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Impacts of Mobility Management and Human Service Transportation Coordination Efforts and End-User Quality of Life

by Jeremy Mattson, James Miller, Jay Goodwill, P.S. Sriraj, and Jill Hough

This study developed an evaluation method to examine the effectiveness of mobility management and coordination programs in a community. A series of surveys were conducted of both transit users and stakeholders in communities across the country. Results from these surveys suggest improvements have occurred in efficiencies, ease of access, and quality of service. Most respondents to the stakeholder survey reported benefits that have been realized. Results from an ordered probit model demonstrate the positive impacts that improved mobility has on life satisfaction.

INTRODUCTION

The Federal Transit Administration (FTA) has been engaged, as part of its livability goals, in helping people with disabilities, older adults, low-income individuals, and other transportation-disadvantaged populations to be active and engaged in their communities by having access to the mobility options that make it possible to connect to employment, community services, and activities. To pursue this objective of community connectivity through mobility, the Secretary of Transportation chairs a Federal Interagency Council on Access and Mobility (CCAM) that strives to coordinate federal programs funding transportation to improve community mobility options. The FTA and its council partners have worked to build a transportation coordination infrastructure that includes establishing coordinated transportation planning processes, mobility management coordination practices, one call/one click transportation management centers, and state leadership activities, including the development of state and regional transportation coordinating councils.

However, a 2011 Government Accountability Office (GAO) (2011) report suggests duplication still exists and many improvements could be made to the coordination efforts. The GAO did recognize that improvements had occurred, specifically at the state and local levels, but suggested Congress may want to consider requiring federal funding programs to participate in coordinated planning. A 2012 GAO report further analyzed the issue by examining federal programs that may fund transportation services for the transportation-disadvantaged (including 80 federal programs), federal coordination efforts undertaken since 2003, and coordination at the state and local levels.

These and other studies have conducted interviews of federal, state, and local officials (GAO 2012, National Conference of State Legislators 2010), but less research is available regarding the impacts of these programs on end-users. The effectiveness of these programs can ultimately be evaluated based on the economic and quality of life impacts they have on their users. Mobility management and coordination efforts need to be evaluated further to determine their impacts on users and their impacts on improving quality of service, ease of access, and efficiency.

This study developed an evaluation method that can be used in communities across the country to examine the effectiveness of their programs. Results examine the impacts of services on meeting the needs of transportation-disadvantaged populations, the impacts of improved mobility on quality of life, and the impacts of mobility management and coordination efforts on meeting the goals of quality of service, ease of access, and efficiency. The evaluation method developed for the study consisted of a series of surveys of both transit users and stakeholders in communities across the country.

BACKGROUND

Human service transportation has evolved over the past several years to focus more on meeting customer needs. While the focus has evolved, non-traditional measures of performance also need to be adopted to properly evaluate how well these programs are meeting their goals.

Evolution of Human Service Transportation Coordination and Mobility Management

In the past 40 years, many public sector and non-profit organizations have been created to respond to specific human service needs of children, low-income individuals, older adults, and people with disabilities. Early on, these organizations realized that lack of transportation prevented potential customers from accessing the agency's services. In response, many human service agencies set up their own transportation services to directly provide rides for their clients. This fragmented response to mobility needs led to a proliferation of providers and often resulted in duplicative, inefficient services. Further, agency efforts to operate a transportation system diverted attention from the agency's primary purpose. By the late 1970s, primarily due to local initiative, these fragmented systems combined to offer region-wide transportation to the clients of many agencies and in some cases, especially in rural areas, to the public.

These early efforts to coordinate human service transportation focused on the supply or provider side of the enterprise with the goal of creating cost-effective organizations that could provide more rides and a lower per-unit cost. More recently, especially in the past 10 years, the vision for coordinated transportation has been expanded to one of mobility management that focuses on customers and meeting their needs, and using the assets of a number of organizations, rather than on the production of transportation services.

Nearly all of the earliest examples of coordinated transportation systems resulted from local initiatives. One of the key ingredients to the success of these efforts of the 1970s and 1980s was the leadership of a particular individual who believed in the value of coordination and worked to make it a reality (TranSystems Corporation 2004). Along with the local champion, access to funding for planning, startup, and operations was a key to continued development of coordinated systems.

