older adult only apartments), church groups, and hospital discharge planners.

Educating Older Adults Regarding Crash Prevention

Educating older adults regarding crash prevention should be a comprehensive effort focusing on knowledge, attitudes, and skills. Older adults need to be aware of older adult crashes so they may realize the importance of the issue and contribute to prevention efforts. Many older adults feel unfairly targeted by other drivers and health care providers. As a result, statistics and an overview of older adult driving may be necessary to emphasize the significance of the problem. Also, older adults feel they cannot compete with younger drivers. Working on confidence and encouraging safety may help them become better drivers. Research indicates that more emphasis needs to be placed on maintaining driving skills in older adults (American Academy of Family Physicians, 2000). Improving driving skills can decrease the likelihood of crashes simply because the older adult driver has the skills to remain safe on the road. Ultimately, targeting knowledge, attitudes, and skills can increase older adult safety while driving. The following are specific strategies to increase these three items:

Table 2. Older Adult Frequency of Safe Driving Assessment Tool (Unsafe Driving Checklist)^a

How often does the older adult driver...	Always (100% of time)	Most of time (51% - 99% of time)	Half of time (50% of time)	Sometimes (1% - 49% of time)	Never (0% of time)
Obey stop signs and traffic lights?					
Yield to right-of-way?					
Obey other traffic signs?					
Drive too slowly (driving under the speed limit)?					
Get distracted while driving?					
Get lost while driving?					
Drive aggressively?					
Stop inappropriately?					
Get honked at by other drivers?					
Nearly collide with other vehicles or pedestrians?					
Pay attention to other vehicles, bicyclists, pedestrians, hazards?					
Remain in the correct lane when turning?					
Use turn signals when turning or changing lanes?					
Check the rearview mirror before changing lanes?					
Remain in the correct lane when driving straight?					
Have a passenger comment about near collisions, failure to obey signs/ traffic lights or unsafe driving?					
Since age 65, how many times has the older adult driver...	Number of Times				
Been involved in a motor vehicle crash?	1	2	3	4	5 or more
Been ticketed for a moving violation?	1	2	3	4	5 or more

^a Note: Table modified from Carr, D. B. (2000). The older adult driver. American Family Physician, (January), 25-28.

Knowledge

- Older adults are at higher risk for crashes
- Certain medical and physical conditions place older adults at risk for crashes
- Programs are available to increase driving-related skills
- Alternative transportation is available to meet transportation needs

Attitudes

- Make a personal commitment to safety
- Have confidence in the ability to drive safely
- Have confidence in the decision to stop driving
- Be willing to use alternative transportation

Skills

- Test driving skills with occupational therapists or other health professionals
- Communicate with family members and primary care physician any driving-related concerns
- Use alternative transportation if necessary
- Initiate community action to support alternative transportation for older adults

Older Adult Crash Prevention Programs

Effective crash prevention programs focus on the multiple needs of older adult drivers. Many programs, including the Elder Mobility Project, have education campaigns to educate older adults, community members, agencies, and health care providers regarding crash prevention (Johnson, 2002). Targeting each group through brochures, pamphlets, newspaper articles, and television and radio announcements are effective methods of conveying many crash prevention messages. Educational campaigns focus on promoting facts about older adult drivers while also discrediting myths surrounding older adult drivers. In view of the fact that older adult drivers believe younger drivers are critical of their driving, it is important to emphasize overall safety and prevention. Next, driver assessments may also be available to test the skills of older drivers. Occupational therapists, driving schools, and driver rehabilitation specialists are all employed to assess older adults' skills behind the

wheel. Mobility management specialists also provide counseling to those who must stop driving and connect them with alternative transportation. Overall, the goals of crash prevention programs should include: 1) Fewer crashes involving older adult drivers, 2) overall safer roads, and 3) less criticism for older adult drivers (Erie County Department of Senior Services, 2003).

