

# Developing a Method for Assessing National Demand-Response Transit Level of Service: Executive Summary

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## Abstract

The objectives of this study are to identify data needs for assessing demand-response transit (DRT) level of service, develop a data collection tool for obtaining those data, and develop a method for assessing DRT levels of service and prioritizing needs for service improvements. A survey was developed to gather important information such as service span, service area, and service eligibility from DRT operators. The survey was tested in North Dakota and Florida, and recommendations were made for deploying the survey nationwide. A method was also developed for combining the service data collected from the survey with population and demographic data to identify areas with greater needs for service improvements.

## Introduction

Demand-response transit (DRT) service is a major source of mobility for older adults and people with disabilities in urban and rural areas. DRT operates based on individual requests or demands for transportation service. DRT vehicles pick up and drop off people at desired origins and destinations by providing door-to-door or curb-to-curb service. Types of DRT services include DRT for the general public, ADA complementary paratransit, limited-eligibility DRT, and human service transportation. While DRT is a critical component of a community's transit system, the data needed to assess the level of service being provided is lacking.

To assess DRT service coverage, level of service, system performance, and unmet needs requires detailed data regarding existing services. Some of these data can be obtained from the National Transit Database (NTD), which is a standard reporting system for urban and rural transit providers. However, there is little information in the NTD or elsewhere about the extent of DRT coverage and level of service across the country, making it difficult to identify gaps in service coverage and to understand unmet needs.

The objectives of this study are to identify data needs for assessing DRT level of service, develop a

data collection tool for obtaining those data, develop a method for assessing DRT levels of service and prioritizing needs for service improvements, and provide recommendations for constructing a DRT level of service survey tool that could be used in any state or nationwide.

The methods developed were tested in North Dakota and Florida, because these two states provide a mix of geographic types. Testing the framework in a mix of large urban, small urban, suburban, and rural areas could ensure that the effort would be successful if applied nationwide.

## Quality of Service Measures and Data Deficiencies

Key variables for identifying the level of DRT service across the country include geographic coverage, days of service per week, hours of service per day, advance reservation requirements, and service eligibility. These data are largely missing from the NTD. Service span and geographic coverage are especially important but which have limited data availability. While the NTD has data for service days and hours for some transit agencies, service span data for DRT service is not available for any agency in the rural NTD.

With regard to geographic coverage data, very general service area (city, or counties served) information is available for some transit agencies in the NTD, but the data available are not specific enough for the study methodology. In the rural NTD, agencies are asked to identify the county or counties in which they provide service. Some of the multi-county providers do not list all of their counties, so the data are incomplete. The data are also imprecise because an agency might not provide service within some areas of the county, or the level of service provided may differ within the county. Some areas might receive daily service, while others have service twice a week. Geographic coverage and level of service information at a level finer than the county would be helpful. This level of information is not available through the NTD. More detail regarding ADA paratransit service areas would also be useful. ADA paratransit providers may offer service within  $\frac{3}{4}$  miles of fixed-route service, as required, or they may provide service to a larger geographic area.

Further, the availability of additional service data for DRT agencies such as minimum advance reservation time, eligibility requirements, and type of DRT service provided (curb-to-curb, door-to-door, etc.) would be helpful for identifying the type and level of service being provided. These data also are not available from the NTD. A significant limitation of the NTD is that it does not distinguish ADA paratransit from general public DRT and other forms of demand-response services.

### **Survey of Demand-Response Transit Agencies in North Dakota and Florida**

Given that currently available data sources are inadequate, this study developed and conducted online surveys of DRT agencies in North Dakota and Florida to gather service details. While the two surveys employed different approaches, both attempted to collect detailed data on geographic coverage and level of service, including service eligibility, service days per week, service hours per day, service area, service type, and minimum advance reservation time. The goal was to collect as much useful and detailed data as possible while minimizing the burden to transit agencies and the possibility for error.

A total of 27 out of 33 transit agencies in North Dakota responded to the first survey. The high response rate was likely influenced by the NDDOT requesting the agencies to

respond. The online survey used a map tool that responding transit agencies could click on to indicate the geographic areas (census tracts/cities) where they offered any kind of DRT service. While the survey was mostly successful, the use of the clickable map tool in the survey was found to be somewhat ineffective.

Based on the lessons learned with the first survey, the survey was redesigned before being sent to DRT agencies in Florida. While the rest of the survey questionnaire was similar to the North Dakota survey, the clickable map tool was discarded and information on service area was gathered using a different approach. Transit agencies were first asked to identify counties in which they provide demand-response service. Then for the individual county or counties selected, the survey asked if the agency provides the same days and hours of service throughout the county or if some areas are unserved or provided different levels of service. If service is the same throughout the county, the survey asked agencies to identify the number of days and hours of service provided in the county. If service differs, the survey then listed each city in the county and asked respondents to identify the number of days and hours of service for each city. Rural areas of the county not belonging to any city were also included in the survey and referred to as “other rural areas.”

