

An Analysis of the Costs and Benefits of Providing Increased Mobility to Reduce Social Isolation among America's Aging Population — Executive Summary

Del Peterson and Antonio Molina

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Abstract

The objective of this research was to quantify the cost of providing greater mobility through public transportation to aging adults in small urban and rural communities to lower social isolation. This was compared with the increased Medicare spending due to current levels of isolation. Effort was taken to quantify the costs in numerous states throughout different regions of the United States. Results for the states studied showed that from three to 10 trips per month could be provided to an isolated individual at a lower cost than the extra Medicare costs due to isolation.

Introduction

Many of us appreciate the occasional opportunity to disconnect, giving our minds and bodies a chance to recharge, but when isolation becomes long-term and turns into loneliness, the results can be detrimental and potentially devastating, particularly for aging adults. The number of Americans aged 65 and older is projected to nearly double from 52 million in 2018 to 95 million by 2060, and the 65-and-older age group's share of the total population will rise from 16% to 23% (US Census 2018). Also, average U.S. life expectancy increased from 68 years in 1950 to 78.6 years in 2017, in large part due to the reduction in mortality at older ages. This larger share of older adults also means that Social Security and Medicare expenditures will increase from a combined 8.7% of gross domestic product today to 11.8% by 2050 (Social Security Administration 2019).

These societal changes among aging Americans have led to isolation on a greater scale than in recent times. This is especially true in the rural Midwest, where small urban and rural communities continue to age as disproportionate shares of the younger population move to larger communities pursuing education, employment, and other

opportunities. The current COVID-19 pandemic has also added to the level of social isolation among aging adults throughout the country. Improving mobility within the aging population in these smaller communities can aid in lessening isolation by allowing for greater opportunities to socialize and move around one's community, resulting in decreased healthcare costs.

Statistics related to the topic of aging in America leading to increased levels of social isolation are compelling:

- Loneliness increases the likelihood of mortality by 26%.
- Those who are socially isolated cost about \$130 per month more in Medicare spending than their non- or less-isolated counterparts.
- Lacking social connections is as damaging to health as smoking 15 cigarettes a day.
- Coronary bypass patients who report feeling lonely have a mortality rate five times higher than other patients 30 days post-surgery.
- Lonely individuals have a 64% increased chance of developing clinical dementia.
- People who are lonely report 5% more severe symptoms of the common cold than those who are less lonely.

(Stonegate Senior Living 2018)

Research Methodology

This research compared the increased Medicare cost from isolation among older adults to the cost of providing greater mobility options through demand response rural public transportation designed to lessen isolation costs. For example, as the degree of isolation increases among aging adults, Medicare costs tend to rise as well (Shaw et al. 2017). By improving mobility options for isolated aging adults, this will lower their social isolation and also the medical costs due to decreased isolation levels.

Comparing the costs associated with providing greater mobility to that of Medicare costs both with and without greater mobility will determine whether or not such action would make financial sense. Considerable uncertainty arises when comparing the costs involved with medical and mobility options. Individuals must make complex, dynamic decisions pertaining to the multiple choices available to them. Therefore, to explain some of the uncertainty that occurs, stochastic simulations were conducted.

Isolation Analysis and Simulation Results

Average cost analysis, simulations, and marketing of rural transit were the focus of the analysis. Increased Medicare costs due to isolation were compared to the costs of providing greater mobility through demand responsive public transportation in rural areas. Three main transit cost ratios were

considered. These included operating expense per trip, operating expense per vehicle mile, and operating expense per vehicle hour. Increased Medicare costs due to isolation were quantified from an AARP (2017) study that found an annual increase of \$1,608 in Medicare costs for each socially isolated older adult in 2012 dollars. Isolation levels

were quantified using a composite score of responses to targeted questions related to social isolation. All analyses used monthly costs per individual, so \$134 per month was used for the 100% level of increased Medicare costs due to isolation. This value was inflated to the 2018-dollar value to match cost data from the 2018 National Rural Transit Database using the Consumer Price Index .

Ten states were studied individually and also grouped together within simulations. These included North Dakota, Idaho, New Mexico, Alabama, Arkansas, Kentucky, West Virginia, Vermont, South Carolina, and Nebraska.

