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Research on Older Adults' Mobility: 2022 Meeting Summary Report

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16. Abstract

Following a similar meeting held in 2021, TransAnalytics held a meeting to spotlight research on older adults' mobility virtually, due to Covid-19 restrictions, on January 9, 2022. The meeting date coincided with the Transportation Research Board Annual Meeting. Under NHTSA sponsorship, this meeting – referred to as "ROAM" for Research on Older Adult Mobility– provided a multi-disciplinary forum to share news of completed research, report on the progress of ongoing studies, and highlight priorities for future work. Some 50 meeting participants included physicians and other medical professionals, occupational therapists and certified driver rehabilitation specialists, State Department of Motor Vehicles officials, mobility service providers, public health practitioners, automated vehicle and Advanced Driver Assistance System experts, and other academic and private sector research professionals. ROAM 2022 included a general session and six breakout sessions devoted to the role of the occupational therapist in older driver safety, safety implications of limited-term license renewal policies, advanced vehicle technologies, perceptions of older road users on automated shuttles and shared automated vehicles, and transportation options for rural and small communities. Meeting participants expressed satisfaction that the ROAM meeting agenda was complementary to TRB offerings and appreciation for the virtual format.

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Introduction

This report highlights key points in the presentations and discussion during a one-day *Research on Older Adults' Mobility* (ROAM) meeting following a similar meeting held in 2021.[1] This was a virtual meeting timed to coincide with the Transportation Research Board (TRB) Annual Meeting in January 2022, in which participants presented findings from recently concluded projects, ongoing research, and planned projects related to older adults' mobility. The ROAM 2022 meeting had a 1-hour general session followed by six 35-minute breakout sessions. The meeting explored equity in traffic safety research by discussing disparities in safe mobility options for older adults and people with medical conditions and explored ways to enhance their safe mobility. The agenda follows.

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ROAM 2022 Agenda
January 9, 2022

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General Session

10-11:30 a.m.: Announcements & self-introductions

Breakout Sessions [30 minutes each with 5-minute Q&A]

A. The IADL of Driving – A Therapeutic Process *[Noon – 12:35 p.m.]*

B. Safety Implications of Limited-Term License Renewal Policies for Drivers With Progressive Vision Disorders *[12:45 – 1:20 p.m.]*

C. ADAS, Headlamps, and V2V-Enhanced Technologies: Potential Safety Benefits for Older Drivers *[1:30 – 2:05 p.m.]*

D. Importance of Trust and Need in the Adoption of Shared Autonomous Vehicles by Older Adults *[2:15 – 2:50 p.m.]*

E. Perceptions of Older Road Users Before and After the Exposure to an Autonomous Shuttle *[3 – 3:35 p.m.]*

F. ITN*Country*: Transportation for Rural and Small Communities *[3:45 – 4:20 p.m.]*

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[1] Mastromatto, T., Quinones, T., & Staplin, L. (2022, May). *Research on older adults' mobility: 2021 meeting summary report* (Report No. DOT HS 813 311). National Highway Traffic Safety Administration.

General Session

The general session was devoted to attendee introductions. It opened with a welcome message from Dr. Loren Staplin, the principal investigator on this initiative and moderator of this session, who explained that this meeting was timed to coincide with the TRB annual meeting in Washington, DC, but was held virtually due to the ongoing COVID-19 pandemic. He reiterated the purpose of this meeting, which was to provide an avenue for stakeholders to collaborate for the benefit of older adults' mobility research. The platform was then passed to Dr. Kathy Sifrit, representative from the National Highway Traffic Safety Administration and the contract manager of this initiative. She stated that NHTSA's goal for this group was to provide a forum to discuss potential, planned, ongoing, and recently completed projects, and to complement TRB activities.

Next, attendees were asked to introduce themselves and briefly comment on their current research interests and activities as they related to older adults' mobility. The first to speak were members of the government, then members of nonprofits and other organizations, and finally the remaining attendees in alphabetical order by last name. Some of the areas of interest among attendees focused on older adults' overall driving performance and safety, while other attendees were interested in issues related to older adults' mobility beyond driving. An overarching theme was mobility options for older drivers, particularly community-based and in rural communities, and older adults' access to these options. Attendees were also interested in the roles that vehicles equipped with automated driving system (ADS) could play in older adult mobility, as well as the effect of advanced driver assistance systems (ADAS) on older driver safety. Keeping older adults safely on the road for as long as possible was a recurrent research theme with many attendees interested in interventions to maintain mobility such as driver education and rehabilitation. Finally, several attendees mentioned resources that may be of interest to the older driver research community:

- Clearinghouse for Older Road User Safety (ChORUS) – A centralized, user-friendly, and dynamic source of information pertaining to highway safety for aging drivers, passengers, pedestrians, and cyclists. www.roadsafeseniors.org
- Federal Transit Administration, Easterseals, USAging: The National Aging and Disability Transportation Center (NADTC) promotes the availability and accessibility of transportation options that meet the needs of older adults, people with disabilities, and caregivers. www.nadtc.org
- Florida Department of Transportation: Safe Mobility for Life Coalition – A coalition of many member organizations whose mission is to implement a strategic plan to increase the safety, access, and mobility for aging road users, eliminate fatalities, and reduce serious injuries. http://safemobilityfl.com
- Michigan Department of State: Safe Driver Smart Options – Web-based information portal that proves resources for active older drivers and for drivers who may be considering limiting their driving and finding other transportation choices. www.michigan.gov/agingdriver/
- American Occupational Therapy Association, AAA, AARP: CarFit Virtual Workshops and Focus Sessions: An in-depth look at several key aspects involved in getting a proper fit in your vehicle and a small group discussion with CarFit

volunteers designed to explore common challenges to making adjustments and finding a safe and comfortable fit in the car. www.car-fit.org

- ITN*America*: Rides in Sight – A comprehensive, up-to-date database of senior transportation options nationwide. https://ridesinsight.org
- University of Massachusetts, Boston: Certificate in Organizing and Managing Senior Transportation Options – An online certificate program for professionals in the field of aging services and transportation services interested in addressing senior transportation challenges and managing services that meet the mobility needs of an aging population. www.umb.edu/academics/caps/corporate/senior_transportation
- University of Florida: Certificate in driver rehabilitation therapy – A professional certificate program that trains students to screen, assess, and evaluate drivers who are medically at risk for driving or who are unfit to drive, and it also provides evidence-based interventions for experienced licensed drivers. https://drt.ot.phhp.ufl.edu

Breakout Sessions

ROAM offered six topic-driven presentations to all who participated in the general session. A single link provided access; recipients could use this link to join a single session or multiple sessions, according to their level of interest. These sessions were presented sequentially, with each speaker allocated 30 minutes, followed by five minutes allotted to questions and answers. There was a 15-minute break between sessions. Each speaker provided an email address to allow attendees to request a copy of their presentation slides. All sessions were recorded; a transcript of the recordings was used to develop this summary report.

Breakout Session A: The IADL of Driving – A Therapeutic Process

This presentation was prepared by Elin Schold Davis, OTR/L, CDRS, FAOTA (Practice Manager, Workforce Capacity & Engagement), American Occupational Therapy Association.

Summary

This presentation emphasized the need for a consistent terminology among researchers and practitioners when assessing medical/functional fitness to drive and for OTs to treat driving in the same way as other instrumental activities of daily living (IADLs) such as shopping or preparing meals. The presenter described the role of the driver rehabilitation specialist (DRS) in evaluating fitness to drive with respect to physical, developmental, neuro-cognitive, and complex-medical categories, all differing in their components and scope. The therapeutic approach is informed but not determined by test results, balancing degenerative versus restorative processes. A tiered interpretation of evaluation data to determine risk was explained within an overarching framework where the DRS considers recovery, disease progression, and diagnosis-specific sequelae related to the driver's medical condition. Ultimately, the approach outlined in this presentation redirects an individual's question, "*Can I drive?*", away from the dichotomy of safe versus unsafe toward a therapeutic framework that integrates safety, social participation, and quality of life, adopting a lifespan perspective that includes prevention and early intervention through education and risk screening to support healthy aging. The presentation included a short video, developed for public awareness through a NHTSA project, that is available for distribution on the American Occupational Therapy Association (AOTA) website[2] under "Promotional videos on driving & community mobility."

Discussion

The first question centered on the public awareness video with the presenter confirming that the video is a publicly available resource. Another attendee asked why the presenter focused specifically on the therapeutic process when the occupational therapy approach to driving is much more complex. The presenter replied that due to time constraints, the presentation was designed to highlight just one area in a much broader field. A final question regarded payment for driving rehabilitation services. The presenter said that occupational therapy is often covered by insurance and a goal for OTs is to address driving as an IADL, which would address driving risk similarly to addressing the risk of living alone, separating it from being a specialized

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[2] www.aota.org/practice/practice-settings/driving-community-mobility/watch-videos-on-driving-and-community-mobility

evaluation. The presenter noted that considering driving as a medical risk that needs medical intervention could allow for insurance coverage.