Of the 56 transit agencies in Florida, 38 responded to the survey. The response rate was lower most likely because the Florida DOT was not involved in distributing the survey. Despite the lower response rate, the survey conducted in Florida was more successful. The survey collected a high level of detail regarding geographic coverage and span of service, it was less prone to error than the North Dakota survey, and feedback from transit agencies in Florida was more positive. Most responding agencies from Florida said that the survey was easy to complete, and very few mentioned any difficulties with the survey. Further, most agencies completed the survey within 5-15 minutes.

### **Mapping Demand-Response Level of Service**

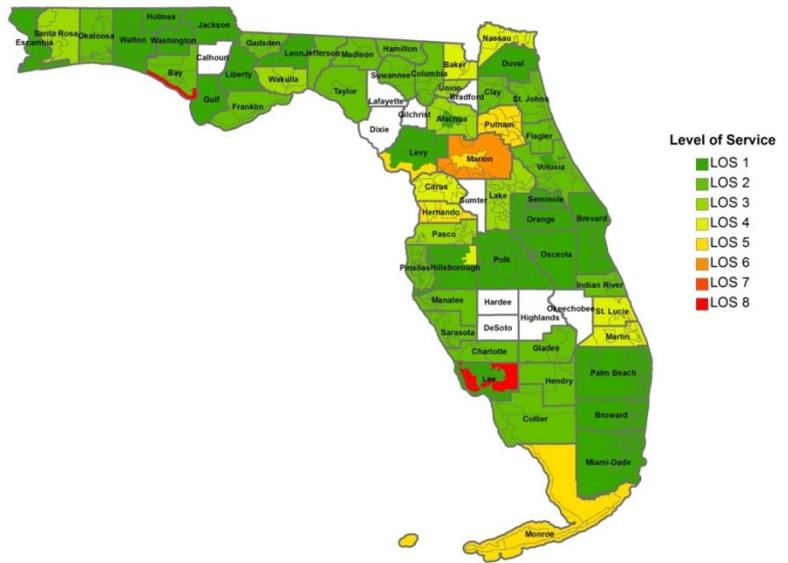
Data collected in these surveys provide a greater description of DRT levels of service than what is currently available in the NTD. Data for days per week and hours per day of service were collected at city or census tract levels and illustrated in statewide maps. Days per week and hours

per day of service can also be combined into a single measure of level of service, as developed in the 2<sup>nd</sup> edition of the Transit Capacity and Quality of Service Manual (TCQSM). Using this approach, Figures 1 and 2 map existing levels of service (LOS) for all types of DRT agencies in North Dakota and Florida. The highest level of service (LOS 1) consists of service six or seven days per week and 16 or more hours per day. The lowest level (LOS 8) indicates very limited service (less than weekly) or no service. Other levels represent varying levels of service.

As a caveat, the levels of service values calculated in this report were based on the accuracy of the transit agency service details provided by the survey respondents and available from their websites. Data are missing for some agencies that did not respond, and service areas or hours for some agencies may have changed by the time this report is published, so the data and results available from this report should be used as a baseline but not for making decisions until proper validation. The point of the exercise is to demonstrate how the collected data could be useful to transportation planners.

### Identifying Unmet Needs and Prioritizing Service Improvements

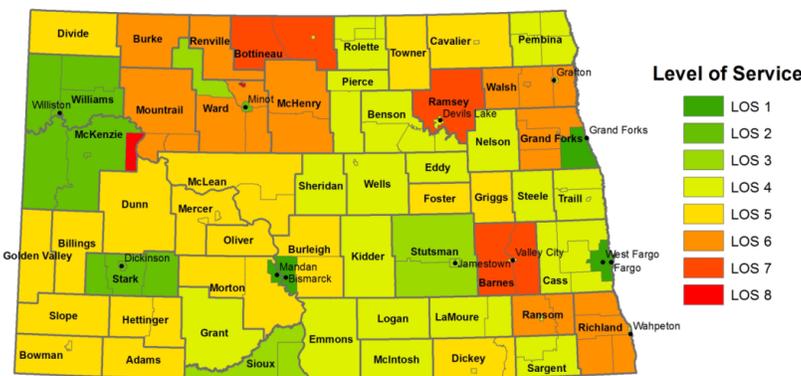
While level of service values and service coverage data provide valuable information about the extent of DRT service, these measures do not completely identify if the mobility needs of transit-dependent populations are being met, nor do they identify the areas with the greatest needs for service improvements. This study proposes a method for combining the service data collected through the survey



**Figure 2. Demand-Response Transit Level of Service in Florida, All Types of Services**

with population and demographic data to prioritize areas for service improvements.

