


# Rural Transportation Conference Participants' Opinions and Concerns Pertaining to Transit for Older Adults

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## Abstract

Mobility remains a vital part of the well-being of rural-living, older adults and transportation disadvantaged persons. This study seeks to identify research and policy needs related to rural transit for older people and the transportation disadvantaged. To obtain this goal, the multidisciplinary study team conducted two activities as part of a 2016 rural transportation conference: a survey of conference attendees and open discussion to elicit additional information. Results suggest the attendees felt the need for rural transit for older adults would continue to increase with public and private funding being critical issues. Respondents had similar opinions about challenges and opportunities across socioeconomic characteristics including age, gender, political leaning, rurality, and organizational function. This suggests an opportunity to mobilize support for public transportation.

## Keywords

transportation, rural areas, mobility, older adults, stakeholders' opinions, disadvantaged

## Introduction

The number and proportion of rural-living older residents continues to increase worldwide (United Nations, 2014). Aging in place (person's residing in the residence of their choice as they age) along with rural retirement migration (migration of retirees from urban to rural areas) leads to an absolute growth in the rural-living older population; contributing to the relative age increase is the outmigration of younger people from nonmetropolitan areas (Brown & Glasgow, 2008; Kusmin, 2015; Ryser & Halseth, 2012). With the older rural-living population growing and the younger rural-living population decreasing, older people are left to depend more on themselves, people of the same age, their community, and government services for their transportation well-being (Grant & Rice, 1983; Rosenbloom, 2004, 2009). Transportation options are often considered when identifying age-friendly communities (Menec et al., 2015) or making relocation decisions (Erickson et al., 2012).

Rural and suburban mobility is centered on the personal automobile. As older persons lose their ability to drive, they can experience isolation and decreased quality of life (De Koning et al., 2017; Freund & Martin, 2007; Pucher & Renne, 2005). Older adults see the lack of transportation as one of the most important issues they face (Glasgow &

Blakely, 2000; Grant & Rice, 1983). Mobility provided by reliable transportation, therefore, contributes to one's physical and mental well-being (Freund & Martin, 2007; Te Brömmelstroet et al., 2017), but older people often view public transit options, including services designed to meet their needs, as having poor reliability and service (Glasgow & Blakely, 2000; Stjernborg et al., 2015). Indeed, negative factors, including disability, poverty, and older age, are associated with increased use of services including public transit (Glasgow, 1995). Still, the aging rural-living population's need for rural transportation assistance is expected to increase (Kusmin, 2015; Rosenbloom, 2004). In-migrated rural

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retirees have a higher utilization of public transportation (Glasgow, 1995).

Reported here are findings from two activities that took place during the 22nd National Conference on Rural Public and Intercity Bus Transportation (RIBTC) held October 2–5, 2016, in Asheville, North Carolina, USA. The RIBTC is a biennial conference sponsored by the Transportation Research Board within the National Academies of Science, Engineering, and Medicine to facilitate learning and sharing around best practices and current research in mobility and transportation access in rural communities. The 2016 conference included multiple subject tracks: planning and design; policy, funding, and finance; rural transportation in today's operating environment; technology and training solutions; and special topics in rural mobility. The approximately 400 registrants included federal agency personnel (Federal Transit Administration; Interior, and Fish and Wildlife), state departments of transportation personnel (planners and administrators with statewide responsibility), transportation providers (transit, health and human service, tribal, veterans, and intercity bus), researchers, consulting firms, and vendors.

The project team interacted with RIBTC participants in sessions throughout the conference and presented in a breakout session on transportation research needs. The team hosted an adjoining open discussion on Economics and Rural Transportation Research Needs. The team also had a vendor booth where they provided additional copies of questionnaires to individuals who had misplaced theirs, and collected completed questionnaires.

The overall goal is to achieve a from-the-ground-up understanding of the research and policy needs related to rural transit for older people and the transportation disadvantaged. The first objective is to describe how individuals involved in rural transit perceive the current role and the future of transit and to identify research needed to support future transit development. A secondary objective is to determine the commonality of opinions across different demographics and thus discover potential for policy agreement. To that end, the study considers if and how opinions of individuals involved in rural transit differ by socioeconomic characteristics. Socioeconomic characteristics considered are age, gender, and political leaning. The survey also asks if the respondent's organization provides rural transportation and if the respondent's work location is in a rural state.

## Literature Review

Many disciplines research aspects of mobility for the elderly. The importance of mobility to older and disadvantaged populations is illustrated by a number of reviews and studies pertaining to aging and mobility (Cobb & Coughlin, 2000; Gwilliam, 2008; Nordbakke & Schwanen, 2014; Santos et al., 2010; Stjernborg et al., 2015; Whelan et al., 2006). Within this literature, focus groups or surveys to obtain the views of older adults are common (Burns, 1999; Glasgow &

Blakely, 2000; Mattson, 2011; Weeks et al., 2015). Surveys of individuals involved in everyday operations of transit are also common. The majority of these studies, however, are concerned with transit supply-side issues rather than stakeholders' opinions concerning rural transit for older adults and disadvantaged people (see, for example, National Center on Senior Transportation, 2010; Seekins et al., 2007; Stunkel, 1997).

