

ANTICIPATORY GUIDANCE PROVISION RELATED TO DRIVING  
SAFETY/CESSATION FOR OLDER DRIVERS

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**Title**

Health Care Provider Anticipatory Guidance Provision Related to  
Driving Safety/Cessation for Older Drivers

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The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

**DOCTOR OF PHILOSOPHY**

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## ABSTRACT

Increasing numbers of older adults continue to drive. Aging-related physical and cognitive changes can impact driving ability. Health care providers (HCPs) are ideally placed in society to provide mobility counseling to older drivers. This research explored the frequency of HCP mobility counseling provision to older drivers; HCP demographic and practice predictors of mobility counseling provision; and rural-urban differences in HCP mobility counseling provision, HCP perceptions of mobility counseling provision, and HCP barriers to mobility counseling provision. Data were collected by surveying HCPs in several upper Midwest states. Two manuscripts were produced as a result of this research. The first article focuses on rural-urban differences in HCP mobility counseling. It was found that rural HCPs were less likely than urban HCPs to provide mobility counseling to patients aged 75 or older. Additionally, rural HCPs were less likely than urban HCPs to feel there are adequate resources, less likely to refer patients if they had questions related to driving issues, and less likely to know where to refer older drivers for driving fitness assessments. The second article focused on HCP demographic and practice predictors of mobility counseling provision. It was found that HCP predictors of mobility counseling provision differed by patient age. HCPs that had personal experience with a motor vehicle crash more often provided mobility counseling to patients aged 65 to 74. For older patients (aged 75 or older), HCPs who practice in rural areas, older HCPs, and HCPs with greater proportions of patients aged 65 or older were more likely to provide mobility counseling. This study is important in laying the groundwork for future research focusing on mobility counseling and older drivers, and emphasizing the significant role of HCPs in this process.

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## INTRODUCTION

The majority of all trips older adults take are in private vehicles, usually as drivers (Jette & Branch, 1992; Kostyniuk & Shope 2003; Pucher & Renne, 2003; Rosenbloom, 2004). In fact, the use of public transit has declined and constitutes less than two percent of trips taken by older adults in the United States (Burkhardt & McGavock, 2002; Pucher & Renne, 2003). Older adults are significantly less likely than the younger population to use public transportation (Zwald, Hipp, Corseuil, & Dodson, 2014). More than two-thirds of adults in the United States aged 75 or older live in suburbs or smaller cities and towns which are designed more for private vehicle use, and are less likely to have public transportation options (Staplin, Lococo, Gish, & Decina, 2003). Privately owned vehicles provide many things to older adults which public transportation options cannot, including mobility, independence, convenience, and security (Glasgow & Blakely, 2000; Kostyniuk & Shope, 2003; Silverstein, 2008). While many driving-related benefits exist for older adults, reasons remain for increased research related to driving cessation.

In 2004, 13% of licensed drivers were aged 65 or older (Potts et al., 2004). Due to the rapidly aging population (U.S. Census Bureau, 2011; U.S. Census Bureau, 2012) by 2030 nearly one-quarter of licensed drivers will be aged 65 or older (Potts et al., 2004). Older adults drive shorter distances and less frequently than other populations, yet an increasing number choose to remain licensed drivers longer and drive more miles annually than in the past (Lyman, Ferguson, Braver, & Williams, 2002). This is concerning for two main reasons. First, age-related physical and cognitive changes can affect driving ability (Anstey, Wood, Lord, & Walker, 2005; Carr, Duchek, Meuser, & Morris, 2006a; Hoffman, McDown, Atchley, & Dubinsky, 2005; Ragland, Satariano, & MacLeod, 2004; Tracy, 2007). Second, as adults age, their likelihood of being involved in a motor vehicle crash which causes injury or death to themselves or others increases



(Tefft, 2008), with older adults making up 17% of the traffic fatalities in the United States, but only 15% of licensed drivers (Federal Highway Administration [FHA], 2009). Starting at approximately age 65, drivers experience an increase in their risk of causing harm to others on the road, with a dramatic increase occurring after age 75 (Tefft, 2008). According to Tefft (2008), older drivers pose an elevated risk of injury to their passengers, other motor vehicle occupants, and pedestrians than younger drivers. In the United States, the overall motor vehicle fatality rate is 2 per 1,000 crashes (Potts et al., 2004). However, for adults aged 65 to 74, the rate increases to 3.2 per 1,000, for adults aged 75 to 84 the rate increases to 5.3 per 1,000 crashes, and for the oldest old (85+) the rate is 8.6 per 1,000 crashes (Potts et al., 2004). Newgard (2008) found that the odds of being seriously injured in a motor vehicle crash increases exponentially starting at age 60, with drivers aged 60-69 being 3.78 times more likely than drivers aged 15-29 to be seriously injured in a motor vehicle crash, drivers aged 70-79 being 6.16 times more likely, and drivers aged 80 or older nearly 6 times more likely.

As a result of aging-related changes, and the increasing risk to themselves and others as they continue to drive, at some point in their lives older adults will need to start planning for the time when they need to reduce their driving or to stop driving altogether, also known as driving cessation. Health care providers (HCPs), including physicians, nurse practitioners, and physician assistants, are uniquely placed in society not only to monitor aging-related changes and medical issues which may affect an older individual's driving ability, but also to provide information to their patients related to these issues, in the form of anticipatory guidance, or mobility counseling (Betz, Jones, Petroff, & Schwartz, 2013a; Betz, Schwartz, Valley, & Lowenstein, 2012).

Most research related to driving cessation focuses on the specific situation in which the older driver is told they must stop driving and on assessing medical fitness to drive. Very little

research has been conducted on the activities which should occur prior to driving cessation, including pre-counseling related to providing information to older drivers about aging-related driving expectations. Additionally, no known research has been conducted on predictors of driving cessation/safety-related anticipatory guidance provision, including HCP demographic characteristics, practice characteristics, and crash exposure. Moreover, no research has examined differences in driving safety/cessation-related anticipatory guidance rates by patient age. Given the potential driving risks for older adults, the impacts of driving cessation, and the continued growth of the older population, further study of these issues is warranted.

In this dissertation, two key research questions were explored: 1) What demographic characteristics and clinic practice characteristics are predictors of HCP anticipatory counseling provision to older adults related to driving safety/cessation?; and 2) Are there rural-urban differences in the following: a. HCP driving safety/cessation-related anticipatory guidance provision; b. perceptions of providing mobility counseling related to driving safety; and c. perceived barriers to providing mobility counseling related to driving safety?

The next section will provide a review of the literature focusing on aging-related physical and cognitive changes that affect driving ability, overall consequences of driving cessation, and anticipatory guidance as provided by physicians, including effectiveness of anticipatory guidance, barriers to providing this type of guidance, benefits of earlier discussions related to driving cessation, and receptivity of older adults to driving-related anticipatory guidance in a healthcare setting.

## **REVIEW OF THE LITERATURE**

This section contains a review of aging-related physical and cognitive changes which affect driving ability, overall consequences of driving cessation, and anticipatory guidance as provided by health care providers, including effectiveness of anticipatory guidance, barriers to providing this type of guidance, benefits of earlier discussions related to driving cessation, and receptivity of older adults to driving-related anticipatory guidance in a healthcare setting.

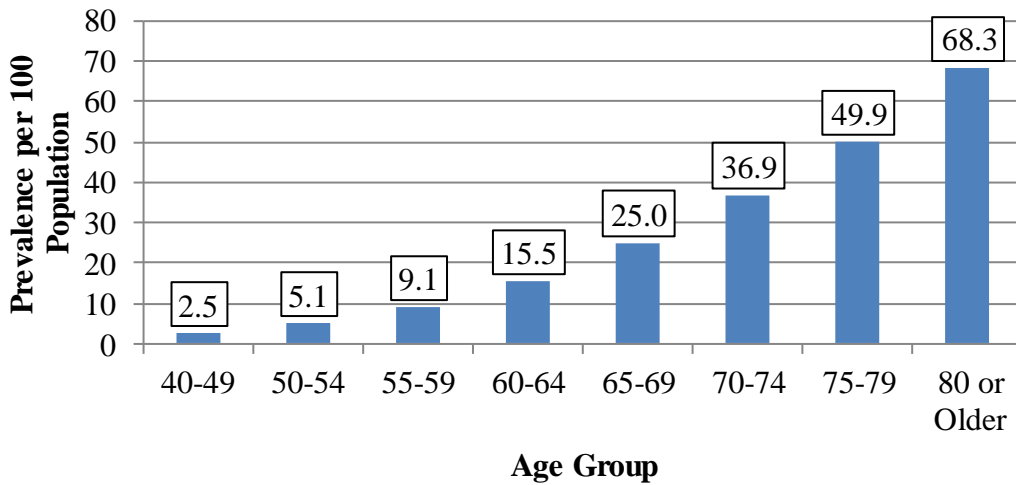
### **Aging-related Changes which Influence Driving**

Aging is strongly correlated with an increase in the frequency of chronic and acute diseases and conditions which have “adverse effects on a person’s functioning in general and driving in particular” (Meyer, 2004, p. 256). In addition, the aging process itself produces changes in basic functions which can affect driving including sensory, cognitive, and motor changes (Meyer, 2004). Old age is often listed as a risk factor for driving cessation (Campbell, Bush & Hale, 1993; Carr, Flood, Steger-May, Schechtman, & Binder, 2006b; Marottoli et al., 2000). Driving frequency tends to decline with increasing age (Ragland et al., 2004). However, age-related driving cessation is not a stand-alone reason for driving retirement instead, it is often associated with age-related medical conditions or functional limitations (Ragland et al., 2004).

Because about 90% of information deciphered by a driver is visual (Malfetti & Winter, 1986), impaired vision is a prevalent issue related to driving ability (Carr et al., 2006b; Ragland et al., 2004). Visual impairments associated with the aging process greatly influence an older adult’s driving ability (Shaheen & Niemeier, 2001), and in addition to normal age-related vision changes, include cataract, glaucoma, diabetic retinopathy, and macular degeneration (Kline & Scialfa, 1997). Normal aging-related vision changes such as yellowing and cloudiness of the lens, decreasing pupil size, and change in macular pigment lead to decreases in sensitivity to

light, an increase in the sensitivity to glare, and a reduction in visual acuity (Wood, 2002). These vision changes can result in a decreased ability to see road signs, other vehicles, and even pedestrians (Wood, 2002), and a decreased capability to drive confidently in certain situations, such as at night (Charlton, et al., 2006). Prevalence of visual impairments which affect driving ability increases with age, which, as a result of the continued increase in the population aged 65 and older, will result in a dramatic increase in older drivers on the road with visual impairments dire enough to affect driving ability (Eye Diseases Prevalence Research Group, 2004). The rate of vision impairments is not consistent across all age groups for those aged 65 or older. For example, as shown in Figure 1, prevalence of cataracts in the population increases dramatically with increasing age, with those aged 80 or older having the largest prevalence of cataracts. Charlton et al. (2004) found that drivers with cataracts were at a higher risk of being involved in a motor vehicle crash compared to other vision impairments. Additionally, rates of visual acuity issues also increase with age, with adults aged 80 or older being 87 times as likely as adults aged 40-49 to have visual acuity issues (Eye Diseases Prevalence Research Group, 2004). It should be noted that some visual impairments, such as cataracts, can be remedied with surgery, resulting in an extension in the amount of time adults can remain independent drivers (Desapriya, Subzwari, Scime-Beltrano, Samayawardhena, & Pike, 2010).

While there is a portion of the “young old” (younger than 80) whose driving may be affected by vision impairments, for the “old old” (those aged 80 or older) the concern related to driving issues and vision is greater.



*Figure 1. Prevalence of Cataracts by Age*  
 Source: Eye Diseases Prevalence Research Group, 2004

Because so much of driving involves physical movements with either hands/arms, or feet/legs, it is not surprising aging-related physical impairments will also have an impact on driving ability. “The aging process is accompanied by a loss in muscle mass and a reduction in muscle cells, connective tissue, and muscle tissue fluids” (Shaheen & Niemeier, 2001, p. 161). Reduction in muscle strength associated with aging, especially as related to the knee and ankle muscles, has been linked to decreased driving coordination and control (Tracy & Enoka, 2002; Tracy, 2007). Having enough strength to depress foot pedals is vital to maintaining control, and “reduced muscle strength and associated fatigue resulting from extended driving periods may lead to relatively less ability to effectively control the pedals, with consequent reduced driving facility” (Lacherez, Wood, Anstey, & Lord, 2014). Reduced flexibility, especially head and neck flexibility, has also been associated with an increase in crashes (Marottoli et al., 1998). Arthritis can also affect driving ability. Osteoarthritis is a very common joint disorder and a common source of pain and disability in older adults, the prevalence of which increases with age (Anderson & Loeser, 2010; Thomas, Peat, Harris, Wilkie, & Croft, 2004). According to Thomas

et al. (2004), daily life challenges resulting from osteoarthritis-related pain increases with age. For example, 39.4% of females and 33.4% of males aged 50-59 reported pain interference related to daily life, and this increases to 50.2% of females and 40.8% of males aged 80 or older (Figure 2). Murray-Leslie (1991) found chronic pain associated with arthritis among arthritic drivers is one of the largest obstacles to driving. Driving-related limitations for persons with arthritis include, but are not limited to, making shoulder checks, holding the steering wheel tightly, and making turns (Cranney et al., 2005).

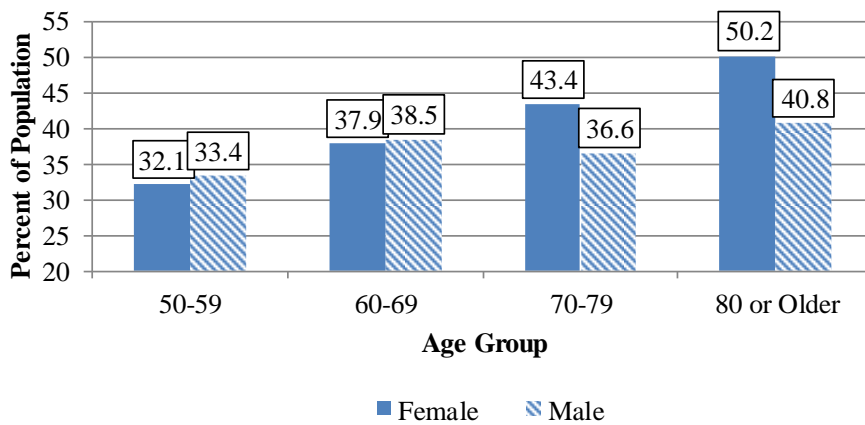


Figure 2. Prevalence of Pain Interference by Age and Gender

Source: Thomas et al., 2004

Declines in cognitive skills, such as short-term memory, attention, orientation, judgment and problem-solving skills, and visuospatial skills, are associated with aging, and have been found to affect driving abilities (Anstey & Low, 2004; Bixby et al., 2007; Carr et al., 2006a). Declining information processing speed may make it challenging for older adults to navigate through difficult traffic scenarios (Anstey et al., 2005). As much of the driving process involves the ability to make quick decisions related to surrounding traffic conditions and route planning, declines in judgment and problem-solving skills also affect the ability of older adults to successfully drive (Anstey et al., 2005).

