

**Assessing Existing and Needed Community Transportation for People
with Disabilities in North Dakota**

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ABSTRACT

Mobility is fundamental for people to live full and satisfying lives in their communities. For adults with disabilities, access to community transportation is often limited. The objectives for this study are to obtain a current and accurate description of existing and needed community transportation for adults with disabilities in North Dakota, establish a methodology for obtaining this information that can be used over time to assess progress in providing transportation for adults with disabilities in the state, and create a data collection instrument that can be used by communities and states beyond North Dakota for collecting similar information. A survey was developed to collect information from individuals regarding their travel behavior, ability to make needed or desired trips, use of community transportation options (public transit, human service agencies, other), unmet needs, and difficulties encountered. A large percentage of the respondents were transit-dependent or dependent on others for rides. The survey results indicated that a significant percentage of respondents desire more trips than they are currently taking, and lack of transportation appears to be the main limiting factor. The survey also revealed significant dissatisfaction with available transportation options, both in the community and for long-distance trips. The most significant concerns with public transportation regarded service availability.

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1. INTRODUCTION

Mobility is fundamental for people to live full and satisfying lives in their communities. With community mobility, people have opportunities for employment, civic involvement, health care, shopping, socialization, and participation in community activities. Without it, people may experience isolation and depression (Hughes, Nosek, and Robinson-Whelen 2007; Marottoli et al. 1997). For adults with disabilities, access to community transportation is often limited or non-existent. While the need for improving this situation is increasingly being recognized, moving forward requires current and accurate descriptive information about transportation services used and needed.

A survey by the Bureau of Transportation Statistics in 2002 showed that almost 15 million people in the United States have difficulties getting the transportation they need, and of these, 6 million are people with disabilities (U.S. Department of Transportation, Bureau of Transportation Statistics 2003). The survey also showed that more than 3.5 million people in the country never leave their homes, more than half of whom are people with disabilities. Lack of transportation was a major contributing factor, as about 560,000 people with disabilities were found to never leave home because of transportation difficulties.

The problem could become more severe as the population ages. Estimates show that the percentage of the population age 65 or older in North Dakota will increase from 15% in 2005 to 23% by 2020, which would be nearly 150,000 people (Rathge 2007). Although disability is not an inevitable consequence of aging, estimates from the Census show that disability rates increase significantly with age. According to the 2006 American Community Survey (U.S. Census Bureau 2006), 14.1% of the non-institutionalized population in North Dakota age 5 or older has a disability, just below the national average of 15.1%. For people age 65 to 74 in the state, 28.3% have a disability, and more than half of the people in the state (51.5%) age 75 or older are found to have a disability. People with disabilities clearly represent a sizable segment of the population.

For those of working age, disabilities can become a barrier to gaining employment. Approximately one in ten people age 21 to 64 in the state has a disability. Among this working age population, the percentage of people employed is much lower for those with disabilities. For example, among people age 35 to 64 in the state, 86% of those with no disability are employed, compared with just 50% of those with a disability. Poor access to transportation could be one factor contributing to this lower rate of employment.

A number of studies and surveys both in North Dakota and nationwide have shown that people with disabilities have experienced problems with transportation. A study published by the Small Urban & Rural Transit Center (SURTC) in 2003 (Hegland and Hough 2003) surveyed people with disabilities in the state regarding their transportation needs and found that many of the respondents used transit; more would use it if it were available to them, and many reported problems with transportation. An update to this previous study is warranted because the scope of that survey was somewhat limited, and conditions may have changed, for better or worse, during the years since that survey was conducted. A new study could address areas not covered in the previous survey, determine if there has been any progress in addressing the transportation needs of people with disabilities, and provide an instrument that can be used for future research either to track progress or collect similar information in other communities. Additionally, the results of the study might enable transportation planners and providers, as well as local and state policy makers, to undertake actions to address the deficiencies documented by this effort.

The objectives for this study, therefore, are to 1) obtain a current and accurate description of existing and needed community transportation for adults with disabilities in North Dakota, 2) establish a methodology for obtaining this information that can be used over time to assess progress in providing transportation for adults with disabilities in North Dakota, and 3) create a data collection instrument that can be used by communities and states beyond North Dakota for collecting similar information.

A survey was developed to collect information from individuals regarding their travel behavior, ability to make needed or desired trips, use of community transportation options (public transit, human service agencies, other), unmet needs, and difficulties encountered. Also gathered were demographic and socioeconomic information. The North Dakota Disabilities Advocacy Consortium and other agencies cooperated with SURTC in distributing the survey.

2. PREVIOUS STUDIES

2.1 Surveys of North Dakota

Hegland and Hough (2003) surveyed people with disabilities in North Dakota to identify their primary transportation needs and to determine the degree to which their needs were being met by measuring quality and availability of service. The study team developed a mail survey and sent it to a sample of clients from the state's four Centers for Independent Living. Working in cooperation with these centers that serve people with disabilities, a total of 285 completed surveys were received. Of these respondents, 103 were users of public transportation. The survey covered four topics: the demographics of the survey respondents, special needs, assessment of the use of public transportation by those who use it, and assessment of the quality of services provided by the transportation providers. About 60% of the transit users were found to have unmet transportation needs. The four most requested improvements in services were increased service hours, cheaper fares, more convenient scheduling, and reduced riding time.

Mattson (2009) recently conducted a study that analyzed the mobility and transportation needs of older adults in North Dakota. This SURTC study analyzed survey data provided by AARP. Of the 1,042 North Dakotans age 50 or older who responded to this survey, 17% identified themselves as having some type of disability. The study showed that having a disability is often the most important individual characteristic influencing travel behavior, mobility, and problems with transportation. People with disabilities were less likely than others to drive themselves, more likely to avoid driving during certain conditions, more likely to use transit, more likely to desire more trips of nearly all types, more likely to say that transportation is a limiting factor for their ability to make trips, and more likely to report problems with using public transportation. In many cases, the magnitude of these effects was significant.

Adequate shelter from the weather while waiting, inconvenient schedules, and having a place to sit while waiting were most often cited as a major problem for people with disabilities. Getting information and going where they need to go were also frequently cited as a major or minor problem. Almost all of the potential issues addressed in the survey were cited as either a major or minor problem for a majority of the respondents with disabilities. The difference in the response between those with a disability and those without was often significant. For example, 25% of people with physical disabilities reported that difficulty boarding was a major problem, compared with just 3.5% of those with no disability. Fifty percent of those with physical disabilities thought adequate shelter from the weather while waiting was a major problem, compared with 28% of people with no disability.

The current study will expand upon the previous SURTC studies by obtaining updated information and expanding upon the questions asked to address topics not previously covered. Some of these additional issues were identified from reviewing studies conducted elsewhere.

2.2. Other Research

2.2.1 National Surveys

The Bureau of Transportation Statistics (BTS) survey previously discussed gathered information in five areas:

- Frequency of travel outside the home, including trip purpose, mode of transportation, frequency of use for different modes, need for assistance, and satisfaction with transportation services
- Availability and use of paratransit (door-to-door service)
- Personal motor vehicle ownership, use, and safety issues
- Experiences when using various modes of travel, including difficulties with public and private transportation
- Respondent demographics (gender, age, income, ethnicity, race, disability, living arrangements, employment status, school attendance, and education level) (U.S. Department of Transportation, Bureau of Transportation Statistics 2003)

The one difficulty most frequently cited in the survey was the lack of a personal vehicle. Other difficulties mentioned by respondents included the availability or cost of public transportation, problems that made using transportation too difficult, and personal preferences, such as not wanting to ask others for help or depend on someone else for transportation (U.S. Department of Transportation, Bureau of Transportation Statistics 2003).

2.2.2 Problems with Public Infrastructure

There are some things that transit agencies may be able to do to improve the experience for riders with disabilities, but some of the major barriers could be due to problems with public infrastructure. Common barriers include inaccessible bus stops, intersections without curb ramps, street crossings and pedestrian signals that are inaccessible to people with visual impairments, and obstacles blocking the sidewalk (National Council on Disability 2005).

2.2.3 Problems with Paratransit

Many people with disabilities may be dependent on paratransit and face problems specific to that mode of travel. Maisels et al. (2000) conducted a series of focus groups on access to health care for people with disabilities in the Boston area, and they found that since public transportation is often not physically accessible, many had to depend on the paratransit system. Some of the problems reported by paratransit users in their study included waiting for hours, waiting outside in cold or rainy weather, or being late for their appointments.

The National Council on Disability (2005) reported that while paratransit ridership and service has soared under the Americans with Disabilities Act, riders continue to experience significant problems. For example, they found that many transit agencies failed to comply with ADA requirements to announce bus stops on fixed routes, to the disadvantage of those with visual or cognitive impairments; wheelchair and scooter securement was often inadequate; accessibility equipment was sometimes poorly maintained; and some bus drivers simply passed by people with disabilities waiting to ride. This report was based on interviews and focus group discussions that took place in locations across the United States between April 2004 and February 2005.

Another finding from this report was that some paratransit systems were still plagued with trip denials. To reduce costs and get people to use the fixed-route system if they can, many transit agencies have

tightened their eligibility requirements, but as a result, some riders may wrongly be denied service. Balog (1997) concluded that the eligibility process needs to be accurate and precise to more appropriately serve its riders and also not discourage people from applying by being too unwieldy or burdensome. In a nationwide survey of transit agencies, Chia (2008) found some progress regarding more precise eligibility determinations.

Problems were also found in the National Council on Disability study with timeliness of paratransit service, long telephone hold times, and the lack of a subscription service for regular riders. Some paratransit systems were also found to have punitive no-show and late cancellation policies. Wasfi and Levinson (2007) in a study in Minnesota found problems with long lead times for scheduling paratransit services and unreliability of those services.

2.2.4 Problems for People with Cognitive Impairments

Hough (2007) found that older women in North Dakota with lower cognitive abilities took fewer trips than those with greater cognitive abilities and were more likely to desire more travel relative to their current travel. People with cognitive disabilities may face a number of challenges in navigating public transportation. As Fischer and Sullivan (2002) described, users of public transportation engage in a series of high-level activities that include planning, waiting, and moving, and they must comprehend and process a number of “essential navigation artifacts,” including maps, schedules, labels and signs, landmarks, and clocks. These artifacts can become cognitive barriers that prevent some people from using transit. Some people with cognitive disabilities will have difficulty orienting themselves in time and space, solving problems, organizing, expressing themselves, and remembering (Rosenkvist et al. 2009). The most common problems include reading and understanding directions, accessing the correct vehicle, exiting at the correct stop, and understanding operator announcements (Carmien et al. 2005).

Rosenkvist et al. (2009) studied the reasons why people with cognitive functional limitations ceased use of public transportation. Their study interviewed people who had a stroke and three months later were able to move about independently and live in ordinary housing. The interviews focused on five areas: mobility in general, environmental factors that hinder or enable use of transit, strategies when desiring to use transit, future use of transit, and ideal transit. The findings indicated usability problems, both real and imagined. Four categories of participants were identified. Those in the first group did not think they were capable of riding again, and so they did not even consider it a possibility. Some of them indicated that they had psychologically adapted to a sedentary situation. Those in the second group did not use transit, not because of their own inability but because other people, mainly relatives, advised them not to. A third group of participants stated that it was demanding to handle a complex environment requiring them to quickly perform a series of tasks, indicating a general fear and anxiety about transit. A final group was influenced by the presence of other people. They did not want to disturb other passengers or be disturbed themselves. They felt like they needed more time to perform the various tasks and did not want to impede others who were in a hurry. The availability of other people to help them was also important, and they were not sure if the bus drivers would be able to provide the needed support. Modes of travel where pressure from other passengers could be avoided and where assistance was available from the driver were preferable to those in this group.

The authors point out that the descriptions of usability problems originated both from experiences of actual trips and also from their imaginations, so some problems might not apply directly to the actual environment but might be considered a problem in the participants' minds. Rosenkvist et al. (2009) also stressed the importance of all parts of the journey, including the search for information, travel to and from the vehicle, and vehicle changes.

A distinction should be made between people with life-long cognitive disabilities and those who have experienced strokes but were fully functioning people earlier in their lives. For most, their life experiences will be quite different. Furthermore, people with cognitive disabilities, present at birth or acquired, present a significant range of capabilities, meaning that some may have a relatively easier time than others successfully using public transportation.

Wasfi and Levinson (2007) studied the transportation needs of adults with developmental disabilities in Hennepin County, Minnesota. They surveyed individuals with autism spectrum disorder, cerebral palsy, intellectual disabilities, and other, generally unspecified, disabilities in this urban county. The study found that public transportation presents challenges for this population both physically and mentally. For example, about one-third had difficulty standing, almost half had difficulty reading transit schedules, and one-third had difficulty understanding operator announcements.

2.2.5 Rural Issues

The National Council on Disability concluded that the need for accessible public transit is the greatest in rural areas, due to a significant discrepancy in funding to such areas. The report cited that approximately 40% of the rural population had no public transportation at all, and another 25% had only minimal service, while urban residents had access to 25 times more public transportation service than rural residents. The lack of necessary transportation for people with disabilities could result in many needing to move from their homes and the institutionalization of some who cannot get to their medical appointments.

Easter Seals Project ACTION (2006) surveyed various human service organizations and transportation providers in rural and small urban areas to identify challenges and issues faced in delivering cost-effective, accessible services to the general public, including people with disabilities. These challenges included limited funding, limited trip purposes (often limited to medical or other “priority” trips), client-only transportation, limited days and hours of service, lack of long-distance transportation, high cost of transportation (due to long distances traveled and low population densities), accessible vehicles and equivalent service needed, limited use of advanced technologies (due to cost and available expertise), driver training (limited due to lack of state-of-the-art training materials or resources), and lack of information.

Their study concluded that fixed-route services could be encouraged by providing travel training to those who could ride the bus if shown how to use it safely and independently, offering fare incentives, and improving access to information. They argued that having easy access to timely and accurate information about available services is essential, especially in rural and small urban areas where services may be provided by a number of different organizations that may have different policies or serve different purposes and where trip origins and destinations may span multiple communities or counties.

In a survey of transit providers, Balog (1997) found that the majority of small operations did not conduct travel training and were less likely to provide or help with fixed-route improvements that would make stations, paths, facilities, or bus stops more accessible. On the other hand, the smaller operators were more likely to coordinate program schedules with social service agencies for more efficient schedules.

2.2.6 Potential Solutions

Research by Carmien et al. (2005) suggested two major design strategies for creating more human-centered systems that are easier for people with cognitive disabilities to navigate. The first approach is to design components that simplify the complex navigational artifacts encountered in public transportation systems, and the second approach is to design architectures and components that transcend the need to understand complex artifacts and serve as a dynamic “navigational assistant.”

With regard to increasing the accessibility of transportation infrastructure, increasing reference is found in the literature regarding the use of universal design (Preiser and Ostroff 2001, Iwarsson and Stahl 2003, Audirac 2008). Universal design means the design of products and environments to be usable by all people to the greatest extent possible without the need for adaptations or specialized design. The Center for Universal Design at North Carolina State University established seven principles of universal design:

- 1) Equitable use – the design is useful and marketable to people with diverse abilities
- 2) Flexibility in use – the design accommodates a wide range of individual preference and abilities
- 3) Simple and intuitive – use of the design is easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level
- 4) Perceptible information – the design communicates information effectively to the user, regardless of ambient conditions of the user’s sensory abilities
- 5) Tolerance for error – the design minimizes hazards and the adverse consequences of accidental or unintended actions
- 6) Low physical effort – the design can be used efficiently and comfortably and with a minimum of fatigue
- 7) Size and space for approach and use – appropriate size and space is provided for approach, reach, manipulation, and use regardless of user’s body size, posture, or mobility (Story, Mueller, and Mace 1998)

Examples of universal design for public transportation include increased walkway widths, low-floor buses, smooth walking surfaces, curb ramps, automatic door openers, and stop announcements.

O’Neill and O’Mahony (2005) surveyed people with disabilities in Dublin, Ireland, and identified a number of improvements, including high-cost and low-cost solutions. The most common high-cost solution was for more turning space for wheelchair users on buses; low-floor vehicles was another high-cost solution. A common medium-cost solution was more accessible information. Low-cost solutions identified included an easy clamp system to secure wheelchairs on buses, stop announcements on vehicles, stop timetables presented in larger print, and brighter numbers on the outside of buses so they could be more easily identified. O’Neill and O’Mahony (2005) concluded that the low-cost solutions, in many cases, would be marginal changes to work practices or design-making but could have a considerable impact on quality of service for people with disabilities.

Balog (1997) surveyed people with disabilities who do not use fixed-route services as well as those who do to identify the characteristics of paratransit riders who could be attracted to ride fixed-route service, the features they value in fixed-route services, and the barriers that prevent them from using such services. The top four features identified in the survey that could make fixed-route services more attractive to paratransit users were low fares, easy access to a bus stop, drivers who announce all stops, and no transfers. Many transit agencies allow ADA riders to ride for free on the fixed-route system, and some also allow a personal care attendant to ride for free, which is important because some people would not ride the fixed route unaccompanied (Balog 1997).

Another important issue that Balog (1997) identified is travel training. Travel training, according to Balog, should teach these individuals the basics of public transportation, including how to read a map and bus schedule, where to wait for a bus, how to board and pay the fare, and how to signal for the desired stop.

3. SURVEY DEVELOPMENT AND DISTRIBUTION

A survey was developed to analyze existing and needed transportation for people with disabilities in North Dakota. The survey was created based on a review of the literature, findings from previous surveys, the identification of the important issues regarding transportation for people with disabilities, including issues that have emerged since the previous surveys were conducted, and feedback from people in the state who work with individuals with disabilities. Some of the areas identified as important issues for the survey to focus on include current mobility; experiences and problems with public transportation; factors hindering the use of public transportation; assessment of services; travel training; use of curb-to-curb, door-to-door, and door-through-door service; intercity transportation; impact of winter on travel; possible use of brokerages; and the communication capabilities of riders.

The survey includes four general sections. The entire survey is provided in Appendix A. The first section, Part A, asks some general transportation questions. These questions focus on travel behavior, whether lack of transportation limits the number of trips made, use of different modes, travel training, and overall satisfaction with transportation options. If the respondent currently uses or has previously used public transportation, he or she is asked to answer questions from Part B of the survey, which focuses specifically on public transportation. Those who have never used public transportation are asked to skip to Part C of the survey. Part C of the survey is simply an open-ended question that allows the respondent to provide any additional comments about transportation. The last section of the survey, Part D, asks the respondent to provide some personal information.

The survey was conducted in cooperation with the North Dakota Disabilities Advocacy Consortium (NDDAC). The NDDAC is a group of North Dakota organizations interested in advocating for public policy that benefits North Dakotans with disabilities and their families. There are 20 different organizations that belong to the NDDAC, including, but not limited to, AARP, Mental Health America of North Dakota, North Dakota Association for the Disabled, North Dakota Association for the Blind, North Dakota Center for Persons with Disabilities, North Dakota Protection and Advocacy Project, and the Arc of North Dakota. A complete list of the NDDAC member organizations is provided in Appendix B. These organizations provide services to a wide range of people with disabilities in the state.

The main role of the NDDAC was to distribute the survey across the state. The organizations also provided some assistance in developing the survey. An early draft of the survey was provided to the member organizations, and a few changes were made based on their comments. The survey was also sent to the North Dakota Centers for Independent Living (CIL) for review. There are four CILs across the state that provide support for people with disabilities in achieving and maintaining an independent lifestyle. Comments received from the CILs were helpful in drafting the survey.

To encourage widespread participation in the survey, it was provided in three different forms: online, mail, and phone. A link to the online survey was provided to the NDDAC member organizations along with a short advertisement describing the survey to potential participants. The member organizations then distributed or advertised the link to the survey. The online survey was also provided to the CILs. Paper surveys, with preaddressed and prepaid return envelopes, were also provided to any organization that wanted to make it available in that form, although most preferred to simply use the online survey. Since completing an online or paper survey may be too difficult for some, a phone option was also provided. The cover letter and survey advertisements gave a phone number that the participant could call to take the survey that way. The survey was conducted from November 2009 through February 2010.

It was necessary to rely on these organizations for distributing the survey because a database of addresses or phone numbers of people with disabilities in the state was not publicly available. It was also desirable

to partner with organizations serving people with disabilities because potential participants would be more likely to complete the survey if their local organization was involved in the project. Involving these organizations gave greater credibility to the project and made it possible to get the survey to a wider range of people.

