Older Drivers
Transportation challenges and mobility issues they face to maintain an active lifestyle  p. 3

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Transportation Research Today

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The National Surface Transportation Safety Center for Excellence (NSTSCE) located at the Virginia Tech Transportation Institute (VTTI) was established by the Federal Public Transportation Act of 2005 to develop and disseminate advanced transportation safety techniques and innovations in both rural and urban communities. NSTSCE uses state-of-the-art technology, including the Virginia Smart Road, to focus on four main research areas:

1. Safety devices and techniques that enhance driver performance;
2. Evaluations of the built roadway environment and infrastructure-based safety systems;
3. Safe mobility for vulnerable road users; and
4. Driver impairment.

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We are pleased to share with you our first issue of Transportation Research Today. This newsletter will present research results and overviews of ongoing research efforts as they are relevant to both practitioners and researchers. We thank the NSTSCE stakeholders for their continued support and for encouraging us to share NSTSCE’s and VTTI’s research to reach a wider audience. There is a lot happening at NSTSCE and VTTI!

Each issue will have a new mile marker on the cover to symbolize the issue number progression. I encourage you to send us your mile marker pictures along with the location of the photo. If your mile marker is selected for publication, you will receive photo credit.

Please feel free to contact us with your ideas and feedback at NSTSCE_Outreach@vtti.vt.edu. If this newsletter was forwarded to you by a friend or colleague and you would like to receive future issues automatically, you can also subscribe using that email address or this subscribe link.

I hope you enjoy our first issue!

Myra Blanco
Outreach Coordinator, NSTSCE

The Mile Marker 1 image on the cover was captured on the Virginia Smart Road by Katie Thacker.
Communicating and Connecting to Help Older Americans Stay Mobile

by Vikki Fitchett

“Tell us what you would like to share and learn” read the statement on the notice disseminated to professionals who have the hands-on responsibilities to facilitate and enhance mobility for older Americans. Acknowledging the challenges faced by this growing segment of the U.S. population, NSTSCE researchers brought together government officials, mobility providers, advocates for senior citizens, and other researchers to share state-of-the-art findings about the transportation issues that can be problematic for older Americans and to devise optimal solutions that address those challenges.

The resulting Senior Mobility Awareness Symposium: Integrating Science, Policy, and Practice (SMAS) attracted more than 55 presenters and participants from Virginia, North Carolina, Michigan, and California with the goal of stimulating an ongoing dialogue between all stakeholders to enhance senior mobility at all levels: local, state, and national. The presenters and attendees represented 42 organizations.

Focusing on the challenges

Dr. Jon Antin, Director of the Center for Vulnerable Road User Safety at the Virginia Tech Transportation Institute, kicked off the event with his opening remarks. Antin noted that we are experiencing the convergence of three factors: a society that is aging, the existence of few mobility options for non-drivers, and the increased crash and fatality risks for older Americans.

Antin also noted that the survey conducted prior to the symposium revealed that the following issues are believed to be the most crucial ones facing senior citizens: loss of safe driving ability, need for better fitness-to-drive evaluations, availability of and accessibility to public and alternative transportation options, loss of independence, poor community design, and novel vehicle technologies.

The morning keynote address was delivered by Esther Wagner of the National Highway Traffic Safety Administration (NHTSA). Her talk (“Safe Mobility for Seniors: Making it Happen”) noted that, despite the fact that there is an increased crash risk for drivers in this age group, the majority of older Americans still rely on personal automobiles for transportation.

Wagner also stated that, while most older drivers are safe drivers, they are more likely to be injured or killed when involved in a crash due to their increased fragility.

Providing an alternative

The mid-day keynote address was delivered by Katherine Freund, the founder and president of ITNAmerica (Independent Transportation Network: Dignified Transportation for Seniors), a national non-profit organization that is focused on making transportation accessible to all older Americans.

Freund’s talk on “Sustainable Mobility for an Aging Population” centered on the policy, research, and development that is necessary to address the challenges surrounding senior mobility.