Federal interagency efforts to encourage coordination date from the mid-1980s and are chronicled and evaluated in a series of reports produced by the GAO, then known as the General Accounting Office, (1999, 2003). A significant change and boost to coordination efforts occurred in 2004 with the signing of Executive Order 13330 (2004) that established the CCAM chaired by the secretary of transportation.

One of the first actions of the CCAM was to establish the United We Ride interagency initiative aimed at improving the availability, quality, and efficient delivery of services for older adults, people with disabilities, and low-income individuals (United We Ride 2014). This FTA-funded activity provided a range of resources to assist state and local officials to enhance coordination efforts, and it provided technical assistance and training. United We Ride adopted a mobility management vision as an expanded view of coordination that emphasized service quality and advocacy for access. They explained this vision with a definition for mobility management: "Mobility management focuses on meeting individual customer needs through a wide range of transportation options and service providers. It also focuses on coordinating these services and providers in order to achieve a more efficient service delivery." (United We Ride 2007a) In addition to this vision, which is similar in scope to earlier coordination efforts, the new vision of mobility management proposes that mobility managers serve as policy coordinators, operations service brokers, and customer travel navigators. The policy coordination role is one of the key differences between previous coordination efforts and mobility management in that the mobility manager now helps communities develop coordination plans, programs, policies, and local partnerships.

A 2011 report by the GAO recognized that improvements had occurred, specifically at the state and local levels, but duplication still existed and many improvements could be made to the coordination efforts. In a later report, the GAO (2012) found an apparent lack of activity at the leadership level of the CCAM. The failure of non-FTA programs to encourage coordination was one of the major shortcomings of federal leadership reported by state and local officials interviewed as part of the GAO's performance audit. Other obstacles to coordination reported by the interviewed officials were changes in state legislation and policies, limited financial resources, and growing unmet needs. Nevertheless, the report catalogued six coordination activities underway at the state and local level: state coordinating councils, regional and local planning processes, one-call centers, mobility managers, vehicle sharing, and outreach and communication activities.

Since the 2004 executive order, a major focus of both the CCAM and the United We Ride program has been to encourage and facilitate state and local coordination efforts. This focus was in part due to a lack of success in coordinating the many federal programs and agencies with a stake in human service transportation, but perhaps more significantly, a recognition that local leadership and energy are required to achieve coordinated systems. Such leadership can best be encouraged by state and regional planning, policy, and funding efforts.

Some states, such as Florida, have for many years (since 1989) had state-level coordinating bodies that were created legislatively or by regulation to promote coordination or to directly control the distribution of state-managed program funds in a coordinated manner. Within the past decade, many other states have taken steps to foster coordinated human service transportation. A report prepared by the National Conference of State Legislatures (NCSL) (2010) documented the progress in building the state-level infrastructure to support coordination and mobility management efforts.

Evaluation Techniques

The most common form of evaluation of coordination programs has been a qualitative judgment on whether federal and state agencies met targets or completed tasks that they agreed to accomplish. The evaluations focused on process and on delivery of products such as technical assistance, training, policy clarifications, etc. The implied assumption was that completion of these tasks would result in increased coordination and the related service and efficiency benefits.

Within the past few years, two changes are evident from the review of the literature. First, the strategic and annual plans of CCAM and related programs such as United We Ride explicitly contain performance measures to assist in the evaluation of program successes. Recent research and reports have examined the use of performance measures (Sen et al. 2011, Burkhardt and Yum 2010, United We Ride 2007b). Second, as an integral part of the mobility management philosophy, evaluation of the success of the federal and state programs has taken on a customer focus in addition to continued concern for the performance of the federal and state initiatives.