4. SURVEY RESULTS

4.1 Response Rate

A total of 131 surveys were received, which was less than the 283 received in the previous SURTC survey. There are several possible explanations for the lower response rate. One is that since the survey was made available predominantly online, fewer paper surveys were made available, and it was not known how many people were aware of the survey and had access to it. Another possibility is that the greater length of this survey, compared with the one previously used, may have discouraged some participants. Finally, there may have been some survey fatigue, as evidenced by a few comments expressing the opinion that there are too many surveys and not enough results in terms of improvements, which could have also discouraged some participation. Despite the lower number of responses than the previous SURTC survey, this survey is more in depth and provides useful information not previously obtained. The respondents are more evenly dispersed across the state than in the previous survey, and there is also a higher percentage of respondents who are users of public transportation. In fact, the total number of transit users in this survey nearly equals that from the previous survey, despite having less than half the total responses.

Of the 131 surveys received, 113 were completed online, 14 were received by mail, and 4 were conducted over the phone. Although the survey was specifically targeted at people with disabilities, 11 of the respondents indicated they had no disability, reducing the number of surveys received from those with a disability to 120. These 11 surveys were excluded from the analysis.

4.2 Characteristics of Respondents

Responses were received from people with different types of disabilities. Of the 100 respondents indicating their type of disability, 64 had a physical disability, 36 had a sensory disability, 29 had a cognitive disability, 22 had an emotional disability, and 6 had some other type of disability such as anxiety disorder, need for oxygen, other health problems, effects from a stroke, a speech disability, or epilepsy (Figure 4.1). Twenty of the respondents did not indicate their disability. Many indicated that they had multiple disabilities. Twenty-five respondents said they had two types of disabilities, 7 reported three, and 6 indicated four types of disabilities, while 62 mentioned one type of disability. The severity of disabilities ranged among the respondents, with 27% saying their disability was mild, 41% saying it was moderate, and 32% indicating they had a severe disability (Figure 4.2).

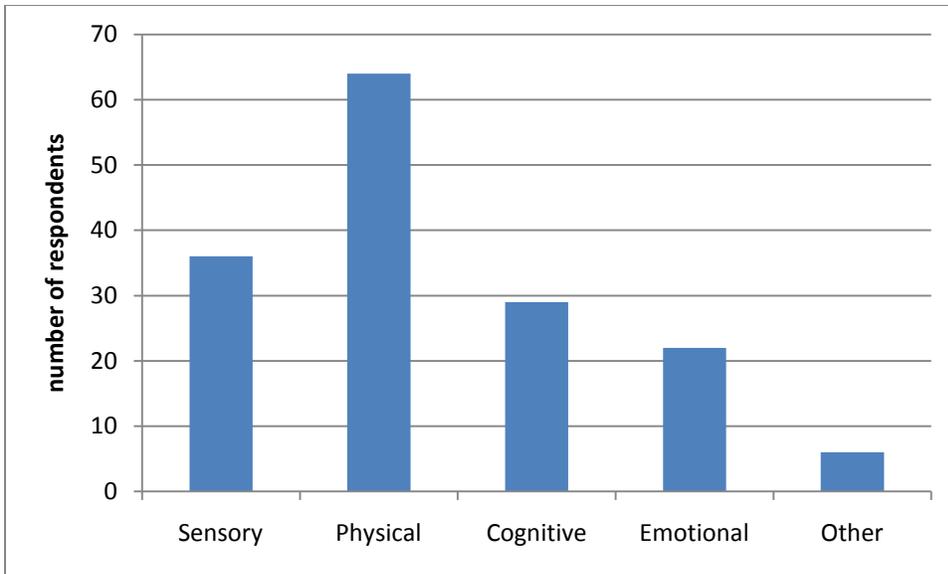


Figure 4.1 Number of Survey Respondents by Type of Disability (n=100)

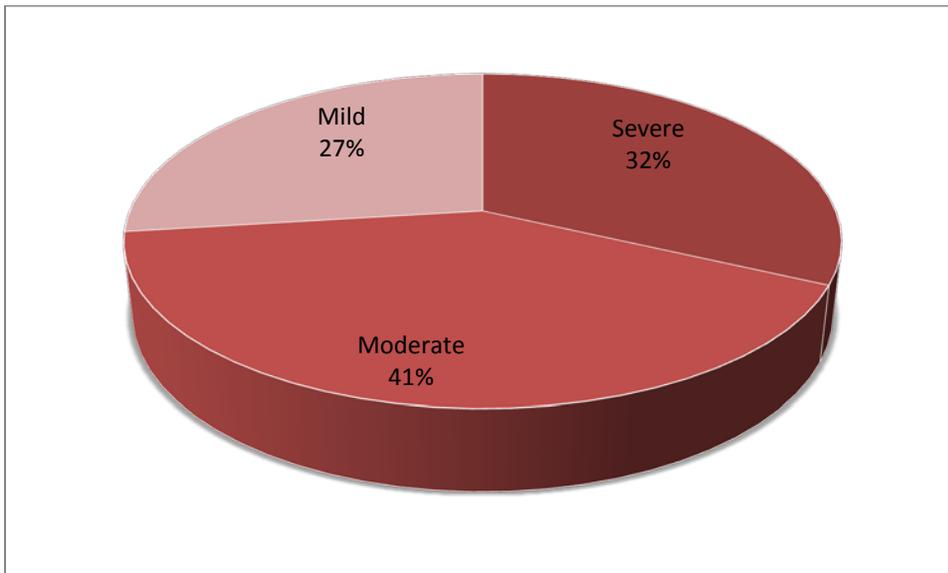


Figure 4.2 Severity of Respondent Disabilities (n=100)

Table 4.1 shows basic demographic information about the respondents. Women were more represented in the survey than men, as 60% of the respondents were female. The age of the respondents tended to skew a bit older, which was to be expected since older adults are more likely to have a disability. The age group most represented in this survey, though, was those aged 45 to 54, with a third of respondents being of this age. Thirty-two percent were 55 or older, and 13% were 65 or older. Seventeen percent of respondents were under the age of 35, and 9% were under the age of 25.

Table 4.1 Demographic Characteristics of Survey Respondents

	Number	Percentage
Gender (n=101)		
Male	40	40%
Female	61	60%
Age (n=100)		
18-25	9	9%
25-34	8	8%
35-44	18	18%
45-54	33	33%
55-64	19	19%
65+	13	13%
Household Income (n=96)		
<\$25,000	64	67%
\$25,000 to \$44,999	18	19%
\$45,000 to \$74,999	8	8%
\$75,000 to \$99,999	3	3%
\$100,000 or more	3	3%

Table 4.1 also shows that those answering the survey were predominantly from low-income households. Two-thirds had a household income of less than \$25,000, and just 14% had income of \$45,000 or more. These income levels were significantly below state and national averages, as the median household income in 2008 was \$49,000 in North Dakota and \$51,000 nationally (U.S. Census Bureau 2009).

The respondents to the survey were distributed fairly evenly geographically across the state. Figure 4.3 divides the state into nine regions defined by the first three digits of the zip code, and Figure 4.4 shows the percentage of respondents from each of these regions compared with the percentage of the total population living in that area. While the responses were distributed across the state, the less populated areas in central North Dakota – those with three-digit zip codes 583, 584, and 587 – were under-represented, and the rural western part of the state provided a greater percentage of responses than would be expected based on population.

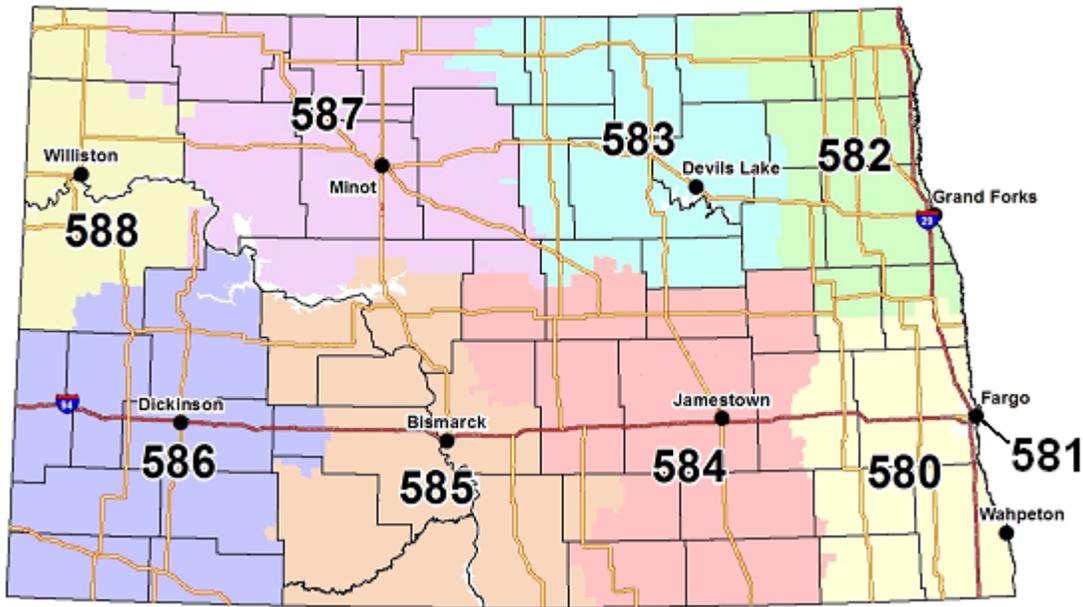


Figure 4.3 Three-digit Zip Code Areas of North Dakota

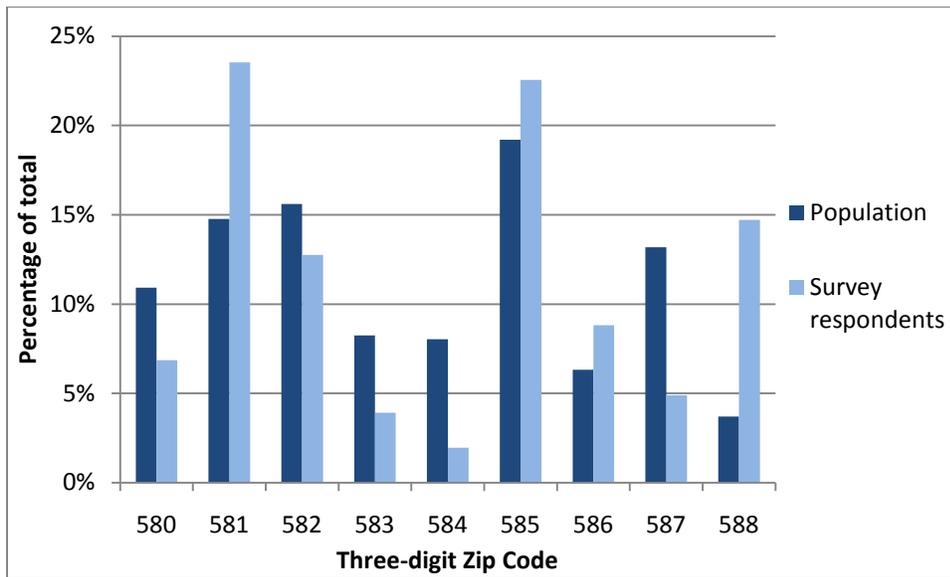


Figure 4.4 Geographic Distribution of Survey Respondents

Over half, 57%, of the respondents were from one of the state’s three largest metro areas (Fargo/West Fargo, Bismarck/Mandan, or Grand Forks), and another 5% were from the fourth largest city, Minot, which has a population above 30,000. Twenty-three percent were from smaller cities with a population below 30,000 and above 5,000, while 16% were from rural areas or towns with a population below 5,000.

Another geographic characteristic considered was the distance the respondents must travel to their most frequent travel destinations. A majority, 57%, answered 1 to 5 miles, while 15% said a mile or less (Figure 4.5). Thirteen percent traveled more than 10 miles.

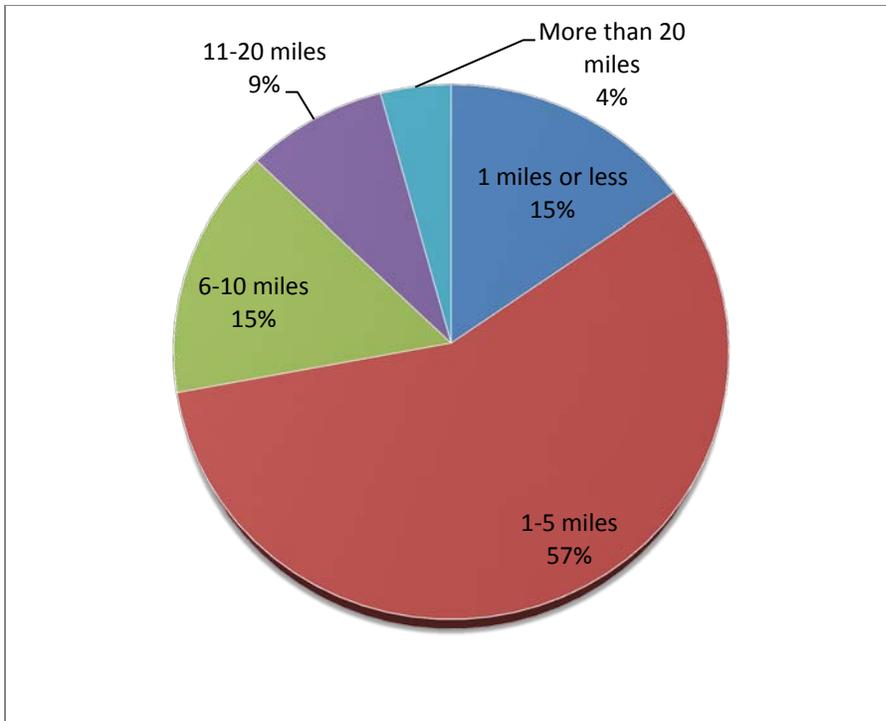


Figure 4.5 Miles from Most Frequent Travel Destinations

Most of the respondents, 91%, lived in a private home or apartment, with the others in a group home. Roughly half lived by themselves, while 40% lived with relatives and 9% lived with non-relatives.

Seventy percent of respondents were found to own and use a computer (Figure 4.6). It may be expected that an online survey would skew participation toward those who own a computer and use the Internet, but a number of respondents who took the survey online took it at a human service agency, and some completed the survey with the assistance of others, so some took the survey online without personally owning a computer or having access to the Internet.

Seventy-six percent indicated that they use the Internet. Slightly more people were found to use the Internet than own a computer, indicating some use the Internet strictly in public locations or with someone else's computer. Among those who completed the survey by mail or phone, a much higher percentage did not own a computer or use the Internet. Finally, 31% said they use social networking sites such as Facebook or Twitter.

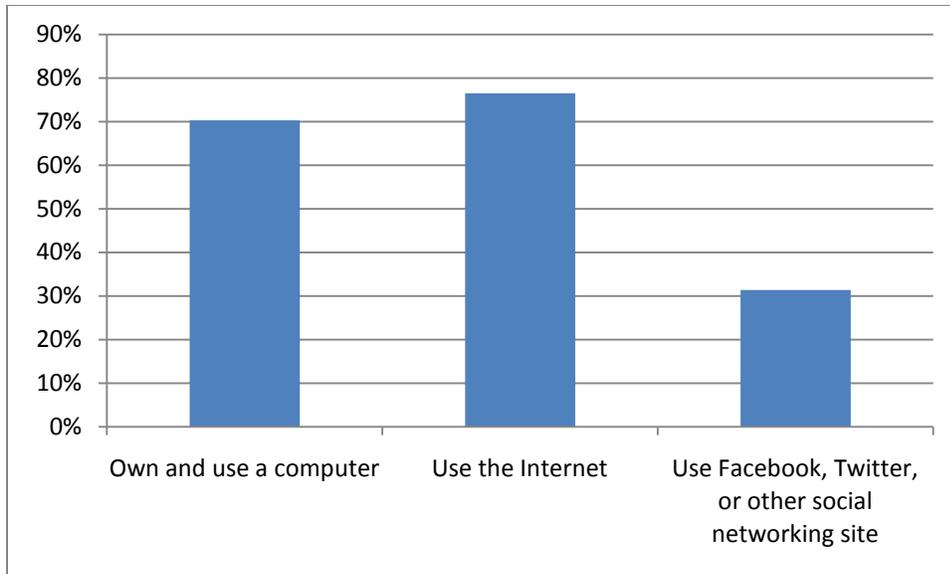


Figure 4.6 Use of Computer by Survey Respondents (n=102)

4.2 Transportation Options

More than half of the respondents to the survey, 58%, were unable to drive (Figure 4.7). Forty-two percent answered that they are legally and physically able to operate a vehicle. The percentage of those who can operate an automobile was lower for those with sensory (28%) or cognitive (29%) disabilities than it was for those with a physical disability (46%), although the number of people with physical disabilities who can drive was still less than half. Close to half of those who said their disability was either mild or moderate were able to drive, while just 28% of those with a severe disability were able to drive.

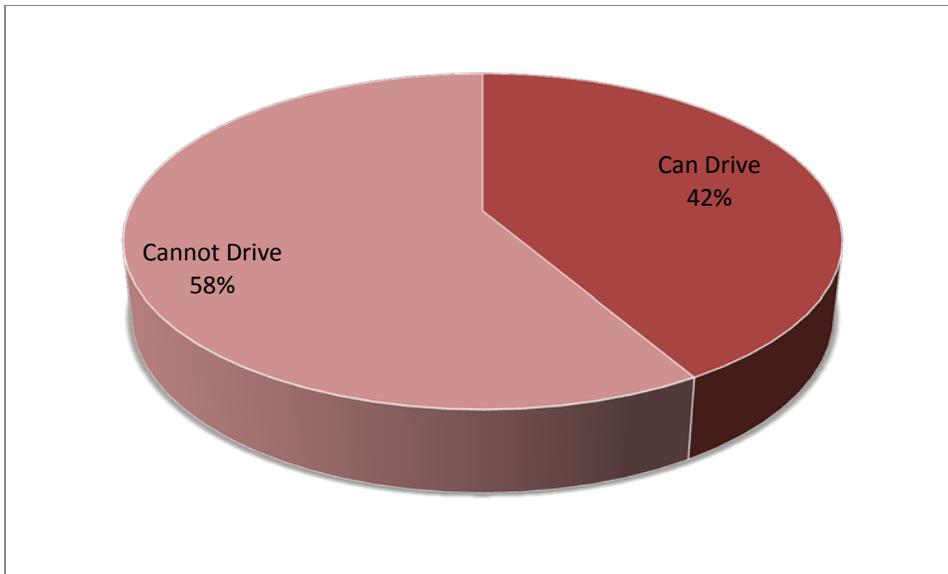


Figure 4.7 Ability to Operate an Automobile (n=101)

Fifty-three percent of respondents indicated there is a local transit bus available within three quarters of a mile of their home, while 32% said there is not, and 15% did not know (Figure 4.8). This is important since, in accordance with the ADA, people with disabilities living within three quarters of a mile of regularly scheduled bus service who are unable to use that service are entitled to paratransit service. Of those who were unable to drive, 40% indicated either not having (28%) or not knowing if they have (12%) transit service. This indicates that 23% of those surveyed could not drive and either did not have transit or did not know if they have transit.

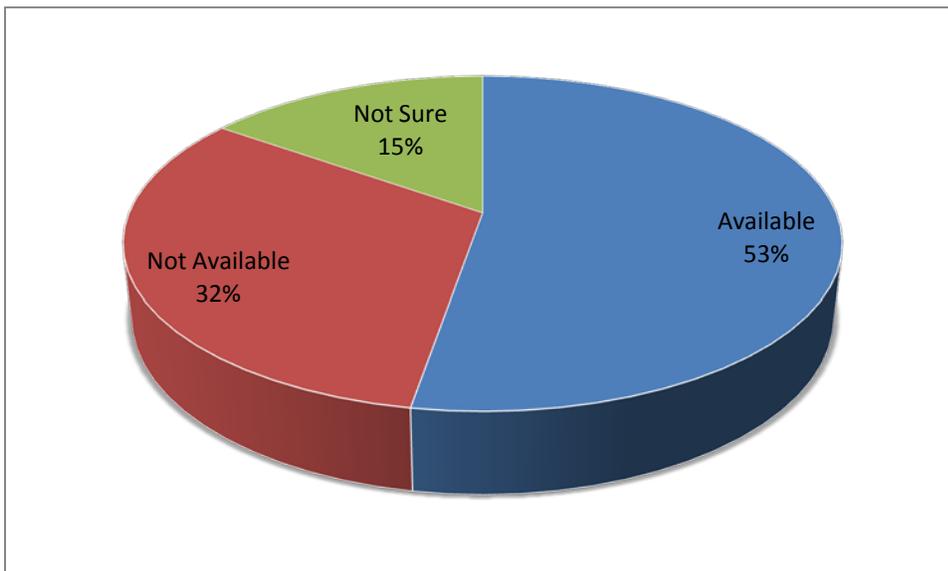


Figure 4.8 Availability of Local Transit Bus within Three Quarters of a Mile of Home (n=112)

The survey revealed significant dissatisfaction with available transportation options both in the community and for long-distance trips (Figure 4.9). More than half, 56%, said they were dissatisfied with the transportation options available in their community, and 19% said they were very dissatisfied. Only 11% said they were very satisfied. The satisfaction with long-distance transportation options is worse, as 60% indicated dissatisfaction, including 36% who were very dissatisfied. Only 17% indicated they were satisfied with their long-distance transportation options, including 7% who were very satisfied.