Anstey, Windsor, Luszcz, and Andrews (2006) conducted the first longitudinal study on cognitive performance and driving status. They conducted annual telephone interviews of nearly 1,500 participants aged 70 or older over a five year period, and found non-drivers were more likely to be cognitively impaired. Specifically, participant performance on several cognitive measures, such as poor symbol recall, poor processing speed, immediate recall, and symbol recall, were the strongest predictors of driving cessation occurring within the five year period. Poor verbal reasoning was also a strong predictor of driving cessation. Ackerman, Edwards, Ross, Ball, and Lunsman (2008) found similar results in a study which followed participants over a three year period, as did Edwards, Bart, O'Connor, and Cissell (2010) in a longitudinal study covering ten years.

Other age-related conditions, such as aging-related cognitive decline, dementia, and Alzheimer's disease, affect driving ability in older adults. While dementia has been found to be prevalent in approximately 6.5% of the overall population in North America, dementia has been found to increase "exponentially" with age, essentially doubling with each 5.5 year increase in age (Figure 3) (Prince et al., 2013). Older drivers with dementia are at least twice as likely as those without dementia to be involved in a motor vehicle crash (Carr et al., 2006a). In studies using driving simulation, drivers with Alzheimer's disease perform worse than drivers who do not have dementia (Freund, Gravenstein, Ferris, & Shaheen, 2002). Also, drivers with Alzheimer's disease are more likely to veer off the road, drive slower than the posted speed limit, use less pressure when trying to brake, and make slower left turns (Cox, Quillan, Thorndike, Kovatchev, & Hanna, 1998). Because the prevalence and incidence of dementia increases significantly from 65 to 85 years of age, cognitive-related driving issues will become

increasingly common as the population over age 65 continues to increase (Herrmann et al., 2006; Jellinger & Atterns, 2010).

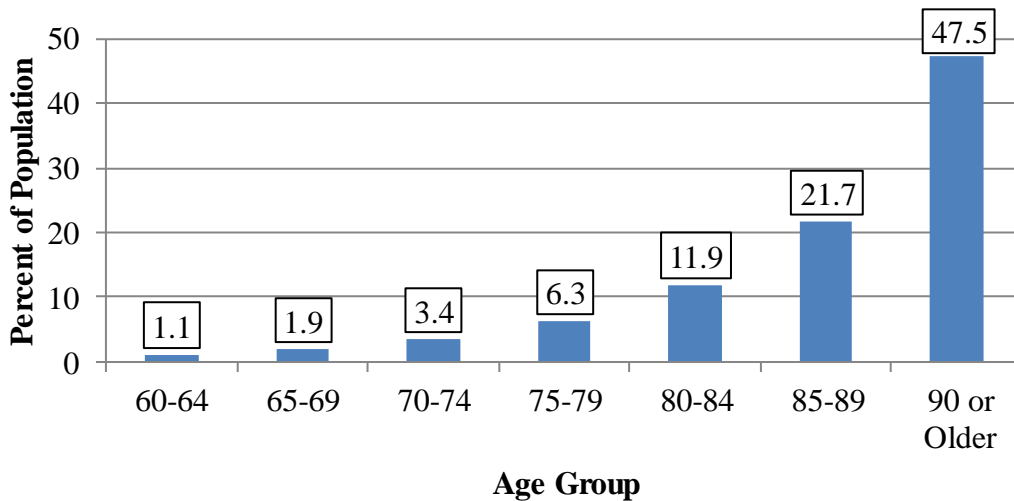


Figure 3. Prevalence of Dementia by Age

Source: Prince et al., 2013

### Consequences of Driving Cessation

More than half of non-drivers aged 65 or older do not leave their home on a daily basis, compared to less than 20% of drivers from this age group (Bailey, 2004; Mattson, 2012).

Marottoli et al. (2000) found driving cessation often leads to a decrease in activities outside of the home, even after controlling for sociodemographic and several health-related factors, including cognitive impairment, vision problems, and number of chronic conditions. Evidence shows a direct connection between out-of-home activity and health status, wellbeing, physical health, and overall mortality in old age (Duke, Leventhal, Brownlee, & Leventhal, 2002; Everard, Lach, Fisher, & Baum, 2000; Marottoli, et al., 2000; Menec, 2003; Rousseau & Vallerand, 2008). What cannot be discerned from the research is the causality: does driving cessation lead to decreased health status, wellbeing, physical health and mortality, or does decreased health status, wellbeing, and declines in physical health lead to driving cessation?



As a result of discontinuing driving, older adults may experience increased loneliness and isolation (Curl, Stowe, Cooney, & Proulx, 2013). It is difficult for non-drivers to maintain essential activities, including, but not limited to, physicians' appointments and grocery shopping (Harrison & Ragland, 2003). Non-drivers make approximately 65% fewer trips for purposes outside of running errands, such as for social or family purposes. According to a focus group participant, "your vehicle is your magic carpet ride to getting out there in the world. And without it, you're kind of imprisoned in your own home" (Rudman, Friedland, Chipman, & Sciortino, 2006, p. 69). Mezuk and Rebok (2008) found older adults who discontinued driving decreased their social integration, as measured by the number of friends they had. They concluded driving cessation directly affects social interaction through the restriction of participation in social events. Curl et al. (2013) found similar results in their study of data from the Health and Retirement Study, a nationally representative study of community-dwelling adults aged 50 or older. They found adults aged 65 or older who stopped driving had lower rates of formal and informal volunteering, paid employment, and social engagement in general as compared to those adults aged 65 or older who continued to drive (Curl et al., 2013).

Increased levels of isolation and decreased social interconnectedness due to driving cessation are associated with many adverse health outcomes. Negative psychological impacts have been found to be associated with driving cessation, the most debilitating of which is depression. Windsor, Anstey, Butterworth, Luszcz, and Andrews (2007) found higher rates of depressive symptoms for drivers who discontinued driving as compared to those who continued driving, even after controlling for sociodemographic characteristics and self-rated health. Fonda, Wallace, and Herzog (2001) and Ragland et al. (2005) also found a relationship between driving cessation and depressive symptoms. Fonda et al. (2001) concluded driving cessation ultimately

signifies “the attainment of old age and its stigma of dependency and/or the constriction of access to necessary and recreational activities” (p. S349). Edwards, Lunsman, Perkins, Rebok, and Roth (2009) found discontinuation of driving for older drivers is related to decreases in physical and social functioning. Several studies have found former drivers have poorer self-rated health than current drivers, and are nearly five times more likely to enter long-term care facilities (Anstey et al., 2006; Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001; Freeman, Gange, Munoz, & West, 2006; Siren, Hakamies-Blomqvist, & Lindeman, 2004). Edwards, Perkins, Ross, and Reynolds (2009) found non-drivers were four to six times more likely to die within three years of their study as compared to drivers, concluding driving status impacts mortality risk.

The literature in this section suggests both that changes in health status affect older adults’ decisions to stop driving, and that driving cessation is associated with declines in health for older adults. Edwards et al. (2009) attempted to isolate this distinction in a longitudinal study of community-dwelling older drivers. They admit to the impossibility of conducting a study that randomizes older drivers into different categories of driving status, which leads to the difficulty in determining a causal relationship between driving status and health. However, in their study, older adults who showed a negative health trajectory prior to driving cessation showed a significantly greater drop in physical health following driving cessation than was indicated by the health trajectory subsequent to stopping driving. In other words, health declined at a faster rate following driving cessation. As this was one of the first studies to attempt to tease apart the distinction between health trajectory timing and driving cessation, future research should focus on expanding on this work.

As a result of the negative consequences related to driving cessation, many older adults may be reluctant to bring up driving-related issues to their physicians (Bogner, Straton, Gallo,

Rebok, & Keyl, 2004; Friedland, Rudman, Chipman, & Steen, 2006; Jang et al., 2007; Miller & Morley, 1993). In addition, physicians may be reluctant to negatively affect the relationship with their patient by bringing up the topic (Bogner et al., 2004; Friedland et al., 2006; Jang et al., 2007; Miller & Morley, 1993). However, HCPs are uniquely positioned in society to provide information related to driving safety and cessation to older adults. The next section will describe the importance of the physicians' role in driving cessation counseling, also known as anticipatory guidance or mobility counseling, as related to driving cessation.

### **Physicians, Anticipatory Guidance, and Driving Cessation**

Physicians, and other HCPs, are ideally placed in society to monitor medical factors which can affect an older adult's ability to drive, and to provide advice and counseling to older adults related to these driving issues in the form of anticipatory guidance. While older drivers have been referred to other sources for measuring fitness to drive, such as occupational therapists (Stephens et al., 2004), these other sources have not been used as frequently as HCPs as sources of information related to aging-related changes which may affect driving ability for older drivers (Wang & Carr, 2004; Molnar, Byszewski, Marshall, & Man-Son-Hing, 2005). HCPs are an ideal source of information related to driving safety/cessation, and have played a large role in this process for several reasons: they are a trusted source of information (Betz et al., 2012), they are knowledgeable about aging-related physical and cognitive changes which may affect driving ability (Hogan, 2005), and they have responsibilities to the public's overall health and safety (Gruen, Pearson, & Brennan, 2004).

Historically, physicians have provided anticipatory guidance to parents of children at pediatric well-child visits (Kuo, Frick, & Minkovitz, 2011; Nelson, Wissow, & Cheng, 2003; Norlin, Crawford, Bell, Sheng, & Stein, 2011). Much of the information provided at these visits

focuses on injury prevention topics, such as child passenger safety, water safety, firearm safety, poisoning prevention, and burn prevention (Durbin, 2011; Gardner, 2007; Lee & Thompson, 2007; Sege, Hatmaker-Flanigan, De Vos, Levin-Goodman, & Spivak, 2006; Wilkerson, Northington, & Fisher, 2005). Anticipatory guidance in general is defined as “information that helps families, and individuals, prepare for expected physical and behavioral changes” (Betz et al., 2013a, p. 1577). It is distinctly different from counseling, as it provides proactive advice, to prevent some future event from occurring, not reactive advice, reacting to an event which has already occurred (Nelson et al., 2003).

Anticipatory guidance provided in a clinical office setting is effective at increasing injury prevention activities (Bass et al., 1993; DiGuseppi & Roberts, 2000). Specifically, anticipatory guidance has resulted in increased knowledge about general injury prevention topics, motor vehicle restraint use, use of a safe water temperature within the home, use of smoke alarms in the home, falls prevention, accidents in the home, and motor vehicle passenger injuries (Bass et al., 1993; DiGuseppi & Roberts, 2000). Several professional health care organizations, including the American Academy of Pediatrics, the American Academy of Family Physicians, the American Medical Association, and the United States Preventive Services Task Force, have acknowledged the importance of injury prevention-related anticipatory guidance (Chen, Kresnow, Simon & Dellinger, 2007). However, despite the fact many specialties have endorsed injury prevention counseling, most notably pediatrics, studies have shown physicians infrequently provide this information to their patients (Ballesteros & Gielen, 2010).

Children are provided with anticipatory guidance much more than adults, but even counseling provided to minors decreases with increases in a child’s age (Chen et al., 2007). For example, Chen et al. (2007) found while nearly two-thirds of parents of children aged 1 or

younger receive injury prevention counseling during a doctor's visit, less than one-third of children in their mid to late teens receive this counseling. Even fewer adults receive anticipatory guidance from a HCP related to injury prevention. Approximately 20% of adults who visit a HCP receive anticipatory guidance on any type of injury prevention topic, with only 10% being counseled on seat belt use, and less than six percent being counseled on the use of smoke alarms within the home (Ballesteros & Gielen, 2010; Dellinger et al., 2009). In regards to driving issues, anticipatory guidance is provided to adolescent drivers and their parents on several topics, including distracted driving issues, impaired driving, high-risk driving, and parental responsibilities related to enacting rules related to nighttime driving and number of passengers in the vehicle (Gardner, 2007). Although few studies focused on the effectiveness of anticipatory guidance and teen driving issues, Johnston, Rivara, Droesch, Dunn and Copass (2002) found anticipatory guidance provided by physicians to teen drivers was associated with a greater likelihood to participate in some positive driving behaviors, such as seat belt use.

Anticipatory guidance is not as common in clinical settings for non-pediatric patients. According to Betz et al. (2013a), the most common counseling provided in the clinic setting which is most similar to anticipatory guidance would be related to end-of-life discussions. However, based on secondary analysis of patient data, Redelmeier, Yarnell, Thiruchelvam, and Tibshirani (2012) found physician warnings to older adults related to being physically unfit to drive were associated with a decrease in the risk of motor vehicle crashes warranting an emergency department visit.

Research has shown physicians play an important role in driving cessation and related counseling, although much of the research is on communicating driving cessation recommendations and conducting driving assessments as opposed to anticipatory guidance

related to driving safety issues (Adler & Rottunda, 2011; Adler, Rottunda, & Kuskowski, 2012; Friedland et al., 2006; Gillespie & McMurdo, 1999; Jang et al., 2007; Lipski, 2002; Sims, Rouse-Watson, Schattner, Beveridge, & Jones, 2012). Studies have shown older adults are more likely to follow the recommendations of physicians as it relates to driving as opposed to other sources, and physicians are often trusted by patients and their families (Adler & Rottunda, 2006; Adler & Rottunda, 2011; Betz et al., 2013a; Betz et al., 2012; Cable, Reisner, Gerges, & Thirumavalavan, 2000; Miller & Morley, 1993; Perkinson et al, 2005; Rudman et al., 2006; Tuokko, McGee, Gabriel & Rhodes, 2007). Betz et al. (2013a) found drivers were “generally open” to being questioned by their physician regarding driving-related issues and saw their doctors as “fair-minded” (p. 1575). In addition, Betz et al. (2012) found older drivers would follow the advice of their physician as related to driving cessation, and almost all of the participants in their study stated they would “consider a driving evaluation” if it was recommended by their physician (p. 152).

However, Betz et al. (2013a) also found older adults are not sure if their physician knows if they currently drive or not, and many physicians state they do not regularly ask about driving issues. While previous studies have found nearly three-fourths of physicians reported discussing driving issues with patients and had provided advice to patients to stop driving in the past year, it is unknown how many patients (some, most, all) they had counseled (Adler & Rottunda, 2011; Drickamer & Marottoli, 1993). Less than one-third of physicians surveyed by Lipski (2002) stated they regularly ask their older patients about driving habits and medical fitness to drive. In addition, relatively few physicians keep records of their patient’s driving status (Jang et al., 2007; Miller & Morley, 1993).