Performance measurement is nothing new for public transit and human service transportation agencies. Funding agencies often require that certain performance metrics be reported. In addition, many providers have adopted evaluation criteria and measures as part of their internal strategic and business plans. Because of readily available financial and operating data, most measures focus on efficiency criteria. Effectiveness measures, such as customer satisfaction or measures of access to service, are more difficult to quantify than measures such as expense per vehicle hour or one-way passenger trips per hour, so they are not as readily reported. In TCRP Report 53, Cambridge Systematics, Inc. (1999) argued that while traditional measures remain important, it has become increasingly necessary to measure the success of transit investments in broader terms that reflect community goals and expectations. They further argued that measures should shift from those of efficiency and output to measures of impact and outcome.

Mobility management in practice is broader than traditional transit; therefore, conventional performance evaluation schemes need to be adapted to mobility management programs. Recognizing

the need for a more robust evaluation framework, the FTA sponsored a study of the state of the art and practice to examine how existing U.S. mobility management programs incorporate performance evaluation. The report presented the results of surveys and case studies of state and local entities that received FTA or Texas DOT funding for mobility management activities (Sen et al. 2011). The study reported on key measures used by each case study system. These measures were found to vary significantly but were still primarily focused on measuring traditional transit service objectives.

Sen et al. (2011) found that most mobility management programs used traditional transit performance measures, such as rides or trips per revenue hour, total passengers, operating expense per passenger trip or per vehicle mile or hour, and on-time performance. Some organizations, primarily in urban areas, did report using unique performance measures considered critical to the success of their programs. However, these non-traditional measures often require data that may not be readily available and therefore require additional effort and expense to collect. Also, since the terminology used for some of these measures may be new, terms and methods of calculation need to be defined. Designing an evaluation framework that goes beyond traditional transit measures and captures the intended outcomes of a mobility management strategy is needed to determine if an agency's program actually works.

Previous reports have developed recommendations for measuring the performance of mobility management programs. Sen et al. (2011) presented a detailed framework suggesting seven program goals along with a series of objectives, possible performance measures, and outcomes. Equally important, the recommended framework also specifies how the outcome is measured, who does the measurement, and finally, the type of service environment (rural, small regional, metro) for which the measures might be appropriate. Burkhardt and Yum (2010) developed recommendations for measuring the performance of human service transportation programs at the national, state, and local levels, though the measures are focused more on inputs and processes than outcomes and impact measures.

A general design and evaluation of a coordinated transportation program was promoted as part of the United We Ride technical assistance effort (United We Ride 2007). This design is a customized version of a technique called the Logic Model and Measures, which provides a representation of the theory of change behind a program or initiative. Some of the key concepts are: a description of the situation, a discussion of the inputs and outputs of the process, and indicators that are initial markers of success, outcomes, and results.

Akoto (2016) explored the use of non-traditional performance indicators, as well as traditional measures, for evaluating rural transit operators whose goals are similar to those of mobility management programs. The results showed that the non-traditional mobility indicators communicated positive outcomes when the traditional measures did not, suggesting that these measures are needed in conjunction with the traditional indicators to better evaluate how well the agency is meeting its goals.

Impacts of Mobility on Quality of Life

The ultimate goal of mobility management is to improve end-user quality of life through enhanced mobility. A number of studies have evaluated the link between mobility and quality of life. For example, Banister and Bowling (2004) found that engaging in a large number of social activities was an important component of what constitutes quality of life for older adults; Delbosc (2012) proposed a model, based on a review of literature, that transportation influences life satisfaction indirectly by facilitating access to important activities and directly through physical mobility and externalities; Stanley et al. (2011) showed that trip making indirectly influences well-being by impacting the risk of social exclusion; Delbosc and Currie (2011) found that a combined effect of transportation disadvantage and social exclusion had a significant negative effect on well-being; and Spinney et al. (2009) found a significant association between transportation mobility benefits and quality of life in

a study of elderly Canadians. This study contributes to the literature by providing further evidence on the impacts of mobility measures on life satisfaction

METHODS

This study builds upon previous research by developing and testing an evaluation method using non-traditional measures that can be used by communities to examine the effectiveness of their mobility management and coordination programs. The evaluation method developed consisted of two survey instruments that were administered at locations across the country. The first was a mail survey of riders, and the second was an online survey of stakeholders. Participating stakeholders included transportation providers, human service agencies, and other interested organizations. Results from the rider survey were used to examine the relationship between mobility and life satisfaction.