For those who cannot drive, 60% were dissatisfied with the transportation options in their community, and 67% were dissatisfied with their long-distance options. Even a majority of those with transit available within three quarters of a mile of their home indicated dissatisfaction with the transit services in their community. Respondents from both urban and rural areas noted significant dissatisfaction, but the level of dissatisfaction was greatest in rural areas (Figure 4.10). The availability of transit services for those rural respondents was much lower.

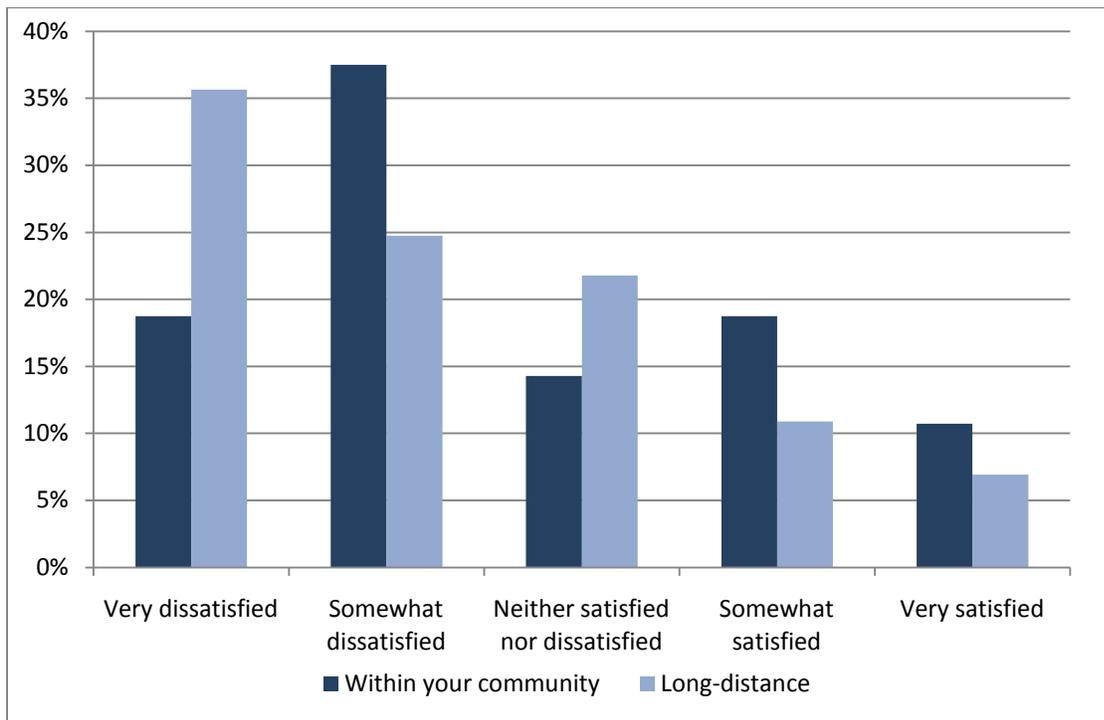


Figure 4.9 Satisfaction with Transportation Options (n=112)

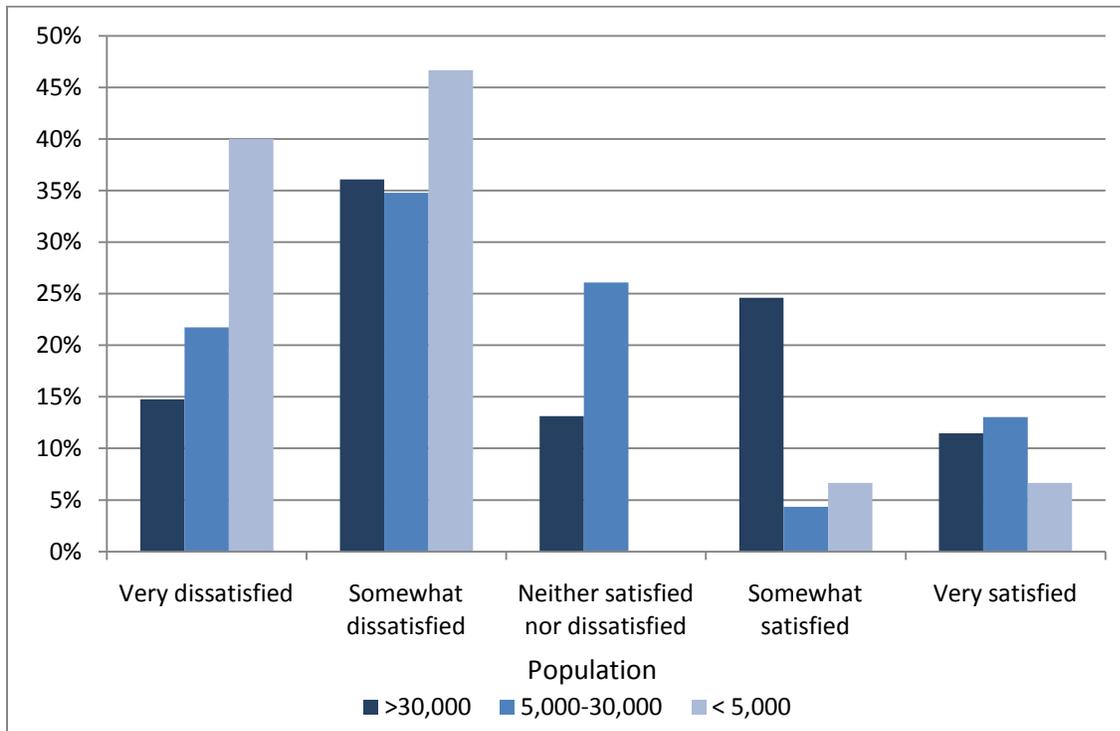


Figure 4.10 Satisfaction with Transportation Options Available in Your Community, by Community Size (n=112)

With fewer transportation options available in rural areas, there may be a concern that people with disabilities may need to move from a rural area into town, or from a small town into a bigger city, to meet their needs and avoid isolation. Twenty-seven percent of survey respondents said they were concerned about being forced to move from their home due to a lack of transportation (Table 4.2). Individuals who live in rural areas and those who must travel longer distances to their most frequent travel destinations were more likely to indicate concern about being forced to move. For example, only one of 17 respondents who travel a mile or less to their most frequent destinations were concerned about needing to move, compared with 10 of 14 who travel 10 or more miles.

Table 4.2 Concern about Being Forced from Home Due to Lack of Transportation

	Concerned	Not Concerned	Percentage Concerned
Total	31	82	27%
Population Size			
>30,000	17	45	27%
5,000-30,000	4	19	17%
<5,000	6	9	40%
Travel distance			
1 mile or less	1	16	6%
1-5 miles	15	50	23%
6-10 miles	5	12	29%
More than 10 miles	10	4	71%

A logit model was estimated to determine the impacts of individual, geographic, and transportation factors on the likelihood that one would be concerned about being forced from home. The dependent variable is a binary variable equal to 1 if the respondent was concerned and 0 if not. The independent variables include population size, travel distance, severity of disability, ability to drive, and use of transit. Estimated odds ratios are shown in Table 4.3. Of these variables, the effect of travel distance was found to be statistically significant and large in magnitude, with an estimated odds ratio of 3.44, which means that the odds of being concerned about needing to move increases by a factor of 3.44 as travel distance increases to the next longest group (travel distance is measured along a 1-5 scale).

Table 4.3 Concern about Being Forced to Move: Results from Logit Model

Variable	Odds Ratio
Pop >30,000	0.64
Pop 5,000-30,000	0.35
Distance	3.44***
Severity	0.86
Can Drive	0.40
Use Transit	0.67
Observations	96

***denotes significant at 1% level

4.3 Trip Frequency and Desire for More Trips

The mobility of people with disabilities was assessed by identifying how often the respondents made different types of trips and then finding if more trips were desired than what were being made. Table 4.4 shows how often the respondents made a trip from home for seven different trip purposes: work (paid or volunteer), shopping, health care, school, agency/organization providing services, leisure/recreation/social activities, and religious activities. Work trips were the most frequently made trips, but there were also 29% of respondents who reported they never make a work trip. The percentage of respondents not making work trips increased with age, as might be expected. Shopping trips were made by the highest percentage of respondents, as just 3% said they never made a shopping trip and three-quarters made a least one such trip per week. The next most frequent trips, overall, were for leisure, recreation, or social activities. The least common trip among these respondents was for school. People with more severe disabilities were less likely to travel for both work and leisure.

Table 4.4 How Often Respondents Make a Trip from Home, by Trip Purpose

	n	5-7 days per week	2-4 days per week	Weekly	About every other week	Once a month or less	Never
	-----Percentage-----						
Work (paid or volunteer)	115	42	14	5	6	4	29
Shopping	116	3	27	46	14	7	3
Health care	116	3	4	18	18	50	7
School	106	11	3	2	0	4	80
Agency/organization providing services	109	11	8	18	7	29	26
Leisure/recreation/social activities	113	8	27	26	12	14	13
Religious activities	113	2	5	42	6	11	35

An ordered logit model was used to estimate the impacts of individual, geographic, and transportation factors on trip frequency. More details of the model can be found in Appendix C. The independent variable is trip frequency measured on a 1-4 scale as follows: 1=never, 2=once a month or less, 3=weekly or about every other week, and 4=two or more days per week. The independent variables were age, measured on a 1-6 scale; a dummy variable for income below \$25,000; severity of disability, measured on a 1-3 scale; ability to drive; and whether or not the respondent uses transit. The model was estimated for five of the trip types. Shopping and school trips could not be modeled since the Score Test for Proportional Odds Assumption found the model to not be valid for these trips. The estimated odds ratios are shown in Table 4.5, with the statistically significant variables noted with asterisks. Many of the variables were found to be statistically insignificant, possibly due to too few observations, but some were found to be significant. Notably, use of transit was found to significantly increase the number of trips taken for work or to agencies or organizations providing services. The number of trips taken for leisure or religious activities was found to decrease for people with more severe disabilities, but health care trips increased. Also, people of lower income were found to take more trips to agencies or organizations providing services, possibly due to greater need, and work trips decreased with age, as expected.

Table 4.5 Characteristics Influencing Trip Frequency, by Trip Type:
Estimated Odds Ratios from Ordered Logit Model

Independent Variable	Work	Health care	Agency/ organization	Leisure activities	Religious activities
-----Odds Ratios-----					
Age	0.68**	1.13			
Low Income		1.78	3.76***	0.89	1.37
Severity	0.64	1.67*	0.81	0.47***	0.53**
Can Drive	1.58	1.41	1.17	1.13	0.85
Use Transit	2.54**	1.35	1.93*	0.88	1.51
Observations	93	91	86	89	88

*denotes significance at 10% level, ** at 5% level, and *** at 1% level.

While analyzing the trip rates may provide some interesting results, it is important to determine if individuals were taking as many trips as desired or if, instead, they had unmet travel demands. The results, in fact, do show that significant percentages of respondents desired more trips than they were making. Unmet demand was greatest for leisure/recreation/social trips, as close to two-thirds of

respondents said they desired more. Fifty-nine percent desired more shopping trips, 46% said they wanted to take more trips for faith-based activities, 41% wanted more trips to agencies/organizations providing services, 35% desired more health care trips, 30% wanted more work trips, and 15% wanted to make more school trips.

The unmet demand, overall, appears to be high, and it tends not to vary significantly based on the gender, age, or income level of the respondent, but it differs based on severity of disability, geographic location, and ability to drive. People with more severe disabilities were more likely to desire more trips, as were those who live in rural areas. Those who could not drive were also significantly more likely to desire more trips than those who could. Of those who could not drive, 80% reported that they desired more leisure/recreation/social activities, and 74% said they would like more shopping trips. Having access to public transportation, though, did not appear to reduce unmet travel demand significantly.

A logit model was estimated to analyze the statistical significance of the individual, geographic, and transportation effects on desire for more trips. The estimated odds ratios are shown in Table 4.6, with the statistically significant effects noted with asterisks. The model found that people with lower income were significantly more likely to desire more work trips. Rural residents were more likely to desire more trips for health care, leisure activities, and religious activities, and the magnitude of the effects were large (odds ratios significantly below 1 for those living in a community with population above 30,000 or 5,000-30,000 show that these individuals were much less likely to desire more trips than those living in rural areas). Those traveling farther distances were also found to be more likely to desire more work trips. Ability to drive was found to significantly reduce the likelihood that one would desire more trips for shopping, leisure, or religious activities.

Table 4.6 Characteristics Influencing Desire for More Trips, by Trip Type: Estimated Odds Ratios from Logit Model

Independent Variable	Work	Shopping	Health care	School	Agency/ organization	Leisure activities	Religious activities
-----Odds Ratios-----							
Age	0.86	1.05	0.76	0.46**	0.83	0.91	1.22
Low Income	2.76*	1.75	1.98	2.58	1.51	0.79	0.89
Pop >30,000	0.74	0.62	0.17***	0.24	0.32	0.07**	0.3*
Pop 5,000-30,000	0.29	1.22	0.29*	0.17	0.35	0.27	0.19**
Distance	2.18**	0.92	1	1.5	0.88	0.93	1.36
Severity	1.46	0.97	1.65	3.82**	1.47	1.39	1.42
Can Drive	0.53	0.16***	0.94	1.62	0.84	0.15***	0.24**
Use Transit	1.25	0.54	0.82	1.18	0.51	0.77	1.21
Observations	86	91	90	74	83	88	86

*denotes significance at 10% level, ** at 5% level, and *** at 1% level.

An individual may make fewer trips than desired for different reasons. Lack of transportation is one important reason, but it may not be the only reason. To specifically isolate the importance of transportation, the survey asked respondents if they take fewer trips for any of the given activities specifically due to a lack of transportation. The results to this question closely resembled the results from the previous one, as seen in Figure 4.11, indicating lack of transportation is the main reason people did not take as many trips as desired. Due to a lack of transportation, 67% of respondents reported they took fewer leisure/recreation/social trips than they desired, 58% took fewer shopping trips, 45% took fewer trips for religious activities, 38% made fewer trips to agencies or organizations providing services, 32%

made fewer health care trips, 25% made fewer work trips, and 14% made fewer school trips. People with more severe disabilities and those who could not drive were more likely to say that lack of transportation limits the number of trips they make, as were those with lower income levels and those living in non-urban areas (Table 4.7).

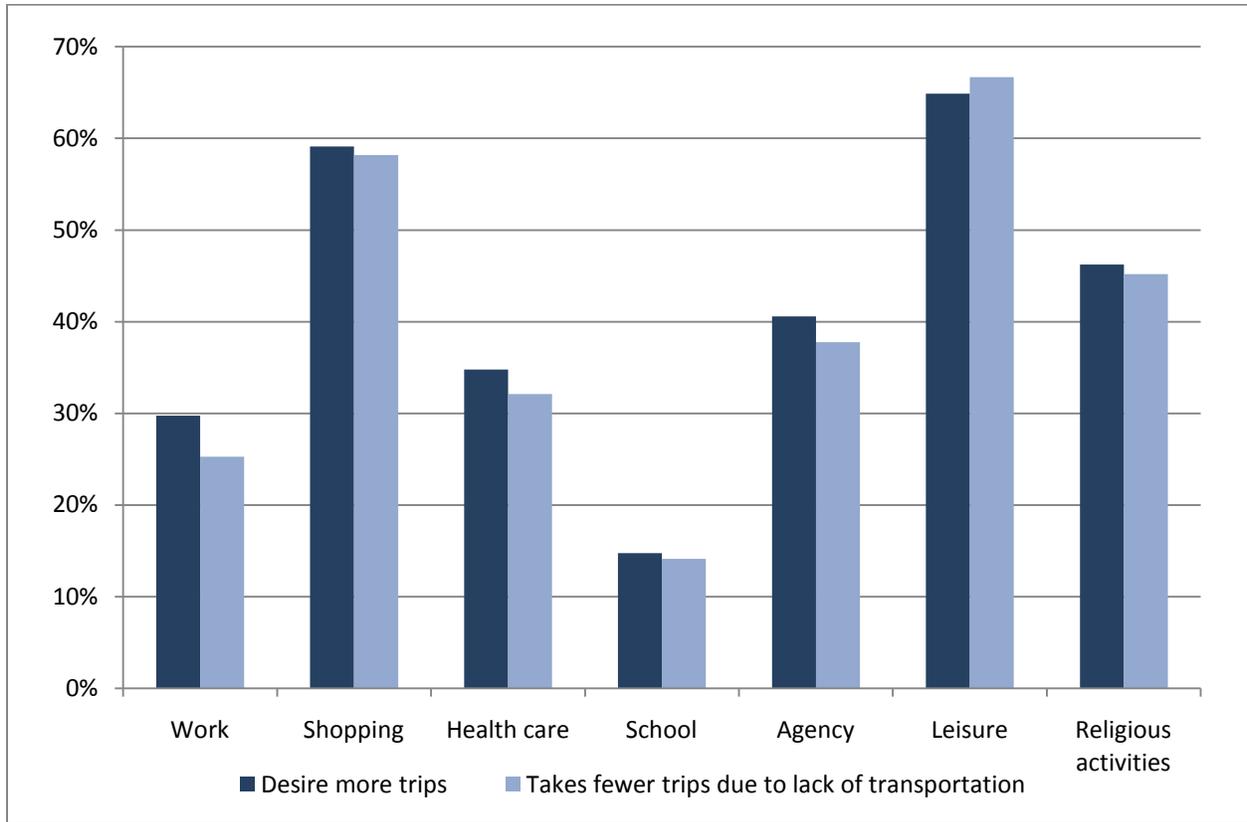


Figure 4.11 Respondents who Desire More Trips and Take Fewer Trips Due to a Lack of Transportation, by Trip Type (n=115)

Table 4.7 Respondents who Take Fewer Trips than Desired Due to a Lack of Transportation, by Trip Type and Individual Characteristics

	Work (paid or volunteer)	Shopping	Health care	School	Agency/ organization providing services	Leisure/ recreation/ social activities	Religious activities
	-----Percentage-----						
Total	25	58	32	14	38	67	45
Income							
<\$25,000	28	63	36	18	39	73	46
\$25,000 to \$44,999	29	72	28	13	41	78	56
\$45,000 or more	14	50	21	9	31	57	38
Severity of Disability							
Mild	9	50	16	0	21	56	29
Moderate	24	59	30	12	38	72	47
Severe	39	71	45	33	50	74	57
Urban vs. Rural							
Urban	23	52	20	13	27	60	46
Small Cities	29	83	53	18	61	88	39
Rural	27	64	50	22	45	77	50
Ability to Operate Automobile							
Can drive	16	46	33	10	38	51	32
Cannot drive	31	71	30	19	36	78	55

Results from a logit model demonstrate the statistical significance of many of these factors (see Table 4.8). As severity of the disability increased from mild to moderate or from moderate to severe, the likelihood of fewer trips taken due to a lack of transportation significantly increased for nearly all trip types, with the odds increasing by a factor of 1.9 for shopping trips to 14.0 for school trips. Travel distance was also found to significantly increase transportation problems for some trip types, and those living in more urban areas were significantly less likely to be limited by a lack of transportation for health care, school, and leisure trips. Ability to drive reduced the likelihood of lack of transportation limiting the number of trips taken, as would be expected, for leisure and religious trips.