Past research has shown mobility increases the quality of life and livability of a region (Burns, 1999; Ripplinger et al., 2012), the elderly need improved transportation options (Choi et al., 2012; Glasgow & Blakely, 2000), and the demand for mobility is increasing (Coughlin & D'Ambrosio, 2012; Shaheen, 2012). Studies also find regions are designing and implementing innovative approaches to meet mobility needs (Cobb & Coughlin, 2004; Mujumdar et al., 2013; Shaheen, 2012).

Gwilliam (2008) reviews the international literature on transit economics, albeit with a focus on urban areas. He discusses topics ranging from organization and finance, demand, and costs, scale, and efficiency to technology choice and regulation. He concludes transit organizations' range of objectives, heterogeneity in supply and demand, transit's two-way interaction with urban form, and the competing and complementary natures of technology create challenges both in operating transit systems and in studying them.

A number of other studies consider other aspects of rural transit economics. The U.S. Department of Transportation, Federal Transit Administration (2009), Wellman (2012), and Israel-Schwarzlose et al. (2014) address provision of transit services to older rural adults, recognizing the presence or lack of transportation services may be more critical for quality of life for older adults than for the general population (Glasgow & Blakely, 2000). A handful of studies have concluded that the benefits of rural transportation exceed its costs of provision (Ferrell, 2015). Stunkel (1997) reviews the literature on transportation policy and makes recommendations regarding social, economic, and the sustainability of rural communities. Among these recommendations, she calls for increased understanding of rural–urban differences, supporting individuals and families in achieving accessibility, providing incentives for rural transit, and decreasing fragmentation in transit provision.

Stiglitz (2015) describes a theoretical foundation for the provision of publicly provided goods, including transit services. Reasons for providing the service publicly rather than privately include “. . . market failures, the benefits of enhancing social cohesion through publicly provided education, and ensuring the attainment of basic rights . . .” (Stiglitz, 2015, p. 84). Ripplinger (2012) investigates cost structures and returns to scale in rural transit and finds returns to density, size, and scope. Ryser and Halseth (2012) note a need for improved coordination across agencies and jurisdictions and call for policies and resources to support a comprehensive regional transportation strategy. Technology promises improvement in

mobility by enhancing the safety and compensating for declining physical and mental abilities (Rhiu et al., 2015; Reimer, 2014). For further discussion of trends in rural transit and provision, see Mjelde et al. (2017).

Although brief, this review illustrates the range of issues in mobility of the older adults. However, questions remain about whether transportation services should be publicly provided and, if so, how best to provide transportation services in light of tightening government budgets and the economic structure of the sector. This study asks the opinions of people involved in the various aspects of providing rural transit regarding its current and future status. While supply-side and operational issues identified in prior studies are expected to emerge, the goal of this study is to identify research and policy topics needed to support rural transit for older populations. The study extends the literature by considering how options differ with socioeconomic variables. Characteristics such as age, gender, political leaning, and proximity to an issue have been found to influence opinions on other policy issues.

## Method

A relevant listing of professionals interested in transportation for the rural-living older people was not available to the researchers. To overcome this limitation, the research team elected to attend the RIBTC to conduct an onsite survey of professionals interested in rural transit. As a follow-up to the survey, an open discussion was held during the final session of the conference. This discussion allowed participants to expand upon their survey remarks and provided insights not captured by the survey. This method is similar to that used by Keefe (2018), who combined a small sample questionnaire and focus group. Survey responses were anonymous, and discussion responses were not associated with participants' names or locations, so it is not possible to match survey and discussion results.

## Survey

*Survey administration and response.* The questionnaire was included in the RIBTC registration packets, generating a convenience sample of professionals known to be interested and working in rural transportation. In addition, questionnaires were available at a booth during the RIBTC Expo. Questionnaires were distributed to 381 individuals from federal agencies, state departments of transportation, transportation providers, researchers, consulting firms, and vendors who registered at the conference. Eighty-one questionnaires were returned, giving a response rate of 21%. Not all respondents answered each question; analyses are based on the number of respondents answering a particular question. A copy of the questionnaire along with additional discussion is found in Mjelde et al. (2017).

Development of the questionnaire relied on an iterative procedure between the authors and experts in rural transit.

The authors reviewed the literature on rural transit and rural transit surveys in particular, including Pucher and Renne (2005), Dill and Neal (2010), Somenahalli et al. (2016), and Coughlin and Proulx (2012), which the authors found particularly relevant to conceptualizing this study. Questions and format are partially based on this review. The questionnaire is also the product of discussion among the project team and other rural transit experts regarding the extant literature, concerns of rural clientele and practitioners, and project goals. The questionnaire, however, differs from previous studies in context and number of questions designed to obtain conference attendees' opinions.

*Socioeconomic characteristics differences.* Responses were compared across five characteristics to gauge the presence of conflicting stakeholder views that might contribute to policy inaction. Two socioeconomic characteristics are compared using two contrasts, gender and if the respondent's organization provides or does not provide rural transportation. Three characteristics are modeled using three contrasts. Age is modeled as younger than 40 years, between 40 and 60 years, and older than 60 years. Respondent's work location is classified by whether the state's population is less than 10% rural, between 10% and 20% rural, and larger than 20% rural based on Reddit (2017). A respondent's political leaning is modeled as conservative, centrist, or liberal. Characteristics such as being older, from a more rural state, and a provider of transportation may be viewed as proximity to the issue. Other socioeconomic characteristics, such as gender and political leaning, may be less tied to the issue but reflect somewhat different worldviews.