The goal of this project was to increase awareness of the mobility challenges faced by seniors... and offer state-of-the-art solutions to those individuals who are striving to address such challenges on a daily basis. (Antin, 2013)

With 27 affiliated communities in 22 states, ITNAmerica provided approximately 463,000 rides to seniors from 1995 through 2012. The average age of riders from July 2010 – June 2011 was 79.76 years, and nearly half of the customers who use ITN’s transportation services have income levels under $25,000. It was stated that the depression scores of the senior non-drivers decreased after six months of ITN membership, and the trend continued one year later, apparently due to being able to continue with typical lifestyle activities. Family members of ITN’s senior customers also reported experiencing less emotional stress (mean scores decreased from 2.8 to 2.3) and missing less work once their loved ones joined ITNAmerica.

Involving the older drivers

The “Older Driver Self-Screening and Functional Assessment” presentation by Dr. David Eby of the University of Michigan Transportation Research Institute (UMTRI) noted that the
functional abilities of cognition, vision, and movement can all be affected by medical conditions that are more commonly seen in older adults.

As drivers begin to restrict driving to avoid such situations or cease driving altogether, the challenges increase in terms of finding accessible and affordable living and personal mobility options that will permit them to perform all the necessary and leisure activities important to maintain healthy and satisfying lives. (Antin, 2013)

With the goals of keeping older adults driving for as long as they safely can and providing safe mobility options for those older adults who do not drive, UMTRI’s program involves the individuals in their screening process — using private completion of tests or questionnaires — so these individuals can be aware of the potential declines that affect safe driving. While self-screening is not useful for cognitively impaired persons, this method is likely to result in earlier screening and, thus, earlier detection of functional declines.

The Driving Decisions Workbook (DDW), which was developed by the UMTRI researchers under the sponsorship of General Motors and NHTSA, gives individualized feedback about potential driving problems and how to continue to drive safely. The DDW study, which involved 99 licensed drivers aged 65 and older, showed that 75 percent of the participants indicated that the workbook made them more aware of changes that affect driving. 41 percent said that they were more likely to take a driving refresher course, and 36 percent said that they were more likely to have a doctor evaluate their abilities.

Considering all angles
Other speakers included Jacquelin Branche, Healthcare Compliance Officer for the Virginia Department of Motor Vehicles (“Virginia Medical Review of Drivers”); Dr. Bruce Mehler of the Massachusetts Institute of Technology AgeLab (“Benefiting from Automation: Trust and Senior Mobility”); and Julie Lee, the vice president and national director of AARP’s Driver Safety Program (“Vehicle, Infrastructure, and Education-Based Counter Measures”).

Dr. Nancy Brossoie of the Center for Gerontology at Virginia Tech discussed the driving issues that seniors face in the Blacksburg, Va. area during her presentation, “Current Transportation Options for Seniors in the New River Valley.”

The financial aspects of non-driving were mentioned by several presenters. For some older Americans, even modest transportation costs can be too high, while others are able to afford paying for rides.

Displays and exhibits were set up adjacent to the Symposium by the Virginia Tech Center for Gerontology, CarFit, the New River Valley Agency on Aging, Driver Side Rehab LLC, Virginia GrandDriver, and a VTTI research group that is now called the Senior Mobility Awareness, Safety, and Health Group.

Many approaches needed
While older adults can experience declines in visual, motor, and cognitive processes which impede their ability to drive safely, blanket removal of driving privileges for older adults can result in social isolation, declines in health, and increased mortality risk (Eby et al., 2003).

Experts such as those who participated in the Senior Mobility Awareness Symposium use various approaches to address the senior mobility issue, and efforts are being made to expand this forum to a broader range of audiences around the United States.

