

Transportation: An Electronic Survey of Persons who are Blind or Visually Impaired

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The contents of this publication were developed under a grant from the Department of Education, NIDRR grant number H133B100022. However, these contents do not necessarily represent the policy of the Department of Education, and readers should not assume endorsement by the federal government.

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File created (4/27/2015). This is not the final version of record. The following article was published in the *Journal of Visual Impairment & Blindness (JVIB)*, 109, p. 445. The final version of record can be found at <http://www.jvib.org>.

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Abstract

Introduction: Persons who are blind or visually impaired encounter transportation barriers that impede their full participation in life activities, including transportation. This survey is the first national survey focusing specifically on the transportation issues of persons with visual disabilities.

Methods: A transportation survey was developed and disseminated electronically to persons who are blind or visually impaired. The first administration, in fall/winter of 2013, went to persons in a volunteer registry. For the second administration in early 2014, participants were recruited through electronic postings and emails with assistance from consumer groups and professional organizations. The combined useable sample of 492 included persons who were legally blind (n=265), totally blind (n=188), and visually impaired (n=39).

Results: Participants were likely to have received O&M training and were confident in their O&M skills. They were also likely to have access to public transportation, to use public transportation to get to work, and to be generally satisfied with how they got to work.

Transportation issues were less likely to impact participation in employment than several other life activities. Although most participants have received services from vocational rehabilitation agencies, few said those agencies assisted them in finding transportation to work.

Discussion: While transportation issues are impacting the lives of persons with visual disabilities, the extent of the impact on employment remains unclear. Survey respondents appear to be using their O&M skills, to be fairly comfortable traveling, and generally satisfied with how they travel to work, thus confirming the importance of receiving quality O&M instruction.

Implications for Practitioners: Service providers should consider evaluating the impact that transportation issues are having on the lifestyles of consumers as transportation for a variety of activities may be problematic. Consumers should be encouraged to take advantage of quality O&M instruction so that they can confidently access public transportation systems. More active rehabilitation practitioner participation in assisting consumers locate employment related transportation is suggested and evaluating the impact of that assistance would prove helpful.

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Lack of transportation can impact a person's ability to engage in employment, obtain health care and housing, and be fully involved in the community. Transportation is regarded as particularly problematic for persons who are blind or visually impaired because most are unable to drive, though a small percentage of persons with vision loss benefit from adaptive technology that may assist in driving, such as bioptic devices. Using public transportation may also be problematic because environmental cues designed for sighted persons may not be accessible or because transit information is not available in accessible formats (Marston & Golledge, 2003; Golledge & Marston, 1997). Consequently, persons with visual disabilities are more limited in their transportation options and may have more difficulty accessing transportation systems. Despite these barriers there is a lack of data concerning transportation issues among persons who are blind and visually impaired. To address this lack, this survey was developed to generate quantitative data about transportation and people who are blind or visually impaired with a particular focus on how transportation impacts employment.

A number of large-scale surveys of adults with disabilities offer valuable insight about transportation issues, such as how a person gets to and from various places, availability of public transportation, travel time, transportation costs, impediments to transportation, impact on employment, carpool negotiations, etc. For example, a national survey of adults with and without disabilities found individuals with disabilities twice as likely to lack transportation as their non-disabled peers (National Organization on Disability, 2004). The 2002 National Transportation Availability and Use Survey found that lack of transportation may contribute to lower employment rates among Americans with disabilities (U.S. Department of Transportation, 2003). A study in Norway found that transportation barriers prompted some individuals with disabilities

to turn down job offers or to refrain from applying to jobs altogether (Bjerkan, Nordtømme, & Kummeneje, 2013). However, in these large studies individuals with blindness and low vision constitute only a small proportion of respondents.

When the ability to travel freely is hampered by vision loss, individuals see a reduction in a range of activities, including employment, social visits, and participation in religious services (Rosenblum & Corn, 2002; Marston & Golledge, 2003). Lack of viable transportation options can also impact housing choices as people with blindness and low vision self-select into neighborhoods perceived as easier to navigate and with better access to public transportation (Golledge & Marston, 1997; Crudden & McBroom, 1999). Availability of public transportation was identified as the most important factor individuals with blindness and low vision consider when deciding where to live (American Foundation for the Blind, 2003). However, approximately 45% of American households lack access to public transportation (American Society of Civil Engineers, 2013) and those living in rural areas face significant transportation barriers that can leave them isolated and disconnected, making it especially difficult for them to secure employment (Salomone & Paige, 1984; Crudden & Sansing, 2011).