Differences in the distribution of responses across socioeconomic characteristics are tested using the Kruskal–Wallis test, a nonparametric test on significance of differences between either continuous or categorical dependent variables by a categorical independent variable with two or more categories (Kruskal & Wallis, 1952). One drawback of the Kruskal–Wallis test is if there are more than two categories, the test does not provide information on which categories differ. To overcome this drawback, for any Kruskal–Wallis test that suggests significant differences, pairwise Mann–Whitney and  $K$ -sample tests are performed. Mann–Whitney (also known as the Wilcoxon rank sum test) tests for the equality of the two distributions and provides the same information as the Kruskal–Wallis test if there are only two categories. The  $K$ -sample tests for the equality of the medians between the two categories. Different statistical techniques requiring differing assumptions including parametric one-way analysis of variance, multiple regression, and ordered logit were performed; statistical inferences are very similar between the techniques. The nonparametric approach is presented because of similar inferences from the results of different techniques, drawbacks of the dependent variable (namely, being a Likert-type scale variable ranging from 1 to 5), and the generally accepted parsimonious argument that

simplest is better in statistics. All tests are performed using Stata 11 (StataCorp LP, 2011).

### **Open Discussion—Rural Transportation Research Needs**

Held as a concurrent final session of the RIBTC, the goal of the open discussion was to gather information about issues not addressed in the questionnaire and to obtain greater detail on concerns from differing perspectives. Attendees self-selected the discussion session and represented public transportation systems that ranged from remote service areas to areas near larger cities, federal agencies, and private firms. Work locations ranged across the United States from the Mid-Atlantic and East coast to the Midwest and on to the West.

The approximately 2-hr come-and-go discussion opened with a short explanation of the project's focus on rural transportation needs not including emergency medical transportation. The floor was then opened to attendees to discuss their concerns and ideas to improve rural transit for older and disadvantaged populations. Although the discussion was free-flowing, guidance was provided by a moderator and members of the research team participated both by asking questions and offering comments. The open discussion participants had viewed the survey, so perhaps it is not surprising their conversations followed similar themes.

## **Results**

### **Survey/Open Discussion**

In this section, summary statistics from the questionnaire are presented along with comments from the open discussion that either support the questionnaire results or provide possible explanations for the results. To make this distinction clear, in this section only, plain (nonitalicized) text describes results from the questionnaire, whereas, text in italics is based on the open discussion. Furthermore, the term "respondents" refers to people who responded to the questionnaire and "discussants" to participants in the open discussion.

**Respondents and their organizations.** The lack of demographic information on conference attendees and rural transit stakeholders across the United States precludes assessing whether the survey sample is representative of the populations of either conference attendees or rural transit stakeholders. The sample, however, demonstrates considerable respondent and organizational diversity. More females (58%) responded than males (42%). Respondents ranged in age from 24 to 86 years, with an average age of 49 years. Most respondents identified themselves as White or Caucasian. Approximately, 39% of the respondents rated themselves as politically conservative or very conservative, 42% liberal or very liberal, and the remainder centrist or other.

The 81 survey respondents held a variety of roles in their organization, including many respondents with multiple roles. Respondents' work locations were in 29 states and Washington, D.C. The type of organization employing the respondents was also diverse, with nonprofit organizations (26%), local (20%), and state governments (17%) employing most. In terms of territory served, 25% of the respondents' organizations had a national scope with the remainder serving one or multiple states. The majority of organizations did not have a main objective to serve or advocate for a specific segment of the population; those that did tended to focus on issues surrounding older populations and persons with disabilities. Fifty-four percent of the respondents' organizations were directly involved in providing rural transportation services. Nontransit providers included representatives of a range of organizations including regional government, travel industry, research, and consulting.

Numerous mechanisms were used to gauge the needs of rural-living older adults with surveys of riders being used by 60% of the respondents' organizations and surveys of the general public used by 39%. More than a third of respondents used public meetings to learn about older residents' needs.

**General transit for older adults.** Generally, respondents agreed or strongly agreed that demand for transportation services for older adults has increased over the last 10 years and that people over age 75 years will be more active and mobile in the future (Table 1). In fact, they agreed more strongly with the statement about increased demand over the past 10 years than any other statement in the survey. They also expected transportation services for older people in 20 years will be different than present services. Respondents were more neutral about whether the political influence of older people will increase in the future.

*The open discussion kicked off with a frank conversation of how rural transit may change in the future, starting with whether rural transit services are needed and whether the lack of transit constitutes a market failure. Childcare, for example, is generally the responsibility of families, but society does provide bus transportation to schools. Should society provide similar programs for older adults and other socially disadvantaged people? Discussants noted that choosing to live in rural areas (like all areas) comes with its own set of benefits and costs. By making this choice, rural residents explicitly or implicitly consider the benefits of the rural package greater than the costs.*

*Issues associated with perceived need for rural transit transitioned into a discussion of transportation as a livability or quality of life issue. Overall, discussants indicated support for rural transit as a livability issue but were concerned about how to measure and interpret benefits and costs including opportunity costs, quality and quantity of life changes with and without mobility, and how available transportation influences economic development. Although providers face similar*

**Table 1.** Number of Respondents Indicating Their Level of Disagreement and Agreement With the Following Statements About the Mobility Current, and the Future of Transportation Services for Older Adults in Rural Areas.