While few studies focus on physician provision of anticipatory guidance as related to driving safety/cessation, many studies have found several common barriers listed by physicians to initiating a conversation on driving safety/driving cessation with their older adult patients. First, physicians are unsure of the role they should be playing in the decision-making process regarding older adults and driving cessation (Adler & Rottunda, 2011; Bogner et al., 2004). Adler and Rottunda (2011) studied physician attitudes toward drivers with dementia and found physicians who felt part of their role was to counsel their patients on driving issues were nearly five times as likely to do so as those who felt it was not their role to provide this information. According to Friedland et al. (2006) physicians have reluctantly assumed the role of driving counselor. Time has been identified as a barrier to broaching the subject of driving safety to patients related to driving cessation (Friedland et al., 2006). Physicians have noted little time exists to fully attend to their patients' primary complaints, let alone providing additional advice related to driving. A belief exists that "driving is an area where there is no treatment" and they are more likely to spend their time dealing with the things "they can do something about than the things that they cannot do something about" (Friedland et al., 2006, p. 56).

Hakamaies-Blomqvist, Henriksson, Falkmer, Lundberg, and Braekhus (2002), in their study of Swedish and Finnish physicians providing counseling on driving issues to their older patients, found physicians often did not bring up the subject of driving due to the fact that driving "did not fit in which the main purpose of the visit" (p. 61). They were more likely to broach the subject if their patients showed symptoms of illnesses which may affect their driving ability, or if medications which they were prescribed would be likely to impair their driving.

Additionally, the lack of knowledge or resources to fulfill the role of discussing driving cessation may be a barrier for physicians (Friedland et al., 2006). Many physicians also do not

counsel on driving cessation issues due to a lack of confidence possibly resulting from unfamiliarity with guidelines outlined by the American Medical Association (AMA) (Adler & Rottunda, 2011; Jang et al., 2007; Sims et al., 2012). More than 45% of physicians surveyed by Jang et al. (2007) disagreed or strongly disagreed with the statement “I am confident in my ability to evaluate driving fitness of my patients” (p. 534). Adler and Rottunda (2011) found three-fourths of HCPs who did not address driving cessation with the patients were not familiar with AMA guidelines, and physicians who were familiar with the guidelines were 2.5 times as likely to address driving cessation with their patients as physicians who were unfamiliar with the guidelines. AMA Guidelines provide physicians with suggested ways bring up the subject of driving cessation for patients who are no longer able to safety drive. Providing physicians with knowledge related to driving issues will increase their confidence in providing this information to their patients in addition to allowing them to become comfortable with having these conversations with patients and family members (Adler & Rottunda, 2011). In fact, the vast majority of physicians surveyed by Jang et al. (2007) agreed or strongly agreed with the statement “I would benefit from further education about the evaluation of patients’ fitness to drive” (p. 534), and less than half of the physicians in a study by Lipski (2002) felt they had enough training to make appropriate medical driver assessments and to asses driving competency.

One of the largest barriers to discussing issues related to driving cessation or driving safety is the discomfort felt by physicians in bringing up the subject to their patients and the fear of upsetting the physician-patient relationship (Bogner et al., 2004; Friedland, et al., 2006; Jang et al., 2007; Hakamies-Blomqvist, et al., 2002; Miller & Morley, 1993; Sims, et al., 2012). A fear exists among physicians that their patients will become angry and defensive (Bogner et al.,



2004). This was found to be more common in the case of a long-term physician-patient relationship (Friedland et al., 2006). According to a physician in a study by Friedland et al. (2006), “the doctor-patient relationship is sort of sacrosanct. It’s very important. And this adversarial position will put fractures in it” (p. 56). Marshall, Demmings, Woolnough, Salim, and Man-Son-Hing (2012) studied the attitudes of physicians in several specialties toward various statements related to fitness to drive, including the specialties of cardiology, endocrinology, geriatrics, neurology, neurosurgery, orthopedic surgery, physiatry, and rheumatology. They found more than half of the physicians in all of the aforementioned specialties stated that reporting patients they considered to be unsafe drivers to appropriate agencies negatively impacts the physician-patient relationship, with geriatricians most likely to report the negative impact (Marshall et al., 2012). Redelmeier et al. (2012) found evidence of the change in the physician-patient relationship resulting directly from driving-related counseling in their analysis of patient medical records. They found that provision of driving warnings to patients who may be unfit to drive compromised the doctor-patient relationship and caused patients to actually reduce the number of subsequent visits to their physician.

The reluctance and barriers of physicians to provide advice related to driving cessation could be due to the timing of the advice provision. Many discussions related to driving cessation only occur after red flags are seen in regards to an older driver’s ability to continue driving (Berg-Weger, Meuser, & Stowe, 2013; Betz et al., 2013a; Betz et al., 2012; Friedland & Rudman, 2009; King et al., 2010). These red flags may include physical or cognitive changes which preclude continued driving, or other more serious events, such as a motor vehicle crash, often resulting in the necessity of the older driver to immediately discontinue driving (Betz et al., 2013a). Early provision of anticipatory guidance related to driving cessation, or mobility

counseling, provided prior to the occurrence of physical or mental changes in an older adult, may allow the patient to adjust to the idea of possibly needing to reduce or cease driving sometime in the future, thereby decreasing the discomfort felt by physicians in providing this information. The transition to non-driving status by older adults may be made less stressful by preparing ahead of time for expected driving cessation.

The study by Betz et al. (2012) found older drivers would be supportive of “advanced driving directives” (ADDs), which they describe as being similar to advanced directives for end-of-life care (p. 152). In this scenario, drivers would select a physician, family member or friend who they would like to assist them in making the decision about driving cessation. The ADDs compel older drivers to start thinking about a time when they feel they can no longer drive, thereby starting the planning process, and possibly alleviating feelings of apprehension that often accompany a driving-cessation discussion (Betz et al., 2012). In a study by Betz et al. (2013a), drivers and physicians stated they would be open to adding questions related to driving issues to their appointments. They felt bringing it up regularly would make it easier to discuss, and drivers might be more amenable to discussing it (Betz et al., 2013a). According to Betz et al. (2013b), the ADDs would not be legally binding, but would prompt early discussions regarding future driving decisions. One respondent in the study by Betz et al. (2013b) stated: “ I wish we could normalize driving health, just like...in pediatrics we try to help folks think ahead about developmental states, and I think [an ADD] is maybe a useful tool” (p. 1577).

This section provided a review of the literature related to driving cessation and driving safety issues for older adults as well as issues regarding the role of HCPs in offering mobility counseling. As was shown, relatively little research has been conducted on anticipatory guidance related to driving safety or driving cessation issues for older adults. The majority of

studies focus on physician perceptions related to telling their older patients they have to stop driving or testing fitness to drive. The research proposed for this dissertation will add to the small amount of literature focusing on provision of anticipatory guidance to older adults related to driving safety/cessation prior to the manifestation of aging-related physical and cognitive changes which may affect driving abilities.

One of the research goals for this dissertation is to examine several items as predictors of driving safety/cessation-related anticipatory guidance provision, including HCP demographic characteristics, HCP practice characteristics, and HCP crash exposure. Two demographic characteristics will be examined: age and gender. First, it has been found that older HCPs are more likely to address driving issues during clinic office visits than younger HCPs (Adler & Rottunda, 2011). Therefore, it is hypothesized that age will be a predictor of driving safety/cessation-related anticipatory guidance provision, with older HCPs being more likely to provide this counseling than younger HCPs. Second, gender has also been found to be an important predictor of prevention counseling (Barkin, Fink, & Gelberg, 1999; Galuska et al., 2002; Henderson & Weisman, 2001; Nelson, Wissow, & Cheng, 2003). Research has shown that female HCPs are more likely to provide preventive counseling than male HCPs. Therefore, it is hypothesized that gender will be a predictor of driving safety/cessation-related anticipatory guidance provision as well, with female HCPs being more likely to provide this type of counseling than male HCPs.

HCP practice characteristics have also been shown to be predictors of healthcare provision. Specifically, research has shown that the greater the proportion of patients aged 65 or older in a practice results in a greater likelihood of performing driving assessments or reporting of unsafe drivers (Jang et al, 2007). As a result, it is hypothesized that HCPs whose practices are

comprised of a larger percent of patients aged 65 or older will be more likely to provide driving safety/cessation-related counseling than HCPs whose practices are comprised of a smaller percent of older patients.

Personal experience has been found to be closely linked to counseling patterns of HCPs in several areas, including, but not limited to, exercise habits (Abramson, Stein, Schaufele, Frates, & Rogan, 2000), breastfeeding (Freed et al., 1995), suicide prevention (Brunero, Smith, Bates & Fairbrother, 2008), and child injury prevention (Woods, 2006). Weiss, O'Neil, Shope, O'Connor, and Levin (2012) found that pediatricians who had patients who had been injured or killed in a motor vehicle crash were more likely to discuss driving safety topics with their adolescent patients. Based on the previous research related to personal experience and counseling patterns, it is hypothesized that HCPs who have had a friend or family member involved in a vehicle crash will be more likely to provide driving safety/cessation-related anticipatory guidance to their older patients than those who have not had this personal experience. Additionally, it is hypothesized that HCPs who have been involved in a vehicle crash will also be more likely to provide this information to their older patients than HCPs who have not had this experience.

The second research goal for this dissertation is to examine rural-urban differences of HCP provision of driving safety/cessation information to their patients. Rurality has been found to be an important factor in health care provision as well as traffic safety issues, although little consensus exists as to what differentiates rural from urban (Philipson & Scharf, 2005). Rurality has been found to be a significant predictor of practice patterns, including counseling provision (Andrus, Kelley, Murphey, & Herndon, 2004; Kemper, Uren, Moseley, & Clar, 2006). Studies have shown that rural HCPs provide preventive counseling and anticipatory guidance less

frequently than urban providers (Probst, Moore, Baxley, & Lammie, 2002; Andrus et al., 2004), although there are no known studies focusing on rural/urban differences in HCP provision of driving safety/cessation-related anticipatory guidance. Although rural populations are free to travel to urban areas to seek health care, and often do so, research has shown that travel burden is a barrier for rural populations to seeking access to health care in urban areas (Probst, Laditka, Wang, & Johnson, 2007). Additionally, a disproportionate number of motor vehicle crash-related older driver injuries and fatalities occur in rural areas (Clark, 2001; Boufous, Finch, Hayen, & Williamson, 2008). A study by Clark (2001) comparing motor vehicle crash fatalities by age group found that as county population density decreased persons aged 65 or older consistently had a higher fatality rate per 100,000 population than those aged less than 65. For example, for counties with a population density of less than 16.6 people per square mile, adults aged 65 or older had a motor vehicle fatality rate of 34.9 per 100,000 population, while those aged less than 65 had a rate of 30.8 per 100,000 population (Clark, 2001).

Based on the previous research related to rurality, it is hypothesized that rural HCPs provide driving safety/cessation-related counseling to their patients less frequently than urban HCPs. In addition, it is hypothesized that significant rural-urban differences exist in regards to attitudes and perceptions related to provision of driving safety/driving cessation-related counseling, as well as perceived barriers to providing this information, knowledge of reporting drivers, and referral processes/sources related to driving issues for older adults.

# **PROVISION OF MOBILITY COUNSELING BY HEALTH CARE PROVIDERS TO OLDER ADULTS: A RURAL/URBAN COMPARISON**

## **Abstract**

Driving is a primary form of transportation for older adults. However, as the population continues to age, the number of older drivers will also increase. Aging-related changes may affect driving ability, requiring older adults to plan for a time when they need to stop driving. Health care providers are a trusted source of information, and are knowledgeable about aging-related changes and medical issues which may affect driving ability, in addition to providing anticipatory guidance to their patients related to driving safety issues. Additionally, many older adults live in rural areas and drive more frequently than those in urban areas. The current study examined the rural-urban differences in health care provider perceptions, attitudes, and practices related to driving safety/cessation-related anticipatory guidance provision. A survey of health care providers in the Midwest found that rural HCPs were less likely than urban HCPs to provide mobility counseling to their patients aged 75 or older. Rural HCPs were also less likely to refer patients to a driving fitness evaluation resource if they had questions related to driving issues, and were less likely to perceive there were adequate resources to get assistance with driving issues.

## **Introduction**

Driving remains a primary means of transportation for older adults. Driving provides many things to older adults that public transportation options cannot, including independence, convenience, and security (Glasgow & Blakely, 2000; Kostyniuk & Shope, 2003; Silverstein, 2008). Research has shown that a majority of all trips by older adults are taken in private vehicles (Rosenbloom, 2004). In fact, less than two percent of trips taken by adults aged 65 or

older in the United States are by public transportation and that level continues to decline (Bukhardt & McGavock, 2002; Pucher & Renne, 2003).

As the U.S. population continues to rapidly age, the number of older drivers will also increase, with the expectation that in the year 2030 nearly one-quarter of licensed drivers will be aged 65 or older (Potts et al., 2004). While older adults drive shorter distances and less frequently than other populations, an increasing number choose to remain licensed drivers longer and are starting to drive more miles annually (Lyman, Ferguson, Braver, & Williams, 2002). This is concerning for two main reasons. First, aging is strongly correlated with an increase in the frequency of chronic and acute diseases and conditions that have “adverse effects on a person’s functioning in general and driving in particular” (Meyer, 2004, p. 256). In addition, the aging process itself produces changes in sensory, cognitive, and motor functions that can affect driving (Anderson & Loeser, 2010; Carr, Duchek, Meuser, & Morris, 2006; Carr, Flood, Steger-May, Schlechtman, & Binder, 2006; Lacherez, Wood, Anstey, & Lord, 2014; Malfetti & Winter, 1986; Meyer, 2004; Ragland, Satariano, & MacLeod, 2004; Shaheen & Niemeier, 2001; Tracy & Enoka, 2002; Tracy, 2007). Second, older adults make up a disproportionately larger percent of traffic fatalities (National Highway Traffic Safety Administration [NHTSA], 2013; FHA, 2009), meaning that older adults, and their passengers, are more likely to die in a crash than younger drivers (Eberhard, 2008). So while older drivers tend to drive shorter distances and less frequently than other age groups (Koppel, Bohenskey, Langford, & Taranto, 2011), they are more likely to be seriously or fatally injured in crashes, with the greatest increase in risk in those aged 70 or older (Eberhard, 2008; Tefft, 2008).

Aging-related changes may affect older adult driving abilities, however these changes are not consistent across all age groups, often with decreases in functioning with increasing age.