Population and demographic data, which can be obtained from the American Community Survey, provide guidance for determining where the greatest needs for mobility services exist. This study uses a mobility needs index based on three factors deemed important for determining mobility needs: population aged 65 or older, population with a disability, and population below the poverty line. The process ranks all regions on a scale of 1 to 5, with higher values identifying areas with greater mobility needs. The mobility needs index is used as a proxy for identifying areas with greater needs for demand-response services, but it does not suggest that needs are unmet.



**Figure 1. Demand-Response Transit Level of Service in North Dakota, All Types of Services**

Comparing the mobility needs index with the existing level of service provides information about where the greatest needs exist for service improvements. This study developed a method of combining these two sources of information to rank areas in terms of needed improvements. The procedure ranks areas on a 1-10 scale in terms of needed improvements (with a rank of 1 indicating greatest need). Areas with a lower level of existing services or a higher mobility needs index were given a higher priority ranking. Resulting priority rankings for North Dakota and Florida are shown in Figures 3 and 4. The ranking is somewhat subjective and can

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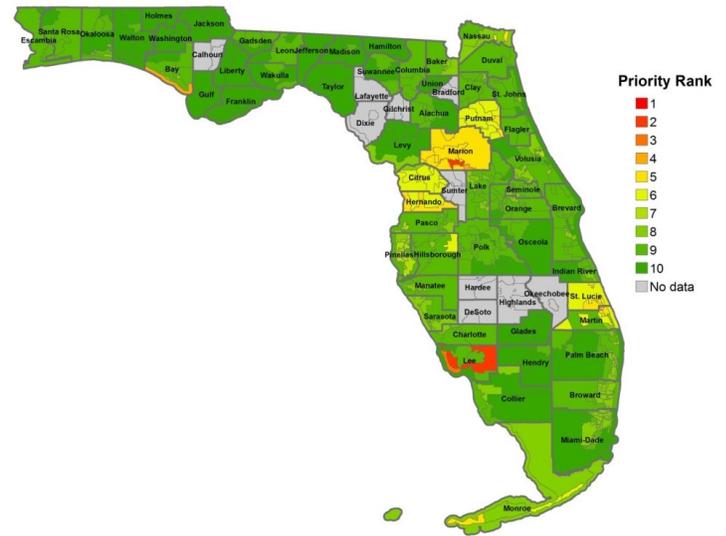
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be modified according to the priorities in any given state. The procedure shows how the level of service data collected in this study can be combined with population and demographic data to identify areas with the greatest needs for DRT service improvements. This information can help transit agencies, MPOs, and state DOTs make investment decisions.

This is one method for prioritizing investment needs that should be considered in conjunction with other sources such as existing NTD data and public input. Other data collected in the survey, such as service type, service eligibility, and minimum advance reservation time should also be considered when analyzing current services.

**Recommendations**

This study recommends using the survey instrument conducted for the Florida survey. As indicated by responses from the survey of Florida agencies, the reporting burden for transit agencies to provide this

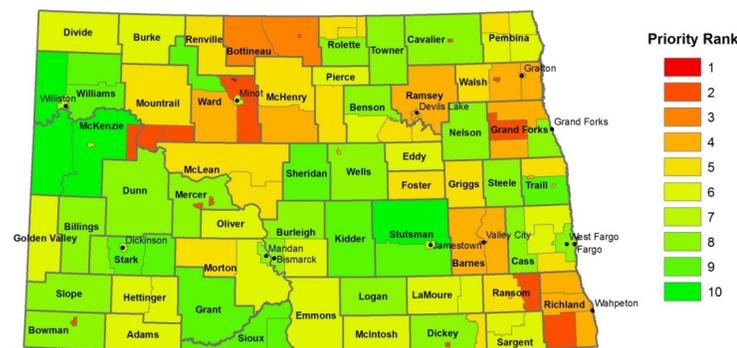


**Figure 4. Priority Ranking for Receiving Demand-Response Service Improvements in Florida, Based on Service Span and Expected Need**

information is not too great. The collected level of service data can then be mapped and compared to American Community Survey data by associating the cities and rural areas with census tracts.

DRT service details such as service span, service area, service type, and service eligibility are critical for determining the level of DRT service that is being provided. Therefore, having such data available in the NTD or elsewhere for all transit agencies operating any type of DRT would be helpful for understanding the current levels of service being provided and for

identifying areas that should be priorities for service improvements.



**Figure 3. Priority Ranking for Receiving Demand-Response Service Improvements in North Dakota, Based on Service Span and Expected Need**