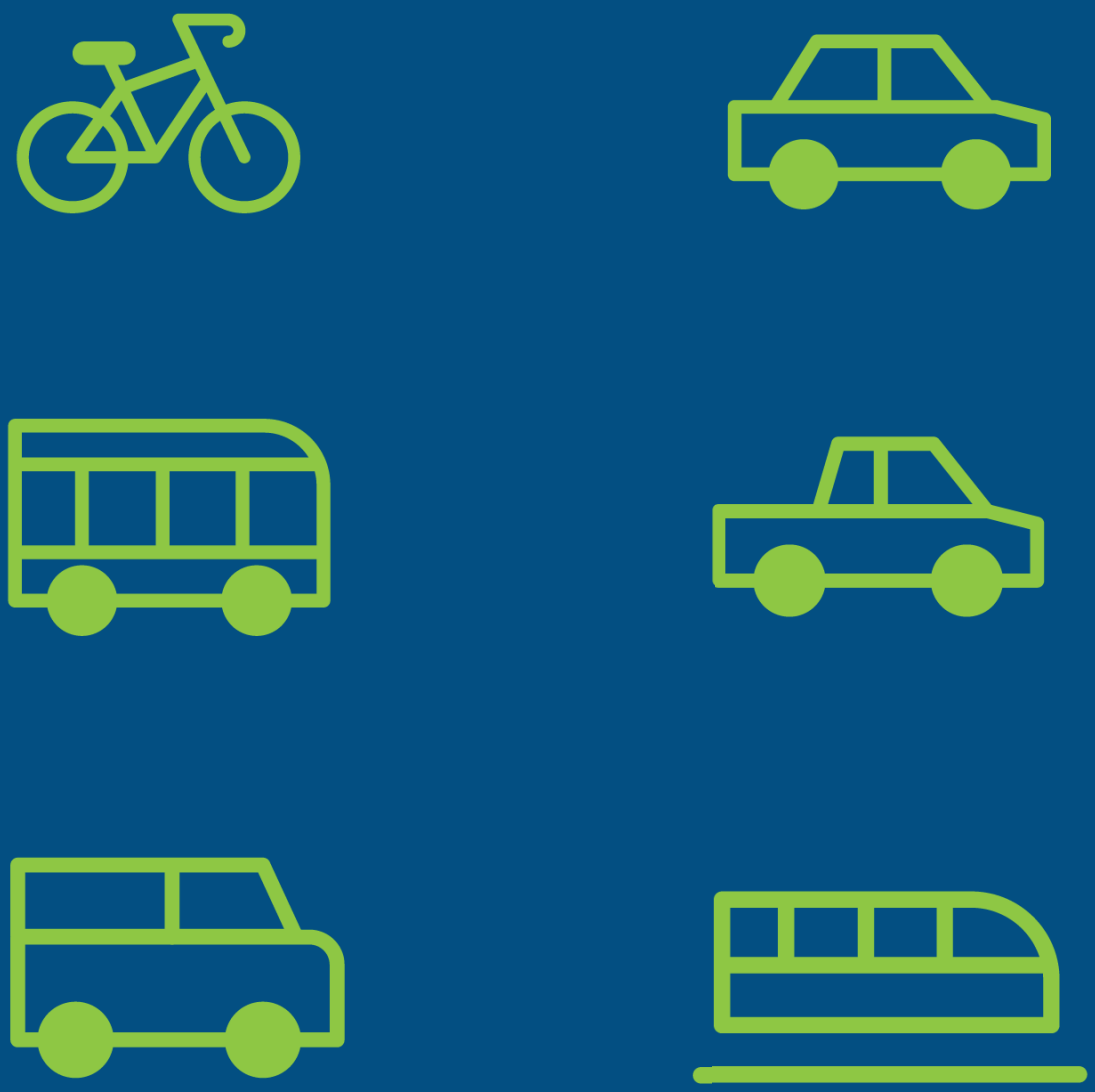
INCLUSIVE SHARED MOBILITY

Enabling the Participation of Older Adults and People with Disabilities



Shared Mobility Inc.

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Inclusive Shared Mobility: Enabling Service for Older Adults and People with Disabilities

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Executive Summary

As part of the National Aging and Disability Transportation Center's Getting Ready to Innovate Grant program, Shared Mobility Inc. (SMI) of Buffalo, New York has engaged in research to assess inclusivity for older adults, people with disabilities, and veterans in shared-use modes. Shared mobility has risen prominently in recent years to the forefront of the nation's transportation alternatives. Shared mobility programs including bikesharing, carsharing, and scootershare, are now common across the country. As these programs grow, there is an increasing need to make them more inclusive and to shift their service models to include all populations, including older adults and people with disabilities.

Beginning in the fall of 2018, SMI analyzed inclusive policy and operations models in bikesharing, carsharing, ridehailing, and volunteer transportation. The research team engaged with local and national transportation operators, policymakers, advocates, and stakeholders, SMI developed a research framework that initially assessed present inclusivity in its target modes for the project's target population. SMI's operations partner network includes organizations such as SocialBicycles, Uber, ZipCar, Mobility Development, and the Volunteer Transportation Center, one of the nation's largest volunteer transportation providers.

In addition to engagement with transportation partners, SMI sought direct feedback with the target population itself through focus groups and interviews. Nearly 40 older adults and people with disabilities took part in these activities and were able to share their transportation needs, challenges, and thoughts on solutions in the shared transportation landscape. SMI partnered with the University at Buffalo's Center for Inclusive Design and Environmental Access (IDeA Center) to host these events and and collaborate on the research's findings. SMI also worked with several other organizations who represent the target population in Western New York to ensure that a diverse set of voices was heard.

Following six months of research, SMI's team has gained a deeper understanding of the challenges and barriers in transportation faced by the target population. Common themes expressed were

1. The lack of on-demand accessible options
2. Unfamiliarity with the mobile applications and technology needed to use the programs
3. No service availability nearby
4. Not being comfortable with unfamiliar ridehailing drivers

Overall, they felt that the current shared mobility options were not very inclusive for them.

This combination of physical, social, geographic and financial barriers was expressed by older adults and people with disabilities alike. The research has shown that volunteer transportation systems can more easily serve the target population than other modes. Their client engagement, lower costs, and increased client familiarity with the service providers make the services more inclusive. The recommendations put forth seek to address a different barrier identified by those who have been unable to benefit from shared mobility thus far.