Aging results in increases in vision impairments which may directly affect driving ability, as nearly 90% of information needed to drive effectively is visual (Malfetti & Winter, 1986). However, the rate of vision impairments is not consistent across all age groups for adults aged 65 or older, with rates of visual acuity issues increasing with age (Eye Diseases Prevalence Research Group, 2004). Additionally, rates of arthritis also increase with age, with adults aged 80 or older seeing the largest rates (Thomas, Peat, Harris, Wilkie, & Croft, 2004). Driving-related limitations for person with arthritis can include difficulties in making shoulder checks, holding the steering wheel with the appropriate amount of tension, and making turns (Cranney et al., 2005). Finally, while dementia is prevalent in about 6.5% of the overall population in North American, it is found to increase with age, almost doubling with each 5.5 year increase in age (Prince et al., 2013).

As a result of aging-related changes and the increasing risk to themselves and others as they continue to drive, at some point older adults will need to start planning for when they need to reduce or discontinue their driving. Health care providers (HCPs) are uniquely placed both to monitor aging-related changes and medical issues that may affect an older individual's driving ability, and to provide information to their patients in the form of anticipatory guidance or mobility counseling (Betz, Jones, Petroff, & Schwartz, 2013; Betz, Schwartz, Valley, & Lowenstein, 2012).

Studies have shown that older adults are more likely to follow the recommendations of physicians as it relates to driving, and that physicians are often trusted by patients and their families (Adler & Rottunda, 2006; Adler & Rottunda, 2011; Betz et al., 2013; Betz et al., 2012; Cable, Reisner, Gerges, Thirumavalavan, 2000; Rudman, Friedland, Chipman, & Sciortino, 2006; Tuokko, McGee, Gabriel & Rhodes, 2007). Betz et al. (2013) found that drivers were



“generally open” to being questioned by their physician regarding driving-related issues and saw their doctors as “fair-minded” (p. 1575). In addition, Betz et al. (2012) found that older drivers would follow the advice of their physician as related to driving cessation, and almost all of the participants in their study stated they would “consider a driving evaluation” if it was recommended by their physician (p. 152).

However, Betz et al. (2013) also found that older adults are not sure if their physician knows if they currently drive or not, and many physicians state they do not regularly ask about driving issues. While previous studies have found that nearly three-fourths of physicians reported discussing driving issues with patients and had provided advice to patients to stop driving in the past year, it is unknown how many patients (some, most, all) they had counseled (Adler & Rottunda, 2011). Less than one-third of physicians surveyed by Lipski (2002) stated they regularly ask their patients about driving habits and medical fitness to drive. In addition, relatively few physicians keep records of their patient’s driving status (Jang et al., 2007). With regard to community, no studies have focused on rural-urban differences in mobility counseling.

A higher proportion of older adults live in rural areas as compared to urban areas, and rural older adults must drive more frequently to access services and to be involved in community activities (Rosenbloom, 2004). Additionally, it has been found that rural older adults are older than and their health is worse than that of urban older adults (Rosenbloom, 2004) putting them at greater risk for mobility disparities. Studies have shown that older adults in rural areas are more than four times as likely as urban older adults to be involved in motor vehicle crashes resulting in injury or death (Zwerling et al., 2005). Providing education to older drivers related to driving safety issues would be useful and may result in reduced driving or driving cessation, possibly reducing the risk of the older driver to harm themselves or others. It is unknown the extent to

which rural older drivers receive mobility counseling from their HCP as compared to their urban counterparts.

Rurality has been found to be a significant predictor of practice patterns, including counseling provision, with rural health care providers less likely to provide counseling (Andrus, Kelley, Murphey, & Herndon, 2004; Kemper, Uren, Moseley, & Clar, 2006). However, no known studies have focused on rural-urban differences in HCP mobility counseling provision to older drivers. The goal of this research was to examine rural-urban differences of HCP provision of driving safety/cessation-related anticipatory guidance to older drivers by patient age. It is hypothesized that rural HCPs provide this counseling to their patients less frequently than urban HCPs, and that significant rural-urban differences exist in regards to attitudes and perceptions related to provision of driving safety/driving cessation-related counseling, as well as perceived barriers to providing this information, knowledge of reporting drivers, and referral processes/sources related to driving issues for older adults.

### **Methods**

The survey used in this research was created based on a review of the literature (Jang et al., 2007; Bogner, Straton, Gallo, Rebok, & Keyl, 2004), with feedback from internal medicine providers who work for a healthcare organization in the upper Midwest.

HCP contact information was purchased from USA Data, an online physician contact information database company. For this study, HCPs include medical doctors and midlevel providers (Nurse Practitioners and Physician Assistants). Physicians and midlevel providers located in North Dakota, South Dakota, Utah, Colorado, or Wyoming with a specialty of ophthalmology/optometry, family medicine, internal medicine, or geriatrics were selected for inclusion in this survey. These specialties were used due to the increased proportion of older

adults in these practices (Pettersson et al., 2012; Lee, Hoskins, Smith, Hutchinson, & Wong, 2007).

The specific states selected for use in this study are part of the National Highway Traffic Safety Administration's Region 8 (NHTSA, 2014). A total of 2,600 HCPs were randomly chosen from a list of 7,557 HCPs. After Institutional Review Board authorization was obtained from North Dakota State University, the first wave of surveys for both rural and urban HCPs were mailed in January 2013 with the second wave being mailed in March 2013. All survey data was entered manually into SPSS Version 20. A response rate of 10.2% was obtained, with 265 HCPs returning surveys from the original sample of 2,600.

### *Variables*

Respondents were asked to identify the size of the community in which they currently practice to define the rurality of the population to which they were providing services. In this study, based on the Census Bureau definition of urban versus rural areas (U.S. Census Bureau, N.D.), rurality is measured with a dichotomous variable with rural communities being defined as those in which HCPs practice with 49,999 or fewer people and urban communities being defined as those in which HCPs practice with 50,000 or more people.

HCPs were asked to rate their agreement to statements measuring their attitudes and perceptions of providing mobility counseling related to driving safety issues for older adults in their practice, as well as perceived barriers related to providing this information, knowledge of reporting drivers within their state, and referral processes/sources related to driving issues for older adults on a scale from one to five with one being "Strongly Disagree" and five being "Strongly Agree".

In addition, HCPs were asked the frequency [“Seldom or Never”, “Occasionally”, “Frequently”, or “Always”], with which they discuss safe driving habits or driving fitness with their patients in specific age groups: 64 years or younger, 65 to 74 years of age, 75 to 84 years of age, and 85 years of age or older. These variables were recoded into dichotomous variables, with “Seldom or Never” and “Occasionally” as one response, and “Frequently” and “Always” as the other response. This was due to extremely low response counts for either end of the frequency spectrum across the patient age groups. HCPs were also asked to list any barriers they perceived in providing counseling to older adults regarding driving issues. Additionally, HCPs were asked if they have ever told an older driver that they should limit their driving or discontinue driving, if they ever had a family member or friend involved in a vehicle crash, or if they have ever been in a vehicle crash. General demographic information collected include age, gender, specialty [“Family Medicine”, “All Other Specialties”], degree [“MD/DO”, “PA/NP”], percent of practice comprised of patients aged 65 or older, and years practicing in their current specialty.

### *Statistical Analyses*

Prior to analysis, data were screened for violations of assumptions associated with univariate and multivariate models (Tabachnik & Fidell, 2013). One outlier was discovered and deleted prior to analysis based on a test of the presence of multivariate outliers using Mahalanobis distance, with a criterion of  $p < 0.001$ . Descriptive statistics were performed for all items and divided by rurality. Chi-square tests and t-tests were run as appropriate for basic comparisons between rural and urban for demographic variables.

Exploratory factor analysis via the principal component extraction method was used to explore the dimensions of the factor structure of HCP perceptions related to driving

safety/cessation anticipatory guidance and to reduce data for subsequent analyses. The cutoff eigenvalue for each item was set at 1.0. Factors were extracted based on minimum loadings of .50, as done in Hair, Black, Babin, and Anderson (2010), examination of scree plots, and simplicity of factor structure (loading on only one factor). Averaging across attitude/perception items for each factor generated factor scores for each respondent. Internal consistency was assessed with Cronbach's alpha reliability coefficients. Factors were compared by rurality using a one-way ANOVA.

Binary logistic regression analyses were conducted to determine if HCP rurality was significantly predictive of HCP provision of mobility counseling by patient age, after adjusting for variables for which a significant difference by rurality was indicated, including gender, specialty, percent of practice aged 65 or older, years practicing in current specialty, and ever having been involved in a vehicle crash. Prior to conducting logistic regression analyses, tests were performed to examine the data for assumptions related to this regression test. The Box-Tidwell test revealed that the variable measuring percent of practice aged 65 or older violated the assumption of linearity in the logit when it was included in the logistic regression model with the frequency of mobility counseling provided to patients aged 85 or older as the outcome variable. This variable was transformed using its square. None of the other assumptions related to logistic regression were violated, including absence of multicollinearity, which was tested using tolerance statistics, independence of errors, and ratio of cases to independent variables (at least 10 cases per independent variable). Odds ratios (ORs) were deemed to be significant when the confidence intervals did not include the value of 1.00. IBM SPSS Statistics v.21 was used for all analyses.

### ***Demographic Characteristics of Respondents***

Nearly 60% (59.5%) of respondents stated they practice in a community of less than 50,000 (rural), with 40.5% stating they practice in a community of 50,000 or more people (urban) (Table 1). There were no statistically significant rural-urban differences for HCPs age [Mean age: Rural - 55.08 years; Urban - 53.74 years], gender [Male: Rural – 71.2%; Urban – 72.9%], degree [MD/DO: Rural – 94.2%; Urban – 99.1%], years practicing in current specialty [Mean years: Rural – 24.15; Urban – 21.95], having ever told an older driver they should limit/discontinue driving [Yes: Rural – 99.4%; Urban – 96.3%], or having a family member ever involved in a vehicle crash [Yes: Rural – 81.0%; Urban – 79.8%]. Significant differences existed by specialty, with a much higher percent of rural HCPs indicating a specialty of family medicine than urban HCPs [69.4% vs. 37.4%, respectively] ( $\chi^2=25.119$ ,  $df=4$ ,  $p<0.001$ ). Rural HCPs also had significantly more patients aged 65 or older in their practice [Rural: 47.64%; Urban: 42.07%,  $p=0.039$ ] ( $t=2.075$ ,  $df=262$ ,  $p=0.039$ ). Rural HCPs were also significantly less likely to have ever been involved personally in a vehicle crash [Rural: 58.3%; Urban: 72.9%,  $p=0.015$ ] ( $\chi^2=5.861$ ,  $df=1$ ,  $p=0.015$ ).

## **Results**

### ***Differences in Frequency of HCP Mobility Counseling Provision by Rurality***

After controlling for the effects of gender, ever having personally been involved in a vehicle crash, HCP specialty, percent of practice age 65 or older, and years practicing in current specialty, logistic regression analyses revealed that rural HCPs were significantly less likely than urban HCPs to discuss safe driving habits or driving fitness with patients aged 75 to 84 (OR=0.452, 95% CI=0.255-0.801,  $p=0.006$ ) or 85 or older (OR=0.496, 95% CI=0.277-0.889,  $p=0.018$ ) (Table 2).

Table 1. Respondent Demographics

		Rural n (%)	Urban n (%)	p- value <sup>a</sup>
Population of community in which you currently practice	Less than 50,000	157 (100.0)	0 (0.0)	na
	50,000 or more	0 (0.0)	107 (100.0)	
Age, mean (SD)		55.08 (9.74)	53.74 (9.11)	NS
Gender	Male	111 (71.2)	78 (72.9)	NS
	Female	45 (28.8)	29 (27.1)	
Specialty	Family Medicine	109 (69.4)	44 (37.4)	<0.001
	Internal Medicine	20 (12.7)	19 (17.8)	
	Geriatrics	0 (0.0)	3 (2.8)	
	Ophthalmology	10 (6.4)	11 (10.3)	
	Other	18 (11.5)	30 (28.0)	
Degree <sup>b</sup>	MD/DO	147 (94.2)	106 (99.1)	NS
	PA/NP	7 (4.5)	1 (0.9)	
	Other	2 (1.3)	0 (0.0)	
Percent of practice comprised of patients 65 or older, mean percent (SD)		47.64 (21.77)	42.07 (20.92)	0.039
Years practicing in current specialty, mean years (SD)		24.15 (9.82)	21.95 (9.17)	NS
Ever told an older driver they should limit or discontinue their driving	Yes	155 (99.4)	103 (96.3)	NS
	No	1 (0.6)	4 (3.7)	
Ever had family member or friend involved in vehicle crash	Yes	124 (81.0)	83 (79.8)	NS
	No	29 (19.0)	21 (20.2)	
Ever personally been involved in vehicle crash	Yes	91 (58.3)	78 (72.9)	0.015
	No	65 (41.7)	29 (27.1)	

<sup>a</sup> Chi-square p-values for rurality for gender, specialty, degree, ever told an older driver they should limit or discontinue driving, ever had family member/friend involved in vehicle crash, ever personally been involved in vehicle crash. T-test p-values for age, percent of practice comprised of patients 65 or older, years practicing in current specialty. Significance at  $p \leq 0.05$ . NS=not significant. na=not applicable.

<sup>b</sup> MD=Doctor of Medicine; DO=Doctor of Osteopathic Medicine; PA=Physician's Assistant; NP=Nurse Practitioner

Overall totals: Rural=157; Urban=108. Column totals may not equal overall totals due to missing values

Table 2. Logistic Regression of HCP Patient Discussions Related to Safe Driving Habits or Driving Fitness by Patient Age

Variable	64 or Younger			65 to 74			75 to 84			85 or Older		
	OR <sup>a</sup>	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
Rurality (Reference: Rural)	.618	.158	2.422	.823	.373	1.818	.452 **	.255	.801	.496 *	.277	.889
Gender (Reference: Male)	1.070	.251	4.566	.559	.247	1.265	.795	.433	1.458	.589	.321	1.079
Personally involved in motor vehicle crash (Reference: Yes)	5.237	.643	42.659	.664	.315	1.398	.773	.451	1.324	.938	.545	1.613
HCP specialty (Reference: Family medicine)	.311	.070	1.389	.491	.206	1.167	1.176	.641	2.159	1.768	.947	3.301
Percent of practice 65 or older	1.000	.970	1.031	1.004	.985	1.023	1.010	.997	1.024	1.019 **	1.005	1.033
Years practicing in current specialty	.995	.927	1.067	.999	.960	1.039	1.028	.999	1.058	1.049 *	1.018	1.080

\*p<0.05; \*\*p<0.01

<sup>a</sup> All odds ratios (ORs) reported for each variable are the result of being adjusted for all variables listed as predictors of patient discussions related to safe driving habits or driving fitness by patient age group.



