

Demand for Accessible Over-the-Road Bus Service

3

FINDINGS

- The number of persons with disabilities is very difficult to estimate. Data-collection methods differ, and in many cases the data conflict. In addition, the definition of ‘disability’ varies by source.
- The prevalence of disabilities correlates with advanced age. U.S. Bureau of the Census projections indicate that the 65-plus age cohort is growing rapidly, from 12.5 percent of the total population in 1990 to as much as 25 percent by 2050. Thus, it is likely that the proportion of persons with disabilities will increase as well.
- The profile of over-the-road bus (OTRB) ridership resembles in key ways the profile of the population of persons with disabilities. The similarities include age, gender, and income characteristics.
- A handful of programs and demonstration projects have offered accessible OTRB service. In general, the use of accessibility equipment in these projects has been very low. However, since the projects covered limited areas with infrequent service, and since several are new and still building ridership, it is not possible to generalize from their ridership levels to total ridership in a nationwide, completely accessible OTRB system.
- To calculate the level of OTRB ridership (for both fixed-route and charter and tour service) by persons with disabilities, the Office of Technology Assessment (OTA) extrapolates from OTRB usage for the entire U.S. population. This methodology estimates the annual trips by persons using wheelchairs at 0.5 to 0.6 percent of the current annual trips by persons without disabilities; the annual trips



by persons using any type of mobility technology device comprise 1.2 percent; the annual trips by persons with hearing impairments come to 5.6 percent (annual trips by those using hearing technology devices total 1.5 percent); annual trips by persons who are legally blind amount to 0.4 percent; annual trips by persons who are sight impaired comprise 2.0 percent; and annual trips by persons using vision technology devices total 0.1 percent. Data on the number of persons with cognitive impairments are too vague and inadequate to predict the number of such persons who require assistance in riding OTRBs.

- OTA cautions that these calculations of potential demand are only estimates, and that projecting demand for accessible service that has not yet been offered is next to impossible.

BACKGROUND

Section 305 of the Americans with Disabilities Act (ADA) requires that OTA study “. . . the anticipated demand by individuals with disabilities for accessible over-the-road buses and accessible over-the-road bus service.”¹ The law asks OTA to develop figures about how many persons with disabilities are likely to use accessible OTRBs; it does *not* state that the results of OTA’s study will affect the requirement to make OTRBs accessible.

This chapter presents OTA’s analysis of the demand for accessible service in three sections: 1) a discussion of persons with disabilities, their characteristics, and their numbers; 2) a description of demonstration projects that have attempted to provide accessible OTRB service to persons with disabilities; and 3) an explanation of OTA methodology and the resulting demand projections.

PERSONS WITH DISABILITIES IN THE UNITED STATES

Accessible OTRB service must accommodate a population of persons with various types and degrees of disabilities. The following section includes estimates of the occurrence of various types of disabilities, the characteristics of some of the more common types of disabilities, demographic data on persons with disabilities, and a comparison of the demographics of bus riders and persons with disabilities.

While data on persons with disabilities have been compiled at the national level, there is little available at the State and local level. The national level data have been developed from the perspective of health and medical services, public assistance, education, employment, and income, but little has been done with regard to transportation services or needs. The data that are available vary in their definitions of “disabled” and “disability.” In a report on its workshop on Disability Statistics held in April 1989, the Committee on National Statistics observed:

Statistics on persons with disabilities are produced by many government agencies whose needs for information are governed and driven by their respective administrative requirements. These agencies, neither individually nor collectively, provide a consistently applied, widely accepted definition of disability.²

Confusion concerning the number of individuals with disabilities arises from several factors: some persons have multiple disabilities, the severity of a disability can vary, and survey methodologies and questions can differ significantly.

In Section 3 of the ADA, Congress establishes a three-pronged definition of the term ‘disability’: 1) a physical or mental impairment that substantially limits one or more of the major life activities of an individual; 2) a record of such an impairment; or 3) being regarded as having such

¹Public Law 101-36, Sec. 305(b).

²Committee on National Statistics, “Disability Statistics: An Assessment,” workshop summary on disability statistics, April 1989.

an impairment. Senate report language expands on this definition; under the first prong, a ‘major life activity’ means functions such as caring for oneself, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working. A ‘substantial limitation’ is a restriction of a major life activity in terms of the conditions, manner, or duration under which it can be performed. In Section 2 of the ADA, Congress finds that “. . . some 43,000,000 Americans have one or more physical or mental disabilities. This figure is one of several, ranging from 20 to 50 million and based on data developed by the National Center for Health Statistics, the International Center for the Disabled, the National Council on Disabilities, the Bureau of the Census, the Health Care Financing Administration, and others.

Types of Disabilities

Disabilities are difficult to quantify and categorize; they manifest differently in each individual, and have different effects. For example, a mobility impairment may affect a particular individual’s ability to board an inaccessible bus, while having no impact on that person’s ability to use a computer. Thus, persons with disabilities are in no way a homogeneous group.³ For the purposes of this discussion, OTA presents three categories of disabilities: 1) mobility impairments; 2) sensory impairments; and 3) cognitive impairments.

Mobility Impairments

National Health Information Survey (NHIS) data⁴ indicate that approximately 1.4 million Americans use wheelchairs, 1.7 million use



Individuals with physical disabilities participate in many aspects of life.

walkers, a total of 3.0 million use mobility devices other than canes or walking sticks⁵ (table 3-1), 4.4 million use canes or walking sticks, and 0.9 million use leg braces.

The NHIS relied on self-identification to determine the use of technology devices for mobility and sensory impairments. The study thus might exclude persons needing accessible services who do not use devices, as well as some individuals with temporary disabilities.⁶ Thus, the survey probably underestimates the numbers of persons with mobility and/or sensory disabilities. However, the NHIS is the most comprehensive source of national data on persons with disabilities.⁷

When considering level-change devices to assist individuals with mobility impairments to board an OTRB, it is useful to consider the activities involved in boarding a bus to understand how some persons would have difficulty

³ “Who Are the Disabled?” *The CQ Researcher*, vol. 1, No. 32, Dec. 27, 1991, p. 999.

⁴ Numbers do not add up to one overall total because of duplication. Derived from U.S. Department of Health and Human Services, *Advance Data Vital Health Statistics of the Centers for Disease Control/National Center for Health Statistics*, Sept. 16, 1992 and Dec. 15, 1992. The National Health Information Survey is a statistical analysis of health-related issues, including disability prevalence.

⁵ This number includes crutches, walkers, wheelchairs, scooters, and other mobility equipment in a total with no duplication.

⁶ As an example, this latter group might include people recovering from broken bones or surgery. Similarly, table 3-1 indicates that crutches are used most often by persons between the ages of 25 and 64.

⁷ Remarks at Office of Technology Assessment Workshop, “Building Accessible OTRB Service,” July 15, 1992.

Table 3-1-Disability Statistics (number of persons in thousands)

	All ages	24 and under	25-44	45-64	65-74	75 and over
Any hearing technology device.	3,987	152	257	818	1,142	1,618
Any vision technology device.	261	12	67	39	32	111
Any mobility technology device.	3,040	223	350	629	620	1,218
Crutch.	671	87	173	209	137	64
Walker	1,687	34	72	275	350	957
Wheelchair	1,411	139	168	304	924	476
Scooter	64	6	11	18	18	11
Other mobility equipment	254	18	28	66	57	85

NOTE: Totals may not add **because** some persons may use more than one device.

SOURCE: U.S. Department of Health and Human Services, *Advance Data, From Vital Health Statistics of the Centers for Disease Control National Center for Health Statistics, No. 217, Sept. 16, 1992.*

with the current OTRB system. Functions necessary to use an inaccessible OTRB include the ability to walk, climb stairs, stand up, sit down, and grip. The loss or impairment of one or more of these functions may result from age, disease, birth defects, or injury. A person who is unable to perform one or more of these actions will likely need some form of assistance, ranging from the support of a steadying hand to a level-change device.⁸ (For a profile of a person who uses a wheeled mobility aid and must travel for his work, see box 3-A.)