The North Dakota average operating expense per trip is compared to increased isolation-related Medicare costs per person in Figure 1. All costs are analyzed on a monthly per-person basis. Isolation Medicare costs were considered at three different levels, including 50%, 75%, and 100% of total isolation Medicare costs. These cost levels highlight the feasibility of increased mobility through greater rural demand-response transit use. For example, if an average potential isolated rider takes five transit trips in a month, the cost of providing these trips from a transit agency perspective will be approximately \$80 and nearly equal to 50% of increased isolation-related Medicare costs. However, if the same rider was to take 10 trips or more per month, the cost of providing the trips would be greater than the overall isolation Medicare costs, and so it is not cost-effective to provide 10 or more trips per month based

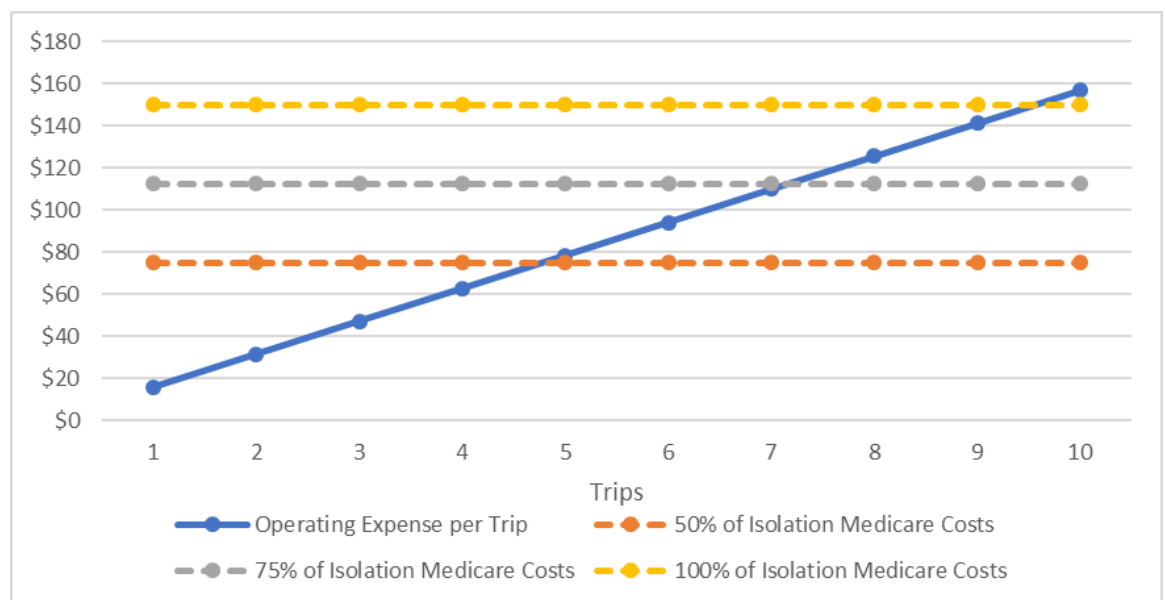


Figure 1. North Dakota Average Operating Expenses per Trip Versus Isolation Medicare Costs

Table 1. Hourly Simulation Inputs

State	Operating Expense/Hour		Passenger Fare/Hour		Probability Distribution
	Mean	Standard Deviation	Mean	Standard Deviation	
South Carolina	\$31.66	\$18.77	\$2.97	\$1.61	Exponential
Alabama	\$51.15	\$28.80	\$3.92	\$2.39	Extreme Value
West Virginia	\$44.30	\$11.53	\$7.73	\$4.52	Uniform

solely on Medicare costs. Therefore, as long as the total cost of providing trips per month, nine or fewer in this example, is less than the total increased isolation Medicare costs per month, it can be cost-effective to provide such service. Once the service provided becomes costlier than the Medicare cost it is designed to lessen, it becomes counterproductive financially based solely on isolation Medicare costs.

Table 1 shows the input data, and Figure 2 shows operating expense per vehicle revenue hour simulation results. These simulations assumed an additional three hours of service would be added per isolated rider for the states of South Carolina, West Virginia, and Alabama. Three hours of additional service was chosen because it represented the mid-point for average costs per vehicle revenue hour at the 75% isolation Medicare costs for most states. Hourly costs were calculated by subtracting the passenger fare per hour from the operating expense per hour to show the total cost per hour not covered by fares. The chosen probability distributions were based on best fit analysis. Results indicate that both South Carolina and West Virginia could

remain below the 75% level of increased isolation Medicare costs at the median level, while Alabama could not. This was due to Alabama’s operating cost per hour of vehicle revenue service being more than \$6 higher than that of West Virginia and nearly \$20 higher than that of South Carolina. Also, the variability of operating costs per vehicle revenue hour (shown by the standard deviations) was higher in both Alabama and South Carolina compared with West Virginia. This led to results at the 25% level being within \$10 of each other when comparing Alabama with West Virginia, but more than \$40 apart at the 75% level.

