Exploring older adults' mobility challenges and preferences before and after COVID-19 pandemic

Project Number:

22MLSU22

Start Date:

04/01/2022

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Lead Institution:

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Funding Source(s):

Tran-SET

Louisiana State University

Total Project Cost:

$ 90,215

Exploring mobility challenges of older adults before/after COVID-19

The world-wide pandemic of COVID-19 have influenced older adults (65+ years) more than any other age groups. Older adults are more likely to have health problems and/or weak immune systems. Hence, they have been at higher risk for severe illness. In addition, the statistics show that older adults have a disproportionate number of deaths in the United States and elsewhere due to the coronavirus. Considering the life threats of this infectious disease among older adults, transportation plays a critical role in maintaining older adults' safety while providing mobility to meet their essential needs such as access to health care. Beyond driving, older adults have few mobility options (e.g., using taxi, public transit, Uber/Lyft). During pandemic period such as COVID 19, safe mobility options for older adults become even more limited. In 2019, the share of senior Americans (with 65 years old and above) from the total US population was about 16.5% and is predicted to reach 22% by 2050. It should be noted that this is a significant increase in senior Americans' share of the total US population compared to 1950 in which merely 8% of the whole population was 65 or above (US Census Bureau, 2020). Since the population in USA is aging (like other developed countries), it is very crucial to examine older road users' opinions, preferences and needs regarding the necessary transportation options that should be provided (during normal times as well as pandemic periods like COVID-19) to maintain their mobility and quality of life. Fortunately, autonomous vehicles (AV) technology can provide a safe mode of transportation for older adults and persons with disabilities (especially those who no longer can drive safely) during infectious disease epidemics. Although previous research showed a lack of trust and willingness among older population to use AVs, there is no sufficient evidence about the changes in their attitudes, concerns, and willingness to use AVs including shared automated vehicles (e.g., driverless taxi) after experiencing COVID-19 pandemic.

Problem Statement

As many seniors are forced to cease driving due to health and/or medical conditions, a limited

motorized transportation mode are available to them. During pandemic period such as COVID 19, safe mobility options for older adults become even more limited. Travel pattern and mode choice were greatly impacted by the COVID-19 pandemic among different socio-demographic groups. Beyond driving, older adults have very few mobility options (e.g., taxi, public transit, Uber/Lyft). Considering the life threats of this infectious disease among older adults, seniors' mobility and activity reduced considerably. According to a survey at Contra Costa County, California conducted by Berkely Institute of Transportation Studies, the average number of seniors' shopping trips including grocery trips were reduced from 3.5 times per week to less than twice a week from 2018 to 2020. In addition, seniors' travel to work (for those who were not retired), was cut by two-thirds.

In terms of seniors' preferred transportation mode during the pandemic, public transit experienced 30% ridership reduction in 2020 compared to 2018. Although driving the personal vehicle is probably the preferred mode of transportation, still many seniors are unable to drive due to health and medical conditions.

The result of a recent national survey by the principal investigator and his research team showed that senior Americans had lower level of active travel during the COVID-19 pandemic compared to the period prior to the pandemic. Figure 1 shows participants' walking frequency pattern before and during the pandemic. Accordingly, daily, 2-4 times a week, weekly, and 1-3 times per month categories show a reduction pattern, meaning those pedestrians who were actively walk before the pandemic reduced their walking activity. In contrast the frequency of walking patterns for monthly, 2-11 times per year, annually and less than once per year categories increased. It should be noted that the largest reduction belongs to 2-4 times per week, and the largest increase belongs to less than once per year

category. This shows that senior pedestrians' activity level was affected by the pandemic.

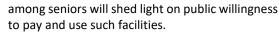## Objectives

The main objectives of this proposed study are to:
1. Examine older Americans' mobility challenges to use current transportation modes (e.g., driving private automobile, using public transit, taxi, shared rides such as Uber) before and during the COVID-19 pandemic.
2. Explore the changes in concerns, preferences, and willingness of older Americans to use autonomous vehicles before and after the pandemic.
3. Identify and quantify the contributing factors affecting older adults' willingness and concerns to use different levels of autonomous vehicle technology including shared autonomous vehicles (shared taxi).

Intended Implementation of Research

Workforce Development, Education, and Outreach: The project will provide the participating graduate and undergraduate students with hands-on experience in conducting literature review, designing, and developing survey instrument, and analyzing the data using advance statistical and machine learning algorithms. Finally, the technical results from this research will be disseminated at conferences such as the annual meeting of transportation research board and submitted to journals such as the Journal of safety science, safety research, transportation research (part F) and accident analysis and prevention. Two undergraduate students from LSU will be recruited to assist with certain aspects of the project.

Anticipated Impacts/Benefits of Implementation

It is expected that the results of this research will provide useful insights regarding the paradigm shifts from conventional transportation options to future Autonomous vehicle due to COVID-19 pandemic. Specifically, older Americans' mobility challenges to use current transportation modes will be identified and the extent to which such challenges caused seniors to consider AVs. A comprehensive investigation about shared autonomous vehicles (shared taxi) which is expected to revolutionize personal transportation among seniors will shed light on public willingness to pay and use such facilities.

These findings will provide DOTs / municipalities and transportation authorities in the United States and elsewhere along with suggestions that can help in promoting the AVs and particularly shared AVs among senior users.

Web links

- Tran-SET's website
  https://transet.lsu.edu/research-in-progress/

Tran-SET

Tran-SET is Region 6's University Transportation Center. It is a collaborative partnership between 11 institutions (see below) across 5 states (AR, LA, NM, OK, and TX). Tran-SET is led by Louisiana State University. It was established in late November 2016 "to address the accelerated deterioration of transportation infrastructure through the development, evaluation, and implementation of cutting-edge technologies, novel materials, and innovative construction management processes".

Learn More

For more information about Tran-SET, please visit our website, LinkedIn, Twitter, Facebook, and YouTube pages. Also, please feel free to contact Dr. Momen Mousa (Tran-SET Program Manager) directly at transet@lsu.edu.