Among conditions affecting these key functions are loss of muscle control (e.g., as a result of multiple sclerosis), loss of balance (associated with inner ear problems, nerve damage, and vision impairments), amputations, breathing difficulties, chronic pain, arthritis, spinal cord damage, heart disease, cancer, and weakness from cancer treatments. Many of these conditions are associated with advanced age.⁹

Sensory Impairments

Estimates of the number of persons with sensory impairments vary according to the source of the information and the definition of impairment. For example, the Survey of Income and Program Participation (SIPP) in 1984 counted 11.1 million individuals “. . . who have difficulty seeing ordinary newsprint with eyeglasses or contact lenses.”¹⁰ The 1978 Survey of Disability and Work, however, found less than 1.8 million people “. . . who have difficulty seeing well enough to read ordinary newsprint even with glasses.”¹¹ The NHIS, meanwhile, gave a total of 4.5 million people who have difficulty seeing even when wearing corrective lenses, and 261,000 who use a vision technology device. These data illustrate that estimates of the numbers of persons with sensory disabilities can vary greatly according to the nature of the study.¹²

Visual Impairments—According to one count, two-thirds of the 1.1 million individuals defined as legally blind still have some perception of light

⁸William H. Henderson et al., *Passenger Assistance Techniques: A Training Manual for Vehicle Operators of Systems Transporting the Elderly and Handicapped* (Fort Worth, TX: Transportation Management Associates, 1982), p. 3.

⁹ *Ibid.*, pp. 3-9.

¹⁰ Mitchell P. LaPlante and Leslie A. Grant, “Persons Who Need or Benefit From Accessibility Features in the Built Environment” paper prepared for the Architectural and Transportation Barriers Compliance Board, April 1988, p. 18.

¹¹ *Ibid.*, p. 19.

¹² *Ibid.*, pp. 19-20.

Box 3-A—Profile of a Traveler Who Uses a Wheelchair

Randall Martin,¹ of Houston, Texas, is a senior vice president of a research institute and a professor of rehabilitation medicine at a medical college. Randall is a quadriplegic as a result of a spinal cord injury and uses a motorized wheelchair.

When relocating to Houston 2 years ago, Randall and his wife looked for a house as close as possible to his workplace in order to minimize commuting time. A quadriplegic can sit in a wheelchair for only a limited number of hours each day, and commuting time directly affects available productive hours.

Randall has a subscription arrangement for paratransit service for the 4-mile trip to and from work. On a given day, if he is unable to meet the prearranged schedule, Randall attempts to arrange alternative paratransit service, which can be time consuming because of the heavy demand for paratransit services in his city.

Randall's other transportation options include a regular city bus route to his office that stops in front of his house, but only 50 percent of those buses are accessible and they run randomly; two or three buses might pass before an accessible one comes along. However, another bus route that is 100 percent accessible travels within about 1/4-mile of both his office and his home. His wife, who also uses a wheelchair, can drive their lift-equipped van as her own schedule allows.

Randall travels frequently by air, almost always accompanied by an attendant. On business-related travel, he sometimes arranges for a lift-equipped van from his office at the medical center to the airport. Otherwise, he tries to schedule paratransit in advance, or relies on his wife. When traveling to Washington, DC, he prefers to arrive at National Airport, where he has two options: the Metro rail system or accessible taxis. Randall claims that next to Vancouver, Canada, Washington has the best accessible on-call taxi service. However, whereas a cab trip from the airport to a nearby hotel costs a person without disabilities \$4.50, it runs \$20 for the accessible service.

Randall wishes that accessible over-the-road bus (OTRB) service were available for some of his travel needs. For instance, from time to time he travels to Princeton, New Jersey, flying from Houston to Newark. As of late 1992, no accessible OTRB service existed between Newark and Princeton. Instead, at a cost of about \$200, he must arrange for ground transportation to Princeton via the nearest provider of accessible service, a contractor in Philadelphia with a lift-equipped school bus.²

One of the worst travel experiences Randall had was in Chicago en route from the airport to his hotel. He had arranged for airport pickup by a lift-equipped van operated by a contract service. The driver operated the lift without much difficulty, but events proved that he did not properly secure the tie-down mechanism. The van swerved in traffic and Randall's wheelchair tipped over, throwing him onto the lift mechanism. The result was a 4-inch gash on his head, which bled profusely. At a nearby hospital, Randall was treated for a concussion and stitched up. He sued the van company; the outcome was an insurance settlement to replace his damaged wheelchair and cover his medical expenses.

¹ **Randall Martin is a fictitious name; the person is real.**

² **Princeton has an Amtrak station, but it is not easily reached from town. Paratransit systems abound in New Jersey, serving county-wide areas. However, they are funded through State and county resources, and Randall's experience has been that only residents are eligible for the service.**

National Federation for the Blind



Persons with vision impairments often use aids, such as dogs or canes.

and shape.¹³ As many as 5 million persons are not legally blind but have vision impairments to a degree that makes travel difficult (see box 3-B). As with many disabilities, vision impairment correlates with advanced age.¹⁴

Auditory Impairments—Hearing loss has a strong correlation to advanced age and is considered a wide-spread condition in the United States, affecting as many as 14 million persons.¹⁵ Some individuals with auditory disabilities benefit from hearing aids, but many do not. While persons with acute hearing sometimes expect individuals with auditory impairments to read lips, this is an ineffective means of communication in which as much as two-thirds of the conversation must be guessed.¹⁶



Gallaudet University

Persons with hearing impairments rely on several forms of communication, including sign language.

Cognitive Impairments

The ADA includes mental retardation, emotional or mental illness, and learning disabilities as part of its definition of ‘mental impairment,’ referred to by OTA as ‘cognitive impairment.’ In addition, an injury, disease, or condition affecting the brain can create a situation in which an individual may have difficulty with particular functions. Examples include the following:

- Mental retardation, also referred to as sub-average intelligence, has many causes, most of which are not well-understood. Categories of mental retardation include borderline retardation, which encompasses Intelligence Quotients (IQs) of 84 to 71; mild retardation (IQs 70 to 50); moderate retardation (IQs 49 to 35); severe retardation (IQs 34 to 20); and profound retardation (IQs 19 and below). Depending on the level of retardation, individuals with this type of cognitive disability may require simple, more explicit instruc-

¹³ Henderson, et al., op. cit., footnote 8, pp. 3-9.

¹⁴ Ibid., 3-9.

¹⁵ Many fewer individuals have speech disabilities, some of which stem from auditory impairments or the aftereffects of strokes or cancer surgery. Ibid., pp. 3-9.

¹⁶ Ecosometrics, Inc., ‘‘Potential Demand for Over-the-Road Bus Services by Individuals With Disabilities,’’ OTA contractor report, July 15, 1992, p. A-4.

Box 3-B—Profile of a Traveler Who Is Blind

Geraldine Dole¹ is a middle-aged social worker in a large city in the Mid-Atlantic region. She is totally blind and uses a seeing-eye dog. Her work requires that she travel around the metropolitan area to visit clients and attend meetings. Advance planning for even the simplest of this travel is necessary and time consuming.

In a recent week that Geraldine describes as typical, she attended a meeting in a location not served by local transit. She arranged with a friend and colleague to provide her and her seeing-eye dog with automobile transportation there and back. The following day she visited a client in the hospital and was able to take local transit both ways. She determined from the driver that his bus was the one she wanted and relied on her dog to guide her onto the bus and to a seat. Later that same week she arranged automobile transportation to a reception. On the way back, in the rain, she tried her luck on paratransit, with the help of a friend using a wheelchair who had arranged a paratransit pickup for herself. In Geraldine's city, only persons with mobility disabilities are eligible for paratransit service. With her friend's intervention and the willingness of the paratransit driver to look the other way, Geraldine was able to ride to within 2 blocks of her home.

Geraldine flies frequently. While making advance ticket reservations she asks for assistance at the other end and requests either a window or middle seat. She must reconfirm these arrangements at the airport; quite often, airline personnel presume she would prefer an aisle seat and change her seating assignment without checking with her. An aisle seat is riskier for her dog, who is more exposed to being stepped on. The dog lies facing the front of the aircraft, with as much of her body as possible under the seat in front of Geraldine.

Over-the-road bus travel is the least convenient of all modes for Geraldine. She claims that assistance from bus personnel for people with disabilities is less available since the Greyhound strike. The entrance to the bus terminal in her city is less accessible by car than is the airport, and she has no escort into the bus terminal if she takes a cab; if she is taken by a friend who can escort her, parking is inconvenient and expensive. Without a guide she has no idea where the ticket counter is, and there seem to be no bus personnel around to help with directions or luggage. It is very difficult to hear announcements of bus departures and finding the departure gate is a major challenge unless someone, usually a fellow passenger, helps.

