SENIOR DRIVERS & AUTOMATED VEHICLES: KNOWLEDGE, ATTITUDES & PRACTICES EXECUTIVE SUMMARY

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The mission of the Traffic Injury Research Foundation (TIRF) is to reduce traffic-related deaths and injuries. TIRF is an independent, charitable road safety research institute. Since its inception in 1964, TIRF has become internationally recognized for its accomplishments in identifying the causes of road crashes and developing program and policies to address them effectively.

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Traffic Injury Research Foundation
171 Nepean Street, Suite 200
Ottawa, Ontario K2P 0B4
Ph: (613) 238-5235
Fax: (613) 238-5292
Email: tirf@tirf.ca
Website: www.tirf.ca

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Robyn D. Robertson, Heather Woods-Fry, Marisela Mainegra Hing and Ward G.M. Vanlaar

EXECUTIVE SUMMARY

Canadians over the age of 65 currently represent one in seven Canadians. In the next two decades, the population of seniors will grow to more than 10 million and account for one in four Canadians (Statistics Canada 2015; Robertson and Vanlaar 2008). As one of the largest age cohorts, older adults will be a significant segment of the driving population. Age-related declines in perceptual, cognitive, and physical capacities that can degrade their driving ability, in addition to their over-representation in crash statistics, are concerning and a major road safety challenge.

Yet, research suggests that mobility and the ability for seniors to continue to drive as they age is integral to their health. Therefore, it is imperative that older drivers are protected on the road, and able to continue to drive safely as they age. Advanced safety features and automated vehicles offer great potential to improve road safety and the mobility of older drivers. However, previous research from the Traffic Injury Research Foundation (TIRF) has suggested that older drivers are less confident in these technologies, are less familiar with them, and are least likely to rely on them to improve their safety on the road (Robertson et al. 2016, 2017).

To address this issue, TIRF, with funding from the Toyota Canada Foundation, conducted several focus groups with licensed drivers over the age of 65 to better understand their perceptions and attitudes towards semi-automated vehicles. Another objective was to understand how their knowledge and beliefs about automated vehicles can affect the likelihood they will rely on this technology to improve their safety on the road and increase their mobility. Effective ways to increase their knowledge and awareness of semi-automated vehicles were also explored. To augment the qualitative data from the focus groups, quantitative data from an online, representative survey conducted in previous studies (Robertson et al. 2016, 2017) were also used in this project.

The primary focus of the study was on limited, self-driving, semi-automated vehicles (LSDVs) and explored the following issues:

- driver knowledge, attitudes, and practices
- driver education and training

Results regarding driver knowledge, attitudes and practices

Knowledge

- The majority of senior drivers reported they were not very familiar with LSDV technology and had limited understanding of self-driving vehicles generally, although many of them were familiar with specific examples of some features of LSDV technology.
- They were most familiar with current vehicle safety technology, but most had limited experience using advanced driver assistance systems. Awareness was also low regarding the role of drivers and the ability of LSDVs to function in complex road environments.
- A large majority of participants had questions about how the technology works and when it will become publicly available. While most were aware that their knowledge of this topic was limited, they expressed interest in receiving more information about LSDVs.

Attitudes

- Senior drivers perceived safety to be the greatest benefit of LSDVs. They mentioned that LSDVs could help improve personal safety for them as drivers, as well as road safety generally.
- It was widely acknowledged by participants that LSDVs could help increase confidence in their driving skills as they age, and LSDVs would enable them to handle more challenging situations on the road with more confidence as opposed to avoiding them.
- The greatest concern expressed by participants was that over-reliance on self-driving technology could ultimately degrade their driving skills.
- An equal level of concern was expressed regarding the potential of LSDV technology to extend the driving lifetime of seniors who may not be safe to drive anymore.
- They also expressed concern that relying on the self-driving capabilities of LSDVs might perhaps entice them as well as other drivers to engage in dangerous driving behaviours (distraction, fatigue, impairment).
- Significant concern was expressed regarding the learning curve for senior drivers, and how overwhelming it might be to use LSDVs. It was generally agreed that they would require training and practice with LSDV technology before feeling comfortable enough to drive a vehicle.
- Senior drivers were also greatly concerned about the cost of LSDVs. The vast majority of participants believed that LSDVs would be significantly more expensive than traditional vehicles. This was related to the higher costs typically associated with new technology, as well as the additional costs such as higher insurance premiums and more expensive maintenance and repairs.

Practices

- More than three-quarters of participants reported that they were willing to use a LSDV if it were available today, and once they had observed others using the technology safely and without incident.
- The majority of senior drivers reported that they would build their trust in this technology as they gained more experience with it, and better understood the reliability of the self-driving capabilities.
- Online survey results supported focus group findings, as quantitative analyses suggested that if you felt more safe using LSDVs and more knowledgeable about LSDVs, you were more likely to believe LSDVs will be easy to use and you will be more likely to declare that you will use LSDVs.