One such program is AARP's Driver Safety Program (American Association of Retired Persons [AARP], 2009a). This program works to build older adult driving confidence while also working on defensive driving skills. The Driver Safety Program acknowledges the capabilities of older drivers and does not approach older adults as drivers with diminished capacities for safe driving. Available nationwide, this program charges a small fee; however, reduced insurance rates and other incentives motivate older adults to take the course (AARP, 2009b). Older adult health professionals should work to educate older adults regarding the availability of such programs.

One aspect of crash prevention programs relates to vehicle design and road engineering (Cobb & Coughlin, 1997). Due to vision and motor control problems, some older adults may benefit from hand controls and larger mirrors on their own motor vehicles. Crash prevention programs attempt to identify these drivers and link them with resources to make the adjustments. The majority of adjustments require older adult drivers to pay a fee for these changes; therefore, such changes may be unavailable to low income older adults. Additionally, crash prevention programs advocate for larger print on road signs (Roper & Mulley, 1996). Speaking with road engineers and highway safety specialists encourages them to consider older adult drivers when designing roadways. Increasing awareness concerning vehicle and road design and improving those areas may help prevent older adult crashes in the future. As the population

ages, vehicle design and road engineering will be important factors in older adult crash prevention strategies.

Transportation Programs for Older Adults

Non-driving adults tend to rely on family and friends for transportation (CDC, 2000). As a result, non-drivers take fewer, shorter trips that are convenient for others. On average, non-drivers take only two trips per week compared to six trips per week for older adult drivers. Not surprisingly, research indicates that transportation is an increasing concern for many older adults and serves as a potential source of anxiety (Coughlin, 2001). Additionally, older adults continue to drive as long as possible because they are unaware of alternative means of transportation, do not believe it is a viable transportation option, or are afraid to use alternative transportation. However, many older adults do not want to depend on family and friends to meet their transportation needs. Therefore, it is important for existing programs to publicize alternative transportation options for older adults while also working to change pre-existing negative perceptions some older adults hold regarding these programs.

Effective transportation programs have multiple components that meet the needs of non-driving older adults. In a review of transportation programs for older adults, five essential criteria were identified by the AAA Foundation for Traffic Safety (2001): availability, accessibility, acceptability, affordability, and adaptability. Older adults tend to seek out transportation options that fulfill each component (Kerschner, & Aizenberg, 1999). It is critical for program coordinators to understand each concept and strive to meet each component to ensure effectiveness and program success.

Availability refers to the timing of transportation services and its ease of use for older adults. Approximately half of programs provide service

only during daytime hours on weekdays. Accessibility concerns the ability of seniors to reach and use these services on a regular basis. Of the programs, approximately 80% provide door-to-door services for older adults. This allows disabled older adults to utilize these programs, usually with the help of the driver or an escort. Acceptability refers to the safety of transportation, the conditions of the vehicles, and the drivers who provide transportation. Most transportation programs check their vehicles on a regular basis and test the driver for safety. Vans, buses, and in some cases, cars are used as transportation vehicles. Interestingly, many programs use vans because seniors enjoy socializing with other passengers during their transport and report greater satisfaction with their transportation. Affordability refers to the cost of transportation to older adults using the services. Most programs are free to older adults whereas others charge a nominal fee or accept donations. Adaptability concerns the accessibility of transportation to all older adults, especially those with special needs. Disabled older adults need vehicles they can get into and out of safely and effectively. If all of these features are included in an older adult transportation program, transportation needs among older adults can be met safely and effectively.

Currently, there are several limitations to alternative transportation services. Scheduling and hours of operation are two limitations. Many of these programs have same day service; however, others require appointments up to two weeks in advance. This could be tedious for the older adult to schedule daily activities weeks in advance. As stated previously, hours of operation are Monday through Friday during daytime hours. This reduces the non-driving older adult to daytime hours during the week.

Older adults who use alternative transportation programs report high satisfaction with their transportation (AAA Foundation for Traffic

Safety, 2001). On average, older adults who utilize alternative transportation are more likely to live alone, to be female, and to have low-income levels. These older adults are also less likely to own a car. Other older adults may not be aware of alternative transportation or may believe they are not eligible for such a program.