Breakout Session B: Safety Implications of Limited-Term License Renewal Policies for Drivers With Progressive Vision Disorders

This presentation was prepared by Daniel Bederian-Gardner, PhD* (Research Data Specialist II), and Ainsley L. Mitchum, PhD (Manager, Driver Competency and Safety Projects Unit), California Department of Motor Vehicles.

* Speaker.

Summary

The second presentation discussed the effect of vision impairment on older driver safety from the perspective of a state licensing agency. The presentation focused on vision conditions that are associated with progressive (as opposed to static) disorders and may lead to traffic safety concerns that have implications for driver licensing agencies' renewal and/or medical advisory board procedures. California DMV has long-established procedures for identifying drivers with such progressive vision disorders, including a basic in-office visual acuity test, a referral process that incorporates precise diagnosis and associated recommendations from licensed medical professionals, and (depending on those recommendations), a limited-term license renewal schedule (typically 2 years instead of the normal 5) that incorporates a drive test at each renewal. The intent of such procedures is to effectively identify drivers whose vision is too impaired to allow for safe driving. However, this filtering process must balance the need for safety with the need to facilitate mobility among aging adults. To assess the effectiveness of this filtering process, California DMV's Research and Development Branch first identified a sample of drivers with limited-term licenses due to impaired vision and calculated crash rates for the period just prior to their most recent license renewal, using an age- and sex-matched group for comparison. This comparison revealed that drivers with limited-term licenses associated with a progressive vision disorder had somewhat higher crash rates than matched controls, experiencing 5.37 crashes per hundred drivers as opposed to 4.24 per hundred drivers among the comparison group. Next steps in this analysis include looking at crash risk post renewal, the renewal status (e.g., removing the limited-term requirement following cataract surgery), and making sure vision screening appropriately balances mobility with public safety.

Discussion

An attendee asked why the CA DMV focused on vision conditions when vision problems can be a symptom of other medical conditions. The presenter explained that they followed the professional advice of a medical advisory board, and the data analyzed here were specific to the license renewal procedures. Another attendee inquired about including vehicle miles traveled in the analysis to account for exposure and travel patterns; the presenter explained that exposure was not a data point available to the researchers. Similarly, in response to a question about the types of vision problems among the sample, the presenter noted that the information was not available to the researchers. One attendee asked if visual field was checked at the DMV office, and the presenter answered that only visual acuity was assessed unless the driver was referred for evaluation by a medical professional. Another attendee asked if the researchers knew where the drivers lived. The presenter said that they can access that information, but it was not included in

the analysis. Finally, a question was raised about whether the drivers with license restrictions were compliant with those restrictions. The researchers replied that, while they could investigate that in the future, the data would likely only be available if a crash was reported. NHTSA mentioned that a recent instrumented vehicle study found that older drivers with license restrictions were generally compliant with those restrictions.[3]

Breakout Session C: ADAS, Headlamps, and V2V-Enhanced Technologies: Potential Safety Benefits for Older Drivers

This presentation was prepared by Aimee Cox, PhD, a research associate at the Insurance Institute for Highway Safety.

Summary

This presentation focused on current and emerging vehicle safety features designed for the general population that may prevent or mitigate the severity of some of the crash scenarios common to older drivers, potentially reducing overall crash involvement and crash-related injuries and fatalities. The study estimated the potential safety benefits of headlamp improvements, vehicle-to-vehicle (V2V)-enhanced features of left turn assist (LTA) and intersection movement assist (IMA) for older (age 70+) and middle-aged (35 to 54) drivers using NHTSA's Crash Reporting Sampling Systems (CRSS) and Fatality Analysis Reporting System (FARS) datasets from 2016 to 2019. The results suggested that older drivers may benefit more from V2V technologies such as IMA and LTA that can support the driver while navigating intersections. In comparison, a larger proportion of middle-aged drivers' crashes may be mitigated by improved headlamps and common forms of ADAS such as automatic emergency braking and lane departure warning. This disparity reflects the types of crashes in which each age group is commonly involved. Older drivers were vulnerable to crashes that involve navigating intersections and they were less likely to be involved in nighttime crashes. All drivers may benefit from safety technologies, yet some technologies may offer unique benefits to certain age demographics because of each age group's predisposition to be involved in specific crash scenarios that these technologies are designed to address. The presenter noted that intersection assistance technologies, which would be most beneficial to older drivers, are still in development. The more widely available features like improved headlamps and ADAS have the potential to prevent or mitigate a substantial number of crashes and injuries for both older and middle-aged drivers. The presenter suggested that older drivers be encouraged to adopt vehicles with these technologies.