Table 4.8 Characteristics Explaining the Likelihood that Fewer Trips are Taken Due to a Lack of Transportation, by Trip Type: Results from Logit Model

Independent Variables	-----Odds Ratios-----						
	Work	Shopping	Health care	School	Agency/ organization	Leisure activities	Religious activities
Age	0.84	0.65**	1.09	0.32**	0.61**	0.67	0.96
Low Income	3.22*	0.81	1.8	3.94	1.08	1.17	1.49
Pop >30,000	0.62	0.39	0.16**	0.08*	0.41	0.12*	0.64
Pop 5,000-30,000	0.78	1.97	0.66	0.08	1.83	0.82	0.4
Distance	2.39**	1.26	0.95	1.32	1.35	3.79**	1.83*
Severity	2.47**	1.87*	2.46**	14.01***	2.41**	2.25*	1.66
Can Drive	0.45	0.45	1.2	2.72	2.01	0.22**	0.36*
Use Transit	1.93	1.41	0.91	1.34	1.12	1.32	1.49
Observations	75	86	85	63	76	84	82

*denotes significance at 10% level, ** at 5% level, and *** at 1% level

In North Dakota, weather is another factor than can limit mobility for everyone. However, due to cold weather and the accumulation of snow, winter weather may disproportionately discourage people with disabilities from traveling. The survey found, in fact, that 59% of respondents take fewer trips in the winter than they do during other seasons (Figure 4.12).

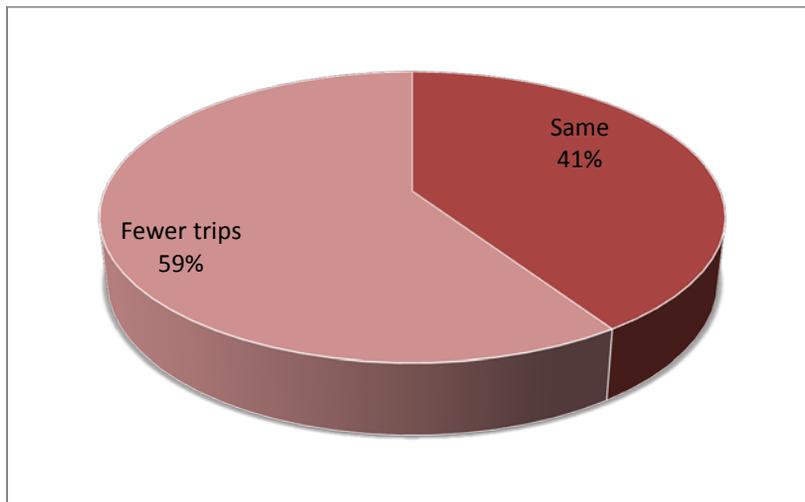


Figure 4.12 Number of Trips Taken in Winter Compared to other Seasons (n=113)

Also of interest is the number of long-distance trips taken by people with disabilities. The survey found that 64% of the respondents took a trip of 100 miles or more one way during the past year. Results also show that those 65 years old or older (31%), those with incomes under \$25,000 (55%), those living in urban areas (54%), and those who cannot drive (56%) were less likely to have taken a long-distance trip during the past year. The reduced likelihood of individuals living in urban areas making a long-distance trip could be due to a lesser need for such travel. Most of the rural respondents, on the other hand, indicated that they took a long-distance trip during the past year. A logit model was estimated to test the significance of these factors on long-distance travel. The results show that lower income individuals and

those living in a community with a population above 5,000 were significantly less likely to have taken a long-distance trip (odds ratios are below 1 and statistically significant) (see Table 4.9).

Table 4.9 Characteristics Influencing Likelihood of Taking a Long Distance Trip: Results from Logit Model

Independent Variable	Odds Ratio
Age	0.77
Low Income	0.35**
Pop >30,000	0.18**
Pop 5,000-30,000	0.21*
Severity	0.87
Can Drive	1.79
Use Transit	0.7
Observations	92

*denotes significance at 10% level, ** at 5% level

4.4 Types of Transportation Used

Respondents reported using a variety of different travel modes, as seen in Table 4.10. (Respondents were able to choose more than one mode of travel for each activity, so the percentages do not necessarily add up to 100%.) Riding with a family member or friend, driving themselves, and using public van or bus were the most commonly chosen modes, and these three were chosen in fairly equal numbers. Riding with a family member or friend was the most chosen mode for shopping, health care, leisure, and religious activities, and public transportation was the most used mode for work, school, and agency trips. The percentage of those who said they drive themselves ranged from 28% for health care and leisure trips to 37% for work trips. Human service agency vehicles were most frequently used for health care, agency, and shopping trips and least used for work and school trips. Some of the respondents also reported using taxis or walking, as seen Table 4.10.

Table 4.10 Types of Transportation Used, by Trip Purpose

	Drive yourself	Ride (family or friend)	Walk/ bicycle	Taxi	Human service agency car or van	Public van or bus
	-----Percentage-----					
Work	37	29	12	9	10	38
Shopping	32	41	12	9	21	22
Health care	28	39	8	11	23	27
School	29	21	17	0	7	48
Agency	30	25	9	5	22	33
Leisure	28	43	11	10	18	31
Religious activities	33	43	15	5	15	17

4.5 Public Transportation

4.5.1 Usage

As Table 4.10 showed, public transportation is a common mode of travel for people with disabilities. More than half of the respondents, 55%, said they currently use public transportation (Figure 4.13). A third reported they have used public transportation in the past but no longer do so, leaving just 12% who have never used public transportation.

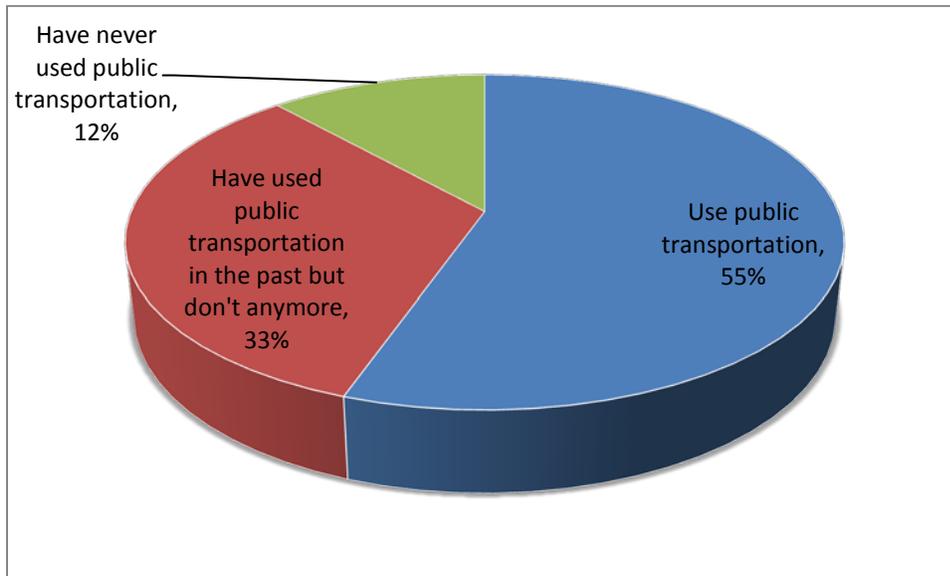


Figure 4.13 Use of Public Transportation (n=112)

4.5.2 Reasons for Not Using Public Transportation

In a question about their thoughts on public transportation, respondents were asked to indicate if they agreed with a number of statements that were essentially reasons why an individual would not use public transportation. The results are shown in Table 4.11. The most significant concerns regarded service availability, as 43% said transit does not go when they need to go, 28% said it does not go where they need to go, and 23% responded that service is not available. A quarter of respondents thought that public transportation is too costly. Some also said they think they are not capable of riding (16%), that they do not have enough information about available services (13%), or that they are fearful of riding (5%). Only 6% said they do not need public transportation.

Table 4.11 Thoughts on Public Transportation

	Total (n=110)	Use public transportation (n=59)	Have used public transportation in past but not anymore (n=34)	Have never used public transportation (n=13)
	-----Percentage-----			
Do not need it.	6	3	12	0
Service is not available.	23	10*	32*	46*
Does not go where I need to go.	28	31	35	8
Does not go when I need to go.	43	51	44	15
Do not have enough information about available services	13	5	21*	31
Not capable of riding/too challenging.	16	10*	21	31
Fearful of riding.	5	2	9	8
Too costly.	25	27	29	15
Others advise me not to ride.	1	2	0	0
None of the above.	22	29	15	15

* denotes percentage is statistically different from that of other groups at the 5% level of significance.

Comparing the responses among those who currently use public transportation, those who have in the past but no longer do, and those who have never used public transportation may help explain why some people use transit and others do not. Of those who have previously used public transportation but do not anymore, 12% say they do not need it. This is four times greater than the response for those currently using public transportation. This result indicates that those who no longer use transit either were not as dependent on transit when they were using it or else their circumstances have changed such that they became less dependent on the service. Still, even though those who quit using transit do not need it as much, the 12% response to this question is rather low, indicating that a large number of those not using transit still have a need for the service.

The responses suggest other possible explanations for why some individuals no longer use transit. Close to a third of these individuals said that service is not available. For some, their service may have been cut, or they may have moved to a location that does not have service. Compared with those currently using the service, respondents who no longer ride were significantly more likely to say they do not have enough information about available services, they are not capable of riding (or that it is too challenging), and they are fearful of riding. It is possible that over time, it may have become too challenging for some to use public transportation, so they stopped riding. Lack of information may also contribute to some people not riding.

The sample of those who have never used public transportation is small, but none said they do not need the service. Close to half of them indicated that service is not available, and 31% thought they were not capable of riding.

Due to small sample size, it may be difficult to find differences between users and non-users to be statistically significant, but the results of a two-proportion z test showed that those who do not use transit were significantly more likely to say service is not available, transit users were less likely to think they are not capable of riding, and those who used transit in the past but do not anymore were more likely to say they do not have enough information.

The results indicate it is not lack of need that keep people with disabilities from using public transportation. Rather, lack of service, lack of information, thinking they are not capable of riding (whether true or not), and fear of riding can likely explain many of the differences between those who use public transportation and those who do not.

Cost does not seem to influence use, as users were just as likely as non-users to say it is too costly. Income also appears to have little effect on transit use as people of all income levels have a need for and use the service. Income has a significant impact, however, on how much of a financial burden it is to pay the fare. Respondents with household incomes below \$45,000 were twice as likely to say that service is too costly compared with those with incomes above \$45,000. Despite the greater financial burden, low-income individuals were just as likely to use the service due to a lack of options.

4.5.3 Travel Training

Since lack of information and concerns about being capable of riding seem to be barriers preventing some people from using public transportation, travel training could be a useful resource. The survey asked respondents if assistance, or training, for learning how to ride public transportation was available to them. Fifty-five percent said it was, 17% said it was not, and 28% did not know (Figure 4.14). This indicates there is a sizable group of people who either do not have travel training available to them or do not know about available assistance.

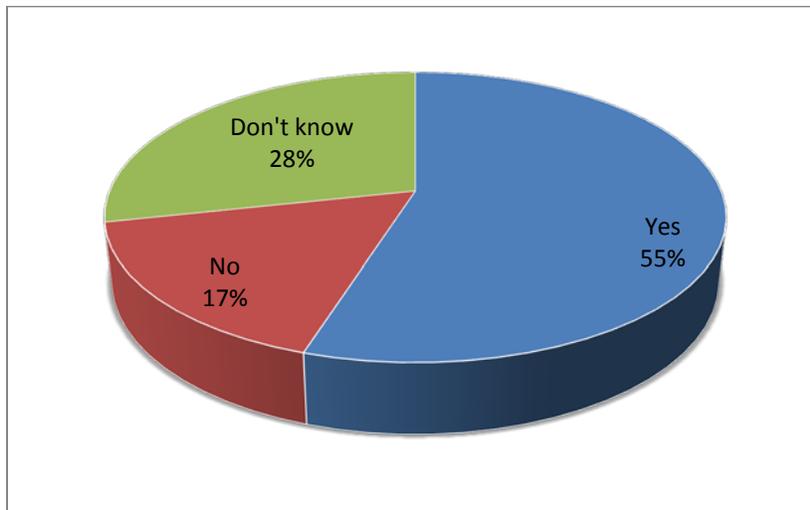


Figure 4.14 Percentage Who Say that Assistance for Learning How to Use Public Transportation is Available to Them (n=102)

The survey also asked specifically if respondents have been shown how to ride public transportation from anyone from different possible sources. About half said they had not been shown by anyone how to ride. Of those who received such training, human service agencies were most often cited as the place where someone showed them how to ride, followed by family members or friends, the local transit company, and schools. Some respondents specifically mentioned organizations such as the Centers for Independent Living, the North Dakota School for the Blind, and the North Dakota Protection & Advocacy Project as resources where they learned how to ride.

Of those that had training, about half said it was needed. Twenty-two percent of people who have not received any training said they need it. People who do not need the training are probably less likely to

seek it out, which explains the smaller percentage, but the result still indicates there are a number of individuals who have not received travel training but are in need.

Overall, a third of the respondents said they need or needed assistance for learning how to ride, but the response varied significantly based on the type of disability (Figure 4.15). The survey results indicated that people with cognitive disabilities are most likely to need training, and the difference is statistically significant ($p < .01$). Seventy percent of those with cognitive disabilities said they need or needed training, compared with 47% for people with emotional disabilities, 36% for those with sensory disabilities, and 23% for those with physical disabilities.

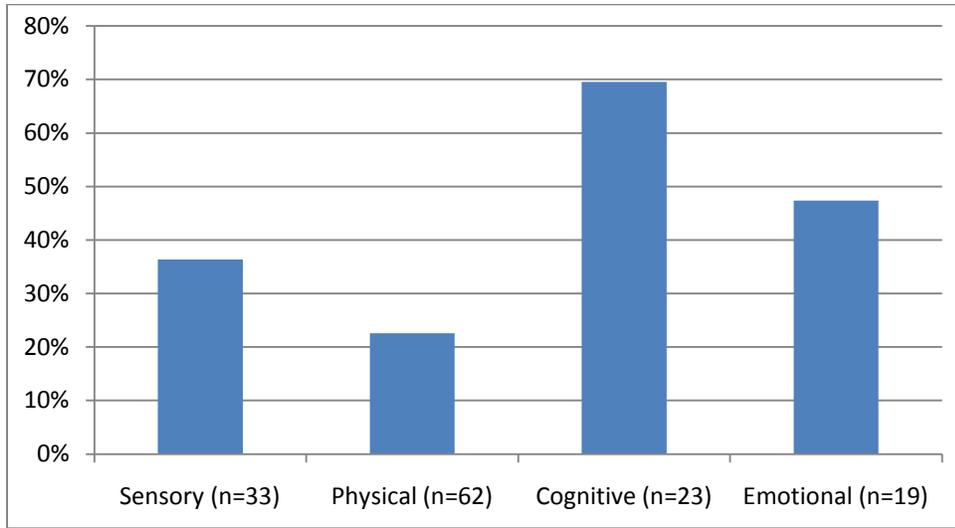


Figure 4.15 Percentage Who Need or Needed Travel Training, by Type of Disability

4.5.4. Problems Encountered

Mattson (2009) showed that older adults with disabilities in North Dakota are much more likely to have problems using public transportation than those without disabilities. In that study, most of the people with disabilities had physical disabilities. In this study, though, there is a greater representation of people with different types of disabilities, and the survey considers a greater number of potential problems. This survey listed 31 different potential problems with using public transportation and asked the respondents to indicate if each is a major problem, a minor problem, or no problem.

The most commonly cited problem was absent or inadequate shelter while waiting, as 66% of respondents said this was a problem and 34% said it was a major problem. Mattson (2009) also found that adequate shelter from the weather while waiting for a ride is one of the greatest concerns among older adults, both those with and without a disability, in North Dakota. Other commonly cited problems, as seen in Figure 4.16, included busy intersections to cross, difficulty getting to a bus stop, difficulty reading or understanding maps or schedules, stairs or uneven ground problems, and poor or no sidewalks. Each of these was indicated as a problem by at least half of the respondents. The percentages of respondents that cited each of these 31 issues as major or minor problems are shown in Figures 4.16 and 4.17, with the more significant problems illustrated in Figure 4.17.

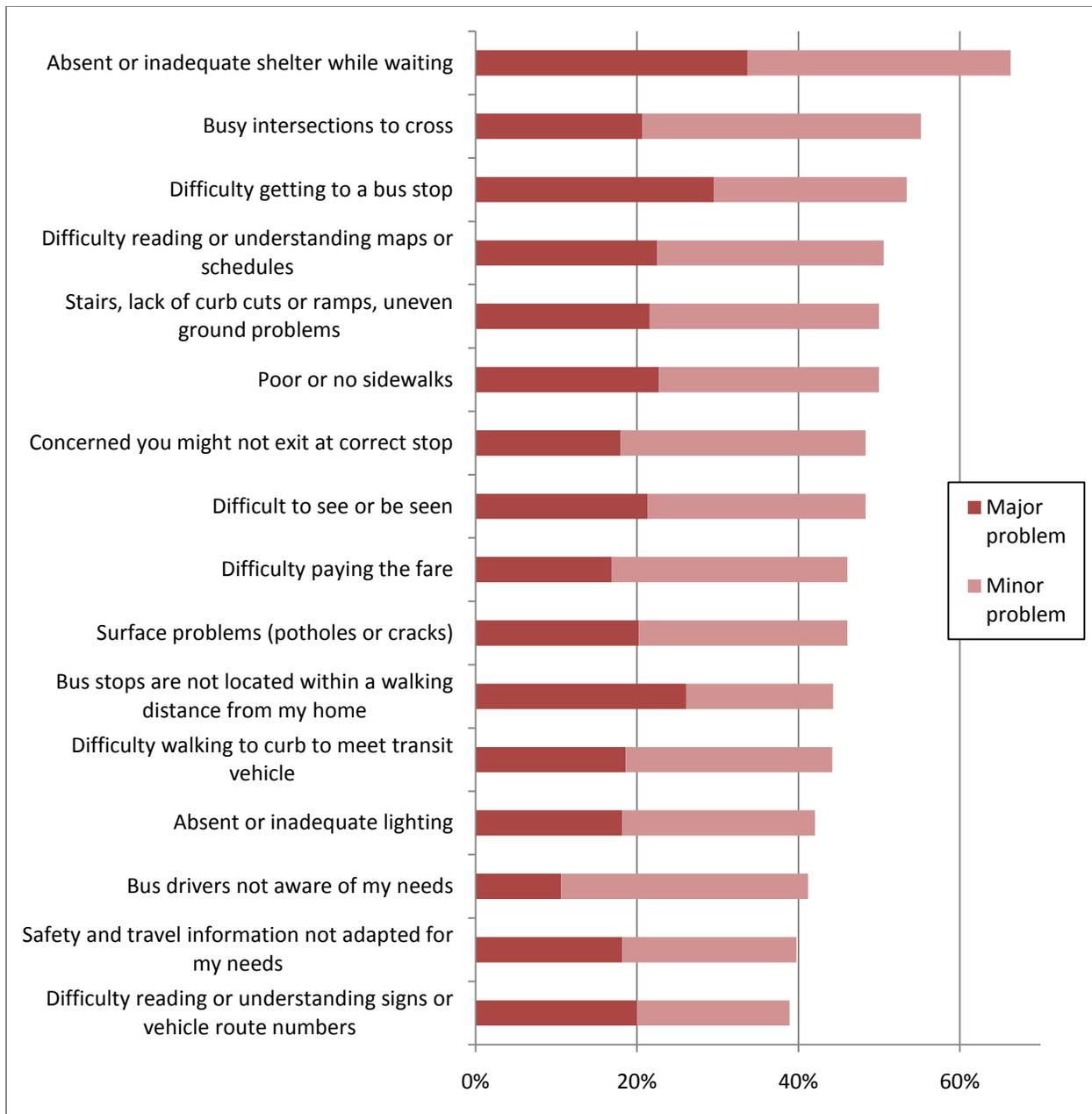


Figure 4.16 Problems Using Public Transportation: Most Significant Problems

People with different types of disabilities encounter different types of problems. The top ten problems identified by people with sensory, physical, cognitive, and emotional disabilities are shown in Figures 4.18 through 4.21, respectively. Problems, overall, tend to be greatest for those with sensory disabilities. People of all disability types indicated absent or inadequate shelter from weather while waiting as either the first or second greatest problem. Other major problems for people with sensory disabilities included busy intersections to cross, difficulty seeing or being seen, concern about not exiting at the correct stop, stairs or lack of curb cuts or uneven ground problems, difficulty hearing announcements, difficulty reading or understanding maps, and safety information not adapted to their needs. Each of these was identified as either a major or minor problem by at least 60% of the respondents with a sensory disability.

