What Can Crash Data Tell Us About Older Drivers in North Dakota?

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Older drivers represent a growing segment of North Dakota's driver population. North Dakota currently has the highest proportion of 85-years-and-older residents, and by 2030, one in five residents will be 70 years or older. Older adults have received local and national attention as a high risk group based on elevated injury rates. In 2007, The North Dakota Department of Transportation (NDDOT) focused on the issue of older drivers locally as an area of emphasis in its Strategic Highway Safety Plan.

Driving is a complex task. Diminished visual, cognitive, and physical capabilities that are part of the normal aging process may pose challenges for older drivers when identifying and reacting to signals in the driving environment. One example of recent scholarship focused on the mature driving population, illustrated in Figure 1, has explored the increasing need for light as drivers age (Trusty 2008). Cognitive challenges often include decreased ability to process complex problems and slower reaction time. Reduced range of motion in the upper torso as well as less leg strength may also pose problems for older drivers in making vehicle maneuvers such as turning and braking. In one study, drivers over 71 who had limited physical mobility were found to be 1.3 times more likely to incur citations and be involved in crashes (Marottoli et. al 1998 and 1994).

The goal of this research was to gain an understanding of the risks to North Dakota's older drivers and to develop short and long term countermeasures to reduce risks. This analysis utilized North Dakota Department of Transportation crash records from 2004 to 2008. In addition to records for older drivers (70 years and older), a control group was established using crash records involving drivers between the ages of 35 and 54. The relative accident involvement ratio (RAIR) was used to assess driver performance. The RAIR is a quasi-induced exposure measure used to estimate relative risk for a target driver population. With this method, data is normalized through relative risk assessment by using cohort data for a group of interest from the same source.

Figure 1. Luminance Needs, by Age

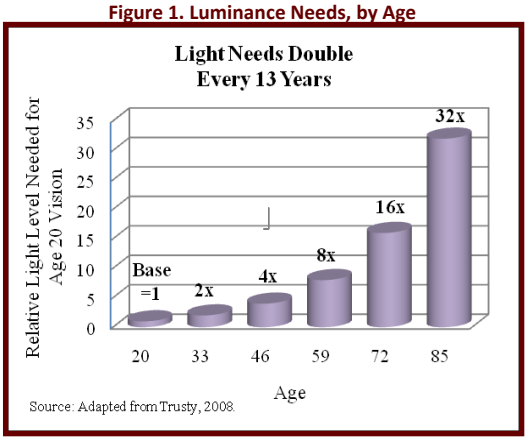


Figure 2. Fatal and Serious Driver Injury per 100 MVMT, 2004 to 2008

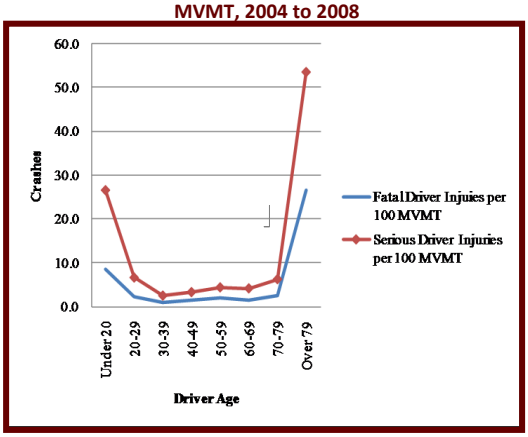
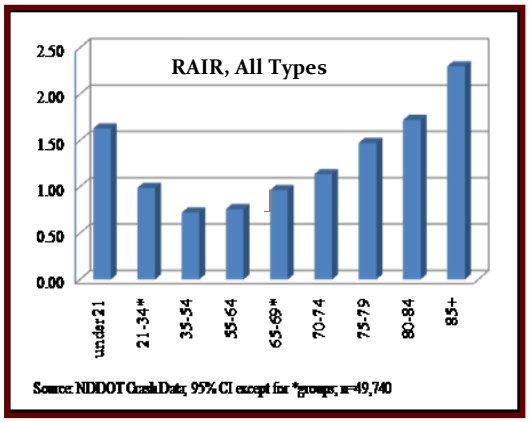


Figure 3. Relative Risk for Driver Responsibility in Two-Vehicle Crashes



Crash Involvement

Older drivers were involved in 7,292 Motor Vehicle Crashes (MVCs) in North Dakota between 2004 and 2008. Among all crashes involving older drivers, 172 resulted in fatalities and disabling injuries, while 1,325 crashes resulted in non-disabling injuries. The control group was involved in 30,591 MVCs, which included 557 included fatal and disabling injuries. Figure 2 shows driver involvement, by age, in fatal and serious driver injury from 2004-2008. The relationship between age and driver error is also evident in the RAIR calculations for all driver groups. The relative risk for the oldest drivers is 207% greater than the control group. The highest ratios are for drivers age 80 and older with ratios of 2.30 and 1.72 for drivers older than age 84 and 80 to 84, respectively (Figure 3).