End-User and Stakeholder Surveys

The intent of the transit user survey was to evaluate the impacts that transit services have on the lives of users and to assess the importance and effectiveness of mobility management and coordination programs. The goal of the stakeholder survey was to learn more about the types of mobility management and coordination activities being conducted, barriers and challenges that exist, successes that have been achieved, and the degree to which the needs of users are being met. The development of the stakeholder survey built upon previous surveys conducted by Sen et al. (2011) and the Virginia Department of Rail and Public Transportation (2005). By evaluating results from both surveys, the goal was to assess the impacts of mobility management and coordination activities on quality of service, ease of access, trip creation, efficiency, and quality of life impacts on users.

The surveys were developed so they would not be specific to any community and could be used over time to assess progress. Therefore, the survey instruments provide an evaluation model that could be applied to other communities across the country and could be repeated over time. The complete survey instrument is provided by Mattson et al. (2014).

Agencies were identified as potential participants if they were actively engaged in mobility management or transportation coordination activities. Potential participants were sent invitations to participate in both the end-user and stakeholder surveys. The intent was for each participating community to conduct both of these surveys. The end-user survey would be conducted of riders for one of the transportation providers in the community, and the stakeholder survey would be completed by the participating transportation provider as well as other transportation providers, human services agencies, and interested stakeholders within that community. Some of the agencies that were contacted, however, were only interested in participating in the stakeholder survey.

Responses were received from a number of different locations across the country, including a mix of urban, suburban, and rural. End-user surveys were completed by riders from six different transportation providers from five different communities and five FTA regions, and stakeholder surveys were obtained from each of the 10 FTA regions (Table 1).

Table 1: Participating Agencies

FTA Region	Participating Agency	Location	Rider Survey		Stakeholder Survey Responses
			Responses	Response Rate	
1	Way to Go CT	North Central Connecticut	- ^a	- ^a	7
	Eastern CT Transportation Consortium, Inc.	Eastern Connecticut	- ^a	- ^a	1
2	Tompkins County Dept. of Social Services	Tompkins County, NY	- ^a	- ^a	2
3	JAUNT, Inc.	Charlottesville, VA	19	19%	11
4	St. Johns County COA	St. Johns County, FL	32	24%	4
5	Dane County Dept. of Human Services	Dane County, WI	- ^a	- ^a	4
6	Harris County RIDES	Harris County, TX	- ^a	- ^a	13
7	Neighborhood Transportation Service (NTS)	Cedar Rapids, IA	42	21%	21
	Linn County LIFTS		75	30%	
	Heart of Iowa Regional Transit Agency (HIRTA)		- ^a	- ^a	39
8	Seniors' Resource Center (SRC)	Denver, CO	232	31%	3
9	Valley Metro	Phoenix, AZ	101	13%	1
10	Community Transportation Association of Idaho (CTAI)	Idaho	- ^a	- ^a	4
	Ride Connection	Portland, OR	- ^a	- ^a	1
Total			501	23%	111

^aDid not participate in rider survey.

Rider surveys were administered by mail to a random sample of riders (with the exception of JAUNT, which had their drivers hand out surveys to riders), and surveys were conducted from May-September 2013. A total of 2,181 surveys were distributed, and 501 responses were received.

Stakeholder surveys were administered online. A link to the survey was sent to individuals from each of the participating agencies. The intent was to receive a variety of responses from different organizations in each community. Therefore, each recipient was asked to complete the survey and also pass it on to organizations they partner with or other interested stakeholders within the area, or they were asked to provide names of other organizations and individuals in the area to whom the survey could be sent. A total of 111 responses were received. The greatest concentration of responses was received from participating agencies in Iowa, but responses were received from each of the 10 FTA regions.

Of the respondents to the rider survey, 72% were female; 44% were aged 75 or older, and nearly two-thirds were 65 or older; 40% had a valid driver's license while just less than one-fourth had access to a vehicle; 70% had a medical condition or disability that made it difficult to travel; and 72% had household income of less than \$20,000. These results suggest many of the respondents have limited transportation options. Nearly all respondents answered that the service is important to them, including 90% who said it is very important.