The research team identified 10 strategies that shared mobility operators can implement in order to make their programs more inclusive. For all programs, targeted outreach and education programming, subsidies for program users, and the co-location of shared vehicles around housing and service centers for the target population are proposed as strategies for all shared mobility operators to implement as a way to enhance access for older adults and people with disabilities. Deployment of adaptive and electric-assist bicycles are two strategies bikeshare operators can employ so that users who are unable to ride standard shared bikes also can use their systems. The incorporation of wheelchair accessible vehicles and allowing members to add a peer driver to their account are ways carshare programs can become more inclusive for their members. For ridehailing, the adoption of local policies mandating wheelchair accessible vehicles in fleets and enhanced training procedures for drivers are strategies that would make significant strides for inclusivity. Lastly, the development of volunteer transportation systems that can fill in a service gap between existing shared programs and public transportation is an effective way to provide community mobility to folks who are transportation vulnerable.

Moving beyond research, SMI intends to deploy its own volunteer transportation program in Western New York by partnering with the Volunteer Transportation Center (VTC). Volunteer transportation is tailored for older adults and people with disabilities through more personal customer service, marketing, and operational focus on making its service inclusive and accessible. Presently, many people in Erie County are burdened by fixed route transit gaps, little to no access to paratransit in rural areas, and no availability of volunteer transportation in urban areas. SMI seeks to adapt VTC's proven model to a metropolitan setting where it can serve clients from rural, suburban, and urban areas alike. VTC is currently working with SMI to develop a driver management platform that will facilitate on-demand volunteer service and facilitate more efficient trips. This program will roll out the current iteration of this platform and assist VTC by beta-testing new features in program development.

In addition to the development of this program, SMI will continue to connect with its partners in the shared mobility industry to spread its findings and help to catalyze inclusive changes in its future projects. SMI is committed to finding ways that incorporate the project's recommendations and findings so that as shared mobility grows, it grows with everyone in mind.

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Introduction

The transportation landscape that has defined the United States over the past century is beginning to change rapidly. Trends in mobility research throughout the past decade have shifted toward new, largely urban, modes of transportation that attract younger adults and professionals. In an effort to reduce the number of single passenger occupancy vehicles in otherwise congested urban areas and to promote healthier urban living, the introduction of ridehailing, carsharing and bikesharing to cities of varying sizes across the United States and the globe have broadened transportation options beyond walking or public transit. With easy-to-use apps, riders can plan their trips in advance or on the spot to move in and around their city without ever having to get behind the wheel.

While these modes of transportation are largely attractive to millennials and young professionals, there is much to explore about their potential for other populations in need of affordable and efficient single-trip transportation options. The American Public Transit Association found that the largest cohort of shared mobility users are between the ages of 25-34. According to the 2016 American Community Survey (5-year Estimates), 46.2 million people age 65 years and older[1] live in the US, up from 38.7 million in 2010. The number of people age 65 years and older[2] living in the US is projected to reach its peak in the year 2030, implies that there will be an increasing amount of people in need of ongoing medical care, affordable housing and most importantly affordable, reliable and accessible transportation[3][4][5][6][7].

Older adults, depending on their level of mobility, traditionally rely on transportation through their own personal vehicle, a friend or family member's personal vehicle, public transit, paratransit services, taxi service, walking, or van pooling program. Of the modes listed above, most older adults prefer either driving themselves to their intended destination or in a personal vehicle of a family member or close friend. Alternately, older adults who are either unable to drive or can no longer afford the expenses associated with personal vehicle ownership are left to seek transportation options through services offered in the public, private or non-profit sectors. While each of these modes of transportation have taken persons with disabilities

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[1] Social Explorer Tables: ACS 2016 (5-Year Estimates)(SE), ACS 2016 (5-Year Estimates), Social Explorer; U.S. Census Bureau

[2] Social Explorer Tables: ACS 2010 (5-Year Estimates)(SE), ACS 2010 (5-Year Estimates), Social Explorer; U.S. Census Bureau

[3] Li, Moyin and Nebiyou Tilahun. "Time Use, Disability, and Mobility of Older Americans." Transportation Research Board. Journal of Transportation Research Board, No. 2650, 2017, pp. 58-65.

[4] Yang, Linchuan. "Modeling the mobility choices of older people in a transit-oriented city: Policy insights." Habitat International. 76 (2018) 10-18.

[5] Bejleri, Hir, Soowoong Noh, Zongni Gu, Ruth L. Steiner and Sadra M. Winter. :Analytical Method to Determine Service Gaps for Transportation Disadvantaged Populations." Transportation Research Board. 2018.

[6] Lubin, Andrea, Karen Alexander, and Elizabeth Harvey. "Achieving Mobility Access for Older Adults Through Group Travel Instruction." Transportation Research Board. Journal of the Transportation Research Board. No. 2650, 2017, pp. 18-24.

[7] Leistner, Deborah L. and Ruth L. Steiner. "Uber for Seniors?: Exploring Transportation Options for the Future. Transportation Research Board. Journal of the Transportation Research Board. No. 2660, 2017, pp. 22-29.

into consideration as they have installed ADA compliant ramps in and around their stations, introduced wheelchair accessible components to their fleet of vehicles, and designed a reduced fare system to support affordable usage, some aspects related to transit, paratransit, taxi and van pooling usage deter older adults including those with disabilities to use them including service area, cost to use, lack of technological familiarity, and physical inaccessibility.

For an overview of shared mobility programming, please see **(Appendix 1 - Shared Mobility Overview)**

Methodology

The research team has developed a multi-phase research methodology to assess the current levels of inclusivity in shared transportation for the target population, seek out and profile best practice programs, and develop solutions to create greater inclusivity in shared programs. The research process began with an extensive literature review into the topic. The literature review covered not only bikesharing, carsharing, and ridehailing, but also touched on public transit, vanpooling, and volunteer transportation programs that are also impactful transportation programs for the target population that can lend breadth to the research. The literature review was conducted over the first month of the project.

The research project's second phase focused on outreach and engagement with the target population through the use of focus groups and individual interviews. Focus groups allowed the research team to discuss a bevy of issues, barriers, and areas of opportunity within the community. Individual interviews, on the other hand, were held with leaders and practitioners within different segments of the disabled community so that a wide range of communities can be factored into the research. Lastly, the research team connected with shared transportation operators to document their successful inclusive programs and understand the challenges that they face in creating, implementing, and operating inclusive models. Major recommendations will then be shared with the research team's partner network and presented to other, relevant nationwide stakeholders in order to spread solutions across the shared mobility spectrum.

Not every disability can be overcome in the pursuit of inclusion within shared mobility, but the aim is to create feasible recommendations to operators that would create the most change possible.

Existing Conditions

Shared mobility currently faces an access equity problem for older adults and people with disabilities. The design and policy that defines shared systems, at this point, is simply not inclusive enough at the present stage of development. This stems from a variety of barriers including physical, geographic, economic, and technical.