Rest stops on Interstate highways are particularly difficult. All of the buses seem to arrive at once, and even helpful fellow passengers make a bee-line to the restrooms or the lunch counter to beat the inevitable lines, leaving Geraldine, and her dog, wondering which direction to take. In such circumstances, she says, it is important to be able to rely on the driver for courteous and considerate assistance in guiding the passenger in the right direction, understanding that the rest stop is for both passenger and dog, and refraining from moving the bus to a different location without warning.

Geraldine believes training of bus personnel in dealing with persons with disabilities is a critical need. She maintains that lack of awareness of others' disabilities and how to deal with them usually underlie the occasional uncaring behavior or rudeness.

¹Geraldine Dole is a fictitious name; the person is real.

tions than other persons need in order to travel.

- . Strokes, which occur predominantly in people over the age of 55, can cause losses of both physical and mental functions. While rehabilitation therapy may eventually restore part or sometimes all of the lost

function, a stroke can affect an individual's ability to speak, read, make purposeful movements, use certain muscles, recognize shapes and objects, remember, and maintain emotional control.

- . Autism is a poorly understood condition that exists from birth. Persons with autism re-

quire explicit instructions in order to travel independently. Among the manifestations of autism that bus company personnel may encounter are a tendency for persons with autism to repeat back what is said to them, a reluctance to contact other persons even when needing assistance, and a loss of emotional control when interrupted or confronted with a disorderly environment.¹⁷

No reliable data exist on the numbers of persons with cognitive disabilities. Depending on the breadth of the definition used, estimates of the number of persons with cognitive disabilities range from 1 to 20 percent of the population at large.

Demographics

In order to compare the population of persons with disabilities with that of the riders of the current OTRB system, it is necessary to examine the demographics of each group. In addition to the 1980 NHIS, a 1977 study by the Urban Mass Transportation Administration (UMTA) and the 1984 SIPP provide data on the demographics of persons with functional difficulties. These data tend to be consistent in key measures.

Demographics and Travel Characteristics of Persons With Disabilities

The UMTA study focused on persons with disabilities that limited their ability to travel.¹⁸ These included individuals using wheelchairs and other mobility aids, as well as those with vision and hearing impairments. The results describe persons who:

- Are older (67 percent are over 55 years of age; 47 percent are over 65 years of age);
- Have lower incomes (34 percent had household incomes of \$4,000 or less in 1977 dollars-\$9,000 in **1991 dollars**); and
- Have demographic characteristics associated with older age and lower incomes, including: predominantly female (63 percent); less education (41 percent have an 8th-grade education or less); and unlikely to be employed (only a 15-percent employment rate).

Working-age persons with disabilities were employed at a rate of 23 percent, low compared with 64 percent of the population in general. Characteristics for individuals using wheeled mobility aids did not differ significantly in the above categories.¹⁹

The 1984 SIPP presented statistics very close to those of the UMTA study.²⁰ The SIPP found that women, African Americans, and persons with lower levels of education were disproportionately represented among the groups with the most limitations of function. For example, women accounted for 51 percent of the working-age population, but they made up 61 percent of those with “. . . a substantial limitation in functioning.”²¹ Similarly, in a total population that was 11 percent African American, 16 percent of persons with severe limitations in functioning were African American. While marriage rates for working-age adults were similar for persons with and without disabilities, this was not true for the total population of persons with disabilities who were more likely to be older and to have had spouses

¹⁷ Henderson et al., op. cit., footnote 8, pp. 39.

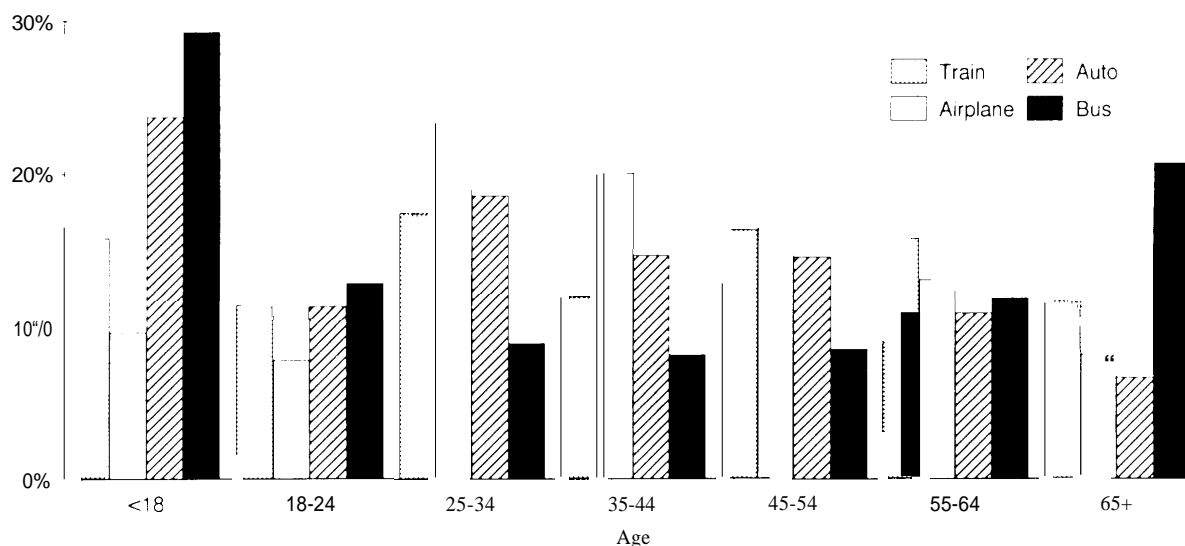
¹⁸ Some analysts within the disability community have reservations about this study. Heavy discounting of potential ridership on accessible transportation occurred when persons with disabilities did not give particular responses. For example, when asked if the absence of “curb cuts” would be a problem, a person with disabilities who had a means of coping with sidewalk curbs and therefore answered “no” would have his or her response dropped. Thus, in some cases numbers as high as 60 percent were discounted to as little as 3 percent.

¹⁹ Econometrics, Inc., op. cit., footnote 16, pp. 4-12 to 4-13.

²⁰ Mathematica Policy Research, “Task I: Population Profile of Disability,” report for the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, October 1989, pp. xvii-xx.

²¹ Ibid., p. 57.

**Figure 3-1—Intercity Passenger Travel, by Age of Traveler and Mode of Transportation, 1977
(percent of total)**



SOURCE: Robert R. Nathan Associates, Inc., from data in U.S. Department of Commerce, Bureau of the Census, "Travel During 1977," October 1979.

who died.²² For elderly persons with no physical limitations, the SIPP found that 26 percent lived alone, compared to 37 percent for elderly persons who needed some form of assistance. These data indicate that elderly persons with disabilities may not find it easy to bring traveling companions.²³

Demographics of OTRB Riders

Fixed-Route Travelers-For Class I carriers, age, income, gender, and race are distinguishing variables of the fixed-route OTRB market.

- Age. Surveys of intercity bus passengers tend to support the observation that fixed-route passengers include riders who are younger or older than passengers in other modes of transportation (see figure 3-1).
- Low income. The intercity bus rider is much more likely to have a low income than is the air or rail passenger. Furthermore, because most OTRB passengers travel to visit some-

one rather than for business purposes, they are likely to be paying for the trip out of personal funds. According to 1991 Greyhound passenger survey data, roughly one-half of its riders have incomes under \$15,000 per year, and do not have a car capable of a 500-mile trip.²⁴

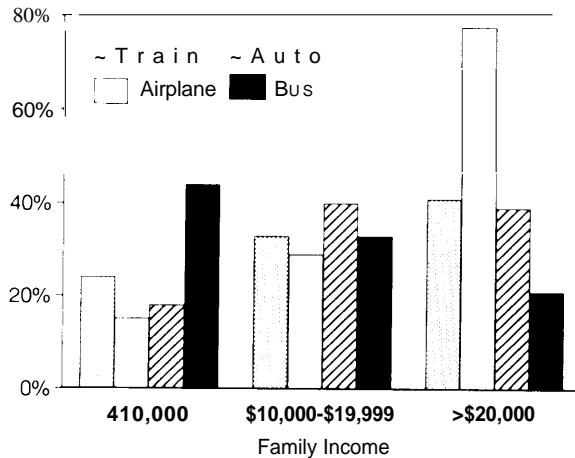
These numbers are even more pronounced when compared to similar data from other intercity transportation modes. Figure 3-2 shows that in 1977, families with \$10,000 (1977 dollars-\$22,500 in 1991 dollars) or less annual income accounted for 45 percent of fixed-route intercity bus-miles, compared to 25 percent for rail, 18 percent for automobiles, and 15 percent for air. However, less than 5 percent of bus riders were traveling on business, in contrast to 37 percent of railroad passengers and 51 percent of those opting to

²² Ibid., pp. 57-61.