The respondents included a mix of frequent (15% use the service five or more days per week) and infrequent (10% use it less than once a month) users. About one-third of respondents had been using the service for more than five years, and more than half had been using it for at least three years, while 10% just began using the service within the previous six months.

Representatives from a number of different types of organizations completed the stakeholder survey. Approximately one-third of respondents identified themselves as belonging to a multi-purpose human service agency, 15% were from a public transit agency, and the remainder were from a variety of different types of human service organizations serving a number of different populations.

Half of the stakeholders were from organizations that directly provide transportation services to their clients. Among these, about two-thirds identified themselves as specialized transportation providers that receive FTA Section 5310, 5316, or 5317 funding. The remainder included both urban and rural transit agencies and lead agencies for regional service coordination. These transportation providers most commonly provide a door-to-door or curb-to-curb demand-response service, but some also provide fixed-route service or other services.

Impacts of Mobility on Quality of Life

Results from the rider survey were used to examine the relationship between mobility and life satisfaction. It is expected that life satisfaction could be influenced by a number of factors, including age, disability, health status, and income, as well as mobility. Data for all of these variables, as well as life satisfaction and different measures of mobility, were collected in the rider survey. Using these data, an ordered probit model was developed that estimated life satisfaction as a function of age, disability, health status, income, and two measures of mobility. Responses from 344 survey respondents were used to estimate the model.

The rider survey collected information on life satisfaction by asking the following question: "All things considered, how satisfied are you with your life as a whole these days? Use a 1 to 10 scale, where 1 is completely dissatisfied and 10 is completely satisfied." This question has been used in previous surveys as a measure of life satisfaction (Kahneman and Krueger 2006).

An ordered probit model was used because the dependent variable was measured using a scale where there is a natural order to the choice categories. Ordered probit and logit models are commonly used when the dependent variable is a ranking. The explanatory variables were also measured using a scale or with a dummy variable. Age was measured with a 1-6 scale (where 1=18-24, 2=25-34, 3=35-49, 4=50-64, 5=65-74, and 6=75 or older), disability was measured using a dummy variable equal to 1 if the individual reported having a disability or medical condition that made it difficult to travel and 0 if not, health status was measured with a 1-3 scale (where 1=poor, 2=fair, and 3=good), and income was measured with a 1-5 scale (where 1=less than \$20,000, 2=\$20,000-\$39,999, 3=\$40,000-\$59,999, 4=\$60,000-\$79,999, and 5=\$80,000 or more). It is expected that increases in income and improvements in health status will have positive effects on life satisfaction, while it is hypothesized that those with disabilities will have lower life satisfaction. The expected effect of age on life satisfaction was uncertain.

Finally, mobility was measured using two variables. The first was a dummy variable equal to 1 if the respondent had missed a trip during the previous week because of lack of transportation and 0 otherwise. The second was the response regarding how difficult it is to travel to the places they want or need to go to, considering all forms of transportation available. The variable was measured with a 1-6 scale, where 1=very easy and 6=very difficult.

MOBILITY MANAGEMENT AND COORDINATION ACTIVITIES AND CHALLENGES

Close to 80% of the stakeholders surveyed indicated they have been involved with efforts to coordinate transportation services in their service area, and most have been taking an active role

in coordination. Seventy-five percent of organizations involved with coordination said that high unmet transportation needs contributed to the initiation of coordination efforts, while a number cited interest from local leaders and potential financial opportunities. Other factors cited by respondents included state or federal mandates and desires to reduce duplication of services and improve current services.

As part of their coordination efforts, these agencies most commonly attend communication coordination meetings that specifically deal in part with transportation. Many provide services to human service agencies by contract, transport clients of other agencies, share or have compatible transportation software, or engage in a number of different activities.

Lack of funding was the most common barrier these organizations faced when initiating these transportation coordination efforts. Other common barriers included lack of communication, fear of responsibility shifting, and lack of time. Comments from respondents also mentioned turf issues and other barriers. Most respondents indicated there is a need for more coordination of transportation in their region, and the greatest barriers hindering more coordination include the unique needs of various client populations, conflicts in hours of needed service, and lack of communication across agencies. These barriers are similar to those identified in previous research (Burkhardt et al. 2003, Burkhardt et al. 2004, GAO 2012). Respondents often commented that working through these barriers required attention to communication efforts, education, bringing together stakeholders, building relationships, and continually searching for funding.