For an in-depth examination of physical, geographic, economic, and operational barriers preventing older adults and people with disabilities being better served by shared mobility services, please see Appendix 2 **(Appendix 2 - Existing Conditions)**

Literature Review

Transportation literature focusing on alternative modes for aging populations has traditionally addressed public transit, paratransit services, taxi services, private and non-profit van pooling, personal vehicles and/or walking. While these have all been acceptable forms of transportation for decades, increasing operational costs, time constraints, fixed route cuts, and a healthier aging population, they declined in service over time and failed to offer affordable, effective and reliable transportation. As a result, many older adults wishing to enjoy their golden years in-place struggle to participate in social events, make scheduled health and social service appointments, commute to grocery stores and other commercial locations, and risk developing severe long-term mental and physical health challenges. The feeling of isolation due to a lack of transportation is a critical factor that must be remedied in order to allow people to age in place[8].

This literature review will give a brief overview of current transportation options for aging populations, the perceptions and challenges facing each mode of transportation, and the efforts made towards innovating transportation as more and more Baby Boomers are entering into retirement. Not all forms of transportation evaluated below are optimal for all aging demographics, however, a veritable push for innovative options is evident as this population becomes increasingly technologically savvy. This same generation has collectively driven more miles than any other generation in history and is statistically healthier than previous aging populations. Any alternative to owning and operating a personal vehicle will require careful planning and consideration.

For an examination of primary existing transportation options for the target population, please see **(Appendix 3 - Existing Transportation Options)**

[8] Li, Moyin and Nebiyou Tilahun. "Time Use, Disability, and Mobility of Older Americans." Transportation Research Board. Journal of Transportation Research Board, No. 2650, 2017, pp. 58-65.

Carsharing

Car-sharing for aging populations is a recent initiative and, as a result, there are few case studies or data to effectively argue in favor or against this mode. With a rapidly growing aging population, safety concerns surrounding their ability to adequately operate a motor vehicle is widely prevalent in transportation literature. Baby Boomers are at the forefront of this population with drivers ranging in age from 54 to 72 years old as the most populous group as well as the most experienced drivers. As a result, many Baby Boomers wish to continue driving as long as they are healthy and of sound mind. Considering their significant health compared to older generations, they may continue driving for one or more decades beyond their current age. In an auto-centric environment, losing one's ability to move freely in a personal car is socially equivalent to losing one's independence, making it difficult to give up a personal car, even if the expense may be greater than worth or use.

Some aging populations may be forced into considering other transportation options since an aging car is an expensive car, and at some point, that individual is forced to give it up based on simple finances. A pilot study conducted by Susan Shaheen et. al discovered that older adults, while fully capable of safely driving a motor vehicle, are less likely to purchase a new one to replace a car they discarded due to high maintenance costs[9].

Car-sharing programs catering to aging populations could offer affordable options for those able to safely operate a motor vehicle but do not wish to or can no longer afford to own and operate their own personal vehicle. Two examples illustrating very different approaches to providing car-sharing services for aging and riders using wheelchairs in Walnut Creek, CA and Chicago, IL. The first example is a pilot program led by a collaborative research team including Susan Shaheen, Lauren Cano, and Madonna Carnel of the Transportation Sustainability Research Center, University of California at Berkeley, and the Nissan Motor Company.

For an examination of inclusive carshare options for the target population, please see **(Appendix 4 - Carsharing)**

Ridehailing

Currently, there is little literature/scholarly research focusing on ridehailing - app-based mobility services - for seniors, however there is a case study from Gainesville, FL where the City of Gainesville received funding to implement a Dynamic Ridesharing program that subsidized fares to be proportionate to low-income and fixed-income senior budgets. Individual rides ranged from free to a maximum of $5 one-way. The City outsourced programming for transportation training to appropriately educate seniors interested in participating in the study. The staff at

[9] Shaheen, Susan, Lauren Cano, and Madonna Camel. "Exploring electric vehicle carsharing as a mobility option for older adults: A case study of a senior adult community in the San Francisco Bay Area." International Journal of Sustainable Transportation. 2016, Vol. 10, No. 5, 406-417.

Elder-care provided basic instruction on how to use the ridesharing app, planning and method of payment. Ride rates were determined on a sliding scale based on annual income, and careful bookkeeping and trip mapping were also handled by the Elder-care staff.

The study showed that seniors are capable of using the subsidized-Uber, however, there were many barriers and deterrents that ultimately reduced the amount of participants by the end of the study These were: technology barriers, gender (females were more likely to use the service over men), age (older seniors were less technologically savvy), anxiety towards entering a car with a stranger, cost, feeling a loss of independence[10].

Accessible alternatives have begun to emerge in ridehailing through on-demand wheelchair accessible vehicles (WAV) integrated into ridehailing operations. This practice has been recently mandated in large cities such as New York, Chicago, and Philadelphia[11]. These policies, with slight variations, all mandate that ridehailing operators provide adequate WAV service to users there. WAV rides cost the same as a standard ridehailing trip for eligible users.

Legislation on WAVs in ridehailing is partly a response to lawsuits by mobility advocates who demand that wheelchair-accessible services needed to be offered by transportation network companies (TNCs) like Uber and Lyft. However, municipal ordinances have been met with resistance from ridehailing operators who, in some cases, have subsequently filed lawsuits against municipalities enacting these policies but have yet to be successful in overturning them. Once the ordinances are upheld, TNCs have failed to share data on their accessible fleets with governments out of fear of revealing too much operational knowledge to their competitors.

Ridehailing's core operations model of using its drivers' vehicles does not naturally facilitate WAV service as so few drivers own eligible vehicles for use in a personal capacity. To remedy this shortcoming, TNCs have begun contracting the service out to third parties in order to provide WAVs to its drivers. One such program is Chicago-based E-Rive carsharing. Aside from providing hybrid and fully electric vehicles to conventional ridehailing drivers, it also maintains a full fleet of wheelchair accessible vans for ridehailing usage. E-Rive operates and maintains the fleet for ridehailing drivers who pay weekly fees to use the vehicles. According to E-Rive's General Manager, Richard Kosmacher, TNCs assign which drivers will serve as WAV drivers and provide them additional bonuses to offset the cost of renting the shared vehicles. The TNCs work with E-Rive to assign its drivers to available wheelchair accessible vehicles. Although, Kosmacher stated that there is a backlog of drivers with not enough available WAVs available through E-Rive and other peers in the Chicago market[12].

This market segment is in flux, however. In 2018, Uber announced its intention to move to an exclusive contract with MV Transportation to provide WAVs in six North American markets (Chicago, Toronto, New York, Washington, DC, Boston, and Philadelphia) with plans for expansion to San Francisco and Los Angeles in the near future. The centralization of third-party WAV service is a new evolution for offering inclusive options in ridehailing and demonstrates commitment to the concept by TNCs.