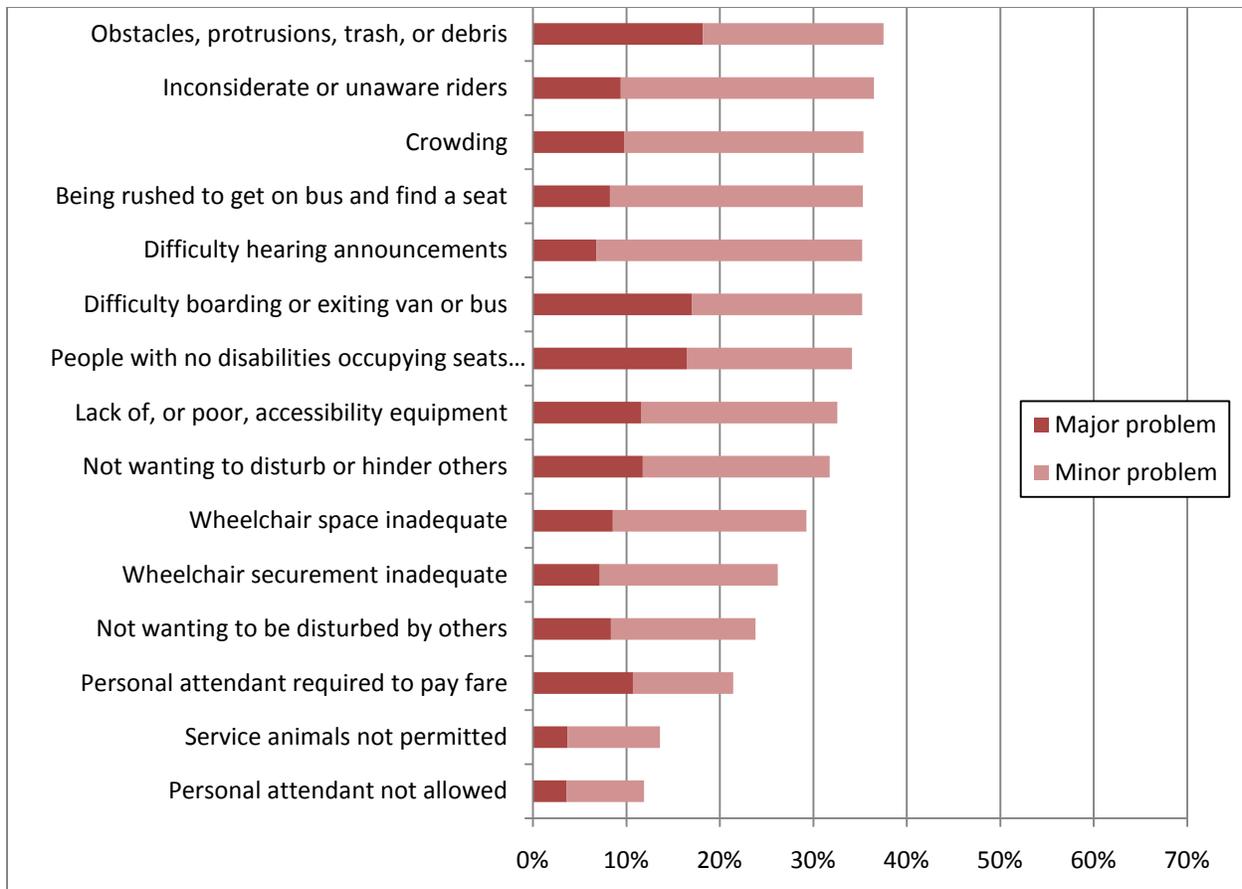


Figure 4.17 Problems Using Public Transportation: Other Problems

People with physical disabilities commonly indicated the following problems: getting to a bus stop; stairs, lack of curb cuts, or uneven ground problems; poor or no sidewalks; difficulty walking to curb to meet the transit vehicle; and surface problems, such as potholes or cracks. The greatest concerns for those with cognitive disabilities, besides inadequate shelter, were difficulty paying the fare, difficulty reading or understanding maps or schedules, concerns about not exiting at the correct stop, and busy intersections to cross. Those with emotional disabilities commonly cited uneven ground problems, difficulty reading or understanding maps or schedules, difficulty paying the fare, and difficulty getting to a bus stop.

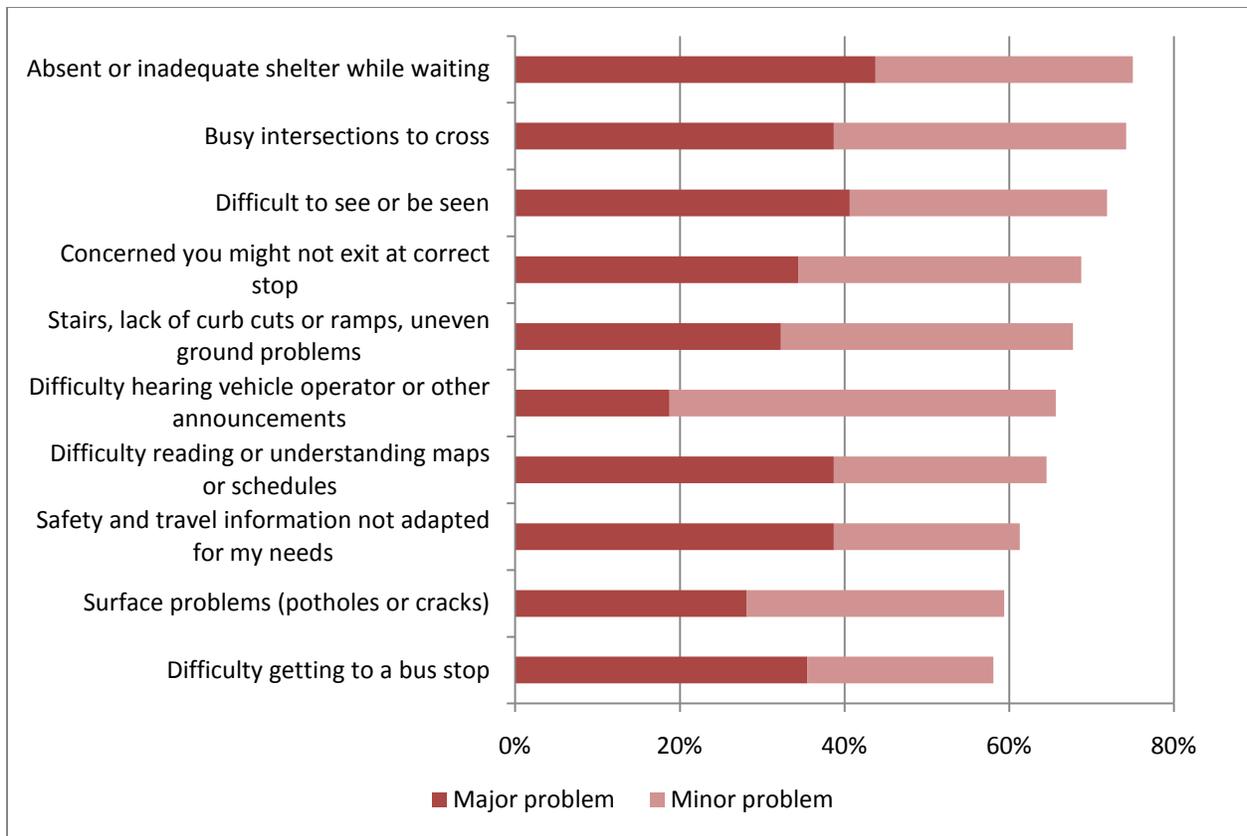


Figure 4.18 Most Significant Problems Using Public Transportation for People with Sensory Disabilities

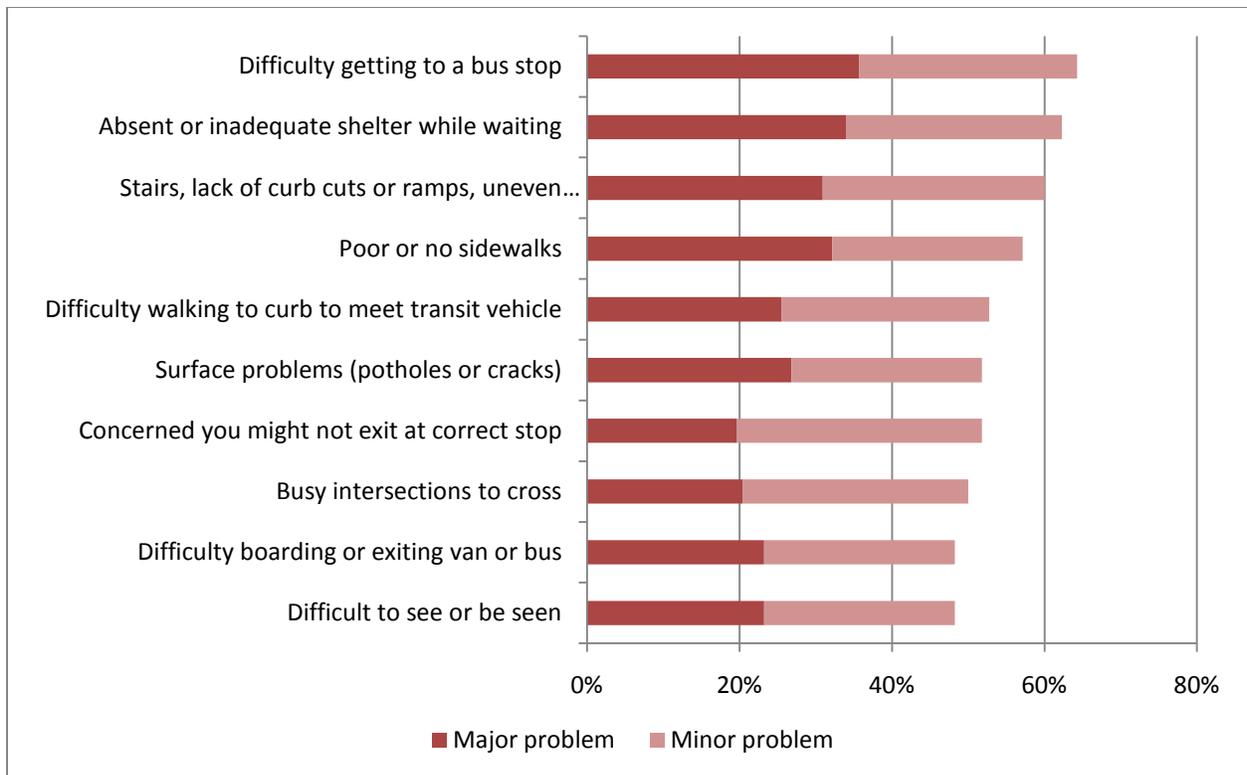


Figure 4.19 Most Significant Problems Using Public Transportation for People with Physical Disabilities

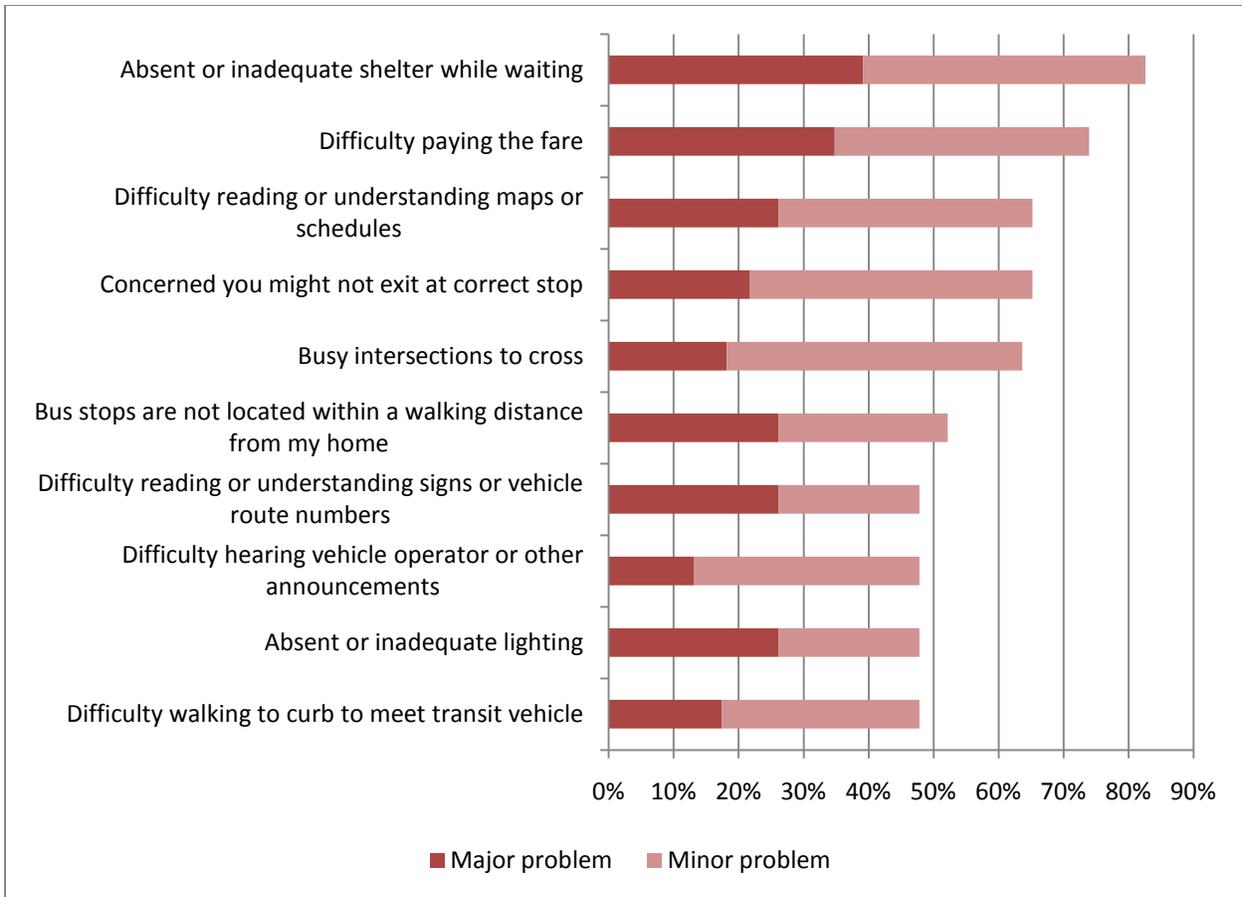


Figure 4.20 Most Significant Problems Using Public Transportation for People with Cognitive Disabilities

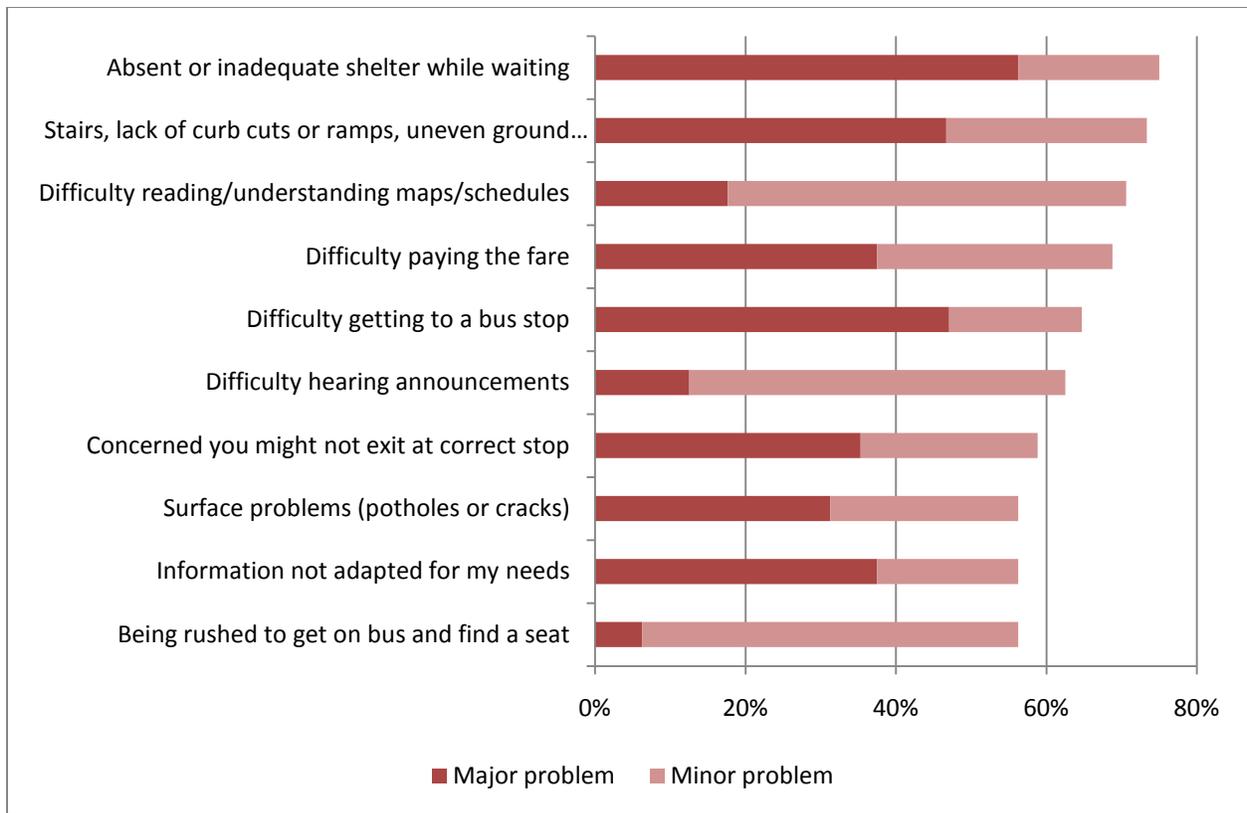


Figure 4.21 Most Significant Problems Using Public Transportation for People with Emotional Problems

4.5.5 Level of Satisfaction with Service Qualities

The survey also asked respondents to rate their level of satisfaction with different public transportation service qualities on a scale from very dissatisfied to very satisfied (Table 4.12). The service qualities that respondents were most likely to be very dissatisfied with were weekend (32%) and holiday hours (31%). Over half of the respondents were at least somewhat dissatisfied with weekend and holiday hours. Other service factors that respondents tended to be more dissatisfied with included waiting time, scheduling procedures, and ride reservation time. Respondents were most satisfied with being safe from both crime and accidents, and they were mostly satisfied with the drivers. They tended to be more satisfied than dissatisfied with the availability of door-to-door service, vehicle comfort, and access to information.

Table 4.12 Level of Satisfaction with Public Transportation Service Qualities

	n	Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very satisfied
	-----Percentage-----					
Safe from crime	86	3	1	27	31	37
Drivers	85	5	6	25	34	31
Safe from accidents	87	5	6	24	39	26
Door-to-door service availability	85	12	9	20	25	34
Comfort	88	6	10	28	33	23
Access to information	87	9	7	31	29	24
Affordability	87	10	15	28	25	22
Reliability	88	10	19	25	22	24
Serves your needs	88	11	20	18	30	20
Travel time	86	14	15	34	17	20
Number of trips offered	89	13	26	17	24	20
Service area	87	20	17	25	22	16
Ride reservation time	85	15	24	29	16	15
Scheduling procedures	85	21	20	26	16	16
Waiting time	87	20	26	20	21	14
Holiday hours	88	31	19	27	7	16
Weekend hours	90	32	23	18	12	14

Average responses to this question were calculated and are displayed in Figure 4.22, where 1 = very dissatisfied, 2 = somewhat dissatisfied, 3 = neither satisfied nor dissatisfied, 4 = somewhat satisfied, and 5 = satisfied. Average responses above 3, therefore, indicate that respondents were more satisfied than dissatisfied, and vice versa.