### ***Differences in HCP Attitudes/Perceptions Related to Mobility Counseling by Rurality***

Table 3 shows the responses to the individual attitude/perception items. Several results of note appear in this table. Rural HCPs were less likely than urban HCPs to agree or strongly agree to the statements related to knowledge of and behaviors related to referring patients for fitness to drive assessments. Additionally, urban HCPs were nearly twice as likely as rural HCPs to agree or strongly agree with the statement regarding the adequacy of resources for older adults to get assistance with assessing their fitness to drive. Rural HCPs were more likely to feel that it is the responsibility of HCPs to counsel patients on their fitness to drive, and that HCPs should be advising older patients on their fitness to drive. Rural HCPs were also more likely than urban HCPs to be concerned with the emotional status of their patients if they were to bring up the topic of either driving cessation or driving safety.

Using a factor loading of 0.50 or greater as the cut-off, four factors were identified accounting for nearly 58% of the variance, as shown in Table 3. Two questions (“I am aware of whether my older patients are active drivers”, “I am confident in my ability to provide counseling to my older patients on their ability to drive”) did not meet the 0.50 cut-off and were excluded from analysis. However, HCP self-efficacy has been found to be integral to actual provision of counseling provision, and because of this individual analysis was conducted on the confidence-related variable (Meuser et al., 2010). Results from a one-way ANOVA show that rural HCPs (mean=3.02, SD=.89) are more confident than urban HCPs (mean=2.94, SD=.984) in their ability to provide counseling to their older patients on their ability to drive.

Table 3. Factor Analysis of Attitudes/Perceptions and HCP Agreement with Items

Factor Name	% Var	Perception/Attitude Item	Loadings				Distribution of Responses			
			1	2	3	4	Rural		Urban	
							% Disagree	% Agree	% Disagree	% Agree
Resources/ Referral	18.3%	I know where to refer older patients if they have questions regarding their fitness to drive.	<b>0.82</b>	0.05	0.02	-0.08	40.1%	49.0%	28.0%	62.6%
		I refer patients to a driving fitness evaluation resource in my community when I am uncertain of a patients' ability to drive safely.	<b>0.80</b>	-0.08	0.18	-0.09	42.7%	40.0%	27.4%	56.6%
		I know the procedure in my state for reporting a patient who is a potentially dangerous driver.	<b>0.72</b>	0.20	0.13	0.08	49.4%	44.9%	50.0%	44.3%
		There are adequate resources for older adults to get assistance with assessing their fitness to drive.	<b>0.64</b>	0.29	-0.25	-0.09	67.7%	18.1%	48.5%	33.0%
HCP Practice Time/Advice	14.0%	In my practice setting, there is adequate time during regular visits to provide counseling regarding a patient's fitness to drive.	0.80	<b>0.72</b>	0.03	-0.18	45.2%	23.6%	42.1%	14.0%
		Older drivers get consistent advice on their fitness to drive from health care professionals.	0.13	<b>0.69</b>	0.06	0.03	81.5%	1.9%	77.4%	3.8%
		Health care providers are the most qualified professionals to discuss driving fitness with older drivers.	-0.11	<b>0.54</b>	0.36	0.01	25.0%	30.1%	26.7%	20.0%
HCP Responsibility	13.7%	As a health care provider, it is my responsibility to counsel older drivers on their fitness to drive.	0.15	0.28	<b>0.74</b>	-0.13	7.7%	71.2%	10.3%	66.4%
		Health care providers should advise older patients on their fitness to drive.	-0.01	0.29	<b>0.69</b>	-0.06	3.8%	85.4%	1.9%	80.4%
		It is the responsibility of health care providers to report patients who may be a danger to others on the road.	0.38	0.05	<b>0.56</b>	0.12	17.8%	56.1%	23.6%	45.3%
		I would benefit from further education about assessing driving fitness.	-0.30	-0.35	<b>0.56</b>	0.07	12.2%	72.4%	8.6%	73.3%
Emotional State	11.8%	I am concerned that patients will become angry if I bring up the subject of driving cessation.	-0.06	-0.07	0.03	<b>0.91</b>	23.6%	49.0%	30.8%	38.9%
		I am concerned that patients will become angry if I bring up the subject of driving safety.	-0.05	-0.06	-0.05	<b>0.91</b>	42.2%	29.2%	55.1%	20.6%

Table 4 shows the difference in mean attitude/perception factor scores by rurality. Only one of the factors was significant by rurality. Attitudes/perceptions related to resources and referral differed significantly by rurality, with rural HCPs less likely (mean=2.81 on a 5-point scale, SD=.91) than urban HCPs (mean=3.10, SD=.96) to agree they had adequate resources and knew where to refer patients for fitness to drive assessments (p=0.012).

*Table 4. Differences in Attitude/Perception Factor Scores by Rurality*

<b>Factor</b>	<b>Sig.<sup>a</sup></b>	<b>Mean Score (SD)</b>	
		<b>Rural</b>	<b>Urban</b>
Resources/Referral	0.012	2.81 (.91)	3.10 (.96)
HCP Practice Time/Advice	0.504	2.58 (.61)	2.53 (.61)
HCP Responsibility	0.754	3.73 (.56)	3.71 (.56)
Emotional State	0.071	3.10 (.93)	2.89 (.96)

<sup>a</sup> Significance at p≤0.05.

SD=Standard deviation

#### ***Differences in Perceived HCP Barriers to Mobility Counseling by Rurality***

Of the 86 rural respondents and 71 urban respondents who listed at least one barrier to providing counseling to older adults regarding driving issues, both rural and urban HCPs most often listed time constraints during office visits as a barrier, followed by family/patient resistance to discussing driving issues or outright denial (Table 5). Three times as many rural HCPs as urban HCPs listed not wanting to contribute to a patient's loss of independence as a barrier (Rural: 14.0%; Urban: 5.6%). Rural HCPs were also more likely than urban HCPs to list distance to the nearest driving testing facility as a barrier to providing counseling (Rural: 9.3%; Urban: 0.0%). Urban HCPs were more likely than rural HCPs to list lack of knowledge on how to test driving ability as a barrier to providing counseling related to driving issues.

*Table 5. Barriers to Providing Counseling to Older Adults Regarding Driving Issues <sup>a</sup>*

	Rural n (%)	Urban n (%)
Time constraints during office visit	26 (30.2)	22 (31.0)
Family/patient resistance to discussion/denial	13 (15.1)	17 (23.9)
HCP does not want to contribute to loss of independence for patient	12 (14.0)	4 (5.6)
Lack of resources	11 (12.8)	7 (9.9)
Distance to nearest facility	8 (9.3)	- (0.0)
Unsure of person's ability to drive safely/lack of awareness	7 (8.1)	8 (11.3)
Unsure of where to send patients	6 (7.0)	4 (5.6)
Lack of family support	6 (7.0)	7 (9.9)
Lack of alternative transportation options	5 (5.8)	3 (4.2)
Cost of testing	4 (4.7)	4 (5.6)
Affects patient-physician relationship	3 (3.5)	5 (7.0)
Unsure of laws regarding testing	2 (2.3)	1 (1.4)
Not qualified	1 (1.2)	- (0.0)
Unsure of how to test driving ability	1 (1.2)	7 (9.9)
Consistency of information	- (0.0)	1 (1.4)
<b>Total Respondents who Listed at Least One Barrier</b>	<b>86</b>	<b>71</b>

<sup>a</sup>Percentages do not total 100 due to multiple responses from individual respondents. Percentages based on total respondents who responded to this question on the survey. Responses sorted descending by Rural.

## **Discussion**

HCPs are ideally placed in society to provide mobility counseling to older drivers, and often are regarded as experts in this area. Using a sample of HCPs located in several states in the upper Midwest, the goal of this study was to determine rural-urban differences in HCP perceptions, attitudes, and practices related to mobility counseling provision to older adults. It was found that rural HCPs were significantly less likely to provide this information to their patients aged 75 to 84 and 85 or older than HCPs practicing in urban areas. In addition, rural HCPs were less likely than urban HCPs to refer patients if they had questions related to driving issues and were less likely to feel there are adequate resources to get assistance with testing fitness to drive. This research is unique in that it is the first known study to focus on rural-urban

differences in the frequency of HCP mobility counseling provision to older drivers, and in HCP attitudes and perceptions related to this topic.

Rural and urban HCP practice patterns related to mobility counseling provision diverge at a critical juncture in an older adult's life, when aging-related physical and mental changes may be more likely to occur, possibly affecting driving ability. It is at this point in life that HCP mobility counseling would be most needed by older drivers. Rural and urban HCPs are both as likely to provide mobility counseling to patients aged 74 or younger. However, for patients aged 75 or older, compared with urban HCPs, rural HCPs are significantly less likely to provide this information to their older patients. Other studies have shown that rural HCP practice patterns differ from that of their urban counterparts, creating health disparities between urban and rural patients (Geller et al., 2008; Leira, Hess, Torner, & Adams, 2008; Tough, Ediger, Hicks, & Clarke, 2008). Studies have shown reduced counseling/services being provided by rural HCPs as compared to their urban counterparts in a variety of areas, including, but not limited to, stroke management practices (Leira et al., 2008), preconception counseling and fetal alcohol spectrum disorders (Tough et al., 2008), and colorectal cancer screening (Geller et al., 2008). This study builds on this compendium of research, and adds mobility counseling as an area in which rural HCPs are less likely than urban HCPs to provide to their patients. Future research should focus on the possible connection between rural-urban differences in HCP provision of mobility counseling to older drivers and rural older adult overrepresentation in motor vehicle injuries and fatalities statistics.

Rural HCPs were less likely than urban HCPs to agree that there were adequate resources related to older driver assessment, and were less likely to know where to refer older adults to assess fitness to drive. HCPs have long acknowledged the lack of resources as a barrier to care

in rural areas (Bonham, Salvador, Altschul, & Silverblatt, 2014; Brems, Johnson, Warner, & Roberts, 2006; Chipp et al., 2011; Chipp, Johnson, Brems, Warner, & Roberts, 2008), and, in this study HCPs affirm a lack of access to driving safety/cessation resources. In their study of HCP adaptations to health care barriers found that successful rural providers “broadened their expertise” (Chipp et al., 2008, p. 537) in areas in which they had limited knowledge. This is related to a limited option for specialization in rural areas, and the requirement for HCPs to have a broader base of skills and knowledge to be effective in their practice setting. In regards to older drivers, one area in which rural HCPs could add to their base of expertise is driving safety/driving cessation-related counseling techniques. One of the challenges faced by rural HCPs is access to few continuing education opportunities (Johnson, Brems, Warner & Roberts, 2006). Obtaining training and education related to mobility counseling will allow rural HCPs to become more effective at identifying red-flag issues related to older drivers, in addition to planting the seeds early in older adults to think about their future driving ability and to plan for the time when they might have to discontinue driving.

While rural HCPs were less likely to provide mobility counseling to their older patients, they were more likely to agree with the statements related to HCP responsibility to counsel patients on fitness to drive, and were more likely to agree that they are confident in their ability to provide counseling to older patients on their ability to drive. This is a paradox. One would expect that HCPs who were more confident in their ability to provide mobility counseling and were more likely to agree that it is a HCP’s responsibility to counsel patient on fitness to drive would be more likely to provide mobility counseling to their older patients, and not the other way around. This is an instance where social desirability bias may be causing respondents to answer certain questions in a manner in which they feel the researcher would like. Additionally,

rural HCPs might be more confident in providing mobility counseling to certain age groups, and believe it is the responsibility of HCPs to provide mobility counseling, again only to certain age groups, and a general question related to confidence in this area does not capture these differences. Finally, it is possible that rural HCPs are more confident in providing mobility counseling and believe that HCPs are the most qualified to provide this information but they simply do not have enough time within their practice setting to provide this information within the confines of a regular visit.

Regarding patient emotional status, this study found that rural HCPs are more sensitive to their patient's reaction to discussion driving safety/cessation-related issues, and were more likely than urban HCPs to believe their patients would become angry at them if these topics were to be broached during a clinic visit. Research into this area has shown that this is one of the largest barriers to discussing issues related to driving safety/cessation with their patients. HCPs have a fear that their patients will become defensive and angry (Bogner et al., 2004). Redelmeier, Yarnell, Thiruchelvam, and Tibshirani (2012) found that provision of driving warnings to patients who may be unfit to drive negatively affected the doctor-patient relationship, causing patients to decrease the number of successive visits to their physician. This is especially problematic in rural areas. Brems et al. (2006) found that rural physicians were more likely than their urban counterparts to acknowledge that patients become defensive, and will avoid or prematurely terminate care.

Respondents listed several barriers to providing counseling to older patients regarding driving issues, including, but not limited to time constraints during office visits and family/patient resistance to discussing this topic, or denial related to the topic. Both rural and urban HCPs were most likely to list time constraints as a barrier. However, rural HCPs were

three times as likely as urban HCPs to list not wanting to contribute to the loss of patient independence as a barrier. The barriers listed by HCPs in this study are similar to barriers provided in previous studies of physician barriers to mobility counseling (Betz, et al., 2013; Meuser, Carr, Irmiter, Schwartzberg, & Ulfarsson, 2010). What is unique in this study is the differentiation of barriers perceived by rural and urban HCPs. Rural-urban differences in HCP perceptions that they are impeding on older adult independence by providing mobility counseling is concerning and may be contributing to differences in motor vehicle injuries and fatalities for rural older adults. If rural HCPs are less likely to provide mobility counseling due to reservations toward limited older adult independence, this needs to be addressed. Results of this study indicate rural HCPs are not as likely to be aware of mobility/driving safety-related resources that might be available in their community. It is possible that this is due to the lack of rural mobility resources, in which case the provision of these resources would be a necessity in rural areas. Additionally, if resources are available, a possible remedy would be to make certain that HCPs are aware of all community resources, family resources, and transportation options to ensure they are able to provide their patients with adequate mobility options or modifications to prevent potential future limitation of patient independence.

The results of this research have provided a foundation on which future research should focus. This study found rural-urban differences in the HCP provision of mobility counseling to older drivers. A valuable next step would be to examine the connection between these differences in mobility counseling and rural older adult overrepresentation in motor vehicle injuries and fatalities statistics. Researchers should study the presence of a rural culture as a potential reason for the differences in the HCP provision of mobility counseling seen by rurality. Additionally, future research should elucidate the extent of training provided to urban HCPs as



compared to their rural counterparts as related to confidence of mobility counseling provision. It has been found that HCPs may not counsel on driving cessation or safety issues due to a lack of confidence, potentially resulting from being unfamiliar with the American Medical Association (AMA) guidelines (Adler & Rottunda, 2011; Jang et al., 2007; Sims, Rouse-Watson, Schattner, Beveridge, & Jones, 2012). Adler and Rottunda (2011) found that a majority of HCPs who did not discuss driving issues with their older patients were not familiar with the AMA guidelines, and that HCPs who were familiar with the guidelines were approximately 2.5 times as likely to address these topics with their patients as HCPs who were not familiar with the guidelines.