- Online survey results also suggested that female drivers were less likely to agree that they were knowledgeable about LSDVs, and that they felt safe. They were also less agreeable to the perceived ease of use of LSDVs, and their intention to use LSDVs.
- Older adults, aged 50 and over, reported in the online survey that they were less agreeable regarding the ease of use of LSDVs. Older adults, aged 70 and over reported that they were less likely to feel safe using LSDVs.
- Focus group results suggested that senior drivers would most likely use the self-driving capabilities of LSDVs for long distance drives, or in stressful driving conditions. Less than 5% of participants reported that they would turn off the autonomous mode to engage in dangerous driving behaviours.
- This finding was consistent with the online survey results, where both female and older drivers were less likely to declare they would engage in risky driving behaviours.
- Focus group results highlighted the primary barriers to adopting this technology. The potential learning curve associated with using LSDVs was a major barrier, and the vast majority of senior drivers agreed that educational resources and training would be essential for this age group to safely adopt the use of LSDVs.
- Cost of LSDVs was also considered to be a significant barrier because many focus group participants reported that they tended to drive less frequently as they aged. As such, they expressed more reluctance to purchase LSDVs and pay a premium price for it when they did not drive frequently.

Results regarding driver education and training

- Online survey data analysis suggested that an opportunity may exist to increase safety, conditional on the availability of education for senior drivers. Interest in, and a need for, education was also a clear finding from the focus groups.
- Focus group participants most frequently requested information about the safety and performance of LSDVs. They wanted to know how LSDVs would help to keep them safe in a hazardous situation, and how LSDVs would help to avoid potential collisions in addition to the traditional information such as crashworthiness, vehicle functionality, and the programmable specifications of LSDVs.
- Participants reported that a hands-on context, a classroom environment or an online learning forum were the environments best-suited to learning about LSDVs. Most participants expressed the desire to have practical experience with LSDVs.

Most participants expressed an interest in learning about LSDVS through hands-on experience so that they could get a sense of how the vehicle would respond to a variety of situations.

- The majority of participants believed that the best format to provide this type of education would be a simulator or on-road training course.
- There was variation regarding the amount of time that participants were willing to invest in learning to drive LSDVs. Some participants suggested that education be offered as a one-time intensive course, and others indicated that a multi-module curriculum over a period of time would be more beneficial.
- Educational institutions and community groups were favoured as the best providers of LSDV training. Many participants and their peers already attended lifelong learning programs or were part of community groups for seniors.

Conclusions

In conclusion, there was significant evidence that drivers in older age cohorts were very interested in semi-autonomous vehicle technology. They were also quite receptive to using it if certain conditions are met. To this end, it is important that the increased safety of these vehicles is proven, that costs of vehicles, insurance and repairs are affordable, and that key questions are answered regarding how and under what conditions the technology works best.

This research revealed that older drivers recognize the potential of LSDV technology to increase their safety on the road and instill greater confidence in their ability to drive under challenging conditions that are typically avoided. Of greater importance, this technology is perceived to enhance mobility among older drivers and help them to safely prolong driving and mitigate errors that are associated with age-related factors. As such, this cohort of drivers was very receptive to strategies and tools to help them learn to use LSDVs in ways that maximize safety benefits. There was widespread recognition that increased knowledge of LSDVs gained through education and training can help senior drivers to reap the greatest benefits from this technology.

This means that educational strategies that accommodate the needs of seniors and their comfort in using new technologies are necessary to help them manage a significant learning curve, and thereby increase their receptivity to adopting LSDV technology. Tailored education is especially pertinent given that the main conclusion from the online survey data analysis suggested that an opportunity may exist to increase safety, conditional on the availability of education for senior drivers.

Perhaps most notably, the widespread and early adoption of LSDVs by aging drivers can help to demonstrate the true safety potential of LSDVs. Older drivers generally have a low crash risk as a result of their accumulated years of driving experience and exposure to all types of road environments and conditions. This is in sharp contrast to younger drivers, and those who drive longer distances who are most likely to be early adopters of LSDVs, but whom also often represent the population of drivers involved in crashes. In other words, the population of older drivers may be more sensitive to the inherent risks and limitations associated with semi-automated vehicles, and thereby best-suited to test them in the real world. Their experiences using semi-automated vehicles can be insightful regarding optimal strategies and conditions that are needed to safely integrate automated vehicles into the existing vehicle fleet consisting of – almost exclusively – traditional vehicles. Of equal importance, their ability to adapt to a new vehicle and road environment, as some of the safest drivers on the road, can help to set standards regarding the level of education and skills that drivers of all ages must possess before using semi-automated vehicles.

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Traffic Injury Research Foundation (TIRF)
171 Nepean Street, Suite 200
Ottawa, Ontario
Canada K2P 0B4
www.tirf.ca
Toll Free: 1-877-238-5235
Fax: 613-238-5292

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