²³ Ibid., pp. 115-117.

²⁴ Greyhound Lines, Inc., "Greyhound Lines Passenger profile," unpublished report, August 1991, as cited in Econometrics, Inc., op. cit., footnote 16, p. 1-18.

Figure 3-2—Intercity Passenger Travel, by Family Income and Transportation Mode, 1977 (percent of total)



SOURCE: Robert R. Nathan Associates, Inc., from data in U.S. Department of Commerce, Bureau of the Census, "Travel During 1977," October 1979.

fly. These patterns continue to hold true into the early 1990s.²⁵

- Gender and racial characteristics. Riders of fixed-route OTRB service are largely female. The percentage of persons from minority groups riding intercity buses is also high. Fifty-eight percent are female, compared to 51 percent of the overall population, and 42 percent are nonwhite compared to 16 percent of the overall population.²⁶

Charter and Tour Service—Information is not readily available regarding the demographics of charter and tour passengers. However, a 1986 survey shows that unlike fixed-route passengers, they have an average household income of over \$34,000 (1985 dollars; over \$47,000 in 1991

dollars) and own 1.8 autos per household. But similar to fixed-route passengers, they are likely to be older, with a median age of 60.²⁷ Thus, advanced age, which has a strong correlation to disability, also characterizes charter and tour travelers.

Demographic Projections—The Bureau of the Census projects that the proportion of the U.S. population age 65 and over will increase from 12 percent in 1990 to around 18 percent in 2020, reaching 21 to 25 percent in 2050 (see figure 3-3). With the high incidence of disabilities among the elderly, it is possible that the growth of this age cohort will correspond to growth in the number of persons with disabilities (see box 3-C). While data are not available quantifying the numbers of "ii-ail" elderly, it seems likely that this group will grow along with the percentage of the population 80 and over (3 percent in 1990, 4 percent in 2020, and 8 percent in 2050).²⁸ Frail elderly persons might not have specific disabilities, but may still need assistance. As age is a strong correlate of both disabilities and use of OTRBs over other modes of transportation, the aging of the U.S. population could lead to increased ridership.

EXPERIENCE WITH ACCESSIBLE SERVICE²⁹

Because there has already been a great deal of experience with technologies for persons with sensory and cognitive impairments (see ch. 4), this section focuses on experience with technologies for persons with mobility disabilities. U.S. experience with accessible OTRB service for persons with mobility impairments is extremely limited. In seeking programs that might shed

²⁵ U.S. Department of Commerce, Bureau of the Census, "Travel During 1977," October 1979, as cited in Econometrics, Inc., op. cit., footnote 16, p. 1-20.

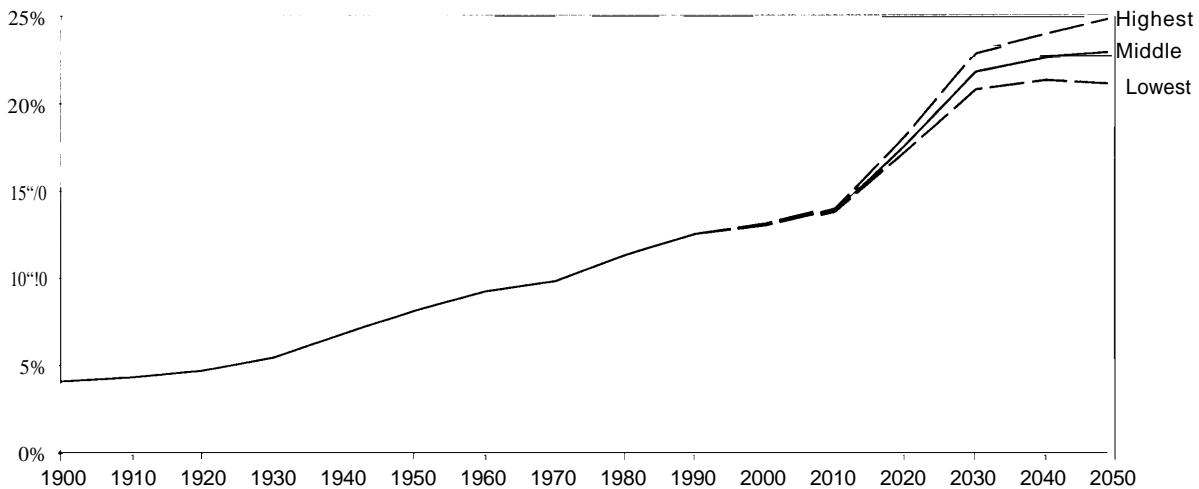
²⁶ Greyhound Lines, Inc., op. cit., footnote 24, p. 1-18.

²⁷ Lawrence F. Cunningham, "Profiling Tour Patrons and Non-Patrons in Intercity Bus Passenger Markets," paper presented at the Annual Meeting of the Transportation Research Board, Washington DC, January 1986.

²⁸ U.S. Department of Commerce, Bureau of the Census, *Projections of the populations of the United States by Age, Sex, and Race: 1988 to 2080*, Current Population Reports, P-25, No. 1018 (Washington, DC: U.S. Government printing Office, 1989).

²⁹ Except where noted, this section is based on Econometrics, Inc., op. cit., footnote 16.

Figure 3-3-Growth of Population, Ages 65 and Over, Actual and Projected



SOURCE: Data for 1990 from 1990 Census of the Population (CPH-L-74, modified age and race counts). U.S. Department of Commerce, Bureau of the Census, *Projections of the Population of the United States by Age, Sex, and Race: 1988-2080*, Current Population Reports P-25, No. 1018 (Washington, DC: U.S. Government Printing Office, 1989).

some light on the likely demand for such OTRB service, OTA discusses one State-sponsored program in Massachusetts, a demonstration project in Canada, and a portion of the Denver transit system. Data from these programs are of marginal use, because such factors as poor lift reliability (especially with early generation lifts), inadequate marketing, incomplete coverage of routes,

and unsatisfactory service affected the ridership. Indeed, many of these operations collected data in such a way that lift usage is extremely difficult to quantify. Further, some lift-equipped OTRBs served limited regions; only a few traveled to major destinations.

The Massachusetts Program

Sustained accessible intercity bus service did not exist in the United States prior to 1986, when Massachusetts began a project to make OTRBs operating in the State accessible. The program stemmed from the convergence of three efforts:

- the Massachusetts Coalition of Citizens with Disabilities (MCCD) identified improvement of inter-regional travel options for persons with disabilities as a priority;
- the Governor's Commission on Accessible Transportation found a need for improvements in the public transportation system; and
- the State moved to assist private bus operators whose services linked Boston with outlying areas.



Elizabeth Robinson

There is a strong correlation between disability and age.

Box 3-C-The Aging of America

The Bureau of the Census, using data from 1990 and earlier, has projected the growth of the Nation's older population through 2050.¹ Projections are based on a Lowest, a Highest, and a Middle Series of assumptions about fertility, mortality, and immigration. The Middle Series projections through 2050 illustrate the passage of the Baby Boom generation and provides an interesting glimpse into the future of an aging America. During this 60-year period, those 65 and over grow from 12.5 percent of the population to 22.9 percent, and those 85 and over increase from 1.2 percent to 5.1 percent of the total (see figure).