Loss of the ability to travel independently can lead to discouragement due to a perceived loss of freedom (Montarzino, Ambrecht, Findlay, Hine, & Dhillon, 2007). Frustration may also arise due to reliance on others for transportation needs (Salomone & Paige, 1984; Golledge & Marston, 1997). Feelings of discouragement and frustration may prompt individuals with blindness and low vision to give up on the job market, fearing that the inability to secure reliable transportation will keep them from finding employment. Indeed, individuals with blindness and low vision cite problems with transportation, such as lack of access to or unreliability of public transportation (Crudden & Sansing, 2011) and fear of navigating unfamiliar environments

(Bjerkan, Nordtømme, & Kummeneje, 2013), as barriers to employment and mobility within the job market (Salomone & Paige, 1984; Crudden & McBroom, 1999).

Although the literature suggests a linkage between transportation barriers and poor employment outcomes for individuals with blindness and low vision, previous surveys of individuals with blindness and low vision on the topic of transportation have been fairly limited in both scope and subject matter. A survey of 162 adults over the age of 60 who stopped driving due to visual impairments found that two-thirds of respondents reported that public transportation was available in their neighborhoods, but only one-third actually used it (Rosenblum & Corn, 2002). One large study in Canada surveyed 352 adults with blindness and low vision about a range of service needs; transportation was one of the two most significant unmet needs identified (Gold & Simson, 2005). The first study conducted using a nationally representative sample of adults who are legally blind in America did not cover the topic of transportation at all (Zuckerman, 2004).

Given the impact that transportation has on the lives of persons with disabilities and research that indicates transportation is a problem for persons who are blind or visually impaired (Salomone & Paige, 1984; Golledge & Marston, 1997; and Crudden & Sansing, 2011), it is surprising that there is not more empirical work documenting transportation issues among persons with visual disabilities. This survey was designed to address that gap and gather information about how transportation impacts persons who are blind or visually impaired with a specific emphasis on employment.

Methodology

Transportation Survey

Prior to constructing this survey, we reviewed previous transportation surveys, including The National Household Travel Survey conducted by the U. S. Department of Transportation (Santos, McGuckin, Nakamoto, Gray, & Liss, 2011); a survey about commuting behavior based on the American Community Survey (McKenzie & Rapino, 2011); an American Association of Retired Persons survey of older persons' mobility (Straight, 1997); and a transportation availability and use study specifically for persons with disabilities (Bureau of Transportation Statistics, 2002), and used them to direct item development for this survey. Because transportation for people who are blind or visually impaired may be linked to their travel skills, we also included related items about orientation and mobility.

A draft survey was developed with feedback and support from members of a national advisory council that supports research associated with employment for people who are blind or visually impaired conducted by our Center's research team. Council members include both consumers who are blind or visually impaired and persons with expertise in orientation and mobility. A revised draft of the survey was pilot tested with persons who are blind or visually impaired and their feedback sought regarding both the content and format. The pilot test and subsequent administration of the survey was conducted using an electronic platform. Pilot testing resulted in minor modifications to content but substantial modifications in formatting the items to facilitate accessibility to persons using screen readers. The survey was designed such that each person did not receive every item but only the items applicable to their answers. For example, those who said they were employed were asked follow up questions about how they got back and forth to work while those who were unemployed were asked if transportation was the reason for their unemployment. The study was approved by our University Institutional Review Board for the Protection of Human Subjects.

Procedure

The survey was initially administered to persons in our participant registry, which is a list of individuals who are blind or visually impaired who have volunteered to be contacted about potential participation in research activities. The survey was disseminated to persons in the registry 18 to 65 years of age. Surveys were completed between September 2013 and November 2013. Approximately 255 persons were sent the survey link and asked to participate. Some recipients forwarded the email to others, so the procedure was then modified to prevent persons outside the invited list from participation. Approximately 225 people started the survey and 140 useable surveys were generated (although some did not have all questions completed). A \$25 gift card was provided to 126 persons who entered their contact information and completed the entire survey.

Results and procedures from the first survey were reviewed, the survey and its formatting were revised, and another round of pilot tests were conducted. We eliminated some items that appeared to be generating duplicate results to shorten the survey but also added a few items. The second round of data collection occurred in January and February of 2014 and was open to all persons who are blind or visually impaired 18 to 65 years of age. A link to the survey was posted on our website and an email with the survey link was sent to major consumer groups, members of our national advisory council, and personal contacts with requests to forward the email to potentially interested individuals and groups. Instead of a gift card, participants could opt to be entered in a drawing for a \$100 gift card per 50 respondents by providing their contact information; six gift cards were awarded. A total of 452 persons who met eligibility criteria started the second survey. Some surveys were excluded from our analysis because they were missing too much data. The second survey yielded 353 useable surveys, though one person

completed both versions of the survey. The combined total of surveys included in the data set for this study was 492.