Statement	M	Median	SD	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
<b>General transit for older adults</b>								
Demand for transportation services for older adults has increased over the last 10 years.	4.46	4	0.57	0	0	3	38	40
People over age 75 in the future will be more active and mobile than in the past.	4.21	4	0.75	0	3	7	41	30
Transportation services for older adults in 20 years will be different than present services.	4.36	4	0.62	0	1	3	43	34
The political influence of older adults will increase in the future.	3.67	4	0.84	1	5	25	39	11
<b>Funding</b>								
Government should play a very large role in providing rural transit for all older and disadvantaged persons.	4.11	4	0.87	1	3	11	37	29
The Federal, State, and local governments are adequately funding infrastructure, institutions, and services to meet the future needs of older and disadvantaged persons.	2.09	2	1.03	27	31	13	9	1
Relative to today, in 20 years government subsidies for transit for older adults and disadvantaged persons will make up a greater share of total transit costs.	3.38	4	0.89	1	14	24	36	5
Rural residents bear a personal responsibility to ensure they are able to meet their transportation needs as they age.	3.16	3	0.96	4	17	23	34	2
<b>Future demand</b>								
People over age 75 in the future will need additional transportation services to meet their needs relative to today's older adults.	4.28	4	0.75	0	2	8	36	35
In the future, older people will require comparatively less assistance with transit services than at present.	2.48	2	1.07	14	34	15	16	2
In 20 years, most of the older and disadvantaged adults will have to rely on their own vehicles or rides with family and friends to meet their transportation needs.	2.69	2.5	0.89	3	37	24	14	2
The number of older and disadvantaged people using alternatives to driving will increase in the future.	3.99	4	0.70	0	5	5	56	14
<b>Technological and mobility advances</b>								
Technological advances are likely to alter how assistance with transportation will be provided to older people.	4.12	4	0.70	0	2	9	47	23
Over the last 10 years, transit innovations have generally resulted in mobility improvements for older and disadvantaged populations.	3.98	4	0.74	1	2	11	51	16
Efforts to provide better transportation services for older and disadvantaged populations also improve mobility for the general population.	4.25	4	0.70	0	1	9	40	31
Efforts to improve mobility for the general population typically also improve mobility for older and disadvantaged populations.	4.05	4	0.84	0	6	8	43	24

(continued)

**Table 1.** (continued)

Statement	M	Median	SD	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Over the last 10 years, transportation innovations have generally resulted in a reduction in costs per trip.	3.21	3	0.80	0	15	38	24	4
Administration and planning								
Federal, State, and local governments' long-range transportation plans will meet the transportation needs of the rural-living older and disadvantaged adults in 20 years.	2.63	2.5	0.99	8	32	25	12	3
Current rural land-use policies encourage walking, transit-oriented development, and other initiatives to promote livable communities for older and disadvantaged people.	2.56	3.5	1.03	12	31	17	20	0
Rural areas are currently employing creative land use, integration of multimodal transportation options, strategic investments in transit, and transit accessibility to improve mobility of older and disadvantaged adults.	2.65	3	0.97	8	31	23	17	1

Note. Summary statistics are based on the coding of 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

problems, there are individual problems unique to each provider. Through the discussion, it became apparent that there is no one-size-fits-all problem or solution. Similarly, there is no single type of rural transit provider. The discussion ranged from very specific topics an individual provider faces to more speculative, abstract, and theoretical issues of rural transit. More academic issues discussed were riders' potential adverse selection, moral hazard issues, asymmetric information, and externalities of rural transit. Comments indicated the discussants consider transit issues affecting rural-living older and disadvantaged adults to be important. They feel more discussion, research, and funding are necessary.

In response to the open-ended question on the survey where respondents could provide additional comments or thoughts, one respondent's comment summed up the discussion, "Quality of life isn't medical care or death with dignity but LIFE."

**Funding.** Respondents tended to agree or strongly agree with the statement that the government should play a very large role in providing rural transit for all older and disadvantaged persons. Most respondents felt the government is not adequately funding infrastructure, institutions, and services to meet the future needs of older adults and disadvantaged persons. In line with the respondents' opinions of funding, most respondents agreed with the statement that relative to today, in 20 years government subsidies for transit for older and disadvantaged people will make up a greater share of total transit costs. However, more respondents agreed than disagreed with the statement that rural residents bear a personal responsibility to ensure they are able to meet their transportation needs as they age. In addition to the questions in Table 1

concerning funding, respondents were asked whether the next generation of transit needs for rural-living older and disadvantaged persons should be funded either by the public sector, private sector, or equally by the two sectors. Even though 44% of the respondents felt that rural residents are personally responsible to meet their transportation needs (Table 1), more respondents felt funding to meet future needs should come from the public sector (28%) or equally from public and private sources (69%) than met by private sources (3%).

The most frequently mentioned issue in the questionnaire's open-ended question was funding. Funding appears to be one of the most important issues in rural transit. Several respondents indicated that rural transit may struggle to remain viable; one respondent simply stated, "Rural transportation is becoming economically ineffective." Funding concerns likely help explain why respondents felt transit for older rural-living populations may differ in the future from what is provided today.