Public transportation is one alternative for older adults. However, many are afraid to use public transportation, and there is a need for training older adults to use public transportation (Adler & Rottunda, 2006; Stepaniuk et al., 2008). Some programs use volunteers to escort older adults as they begin to use public transportation (AAA Foundation for Traffic Safety, 2001). Older adults have responded well to such programs, and they are particularly responsive to programs featuring non-driving older adults and retired policemen as escorts. It is important to increase older adults' confidence in using public transportation. Having someone to show them how to use this type of transportation increases the likelihood that they will use it.

Regularly Evaluate the Effectiveness of Crash Prevention Programs

Many crash prevention and alternative transportation programs remain unevaluated. It is imperative to evaluate any programs developed for older adult drivers. As many programs are not evaluated, there is a significant deficit in the literature regarding the effectiveness of such programs. Once an evaluation is conducted, the results should be published and presented to others. It is vital that other older adult specialists realize what works best for alternative transportation programs as well as older adult crash prevention.

Conclusion

Older adult crash prevention should primarily target older adults, family members, caregivers,

and physicians. Each group plays an essential role in identifying older adults who are at increased risk for crashes while also helping to keep competent older drivers safe. All of these groups must work together to prevent older adult crashes.

Overall, it is important to target both groups of older adults in crash prevention. First, adults who should no longer drive need to be connected to viable alternative transportation. It is important for health educators and other health professionals to act as a resource linking older adults to existing services. Publicizing existing services is important because many older adults do not realize they exist. According to the literature, older adults are best targeted at doctors' offices, churches, hospitals, and senior centers. Offering brochures, pamphlets, or speaking engagements at these sites may reach a large number of older adults. Next, older adults who no longer drive experience many personal challenges that should not be overlooked by health professionals. Speaking with other older adult non-drivers or professional counselors is often needed to help the older adult cope with the transition to non-driving. Establishing a support group for older adult drivers may be an important aspect of any program involving older adults and driving. Regarding older adult drivers, this group often feels "singled out" by health professionals and others. Education programs should acknowledge this fact and reassure older adult drivers that their safety is most important. In addition, older adult drivers feel defensive while driving and lack confidence in their ability to drive on today's roadways (e.g. speeding drivers, larger vehicles, cell phone-using drivers). Teaching defensive-driving skills as well as other skills needed for driving is imperative. Contracting with occupational therapists or professional driving schools may be necessary for this aspect of the program. If older adults feel confident in their skills and have the necessary skills for safe driving, crashes can be prevented.

A program that targets the knowledge, attitudes, and skills of older adult drivers will encourage safe driving behavior and ultimately prevent crashes. Finally, many older adult crash prevention programs are not evaluated for their effectiveness. It is essential to evaluate any programs that may be established so the most valuable programming can be utilized.

Additionally, family members, caregivers, and physicians need to be targeted with educational campaigns. These groups need general information relating to older adult drivers as well as knowledge of problem-solving resources. Since each works closely with an older adult, they are vital in identifying problem driving; however, they currently lack the knowledge to determine if an older adult needs to stop driving. These groups can collaborate with health professionals to advocate for older adults and convince the at risk older adult drivers to stop driving.

Based on these findings, the following are recommendations:

- 1) Educate older adult drivers concerning motor vehicle crashes and crash prevention
- 2) Screen older adults for decreases in driving-related skills
- 3) Establish programs to enhance older adult driving-related skills including defensive driving techniques while also enhancing knowledge and improving attitudes
- 4) Advocate for increases in older adult transportation options
- 5) Involve family members, physicians, and caregivers in any program
- 6) Communicate alternative transportation options to older adults, family members, and physicians
- 7) Evaluate the effectiveness of prevention programs
- 8) Publicize community resources including education programs, transportation options, and informational sources to older adults, family members, and physicians
- 9) Collaborations among organizations and local senior services should promote programs and alternative transportation to older adults

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