Results

Demographics

Basic demographic and disability information for the sample is displayed in Table 1. The mean age of respondents was 47.1 years ($SD = 12.6$). Nearly one-half of the sample (49.4%, $n = 243$) lost their vision either at or before the age of one, with an average age at vision loss of 11 years ($SD = 15.35$). Almost half (49.0%, $n=148$) said they could read normal size print with the aid of assistive devices, while 29.1% ($n=88$) said they could not read normal print at all. Nearly half of the sample (48.6%, $n =232$) reported being employed, with a further 7.6% ($n=36$) stating that they are currently self-employed. The remainder of the sample reported being retired (10.7%, $n=51$), volunteer workers only (9.4%, $n=45$), or unemployed (23.7%, $n=113$). Of those who are unemployed, about a third (37.5%, $n=42$) had actively looked for work in the last four weeks. The vast majority of the sample (92%, $n=448$) resides in metro areas, while the remaining 8.0% ($n=39$) live in smaller, nonmetro locations. Just 3.4% ($n=16$) of the sample reported driving themselves as a means of transportation.

Mobility and General Transportation Issues

The majority of our sample (83.3%, $n=404$) received orientation and mobility training at some point in their lives. Most participants are very confident in their independent travel skills: when asked to rate their confidence on a scale from 0 (no confidence) to 10 (complete confidence), the average rating was 7.46 ($SD=2.26$), with 72.8% rating their confidence at 7 or higher. (Note that this question was only asked in Survey 2.) A majority of the sample also have access to fixed route public transportation in their area (81.3%, $n=382$), although use of that

public transportation varies among those who have access to it (see Table 2). Those who use public transportation infrequently (never or less than once per month, n=106) were asked to identify reasons they do not use public transportation, from a list of potential reasons. The most commonly identified reasons were: (a) Difficulty getting to destination (56.6%), (b) Inconvenient (53.8%), (c) Do not feel safe using public transportation (35.9%), (d) Unreliable (30.2%), and (e) Poor shelter from weather while waiting (28.3%). Of those who do not have access to public transportation, the vast majority state that they would use it if it were available in their area (93.1%, n=81).

Participants were asked whether lack of transportation limits their participation in a list of common activities. See Table 3 for the percentage of respondents who indicated that lack of transportation limits their participation in each specific activity. Although only 37.1% reported that lack of transportation limited their participation in employment, one of the least limited activities, this question was asked of all respondents. When responses to this item were limited to those who were not currently employed (in a job with an employer), 51.0% (130 of 255) reported that lack of transportation limited their participation in employment.

Employment Related Issues

Because lack of transportation is such a concern in terms of employment for this population, we asked several questions related to this topic. In order to determine whether a state Vocational Rehabilitation (VR) agency had assisted participants with work transportation, we first asked whether they had received services from such an agency. The majority of respondents had received VR services (77.2%, n=331), but only a small portion of them (26.3%, n=85) reported receiving assistance from the agency in locating transportation to and from work. Respondents in the second survey were asked whether they had ever relocated so they could get

transportation to and from work. The majority of those who responded had not relocated for this purpose (27.0%, n=81). All respondents were asked whether they had ever turned down a job because of transportation concerns, and more than one-third reported that they had (38.1%, n=183).

Persons who reported being unemployed were asked whether they believed transportation was the reason they were not working; only a relatively small portion indicated that it was (29.1%, n=32). This group was also asked whether they thought they could earn enough money at a job to make transportation to work cost effective. A large percentage thought it was extremely or somewhat likely (41.3% n=45), many were uncertain (33.0%, n=36), and a smaller percentage thought it was somewhat or extremely unlikely (25.7%, n=28). We asked all respondents who were not working (not employed or self-employed) whether other factors would prevent them from accepting a job, if affordable transportation were available. One-third of them (33.0%, n=74) indicated that other factors would prevent them from taking a job, with the most common barriers being potential loss of disability benefits (18.3%, n=41), poor health or another disability (10.7%, n=24), and difficulty with travel skills (8.5%, n=19).