Discussants expressed concern about whether transportation services could be provided cost-effectively in rural areas. Discussants recognized that cost-effectiveness is an important metric. Furthermore, they noted the need for more cost-effective methods to provide single-rider trips. At the same, they questioned the appropriateness of tying funding to performance measures, which vary greatly by volume of ridership. If riders per trip, for example, are the measure, a more populated rural area will have a better performance measure (more riders per trip and more fare box recovery) than a same-distance trip in an isolated area. Highly individualized transit, such as using a van to transport a single person, also reduces ridership metrics while serving an

*important need.* Discussants expressed concern about the ambiguity caused by the different meanings of public transit existing among local government officials who influence the acceptance and funding of public transit. Another funding issue raised is that funding often comes from competitive grants, but small providers lack a grant staff, placing them at a disadvantage.

**Future demand.** Respondents generally agreed or strongly agreed with the statement that people over age 75 years will need additional transportation services to meet their needs and disagreed with the statement that older adults will require comparatively less assistance with transit services than at present (Table 1). Respondents were consistent in that they tended to feel people will be less reliant on their own vehicles and there will be an increase in use of alternatives to driving in the future. Factoring in the increasing older adult population, these results indicate the view that the future demand for rural transportation for older people will increase.

*Discussants expanded upon juxtaposition of the increasing need for public transportation with the public's resistance to giving up personal vehicles in favor of transit. The personal automobile plays an important role in rural culture. Losing the ability to drive reduces an individual's independence and self-esteem. Providers recognized that many older riders consider public transit an inferior option that carries a social stigma. Transit providers need to get potential riders to accept public transportation to increase ridership and remove negative connotations about using public transportation. One provider mentioned having a bus at a local senior event so that potential riders could see that it was nice and easy to enter and exit. To further increase ridership, the need for providing incentives rather than penalties (negative connotations) for ridership was mentioned. From a practical perspective, discussants acknowledged the need to address gaps in services and transit coverage. They recognized a need to identify new services or service combinations that would appeal to potential users as well as transit authorities and also bridge gaps in current services. Conditions necessary for the economic viability of new services need to be ascertained.*

**Technological and mobility advances.** Technological advances may alter how older people will be provided assistance with transportation. Respondents tended to agree that transit innovations have generally resulted in mobility improvements for older and disadvantaged populations (Table 1). Respondents felt that transit innovations have improved for both older people and the general population; however, they also felt innovations for older adults have helped the general population more than innovations for the general population have helped older people. Opinions were more divided on whether these innovations have reduced costs per trip.

*Discussants believed future advancements may improve rural transportation for some people (and areas) but not others. People with disabilities, for example, may need passenger*

*assistance, which autonomous vehicles cannot offer. In addition, the infrastructure required to support such technologies might not exist in many rural regions of the United States.*

*The questionnaire considered innovation and technology as they pertained to vehicles, but discussants were more optimistic about using information technology as a way to improve services. Mobility-on-demand services can take advantage of information technology as the aging population becomes more tech savvy. Improved data collection and, perhaps even more importantly, data sharing may improve the efficiency of transit systems. Furthermore, improved and better access to data about older people and the transportation disadvantaged, such as people's longevity after losing their driver license, would help in exploring many rural transit issues.*

**Administration and planning.** More respondents disagreed than agreed that federal, state, and local governments' long-range transportation plans will meet the transportation needs of older and disadvantaged rural-living populations in 20 years. Furthermore, they also disagreed that current rural land-use policies encourage walking, transit-oriented development, and other initiatives to promote livable communities for older adults and disadvantaged people. They tended not to believe rural areas are currently employing creative land use, integration of multimodal transportation options, strategic investments in transit, and transit accessibility to improve the mobility of older and disadvantaged persons. Overall, respondents questioned whether government policies will meet older adults' future transportation needs. In addition to the questions in Table 1, respondents were asked the primary reason age-related rural transit issues are often believed to have a low agenda status. Ten percent of respondents disagree with the statement, believing age-related rural transit issues have a high political agenda status. Most respondents' opinions were that competition for attention (22%) and for resources (54%) are the main reasons for the belief that transportation issues for older rural-living people are not high agenda items.

*Discussants noted the effects physical and political boundary issues have on both service provision and funding. Many transit systems are funded by local taxes, but riders need service that extends beyond local service territory boundaries. Discussants suggested that service provision, funding, and program evaluation, including metrics for funding, could be improved by examining rural transit at levels of aggregation higher than the local provider level and considering combining service providers across agencies and areas to avoid duplication. Discussants believed right-sizing and appropriate service mixes would improve rural transit systems. Of course, these institutions, including regional councils of government and inter-governmental agreements, are the results of previous policies; changing institutions will likely require policy revisions.*

*Discussants noted challenges in scheduling group trips involving differing appointment lengths, which required*

co-riders to have to wait to return home. They recognized the need to balance co-riders' needs and incorporate social aspects into trips. Furthermore, discussants wondered if medical specialists might be persuaded to schedule co-riders on the same day at approximately the same time to shorten or decrease the number of trips.