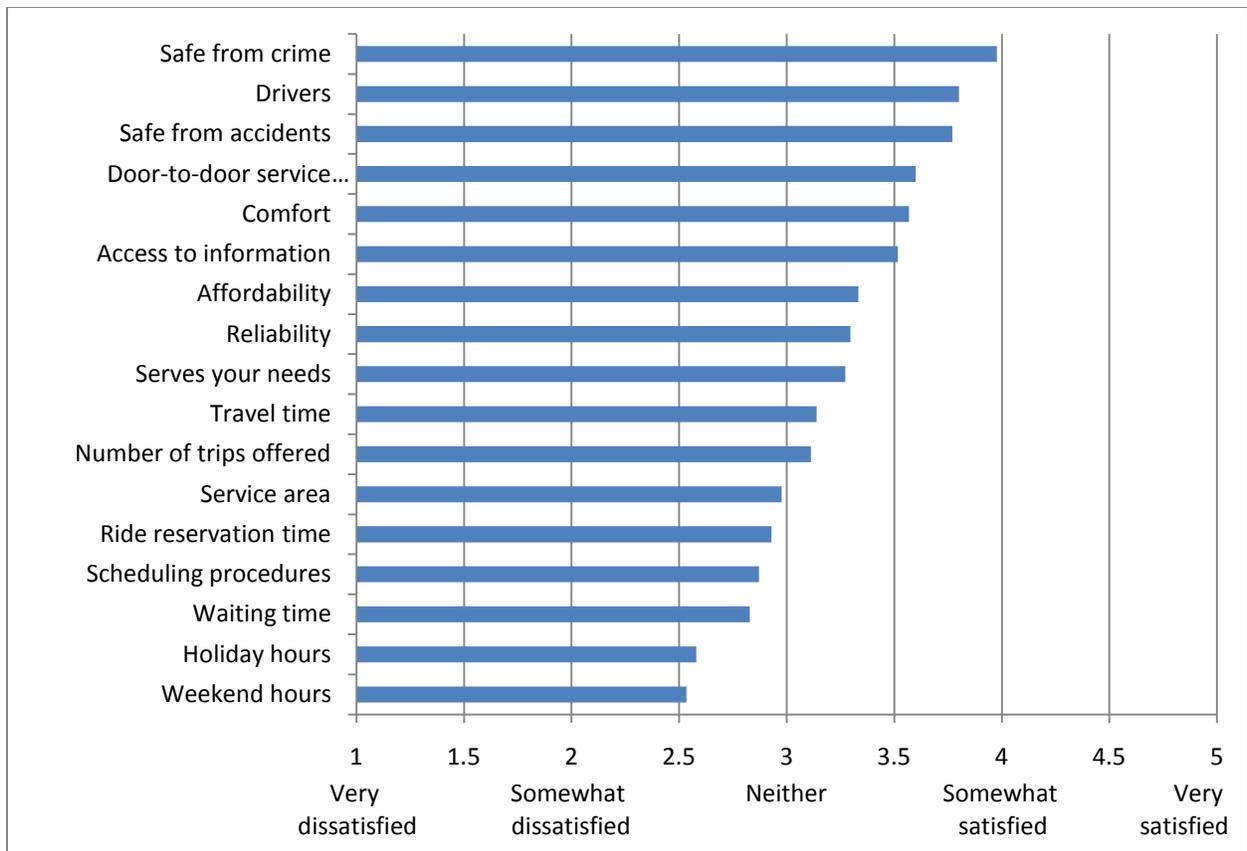


Figure 4.22 Level of Satisfaction with Public Transportation Service Qualities, Average Response

Individuals who cannot drive, and are therefore more likely to be dependent on transit, were less likely to be satisfied with public transportation. Figure 4.23 shows how the average responses differed between those who can drive and those who cannot. In many cases, people who cannot drive were less likely to be satisfied with public transportation, and the greatest differences were with regard to weekend and holiday hours.

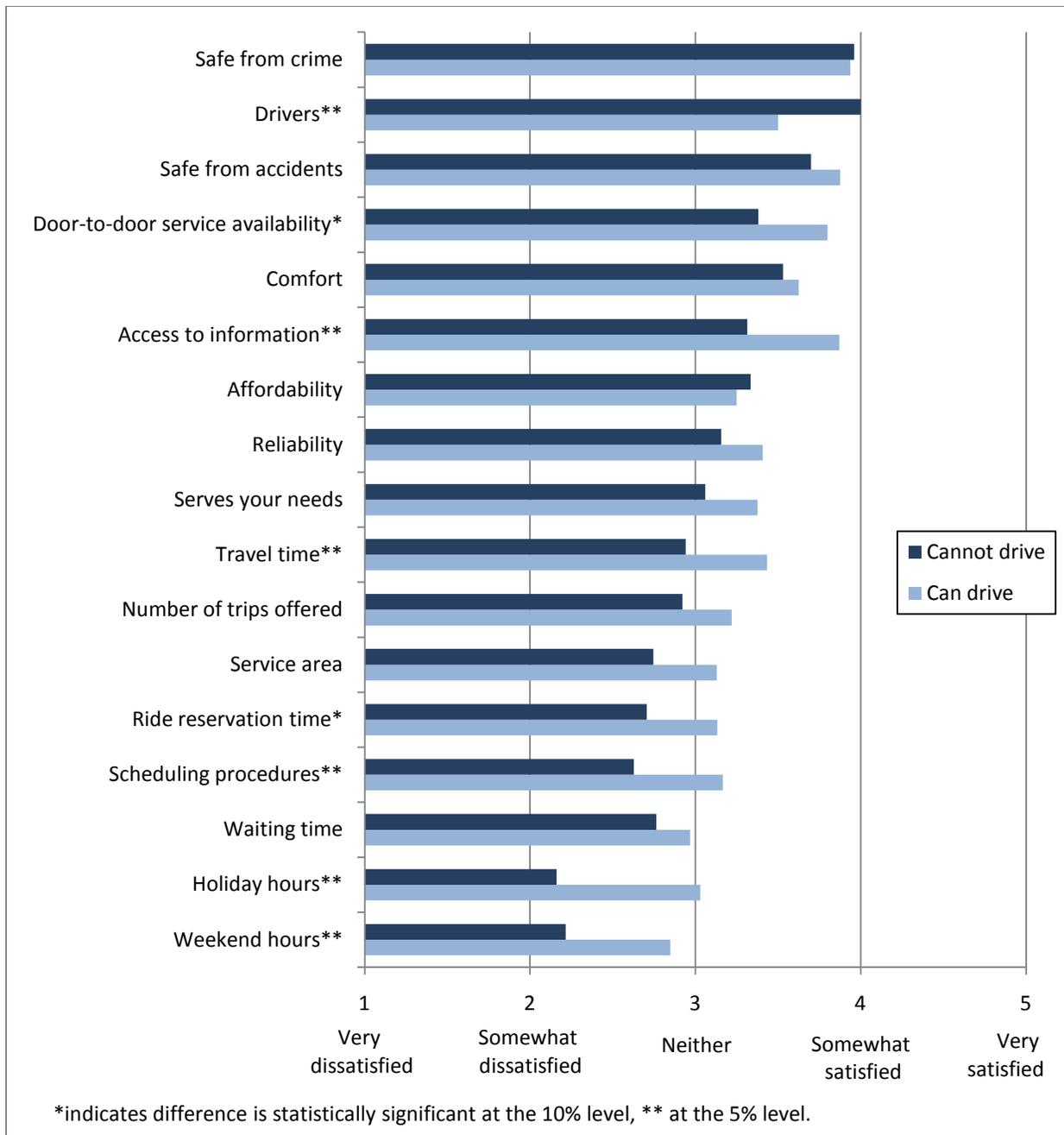


Figure 4.23 Satisfaction with Public Transportation Service Qualities, Average Responses by Ability to Drive

4.5.6 Need for Specialized Equipment or Assistance

Many of the respondents indicated a need for specialized equipment or assistance when using public transportation. Thirty-five percent said they need a wheelchair; 26% need a cane, crutches, or a walker; 12% need a scooter; 5% need a service animal; and 2% need an interpreter (Figure 4.24). A few respondents also remarked that they sometimes need assistance from the driver. About a third of respondents said they do not need any specialized equipment or assistance.

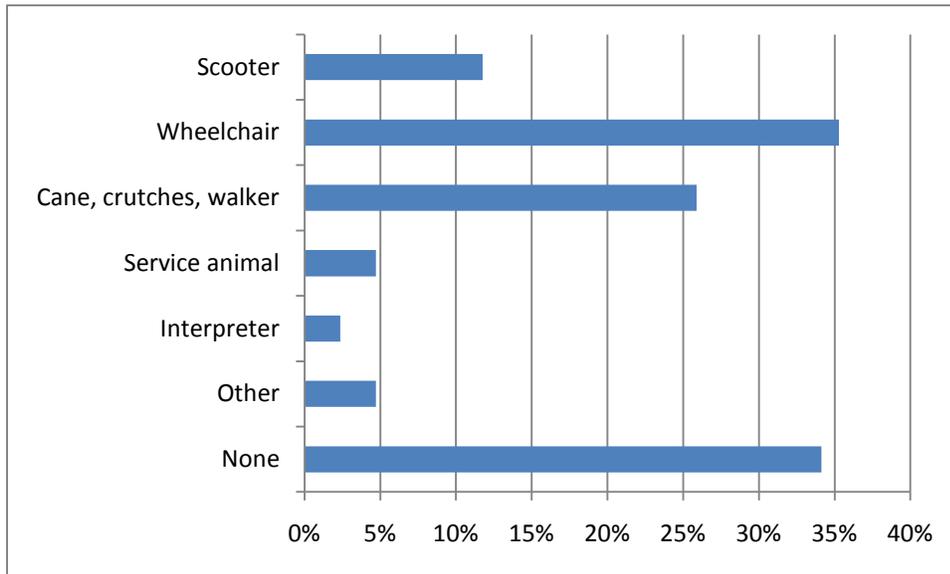


Figure 4.24 Percentage who Need Specialized Equipment or Assistance (n=85)

Close to half, 47%, indicated they need some kind of assistance when they make trips. People with more severe disabilities were more likely to say they need assistance, as might be expected (Table 4.13).

Table 4.13 Do You Need Any Kind of Assistance When You Make a Trip?

	n	Need Assistance (%)
Total	112	47%
Disability Type		
Sensory	34	59%
Physical	63	60%
Cognitive	29	52%
Emotional	22	50%
Not specified	15	33%
Disability Severity		
Mild	27	33%
Moderate	39	33%
Severe	31	81%

4.5.7 Travel Arrangements

People with disabilities initiate, or arrange for, their transit rides in a number of ways. Most commonly they will call the local transit company to arrange for a paratransit ride, go to a bus stop, or call a taxi (Figure 4.25). Some will also call a human service organization or call a number that will arrange a ride for them.

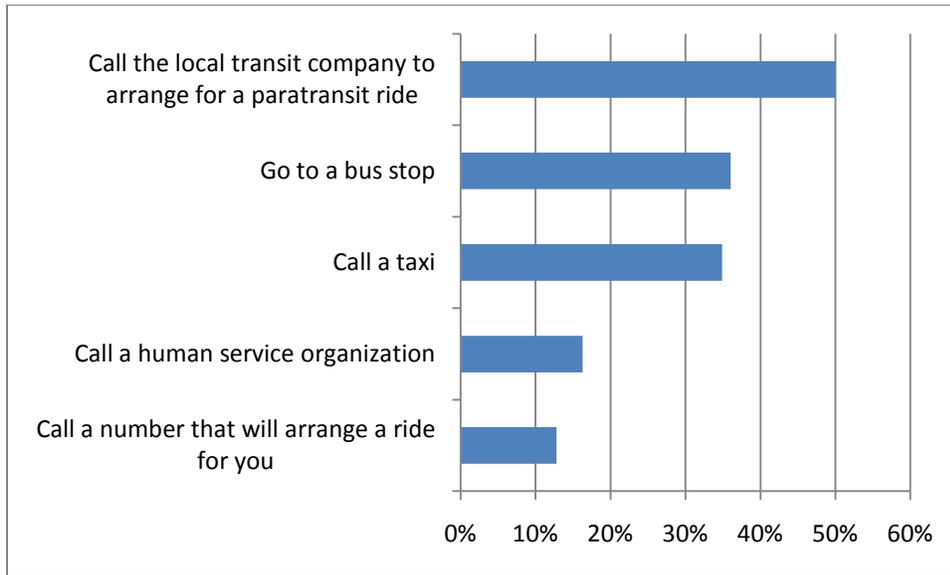


Figure 4.25 Ways that Respondents Initiate Rides (n=86)

One possible method for arranging for a ride is through the use of a brokerage. With such a service, a potential rider would call a number that would match the rider with appropriate transportation providers through a central trip request and administrative facility. Survey responses indicated that such brokerages are not commonly used.

4.5.8 Paratransit: Problems Encountered

Forty-nine percent of the respondents indicated they use paratransit. Since paratransit users may experience different problems than those using fixed-route services, problems specific to paratransit services were identified. Two-thirds of respondents said that service not being available when they need it was a problem; 35% said it was a major problem. Other significant problems were unkept schedules for pickups and drop-offs or long waits, the need for scheduling trips too far in advance, and trip times that are too variable or unpredictable (Figure 4.26). Respondents were least concerned about the vehicles, in terms of their mechanical condition, accessibility, and seating availability.

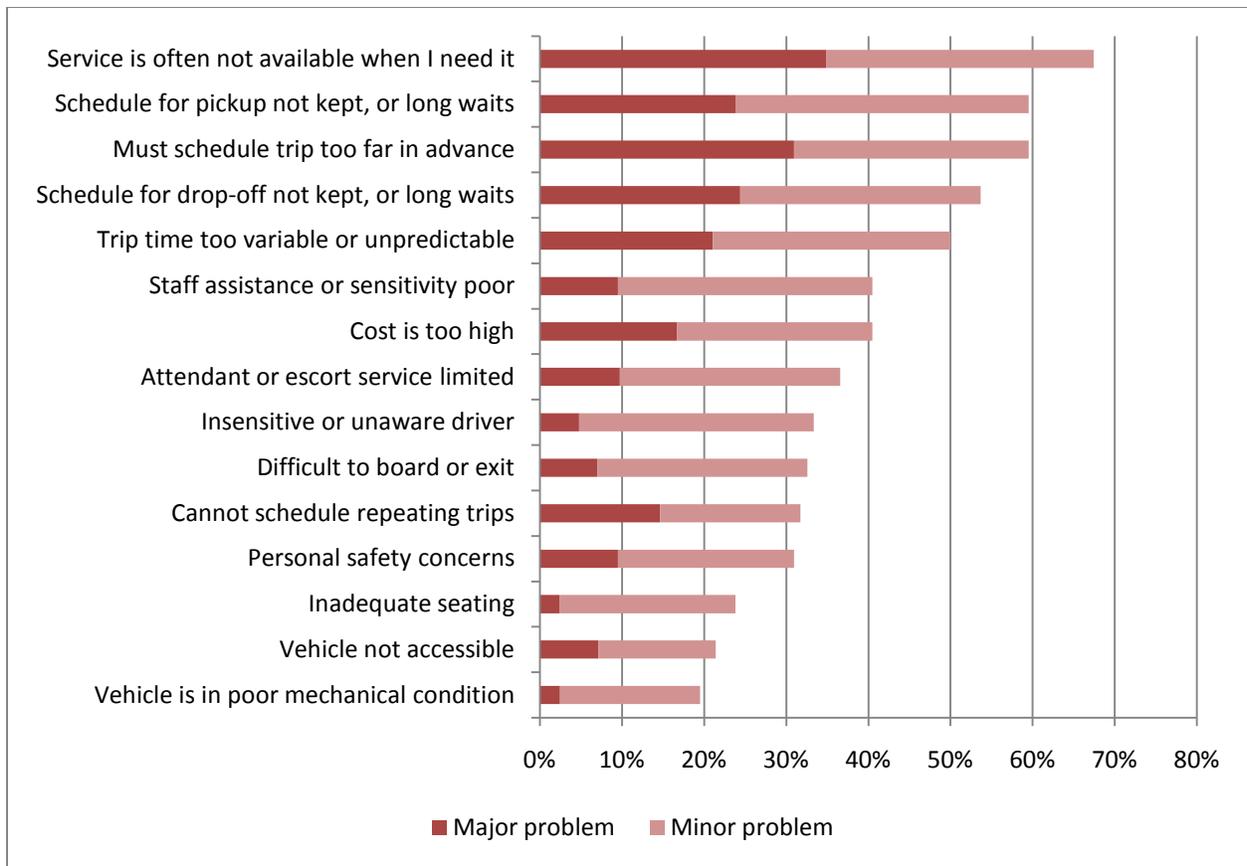


Figure 4.26 Problems Using Paratransit

4.5.9 Use of Curb-to-Curb, Door-to-Door, and Door-Through-Door Service

The level of paratransit service can vary based on how the driver picks up the rider. With curb-to-curb service, the transit vehicle picks up and discharges passengers at the curb or driveway in front of their home or destination. The driver does not assist the passenger along walks or steps to the door of the home or other destination, but may assist the passenger on and off the vehicle as needed. Door-to-door service is a higher level of service where the driver will provide passenger assistance between the vehicle and outside door of a person’s home or other destination. Door-through-door takes the level of service a step higher by the driver providing assistance within the door at the origin or destination. The survey investigated the use of these three different levels of service (Table 4.14).

Table 4.14 If You Use Paratransit, How Does the Driver Pick You Up and Drop You Off?

	n	Never	Sometimes	Always
Picking you up				
Wait for you at the curb in front of your home.	44	16%	25%	59%
Come to the door of your home and accompany you to the vehicle.	46	43%	41%	15%
Come into your home and accompany you to the vehicle.	46	74%	22%	4%
Dropping you off				
Drop you off outside at your destination.	46	7%	15%	78%
Accompany you inside at your destination.	46	54%	35%	11%
Returning you home				
Return you to the curb at the front of your home.	45	16%	29%	56%
Return you to your front door when you return home.	46	35%	30%	35%
Accompany you into your home at the end of your trip.	45	69%	27%	4%

When picking them up, survey respondents most often indicated that the driver would wait for them at the curb in front of their home. Some indicated that the driver would come to the door of their home and accompany them to the vehicle. Use of door-through-door service, where the driver would come into the passenger's home and accompany him or her to the vehicle was occasionally indicated, but not very often. When reaching their destination, most respondents said they are dropped off outside the destination, while a few indicated they are accompanied inside. Similarly, when being returned home, a majority indicated they always get dropped off at the curb in front of their home, but it is also not uncommon for them to be returned to their front door. Few said they get accompanied back into their home. These results indicate curb-to-curb service is the most frequently used, door-to-door service is not uncommon, and door-through-door service is seldom used and/or provided.

4.6 Other Comments

The survey included an open-ended question that gave respondents the opportunity to provide any additional comments about transportation. Many respondents took the opportunity to detail some of their problems. Some of the more common comments cited poor or no access to public transportation; desire for more service hours, especially in the evenings, on Sundays, and during holidays; high costs; difficulties with scheduling; and long waits. All of the respondent comments are shown in Appendix D.

5. COMPARISON WITH PREVIOUS SURVEY OF NORTH DAKOTA

Direct comparison between the results of this survey and the previous survey by Hegland and Hough (2003) is somewhat difficult since some different questions were asked and the characteristics of the respondents also differ somewhat due to differences in the ways the surveys were distributed. The earlier survey, which was published in 2003 but conducted in 2001, was distributed exclusively through the Centers for Independent Living, while the current version was distributed by a number of different organizations. The respondents to the current survey had a greater geographic distribution. About 60% of people responding to the first survey were from the northwest part of the state, since this is where the largest percentage of surveys was distributed. The geographic distribution of the current survey was more even across the entire state. Census data show people with disabilities live in all parts of the state, with few areas having significantly more or fewer people with disabilities (North Dakota State Data Center 2003). The previous survey had more than twice as many total respondents. Despite the lower response rate, the current survey included results from nearly as many transit users, since a much greater percentage of respondents were transit users and unable to drive. In both surveys, the income levels of the respondents were low. In the previous survey, more than half had income of \$15,000 (2002 dollars) or less, and in the current survey, two-thirds had income of \$25,000 (2009/10 dollars) or less.

There are some similarities between the results of the two studies regarding problems with public transportation and identified improvements. The four most requested improvements in services from the previous study were increased service hours, cheaper fares, more convenient scheduling, and reduced riding time. The service qualities that respondents were most likely to be dissatisfied with in the previous survey were ride reservation times, weekend hours, holiday hours, scheduling procedures, and waiting times.¹ Similarly, the current survey found greatest dissatisfaction with weekend and holiday hours, waiting and ride reservation times, and scheduling procedures.

The most direct comparison between the two studies can be made with the question asking respondents to rate their satisfaction with different public transportation service qualities along a Likert scale. The previous survey asked respondents how they felt about eleven different issues, with responses given on a five-level scale ranging from strongly agree to strongly disagree. The current survey included the same 11 items plus six additional ones and asked respondents to rate their level of satisfaction on a scale ranging from strongly dissatisfied to strongly satisfied, as shown in Table 4.12 and Figure 4.22. Since the previous survey used a lower number to indicate greater satisfaction and calculated mean responses with 1=strongly agree, 2=agree, 3=neutral, 4=disagree, and 5=strongly disagree, for comparison purposes, the mean responses to the previous survey were recalculated with 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. A few factors were defined differently in the current survey. Regarding drivers, the previous survey asked respondents how satisfied they were with the training provided to drivers, while the current survey asked about general satisfaction with drivers. Regarding waiting times, the previous survey asked about time vehicles spend waiting at bus stops, and the current survey simply asks about satisfaction with waiting times. Respondents to the current survey are more likely referring to times spent waiting at a bus stop or at home for the vehicle.