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[10] Leistner, Deborah L. and Ruth L. Steiner. "Uber for Seniors?: Exploring Transportation Options for the Future. Transportation Research Board. Journal of the Transportation Research Board. No. 2660, 2017, pp. 22-29.

[11] "Niagara Frontier Transportation Authority Interview." Interview by author. October 16, 2018

[12] Kosmacher, Richard. "E-Rive Carsharing." Telephone interview by author. November 15, 2018.

Bikesharing

Bikesharing was first introduced to citizens in 1960s Amsterdam and has since become a popular urban mode of transportation throughout the world[13]. Innovations such as dockless bicycles, greater availability, integrated technology features allowing users to reserve bicycles, and GPS technology encourages more users to choose bikesharing for shorter commutes than other modes of transportation[14]. While bikesharing is widely popular in urban settings, bikesharing companies continue to focus their programming around traditional two-wheel bicycles, which, the broader clientele is more likely to use.

Recent efforts by at least two bikesharing companies in Portland, Oregon and Detroit, Michigan have shifted their efforts to improve the quality and inclusivity of their services by piloting adaptive bicycle programs. Adaptive bicycles and tricycles are designed to allow individuals with a wide array of physical and developmental needs exercise and freedom to those who may otherwise be limited by their disabilities[15]. These can be custom designed based on age, ability, and safety needs. There is currently little scholarship available on these programs since they are relatively new programs.

More information about bikeshare programs that better serve older adults and people with disabilities, see **(Appendix 5 - Bikesharing)**

Focus Group and Outreach Findings

As part of its research, Shared Mobility partnered with the University at Buffalo's Center for Inclusive Design and Environmental Access (IDeA Center) to host a focus group event for the research target population. 28 people participated in the focus group event which included older adults, people with mobility impairments, and people with visual impairments. With the understanding that there are other segments of the target population not covered by this event, the research team conducted additional outreach with people with cognitive disabilities and the Deaf community in order to account for their experiences as well.

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[12] Kosmacher, Richard. "E-Rive Carsharing." Telephone interview by author. November 15, 2018.

[13] Wielinski, Grzegorz, Martin Trépanier, and Catherine Morency. "Carsharing Versus Bikesharing: Comparing Mobility Behaviors." Transportation Research Record: Journal of the Transportation Research Board, No. 2650, 2017, pp. 112-122.

[14] Wielinski, Grzegorz, Martin Trépanier, and Catherine Morency. "Carsharing Versus Bikesharing: Comparing Mobility Behaviors."

[15] Special Needs Tricycles & Bicycles." eSpecialNeeds. https://www.especialneeds.com/shop/mobility/special-needs-tricycles-bicycles.html.

The focus group event consisted of a series of focus groups that discussed their experiences with ridehailing, bikesharing, and carsharing. The event also included surveys before and after that focused on the individuals' familiarity with the programs, frequency of use, travel patterns, overall mobility, and other related factors such as comfortability using mobile phones and digital payments. The participants were surveyed after the focus groups to register the change in understanding and desire interest in using modes. Participants came from a wide range of socio-economic and demographic backgrounds and represented a diverse set of individuals across the target population.

Full survey data and a more detailed description of the results from the focus group event can be found in **(Appendix 7 - Focus Group detail)**

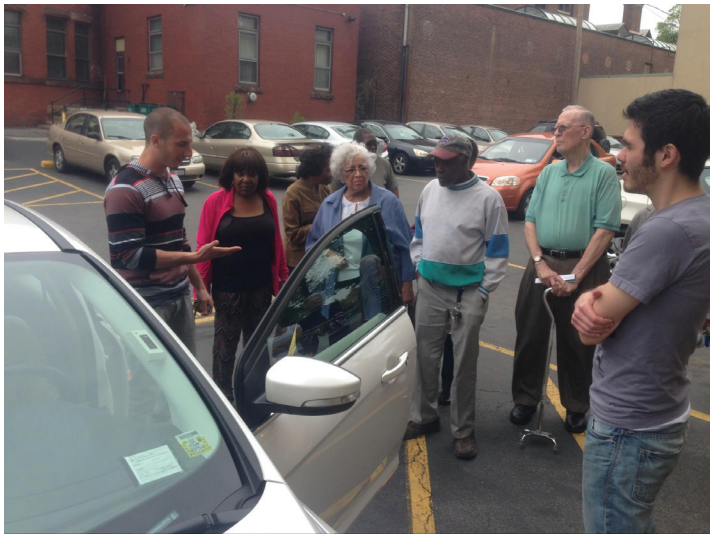
Recommendations for Operators

Overall Recommendations

Several recommendations formulated by the research team were applicable to the operation of bikesharing, carsharing, and ridehailing alike. All operators could benefit from the implementation of these policies and programs would help inclusivity in any given program.

Targeted Outreach and Education

The research team learned through interaction with the target population, that many people were either not aware of how shared mobility programs worked or even that they existed at all. This was confirmed at the project's focus group event where nearly half of the participants had never before used ridehailing; just 1 out of 28 surveyed had used bikesharing; and no participants had ever used carsharing. Overall familiarity with the programs was low across the board, especially with bikesharing and carsharing where 75% of all participants were completely unfamiliar with the programs.



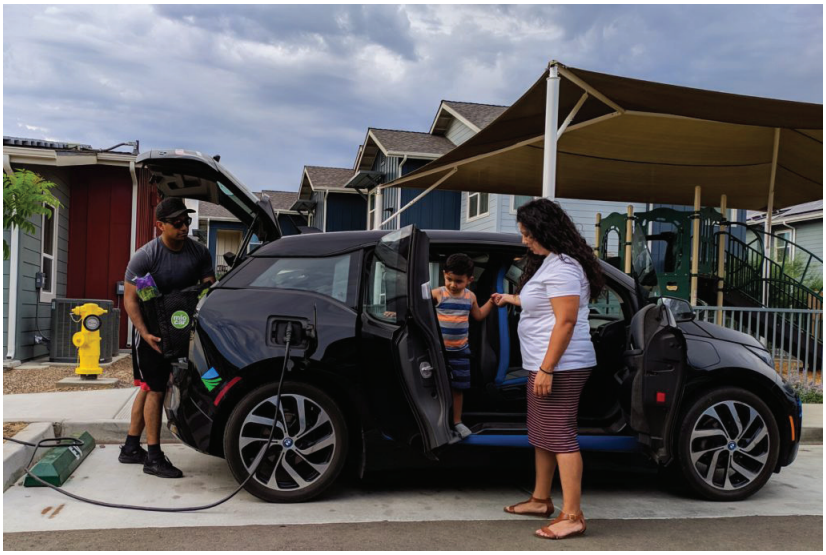
Source: Buffalo CarShare, 2014

If shared mobility operators intend to be more inclusive for older adults and people with

disabilities, the target population must be made more aware of these services as a means to enhance their personal mobility. The best way to do this is to make the process as relatable and individual as possible. This includes all facets of outreach: education, marketing, and customer assistance. Focus group participants stressed that they preferred to speak directly with service representatives and outlined numerous scenarios in which in-person assistance would be preferred. This included help with a broken bikeshare bicycle, problems finding a carshare vehicle, and issues with a ridehailing trip, among others.