*Transportation for rural-living older adults does not exist in a vacuum. Other social groups also rely on public transportation. One attendee from a location with a high population of military veterans brought up questions of how can transit help veterans, who are disproportionately located in rural areas compared to the general population, integrate back into society. Poverty in rural areas as it affects transit was mentioned with no concrete ideas of how to approach this issue.*

**Innovations, institutional changes, and transportation alternatives.** Respondents tended to be ambivalent about potential innovations, institutional changes, and transportation alternatives to their industry (Table 2). Among all the advances listed in Table 2, respondents expected major or noticeable changes (mean greater than 3), as opposed to little to no change, from only two advances: public-private partnerships to provide transportation and increased acceptance of technology by older adults and disadvantaged people for everyday activities. Both of these changes are in the nonmarket area. No market-based change is expected to provide major or noticeable changes, perhaps reflecting the current state in which most transportation for rural-living older adults, other than the personal automobile, is provided by public entities. Respondents most frequently felt partnerships with schools to use buses during off hours or student volunteers, volunteer-provided transportation—faith-based, nonprofit, retiree-provided, and so on—and sharing of vehicle ownership expenses (e.g., multi-household ownership of a car) will have no change in the demand for public transit in rural areas. Opinions concerning fully autonomous vehicles had the largest standard deviation, suggesting that respondents had the largest range of responses concerning the impact of this forthcoming technology.

*Discussants acknowledged interest in volunteer-provided transit, but raised issues concerning its usefulness for older adults and disadvantaged people. Volunteer incentives need addressing. Medicaid, for example, may compensate volunteers for mileage when using their own vehicle, but neglects considerations such as the opportunity cost of time for the individual who drives a Medicaid-eligible individual. Discussants felt there was a need for more professional, better-funded rural volunteer driver programs to fill gaps in existing transit coverage. Within the topic of innovation and alternatives, safety issues and insurance were the two most important issues that need addressed. As noted previously, discussants expressed concern that many of their riders needed assistance entering and exiting vehicles and even getting through the door of their destination. Autonomous vehicles cannot provide such assistance which may help explain why this advance has the largest standard deviation.*

## Differences by Socioeconomic Characteristics

Policy changes usually result from common understanding of concerns and expected outcomes among various stakeholder groups, including people of different ages, genders, political leaning, and proximity to the issue. If socioeconomic differences among professions in the rural transit field result in different opinions, cohesive policy will be more difficult to achieve. Statistical comparisons of socioeconomic groups reveal only limited differences on opinions of rural transit. One hundred seventy comparisons using the survey data (34 questions  $\times$  five socioeconomic characteristics) are possible. Using Kruskal–Wallis tests, only 13 are significant at an alpha level of .05 (Table 3). The largest number of significant differences is associated with age, but the number is still small at six of 34 comparisons. Five of the six comparisons involved respondents older than 60 and those younger than 40. Generally, respondents over 60 tended to agree or strongly agree with more statements than did younger respondents. One exception to this generality is the question concerning adequate funding; respondents between the ages 40 and 60 had a larger median for this question. As individuals approach the age where transit help may be necessary, it is not surprising their views may differ from younger individuals both in the need for services and funding for such services.

Significant differences for three comparisons involve if the respondent's organization provided transit services. Respondents from organizations that provide transit services appear to be slightly less optimistic about future innovations' impact on older people than respondents whose organizations do not directly provide services. Thus, it is somewhat surprising that respondents who are directly involved in providing transportation were more likely to think efforts to improve the general population's mobility also improve mobility for older adults and disadvantaged people. Despite some differences, having boots on the ground does not appear to be an important characteristic determining respondents' views and opinions.

The research team believed a priori that females' perceptions may differ from males' perspectives, reflecting the facts that women tend to live longer, are less likely to drive as they age, and are often seen more as caregivers. Gender, however, appears to be only a relatively small issue. Female respondents tended to think older adults would require less assistance in the future and that rural areas are employing creative means to improve mobility.

Respondents from more rural states were less likely to think federal, state, and local governments are adequately funding infrastructure, institutions, and services to meet the needs of future older populations than respondents from less rural states and less likely to view the potential of fully autonomous vehicles to address rural mobility issues. No comparison involving political leaning is significant.

Inference from the small percentage of significant differences is that there are few differences in opinions between respondents with different socioeconomic characteristics. In



**Table 2.** Number of Respondents Indicating the Level of Change to Expected From the Following Innovations, Institutional Changes, and Transportation Alternatives.

Statement	M	Median	SD	Little to no change	Some change	Noticeable changes	Major changes	Unsure
<b>Market</b>								
Transportation network companies (TNC) (e.g., Uber, Lyft)	2.88	2	1.36	13	29	21	12	6
Fully autonomous vehicles (e.g., Google self-driving cars)	2.74	2	1.51	24	17	14	15	11
Safe vehicle enhancements (e.g., smart braking, back-over prevention, and night vision)	2.42	2	1.33	24	29	16	7	5
Sharing of vehicle ownership expenses (e.g., multi-household ownership of a car)	2.25	2	1.24	25	34	11	6	5
Voucher programs such as for taxi fee payments	2.53	2	1.22	16	35	21	4	5
For profit transportation companies that specifically market to older and disadvantaged people	2.63	2	1.27	14	35	17	8	7
<b>Nonmarket</b>								
Volunteer-provided transportation—faith-based, nonprofit, retiree-provided, and so on.	2.14	2	1.20	28	34	10	5	4
Laws providing limited liability to providers of volunteer services (faith-based, nonprofit, retiree-provided, etc.)	2.43	2	1.16	16	37	13	5	10
Public-private partnerships to provide transportation	3.14	4	1.37	10	26	29	14	2
Partnerships with schools to use buses during off hours or student volunteers	2.12	2	1.23	33	24	11	4	9
Programs assessing and improving senior driver abilities	2.37	2	1.29	27	25	24	2	3
Programs to improve older and disadvantaged persons' cognitive and physical abilities	2.44	2	1.30	21	32	13	8	7
Increased acceptance of technology by older and disadvantaged people for everyday activities (e.g., shopping or personal interactions)	3.22	4	1.28	6	28	32	13	2

Note. Mean and standard deviation are based on the coding of 1 = little to no change, 2 = some changes, 3 = unsure, 4 = noticeable changes, and 5 = major changes.

fact, some differences may simply be a matter of statistical chance given the number of comparisons and the potential for type I error. Most significant differences may be explained by proximity to the issue. Providing transportation services and interacting regularly with older clientele or friends, for example, may influence perceptions of some measures. Very few differences were influenced by more general differences like gender or political leaning.