Figure 5.1 compares surveys responses from the two surveys for the 11 items included in both studies, where a higher number indicates greater level of satisfaction. The figure takes what was given in Figure 4.22 and adds the results from the previous survey. In most cases, the current survey found respondents

¹ Hegland and Hough (2003) indicated ride reservation times and waiting times as being factors respondents tended to be more satisfied with, but upon reviewing the data further, these results were due to miscalculations that overestimated respondent satisfaction.

to be less satisfied with public transportation services, and in all areas but drivers and ride reservation time, the result is statistically significant. These discouraging results suggest that despite considerable growth in the awareness of the transportation needs for people with disabilities nationally and in North Dakota, a lack of progress has occurred during the past decade.

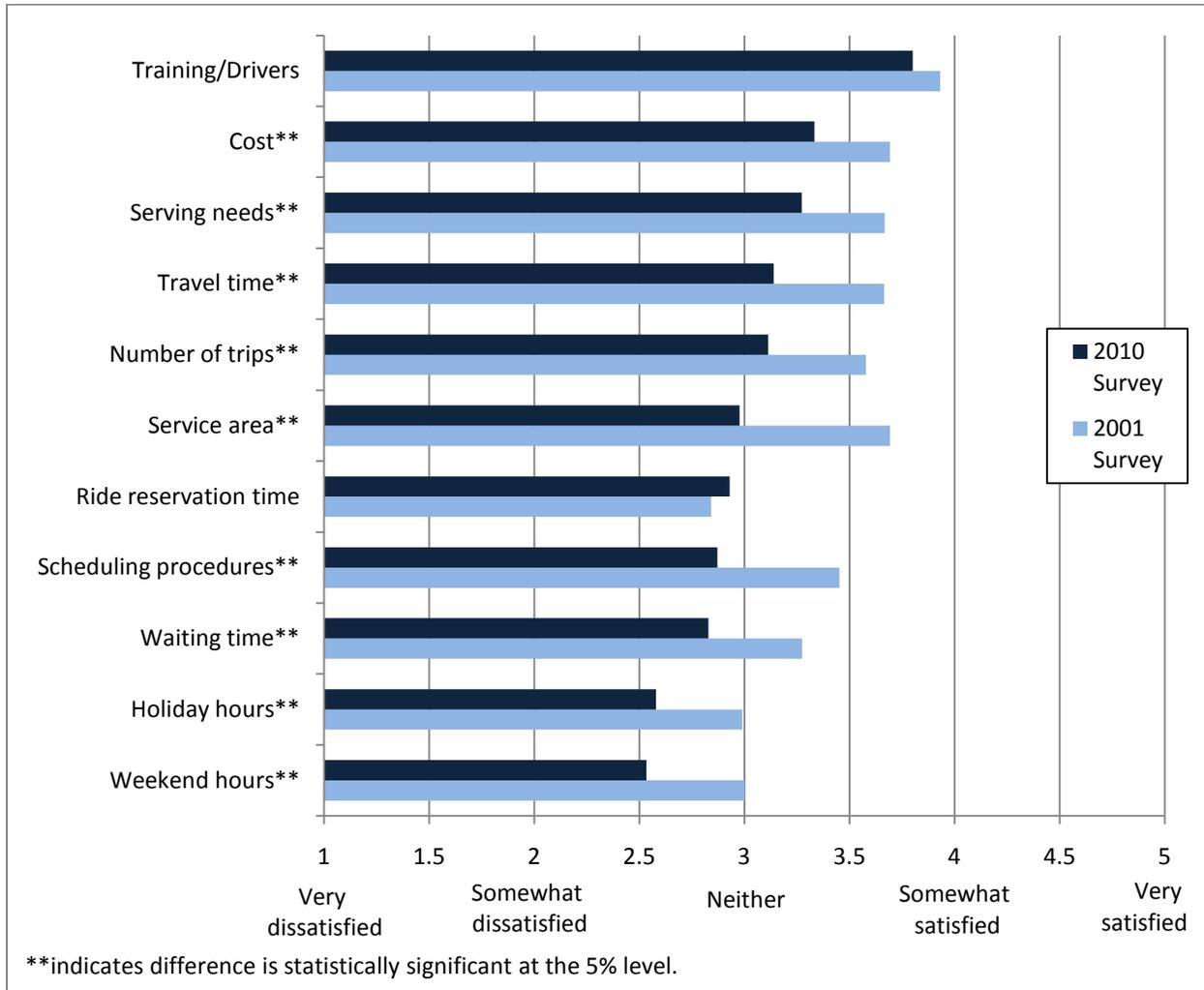


Figure 5.1 Comparison of Satisfaction with Public Transportation between 2001 and 2010 Surveys of People with Disabilities in North Dakota

One possible reason for the greater levels of dissatisfaction found in the current survey is that it includes a greater percentage of transit dependent riders, and as shown in Figure 4.23, people who cannot drive are less likely to be satisfied with public transportation. To make a better comparison, therefore, the average responses for those who cannot drive were calculated for both surveys. The results are shown in Figure 5.2. Even when the responses are limited to those who cannot drive, the results show that respondents to the current survey were less satisfied with public transportation, with the differences being statistically significant in most cases. There may be other characteristics that differ between the samples that could explain some of the difference in satisfaction, such as differences in geographic characteristics, types or severity of disabilities, or attitudes. Again, however, the results seem to suggest a lack of progress.

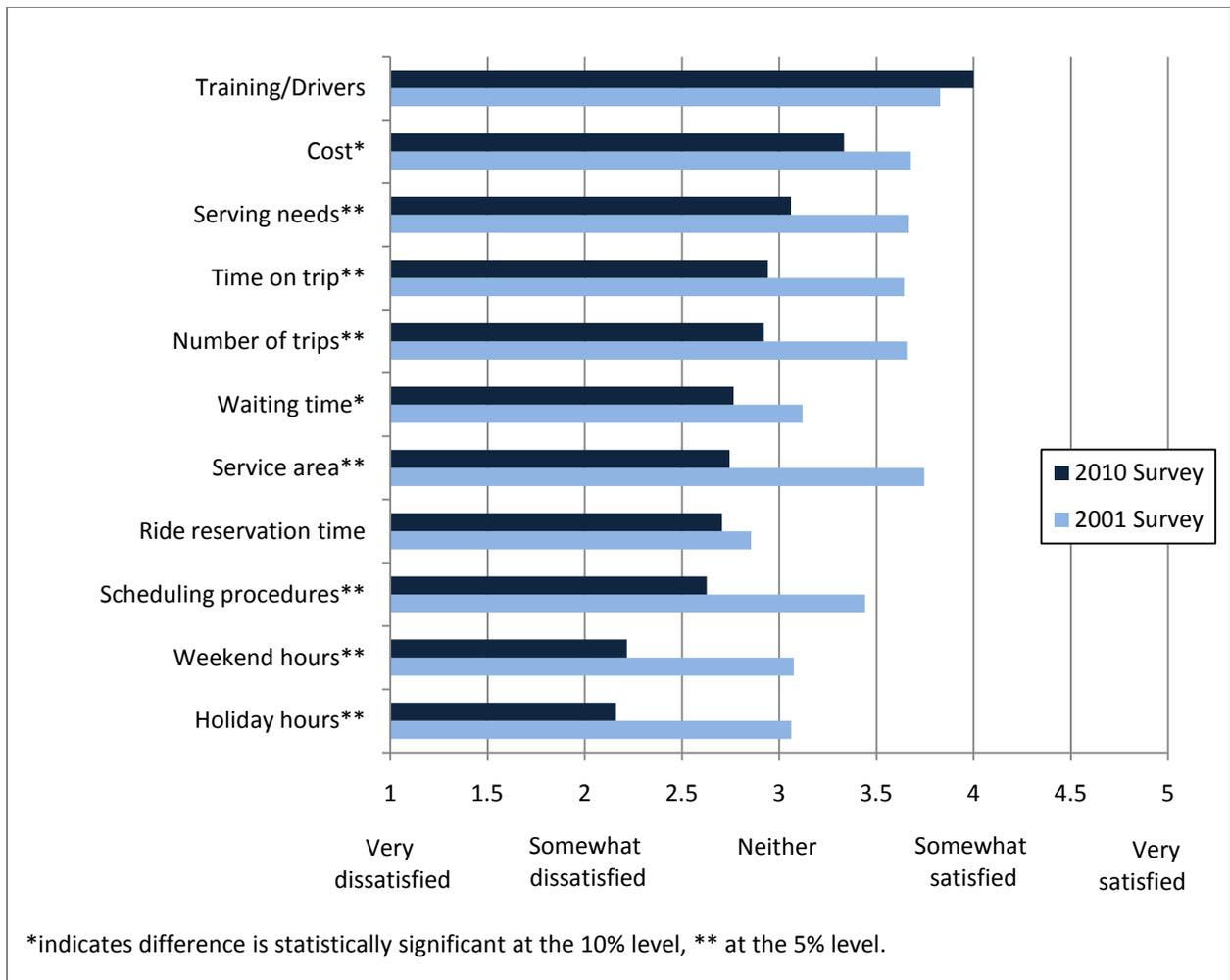


Figure 5.2 Comparison of Satisfaction with Public Transportation between 2001 and 2010 Surveys of People with Disabilities in North Dakota for those Who Cannot Drive

The results are somewhat unexpected given that federal funding for rural transit has increased under the Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users (SAFETEA-LU), which was signed into law in 2005. A TCRP project assessed the outcomes of this increased funding for rural passenger services (KFH Group, Inc. 2009). As the researchers found, documenting the achievements attributable to SAFETEA-LU is difficult because there is no comprehensive set of service data from before this legislation to compare the current service levels to. Data from the rural National Transit Database are not available before 2006, and service level data for Section 5310 programs, those that specifically serve the elderly and people with disabilities, are not collected. Based on the available data, they found that from 2005 to 2008, there was a 13% increase nationwide in the number of passenger trips provided under the Section 5311 program, which provides funding to public transit systems in areas with a population below 50,000 (Transit Cooperative Research Program 2009). They also concluded that new services have been created, new operators have emerged, more geographical areas are being served, and new vehicles have been purchased. These results were nationwide, though, and could vary from state to state. The authors also cautioned that it takes some time for the full impact of funding increases to be realized and that due to increased operating costs for fuel, insurance, and so on, a few states have used a substantial portion of their increased funding just to maintain existing services. According to the study, state program managers and local operators face two major financial barriers in their attempts to provide service in rural areas: increases in operating costs and lack of state and local matching funds.

Data are not available to objectively determine if levels of transit service for people with disabilities in North Dakota have increased or decreased since 2001. It would have been expected that increased federal funding under SAFETEA-LU would have improved service, but it is possible that improvements have been slow to develop, increased operating costs have hindered the ability to expand service, or matching funds have not been available. Larger sample sizes for the two studies would have yielded more definitive results. Whatever the case, it can reasonably be concluded that currently there are a number of challenges that people with disabilities face in obtaining transportation.

6. SUMMARY AND CONCLUSIONS

To assess the existing and needed community transportation for people with disabilities in North Dakota, this study developed and administered a survey to a sample of people with disabilities in the state. The survey instrument was developed in such a way that it could be used by communities and states beyond North Dakota for collecting similar information and could be used over time to assess progress in providing transportation for adults with disabilities.

Responses were received from 131 people in the state, including those with physical, sensory, cognitive, and emotional disabilities. The respondents were dispersed geographically across the state, representing the larger cities, the smaller cities, and the rural areas, and including people from most areas of the state. A large percentage of the respondents were transit-dependent or dependent on others for rides. More than half, or 58%, were unable to drive, and most had some experience with public transportation. Respondents were predominantly from low-income households, which can contribute to difficulties in obtaining transportation since they are especially sensitive to cost.

The survey results indicated that a significant percentage of respondents desire more trips than they are currently taking, and lack of transportation appears to be the main limiting factor. Transportation is critical for people to meet their basic needs, such as going to work or accessing health care services, and many indicate they are unable to make as many trips for these basic needs as they desire. Beyond meeting basic needs, there is also a strong desire to take more trips for activities that prevent isolation and enrich life, such as social interactions and faith-based participation. Unmet demand was greatest for leisure, recreation, and social trips, as about two-thirds of respondents said they desired more of these types of trips, while 59% desired more shopping trips. Transit services that provide access to health care or to jobs provide a vital service, but if the service is limited to those trips, then transit-dependent individuals are limited in their abilities to take discretionary trips that can prevent isolation and enrich life.

The survey revealed significant dissatisfaction with available transportation options both in the community and for long-distance trips. While individuals from both urban and rural areas were dissatisfied, the level of dissatisfaction was greatest in rural areas.

The most significant concerns with public transportation were regarding service availability. Respondents were most dissatisfied with unavailable or insufficient weekend and holiday hours. Other service factors that respondents were dissatisfied with include waiting time, scheduling procedures, and ride reservation time. Respondents were most satisfied with being safe from both crime and accidents and were generally satisfied with drivers. Respondents were more satisfied than dissatisfied with the availability of door-to-door service, vehicle comfort, and access to information. In nearly every case, people who cannot drive, or those who are more transit dependent, were less likely to be satisfied with public transportation.

The study found a number of problems encountered by people with disabilities using public transportation. The most commonly cited problem was absent or inadequate shelter while waiting for vehicles. Other commonly reported problems include busy intersections to cross, difficulty getting to bus stops, difficulty reading or understanding maps or schedules, stairs or uneven ground problems, and poor or no sidewalks. While many of the problems studied are important for people of all types of disabilities, some problems are more severe for certain groups of individuals. For example, people with sensory disabilities were more likely to say that busy intersections to cross is a problem, people with physical disabilities were more likely to report a problem with getting to the bus stop, and people with cognitive or sensory disabilities were more likely to have problems reading or understanding maps or schedules or be concerned about exiting at the correct stop.

Since paratransit users may experience different problems than those using fixed-route services, problems specific to this mode were also identified. Two-thirds of respondents said that service not being available when they need it is a problem, and 35% rated it as a major problem. Other significant problems were schedules for pickups and drop-offs not being fulfilled or long waits, the need for scheduling trips too far in advance, and trip times that are too variable or unpredictable.

Analyzing the differences in responses between those who currently use public transportation, those who have in the past but do not anymore, and those who have never used public transportation provides some insight into why some use public transportation and others do not. The results suggest it is not lack of need that keeps some people with disabilities from using public transportation. Rather, lack of service, lack of information, thinking they are not capable of riding (whether it is true or not), and fear of riding can likely explain much of the differences between those who use public transportation and those who do not. Even though cost is a concern for many respondents, especially those with lower incomes, it does not seem to influence use, as users were just as likely as non-users to say that it is too costly.

Many of the improvements that people with disabilities desire would benefit not just them but all people who use public transportation. For example, improving or adding new bus shelters, adding weekend or holiday service, reducing wait times, or improving sidewalks would benefit all users. As Mattson (2009) reported, people with disabilities were more likely to have problems with public transportation, but those without disabilities also experienced difficulties. So, many of these problems are not specific to people with disabilities, but those with disabilities are most negatively impacted. Along those lines, the concept of universal design is important. This concept refers to the idea that equipment and infrastructure should be designed to be easy to use for as much of the population as possible. The appeal of universal design is that it makes products or services easier to use for all people and not just individuals with disabilities.

The authors recognize that cost is a factor in responding to some of the deficiencies in transportation for people with disabilities documented in this study. Again, it is important to emphasize that remedying many of these inadequacies would benefit all North Dakotans that already do or could use public transportation. For example, adding weekend and holiday service and expanding evening service could enable people other than those with usual day schedules to get to and from work, jobs often available to people with disabilities. Other improvements, such as improving scheduling procedures or reducing waiting times, could be undertaken with limited cost but would be highly beneficial and likely result in additional people using public transportation, resulting in lower per-ride costs for all and increased fare revenue.

As Hegland and Hough (2003) concluded, coordination by all agencies involved in providing public transportation may be the best and most cost-effective solution for increasing hours of service and number of trips available. Given that resources are limited, efforts at coordinating transportation services are increasingly being made across the country and in North Dakota. Coordination models can range in scope from shared use of facilities, training, or maintenance to integrated brokerages or consolidated transportation service providers. The economic benefits of coordination can include additional funding, increased efficiency, increased productivity, enhanced mobility, and increased economic development; and other expected benefits include improved service quality and more people served (Burkhardt, Koffman, and Murray 2003). Most transportation coordination efforts, however, will present a number of barriers, both real and perceived, that must be identified and addressed.

Changing demographics could intensify the need for improved transportation options. The percentages of the population both in the state and nationwide age 65 or older and age 80 or older are expected to increase significantly over the next decades; and since disability rates increase with age, the number of people with disabilities is expected to grow, creating increased needs for transit services.

While this study covered a wide range of topics, one of its limitations is the small sample size. This survey could be conducted again in a few years to determine if there have been any improvements. Such a study would need to attempt to increase the sample size. Further study could also be useful for identifying the most cost-effective approaches for improving transit services.

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APPENDIX A. SURVEY

TRANSPORTATION FOR PEOPLE WITH DISABILITIES IN NORTH DAKOTA

**Small Urban & Rural Transit Center
North Dakota State University**

Please consider each of the following questions carefully. If you wish, you can let someone help you fill out the survey. To clarify, here are the definitions of some terms used in the survey:

Public transportation	Transportation services delivered by bus, van, train, or other means, either publicly or privately owned, that provide regular and continuing general or special transportation to the public upon payment of a fare, but not including school buses, charter, or sightseeing services.
Transit	Same as public transportation.
Paratransit	Wheelchair-accessible, demand-response transportation service. It generally requires reservations or calling for a specific ride.
Human service agency	An organization that seeks to improve the quality of their clients' lives by providing, facilitating or recommending support for an array of basic social, physical health, housing and mental health services to clients in that community.

PART A. GENERAL TRANSPORTATION

1. Approximately how many miles do you live from your most frequent travel destinations (for example, grocery, pharmacy, neighbor, etc)?

- 1 mile or less
- 1-5 miles
- 6-10 miles
- 11-20 miles
- More than 20 miles

2. During the past year, did you make any long-distance trips of 100 miles or more one way?

- Yes
- No

3. For each of the following activities, indicate how often you make a trip from your home.

Purpose	5-7 days per week	2-4 days per week	Weekly	About every other week	Once a month or less	Never
Work (paid or volunteer)						
Shopping						
Health care						
School						
Agency/organization providing services						
Leisure/recreation/social activities						
Religious activities						

4. Mark the types of transportation you use for each of the following trips. (check all that apply)

Purpose	Drive yourself	Ride (Family or Friend)	Walk/ bicycle	Taxi	Human Service Agency Car or Van	Public Van or Bus
Work (paid or volunteer)						
Shopping						
Health care						
School						
Agency/organization providing services						
Leisure/recreation/Social activities						
Religious activities						

5. Do you desire more trips than you currently take for those activities?

	Yes	No
Work (paid or volunteer)		
Shopping		
Health care		
School		
Agency/organization providing services		
Leisure/recreation/social activities		
Religious activities		

6. Do you take fewer trips than you would like for any of those activities due to a lack of transportation?

	Yes	No
Work (paid or volunteer)		
Shopping		
Health care		
School		
Agency/organization providing services		
Leisure/recreation/social activities		
Religious activities		

7. Do you take about the same number of trips in winter as you do during other seasons?

Yes
 No

8. Do you need any kind of assistance when you make trips?

Yes
 No

9. Is there a local transit bus available within three quarters of a mile of your home?

Yes
 No
 Not sure

10. What are your thoughts on public transportation? (check all that apply)

- Do not need it.
- Service is not available.
- Does not go **where** I need to go.
- Does not go **when** I need to go.
- Do not have enough information about available services.
- Not capable of riding/too challenging.
- Fearful of riding.
- Too costly.
- Others advise me not to ride.
- None of the above.

11. Overall, how satisfied are you with your transportation options?

	Very Dissatisfied	Somewhat Dissatisfied	Neither Satisfied nor Dissatisfied	Somewhat Satisfied	Very Satisfied
Transportation options available in your community					
Long-distance transportation options					

12. Are you concerned about being forced to move from your home due to lack of transportation?

- Yes
- No

13. Is assistance, or training, for learning how to ride public transportation available to you?

- Yes
- No
- Don't know

14. Has anyone from any of the following shown you how to ride public transportation? (check all that apply)

- Schools
- Human service agency
- Senior center
- Local transit company
- Family member or friend
- Other: _____
- None

15. Do you, or did you, need training for learning to ride public transportation?

- Yes
- No

16. What is your experience with public transportation?

- I use public transportation.
- I have used public transportation but don't anymore.
- I have never used public transportation.

PART B. PUBLIC TRANSPORTATION

Please answer the questions in this section if you have used public transportation. If you have never used public transportation, you can skip to Part C.

