



# The National Council on Aging (NCOA) and VWGoA release national survey results of **older adults' perceptions of self-driving ride hailing services**

## BACKGROUND

**I**n 2015, more than 85% of adults aged 65-84 and nearly 70% of adults aged 85 and older were licensed to drive<sup>1</sup>. In fact, the National Highway Traffic Safety Administration indicated a 33% increase in the number of licensed older drivers in the US between 2006 and 2015, with 47.8 million licensed older drivers in 2015<sup>2</sup>. This number is expected to increase as the population of older adults increases during the next five decades. By 2025, approximately 1 in 5 drivers will be age 65 or older, and research has found that they outlive their decision to stop driving by about 10 years for women and 7 years for men<sup>3,4</sup>.

Most older adults rely primarily on private automobile or walking to meet their travel needs<sup>5</sup>. The use of a private automobile has many benefits for the older adult, including being a reliable and convenient way to maintain social connections, access goods and services, and fulfill other household needs<sup>6</sup>. However, estimates suggest that men and women have about 7 and 10 years, respectively, of unmet mobility need<sup>7</sup>.

While private automobiles promote healthy aging and enhances mobility, older drivers are at an elevated risk for fatal auto crashes due to the aging-related factors, such as declining visual, cognitive, and psychomotor abilities, disease-related medication interactions that impair driving function, and an increase in fragility and frailty associated with aging<sup>8,9</sup>. A reduction in driving is one solution to the increase in the risk of car accidents and fatalities. However, a reduction in driving is associated with negative outcomes such as depressive symptoms, decreased health status, and decreased life satisfaction<sup>10,11</sup>. Eventually, older adults must rely on alternative methods to meet their transportation needs. Transportation is one of the most common supports provided by caregivers and research has estimated that 78% of caregivers provide or arrange for over 1.4 billion rides per year to older adults<sup>12</sup>. Still, older adults report that relying on others for transportation tends to limit their requests to only 'serious' transport, such as for medical appointments, which impacts engagement in social and personal activities related to improving quality of life<sup>13</sup>

In many areas of the U.S., travel by car is the only practical transportation option<sup>14</sup>. Alternative transportation services, such as public bus, taxis, and ride-sharing services, may be unavailable or inaccessible to older adults due to the location of routes, the distance of stops to homes, and the hours-of-service operation<sup>5,15</sup>. Mobility impairments can also restrict an older adults' ability to use alternative transportation, including having difficulty in getting to stop and with boarding the vehicle<sup>16</sup>. Finally, cognitive impairments may act as a barrier to using alternative transportation services. Cognitive impairments such as difficulty managing fare transactions, difficulty with coping with unexpected situations, and getting lost or confused on the way to a stop all result in challenges to transportation use (Centers for Disease Control and Prevention, 2013).

The advancement of technologies in vehicles has the potential to mitigate the challenges of driving as an older adult and may assist in the maintenance of mobility and social connectedness that vehicles provide, especially in areas where alternative transportation is not available<sup>17</sup>. While autonomous vehicles (AVs) remain under development and testing, their impact is expected to provide important benefits to the environment as well as the consumer, including crash prevention, emission reduction, and increased mobility<sup>18</sup>. Furthermore, the availability of AVs has the potential for advancing Mobility as a Service (MaaS) when coupled as a ride-hailing service. MaaS is described as a shift away from individually owned transportation towards a menu of services provide to consumers on demand through a single platform that offers real-time information to identify transportation options, evaluate costs and timing, and schedule and pay for a ride.<sup>19</sup> Ride hailing services, such as Waymo and Lyft, have piloted commercial services using AVs and this service model can be used as a proxy to understand the benefits and challenges for AV adoption in older adults.

Self-driving ride-hailing services (SDRH) has the potential to benefit older adults if their design is congruent with the complex needs and diverse abilities of this population<sup>20</sup>. Using SDRH may require access to and comfort with technology services. Current studies have shown that some older adults are uncomfortable

with technology<sup>21</sup>, including online payments<sup>22</sup>, and only slightly more than half of older adults in the U.S. own a smartphone<sup>23</sup>. Use of SDRH by older adults may also need to consider accommodations for physical and/or cognitive impairments. For example, more than a quarter of older adults use a mobility device, such as a walker, and mobility device use increases with advancing age<sup>24</sup>. SDRH design must consider the physical act of entering and exiting a vehicle, as well as in-car design for optimal use and safety<sup>25</sup>.