We asked those who are currently employed how they typically get to work, with instructions to only choose more than one method if their route requires their use each day. The methods participants use to get to work each day are provided in Table 4, ordered from most to least commonly used with public transportation as the most frequently used method, followed by partransit, walking, driven by family member, using cab or taxi, volunteer driver, carpool, hired driver, driving self, employer provided transportation, and riding a bicycle. Satisfaction varied widely among the participants, who were asked to rate on a scale from 0 (very dissatisfied) to 10 (totally satisfied) how satisfied they were with their transportation to work. A higher percentage

of participants expressed satisfaction with their work transportation (score of 7 or higher; 44.0%, n=121) compared to those who were more neutral (score between 4 and 6; 36.0%, n=99) or expressed dissatisfaction (score between 0 and 3; 20.0%, n=55).

Discussion

Persons who are blind or visually impaired have reported problems with transportation in a variety of studies (Crudden & McBroom, 1999; Bjerkan, Nordtømme, & Kummeneje, 2013; Montarzino, 2007) and transportation is a common topic of discussion when groups of consumers congregate (D. Smith, personal communication, April 7, 2015). Yet this survey represents the first national quantitative data about transportation and associated issues specifically concerning persons with visual disabilities. As such, it generates interesting findings for potential avenues of more in-depth investigation.

Because transportation is frequently mentioned as a barrier to employment (Crudden & McBroom, 1999; Crudden, Sansing, & Butler, 2005), the results here concerning employment are particularly interesting. Over one-half of those in this sample are employed or self-employed and just over 10% report being retired. This employment rate is significantly above the 31% labor market participation rate estimated for this population (Bureau of Labor Statistics, 2013). Less than one-fourth of these participants describe themselves as unemployed. Of those, almost two-thirds are not actively looking for work. Potentially, some of those not seeking employment are discouraged job seekers but some are optimistic about their earning potential as over 40% of the unemployed believed they could earn enough money to make transportation cost effective.

Given the importance of reliable transportation in maintaining employment, we might expect vocational rehabilitation providers to be active in assisting consumers with locating transportation. Over three-quarters of the sample report receiving services from vocational

rehabilitation, but a large majority say that they were not assisted in locating transportation to and from work. We do not know if consumers requested such assistance but it appears that it would be helpful. Providing consumers with transit system information, resources about other transportation possibilities, evaluating their ability to engage in tasks associated with finding and accessing transportation, and engaging consumers in problem solving discussions to generate transportation options may be very helpful to consumers in their efforts to locate employment related transportation as well as transportation for other life activities.

Over 70% of the unemployed say transportation is NOT the reason they are unemployed, However, just over half of the persons who described themselves as self-employed, unemployed, retired, students, or volunteers only, reported that lack of transportation limited their participation in employment. More than a third of participants report having turned down a job because of transportation concerns. These data confirm that there are consumers who experience transportation issues that impact their employment but transportation may not be the deciding factor in employment for the majority who responded. Consequently, the magnitude of the impact of transportation on employment remains unclear.

We found that less than one-third of these respondents have relocated to get transportation to and from work. However, previous research indicates transportation is an important factor for persons with visual disabilities when choosing where to live (American Foundation for the Blind). These results are not necessarily conflicting because the choice about where to live could occur first, so an individual then lives in an area with public transportation access and consequently has access to improved transportation options for work and other activities.

Participants report that lack of transportation limits their participation in entertainment or leisure activities, visiting friends and family, shopping, volunteering, and grocery shopping more than it impacts employment. Because employment related transportation is typically a set schedule with little variation, it may be easier to make arrangements to get to and from work than to activities that have more variety in scheduling. The activities that were limited for the highest percentage of people were also the ones that were more optional – not necessary but enjoyable. In addition, the operational hours of public transportation systems are typically more limited in the evenings and on weekends, so it may be easier to negotiate employment related travel than travel that occurs outside of the typical work schedule.

The frequent use of public transportation by persons in the sample is also noteworthy. Over 80% of the respondents have access to public transportation, which is much higher than the 45% of the total U.S. population with access (American Society of Civil Engineers, 2013), and contrasts with results from the National Organization on Disability survey (2004) that found individuals with disabilities more likely to lack transportation than those without disabilities. In this study, over 70% of those with access to public transportation use it more than once per month and almost half report using it weekly. Such high accessibility rates may be associated with the high representation in the sample of persons from metropolitan areas.

Employed persons who responded tended to use public transportation for work most often, followed by paratransit. Respondents tended to be more satisfied than dissatisfied with their work transportation, with more than twice as many providing a rating in the satisfied range than dissatisfied. This high use and satisfaction may be associated with the fact that over 80% of the sample received O&M training.

The most frequent reason for those who do not use public transportation was difficulty getting to their destination, followed by inconvenience and then safety concerns. Of those without access, over 90% say they would use it if it were available. This information supports the importance of quality O&M services that includes training in use of fixed route public transportation systems.