### ***Limitations***

This study was limited by a number of factors. The first limitation is related to the representativeness of the sample. These results reflect the responses of HCPs whose names and contact information were made available through a data clearinghouse. Persons whose contact information was not available through this source were excluded from participating in the surveys. Second, the overall response rate was low, decreasing the generalizability of the data. Mail surveys typically have low response rates, and with the addition of historically low response rates for physicians, this led to a lower than expected response rate (VanGeest, Johnson, & Welch, 2007). However, while the response rate was low potentially reducing the generalizability of the results, the results did mirror those found in other studies of rural-urban differences in HCP practice patterns as previously stated (Geller et al., 2008; Leira et al., 2008; Tough et al., 2008), perhaps providing more confidence in the generalizability of the results than would otherwise be seen with a low response rate.

Future research should focus on increasing response rates for the HCP population. Third, results could have been affected by social desirability bias. This is specifically in regards to the

high percent of HCPs indicating they provide mobility counseling to their older patients. HCPs may be aware of the behaviors that are expected of them, they may over-report providing these types of services to their patients.

### **Conclusion**

Logistic regression analyses indicated that rural HCPs are significantly less likely than urban HCPs to discuss safe driving habits or driving fitness with patients aged 75 to 84 and 85 or older, even after controlling for the effects of gender, ever having personally been involved in a vehicle rash, HCP specialty, percent of practice age 65 or older, and years practicing in current specialty. This research is an important first step toward determining the vital role HCPs play in reducing motor vehicle injuries and fatalities for both rural and urban older adults. With older adults disproportionately involved in fatal motor vehicle crashes in rural areas, the extent to which rural-urban disparities in HCP provision of mobility counseling to older drivers contribute to the increased motor vehicle injuries and fatalities in rural areas needs to be determined. Future research should focus on explaining the rural-urban differences in HCP mobility counseling provision and how this may contribute to increased motor vehicle injuries and fatalities for rural older drivers.

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# **PREDICTORS OF HEALTH CARE PROVIDER ANTICIPATORY GUIDANCE PROVISION RELATED TO DRIVING SAFETY/CESSATION FOR OLDER DRIVERS**

## **Abstract**

The current study explored frequency of driving safety/cessation-related anticipatory guidance provision and predictors of driving safety-related anticipatory guidance provision by health care providers. A survey of health care providers in several central/upper Midwest states found that predictors of driving safety/cessation-related anticipatory guidance provision differed by patient age. For younger patients, HCP personal experience with a motor vehicle crash (either the HCP themselves, or a friend/family member) was significant in predicting anticipatory guidance provision. For older patients, HCP practice rurality, HCP age, and percent of HCP practice aged 65 or older were significant in predicting driving safety/cessation-related anticipatory guidance provision.

## **Introduction**

Older drivers are overrepresented in driver fatalities, total traffic fatalities, and occupant fatalities (NHTSA, 2011; U.S. Census Bureau, 2011). This problem is projected to increase as the U.S. population continues to age and as the population aged 65 and older continues to make up a larger proportion of the population. The population aged 65 and older is projected to increase by as much as 178% by 2030, with fatal crash involvements by this population ballooning by approximately 155% in the same time period (Lyman, Ferguson, Braver, & Williams, 2002).

Health care providers (HCPs), such as physicians, nurse practitioners, and physician assistants, are in a position to provide driving-related anticipatory guidance to their older patients that may prevent motor vehicle injuries and fatalities. Anticipatory guidance is defined as the

provision of age-appropriate information to assist in preparing for anticipated physical and behavioral changes (Betz, Jones, Petroff, & Schwartz, 2013). It differs from counseling, in that it imparts proactive information to assist in the prevention of a future event, not the provision of information reacting to an event that has previously transpired (Nelson, Wissow, & Cheng, 2003). Although used mostly with children and their parents, anticipatory guidance has been found to be a critical but underused strategy, especially for adults (Ballesteros & Gielen, 2010). Research has shown that injury prevention counseling or anticipatory guidance by HCPs is associated with safer behaviors (Chen, Kresnow, Simon, & Dellinger, 2007; Posner, Hawkins, Garcia-Espana, & Durbin, 2004).

Considerable research has been conducted on identifying and screening for problem older drivers (Bogner, Straton, Gallo, Rebok, & Keyl, 2004; Jang et al., 2007; Kakaiya, Tisovec, & Fulkerson, 2000; Korner-Bitensky, Menon, von Zweck, & Van Bentham, 2010; Marshall & Gilbert, 1999), but little research has been conducted on solely providing anticipatory guidance on safe driving habits and pre-counseling specific to the provision of information to older drivers about aging-related driving expectations. In addition, no known research has been conducted on HCP predictors of driving cessation/safety-related anticipatory guidance provision, including HCP demographic characteristics, HCP practice characteristics, and HCP crash exposure. Moreover, no research has examined differences in HCP driving safety/cessation-related anticipatory guidance rates by patient age.

The goal of this research was to determine predictors of HCP provision of driving safety/cessation-related anticipatory guidance to older drivers by patient age. Previous research has shown that older HCPs are more likely to address driving issues during clinic office visits than younger HCPs (Adler & Rottunda, 2011). It was hypothesized that HCP age was a

significant predictor of driving safety/cessation-related anticipatory guidance provision, with older HCPs being more likely to provide this counseling than younger HCPs. HCP gender was also a significant predictor of prevention counseling (Barkin, Fink, & Gelberg, 1999; Galuska et al., 2002; Henderson & Weisman, 2001; Nelson et al., 2003). As research has shown that female HCPs are more likely to provide preventive counseling to their patients than male HCPs, it was hypothesized that female HCPs will be more likely to provide anticipatory guidance related to driving safety/cessation to their older patients than male HCPs. In relation to HCP practice characteristics, studies have shown that HCPs with a greater proportion of patients aged 65 or older in their practices are more likely to conduct driving assessments or to report unsafe drivers (Jang et al., 2007). Another hypothesis of this research was that HCPs who have practices with a greater proportion of patients aged 65 or older will be more likely to provide driving safety/cessation-related counseling than HCPs who have practices with a smaller proportion of older patients. Rurality also has been found to be significant in predicting counseling provision (Andrus, Kelley, Murphey, & Herndon, 2004; Kemper, Uren, Moseley, & Clar, 2006), with HCPs practicing in rural areas less likely to provide preventive counseling and anticipatory guidance to their patients than HCPs practicing in urban areas (Andrus et al., 2004; Probst, Moore, Baxley, & Lammie, 2002). Based on the previous research, it was hypothesized that HCPs practicing in rural areas will be less likely to provide driving safety/cessation-related counseling to their patients than HCPs practicing in urban areas.

Research has also connected personal experience to HCP counseling patterns across a broad expanse of subject matter, including, but not limited to, exercise habits (Abramson, Stein, Schaufele, Frates, & Rogan, 2000), breastfeeding (Freed et al., 1995), suicide prevention (Brunero, Smith, Bates & Fairbrother, 2008), and child injury prevention (Woods, 2006). In

regards to transportation-related personal experiences, a study by Weiss, O’Neil, Shope, O’Connor, and Levin (2012) found that pediatricians with patients injured or killed in a motor vehicle crash had a greater likelihood of discussing driving safety topics with their adolescent patients. Based on this previous research related to personal experience and counseling patterns, it is hypothesized that having had a friend or family member involved in a motor vehicle crash or having been involved in a motor vehicle crash themselves will increase the likelihood that HCPs will provide driving safety/cessation-related anticipatory guidance to their older patients. Researchers decided to focus on the personal experience of HCPs being in a motor vehicle crash, or having a close friend or family member in a motor vehicle crash as opposed to patients, as it was assumed that the former would evoke the more emotional response.

## **Method**

### ***Measures***

The survey used in this research was adapted from prior studies (Jang et al., 2007; Bogner et al., 2004), and with feedback from primary care physicians working for a large healthcare organization in North Dakota and Minnesota. The survey contained questions measuring the frequency with which HCPs are providing driving safety/cessation-related anticipatory guidance for patients aged 65 to 74, 75 to 84, and 85 or older (Table 6). HCPs were asked the frequency [“Seldom or Never”, “Occasionally”, “Frequently”, or “Always”], with which they discuss safe driving habits or driving fitness with their patients in specific age groups: 64 years or younger, 65 to 74 years of age, 75 to 84 years of age, and 85 years of age or older. Due to low response counts for the frequency range across the patient age groups, these variables were recoded into dichotomous variables, with “Seldom or Never” and “Occasionally” as one response, and “Frequently” and “Always” as the other response.

HCPs were also asked to provide general demographic information including age (open-ended), gender (male/female), specialty (ophthalmology/optometry, family medicine, internal medicine, geriatrics, other), size of community in which they practice, and percent of practice comprised of patients aged 65 or older (open-ended) In addition, HCPs were also asked if they had ever had a family member or friend involved in a vehicle crash (yes/ no) or if they had ever been involved in a vehicle crash (yes/no).

### ***Participants***

Provider contact information was purchased from an online physician contact information database company. Physicians (MDs, DOs) and midlevels (Physician Assistants, Nurse Practitioners) with a specialty of ophthalmology/ optometry, family medicine, internal medicine, or geriatrics were selected for inclusion in this survey due to higher usage of these specialties for older adults (Pettersson et al., 2012; Lee, Hoskins, Smith, Hutchinson, & Wong, 2007).

HCPs in the following states were surveyed: North Dakota, South Dakota, Utah, Colorado, and Wyoming. The specific states selected for use in this study are part of the National Highway Traffic Safety Administration's Region 8 (NHTSA, 2014).

A list of 7,557 HCPs were obtained. After Institutional Review Board authorization was obtained from North Dakota State University, the first wave of surveys was mailed in January 2013 to 2,600 randomly selected HCPs. The second wave of surveys was mailed in March 2013. All survey data was manually entered into SPSS Version 20.0.

The Census Bureau defines urbanized areas as having a population of at least 50,000 (U.S. Census Bureau, N.D.). Because of this, the variable measuring rurality was dichotomized with rural communities defined as those having 49,999 or fewer people and urban communities defined as those with 50,000 or more people. More than half of respondents (58.8%) stated they

practiced in a community of 49,999 people or less, with 41.2% practicing in communities of 50,000 or more people (Table 6).

*Table 6. Health Care Provider Demographics*

<b>Characteristic</b>	<b>No. (%)</b>
Gender	n=254
Male	184 (72.4)
Female	70 (27.6)
Age	n=253
Mean years (SD)	54.6 (9.527)
Specialty	n=255
Ophthalmology/Optomety	21 (8.2)
Family Medicine	143 (56.1)
Internal Medicine	40 (15.7)
Geriatrics	3 (1.2)
Other	48 (18.8)
Percent of practice with 65+ patients	n=255
Mean percent (SD)	46.0% (21.623)
10% to 25%	56 (22.0)
26% to 50%	111 (43.5)
51% to 75%	67 (26.3)
76% or Greater	21 (8.2)
Had family member/friend involved in vehicle crash	n=252
Yes	201 (79.8)
No	47 (18.7)
Do not know	4 (1.6)
Respondent involved in crash	n=254
Yes	163 (64.2)
No	91 (35.8)
Community Size	n=255
Less than 10,000	77 (30.2)
10,000 to 49,999	73 (28.6)
50,000 to 99,999	34 (13.3)
100,000 to 499,999	49 (19.2)
500,000 or more	22 (8.6)

SD=Standard Deviation

Overall, slightly less than three-fourths of respondents were male (72.4%) (Table 6). The average age of all respondents was 54.6 years. The majority of respondents stated their specialty was family medicine (56.1%), with 15.7% in internal medicine. Respondents were asked to

approximate the percent of their practice comprised of patients aged 65 years of age or older. On average, 46% of respondent practices were comprised of patients aged 65 or older. Respondents were asked if they have ever had a family member or friend involved in a vehicle crash, or if they had ever been involved in a vehicle crash. More than three-fourths of respondents stated they had a friend or family member who had been involved in a vehicle crash (79.8%), and 64.2% stated they had been in a vehicle crash.

### *Statistical Analyses*

Because the outcome variables were dichotomous and the goal of the research was to determine the predictors of mobility counseling provision by HCPs, binary logistic regression was used, with statistical significance set at  $p \leq 0.05$ . Independent variables used in the analysis include: HCP ever having had a family member or friend involved in a vehicle crash, HCP ever having been in a vehicle crash, HCP practice rurality, HCP age, HCP gender, and percent of HCP practice aged 65 or older.

The following assumptions related to binary logistic regression were checked: linearity in the logit, multicollinearity, independence of errors, and absence of outliers. None of the assumptions related to binary logistic regression were violated. Absence of outliers was checked by running binomial logistic regression and selecting the option to save standardized residuals. The standardized residuals were then checked against the benchmark of being greater than 2.58 or less than -2.58. Anything outside of this range was considered an outlier and excluded from the analysis. Analysis of the standardized residuals revealed ten responses with values greater than 2.58 indicating they were outliers in the dataset, and they were removed prior to running the final regression model.



## Results

Of the 2,600 surveys sent out, 265 HCPs completed and returned the survey for an overall response rate of 10.2%.

For the binary logistic regression results, a lower odds ratio (OR) indicates a lower likelihood of HCP provision of mobility counseling to their patients (Table 7). For patients aged 65 to 74, HCPs who had a friend or family member involved in a vehicle crash were nearly 16 times as likely to provide mobility counseling to this populations than those who had never had a family member involved in a vehicle crash (OR=15.957, 95% CI=1.828-139.265, p=0.0122). However, the large confidence interval (1.828-139.265) suggests a decreased level of accuracy in the OR (Szumilas, 2010). HCPs who had ever been in a vehicle crash themselves were less likely than those who had been in a crash to provide counseling to their patients aged 65 to 74 (OR=0.225, 95% CI=0.081-0.625, p=0.0042). In addition, male HCPs (OR=0.354, 95% CI=0.123-1.021, p=0.0550) were also less likely than female HCPs to provide mobility counseling to their patients aged 65 to 74. Community size, HCP age, and percent of practice aged 65 or older were not significant predictors of mobility counseling provision to patients aged 65 to 74.

HCPs practicing in communities of 49,999 people or fewer were 0.379 times as likely as those in more urban areas to provide driving safety-related counseling to their patients aged 75 to 84 (OR=0.379, 95% CI=0.204-0.704, p=0.0020). For every additional year in HCP age, the odds of providing mobility counseling to patients aged 75 to 84 increased by 3.2% (OR=1.032, 95% CI=1.001-1.064, p=0.0430). Having a family member being involved in a vehicle crash, having the HCP having been involved in a vehicle crash, HCP gender, and percent of practice aged 65

or older were not significant predictors of mobility counseling provision to patients aged 75 to 84.