Twenty-nine percent of the responding agencies receive funds specifically for mobility management, and an additional 23% provide services they consider to be mobility management, while 13% currently do not provide mobility management but would like to in the future. The agencies involved with mobility management most commonly participate in outreach regarding public transit access, provide agencies and individuals with information and training materials on how to use local transportation, conduct needs assessments, or employ agency staff to plan and manage activities to improve coordination among public transportation providers, other transportation service providers, and agencies that serve people who need transportation services. Challenges identified with implementing these programs were lack of funding, limited time and resources, turf issues, and lack of leadership.

IMPACTS ON MEETING THE NEEDS OF THE TRANSPORTATION-DISADVANTAGED AND ACHIEVING GOALS

Results from the rider and stakeholder surveys were used to evaluate the impacts of mobility management and coordination programs on meeting the needs of the transportation-disadvantaged and achieving the goals of improved quality of service, ease of access, and efficiency. As noted by Majumdar et al. (2013), the evaluation of these programs is difficult due to a lack of national guidelines, and little research currently exists.

Results from Rider Survey

The rider survey specifically examined the types of trips taken, other transportation options available to riders, ability for riders to make trips, rider satisfaction with the service, and perceived changes in quality of service.

Travel Destinations, Transportation Options, and Ability to Make Trips. Riders from the participating agencies were found to most commonly use these services for health care trips, but the responses differ between agencies. For example, NTS primarily provides work trips, and SRC, serving older riders, provides a high percentage of medical trips. The results show that while agencies may focus on medical or work trips, riders use the services for a number of different purposes.

The impact of the transportation service can be demonstrated by how riders would respond if the service was no longer available. The survey found that only 38% of respondents would continue to make the same number of trips if the service was not available. The remainder would either make somewhat fewer trips (13%), a lot fewer trips (26%), or no trips at all (22%) for the activities they currently use the service for. These results show the significant impact the services have on increasing the ability of riders to make trips, and the results are especially important considering the percentage of trips that are for health care purposes.

When asked what mobility options were available if this service was no longer available, only 7% of respondents said that they can drive themselves. Nearly one-fourth answered that they have no options other than the transit service they are using. When asked to identify how they most often would get to where they are going if the service was not available, 32% said they would get a ride from a family member or friend, 12% would get a ride from a volunteer driver, 11% would use a taxi, and very few would use some other option. Only 4% would drive, and 29% would not make the trip.

Responses varied regarding how easy it is to make trips with the current availability of transportation services, as 20% said it is very easy to travel to the places they want or need to go, and the same percentage said it is very difficult. Half of respondents said they always, or almost always, are able to get the transportation they need so they can go where they want to go, while 20% are often able to get transportation, 23% are only sometimes able to get transportation, and 8% are rarely able to get transportation. Meanwhile, 20% said there was a destination they wanted to travel to during the previous week but could not due to lack of transportation.

Satisfaction with Transportation Service. Most respondents were satisfied with the quality of service they are receiving from their transportation provider. Respondents were specifically asked about their satisfaction with how the service serves their needs, number of trips offered, weekend hours, service coverage, ease of use, scheduling procedures, access to information, door-to-door availability, cost, and comfort. Regarding each aspect of service quality, the number of respondents satisfied was greater than the number not satisfied, and with the exception of weekend hours, the difference was statistically significant at the 1% level. For example, 72% were very satisfied with how the service served their needs, 73% were very satisfied with ease of use, and 69% were very satisfied with available travel destinations.

An important measure of the success of mobility management and coordination efforts is the degree to which service quality is improving for the transit user. A majority of respondents answered that since they have been using the service, service quality had stayed about the same, but a number also reported improvements in service and fewer noted declines in service (Table 2). For example, 31% of respondents reported that ease of use has improved, while only 3% answered that it is getting worse. Similarly, 28% reported that the service is doing a better job of serving their needs, while only 4% answered that the service is doing worse. The difference between those who reported improvements and those who reported service is getting worse is statistically significant in each case, with the exception of weekend hours. These results show general improvements in quality of service, as perceived by the riders.