The focus group event highlighted the potential for in-person outreach. Participants and event hosts discussed how each program worked and how they could relate to participants. Survey results showed a dramatic spike in program awareness and interest in use. 65% of participants reported being at least generally familiar with bikesharing and carsharing services following the event, up from 18% and 11% before the event, respectively. Ridehailing also saw a nearly 25% increase in participant familiarity. Participants were also far more likely to consider using these programs as a way to increase their own mobility in the community. Over 90% of participants stated they believe using ridehailing in the future would increase their own mobility. Similarly, 29% and 42% of participants reported the same for bikesharing and carsharing, respectively.

Overall, these results show a strong relationship between acquiring knowledge of the programs and participants willingness to use them. This effect translates beyond just research events too. Operators must consider this when planning their own marketing and outreach. Ensuring that information is posted in mediums most accessible to the target population and making program representatives easily available will yield greater awareness and, in turn, greater usage. Activities like this would include advertisements in the local newspaper, radio, and television, coordinated events with groups that represent the target population community, and allocating more resources for in-person customer service.



Source: Míocar, 2019

Co-location of Services around Target Population

Geographic barriers continue to deter access to shared mobility services for older adults and people with disabilities. Many people in the target population have restricted personal mobility which limits them from traveling far from their dwellings without assistance or the use of a mobility device. With that in mind, shared mobility services should be as geographically accessible as possible. This lack of access could range from a hub or station of bikes or cars being too far away or simply the complete lack of service availability in a given area. This naturally blocks the target population from even being able to consider shared mobility options.

The research team found that many in the target population, specifically those who gave

feedback in the project's focus groups, would not consider using bikesharing or carsharing due to lack of direct access to the shared vehicles. For ridehailing, some were concerned about a lack of clarity on where to meet the driver and other boarding logistics. Concerns from the community about direct access to these services are a clear barrier for usage.

In response, operators must work on integrating their services better with the target population. Locating carshare and bikeshare hubs at key locations for the target population is one way to facilitate usage. Locations of note could include housing concentrations (such as senior housing facilities, group homes, or any area with a high concentration of target population resident), essential service providers, recreation centers, and other important destinations would increase the utility of the services. For a more dynamic program like ridehailing, this could come in the form of designated pick-up/drop-off locations at given destinations. This would centralize access and clearly demarcate where a user should wait for their ride, alleviating an anxiety that some focus group participants had stated. This would be particularly useful for people with visual impairments and would ensure that the designated location be wheelchair accessible as well.

Valley GO, a carshare pilot program in California's Central Valley, is one example of this concept. The pilot program launched across multiple rural counties with a goal to give increased access to traditionally underserved communities - particularly older adults and low-income individuals. The pilot placed carshare hubs at residential complexes with high volumes of their target population and coordinated with on-the-ground staff to inform residents of the program, facilitate signing up, and answer any questions residents may have. This targeted access brought a new shared mobility service to areas that would have been passed over by conventional carshare models due to its remote location and limited density.

This could also include the coordination of trip planning and other travel advisement with different agencies. A non-profit transportation organization in California's Stanislaus County, MOVE, has worked to consolidate human service and transportation operators together in one location. This allows clients to schedule transportation alongside their service appointments as well as facilitating increased coordination between all stakeholders. This 'one-stop-shop' model was praised by planners involved in the project as a way to increase mobility for local service recipients.

Subsidies for Shared Mobility Users

Economic barriers were a consistent point made by many in the target population. Many older adults and people with disabilities face either life on a fixed income or face other limited employment opportunities that financially constrain their mobility options. Because they are generally privately-operated systems, most shared mobility programs are not able to make adjustments in their pricing models to increase access for the target population. However, other publicly funded transportation programs are able to make this adjustment. Transit, paratransit, and municipal vanpooling programs, for instance, subsidized a large portion of total operating costs for riders. This is done as a matter of public service and obligation by public agencies to serve their constituency.

In Buffalo, New York paratransit costs users $4 per trip. The estimated actual cost of these rides are closer to $47 per trip with the difference being subsidized by the transit agency[16]. If this

[16] Niagara Frontier Transportation Authority Interview." Interview by author. October 16, 2018

type of discount was offered to shared mobility options would make it more appealing to use systems like this and thus reducing the costs for the state. For instance, an annual membership for Buffalo's bikesharing service costs $55. If this was subsidized at the same rate as paratransit service, annual access to the bikeshare program would only cost about $4.70. Such a reduction in price would open the market up to many more users. While this level of subsidy may be excessive in this context, the principle remains that making shared mobility more affordable will give more people the opportunity to access it.

However, as the use of public transit continues to decline alongside a steady increase in the use of other shared mobility modes, policymakers need to begin to consider how all shared mobility modes can meld to better serve older adults and people with disabilities. Shared mobility offers a new, dynamic approach to transportation that stands to increase mobility options, alongside conventional transit programs. As such, funding structures should be aligned so that shared mobility is treated more like public transit and can offer subsidized service costs to those who need it. In this paradigm, shared mobility is considered to be more of a community asset that all can afford to use.