Summary and Key Findings

The objectives of this study were to quantify the added Medicare costs due to isolation among aging adults, and to compare those to the cost of added mobility to lessen isolation by local rural transit agencies. Average cost analysis from a transit perspective was conducted using three ratios: operating costs per trip, operating costs per vehicle revenue mile, and operating costs per vehicle revenue hour. Simulation allowed these three cost ratios to

vary, which yielded a range of outcomes. This gives rural transit agencies the ability to compare their unique circumstances to a range of results rather than a single scenario or value.

Key Finding #1: Rural transit agencies can cost effectively provide service to lower isolation-related Medicare costs among aging adults. For example, based on the

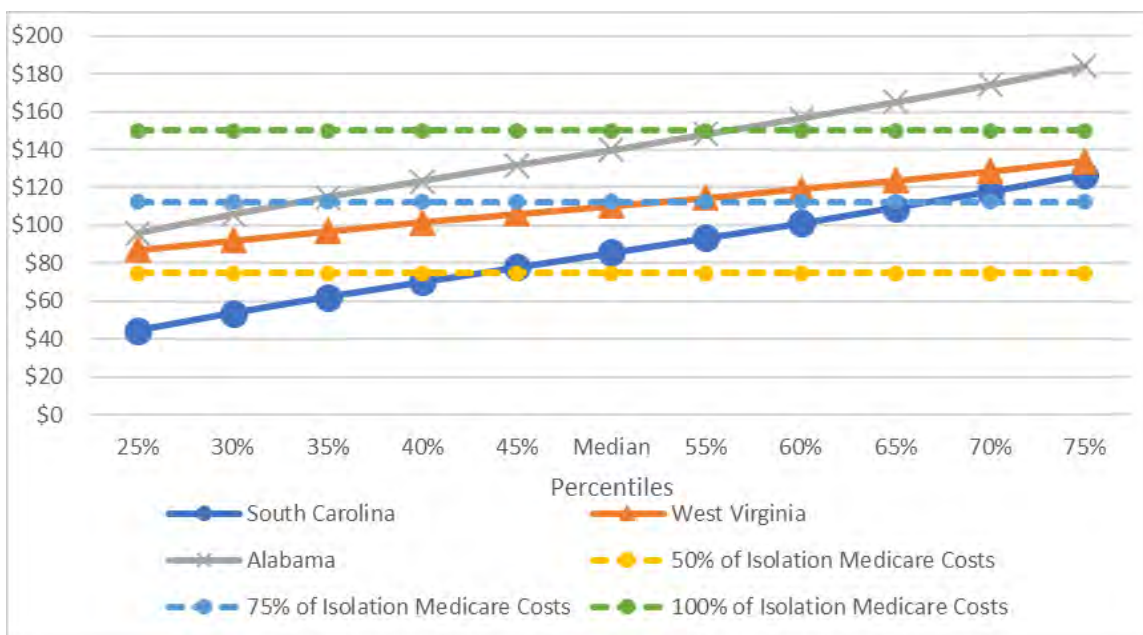


Figure 2. Simulation Costs for Three Hours of Additional Service Compared to Isolation Medicare Costs

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conducted the research.

For more details about
this study, contact
Del Peterson at
del.peterson@ndsu.edu

www.ugpti.org/surcom

isolation benefit alone, rural North Dakota transit agencies can provide up to nine demand response transit rides per month to an isolated aging adult for less than the added Medicare cost of being isolated. These rides would allow the aging adult to visit friends and family, attend local functions, or participate in a variety of other activities within their local community each month, leading to lower isolation and lessened medical costs.

Key Finding #2: The current COVID pandemic has increased isolation among aging adults, which will lead to greater isolation medical costs in the future. Wu (2020) found that social isolation is likely to become a major risk factor that affects adults' health outcomes. Rural transit can lessen this increased isolation by increasing ridership among isolated aging adults. For example, based on the marketing to aging adults' simulations in this study, the average small, medium, and large rural transit agency within the study's 10-state region can cost effectively provide an additional seven trips per month per isolated aging adult at the median level.

Key Finding #3: Rural transit's role to help lower Medicare costs through lessening isolation needs to be considered as Americans live longer and demand greater mobility options. Average U.S. life expectancy has increased, and Social Security and Medicare expenditures as a share of gross domestic product is growing. Rural transit will continue to play a considerable role in lessening these costs through added service as long as they are properly funded.

Key Finding #4: Increased funding for rural transit will be necessary as rural communities continue to age disproportionately with the younger population moving to larger communities. Transit will need to serve as a transportation lifeline for many aging adults whose support networks of friends and family no longer reside in their local community (Stonegate Senior Living 2018).

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