Driver and Event Characteristics

Older drivers are less likely to wear a seat belt and more likely to be involved in a multicar crash than the control group. Older drivers were found to be at-fault in 49% more of their crashes than the control group drivers, cited in 33.4% of their MVCs compared to 22.3% for the control group. "Failure to yield," "failure to stop," and "improper turn" errors are cited at higher rates for the older drivers.

Certain crash types pose risks to older drivers, in terms of roadway elements. National studies show intersections and left-hand turns to be problematic situations. 45.1% of older driver crashes and 30.9% of control group crashes occur at intersections. Although town

and urban road exposure may explain some of the difference in intersection crash rates, studies have shown intersections to be more problematic for older drivers due to diminished skills. Older drivers are more likely to be involved in an intersection crash making a left-turn maneuver than the control group – 24.2%, compared to 16.2% for the control group. The older driver group is also at-fault in significantly more of these events than the control group – 61.3% of cases compared to 45.8%, respectively. More than one-third of violations for the older drivers are cited as "failure to yield" violations.

Trends Among Older Drivers

Data not only show significant differences between older drivers and the control group, but also a variance among older driver age groups. The share of crashes involving a serious injury is about 44% higher for 75- to 84-year-olds and 141% higher for those 85 years and older, when compared to the 70- to 74-year-olds. A significant decline in evasive action is reported among the older driver groups drivers. While 70 to 74 year-olds perform some type of evasive action in 40.3% of their reported MVCs, only about 30% of the cases where the driver is age 80 and older report evasive action. The highest relative risk is found in left-maneuver crashes. Risk ratios range from 1.36 for the youngest drivers – ages 65 to 69 years – to 1.83 for drivers 85 years and older. The gap within the older drivers is also large as the oldest drivers are 35% more likely to be involved in left-maneuver crashes than drivers ages 65 to 69. In comparison, drivers older than age 84 are only 15% more likely than the 65 to 69 year old drivers to be involved in an intersection-related crash. While older drivers have shown a consistently lower risk compared to the control group of being involved in rear-end crashes, they are increasingly likely to be driving the vehicle at fault, as identified by a citation and front-end damage.

Discussion

Several projects in the U.S. have highlighted practices, programs, and strategies designed to improve road safety for older drivers. Some programs offer services from occupational therapists with specialized training to perform comprehensive driver capabilities evaluation and make recommendations to improve driver safety. Classes and materials are offered from many sources that allow older drivers to refresh or assess driving skills for road safety. Education programs can also be used to provide guidance to improve older driver self-regulation. Further analysis is needed to understand efficacy of specific programs.

In addition, some states have taken a proactive stance in reducing older driver risk through the administration process. One opportunity is in identifying at-risk drivers through the licensing process and in working with medical professionals to identify drivers in need of further evaluation (Stutts and Wilkins 2009). Primary seat belt laws have also been effective. In fact, seat belt laws were the only policies found to reduce fatalities in a study of older driver safety related to state laws (Morrisey 2004). Strategic approaches are also strong in several states such as California, Florida, Iowa, Maryland, and Michigan, and Oregon. These states have multidisciplinary groups that may involve government, medical, academic, and social service stakeholders to focus on devising and implementing strategies to improve older driver safety (Government Accounting Office 2007).

System strategies and spot treatments have also been offered with regard to improving roadway design and operation for older drivers (Table 7). These range from low-cost measures such as improved signage to higher-cost measures such as roundabouts and protected left turn lanes (Braitman 2007). Additional guidance is available in the *Older Driver Highway Design Handbook* which is scheduled for update in 2011 (Federal Highway Administration). As with most safety strategies, spillover benefits are associated from safety investments implemented to reduce risk for specific driver groups are shared by the larger driving population (Braitman 2007).

An improved understanding of older driver capabilities and challenges is important to future traffic safety as this is a growing driver segment in North Dakota. Resources are available to move forward with strategies and programs to improve older driver safety.

Table 4. Roadway Strategies and Treatments to Improve Older Driver Safety

System Strategies	
	Provide advance warning signs. (T)
	Provide advance-guide and street name signs. (T)
	Increase the size and letter height of roadway signs. (T)
	Provide all-red clearance intervals at signalized intersections. (T)
	Provide more protected left turn signal phases at high-volume intersections. (T)
	Provide offset left-turn lanes at intersections. (T)
	Improve lighting at intersections, horizontal curves, and railroad grade crossings. (T)
	Improve roadway delineation. (T)
	Replace painted channelization with raised channelization. (P)
	Reduce intersection skew angle. (T)
	Improve traffic control at work zones. (T)
Spot Treatments	
	Limiting the use of left-hand exits.
	Providing parallel-type acceleration lanes for easier merging maneuvers.
	Providing longer acceleration lanes to give older drivers a greater opportunity to merge.
	Replace intersections with roundabouts at appropriate candidate sites (Braitman 2007).

For complete report please visit http://www.ugpti.org/rtssc

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