Table 2: Transit-User Perceptions on Changes in Quality of Service

	Has gotten better		Has stayed the same		Has gotten worse	
	%	Count	%	Count	%	Count
Serves your needs	28**	123	68	303	4**	19
Number of trips offered	20**	81	75	306	5**	20
Weekend hours	15	43	73	209	12	34
Goes where you want to go	27**	114	70	294	4**	15
Ease of use	31**	129	66	277	3**	12
Scheduling procedures	26**	114	67	289	7**	29
Access to information	26**	103	71	281	4**	14
Door-to-door service availability	33**	141	64	273	3**	11
Cost of the service	24**	100	68	278	8**	32
Comfort	31**	132	67	287	2**	9

**Difference between “Has gotten better” and “Has gotten worse” is statistically significant, $p < .01$

Results from Stakeholder Survey

The stakeholder survey documented benefits that have been achieved and the perceived impacts on quality of service.

Benefits of Mobility Management and Coordination. Many respondents to the stakeholder survey reported that mobility management and coordination activities have yielded positive results (Table 3). Nearly two-thirds have recognized simplified access to transportation services for riders, and a majority also identified an increase in the range of transportation options and service providers available to riders, increased awareness of transportation services, and increased ridership. A number of other benefits have also been observed by a smaller percentage of respondents.

Table 3: Percentage of Agencies Involved with Coordination or Mobility Management that have Realized Specific Benefits (n=60)

Answer Options	Response Percent
Simplified access to transportation services for riders	65%
Increase in the range of transportation options and service providers available to riders	63%
Increased awareness of transportation services	63%
Increased ridership	57%
Reduction in service gaps	48%
Expanded transit service area to include new destinations where individuals need to go	43%
Expanded span of service (provide transit service earlier or later)	37%
Reduction in service duplication or overlap	35%
Increased service days per week (provide transit service more days of the week)	32%
Increased frequency of service	32%
Reduced cost per ride	30%
Expanded transit service days to include weekends	23%

Many respondents commented on the benefits of partnership and increased communications, including increased awareness of existing transportation resources and greater capacity to identify and address unmet transportation needs. Some respondents provided specifics about new services that have been implemented, and others commented on how the programs have improved efficiencies by combining routes and co-mingling trips. In addition to the increased availability of transportation options and improved efficiencies, some respondents commented on how the programs have improved quality of life for the users and their families by providing a more personal connection for riders, relieving family members of numerous stressful trips, and allowing users to be more independent. Most respondents indicated that these efforts have resulted in improved access to transportation services for older adults and people with disabilities.

Needs of End-Users and Impacts on Quality of Service. Stakeholders were asked the degree to which they agree or disagree with whether the transportation needs of their clients are being met and whether the transportation services are easy for their clients to access. Opinions were mixed. Among respondents, 44% either strongly agreed (11%) or somewhat agreed (33%) that the transportation needs of their clients are being met, while 42% either strongly (13%) or somewhat (29%) disagreed. Similarly, 46% agreed that transportation services are easy for their clients to access, and 41% disagreed. In both cases, the difference between the number who agreed and the number who disagreed was statistically insignificant.

A majority of respondents agreed that these efforts have led to improvements. For example, 66% agreed that mobility management and coordination programs have resulted in more transportation options available to their clients; 65% agreed it has resulted in simplified access to transportation services; and a majority also agreed that there has been increased awareness of transportation services and expanded service areas. In each of these cases, the difference between the number who agreed and the number who disagreed was statistically significant at the 1% level.

MOBILITY AND QUALITY OF LIFE

Table 4 shows the results from the ordered probit model estimating the impacts of age, disability, health status, income, and mobility on life satisfaction. The statistically significant variables are noted, and the calculated odds ratios are shown. An odds ratio greater than 1 indicates an increased probability of the respondent giving a higher life satisfaction score as the value of the independent variable increases, and a value less than 1 indicates a decreased probability.