Links to presentations
Benefiting from Automation: Trust and Senior Mobility
Current Transportation Options for Seniors in the New River Valley
Independent Transportation Network: Sustainable Mobility for an Aging Population
Older Driver Self-Screening and Functional Assessment
Safe Mobility for Seniors, Making it Happen
Senior Mobility Awareness Symposium: Integrating Science, Policy, and Practice
Training Approaches to Enhance Senior Mobility Safety
Vehicle, Infrastructure, and Education-Based Counter Measures
Virginia Medical Review of Drivers

References

Cell Phones and Driving: Do They Mix?
by Kevin Grove & Vikki Fitchett

One of the lessons learned from naturalistic research is that what appears simple in a lab can be complex in real-world situations. This was the case when researchers decided to dig into the data about cell phone use while driving. What appeared to be a simple story of cell phone use increasing the risk of safety-critical events (SCEs) actually required considering the context in which people used their phones.

Breaking down the data
As was done in previous research (Fitch et al., 2013; Hickman and Hanowski, 2012; Klauer et al., 2006; Olson et al., 2009), the study entitled The Risk of a Safety-critical Event Associated with Mobile Device Subtasks in Specific Driving Contexts broke down cell phone usage into the actual tasks being performed. The results showed that not all tasks are created equal. Tasks that required visual and manual interaction with the phone (e.g., texting and dialing) were associated with increased risk, while just talking or listening were not. This led to another question about context: If what someone is doing with a phone matters more than previously thought, could when and where someone is doing it matter just as much?

The effect of demands
To find the answer to this question, NSTSCE researchers looked again at the data about cell phone use by both commercial vehicle and light-vehicle drivers, this time to identify the conditions under which people were driving. The researchers began classifying the data based on the demands that the environment placed on the driver. Depending on the number of lanes, the density of traffic, and the types of maneuvers being performed, each usage of a cell phone was categorized as taking place during a time of Low, Moderate, or High demand. Researchers re-examined the data within these new contexts, and the results were again more complex than originally thought.

Intuition might dictate that cell phone use is more dangerous when the driver is placed under higher demands from driving; e.g., under heavy traffic conditions or when navigating intersections. However, the study results indicate that higher driving demands were not associated with increased risk. Under low demands (e.g., light, free-flowing traffic), only dialing was associated with an increased risk of SCEs. Under moderate demands (e.g., heavier but flowing traffic), texting and dialing were associated with increased risk of SCEs, but talking/listening on a cell phone were associated with a decreased risk of SCEs.

Under high demands, the NSTSCE researchers found the same result: talking/listening on a cell phone was associated with a decreased risk of SCEs (Fitch and Hanowski, 2012). Under all three conditions, talking/listening was not only benign, but the results showed that a benefit is sometimes seen. To try to understand how this result could have occurred, researchers asked a follow-up question: Are drivers changing other behaviors to compensate during cell phone use?

Not so cut-and-dried
There was little evidence of drivers compensating when they used their cell phones (Fitch et al., 2014; Fitch and Hanowski, 2012). Commercial vehicle drivers sped up slightly while changing lanes less often, and light-vehicle drivers showed fewer unintentional lane departures. While drivers may have slightly simplified their driving tasks while talking on a cell phone, these behavioral changes were not substantial. This leads to another important question: Could there be something intrinsically beneficial about talking/listening while driving under higher demand conditions?

More research needs to be done to answer this question. Other research has found that drivers tend to look forward more while talking/listening on a cell phone (Fitch et al., 2013; Olson et al., 2009). If drivers are looking forward more, could that be improving their response to what’s going on in front of them? Other research has also shown that truck drivers tend to use their phones more when they are feeling tired (Toole et al., 2013). It could be the case that professionals who drive for a living are instinctively using their phones to help them stave off drowsiness (Jellentrup et al., 2011). In this light, this study’s results make sense.

What does this mean?
Visual/manual tasks, such as texting and dialing, take the driver’s eyes off the roadway. However, talking/listening has no visual component. Under conditions...
of moderate or high driving demands, there is more information that the driver must process about the forward roadway, and spending more time looking forward could reduce the risk of SCEs. Additional research is needed before cell phone use in vehicles is fully understood, but the answers may not be as simple as originally thought.

All types of cell phone interaction are not created equal, and the way people use phones in real life may be a clue to understanding the complexity of cell phone use while driving.