While vehicle design is important for use of SDRH, research demonstrates that the biggest roadblocks standing in the path of adoption of SDRH may be psychological, such as consumer acceptance and trust, not technological<sup>26</sup>. According to Lee and Coughlin<sup>27</sup>, new technology is not adopted widely due to several factors, including insufficient knowledge, individual characteristics, expectations, and design needs. A review of empirical findings from the research base revealed several common themes and concepts that impact technology adoption. The findings converged into 10 factors – value, usability, affordability, accessibility, technical support, social support, emotion, independence, experience, and confidence. While technology adoption is a complex process of the amalgamation of various determinants, research into how disparate factors interact with each other can provide insight into user’s decision about use of new technology and adoption decisions.

The perception of older adults regarding the use of SDRH is of interest as many advances being made in technologies may help older adults compensate for some of the deficits in abilities associated with aging and older adults are predicted to be a high user group of automated technology, whether through private ownership or ridesharing. The objectives of this study were to describe the attitudes and perceptions of older adults about SDRH and examine the factors that influence intention to use SDRH in the future.

## Survey Methods

A nonexperimental, cross-sectional study design was used to obtain survey responses from older adults from August 2020 to September 2020. This study used an *a priori* approach to examine the factors associated with and intention to use SDRH among older adults. *A priori* acceptability of a technology can be defined as the evaluation of that technology before having any interaction with it.<sup>28</sup> Based on the limited availability of SDRH in the U.S., it was assumed that most participants did not have prior experience with SDRH.

Participants were eligible to participate in this study if they were 55 years or older and resided in the U.S. Participants were recruited for this study via social media platform advertisement that provided a link to a consent form and survey hosted on Qualtrics®, a secure platform.

A 31-item survey was used to assess the following domains: (1) attitudes about SDRH, (2) perceptions about SDRH, (3) perceptions about alternative transportation, (4) current transportation use, (5) interest in and concerns about SDRH, and (6) health-related and sociodemographic variables.

## Characteristics of Survey Respondents (N=2477):

- ❖ Average age was 60.16 years, with a range of 55-88 years. **83.71%** of the sample was 64 years and younger. Less than **1%** of the sample was aged 75 or older.
- ❖ **64%** of respondents were male, **35.9%** were female, and **0.1%** identified as “other”.
- ❖ **75.6%** of respondent were white, **14.9%** were Black or African American, and **4.3%** were American Indian/Alaskan Native. **30.1%** reported they were of Hispanic or Latino origin.
- ❖ **10.3%** of respondents reported a monthly gross income of less than \$2000, **31.7%** reported a monthly gross income between \$2000 - \$3000, **39.8%** reported an income between \$3000-\$4000, and **17.4%** reported an income of \$4000 or more.
- ❖ **14.9%** of respondents reported they were a Veteran of the U.S. Armed Forces.
- ❖ **45.8%** of respondents reported they were in very good or excellent health, while **19.8%** reported their health was fair or poor. **34.2%** reported their health was good.
- ❖ **43.8%** of respondents had at least a college degree. **11.3%** had a high school degree and **1.4%** had less than a high school education.
- ❖ **8.6%** of respondents reported they live alone.
- ❖ **22.6%** of respondents reported that they were a caregiver in the last 12 months.
- ❖ Several difficulties were reported by respondents. **19.8%** of respondents reported difficulty doing errands alone such as shopping and **18.8%** reported difficulty walking or climbing stairs. **8.5%** of respondents reported difficulty seeing even with glass, while **7.7%** reported difficulty hearing and **7.1%** reported difficulty dressing or bathing.
- ❖ **16.9%** of respondents stated they had felt lonely or isolated often or always, **32.4%** reported feeling lonely or isolated sometimes, and **40.5%** reported feeling lonely or isolated rarely or never.
- ❖ **87.7%** of respondents resided in a metro area, **8.7%** resided in a non-metro area, and **3.5%** resided in non-metro non-adjacent areas.

# Survey Findings

## ❖ **Current Transportation Use:**

- **92.7%** owned or leased their own vehicle
- **92%** currently drive
- **96.86%** used some other form of transportation, including driving as a passenger from a family, friend, or community member, during the past 3 months to get around.
  - Of those who had used this form of transportation, only **3.63%** reported feeling unsafe or uncomfortable during those trips.
- **68.8%** of respondents agreed or strongly agreed that they were satisfied with the alternative transportation options\* available in their area.
- **4.9%** of respondents agreed or strongly agreed that it was easy for them to access alternative transportation options\*
- **72.1%** of respondents agreed or strongly agreed that they believed that alternative transportation options\* are designed with the needs of older adults in mind.

❖ **Perceived Utility:** **72%** of respondents strongly agreed or agreed that using a self-driving ride-hailing service (SDRD) would increase their ability to achieve tasks outside the home, such as shopping or accessing services. **66%** strongly agree or agreed that using SDRH would enhance the driving performance of the vehicle.