The impacts of age, disability, and income were all statistically insignificant, while the other three variables had significant impacts. As expected, health status was found to have a significant impact on life satisfaction. Increases in health status were associated with higher life satisfaction ratings. The results show that the odds of giving a higher life satisfaction score increase by 88% as health status increased from poor to fair or from fair to good.

Table 4: Factors Affecting Life Satisfaction: Results from Ordered Probit Model (n=344)

Variable	Estimate	Odds Ratio
Age (1-6 scale)	0.012	1.01
Disability (0-1)	-0.023	0.98
Health Status (1-3 scale)	0.633**	1.88**
Income (1-5 scale)	0.0148	1.01
Missed Trip (0-1)	-0.4067**	0.67**
Travel Difficulty (1-5 scale)	-0.1138**	0.89**

* $p < .05$, ** $p < .01$

The results demonstrate the importance of mobility on life satisfaction, supporting findings from previous research. Those who had reported missing a trip during the previous week because of lack of transportation and those who reported greater difficulty in making trips gave significantly lower life satisfaction ratings. The odds ratios for these two variables were 0.67 and 0.89, respectively, indicating decreases in the odds of a respondent giving higher life satisfaction scores if they missed a trip or if travel became more difficult. The impacts of mobility on life satisfaction were found after controlling for other factors such as age, disability, health status, and income.

These results demonstrate the impacts that mobility management programs can have on the lives of the users. When these efforts result in new transportation options, new trips that can be made, and simplified access to service, quality of life for the users of these services is shown to improve significantly.

CONCLUSIONS

A diversity of performance measures, with the inclusion of non-traditional mobility indicators, is beneficial for evaluating how well programs focused on mobility and accessibility are meeting their goals (Akoto 2016). This study developed non-traditional measures and collected data through end-user and stakeholder surveys across the country. Results suggest improvements in efficiencies, ease of access, and quality of service. Most respondents to the stakeholder survey reported benefits that have been realized.

The general perspective of the stakeholders is that 1) there are a number of challenges to implementing coordination and mobility management, such as lack of funding, lack of communication, unique needs of various client populations, and many other issues; 2) there is a need for more coordination of existing human service transportation programs; and 3) the programs that have been implemented have had a positive impact on quality of service, ease of access, and, to a lesser extent, efficiency.

Results from the stakeholder survey were somewhat mixed regarding how well services are meeting the needs of end-users. Most indicated some need for more service, such as longer hours, weekend service, or an increase in the scale of services currently available. Results were positive regarding the impact that mobility management and coordination programs have had on quality of service.

Most respondents to the end-user survey were satisfied with the quality of service they receive from their transportation provider, and the results show general improvements in quality of service, as perceived by the riders. The results show that these transportation programs have significant impacts on the lives of their users. Many respondents reported that they would not be able to make these trips if the service they use was not available.

Results from an ordered probit model show how improving mobility and increasing the number of trips an individual can make improves quality of life. These results demonstrate the impacts that mobility management programs can have on the lives of the users. When these efforts result in new transportation options, new trips that can be made, and simplified access to service, quality of life for the users of these services is shown to improve significantly.

These surveys were conducted in different locations across the country, including a mix of urban, suburban, and rural areas. Key for such an evaluation is to collect information from a variety of perspectives, including the end-users, transportation providers, human service agencies, and other stakeholders. While the surveys provide enough information to evaluate mobility management and coordination efforts, more specific data for performance measures would provide more precise results. Future evaluation methods could investigate the possibility of collecting more specific data on performance measures. Individual communities need to ensure a large enough response from both stakeholders and end-users to ensure a proper evaluation. Because of the limited number of responses received from some communities, this study did not attempt to draw conclusions about

individual jurisdictions. The results presented were based on the collection of responses from all communities surveyed.

The survey method can be useful for tracking progress over time. Results from end-user responses on ability to make trips and satisfaction with transportation service, as well as stakeholder responses on benefits, needs of end-users, and quality of service could be used to track progress. Overall, the results suggest that some progress has been made and that the mobility management programs should continue.

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