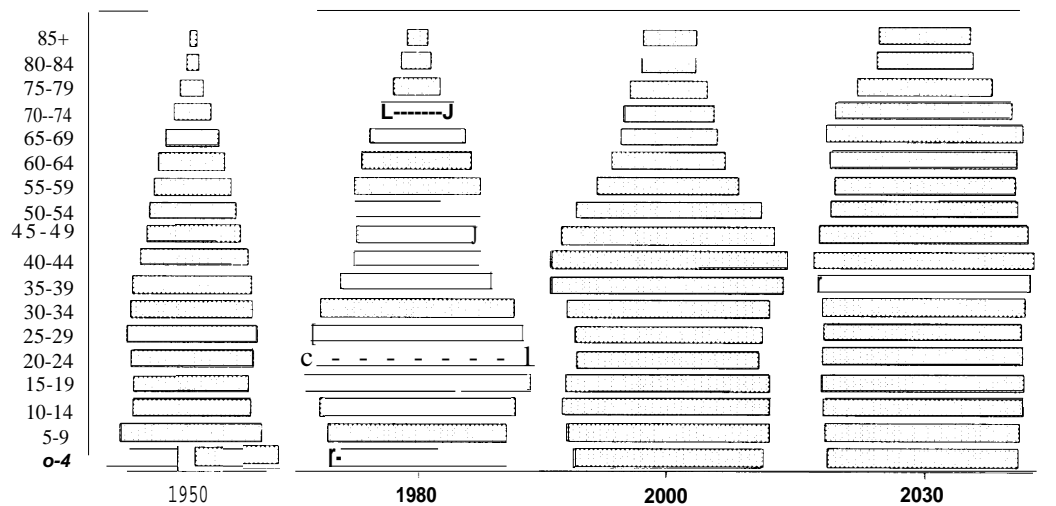
In 1990, 31,079,000 Americans were 65 years and over, in a total population of 248,710,000. The Bureau of Census projections break these figures into 5 categories ages 65 to 74 (7.3 percent), 75 to 79 (2.5 percent), 80 to 84 (1.6 percent), and 85 and over (1.2 percent); the fifth category, those 80 and over, represented 2.8 percent of the Nation's 1990 population.

The first 20 years of the 1990-2050 period begin with the proportion of elderly in the total population increasing to 13.9 percent. Most growth is among the upper ranks of the elderly and is not matched by those entering the 65 to 74 year category. As a percentage of the population, the 65 to 74 group actually declines in 2000, rises to 1990 levels in 2010, then swells in 2020 as the Baby Boom generation begins its march through the ranks of the elderly.

By 2020, the number of those 65 and over will have increased to more than 52 million. Their portion of the population will rise from 12.5 to 17.7 percent. The number of persons in the 65 to 74 age bracket will have grown by 72 percent, and those in each of the next two categories by less than 50 percent. The 80 and over cohort, however, increases by 75 percent, and the over 85 category jumps an astounding 120 percent.

In 2050, the total population of the United States is projected to decline for the first time since 1900, falling below 300 million. Those 65 and over will comprise 22.9 percent of total population, however. The two categories encompassing age 75 through 84 will decline noticeably, and the over 85 cohort will reach 5.1 percent of the population, compared to 1.2 percent in 1990.

U.S. Population Pyramid, 1950-2030



SOURCE: National Research Council, Transportation Research Board, *Transportation in an Aging Society: Improving Mobility and Safety for Older Persons-Volume 1* (Washington, DC: 1988), p. 21.

¹From U.S. Department of Commerce, Bureau of the Census, 1990_ of **Population (CPH-L-74, modified age and race counts), Table 1—Growth of the Older Population, Actual and Projected: 1900-2050.**

As a consequence, the State's Office of Transportation created the Intercity Bus Capital Assistance Program (IBCAP) to purchase new intercity coaches that would be leased to the private carriers at rates 50 percent lower than commercial lease rates.

Six of the first 28 coaches ordered under IBCAP were equipped with lifts. At the time, the only lift available was an elevator-style lift, developed for a Canadian demonstration project (discussed below) using MCI coaches, and commonly referred to as the first generation MCI lift. All 28 coaches had a retractable first step, extra handrails, and public address systems. The first accessible service began in May of 1986 with six regional carriers.³⁰ In 1989, 22 more coaches were delivered, all accessible with second-generation elevator-style MCI lifts, and the program was expanded to include 4 more bus companies.³¹

The Massachusetts Port Authority obtained six accessible coaches, leasing them to Plymouth & Brockton to provide service to Logan Airport. Using UMTA funds, the Taunton Regional Transit Authority purchased one lift-equipped OTRB and the Brockton Area Transit Authority purchased six, leasing them to Plymouth & Brockton. The Greater Attleboro Regional Transit Authority made plans to purchase nine accessible OTRBs, to be leased to Plymouth & Brockton. As of mid-1992, 15 percent of the total OTRB fleet in Massachusetts was lift-equipped.

Route Restrictions

Eighty percent of the routes traveled by buses purchased under IBCAP must be within the State of Massachusetts. This requirement is determined by total bus-miles operated in freed-route service, which allows bus companies to schedule accessible travel to limited destinations outside Massa-

chusetts, as Peter Pan does with its route from Springfield, Massachusetts to Albany, New York.

Another restriction is that no more than 15 percent of the bus-miles can be operated in charter and tour service, with no charters to be operated during peak commuting times. Initially, all charter-miles were to be operated in Massachusetts, although this was revised to allow charters to go outside the State.

Technology Issues That May Affect Demand

The first-generation elevator-style MCI lift on the accessible buses had problems associated with microprocessors, clearances, and loss of seating positions (see ch. 4). Second-generation MCI lifts addressed some of these issues. Overall seating capacity improved, from a displacement of six seats with both tie-downs occupied to a displacement of only four seats with both tie-downs occupied, although decreased baggage space remained a concern of the bus companies. However, significant maintenance problems are unsolved.

Passengers feel the effects of the imperfections of this system-sometimes quite literally. When the elevator platform settles, cold air from the baggage compartment rushes into the passenger compartment, and seals on the accessible door sometimes let in more cold air. Most of the 10 to 15 minutes involved in boarding a person with a wheeled mobility aid is taken up in the securement process. Securement is awkward and sometimes intrusive, creating difficulties for both the driver and the passenger. Some drivers complain that they are uncomfortable using the lifts to board persons in wheeled mobility aids; drivers also comment on lift reliability problems and their own lack of experience using the lifts. A few carriers have tried to limit such boardings to terminal end-points.

³⁰ These were Peter Pan Bus Lines, Plymouth & Brockton, American Eagle, Englander Coach, -then Line, and Interstate Coach.

³¹ The four companies were Big W Transportation, H&L Bloom, Inc., Brush Hill Transportation, and Gulbankian Bus Lines. Ecosometrics, Inc., op. cit., footnote 16, p. B-18.

Usage

Despite marketing efforts (discussed below), usage has been low. While data are incomplete, ridership statistics indicate that few individuals had actually taken advantage of the lifts as of mid-1992:

- Peter Pan Bus Lines of Springfield, Massachusetts, the largest carrier in the program, reports 361 reservations for accessible service since 1985, resulting in approximately 722 uses of the lifts.
- Plymouth & Brockton, despite extensive cooperative efforts with MCCD, the Equal Opportunity Transportation Commission (EOTC), and the Cape Organization for the Rights of the Disabled, had approximately 50 lift-use reservations in 1991, out of a total ridership of approximately 1.25 million for that year.
- Englander Coach Lines, which stopped doing business in 1992, averaged less than one lift-use per month for the time periods in which it kept data.
- American Eagle had four fixed-route lift-uses in the first three-quarters of 1991, out of a total of 47,000 boardings. In its charter work, American Eagle had three lift-uses for that same time period, and found that its charter calls for accessible service tended to come from cruise lines.
- None of the carriers with data report a single daily commuter.

Conclusions

In the debate over the ADA, industry sources cited the operational problems and the low demand in the Massachusetts project as reasons not to require a lift on every bus. But both the carriers and MCCD recognized that the operational problems with the lifts may have been a factor in low usage, as individuals using wheeled mobility aids shared with each other information about problems with the lifts, schedules, and drivers, thus discouraging greater use. Indeed, with the need for reservations, the potential for

error, and the limited number of accessible coaches, the possibility exists of a traveler with disabilities, on a trip from Cape Cod to Springfield, having to spend the night in Boston. Advocates for accessible service emphasize that only 6 of the 226 OTRBs in the State were lift-equipped through 1989.

The carriers involved had a mostly positive attitude about providing accessible service; the main thing they wanted was better lifts, although a second priority was finding a means of retaining the seats displaced by use of the tie-down positions, especially on busy commuter runs. The restrictions on charter and tour use outside the State caused some carriers to feel they must reject opportunities for business, such as tours of New England or trips lasting longer than a weekend. It is therefore likely that this low usage says little about the possible demand for charter and tour accessible vehicles.

Canada—The Newfoundland Demonstration Project

The Massachusetts program began with technology developed in Canada. Transport Canada has run two demonstration projects, one in Newfoundland and a second in Ontario. Because of the more complete data reviewed, OTA has opted to present the Newfoundland project, examining the genesis of the program, technical issues affecting demand, and actual usage. (For a discussion of Canadian support for its OTRB industry, see box 3-D.)