Discussion

Attendees asked about failures of the ADAS systems, and the effect of headlight glare on other drivers. The presenter reiterated that the technologies do not work 100% of the time; the data presented did not address such failures, but it indicated a potential savings for one of the technologies--automatic emergency braking--of 50% or roughly 40,000 of the rear-end crashes experienced by older drivers each year (assuming full deployment in the fleet). The next question was about steps that could help drivers who do not understand or use the safety features or turn

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[3] Joyce, J., Lococo, K. H., Gish, K. W., Mastromatto, T., Stutts, J., Thomas, D., & Blomberg, R. (2018, April). *Older driver compliance with license restrictions (*Report No. DOT HS 812 486). National Highway Traffic Safety Administration.

them off because they find them annoying or distracting. The presenter replied that these problems could be addressed through improved educational programs since dealerships may not prepare older adults to understand how and when to use these technologies. Another attendee asked when these perceived safety benefits might be seen, as some applications associated with V2V communications are hypothetical at this point. The presenter replied that it is not yet clear when V2V technologies would be available. Another attendee asked if any of these features are available as aftermarket add-ons for older vehicles. The presenter was aware of after market lane departure systems that likely only give warnings and do not engage the brake or steer as some of the original equipment manufacturer features would. Finally, an attendee asked if there were concerns about whether older drivers would use these technologies in the way they were intended to get the hypothesized benefits. The presenter referenced research that has suggested once older drivers are introduced to the new technologies, they tend to accept them; similarly, once they have used the technology, the acceptance tends to be high. The session closed out with a note on the limitations that arise from similar features varying across models and manufacturers, which complicates driver education efforts.

Breakout Session D: Perceptions of Older Road Users Before and After the Exposure to an Automated Shuttle

This presentation was prepared by Sherrilene Classen, PhD*, Pruthvi Manjunatha, PhD, Nichole Stetten, PhD, Justin Mason, PhD, Lily Elefteriadou, PhD, University of Florida.

* Speaker.

Summary

This presentation reported on two independent low-speed automated shuttles (AS) (Level 4 driving automation per SAE International,[4]) that are being tested in certain cities in the United States including demonstration projects in Gainesville, Florida. The goals of these demonstrations are to examine public perception of AS and to document the effects of AS on road users. The project provided researchers with opportunities to collaborate with industry, community stakeholders, policy makers, and local, State, and Federal transit authorities to help determine the future role of AS in public transit. Data for the first study (2018-2021; N=45; age 55+) and second study (2019- 2021; N=104; age 65+) were collected via user perceptions assessed through exposure surveys conducted before and after participants rode in the vehicles. The first study exposed riders from the public to an AS in downtown Gainesville, and the second exposed older adults to an AS running in a bus depot in Gainesville. Across both studies, riders' perceptions changed after riding in the AS. For the first study, comfort in riding the AS increased, whereas intention to use decreased after exposure to the AS. The low speed of the AS negatively influenced riders' acceptance. For the second study, the main themes affecting older adults' acceptance of the AS pertained to safety, cost, and accessibility. Based on findings from the first study, the researchers recommend adjusting speeds and availability of shuttle information to help increase riders' acceptance. From the second study the researchers recommend that policymakers consider safety, cost, and accessibility to increase older adult acceptance.

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[4] SAE Levels of Automation can be found here: www.sae.org/blog/sae-j3016-update.

Discussion

The first question addressed the finding that some people were *less* comfortable after exposure to the AS and what that means in terms of encouraging the use of AS. The presenter replied that this question is the framework for future research, which will consider in-depth interviews to capture the reasons a person would choose to use or avoid using an AS. Another attendee asked if there was an operator or attendant on board to help riders on and off the shuttle and to promote feelings of safety and legitimacy. The presenter replied that the shuttles all ran with a safety operator to help riders enter and exit the vehicle and to explain some of the technology. The presenter confirmed that when operating on the road, the shuttle was in a regular traffic lane. An attendee then asked if the finding of increased comfort for 'after' versus 'before,' combined with a decrease in intent to use, more likely reflected issues like location and equity rather than attitudes toward the automated vehicle technology itself. The presenter agreed with this observation. Finally, an attendee asked if the study distinguished between former and current drivers. The presenter replied that for study two, all participants had to have a valid license and have driven within the last 6 months and that there were no such criteria for study one as it was geared toward the general public.

Breakout Session E: Importance of Trust and Need in the Adoption of Shared Automated Vehicles by Older Adults

This presentation was prepared by Andy Beran, PhD, an independent consultant.