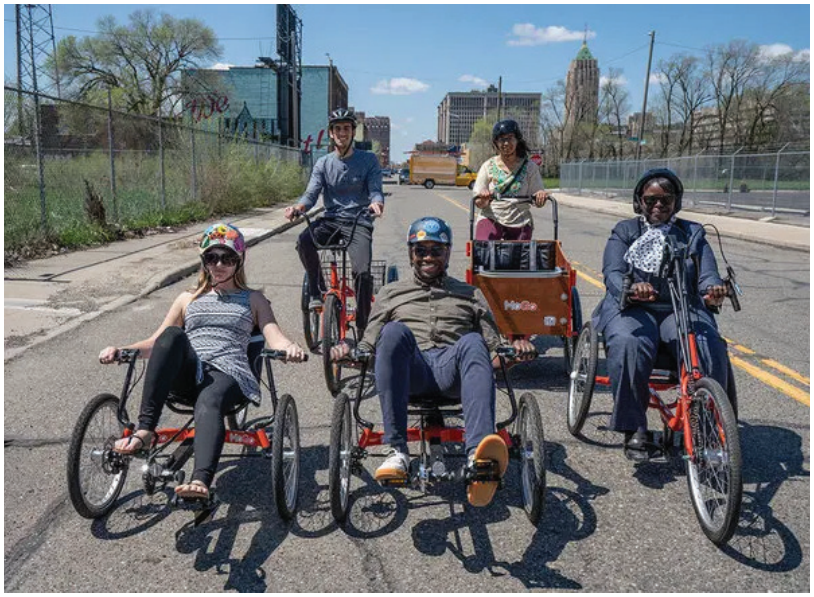
This is a major shift from the trajectory of shared mobility is not out of the realm of possibility. Transit agencies across the country are already beginning to provide subsidies for ridehailing companies to provide service in lieu of either fixed routes, paratransit, or other on-demand programs. These public-private mobility partnerships have the potential to add a dynamic piece to the public transportation network and increase mobility for the target population in ways that conventional transit cannot.

Bikeshare

Bikeshare operators face an interesting challenge in enhancing personal mobility for the target population. Recommendations made here are most suitable to enhance recreational options for older adults and people with disabilities, rather than point-to-point travel.

Adaptive Bikes

Bikeshare fleets are, with few exceptions, designed for the median user who is physically able and willing to ride a two-wheeled bicycle. Even though this is the norm, it creates an inaccessible program for many older adults and people with disabilities who are unable to engage in this type of riding. One inclusive strategy is the introduction of adaptive bicycles. Adaptive bikes come in several different varieties: handcycle, side-by-side tandem, heavy duty cruiser, standard tricycle, recumbent tricycle, and



Source: MoGo Detroit, 2018

cargo tricycles among others. Each variation offers a riding experience for different population segments and no single adaptive bike that is a ubiquitous solution.

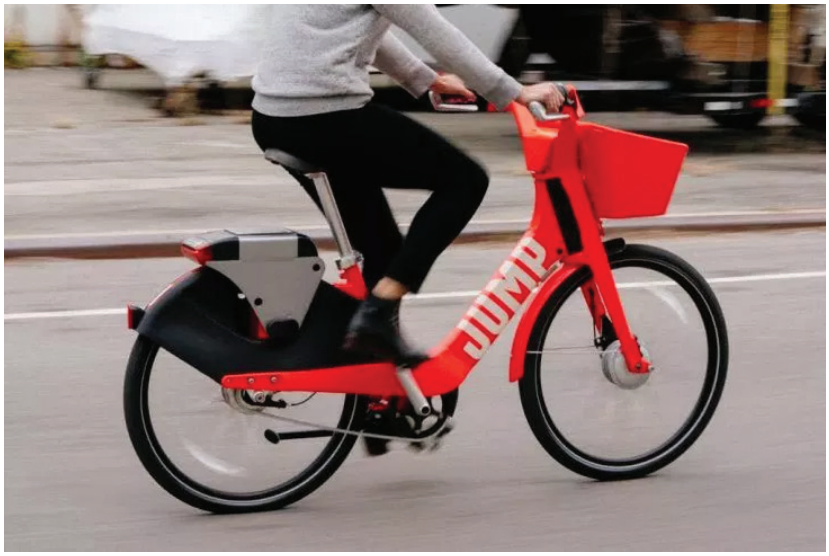
A majority of the target population surveyed said they would be interested in using adaptive bicycle options as part of bikeshare. The consensus showed a preference for a rental model that requires more assistance using the system. This includes assistance mounting the bike, storage of wheelchairs and other mobility devices and a staff member able to resolve issues and explain how to use the bikes. Over 80% of focus group participants had never used an adaptive bike before, though many people expressed that it would be a new recreation option for them.

Bikeshare has two general uses for riders - transportation and recreation. Traditional bikeshare models that have limited to no customer service helping users would need to adapt part of the service as a bike rental model that provides the ability to assist potential users. Target population members generally agreed this location should be a transit accessible that has access to multi-use and bicycle-specific trails and facilities to maximize usage

Bikes could not be deployed into the system like conventional shared bikes because it would be operationally challenging to maintain their availability for users given the differences in adaptive bikes and the locations of users in need of a specific bike. Adaptive bike programs have been added to several bikeshare operations across the country. BIKETOWN in Portland, Oregon, MoGo in Detroit, Michigan, and several college campuses served by Zagster have incorporated adaptive bicycles into their fleets. These programs also use a central rental model for users in addition to the regular service. Each of these providers has also acquired several adaptive bicycle variations in an attempt to serve as many users as possible.

Electric-Assist Bikes

Electric-assist bicycles help to fill another niche in the bikeshare marketplace. These bikes, also known as e-bikes, assist users by boosting their travel speed using an electric motor activated while pedaling. No extra effort is needed as the bike travels up to 20 miles per hour with a 40-50 mile range on each charge. Conventional bikeshare bikes can oftentimes by heavy and more difficult to ride than most personal bikes. This is prone to discourage the target population from riding in general. In contrast, e-bikes help to reduce physical stress on the rider and increase the distance they are willing to travel.



Source: JUMP, 2018

Following a discussion on e-bikes, nearly half of all participants surveyed from the project's

focus groups said they believed e-bikes would help to increase their community mobility. Specifically, 60% of older adults surveyed agreed with this statement. Many were excited and felt that this technology would reduce the physical stress of riding, allow them to ride further, and make them feel more comfortable alongside automobiles and other bikers alike.

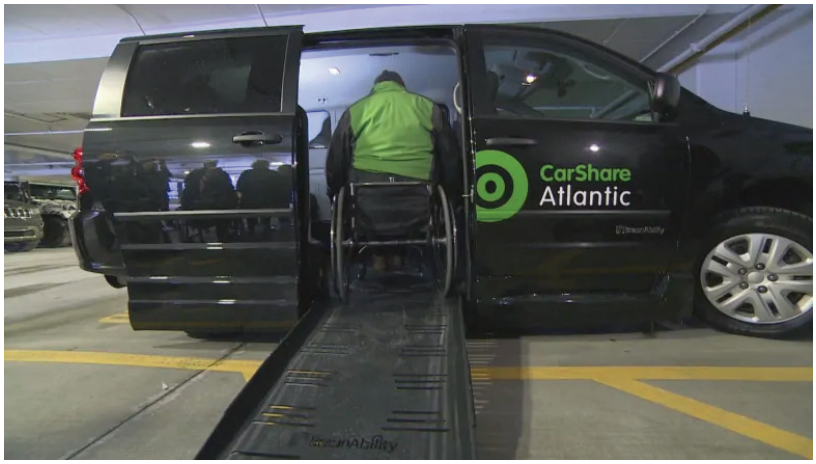
E-bikes are presently being deployed in cities nationwide using the same shared concept as traditional bikeshare with infrastructure deployed across the service area in a self-service model. This is possible as the bike are uniform (unlike adaptive bikes), giving operators more flexibility for service. However, this deployment style may not increase accessibility for everyone in a two-wheeled bike format. Electric-assist technology could be applied to adaptive bikes as well, giving riders of those models the same assistance