Table 7. Logistic Regression Model of Mobility Counseling Provision by Patient Age

Variable	Patient Age 65 to 74					
	B	S.E.	P-value	OR	95% CI	
					Lower	Upper
Had a family member involved in vehicle crash	2.770	1.105	0.01	15.957	1.828	139.265
HCP involved in vehicle crash	-1.490	0.521	0.00	0.225	0.081	0.625
HCP practice community size of 49,999 or fewer people	-0.587	0.525	0.26	0.556	0.199	1.558
HCP age	0.006	0.024	0.79	1.006	0.960	1.055
HCP male	-1.039	0.541	0.06	0.354	0.123	1.021
Percent of HCP practice 65 or older	0.015	0.011	0.19	1.015	0.993	1.038

Variable	Patient Age 75 to 84					
	B	S.E.	P-value	OR	95% CI	
					Lower	Upper
Had a family member involved in vehicle crash	0.699	0.399	0.08	2.012	0.920	4.400
HCP involved in vehicle crash	-0.441	0.32	0.17	0.643	0.344	1.205
HCP practice community size of 49,999 or fewer people	-0.971	0.316	0.00	0.379	0.204	0.704
HCP age	0.032	0.016	0.04	1.032	1.001	1.064
HCP male	-0.169	0.334	0.61	0.845	0.439	1.624
Percent of HCP practice 65 or older	0.012	0.008	0.12	1.012	0.997	1.027

Variable	Patient Age 85 or Older					
	B	S.E.	P-value	OR	95% CI	
					Lower	Upper
Had a family member involved in vehicle crash	0.08	0.375	0.83	1.083	0.519	2.258
HCP involved in vehicle crash	-0.052	0.313	0.87	0.949	0.514	1.751
HCP practice community size of 49,999 or fewer people	-0.799	0.312	0.01	0.450	0.244	0.829
HCP age	0.048	0.016	0.00	1.049	1.017	1.082
HCP male	-0.387	0.324	0.23	0.679	0.360	1.282
Percent of HCP practice 65 or older	0.017	0.008	0.02	1.017	1.002	1.032

HCPs practicing in communities of 49,999 people or fewer were 0.450 times as likely as those in more urban areas to provide driving safety-related counseling to their patients aged 85 or older (OR=0.450, 95% CI = 0.244-0.829, p=0.0100). For every additional year in HCP age, the odds of providing mobility counseling to patients aged 85 or older increases by 4.9% (OR=1.049, 95% CI=1.017-1.082, p=0.0030). For every percent increase in patients aged 65 or older within their practice, HCPs are 1.7% more likely to provide driving safety-related counseling to their patients aged 85 or older (OR=1.017, 95% CI=1.002-1.032, p=0.0230). Having a family member being involved in a vehicle crash, having the HCP being involved in a vehicle crash, and HCP gender were not significant predictors of mobility counseling provision to patients aged 85 or older.

### **Discussion**

HCPs are uniquely placed in society to initiate driving safety/cessation-related anticipatory guidance to their older patients, and are frequently turned to as experts in this area. The goal of this study was to determine HCP predictors of driving safety/cessation-related anticipatory guidance provision by patient age. HCPs in several upper Midwest states were surveyed to determine their current frequency of driving safety/cessation-related anticipatory guidance provision to their older patients by patient age, in addition to demographic and practice-related predictors of this counseling. Predictors of mobility counseling provision differed by patient age. HCP personal experience with a motor vehicle crash (either the HCP themselves, or a friend/family member) was found to be a significant predictor of HCP provision of mobility counseling for patients aged 65 to 74. In contrast, HCP mobility counseling predictors for patients aged 85 or older included size of the community in which the HCP practiced (rurality), HCP age, and percent of HCP practice aged 65 or older.

The results associated with HCP age were consistent with previous research (Adler & Rottunda, 2011). It is thought that older HCPs are more apt to provide driving safety/cessation-related anticipatory guidance to their older drivers due to having the advantage of accumulated knowledge and skills from additional years of health care practice, which may provide them with additional confidence in dealing with a challenging topic such as driving safety and cessation (Adler & Rottunda, 2011). Additionally, older HCPs may be more aware of this issue because of personal experiences, such as contending with older drivers within their own family (Adler & Rottunda, 2011). It is interesting that HCP age was not a significant predictor of mobility counseling for patients aged 65 to 74, but only for those aged 75 or older. A mindset might exist among HCPs that because “young-old” patients (i.e. those aged 65 to 74) are not exhibiting signs of aging-related change which may affect driving ability, HCPs do not need to provide information to this age group regarding driving safety/cessation. HCPs may not feel that proactive mobility counseling is necessary to their “young-old” patients, thereby pushing HCP provision of mobility counseling to those patients who they feel need it more (i.e. those aged 75 or older) as they are more likely to display outward symptoms of aging-related physical and cognitive changes which may affect driving ability.

The predictability of the proportion of patients aged 65 or older in a clinical practice as related to HCP provision of driving safety/cessation-related anticipatory guidance was also consistent with previous research (Jang et al., 2007). HCPs with a larger proportion of patients aged 65 or older in their practice were more likely to provide mobility counseling to their patients, but this was significant only for patients aged 85 or older. HCPs with a greater number of older patients in their practice may be more comfortable bringing this topic up to older patients. However, all HCPs in this study may be reticent to broach the subject of driving issues

with their patients who are younger than 85 for several reasons. First, HCPs may be unsure of the role they should be playing in the driving process with their older adult patients who have not yet begun to exhibit signs of aging-related physical and cognitive changes which may affect their driving ability (Adler & Rottunda, 2011; Bogner et al., 2004). Second, time may be a barrier to broaching this subject with their patients (Friedland, Rudman, Chipman, & Steen, 2006). HCPs have identified they have little time to attend to their patients' primary complaints, let alone to providing counseling related to driving, especially if the need to do so is not imperative. There is a considerable likelihood they would wait to discuss this topic with their patients until they had issues which may affect driving safety. Finally, the decreased likelihood to provide mobility counseling to patients younger than age 85 may be related to the discomfort felt by HCPs in broaching the subject and the fear of upsetting the HCP-patient relationship (Bogner et al., 2004; Friedland, et al., 2006; Jang et al., 2007; Hakamies-Blomqvist, Henriksson, Falkmer, Lundberg, & Braekhus, 2002; Miller & Morley, 1993; Sims, Rouse-Watson, Schattner, Beveridge, & Jones, 2012). In fact, some research has shown a change in the HCP-patient relationship directly resulting from mobility counseling (Redelmeier, Yarnell, Thiruchelvam, and Tibshirani, 2012).

The association between rurality and the provision of mobility counseling is also consistent with previous research (Andrus et al., 2004; Kemper et al., 2006). HCP practice rurality was significantly predictive for mobility counseling provision for patients aged 75 or older, with urban providers being more likely to provide mobility counseling to their patients. Because they are practicing in smaller communities, rural HCPs may feel an increased pressure to preserve a good relationship with their patients by not bringing up topics which may affect the HCP-patient interaction, such as driving safety or driving cessation (Bogner et al., 2004;

Friedland, et al., 2006; Hakamies-Blomqvist, et al., 2002; Jang et al., 2007; Miller & Morley, 1993; Sims, et al., 2012).

Study results related to an HCP's personal experience with motor vehicle crashes was also found to be significantly predictive of mobility counseling to older drivers. If the HCP had ever had a family member involved in a motor vehicle crash they were more likely to provide mobility counseling for patients aged 65 to 74, but not for patients aged 75 or older. This result was similar to previous research that indicated HCP personal experience is related to increased patient counseling (Abramson et al., 2000; Brunero et al., 2008; Weiss et al., 2012). However, this study also found that HCPs who had been involved in a motor vehicle crash were less likely than those who had not been involved in a crash to provide mobility counseling to their patients aged 65 to 74, contradicting the original hypothesis that having been in a motor vehicle crash would increase the likelihood that an HCP would provide this information to their older patients. The reasons for this are unclear, and additional research should examine this finding further.

This study has the following limitations. First, the sample used for this study may not be representative of the population being studied. The results of this study represent responses from HCPs whose contact information was available through a data clearinghouse. HCPs who did not have their contact information listed in such a manner were not provided an opportunity to participate in this study. A second limitation of this study was the low response rate. Historically, HCP mail surveys have resulted in lower response rates than the general population (Cummings, Savitz, & Konrad, 2001; VanGeest, Johnson, & Welch, 2007). One way to increase response rates for future surveys of HCPs would be to utilize a modified Dillman approach (Adler, Rottunda, & Kuskowski, 2012; Thorpe et al., 2009). This would entail using a "respondent-friendly" survey, using a minimum of three contacts via first-class mail, using return

envelopes with stamps, personalizing the cover letter, and having some sort of incentive (Thorpe et al., 2009, p. 66). An additional limitation of this study was related to social desirability bias (Van de Mortel, 2008). HCPs may have responded positively to providing anticipatory guidance to their older patients knowing that this counseling is expected of them, thereby over-reporting the provision of these services to their older patients. However, there were still several statistically significant predictors of driving safety/cessation-related anticipatory guidance provision, even with the possible presence of this bias.

### **Conclusion**

The current study suggests that predictors of HCP driving safety/cessation-related anticipatory guidance provision differ by patient age. Several issues have arisen as a result of this study which should be fleshed out by future research. An important next step would be to determine the reasons patient age may be a predictor of mobility counseling. HCPs are potentially beginning mobility counseling too late, waiting for red-flag aging-related changes to materialize and affect driving before broaching the subject with their patient. Additionally, future research should provide reasons for the increased provision of mobility counseling by older HCPs and for HCPs with a greater proportion of older adults in their practices. Finally, research should focus on the connection between rurality and HCP provision of mobility counseling to older drivers. Research has alluded to the existence of a rural culture (Hartley, 2004), and future studies should examine this as a possible explanation for the rural-urban differences borne out in this research. As baby boomers continue to age and remain drivers longer, the need to find answers to these questions will become more pressing. This research is an important first step in determining the differences in HCP driving safety/cessation-related anticipatory guidance provision to older adults.

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## GENERAL CONCLUSIONS

The purpose of this study was to explore the role of health care providers in the provision of driving safety/cessation-related anticipatory guidance to their older patients. The population is aging, and the number of older drivers will continue to increase. Aging-related physical and cognitive changes affect driving ability in older adults, which for most will require proactive planning for the time in their lives when they are no longer able to drive. HCPs are knowledgeable about aging-related changes, and are ideally placed in society to provide information to older drivers about the impending physical and cognitive changes that may eventually affect their driving competence. Very little research has focused on HCP provision of anticipatory guidance related to driving safety/cessation, meaning providing information to older adults before red-flag symptoms arise that require an older driver to discontinue driving. This study added to the literature by examining the frequency with which HCPs providing driving safety/cessation-related anticipatory guidance to their older patients, HCP attitudes and perceptions related to the provision of driving safety/cessation-related anticipatory guidance, and HCP demographic and practice predictors of driving safety/cessation-related anticipatory guidance.

Based on this research, two articles were authored. The first article focused on differences by rurality in HCP provision of mobility counseling. Research has confirmed the existence of health care provision and health outcomes disparities by rurality. However, no research has delved into rural/urban differences in HCP provision of mobility counseling to older drivers. The second article concentrated on determining the HCP demographic and practice predictors of driving safety/cessation-related anticipatory guidance.

The first article added to the literature on health care provision disparities by rurality. It was found that rural-urban differences exist in HCP provision of mobility counseling to older drivers, with rural HCPs less likely to provide this information to their patients than urban HCPs. While this is an important finding, it is unfortunate to see this as a reality in the lives of rural older adults. Practice patterns of rural and urban HCPs seem to deviate at a vital stage in an older adult's life, when aging-related physical and cognitive changes may be more likely to materialize, which may affect an older adult's ability to drive. Additionally, the results indicated rural-urban differences in HCP attitudes and perceptions related to the availability of resources and knowledge of and behaviors related to referring patients to appropriate resources for driving fitness assessments. Previous research has shown differences in the availability of resources for HCPs in rural areas as compared to their urban counterparts (Bonham, Salvador, Altschul, & Silverblatt, 2014; Brems, Johnson, Warner, & Roberts, 2006). The lack of resources for rural HCPs puts an unfair burden on older adults in rural areas, affecting the frequency of mobility counseling information they are receiving, possibly affecting the choices they are making related to driving as they continue to experience aging-related physical and cognitive changes.

Findings for the second article showed differences in HCP predictors of mobility counseling provision to older drivers. HCP personal experience has been found to be predictive of HCP counseling patterns in many areas such as exercise habits (Abramson, et al., 2000), suicide prevention (Brunero et al., 2008), and driving safety for adolescents (Weiss et al., 2012). In the current study, personal experience with a motor vehicle crash (either themselves or a friend/family member) was a significant predictor of HCP provision of mobility counseling for "young-old" patients. HCPs who have had friends or family members involved in a vehicle crash were more likely to provide counseling to patients in this age group, while HCPs who have

been involved in a motor vehicle crash were less likely to provide counseling to these patients. For “old-old” patients, HCPs were more likely to provide counseling if their practice was located in a rural area, if they were older, and if they had a greater percent of patients in their practice aged 65 or older. Results from this study extend into areas previously unstudied and will provide direction for new areas of future research related to mobility counseling for older drivers.

### **Strengths of Study**

The researcher sought to examine HCP counseling behaviors, and a quantitative methodology, specifically survey research, met this goal for several reasons. Two main advantages to using a survey to collect data include the relative low cost of survey research and the potential for collecting a large amount of data (Kelley, Clark, Brown, & Sitzia, 2003). Also, depending on the sampling methodology used, the size of the sample, and the response rate, the data collected can be generalizable to a population (Kelley et al., 2003). Considering the population being surveyed, HCPs who have precious little time to spare in a given day, the mail survey can be completed at the pleasure of the respondent. Additionally, respondents of mail surveys are less likely to provide socially desirable responses, and to bend their responses in the presence of a telephone interviewer or in-person interviewer, which will ideally result in more truthful responses (Dillman et al., 2009).

The major strength of this study lies in its foci. This research is the first known study to focus on rural-urban differences in differences in the frequency of HCP mobility counseling provision to older drivers, in addition to rural-urban differences in HCP attitudes and perceptions related to this topic. Additionally, this research is the first known study to examine HCP predictors of mobility counseling provision for older drivers. This research is fundamental in the continuation of research as it relates to older driver research.