Summary

This presentation reviewed two of the critical determinants found to impact the rate of acceptance and adoption of shared automated vehicles (SAVs) by older adults. The presentation was based on recent quantitative correlational research that determined if, and to what extent, a relationship exists between the perceptions of trust and need and the intent to accept and adopt SAVs by older adults in the Phoenix, Arizona, metropolitan area. Two questions were examined in a sample of 50 people, ranging in age from 65 to 85, as follows.

a. Was there a correlation between the perceptions of older adults of their trust in SAVs and their intent to accept and adopt shared automated vehicles to help meet their post-self-driving transportation needs?
b. Was there a correlation between the perceptions of older adults of their need for SAVs and their intent to accept and adopt SAVs to help meet their post-self-driving transportation needs?

Respondents were presented with a hypothetical scenario of SAV use in their daily lives, including pictures of older adults entering and riding in an SAV, and were asked to assess the likelihood of their acceptance and adoption of the SAV for their own personal travel on a 7-point Likert-type scale. Results of the study demonstrated a statistically significant positive correlation between the perceptions of trust in and need for shared automated vehicles and the perception of intent to accept and adopt the vehicles to help meet their post-self-driving transportation needs. Addressing the issues of trust and need, such as the value of the technology compared to other options and the cost and accessibility, may increase the rate of acceptance and adoption and provide an important new means of transportation for older adults who want to remain independent but no longer have the ability to drive.

Discussion

The first question centered on how automated vehicles address potential technological failures in certain weather conditions. While the presenter could not speak to the technology, he considered the question as it relates to the perspective of a user about the reliability of the technology, similar to how an older driver may avoid driving during inclement weather. The presenter later said it is also important to test these SAVs in a variety of road types and terrains as well as climates. An attendee suggested that an implication of this study would then be that an educational intervention related to the safety of the SAVs in inclement weather may be effective in helping people make appropriate choices about the use of this technology. The presenter replied that yes, trust would be associated with reliability related to weather and other factors like traffic congestion. Another attendee asked about the conflict between the need for consistency in uniform standards versus the desire of manufacturers to distinguish their product from that of competitors. The presenter replied that there needs to be consistency in standards for technology to be widely deployed, which will be contested by the market leaders and the market followers, and by the evolution of the technology itself. He used an analogy of different cars having the accelerator in different locations, which would make driving difficult. The presenter reiterated that consistency is especially important to older adult users. Finally, an attendee asked how much the responses analyzed in the study related to the shared aspect versus the automated aspect. The presenter clarified that the scenario presented to respondents was that a vehicle comes to pick them up, it takes them where they want to go, it drops them off, and then it goes off to give somebody else a ride, rather than multiple riders sharing the vehicle at one time like a bus.

Breakout Session F: ITN*Country*: Transportation for Rural and Small Communities

This presentation was prepared by Katherine Freund, president of ITN*America*.

Summary

The final presentation was an evaluation plan for an effort to address unmet rural transportation needs for older adults and people with disabilities in 10 communities across Maine, Kentucky, California, Florida, and Hawaii. The project represents a collaboration involving business and industry, private philanthropy, and the Federal Transit Administration's Integrated Mobility Innovation program. The foundation for this innovative program is the Independent Transportation Network (ITN) model, which was reported to have generated extremely high customer satisfaction ratings over its 26-year history. However, that model is not scaling fast enough to meet the mobility needs of America's aging population, especially in rural communities where resources are scarce and opportunities for efficiency through shared rides are few. This 2-year project will employ cloud-based routing algorithms, training, and support for service providers, with an online learning center for participating communities. The evaluation will include qualitative and quantitative research methods applied before, during, and after the project. Hypothesized outcomes include that the technology platform will provide (1) stable software backup; (2) stable, secure, and accessible software for volunteer transportation services; and (3) improved marketing and community outreach; and, that people will participate in some of the innovative program options. Anticipated impacts include more transportation options for people than when these services started, more transportation options for unbanked and low-income people, increases in volunteers and volunteer credits (i.e., social capital) available for

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transportation, more efficient and effective routing, and that affordable and reliable technology will be available to people in small communities.

Discussion

An attendee asked if the results for this study would be shared publicly, and the presenter replied that she hopes that is the case. Next, an attendee asked how the transaction data specification between service providers would be open for coordination. The presenter stated that a goal is for anyone on the ITN*Country* platform to connect with paratransit or any other transportation service that is also participating in the transactional data specification. The attendee then remarked on the unreliability of broadband in rural communities and asked if there were resources for the communities to help address this issue. The presenter replied that someone, somewhere in the community must have broadband to connect to the telephone, but they do not need a mobile device to participate. Another attendee asked about the size of the communities in the program. The presenter replied that while that data is currently being collected, the largest community is estimated at a population of about 20,000, but most have populations of around 3,000 to 5,000.

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