Carshare

Carshare operations continue to play an important part in today's mobility landscape by offering users consistent access to automobiles. The need to enhance this service is driven by auto-dependence in many areas, especially to access necessary services such as groceries and medical appointments

Dedicated Drivers for Members

Shared cars are a community asset that can help increase mobility for all. Unfortunately, conventional vehicles are not universally accessible, creating a physical barrier for many in the target population to use. One way to increase access to the vehicles without an equipment changes or alterations is to adapt the membership policy of the carshare program itself, specifically regarding who is allowed to drive as part of membership.



Source: CBC, 2019

Allowing people who can not drive to be a member of the car sharing organization and allowing these non-driving members to assign drivers to their account. The non-driving member would still be responsible still for making reservations of cars, billing and all other policies and procedures that the operator requires. In addition, the non driving member would take the legal responsibilities of their assigned drivers, by signing an additional membership agreement. Dedicated drivers would be able to give access to carshare members who cannot drive themselves and would be covered under the members policies and insurance that is set forth by the operator. This person would go through the same checks and approvals any other member would.

A dedicated driver program would give the carshare member the agency to select someone they trust to drive them as opposed to an assigned driver they would have if they used

ridehailing. Many target population members spoke to their concerns with being driven by someone who they are not familiar with. By allowing them to bring their own driver into the fold, it gives them the opportunity to maintain an independent standard of living and control more of their personal mobility.

A similar program was in place during the operation of Buffalo CarShare. In response to several members losing the ability to drive over time, the program decided to allow “buddy” drivers on their members accounts. Their customer services team worked with their members to create this solution out of necessity but found it to be a very useful tool that gave people, mostly older adults, a chance to maintain their independence through the program

Wheelchair Accessible Shared Vehicles

Creating more direct access to shared cars is a key issue as well. There is an extreme physical barrier for wheelchair users to access conventional shared vehicles, even with additional assistance. Utilizing wheelchair accessible vehicles in carsharing fleets creates an entirely new option for wheelchair users.

This access has previously taken place in one of two ways. First, wheelchair accessible vehicles designed for the wheelchair user to drive. This vehicle type would give applicable users the direct freedom to drive themselves with an on-demand vehicle option. Secondly, the inclusion of wheelchair accessible vehicles designed to accommodate a passenger using a wheelchair. In this case, the wheelchair user would theoretically employ a dedicated driver for the trip. Either alignment provides a significant upgrade from the status quo of no wheelchair accessibility in most carsharing markets.

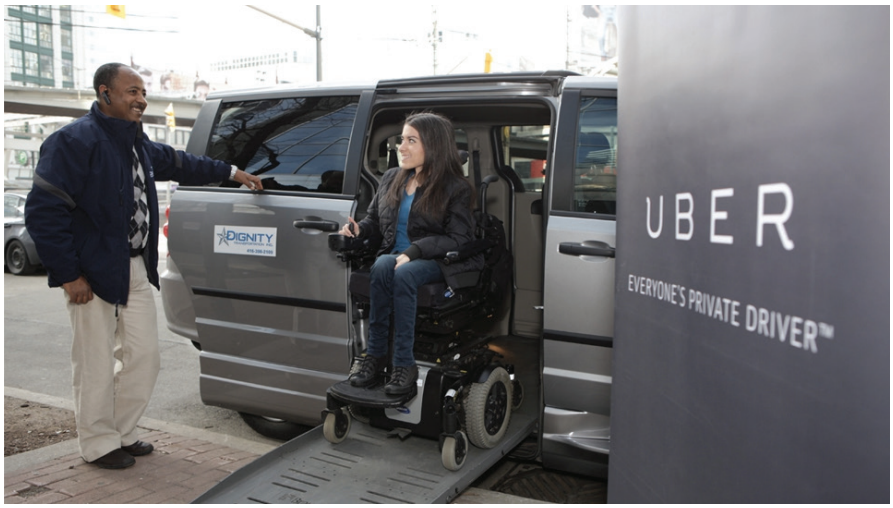
Previously, CityCarShare’s AccessMobile program provided both types of vehicles to carshare members in California’s Bay Area. This innovative approach expanded carsharing to people with disabilities like never before. Additionally, the program provided access to hand control devices that would give accessibility to its conventional shared cars as well. Prior to its 2016 discontinuation, AccessMobile was hailed as one of the most forward-thinking approaches to accessibility in carsharing.

Ridehailing

The newest of the three target modes, ridehailing's accelerated growth over the past 4 years has changed the mobility landscape inexorably, giving users an on-demand travel option never seen before. It is imperative now more than ever that inclusive policies be set forth to shape these programs moving forward.

Mandatory Wheelchair Accessible Vehicle Policies

In the past several years, a select handful of larger cities have enacted municipal legislation mandating that transportation network companies (TNCs) provide wheelchair accessible vehicles as a part of their ridehailing services at no additional cost to the user. This is a landmark step in accessible transportation policy and is the closest functioning regulation that pushes shared mobility towards the same levels of accessibility as public transit. Additionally, it gives wheelchair users a completely on-demand mobility option without adding any additional cost burden onto them.



Source: Uber, 2016

Cities that have enacted this legislation so far include New York, Chicago, Philadelphia and Washington, DC. TNCs have worked to meet these requirements in different ways so far, but the practice is becoming more standardized through the use of third-party operators. In 2018, Uber reached an agreement with operator MV Transportation to provide wheelchair accessible services in six North American markets, but only in those with a mandate in place. This move will begin to unify the type of service provided by the TNCs and may lay the framework for future expansion of this service type.

Based on conversations with stakeholders involved in Chicago-area ridehailing, the impacts of the city's mandatory accessible ridehailing policy have been overwhelmingly positive. Wheelchair-using riders are now able to call for a ridehailing vehicle at the same prices while, generally, only waiting a few extra minutes on average. Thus far, ridehailing companies have utilized third party operators to provide these accessible rides but have made it part of their mobile application interface for users so rides can be called in the same way[17]. This policy has been the biggest step taken towards inclusivity for ridehailing users.