In the early 1980s, the Transportation Development Centre of Transport Canada began to study the development of accessibility technologies. Transport Canada's Advisory Committee on Transportation of the Handicapped had previously identified accessibility of intercity buses as a concern. A September 1981 report prepared the way for development of an accessible OTRB.

Between February 1985 and February 1988, Canadian National Rail operated a lift-equipped

Box 3-D—The Canadian Experience

As in the United States, Canadian freed-route over-the-road bus (OTRB) service reaches more communities than all the other public transportation services combined;¹ accessible intercity coaches are seen as an important step in making Canada accessible for persons with disabilities. Although Canada does not have legislation similar to the Americans with Disabilities Act, the Canadian Government has acknowledged the need for accessible service, and several Provincial governments have conducted demonstration projects. However, as in the United States, Canadian intercity coach operators face tough financial conditions, and it is unclear if some carriers can afford to invest in new technologies.

In October 1991, the Transport Minister announced that over the next 5 years the Canadian Government would provide \$24.6 million (Canadian dollars) in financial incentives to the transportation industry to provide accessibility for travelers. Of this sum, the government set aside \$3.5 million for Canadian intercity bus operators to purchase or retrofit buses with level-change devices and other accessibility features. Similarly, the government provided \$2.9 million to support fieldtesting, trials, and demonstrations of small-scale accessibility transportation technologies.²

In March 1992, the National Transportation Agency of Canada announced an inquiry into the accessibility needs of persons with disabilities, and methods by which access could be provided to intercity coaches. The agency has issued a draft national standard for accessibility, and expects to hear comments throughout 1993. The agency has proposed an equipment standard, which includes:

- ramps, lifts, or other level-change devices;
- two wheelchair spaces with proper securement equipment on each coach;
- movable arm rests for at least five seats on every coach;
- appropriate signage;
- high illumination levels;
- reduced height (less than 18 centimeters) for the first step onto the bus; and
- handrails and slip-resistant floors.

In addition, the proposed equipment standards reads: "Where no on-board restroom is accessible to persons in a wheelchair, the operator shall identify, in its schedule, specific stops which will be made to permit these persons to use accessible facilities."³

The intercity bus manufacturing companies in North America market to both countries, so both the U.S. and Canadian standards will affect the larger market in terms of accessibility technologies for intercity coaches.

¹ Whereas both trains and airplanes each serve about 500 communities, intercity buses serve over 3,000 Canadian communities, many of them small towns. National Transportation Agency of Canada, "Inquiry Into Canadian Motor Coach Services," discussion paper, March 1992, p. 2.

² T-pen Canada, Press Release No. 190/91, Oct. 21, 1991.

³ National Transportation Agency of Canada, op. cit., footnote 1, pp. 6-7.

MCI MC9 across Newfoundland as part of a demonstration project. The program involved driver training, public information, demonstrations to disability groups, a toll-free information and reservation number, and other efforts. Advanced reservations were encouraged but not required.

Technical Issues Affecting Demand

The Newfoundland project's MCI demonstration vehicle used an internal elevator lift, which became known as the first-generation MCI lift. The two tie-downs eliminated eight seats; an accessible restroom was discussed but vetoed when it was decided that it would be hazardous to

use while the bus was in motion, a particular concern when heavy braking occurs. The accessible trips available were limited. They at first included one weekly round-trip from St. John's to Port Aux Basques and back, and another weekly round-trip from St. John's to Grand Falls and back. In November 1986, this was changed to two weekly trips from St. John's to Port Aux Basques and back; the original schedule resumed in 1988.

The lift technology functioned well enough, but lift operations were so infrequent that even trained drivers forgot certain aspects of lift use. In addition, the high-technology aspects of the lift intimidated some drivers, and some of the safety sensors did not function.

Usage

For the 3-year period of the demonstration project, the evaluation report counts 130 one-way uses of the lift. Persons using wheeled mobility aids accounted for 128 of these uses; only 9 times did anyone opt to transfer from a wheeled mobility aid to a conventional seat. While most usage characteristics were similar to those of other riders, persons with wheeled mobility aids tended to take fewer long trips. For many of these individuals, the bus schedule was more important than the issue of accessibility—the project report states that despite preferring the accessible bus, persons needing the lift were more likely to deal with the inconvenience and discomfort of a nonaccessible bus than to adjust their schedules for the arrival of the lift-equipped OTRB. Among those using the lift, 55 percent of the trips were for social or recreational occasions, 32 percent for medical reasons, and 13 percent for education or work. In 1988, ridership of persons using the lift declined to 23 uses per year; by 1991, this number was down to 13 uses. Total ridership during that period declined as well, although much less rapidly.

Conclusions

Does a demonstration project that runs a route only once or twice a week present any basis for

extrapolating to a fully accessible service schedule? The short answer is that it does not. As shown by the data, the Canadian operators learned that the timing of the bus was a key factor in the decision to travel. Problems with lift operation may also have had an impact. In addition, the population served by the project is quite small: in a province about 500,000 people, both Grand Falls and Port Aux Basques have populations under 10,000, and the St. John's greater metropolitan area barely exceeds 100,000. These factors, combined with the small area of the Province, make it unlikely that the data are relevant to the demand for nationwide accessible OTRB service in the United States.

The Denver Regional Transit District Experience

Since 1987, the Denver Regional Transit District (Denver RTD) has purchased OTRBs to serve a number of routes to outlying cities. Denver RTD now has 102 OTRBs, 39 of which are equipped with Stewart and Stevenson lifts. One of the main routes using OTRBs connects Denver, Stapleton Airport, and Boulder. Accessible service accounts for 37 percent of total intercity service; weekend service is 100 percent accessible, and weekday service runs between 0 and 55 percent, depending on the route.

Technology Issues Affecting Demand

Denver RTD primarily uses an external lift designed by Stewart and Stevenson Power, Inc., which has been installed on both MCI and Neoplan OTRBs. Experience with this lift has been positive; it is simple to operate and requires little maintenance. Denver RTD reports that in 1991 a total of 39 labor-hours were spent on maintenance of the 18 lifts used that year. Criticism of the external lift centers on its operation outside the bus, for it exposes to the elements both the driver and the passenger using

the lift, and it offers no enclosure for a passenger leery of its 5-foot elevation.³²

Usage

Early ridership on the lift-equipped OTRBs was low, at perhaps one or two lift-uses per month. Ridership by persons using wheeled mobility aids has grown steadily, however, as the overall accessibility of the fleet has improved. From November 1990 to October 1991, lift usage on routes with scheduled accessible service was 3,837, or 0.19 percent of total ridership. The heaviest lift usage has been on the route linking Denver, Boulder, and Stapleton Airport—with 2,885 total trips on a route that is 57 percent scheduled for accessible service, the rate is about eight lift-uses per day, or 0.28 percent of total ridership on that route.

Conclusions

Like the other projects discussed here, the experience of the Denver RTD does not provide a look into the future of accessible fixed-route OTRB service. The Denver RTD is a transit operation, and its passengers use the service for different reasons than they would a longer haul bus service. However, the experience of the system offers some lessons.

First, from a technical standpoint, the lifts operate well and it appears that for the most part both the operators and the passengers are pleased with them. Second, ridership has increased over time, as more and more routes became accessible and as persons with disabilities became familiar with the system. Finally, the heaviest use of the lifts is to key locations: a large city (Denver), a

large college town with a nearby military base (Boulder), and a major airport (Denver Stapleton).

Charter and Tour Service

The experience with accessible charter and tour OTRB service in the United States is even more limited than with fixed-route service. Nothing in the way of a demonstration project has been done with charter and tour service, although some accessible buses purchased or operated with the help of public financing do run the occasional charter. Of the handful of private firms operating accessible tours, only two use their own accessible OTRBs (Evergreen Travel Service, Inc. in Lynnwood, Washington, and Sunrise Plaza, Inc., in Los Angeles, California—see ch. 2).³³ These numbers would seem to suggest that the demand for accessible charter and tour service is very low. In some European countries, however, many more tour firms operate accessible coaches. Indeed, this disparity between U.S. and European OTRB services forces many tour operators servicing the disability community to arrange most of their accessible tours abroad.