17. How much of a problem is each of the following when using public transportation?

	Not a Problem	Minor Problem	Major Problem
Difficulty reading or understanding maps or schedules			
Difficulty reading or understanding signs or vehicle route			
Difficulty getting to a bus stop			
Difficulty walking to curb to meet transit vehicle			
Difficulty boarding or exiting van or bus			
Poor or no sidewalks			
Obstacles, protrusions, trash, or debris			
Difficult to see or be seen			
Surface problems (potholes or cracks)			
Busy intersections to cross			
Absent or inadequate shelter while waiting			
Absent or inadequate lighting			
Stairs, lack of curb cuts or ramps, uneven ground problems			
Safety and travel information not adapted for my needs (such as Braille signs and beeping or flashing signals)			
Bus stops are not located within a walking distance from my home			

18. How much of a problem is each of the following when using public transportation?

	Not a Problem	Minor Problem	Major Problem
Difficulty paying the fare			
Concerned you might not exit at correct stop			
Difficulty hearing vehicle operator or other announcements			
Buses lack, or have poorly maintained, accessibility equipment			
Wheelchair securement inadequate			
Wheelchair space inadequate			
Service animals not permitted (i.e., an animal trained to assist people, such as a guide dog)			
Personal attendant not allowed			
Personal attendant required to pay fare			
Bus drivers not aware of my needs			
Inconsiderate or unaware riders			
Being rushed to get on bus and find a seat			
People with no disabilities occupying seats reserved for those with disabilities			
Not wanting to be disturbed by others			
Not wanting to disturb or hinder others			
Crowding			

19. When you use or have used public transportation do you need any of the following?

Specialized equipment

- Scooter
- Wheelchair (manual or power)
- Cane, crutches, walker
- Other: _____
- None

Specialized assistance

- Service animal
- Interpreter
- Other: _____
- None

20. When you need to take a trip using public transportation, what do you do? (check all that apply)

- Go to a bus stop
- Call a taxi
- Call a human service organization
- Call the local transit company to arrange for a paratransit ride
- Call a number that will arrange a ride for you

21. Rate your level of satisfaction with the following public transportation service qualities.

	Very Dissatisfied	Somewhat Dissatisfied	Neither Satisfied nor Dissatisfied	Somewhat Satisfied	Very Satisfied
Serves your needs					
Number of trips offered					
Weekend hours					
Holiday hours					
Service area					
Scheduling procedures					
Ride reservation time					
Waiting time					
Travel time					
Affordability					
Reliability					
Comfort					
Safe from accidents					
Safe from crime					
Drivers					
Access to information					
Door-to-door service availability					

22. Do you use paratransit?

Yes

No

23. If you use paratransit, how does the driver pick you up and drop you off?

Check here if you do not use paratransit and move to next question.

	Never	Sometimes	Always
Wait for you at the curb in front of your home.			
Come to the door of your home and accompany you to the vehicle.			
Come into your home and accompany you to the vehicle.			
Drop you off outside at your destination.			
Accompany you inside at your destination.			
Return you to the curb at the front of your home.			
Return you to your front door when you return home.			
Accompany you into your home at the end of your trip.			

24. Have you experienced any of the following problems using paratransit?

___ Check here if you do not use paratransit and move to next question.

	Not a Problem	Minor Problem	Major Problem
Attendant or escort service limited			
Cannot schedule repeating trips (for example, trips at the same time each day)			
Cost is too high			
Difficult to board or exit			
Inadequate seating			
Insensitive or unaware driver			
Personal safety concerns			
Must schedule trip too far in advance			
Schedule for pickup not kept, or long waits			
Schedule for drop-off not kept, or long waits			
Service is often not available when I need it			
Staff assistance or sensitivity poor			
Vehicle is in poor mechanical condition			
Vehicle not accessible			
Trip time too variable or unpredictable			
Other:			

PART C. ADDITIONAL COMMENTS

25. If you have any additional comments about transportation, provide them here:

PART D. ABOUT YOU

Finally, please provide some information about yourself. Your answers will be kept entirely confidential.

26. Gender: Male Female

27. Age: 18-25 25-34 35-44 45-54 55-64
 65 or older

28. What is your yearly household income level from all sources?

- Less than \$25,000
- From \$25,000 to \$44,999
- From \$45,000 to \$74,999
- From \$75,000 to \$99,999
- \$100,000 or more

29. Are you able to operate an automobile (legally, physically)?

- Yes
- No

30. Do you live in a:

- Private home or apartment
- Group home (group home, assisted living, nursing home)
- Other: _____

31. Do you live:

- Alone
- With relatives
- With non-relatives
- Other: _____

32. Do you have any of the following disabilities?

- Sensory (vision/hearing)
- Physical (orthopedic)
- Cognitive (learning, remembering, concentrating)
- Emotional

33. Do you consider your disability to be:

- Mild
- Moderate
- Severe

34. Do you own and use a computer?

- Yes
- No

35. Do you use the Internet?

- Yes
- No

36. Do you use Facebook, Twitter, or any other social networking site?

- Yes
- No

37. What is your 5-digit Zip Code? (Write in your ZIP CODE) _ _ _ _ _

THANK YOU FOR YOUR HELP!

APPENDIX B. NDDAC MEMBER ORGANIZATIONS

2009-2010 NDDAC Membership List

- AARP
- American People Self Advocacy Association
- Experience Works, Inc.
- Fair Housing of the Dakotas
- Family Voices of North Dakota
- Independence, Inc.
- Mental Health America of North Dakota
- ND APSE
- ND Association for the Disabled
- ND Association of Community Providers
- ND Association of the Blind
- ND Center for Persons with Disabilities
- ND Consumer & Family Network
- ND Federation of Families for Children's Mental Health
- ND IPAT Consumer Advisory Committee
- ND Protection & Advocacy Project
- Senior Health Insurance Counseling/Prescription Connection
- The Arc of Bismarck
- The Arc of Cass County
- The Arc of North Dakota

APPENDIX C. LOGIT MODEL

A logit model can be used when the dependent variable is qualitative in nature. Such a model is often used to estimate the relationship between binary or ordinal responses and a set of explanatory variables. Many of the responses to our survey questions are qualitative variables with either two possible responses or a range of possible responses along a scale. To analyze factors that may influence how a respondent answers questions with two possible responses, such as a yes/no question, a binary logit model is developed where the dependent variable is set up as a 0-1 dummy variable, equal to 1 for those answering yes and 0 for those answering no. The ordered logit model is used when there are multiple possible responses along a scale.

The logit model was used to estimate the likelihood that a respondent is concerned about being forced to move from home due to lack of transportation, trip frequency, desire for more trips, lack of transportation causing fewer trips than desired, and likelihood that the respondent took a long-distance trip during the last year. Trip frequency, desire for more trips, and lack of transportation causing fewer trips were estimated for seven different trip types. Trip frequency was measured with a 1-4 scale, while the others are all binary variables. Independent variables included individual (age, income, severity of disability), geographic (population size of community, travel distance), and transportation factors (ability to drive, use of transit). A description of the variables is shown in Table C.15.

Table C.15 Definitions of Variables Used in Logit Models

Variable	Definition
Independent Variables	
Move	Equals 1 if respondent said he/she is concerned about being forced to move from home due to a lack of transportation and 0 if he/she is not concerned.
Trip Frequency	How often the respondent makes a type of trip measured along a scale as follows: 1=never, 2=once a month or less, 3=weekly or about every other week, 4=two or more days per week.
Desire More Trips	Equals 1 if respondent desires more trips than currently taking and 0 if not.
Fewer Trips Due to Lack of Transportation	Equals 1 if respondent takes fewer trips than desired due to a lack of transportation and 0 if not.
Long Distance Trips	Equals 1 if respondent has made any long-distance trip of 100 miles or more one way during the past year and 0 if not.
Independent Variables	
Age	Measured on a 1-6 scale as follows: 1=18-25, 2=25-34, 3=35-44, 4=45-54, 5=55-64, and 6=65 or older.
Low Income	Dummy variable equal to 1 if respondent has annual household income of less than \$25,000 and 0 if more than \$25,000.
Severity	Severity of disability measured as follows: 1=mild, 2=moderate, and 3=severe.
Pop >30,000	Dummy variable equal to 1 if respondent lives in a community with a population size above 30,000 and 0 if not.
Pop 5,000-30,000	Dummy variable equal to 1 if respondent lives in a community with a population size of 5,000 to 30,000 and 0 if not.
Distance	Travel distance to most frequent travel destinations measured on a 1-5 scale as follows: 1=1 mile or less, 2=1-5 miles, 3=6-10 miles, 4=11-20 miles, and 5=more than 20 miles.
Can Drive	Dummy variable equal to 1 if respondent is able to operate an automobile and 0 if not.
Use Transit	Dummy variable equal to 1 if respondent currently uses transit.

It is hypothesized that as age increases or as the severity of the disability increases, trip frequency will decrease and desire for more trips will increase due to decreases in mobility, but that the number of health care trips taken may increase due to increased need. It is expected that people of low income may take fewer trips and have greater unmet demand due to inability to afford transportation. Geography is also expected to impact travel. It is hypothesized that those who live in larger communities or who have shorter travel distances will take more trips, be less likely to desire more trip or say they take fewer trips than desired due to lack of transportation, and less likely to be concerned about needing to move. Obtaining necessary transportation could be more difficult for those living in rural areas or traveling longer distances. (The dummy variable for areas with a population below 5,000 was excluded from the model to avoid multicollinearity problem, so the rural areas is the used as the reference.) Finally, ability to drive and use of transit are expected to increase trip frequency, reduce unmet travel demand, and reduce concern about needing to move.

The ordered logit model was used to estimate trip frequency, and the binary logit model was used for all other equations. The predicted value of the dependent variable in the binary logit model can be interpreted as the probability of the individual answering yes to the survey question given the values of

the explanatory variables. Suppose Y is the binary response to the survey question, X is a vector of explanatory variables, and β' is a vector of parameters associated with X , then the logit model states the following:

$$\text{Prob}(Y = 1) = \frac{e^{\beta'X}}{1 + e^{\beta'X}}$$

Suppose $p = \text{prob}(Y=1|X)$, then estimated logit model is as follows:

$$\text{logit}(p) \equiv \log\left(\frac{p}{1-p}\right) = \alpha + \beta'X$$

where α is the intercept parameter.

The ordered logit model is estimated using a proportional odds model (POM). This is the most popular model for ordinal logistic regression (Gameroff 2005). The POM models several cumulative logits. For example, if the ordinal outcome has four levels (1, 2, 3, and 4), three logits will be estimated, one for each of the following cut points: 1 vs. 2,3,4; 1,2, vs. 3,4; and 1,2,3 vs. 4 (Gameroff 2005). This model assumes the odds of a response below a given response level are constant regardless of which level you pick. For the POM model to be valid, this assumption must be tested. The standard test is the Score Test for Proportional Odds Assumption. This test was conducted for each of the ordered logit models.

The results from the models were converted to odds ratios, as shown in Tables 4.3, 4.5, 4.6, 4.8, and 4.9. The odds ratio is a way of comparing whether the probability of an event is the same for two groups of people. The odds of an event happening is equal to the probability of it happening divided by the probability of it not happening. An odds ratio is calculated by dividing the odds in group 1 by the odds in group 2. An odds ratio of 1 indicates the event is equally probable for the two groups, while an odds ratio greater (less) than 1 indicates the event is more (less) likely among the first group. For independent variables measured on a scale – age, severity, and distance – the odds ratio compares the odds between one of the groups along the scale with the next highest group.

APPENDIX D. COMMENTS

Respondent Comment
It is extremely difficult in North Dakota or in this area to travel from town to town for anyone who cannot drive. If you live at the periphery of a major city as I do there is no access to public transportation.
I take a taxi to work and anywhere else if I don't have staff. It gets expensive.
If public transportation was available I would learn how to use it and go places more often.
I have to get a ride to where I can use paratransit, have back problems, ride can be rough. Sometimes I have to take 3 or 4 rides to do one thing, yes it is great that I do that, but that is why I don't go anywhere because of the hassle, if one person backs out it is like domino theory, a person shouldn't have to beg, borrow to get a ride. A person likes to be as independent as possible, and when you are blind it takes it to a whole other level. Example: Doctors appt. Ride to Fargo, go to my friends, paratransit or bus, whichever can accommodate me, ride back to friends, then I need a ride home, if I don't want to do anything more, that is more rides. What would your frustration level be?
We do not have a bus system.
When I get to my friends house in Fargo is when I use paratransit, bus, Wahpeton does have a taxi, too expensive, and I have to get a ride to Wahpeton or Fargo to use any services and I just stay home.
Affordable, accessible rural transportation would be very nice so that a person can visit other communities or go back to home town.
Buses need to go more places. They don't go down ... Street and there are lots of businesses there. They don't go to way south ... or in the Industrial Park where many people could get jobs. Also many people have to work on Sundays and there is no bus service on Sundays.
I have a number them. One is from a CLS staff of mine. She feels like when para is late, they expect us to understand, but when I want to reschedule or change, they are uncooperative. I'll tell you this last December was bad. It was Christmas time, so I had things going on. So I reschedule or change my mind. They went behind my back and tell other people without directly talking to me. It has gotten to the point where I need someone with me to change my rides.
I have trouble using the bus because: 1. I can't carry packages when I shop and a cart is a hassle for everybody. 2. One bus route goes south, right past my building, but only to the depot. It seems to pick up passengers only across the street when it's going north, but it goes by my place on the opposite side too. Why can't I be picked up on my side without the hassle of getting a transfer? Couldn't I just stay on the bus at the depot until it starts the route again?
Sometimes I have to wait for 45 min to 1 hour, and then they can only wait 5 minutes for me. It doesn't seem quite right! Most of the drivers are very helpful and kind but some have been rude and insensitive, asking why I need both a wheelchair and a walker! I feel like the bus drivers often don't know where they are going and we spend a lot of time driving around, not going where we are supposed to go. Software difficulties are improving but are still a big concern...it is all goofed up! I hope it can be fixed at some point soon.
The public transportation needs of the rural areas of the state need to be addressed right away. Affordability of paratransit rides is restrictive to most disabled people.
No bus on Sunday. Problem with some drivers stopping at snow bank. Some shelters are by high snow banks - can't get in with walker.
Availability and reliability are lacking; drivers are surly and rude; overall a very unpleasant experience for someone who has no other options.

Even with two Route 15 busses running, many times it is standing room only. Some people drag the biggest strollers, etc. on the bus, and expect people to just move and give up their spot for them. Then, there are the joy riders; people putting their feet up on the seats; and sometimes people using foul language; or just plain talking constantly-whether with someone, or on their cell phones. Many different languages going at once....how very annoying!! Oh, and did I mention the busses being late & not making transfers-sometimes even in nice weather?
Long distance travel is often difficult.
The city bus does not run on Sundays or Holidays. Can be a problem when I work on Sundays and want to see family on the holiday.
Would like to see [the bus system] go to the industrial park and south of town.
I would use public transport more if there was a route ... within a mile or so radius from my home. However, since there is not one I do not travel as much as I'd like. It would also be useful for job hunting and education purposes as well as leisure if the routes had a frequency of every 15 min instead of every 30 min - 1 hr and were 24/7 in terms of operating hours.
Paratransit is not available to meet my schedule, and the cost is beyond my means
It would be nice to be able to have another company of choice to use if the other company couldn't pick you up at the time needed or if the company is running late.
80% time when needed can't get dial a ride to pick me up so call other cab companies which cost too much for me. City bus ... never calls out stop for me--legally blind, a lot of the time passes me up too, dial-a-ride services not always available when needed, ... cab ... service stinks--drivers rude, can wait long time or never be picked up, transportation [here] stinks, moving back to NM where I can have much better transportation since I can't drive due to vision.
I am an obese disabled person in an over sized wheel chair. Fitting in to handicapped taxis and busses is very difficult.
The night bus only runs once every hour and depending on where I would like to go it may take me an hour to get to my destination. Also, there is no bus service on Sunday. Nor is there any paratransit service on Sunday.
Having difficulty with one particular driver but it's being worked on.
I live in a rural community on a reservation in Northern North Dakota. We do have community transportation, but it is too costly. No programs available to subsidize costs. Private owner has discretion, need for Consumer protection and input more.
Only available 2 1/2 days a week.
Had more than one accident, one minor, one more serious, belts were insecure or not used.
I appreciate the CAT bus system.
My biggest concern is with the bus service in town and the lack of transportation to destinations out of town.
There is a need for more public transportation with bus stops in more residential neighborhoods.
We need an accessible taxi cab ... for on demand service.
Costs way too high and cannot schedule events for day.
Drivers are not allowed to go into clients home, only to the door.
I live in Bismarck and only use paratransit. In the future I would like to try taking a bus to Fargo but more than likely would have to have someone travel with me.
Safer warmer and personal attendance, affordable rates and on time destinations and pickups.
Even though I am scheduled as a "door-to-door" rider, often the drivers will not come to the door and I do not know they are waiting for me. I am concerned that paratransit service might be restricted for those with visual impairments who are otherwise able-bodied. Because I am also hearing impaired, door-to-door service is a must for me. *smile*

In filling out this survey, I realized I should call about paratransit, I believe it comes by my home quite regularly, as does transit. I could be much more independent and not have to rely on friends and family.
In the winter sometimes the bus lift for wheelchairs does not work due to cold conditions and I cannot board.
I would like to see extended hours. Can't participate in evening, night or weekend activities.
I'm happy it's available to me when and if I need it.
It would be nice to have extended evening hours and more hours on weekends.
Most comments that I have received from many who have used public transportation are the time issue. Either you sit for a length of time waiting for transit to pick you up or when they do stop on time to pick you up if you are not standing on the corner when they show up they will wait for may be less that 30 seconds and then leave. In the winter time, it is too cold to stand outside waiting for them to show up or in the summer too hot. Also ... [some] need to be on the bus an hour or two earlier than they need to leave to get to work or whatever the destination is. I have received comments that most bus drivers ... are very helpful and considerate but also have had comments that some are not. I do encourage those who have bad experiences to call and report the drivers but they do not want to cause any problems for themselves.
Public transportation is not available. It would be nice if they came out here.
There is a gap for many that need rides that paratransit does not provide.
All drivers have always been very accommodating except for one time I waited for over an hour to be picked up at the hospital and dropped at the motel.
How many more surveys do we need to do - we all know there are issues; we need action, not surveys!!!!!!
I live in rural Dickinson; the Eldercare Taxi service is excellent here. A great value!
I need more weekend hours available and more after hour, hours during the weekend.
We have no transportation in our city ... or any other town in this area on the week-ends or after 5 p.m. for late Dr appointments or evening church or school activities or community functions that I would like to attend. That is the main reason I must depend on my relatives for week-end and evening rides.
Buses don't run on nights, weekends, or over noon hour.
My local bus service doesn't offer services at nights, weekends or over noon hour.
Do not run after 4 p.m. or on weekends/holidays.
Transportation is not available in the small town where I live. I have to rely on friends and family to go long distances. All of my family but one lives out of town from me.
I have continually requested additional transit hours for our community but have continually been told there are not sufficient funds to make that possible. When I remind them that communities smaller than ours receive the same type of funding and offer longer hours, I am bluntly told they won't extend hours. It is complete unwillingness that I sense rather than a lack of funding.
I have had scheduling issues before where I had a pick up scheduled (confirmed on my voice mail) and was not put on the bus schedule. Left me in the dark waiting for the bus. Very much appreciated the bus drivers; they have all been pleasant and accommodating. Not impressed with the dispatcher scheduling, particularly one person. S/he was rude, cut me in conversation and yelled at me on the phone. Obviously s/he is having a bad day MOST of the time. S/he needs a little customer service training. I will not use your transportation unless I absolutely have to, due to rude and degrading treatment from that individual. I have since talked to some of the bus riders that have had problems not being picked up when they were on the schedule and/or rude treatment from some (not all) of the dispatchers. Unfortunately those individuals will probably not do this survey because they like me are visually impaired and/or do not have computer access. Where I work we are trained to be customer orientated and are accountable for our inappropriate customer treatment. Now, is your organization customer orientated or are you just doing all of us "disabled" people a big favor?
It is kind of expensive.

Must take handicap lift or van. No problems in Fargo-Moorhead. Don't want to have to call ahead - don't like it. Calling ahead is fine for medical trips, but not for shopping.

Pleased with the Taxi and the bus.

Returning home after medical appointments is hard to schedule.

The Senior Center Bus will not pick me at time scheduled. The taxi is very reliable.

There is a great need for increased public transportation in our area. People who have no reliable personal transportation have few options and with the severe weather we have this is a crucial issue.

We do not have public transportation so the survey is difficult to fill out.