Evaluating Demand-Responsive Scheduling in Public Transportation Service Offerings to Retirement Communities

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Introduction

Access to reliable transportation is essential for older adults, particularly those living in retirement communities where mobility limitations can affect quality of life. Traditional fixed-route public transit services often fail to meet the diverse and flexible travel needs of this demographic. This study examines the effectiveness of demand-responsive transit (DRT) compared to fixed-schedule services in Santa Clara County retirement communities. The primary research question investigates whether DRT improves public transit usage and subjective well-being among older adults. By analyzing travel behavior, transportation mode preferences, and satisfaction ratings, this research provides empirical insights into the potential benefits of flexible transit scheduling. The study's findings contribute to a growing body of evidence supporting alternative transportation solutions for aging populations. The results inform policymakers and transit agencies on best practices for designing senior-friendly mobility services that enhance independence, accessibility, and overall well-being.

Study Methods

This study employs a comparative design, analyzing two demographically similar retirement communities in Santa Clara County—one utilizing demand-responsive transit (DRT) and the other reliant on traditional fixed-route transit. Participants in both communities were asked to record details about their four most recent trips, including mode of transportation (public or private), trip purpose, and satisfaction levels. The study incorporated a validated measure of subjective well-being (Satisfaction with Travel Scale, STS) to assess how different transit systems impact users' experience. Data collection involved diary-based self-reports from participants, supplemented by structured survey responses regarding their transportation preferences and service satisfaction.

A General Linear Multimode Model (GLMM) was applied to analyze public versus private transportation usage, while a Linear Mixed Model (LMM) was used to evaluate STS ratings. Additional analyses explored variations in transportation mode selection based on age and gender demographics. To ensure data accuracy and encourage participation, a trained research assistant facilitated the survey process and provided clarifications as needed for participants. The study design and methodology were piloted in a separate retirement community before full implementation to refine survey questions and optimize data collection procedures. By combining real-world travel behavior with subjective assessments of well-being, this study offers a comprehensive evaluation of how flexible transportation services impact older adults' mobility choices and quality of life.

Findings

The study indicates significant advantages that demand-responsive transit (DRT) can have compared to fixed-schedule services for retirement community residents. Key findings include:

- Increased Public Transit Usage: Residents in the DRT-served community took significantly more public transit trips than those in the fixed-route community (54.2% vs. 34.5%, $p < 0.05$).
- Enhanced Well-Being: Participants using DRT reported higher satisfaction levels on the STS scale, notably in measures of travel confidence, relaxation, and overall trip experience.
- Greater Accessibility & Convenience: DRT users expressed higher ratings for service timeliness and responsiveness, suggesting that flexible scheduling meets their needs more effectively.
- Impact of Age & Gender: Older participants (75+) reported the highest satisfaction with DRT services, highlighting its importance for aging

populations. Gender differences were minimal, though female respondents slightly favored DRT.

- Service Provider Perception: While both communities rated the Valley Transit Authority (VTA) positively, those with access to DRT gave higher ratings for customer care and reliability. The differences between VTA ratings by the study communities were not statistically significant.

These findings further suggest the role that flexible transit options can have in promoting independence and well-being among seniors. The results show that replacing or supplementing fixed-route services with demand-responsive systems can enhance accessibility and encourage greater transit usage.

Demand-responsive transit (DRT) can increase public transit usage and enhance travel satisfaction among older adults, offering a methodology for improving mobility in retirement communities.

Policy Recommendations

The study's findings support policy recommendations aimed at improving transportation services for older adults:

1. Expand Demand-Responsive Transit Programs: It may be timely for transit agencies to consider scaling up DRT services in retirement communities to better accommodate flexible travel needs.
2. Subsidized Senior Transit Programs: State and local governments should consider providing financial incentives for DRT services to ensure affordability by local transit agencies in serving older populations. Over a longer horizon, this may reduce the cost of maintaining health in this population.
3. Integrated Transportation Solutions: Combining fixed-route and demand-responsive options can offer a more inclusive and effective transit network.
4. Enhance Rider Awareness: Public education campaigns can highlight DRT benefits to encourage adoption and improve utilization rates.
5. Improve Data-Driven Decision-Making: Transit providers can collect and analyze user feedback to refine and optimize scheduling strategies continually.

By implementing these recommendations, policymakers and transit authorities can improve mobility reduce transportation barriers, and enhance the quality of life for seniors.

Table 1-a Mode of Transportation Count and Percentage

Mode of Transportation	Public Count	Private Count	Public Percentage	Private Percentage
Fixed	29	55	34.524	65.476
DRT	52	44	54.1667	45.833

About the Author

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