## Discussion

Transportation providers and other professionals associated with rural transportation provided their views on the provision of transportation for rural-living older adults. Although, the viewpoints of professionals working in rural transit may not represent all stakeholders' perspectives, their viewpoints are important in developing policy and in day-to-day activities. Very few statistically significant differences in opinions were found among these professionals with regard to age,

gender, and political leaning, suggesting support for rural transportation is not a highly political issue but a practical one. Furthermore, in the group discussion, differences in research and policy concerns appeared not to reflect socioeconomic characteristics, although discussants sometimes prioritized issues differently based on their region's population and geography. Individuals involved in rural transit should be able to come together to find common ground and join forces to raise the visibility of the issue and recommend policies to decision makers.

Both survey respondents and discussants in the open discussion (henceforth referred to collectively as participants) had opinions and concerns that are similar across socioeconomic characteristics. There was a general consensus among participants that older adults have a continuing need for rural transit and the future will bring an increase in this need, consistent with previous studies (Cobb & Coughlin, 2000; Coughlin & Proulx, 2012; Glasgow & Blakely, 2000). Discussants in the open discussion were willing to discuss tough questions: "Do

**Table 3.** Contrasts That Had Significant Differences at an Alpha Level of .05 for the Kruskal–Wallis (K-W) Test and Mann–Whitney and K-Sample Two Sample Comparison Tests.

Statement	K-W p-value	Mann–Whitney—distribution	K-sample—median
Demand for transportation services for older adults has increased over the last 10 years.	Age .020	Older than 60 years differs from younger than 40 years	Older than 60 years median is larger than younger than 40 years mean
People over age 75 years in the future will be more active and mobile than in the past.	Age .020	Older than 60 years differs from both younger than 40 years and between 40 and 60 years	Older than 60 years median is larger than between 40 and 60 years median
Relative to today, in 20 years government subsidies for transit for older and disadvantaged people will make up a greater share of total transit costs.	Age .043	Older than 60 years differs from both younger than 40 years and between 40 and 60 years	None at .05
Rural areas are currently employing creative land use, integration of multi-modal transportation options, strategic investments in transit, and transit accessibility to improve mobility of elderly and disadvantaged.	Age .046 Gender .006	Older than 60 years differs from younger than 40 years Female differs from male	Older than 60 years median is larger than younger than 40 years Female median is larger than male median
Efforts to improve mobility for the general population typically also improve mobility for older and disadvantaged populations.	Age .006 Organization .012	Younger than 40 years differs from both between 40 and 60 years and older than 60 years Provides services differs from does not provide service	None at .05 None at .05
The federal, state, and local governments are adequately funding infrastructure, institutions, and services to meet the future needs of older and disadvantaged people.	Age .016 Rural .023	Between 40 and 60 years differs from older than 60 years Greater than 20% differs from both less than 10% and between 10% and 20%	Between 40 and 60 years median is larger than older 60 years median Greater than 20% median is larger than less than 10% median
In the future, older people will require comparatively less assistance with transit services than present.	Gender .042	Female differs from male	Female mean is larger than male mean
Sharing of vehicle ownership expenses (e.g., multi-household ownership of a car)	Organization .023	Provides services differs from does not provide service	None at .05
Fully autonomous vehicles (e.g., Google self-driving cars)	Organization .002 Rural .012	Provides services differs from does not provide service Between 10% and 20% differs from both less than 10% and greater than 20%	Does not provides services median larger than provide services Less than 10% median is greater than between 10% and 20% median

we need transit services in rural areas?,” “If so, at what level?,” and “Is it a market failure that rural transit is not provided to everyone?” Their responses were consistent with survey responses in noting the important role public transportation plays in quality of life for rural-living older adults and the significant influence of government policies, funding, and technology on the cost-effective provision of transportation for older adults in rural areas. These discussions reach to the heart of issues surrounding organizational finance, costs and returns to scale, and publicly provided goods as noted by Gwilliam (2008), Ripplinger (2012), and Stiglitz (2015).

Overall, participants felt governments must play a major role not only in funding but also in transportation and land-use planning; however, they believed governments are not adequately funding or planning to meet future needs. The importance of governments’ roles is not surprising given the majority of respondents work in the public sector; this result is consistent with the literature (Stiglitz, 2015; Stunkel, 1997). Even with the number of public employees, respondents noted the need for private funding in addition to public funding. Still, less than 50% of survey respondents agreed with the statement rural residents bear a personal

responsibility to meet their transportation needs as they age. There are some inconsistencies among the respondent's opinions on the questions concerning the role of government in rural transit. Discussants also noted difficulties in coordinating service to trade centers across regional and organizational boundaries, a theme noted in previous studies focused on rural transit (Ryser & Halseth, 2012; Stunkel, 1997). Thus, improvements to transit provision may depend in part on policies promoting coordination with regional health and other service providers to improve efficiency in arranging group transportation and wait times.