Why is accessible charter and tour service available in Europe and not in the United States? The European population of persons with disabilities is not appreciably different from that in the United States. Nor are the technologies for providing accessibility (e.g., lifts and ramps) less expensive—although some governments pay part of the costs for accessibility technologies on OTRBs. Most likely, the difference between the United States and Europe is that the demand for accessible service was recognized much earlier by segments of the European travel industry and therefore, by fostering the market for accessible

³²OTA has heard these Cements from both bus operators and individuals with mobility disabilities. The point is usually raised by bus operators and usually discounted by people with disabilities as a small price to pay for accessibility.

³³The bus companies participating in the Massachusetts Intercity Bus Capital Assistance Program can run charter and tour service with their accessible OTRBs, but they are under time constraints and they have received public funding. Similarly, a number of California firms under contract to local governments have the capacity to offer charter and tour service on accessible OTRBs, but they are under restrictions due to the nature of their contracts.

charter and tour services, accessible travel has grown.³⁴ Consequently, although the lack of supply of accessible charter and tour service in the United States might be a function of the lack of demand, it could well be the case that the lack of demand is due to the lack of supply. (See box 3-E on marketing of charter and tour services.)

Problems With Using Existing Ridership To Indicate Demand

The demonstration projects discussed above have tested the potential demand (and technologies required, see ch. 4) for accessible fixed-route OTRB service. As noted, usage of lift-equipped OTRBs in these demonstration projects has been quite low.³⁵ However, as discussed above, extrapolations from these data to estimate ridership by persons with disabilities for nationwide accessible fixed-route OTRB services may be quite inaccurate for several reasons.

- Since there have been only a few examples of accessible OTRB service, the overall experience with such service has been extremely limited.
- The accessible operations were limited in geographical extent and served only a few routes; many potential riders found that their destinations and scheduling needs were not addressed by accessible service.
- Although the Canadian demonstration projects collected good data on lift usage and ridership, the U.S. accessible systems have collected very little data.
- Little marketing accompanied the projects, so persons with disabilities often did not know that the service existed.

Yellow Pages advertisements are the most common marketing tools used by OTRB companies.

- Much of the experience to date is based on an early generation MCI elevator-style lift, which was plagued with reliability problems.

Marketing

Fixed-route bus companies tend to do little marketing. Some run an occasional advertisement, in which they may mention that they will assist riders with disabilities who make a special request. In addition, Greyhound has a toll-free number for persons seeking such assistance. Past this, however, OTA could find no efforts to reach or assist persons with disabilities in using the OTRB system.

Even with accessible fixed-route service, marketing efforts have been limited. The Massachusetts EOTC provided carriers with brochures on the availability of service through their program, and worked with MCCD to develop public service announcements and to communicate with disability groups. EOTC has made further efforts

³⁴ Although it may be relatively easy to arrange an accessible tour in certain European countries, OTA could learn of no accessible fried-mute OTRB service in Europe. So, for example, a person with disabilities might be able to take a tour of Berlin and its sights, but would be unable to take a bus from Dusseldorf to Vienna. While the U.S. guide to fixed-route bus schedules, *Russell's Guide, is 540* pages long, its European equivalent is a mere 40 pages. Instead, much European travel takes place on the extensive railroad system. Frederic D. Fravel, Econometrics, Inc., personal communication, July 1, 1992.

³⁵ While some transit systems have seen ridership by individuals with disabilities increase dramatically once the entire system became accessible, transit service differs significantly from OTRB service. For example, individuals with disabilities might use transit services to go to work, a usage that would be less likely for a fixed-route OTRB passenger.

Box 3-E—Charter and Tour Marketing for Individuals With Disabilities

Most accessible leisure or vacation travel for Americans with disabilities is by private auto, accessible van, airplane, cruise ship, or Amtrak. Over-the-road bus (OTRB) travel is the least accessible and most difficult to arrange. The result is that most opportunities for accessible motorcoach tours for Americans with disabilities lie abroad, not in the United States. Americans with disabilities take their bus tours in Western Europe, Israel, New Zealand, Australia, and elsewhere. But overseas trips are expensive, and few individuals with disabilities, their family members, and traveling companions can afford them.

A few U.S. travel agents and tour operators have the disability community as their primary client base and advertise in publications such as *Paraplegia News*, *Mainstream Magazine*, *The Itinerary*, *Sports and Spokes*, *Handicapped Travel Newsletter*, and *Accent on Living*. One tour operator in Minnesota has been providing accessible tours for over 20 years.¹ Another in California runs an information network called Travel Industry and Disabled Exchange (TIDE), publishes a newsletter, "Tide's In," and maintains a mailing list of more than 1,100 wheeled mobility aid users.² Most of the operators rely on traditional travel business to offset the expense of the disability niche market.

OTA located 3 directories that list some 325 travel agencies and tour operators offering accessible travel opportunities for persons with disabilities. Many arrange trips for clients with specific disabilities, such as visual impairments, hearing impairments, or cognitive impairments. Some offer tours for individuals dependent on dialysis or for persons with diabetes, while others specialize in travel for people using wheeled mobility aids. A few handle tours accommodating the entire range of persons with disabilities. Only five tour operators/travel agents appear on all three lists.³ One is the tour operator with the lift-equipped OTRB profiled in chapter 2, box 2-F.

A nonprofit organization in New York City, called the Society for the Advancement of Travel for the Handicapped, operates a worldwide clearinghouse of information on accessible travel conditions for persons with disabilities. It lists 35 travel agents in this country and 9 operating in Australia, Egypt, Greece, Israel, France, and Hungary.⁴ Twin Peaks Press in Vancouver, Washington has published a directory of 300 travel agencies in the United States, 26 in Canada, and 46 abroad that arrange tours for individuals with disabilities.⁵ The American Association of Retired Persons (AARP), in its book *Touring by Bus at Home and Abroad*, devotes one chapter to "The Traveler With Disabilities" and lists 10 travel agents in this country providing tour services for persons with disabilities.⁶

The tour network for persons with disabilities is rudimentary and scattered. Participants are primarily small businesses. In many cases, the involvement of a travel agent or tour operator in serving the disability community depends on the interest of a single employee who may leave at any time. The American Society of Travel Agents, representing some 12,000 approved travel agents, has established a 15-member Committee on Travel for the Disabled to raise the level of awareness of front-line travel agents about the travel needs of persons with disabilities. Several active participants in this informal tour network are members of the committee.

¹ Barbara Jacobson, owner, Flying Wheels Travel Service, Owatonna, MN, personal Communication, July 15, 1992.

² Yvonne Nau, Nautilus Tours, he., Tarzana, CA, personal communication, Jan. 28, 1992.

³ Evergreen Travel Service, Inc. of Lynnwood, WA; Flying Wheels Travel Service Of Owatonna, MN; Nautilus Tours, Inc. of Tarzana, CA; New Directions, Inc. of Santa Barbara, CA; and Wheelchair Wagon Tours of Kissimmee, FL. A sixth, Whole Person Tours of Bayonne, NJ, would probably have made all three lists but has been inactive since late 1991.

⁴ Available through Society fo, the Advancement of Travel for the Handicapped, 347 Fifth Avenue, New York, NY 10016.

⁵ Available through the Disability Bookshop, P.O. Box 129, Vancouver, WA 98666-0129.

⁶ Diane C. Gleasner, *Touring by Bus at Home and Abroad* (Washington, DC: American Association of Retired Persons, 1990), pp. 95-103.

to enable persons with wheeled mobility aids to use paratransit throughout the State, easing travel to and from OTRB stations at both ends of the journey. MCCD, meanwhile, has developed and promoted use of accessible OTRBs within the State. Some of these funds have gone toward a statewide toll-free number that provides information about and reservations on accessible intercity buses and the corresponding paratransit connections. Most Massachusetts carriers, however, have done little beyond *Yellow Pages* advertisements to promote their accessible service.

The Canadian demonstration projects involved extensive marketing, including meetings and demonstrations with disability groups, media advertising, free rides, and publicity efforts. The free ride promotion was particularly effective. In the United States, transit systems tend to market OTRB accessibility as part of the information they provide regarding the overall accessibility of their systems. Denver RTD has a brochure describing its system, and its timetables include accessibility information. In California, the Golden Gate Bridge Highway and Transportation District has a user brochure discussing all of its accessible vehicles, including OTRBs.

THE DIFFICULTIES OF PROJECTING DEMAND

One of the issues regarding ADA accessibility standards for OTRBs concerns demand versus need. Disability groups make a strong case that a significant portion of the population needs accessible OTRB service. On the other hand, bus company owners fear making capital expenditures they might not be able to afford in order to provide a service that maybe little used. Who is right? It is possible that both groups are; a given service might be needed by a particular segment of society, while the demand might still be small

compared with the demand of the total population.