Limitations

A major limitation associated with this survey is that it uses a nonprobability-based sample. Participants represent volunteers who learned about the survey through electronic communications and possessed the technology skills and the equipment that enabled them to participate. Consequently, this survey represents only people who have some degree of experience and skill with technology as well as access to the internet. Because internet access is more limited among people with lower incomes and education, as well as for those in rural areas, persons with those characteristics are likely underrepresented in this sample.

Another limitation of electronically collected survey data is that surveys can be confusing to complete because of software issues and because variations in browsers and the skill level of respondents increases error and dropout rates (Andrews, Nonnecke, & Preece, 2013). We anticipate that these issues were further complicated by the use of assistive technology and that some persons were either unable to access the survey or discontinued participation due to technological issues. Additionally, because surveys rely on participants' memories, some information may be forgotten or remembered incorrectly.

There may have been some variability in the way respondents interpreted various questions. For example, when asked if VR assisted them in locating transportation to and from work, persons saying yes were asked what assistance was given. Their responses included things

like getting assistance with eligibility for public transportation, getting O&M training to use the bus, or temporary financial assistance. Other consumers may have received these services but did not interpret this as helping them in locating transportation to and from work.

This survey includes an unusually high number of persons who are blind or visually impaired who are employed (48.6%). According to the Bureau of Labor Statistics (2013) approximately 31% of persons who are blind or visually impaired and between 18 and 64 were employed in 2012. This survey also includes a majority of persons who lost their vision earlier in life, persons who are White, living in the South and in metropolitan areas, and persons with higher education. Consequently, results of this survey must be generalized with caution.

Implications for Practitioners:

Transportation may be a significant barrier to employment for some persons who are blind or visually impaired but for many, transportation for leisure, activities of daily living, and community involvement is more problematic; practitioners should consider evaluating how transportation issues might impact each consumers' lifestyle. The effect of transportation on the work behavior of persons who are blind or visually impaired remains unclear and further research in this area is indicated. However, the critical role of quality O&M is affirmed, particularly with respect to use of fixed route public transportation, and rehabilitation counselors should stress this in their work with consumers. Rehabilitation counselors and O&M providers should consider becoming more actively involved in assisting consumers locate transportation to and from work and the impact of that assistance assessed.

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Table 1
Demographic Characteristics of the Sample

Variable	%
Race or ethnicity	
White	77.4
Black or African American	8.5
Hispanic	5.9
Asian American or Pacific Islander	2.6
American Indian or Alaskan	1.0
Native	
Mixed Race or Multiracial	2.0
Level of vision loss	
Totally blind	38.2
Legally blind	53.9
Less severe visual impairment	7.9
Educational level ($N = 483$)	
No high school diploma	2.5
High school graduate	8.7
Some college	18.0
Associate's degree	10.8
Bachelor's degree	28.4
Graduate or professional degree	31.7
Current household income	
Less than \$25,000	28.9
\$25,000-\$49,999	22.0
\$50,000-\$74,999	13.4
\$75,000-\$99,999	8.5
More than \$100,000	7.3
Choose not to answer	19.9
Census region ($N = 489$)	
Northeast	24.3
Midwest	18.8
South	42.3
West	14.5
Use of mobility aids (choose all that apply)	
White cane	64.6
Dog guide	26.4
Wayfinding device	13.4
None	23.6

Note. $N = 492$, unless otherwise noted.

Table 2
Frequency of Public Transportation Use

Variable	%
Never	11.5
Less than once per month	16.5
More than once per month but less than once per week	14.9
Once per week	5.5
Two to three times per week	16.0
Four to five times per week	14.4
Six or more times per week	21.2

Note. $N = 382$.

Table 3***Activities Limited by Lack of
Transportation (Choose All That Apply)***

Variable	%
Entertainment or leisure activities	72.4
Visiting friends or family	66.2
Other shopping	56.0
Volunteer activities	46.0
Grocery shopping	41.5
Employment	37.1
Medical appointments	35.7
Worship services	34.9

Note. $N = 482$.

Table 4***Typical Mode of Transportation to Work
(Choose All That Apply)***

Variable	%
Public transportation	41.9
Para transit	30.2
Walk	25.0
Spouse/other family member drives	18.2
Work at home	18.2
Cab/taxi	11.4
Volunteer driver (not a relative)	6.8
Carpool	5.9
Hired driver	4.9
Drive self	2.6
Employer provides transportation	1.3
Rice bicycle	0.7

Note. $N = 308$.