## **Limitations of Study**

Several study limitations were recognized. First, the response rate for this study was exceptionally low. HCP mail surveys have historically resulted in lower response rates as compared to the overall population (Cummings, Savitz, & Konrad, 2001; VanGeest et al., 2007). There are many reasons why HCPs may have lower response rates. HCPs tend to be extremely busy, and often they focus only on patient-related activities, to the exclusion of other activities, such as participating in a mobility counseling study (VanGeest et al., 2007). Another reason that HCPs tend not to participate in survey research is due to the topic of the study, and its relevance to the HCP's practice. HCPs are less likely to fill out a survey if they do not feel the study has value (VanGeest et al., 2007). An option for future research to increase response rates of HCPs would be to use the modified Dillman approach (Adler et al., 2012; Thorpe et al., 2009). In this approach, a "respondent-friendly" survey is used, including contacting potential respondents a minimum of three times via first-class mail, using self-addressed stamped return envelopes, providing a personalized cover letter, and including some sort of incentive, such as a small monetary reward, or other inexpensive items (Thorpe et al., 2009, p. 66).

A second limitation is related to the representativeness of the sample to the overall population. The study results include responses from HCPs who had contact information available via an online data clearinghouse. HCPs who did not have their contact information available through this means were not given the opportunity to contribute to this study.

A third limitation is related to social desirability bias (Van de Mortel, 2008). Studies that rely on self-report responses have the expectation that the responses provided will be accurate and truthful. Social desirability bias is related to survey participants providing responses so as to give themselves a more favorable image in the eyes of either the researchers or society in general



(Van de Mortel, 2008). Social desirability bias tends to occur more frequently in studies that include “socially sensitive questions” (Van de Mortel, 2008, p. 41). Given that many HCPs in this study felt that discussing driving safety/cessation with their patients would negatively affect the physician-patient relationship, this topic may be considered socially sensitive, thereby increasing the likelihood they would falsify their responses to produce a more socially appropriate response.

A fourth limitation is related to the sampling design. Ideally, sampling would have stratified not only on rurality but also on HCP degree and specialty. Research has shown that differences in practice patterns and counseling provision exist between midlevel providers (nurse practitioners and physician’s assistants) and physicians (MD/DOs) (Hopkins, Lenz, Pontes, Lin & Munding, 2005; Running, Kipp, & Mercer, 2006). In addition, when examined in the lens of rurality, many rural areas are served mostly by midlevel providers (Probst et al., 2002) which can affect study results. Also, research has shown that physicians in different specialties tend to have different practice styles and patterns, demonstrating the importance of controlling for or reporting the distribution of specialty in research results (Bertakis et al., 1998; Jay et al., 2008; Park, Wolfe, Gokhale, Winickoff, & Rigotti, 2005; Perez-Stable et al., 2001). While it would have been ideal to conduct this comparison within this study, the number of respondents per HCP specialty category was not sufficient to be able to conduct this analysis.

A fifth limitation was associated with survey question design and inclusion. The questions related to personal experience of involvement related to motor vehicle crashes were too broad. Both of the questions asked about involvement in a vehicle crash, which might be interpreted to include a range of crash outcomes, anywhere from minor vehicle damage to a crash involving severe injuries or fatalities. This may have affected the results, as a majority of

respondents stated that they had been involved in a crash, or had friends or family members involved in a crash. Rewording the questions to include only serious crashes might have resulted in different outcomes. Additionally, the survey failed to include a question related to race or ethnicity. Research has shown that health care provider demographic characteristics might influence practice behaviors (Berger, 2008), and the inclusion of a question related to race and ethnicity might have provided additional insight into this phenomenon.

Finally, an additional limitation to this study was the lack of focus on personal experience with older friends or family members and driving issues. While we determined the extent of personal experience with motor vehicle crashes, one area which we did not explore was personal experience with older drivers. This may have provided additional insight into the impetus for providing mobility counseling to older drivers.

### **Implications for Future Research**

The results of this research have opened the door for topics related to older drivers that should be explored by future research. This research found that rural-urban differences exist in HCP provision of mobility counseling to older drivers. The next step would be to explore the connection between these differences in mobility counseling and rural older adult overrepresentation in motor vehicle injuries and fatalities statistics. Additionally, why are these differences present? Researchers should examine the presence of a rural culture as a possible explanation for the differences in the provision of mobility counseling seen by rurality. Also, researchers might explore the extent of training being provided to urban HCPs as compared to rural HCPs as related to confidence levels. Many physicians also do not counsel on driving cessation issues due to a lack of confidence possibly resulting from unfamiliarity with guidelines outlined by the American Medical Association (AMA) (Adler & Rottunda, 2011; Jang et al.,

2007; Sims et al., 2012). Adler and Rottunda (2011) found that three-fourths of health care providers who did not address driving cessation with the patients were not familiar with AMA guidelines, and that physicians who were familiar with the guidelines were 2.5 times as likely to address driving cessation with their patients as physicians who were unfamiliar with the guidelines. An important next step of this research is to determine whether rural HCPs lack training in this area.

Another area of research that would be valuable to explore is the gradual introduction of driving safety/cessation information to older patients starting before red-flag aging-related changes affecting driving ability occur. Early provision of anticipatory guidance related to driving safety/cessation provided prior to the occurrence of physical or mental changes in an older adult may allow the patient to become used to the idea of the possibility of needing to reduce or cease driving sometime in the future, thereby decreasing the discomfort felt by physicians in providing this information. The transition to non-driving status by older adults may be made less stressful by preparing ahead of time for expected driving cessation. A longitudinal study on differences in driving transitions of older drivers would be ideal in determining if earlier provision of mobility counseling assists in the transition to driving cessation.

Another area of research to investigate would be the effect of anticipatory guidance on older adult driving behavior. Previous research has found anticipatory guidance to be effective at improving injury prevention behavior for some areas, including child passenger safety and seat belt use, yet it is unclear whether such guidance is effective for mobility counseling. Future research should determine the efficacy of mobility counseling on older adult driving behavior,

including the successful continuation of driving due to driving modifications based on aging-related changes, or successful transition to driving cessation based on HCP recommendations.

Additionally, research can focus on the rationale for the HCP predictors borne out in this study. This study found differences in provision of mobility counseling by HCP age, HCP rurality, percent of HCP practice aged 65 or older, and HCP personal experience with motor vehicle crashes. Another next step of this research would be to examine the reasons behind the differences in mobility counseling provision by HCP characteristic, and to extend this research to examine differences in mobility counseling by HCP specialty and HCP type (i.e. doctor vs. midlevel provider).

Future research can also focus on other potential providers of mobility counseling. Although health care providers have been identified as being a trusted source of information for older adults, researches should examine if other sources of information may be more or less successful in providing this information to older adults. For example, an additional potential source of information includes registered nurses (RNs). As RNs are usually the first point of contact during a visit to a health care provider, researchers could flesh out the specific role which RNs could play in providing mobility counseling to older drivers.

Finally, an important area in which additional research should be conducted is related to health care policy. National Ambulatory Medical Care Survey (NAMCS) shows that although physician-reported face-to-face interaction time is gradually increasing, an average office visit is only 18.7 minutes (Gottschalk & Flocke, 2005). This can be an issue because less pressing issues, such as injury prevention counseling, can be overlooked, when under such time constraints. Additionally, based on current reimbursement policies HCPs are often not reimbursed for providing lifestyle counseling services or other advice-centered patient services,

providing yet another reason this information may not be provided to older adults (Bodenheimer & Pham, 2010). Future research should examine potential improvements in mobility counseling provision with incremental changes in health care reimbursement policy.

As the population continues to age and remain drivers longer, the necessity to find answers to these questions will become more pertinent. This research is a significant first step in determining the disparities in HCP driving safety/cessation-related anticipatory guidance provision to older adults.

### **Summary**

This study explored the role of HCPs in providing mobility counseling to older drivers, specifically the frequency with which they are providing this information and the relation of HCP demographic and practice predictors to providing this material to older drivers. A mail survey of HCPs in several states in the Midwest revealed differences in the frequency of mobility counseling provision to older drivers by patient age, differences in attitudes and perceptions associated with several mobility counseling-related items, and differences in HCP predictors of mobility counseling provision.

As the population continues to age, the number of older drivers will continue to increase as well. Driving is a vital source of independence for older adults, and has been tied to health outcomes. As HCPs are knowledgeable about aging-related changes that may affect driving ability, and as older adults are more likely to follow the advice of their HCP, it is imperative to understand the importance of HCP provision of mobility counseling. This study is a vital stepping stone in the mobility counseling literature, fleshing out the significant role of HCPs in the continuing older driver conversation.

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## APPENDIX A. IRB APPROVAL

**NDSU**

**NORTH DAKOTA STATE UNIVERSITY**

*Institutional Review Board*

*Office of the Vice President for Research, Creative Activities and Technology Transfer*

*NDSU Dept. 4000*

*1735 NDSU Research Park Drive*

*Research 1, P.O. Box 6050*

*Fargo, ND 58108-6050*

701.231.8995

Fax 701.231.8098

Federalwide Assurance #FWA00002439

Tuesday, November 13, 2012

Andrea Huseth  
Pharmacy Practice  
118 Sudro Hall

**Re:** IRB Certification of Exempt Human Subjects Research:  
Protocol #PH13072, "Anticipatory Guidance for Older Drivers"

Co-investigator(s) and research team: n/a

Certification Date: 11/13/2012

Expiration Date: 11/12/2015

Study site(s): NDSU

Funding: DOT/Mountain Plains Consortium

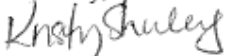
The above referenced human subjects research project has been certified as exempt (category # 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*). This determination is based on the protocol (received 11/8/2012).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- Conduct the study as described in the approved protocol. If you wish to make changes, obtain approval from the IRB prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

Sincerely,



Kristy Shirley, CIP, Research Compliance Administrator

## APPENDIX B. HEALTH CARE PROVIDER SURVEY INSTRUMENT

**NDSU**

PUBLIC HEALTH

**NORTH DAKOTA STATE UNIVERSITY**

*College of Pharmacy, Nursing, and Allied Sciences*

*Master of Public Health Program*

*NDSU Dept. 2660; P.O. Box 6050*

*Fargo, ND 58108-6050*

*701.231.6323*

*Fax 701.231.7606*

December 3, 2014

RE: Health Care Providers and Older Drivers Survey

Dear Health Care Provider,

North Dakota State University in Fargo, North Dakota is conducting a survey of issues concerning older drivers and health care providers, including MDs, DOs, NPs, and PAs. We are inviting you to participate in this research project. Enclosed with this letter is a brief survey asking a variety of questions regarding older driver issues. We are asking you to look over the survey, and if you choose to do so, complete it and return it in the enclosed postage paid envelope. Please do not include your name or address on the return envelope or survey.

Your participation in this research study is voluntary and your response is confidential. The survey will take approximately 5-10 minutes to complete. By returning the survey to us, you are providing your consent to participate in the project.

Any questions about this survey can be referred to Andrea Huseth at (701) 231-8681 or [andrea.huseth-zosel@ndsu.edu](mailto:andrea.huseth-zosel@ndsu.edu). If you have any questions about your rights as a research subject, or if you would like to file a complaint about this research, please contact the NDSU Human Research Protection Program at 1-855-800-6717, [ndsu.irb@ndsu.edu](mailto:ndsu.irb@ndsu.edu), or NDSU HRPP Office, NDSU Dept. 4000, PO Box 6050, Fargo, ND 58108-6050. The role of IRB is to see that your rights are protected in this research. This project is funded by the Mountain Plains Consortium through a grant from the U.S. Department of Transportation.

Sincerely,



Dr. Donald Warne, MD, MPH  
Associate Professor and Director  
Master of Public Health Program  
North Dakota State University

**Are you currently in an active clinical practice that includes patients 65 years of age and older?**

- Yes. Please complete the rest of the survey.  
 No. Thank you for your time. Please do NOT complete the rest of the survey.

1. On a scale from one to five with one being “Strongly Disagree” and five being “Strongly Agree”, please rate your level of agreement with the following statements by circling the most appropriate response:

	Strongly Disagree	Disagree	Depends	Agree	Strongly Agree
In my practice setting, there is adequate time during regular visits to provide counseling regarding a patient’s fitness to drive.	1	2	3	4	5
I know where to refer older patients if they have questions regarding their fitness to drive.	1	2	3	4	5
Health care providers should advise older patients on their fitness to drive.	1	2	3	4	5
It is the responsibility of health care providers to report patients who may be a danger to others on the road.	1	2	3	4	5
Older drivers get consistent advice on their fitness to drive from health care professionals.	1	2	3	4	5
Health care providers are the most qualified professionals to discuss driving fitness with older drivers.	1	2	3	4	5
I am concerned that patients will become angry if I bring up the subject of <u>driving cessation</u> .	1	2	3	4	5
I know the procedure in my state for reporting a patient who is potentially a dangerous driver.	1	2	3	4	5
There are adequate resources for older adults to get assistance with assessing their fitness to drive.	1	2	3	4	5
I am concerned that patients will become angry if I bring up the subject of <u>driving safety</u> .	1	2	3	4	5
As a health care provider, it is my responsibility to counsel older drivers on their fitness to drive.	1	2	3	4	5
I am aware of whether my older patients are active drivers.	1	2	3	4	5
I refer patients to a driving fitness evaluation resource in my community when I am uncertain of a patients’ ability to drive safely.	1	2	3	4	5
I am confident in my ability to provide counseling to my older patients on their ability to drive.	1	2	3	4	5
I would benefit from further education about assessing driving fitness.	1	2	3	4	5

2. How frequently do you discuss safe driving habits or driving fitness with patients in the following age groups:

Age	Seldom or Never	Occasionally	Frequently	Always
64 years or younger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65 to 74 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75 to 84 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85 years or older	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Please list any barriers you perceive to providing counseling to older adults regarding driving issues.

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4. Have you ever told an older driver that they should limit their driving or discontinue driving?

- Yes     No     Do Not Know

5. Have you ever had a family member or friend involved in a vehicle crash?     Yes     No     Do Not Know

6. Have you ever been involved in a vehicle crash?     Yes     No

The following questions ask about you and your practice:

7. In which state do you currently practice? \_\_\_\_\_

8. What is the population of the community in which you currently practice?

- Less than 10,000     10,000-49,999     50,000-99,999     100,000-499,999     500,000 or more

9. What is your age? \_\_\_\_\_ years

10. What is your gender?     Male     Female

11. What is your specialty?     Ophthalmology/Optometry     Family Medicine     Internal Medicine  
 Geriatrics     Other \_\_\_\_\_

12. Please specify your degree:     MD/DO     PA/NP     Other (please list) \_\_\_\_\_

13. Approximately what percent of your practice is comprised of patients aged 65 or older? \_\_\_\_\_%

14. How many years have you been practicing in your current specialty? \_\_\_\_\_ years

**Thank you for your response!**

**Please return this survey in the envelope provided to you.**

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