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[17] Kosmacher, Richard. "E-Rive Carsharing." Telephone interview by author. November 15, 2018.

Enhanced Driver Training

Even though not all older adults and people with disabilities need a different vehicle type to access ridehailing, drivers still must be attuned to the needs of their passengers. Lack of familiarity with drivers, uncomfortable interactions, and lack of tolerance regarding disabilities or service animals were circumstances brought up repeatedly during the outreach activities. Many people with disabilities did not always feel safe using ridehailing if they didn't believe they could adequately communicate with the driver. Others, specifically people with visual impairments, were alienated by a lack of ability to coordinate a pick-up location and monitor their ride effectively on the way.

All of these factors could be alleviated with better training for ridehailing drivers on how to interact with and serve people with disabilities. This training would need to encompass a wide spectrum of needs from different communities, so that ridehailing drivers be sufficiently aware of their riders' self-identified needs. For example, if a TNC driver knew a potential rider had a visual impairment affecting his ability to see the car, drivers could react more appropriately to better serve this population. Making sure that all riders feel safe when utilizing ridehailing should be imperative for TNCs and is one of the first steps for inclusion. This is heightened by the fact that the system minimizes any person-to-person contact outside of the driver-rider interaction.

TNCs should seek to follow the same disability sensitivity and passenger assistance training protocols and procedures that paratransit services have enacted for their drivers. The Americans with Disabilities Act (ADA) mandates that any public transit agency that provides fixed-route transit must in turn provide "complementary paratransit" services as well. TNCs should look to paratransit as a standard for how to adopt and operate inclusively, using ADA guidelines as a start. Additionally, attaining this level of competence would help to validate shared mobility as worthy to provide rides subsidized by public transit.

Volunteer Transportation

In addition, the findings of this study point to a need for an alternative shared mobility solution for the target population. The barriers to access bikesharing, carsharing, and ridehailing cannot be completely overcome by the implementation of this report's stated recommendations. Even if every given recommendation were to be implemented, some accessibility barriers for each mode would remain to the target population trying to reach some destinations.

Bikesharing and carsharing are naturally limited by the geographic placement of the shared vehicles, limiting their on-demand capabilities. Additionally, not all bicycles and automobiles are fully accessible for the target population, creating an additional constraint. Even though ridehailing does not require active control from the user, several barriers remain including lack of familiarity with the driver and inability to coordinate their trip via a smartphone. All of these modes share a financial barrier as well, with cost to use above and beyond what the target population can afford, especially for those on fixed incomes.

Therefore, planners and operators alike still need to consider alternative solutions to increase mobility options for the target population. Volunteer transportation provides an opportunity

Source: GoGet, 2015

with a model that combines the shared use vehicle aspect of carsharing with the on-demand, passive travel experience for users provided by ridehailing. Volunteer transportation is an effective shared mobility option to provide access to services for older adults and people with disabilities.

When presented with the possibility of a volunteer program that would serve the local area, participants expressed interest. They believed that a program that could serve destinations beyond current transit routes and felt they would be more comfortable being driven by a volunteer as opposed to a ridehailing or taxi driver. Those who had used less formalized volunteer transportation also signaled their support for a more comprehensive program. The potential for wheelchair accessibility was seen as universally positive because there are no accessible ridehailing services available locally. Many participants need door-to-door assistance that volunteers could provide them as part of their trips. Last, the ability to schedule rides with an over the phone option appealed to participants without a smartphone.

Volunteer transportation also provides a transportation alternative that is cost effective for users in the target population who oftentimes live on a fixed income. Volunteer transportation programs use several different financial models including subsidies, reimbursements, and charity to diminish the cost for its users.

For additional detail on the history and operations of volunteer transportation programs, please sew **(Appendix 6 -Volunteer Transportation Operations)**

Conclusion

Shared Mobility Inc. strongly believes that older adults and people with disabilities can and should be enabled to use shared transportation. Currently, older adults and people with disabilities are largely being excluded from the social progress that shared mobility is catalyzing. This is not only unacceptable but also missed opportunities on the part of operators.

As the transportation landscape continues to evolve and shared mobility increasingly becomes the norm, the needs of older adults and people with disabilities must be brought to the forefront. Ridehailing, bikesharing, and carsharing will remain key transportation services for the foreseeable future. Currently, access to these services for the target population is inhibited by economic, technical, geographic, and physical barriers alike.

Solutions must be developed and implemented by operators to make their services more inclusive. Due to the wide spectrum of challenges that exist in transportation for the target population, the changes need to be both broad and substantive. A comprehensive approach should be taken by operators seeking to increase inclusivity and program-specific solutions implemented in order to solve the stated barriers. The recommendations in this paper collectively offer practical solutions that address the lack of inclusivity in shared mobility programs including the addition of the following:

- **Overall Recommendations**
  - *Targeted Outreach and Education*
  - *Co-location of Services round Target Population*
  - *Subsidies for Shared Mobility Users*

- **Bikeshare**
  - *Adaptive Bikes*
  - *Electric-Assist Bikes*

- **Carshare**
  - *Dedicated Drivers for Members*
  - *Wheelchair Accessible Shared Vehicles*

- **Ridehailing**
  - *Mandatory Wheelchair Accessible Vehicle Policies*
  - *Enhanced Driver Training*

- **New Volunteer Transportation Programs**

SMI believes strongly that the recommendations its team will develop through this research will be able to make deep, meaningful impacts on the shared mobility landscape. As shared transportation continues to evolve rapidly, research will be one of the forces which shape programs and services to become more inclusive in both the short and long term.

The recommendations put forth in this paper seek to move from talking about the barriers of access to implementing real change in the industry. There are major strides all bikesharing, carsharing, and ridehailing operators can take to become more inclusive. The recommendations detailed here take a comprehensive approach to this issue but are just a starting point. SMI hopes that this can begin to move the needle and be the catalyst for even more structural future change.

With this framework, SMI will seek out partners that have made inclusive strides in their operations. This outreach to best practitioners will allow the project to better showcase functioning examples of how operational policy and action can create more inclusive transportation options for the target population. This scope of best practice analysis will center on the research study's target modes, bikesharing, carsharing, and ridehailing, but will also include other associated transportation options such as fixed route public transit, paratransit, and volunteer transportation, as these modes inevitably intersect and intertwine to serve the target population. Best practices from these related modes will lend themselves well to recommendations made for newer shared services.

Shared Mobility Inc. is committed to champion this research in the industry and seeking to find operational partners committed to enhance inclusion. As the transportation landscape rapidly evolves, the needs of older adults and people with disabilities must not be lost in the shuffle. Advocates, operators, and all stakeholders in between must come together to find and apply common ground solutions that give access to everyone.

Shared Mobility Inc.

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