❖ **Perceived Ease of Use:** **64%** of respondents strongly agreed or agreed that learning to use SDRH would be easy for them and **68%** strongly agreed or agreed that they would find it easy to get SDRH to do what they wanted it to do, such as set location.

❖ **Trust:** **75%** of respondents strongly agreed or agreed that they would trust SDRH and **71%** strongly agreed or agreed that SDRH would be a reliable form of transportation.

❖ **Technical Support:** **72%** of respondents strongly agreed or agreed that they believed resources, such as informational pamphlets or call lines, would be available to them if they had a question about SDRH and **66%** strongly agreed or agreed that they believed they could depend on SDRH support personnel to help if needed.

❖ **Confidence:** **69%** of respondents strongly agreed or agreed that they felt confident that SDRH would enhance their safety and that SDRH would help them do the things they wanted to do in life.

❖ **Independence:** **71%** of respondents strongly agreed or agreed that SDRH would enable them to maintain their independence and **74%** strongly agreed or agreed that SDRH would help people of any age remain safe.

❖ **Behavioral Intention:** **75%** of respondents strongly agreed or agreed that they would expect to use SDRH in the future and **70%** strongly agreed or agreed that they planned on using SDRH in the future.

- ❖ **Perceived Behavioral Control:** 71% of respondents strongly agreed or agreed that they could probably learn to use SDRH and felt confident that they could use it.
- ❖ **Subjective Norms:** 67% of respondents strongly agreed or agreed that most people would want them to use SDRH and 70% strongly agreed or agreed that most people their age should use SDRH.
- ❖ **Attitudes:** When asked their initial opinion when hearing the words “self-driving ride-hailing services”, 69.87% had a positive response.
- ❖ **Interest:** 75.6% of respondents reported they were somewhat or very interested in SDRH if it was an option for them.
- ❖ **Length of trip:** 18.2% of respondents reported they would feel comfortable using SDRH for a trip length of 4 or more hours, 55.1% felt comfortable using SDRH for a trip length of 2-3 hours, and 24.8% felt comfortable using SDRH for a trip length of one hour or less. Only 44 respondents (2.0%) reported that they would not feel safe in a self-driving ride-hailing vehicle.

### **Top five aspects of SDRH that were important to older adults include:**

1. Safety
2. Quality of Service
3. Convenience
4. Traffic
5. Overall comfort of riding in the vehicle

### **Least important aspects of SDRH to older adults:**

6. Luxurious Interior
7. Style of Vehicle
8. Time
9. Companionship
10. Accessibility

### **Top concerns about SDRH were:**

- ❖ Safety
- ❖ Privacy and Data Issues
- ❖ Convenience

\* Alternative transportation is defined as transportation other than an individual driving their own car, including using services such as shuttles, buses, trains, and taxis. This does not include rides from family and/or friends that are not offered on a consistent basis.

## Conclusions

- ❖ Those who do NOT currently drive were older, completed less education, reported poorer health, and reported more difficulties in walking, dressing, doing errands, hearing, or seeing. This group had higher satisfaction with alternative transportation, perceptions about SDRH, and more positive attitudes toward SDRH. They also reported a greater intention to use SDRH in the future.
- ❖ Those who reported more positive perceptions and attitudes around alternative transportation and SDRH tended to have a higher level of income, better health status, and a higher level of education compared to those who had poorer perceptions.
- ❖ Those who were older, had more difficulties in walking, dressing, doing errands, hearing, or seeing, and lived in more rural areas had poorer perceptions and attitudes around alternative transportation and SDRH. Those who reported a greater intention to use SDRH in the future had more positive perceptions and attitudes about SDRH and alternative transportation, had a higher level of income, better health status, and a higher level of education compared to those who reported less intention.
- ❖ Those who reported a lower intention to use SDRH in the future tended to be older, reported more difficulties in walking, dressing, doing errands, hearing, or seeing, and lived in more rural areas.
  - There were differences between male and female respondents. Male respondents were younger and had fewer number of difficulties in walking, dressing, doing errands, hearing, or seeing. There was a greater percentage of male respondents from urbanized areas.
  - For both females and males, those who reported higher intention to use SDRH had more positive attitudes and perceptions around SDRH and alternative transportation, had a higher level of income and education, and better health status than those who reported less intention to use SDRH.
  - For males, the strength of the association between intention to use SDRH in the future was most closely associated with, in order, 1) perceptions about SDRH, 2) attitudes about SDRH, and 3) level of income. For females, the strength of the association between intention to use SDRH in the future was most closely associated with, in order, 1) perceptions about SDRH, 2) level of income, and 3) number of difficulties in walking, dressing, doing errands, hearing, or seeing.

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