Technological and innovative solutions that go beyond increased public funding have improved and will continue to improve rural transportation (Cobb & Coughlin, 2000; Reimer, 2014). Although these advances will continue to change rural transit and mobility for older people, the advances are only part of the solution. These advances do not alleviate the need for human assistance in transportation. Furthermore, older rural disadvantaged populations face cultural and economic barriers that restrict access to such technology (Baker et al., 2017). Although, many different innovations are used, the effect of these innovations beyond the immediate local area appears to be small. While some innovations are location- or culture-specific, others are replicable across space, including some technological and scheduling innovations.

## Conclusion

This study's goal is to understand research and policy needs related to rural transit for older people and the transportation disadvantaged. This article reports on a survey and open discussion among individuals actively engaged in rural transit, either as transit providers or as staff of agencies that coordinate with providers. Regarding the primary objective of describing perceptions of rural transit now and in the future, results suggest the participants felt the need for rural transit for older people would continue to increase with public and private funding being critical issues. Participants felt although transit innovations have generally resulted in mobility improvements, human interactions continue to be necessary for rural transit for older adults and disadvantaged people. Although participants who were transit providers tended to face some of the same problems, each faced problems unique to their location, size, and objectives. Similarly, there is no generic solution.

As is true of all research, this study has limitations and drawbacks. The study describes the opinions of a convenience sample of conference participants interested in rural transit. Lack of a database of rural transit stakeholders prevents comparison to the stakeholder population. As such, findings may not be generalizable to all rural transit stakeholders. Future work should expand the sample to include more stakeholders around the United States. Anonymity in the survey and discussion notes preclude integrating survey responses and discussion remarks. Drawbacks associated with the study's nonparametric techniques and statistical tests are mitigated by comparing the results of multiple tests.

Regarding the secondary objective of understanding how socioeconomic differences affect policy perspectives, similarities in perceptions of transportation across socioeconomic characteristics suggest that professionals working for, supporting, or collaborating with rural transit agencies hold similar opinions. Furthermore, similarities between those working for transit providers and other respondents suggest opinions among people and organizations active in rural transportation policy may be similar enough to reach common goals. For example, even transit providers questioned whether transit is a basic service and asked what levels of service transit can be sustainably provided to rural-living older adults and socially disadvantaged people.

Respondents discussed numerous transportation policy issues and related research needs, many of which are mentioned in preceding sections. Recommended research topics help in answering the fundamental questions of should society provide rural transportation for the elderly and transportation disadvantaged, and if so, at what level as government budgets tighten and private substitutes emerge. Issues discussed included both specific ideas and broader themes ranging from local to national in scope. These questions are not only economic issues but encompass multiple disciplines. A list of these topics is included in the Supplemental Appendix. The authors independently categorized survey results, written comments, and discussion notes, and differences in groupings and nomenclature were resolved through team discussion. These ideas form five highly interrelated categories which form the research and policy recommendations:

- Theoretical issues: Applied studies can lead to improved basic theoretical understanding while addressing the needs of rural transit.
- Innovative solutions: Rural transit is faced with increasing demand and limited funds, as such innovative solutions are being proposed. The influence that adoption of these solutions will have on rural areas should be determined.
- Rural socioeconomic considerations: There is no doubt availability of rural transit influences the lives of those that rely on it. How individual needs translate into broader community issues including livability and sustainability of rural communities needs to be ascertained.
- Economic assessment and evaluation of rural transit: Rural transit has been subject to economic assessment studies, but because many studies rely on incorrect methods and assumptions, correct usage of economic and social assessments is necessary.
- Information technology solutions: Usage of technological advancements, including data collection, may improve the coordination and management of rural transit systems and needs to be addressed.

Many problems described by transit providers are receiving little attention in the academic literature or policy arenas. Scientific research is generally more top down and researcher

driven than a bottom up approach to problems (Kuhn, 1962). Policy tends to follow a similar top down approach. Opinions about transportation for rural-living older adults were not generally swayed by socioeconomic differences, including age, gender, or political leaning. This suggests that stakeholders may be able to unite their voices to call for additional research and policy action.

Participants felt although technological innovations are important, policy innovations are necessary. Policy makers should be open to all options and be responsive to the needs of diverse transit systems serving different geographic and socioeconomic environments. As expected, the level of funding remains an important issue; however, participants recognized limited funding and challenged current policies for allocating funds. Given differences in population density and other demographics across the United States, policy makers may need to consider new ways to measure efficiency and allocate funding. While inequalities in funding and power among organizations may impede full cooperation, pragmatic collaboration may provide more effective service (Keefe, 2018). Restricting transportation systems by political boundaries limits the efficiency and types of services a provider can offer. Other major policy issues included cooperation across service providers, changing policies directed toward the role of volunteer services, and addressing the roles technological innovations can play in transit provision.

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### Disclaimer

The findings and conclusions in this presentation have not been formally disseminated by the U.S. Department of Agriculture and should not be construed to represent any determination or policy.

### Ethical Approval

This project was approved by the Texas A&M University Institutional Review Board (IRB2016-0667M).

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### Supplemental Material

Supplemental material for this article is available online.

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