References


In 2011, 5,401 people aged 65 or older were killed, and 185,000 were injured in motor vehicle traffic crashes.


Interested in becoming an NSTSCE stakeholder?

For more information about NSTSCE, please contact:

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Greg Fitch, Ph.D., served as the project manager for the The Risk of a Safety-critical Event Associated with Mobile Device Subtasks in Specific Driving Contexts study. Dr. Fitch is a senior research associate in the Automated Vehicle Systems group at VTTI. He has been conducting human factors research focused on transportation safety since 2002.
Past research has indicated that certain forms of cognitive training can have a substantial and long-term beneficial impact on senior drivers’ crash rates. The goal of the project entitled *Comparing the Driving Safety Benefits of Brain Fitness Training Programs for Older Drivers* is to evaluate training-based approaches aimed at enhancing senior drivers’ safety to see if we can measure specific driver performance measures which would indicate the underlying mechanisms for the observed crash rate reductions.

For this study, male and female licensed drivers aged 70-85 are being recruited to participate in an evaluation of the following training approaches: (1) a prototype in-vehicle training system, and (2) a commercially available computer-based application. Both approaches emphasize expanding senior drivers’ useful fields-of-view and strengthening other cognitive and perceptual abilities, such as speed of information processing and ability to visually track moving objects. One-third of the participants will receive training with each system, and the other third will not receive training, serving as a control group.

Participants are being assessed in terms of their perceptual and driving performance, and they will all undergo pre-training evaluations on a variety of driving-related tasks on the Virginia Smart Road and public roads. All participants will experience similar evaluation sessions immediately after training, at 6 months post-training, and again at 12 months post-training. This design will help to determine whether measurable driving performance-based safety benefits are a result of training with either system, and how durable these benefits are over time.

This project could help to verify and define specific and highly feasible methods for keeping seniors driving longer and safer, thus facilitating mobility that enables independence and self-sufficiency. The project is expected to be completed in December 2014.

This project falls under the Safe Mobility for Vulnerable Road Users focus area and benefits from additional support provided by the Toyota Collaborative Safety Research Center.
Visibility in Roundabouts

Roundabouts have been gaining popularity in the United States as a method for reducing the frequency and severity of vehicle crashes as compared to traditional intersections. The effects on cyclist and pedestrian safety are not well understood, and studying drivers’ glance patterns in the presence of cyclists and pedestrians in the vicinity of roundabouts could provide important information. The research undertaken in the Visual Behavior in Roundabouts project has the potential to provide information about driver eye-glance behavior in roundabouts, which can help determine where conflicts with cyclists and pedestrians might occur and how those conflicts might be mitigated.

For this study, participants wear an eye-tracking device to track their glancing patterns while driving a pre-determined route, and they are asked to verbally identify when they see a cyclist or pedestrian. Data collection is scheduled to occur during times when vehicle and pedestrian traffic is typically reduced. The data collection portion of the project is set to conclude by the end of January 2014, and analysis of the eye-tracker data is continuing alongside data collection.

This project falls under the NSTSCE focus area of: Evaluations of the Built Roadway Environment and Infrastructure-based Safety Systems. The subject matter expert for this area is Dr. Ron Gibbons.

NSTSCE Researcher Profile

Did you know?

The Smart Road has the capability of recreating 95 percent of the overhead lighting configurations in the United States. The testing facility allows researchers full control of multiple lighting configurations from a research console application.

Dr. Ron Gibbons is the subject matter expert for the NSTSCE focus area entitled Evaluations of the Built Roadway Environment and Infrastructure-based Safety Systems. He also serves as the director of VTTI's Center for Infrastructure-Based Safety Systems. Dr. Gibbons is VTTI's lead lighting research scientist and is responsible for lighting- and visibility-associated research projects and projects that consider roadway safety as they relate to infrastructure.

He is currently the principal investigator for projects studying the impact of lighting design on roadway safety, the impact of headlamp design on safety, wet night visibility, and the performance of alternative light sources in roadway lighting.

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