Need may seem relatively easy to quantify in the case of individuals with disabilities. Although a precise count of such persons does not exist—and the accuracy of such a count would be questionable because of the definitions used and the exclusion of temporary disabilities—the surveys cited earlier in this chapter present an approximate range. However, there is as yet no way to specify the frequency of supply required to fulfill this need. While the passage of the ADA requires that persons with disabilities eventually have universal access to OTRBs, previous studies have found that actual use of a new transportation mode by a given group seldom correlates with the behavior predicted in advance.³⁶

Demand is the actual use of a service. Estimation of demand for transportation services requires data from the observed behavior of similar consumers making similar choices of services with similar attributes. In the case of accessible OTRB service, which has been offered only in a handful of demonstration projects, extrapolation becomes difficult, more abstract, and less reliable. Need almost always exceeds demand, and therefore complicates projections.³⁷

Demand Estimation Methodology

Because of the many problems with extrapolating demand estimates from current usage figures for both fixed-route and charter and tour accessible service, OTA devised an alternative method to estimate the demand for accessible service, using both OTRB travel data available for the general population and the numbers of persons with disabilities in the total population. First, “trip rates” are calculated for both fixed-route and charter and tour services. A trip rate is the average number of fixed-route or charter and tour trips taken by one person in the United States. These

³⁶ Ecosometrics, Inc., op. cit., footnote 16, pp. 1-48 to 1-49.

³⁷ Ibid., p. 1-49.

trip rates are then applied to total population estimates of persons with disabilities to obtain the number of trips that these persons might take.

Estimating Trip Rates for OTRB Services

OTA estimated the fixed-route intercity per capita trip rate by taking the best estimate of U.S. fixed-route ridership and dividing it by the total population. Interstate Commerce Commission data from the largest fixed-route intercity carriers estimates 28 million passenger-trips in 1990. To account for ridership on the smaller carriers, an additional 10 percent was added to this figure for a total of slightly less than 31 million. This number was then divided by 249 million (the U.S. total population, as estimated by the U.S. Bureau of the Census) to obtain a national fixed-route intercity trip-making figure of 0.125 trips per-person annually.³⁸

Estimating a trip rate for charter and tour service is problematic, because the nationwide data on charter and tour trips are incomplete. To ensure the greatest level of statistical confidence possible, the annual number of charter and tour trips in the United States was estimated in three ways.³⁹ First, the statistical summary, *Transportation in America*, reported that in 1990, OTRBs carried 322 million passengers. Subtracting the 31 million fixed-route passengers leaves 291 million passenger-trips on charter and tour OTRB services. Second, the 1983 American Bus Association (ABA) Annual Report estimated that 209 million passengers used charter and tour services in that year. Assuming an annual growth rate of 5 percent, there would have been 294 million passengers in 1990. Finally, ABA surveyed the 3,500 charter and tour firms. Of the firms that responded, the typical firm may carry between 82,000 and 92,000 passengers annually, resulting



National Federation for the Blind

Persons with disabilities have family members or friends who might travel with them.

in 287 to 322 million trips nationwide. Choosing 291 million trips as the best estimate and dividing by the total population of the United States gives an average per capita trip rate of 1.17 trips.

Adjusting for Differences in Travel Patterns of Persons With Disabilities

The 1977 UMTA study is the only national travel survey thus far to attempt to determine the travel characteristics of persons with disabilities.⁴⁰ This study interviewed a sample of persons with permanent or temporary disabilities, including those in institutions. It found that these

³⁸ One important note concerns the possibility of developing different per capita trip rates for different age groups and for urban versus rural populations. While such a breakdown of the national trip rate might be ideal, it is not feasible with the incomplete data available.

³⁹ *Ecosometrics, Inc.*, op. cit., footnote 16, pp. 3-14 to 3-15.

⁴⁰ Grey Advertising, "Technical Report of the National Survey of Transportation for Handicapped People," prepared for Urban Mass Transportation Administration, October 1978.

persons took 35 percent fewer recreational trips than persons without disabilities. Most fixed-route and charter and tour passengers traveled to visit family or for other social or recreational reasons.⁴¹ In accounting for how many trips **they** would have liked to take, the survey found that the overall trip rate for persons with disabilities would be 15 percent less than that of persons without disabilities if all transportation modes were accessible.

Although this study argues for a lower trip rate for persons with disabilities, considerable debate exists about the likely travel patterns of persons with disabilities on OTRBs if all such services were accessible. Some researchers suggest that trip rates for persons with disabilities must be less than those for the general populace due to the subpopulation of persons with disabilities who have overall lower mobility, or due to the low economic status of many persons with disabilities (i.e., they could not afford the trip).

However, other researchers cite the high correlation of disabilities with age, lack of access to automobiles, and lower incomes as a reason persons with disabilities might have higher than average trip rates.⁴² *At the same* time, escorted tour trip rates may be higher due to the convenience of having a tour operator “scout ahead” to determine the accessibility of the tour route.⁴³ In particular, older persons with disabilities who also have higher incomes might avail themselves of accessible charter and tour service. What is not

known is whether trip rates for persons with disabilities will most strongly reflect certain demographic characteristics, or the extent to which having a disability is a characteristic that overrides other factors.

Because of the conflicting analyses cited above, the following calculations include no adjustments for differences in the travel patterns of persons with disabilities. Nor does the trip rate account for additional travel by persons without disabilities who can now accompany friends and family who have disabilities onto OTRBs, a factor with potential to increase the estimated number of trips.

Calculating the Number of OTRB Trips by Persons With Disabilities

To reiterate the demographic data above:⁴⁴

- 1.4 million people use wheelchairs.
- 1.7 million people use walkers.
- 3.0 million people use any mobility technology devices,⁴⁵
- Up to 14 million people have hearing impairments.
- 4.0 million people use hearing technology devices.
- 5.0 million people have sight impairments that make independent travel difficult.
- 1.1 million people are legally blind.
- 0.3 million people use vision technology devices.

These figures and the trip rates developed above are used to calculate the number of trips taken by persons for fixed-route and charter and tour

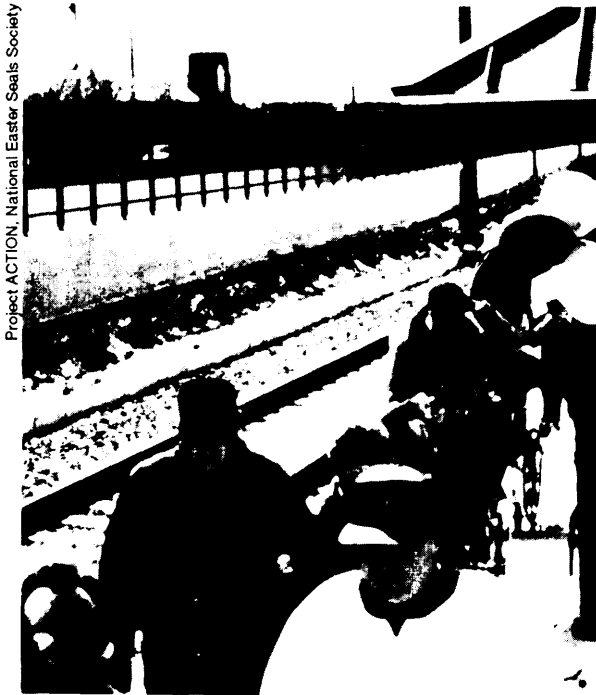
⁴¹Frederic D. Fravel, “Intercity Bus Passenger Profile,” paper presented at the Annual Meeting of the Transportation Research Board, Washington DC, January 1985; and Greyhound Lines, Inc., “Greyhound On-Board Passenger Profile Survey,” unpublished document, August 1991.

⁴²Because of **the** lack of accessible OTRBs, travelers with disabilities have had to rely on other modes of transportation. For **those** who **have** traveled via other modes, the question must be asked as to whether they would switch to OTRBs. Since many persons with disabilities do not drive and thus more remote locations are **difficult** for them to **reach**, the large network of stops served by OTRBs compared with other modes of transportation may be an invaluable service to many persons with disabilities. With fixed-route bus **service** as a low-cost alternative, it is possible that low-income persons with disabilities will see accessible OTRB service as their best travel option. Remarks at Office of **Technology** Assessment Workshop, “Building an Accessible OTRB System,” July 15, 1992.

⁴³ Ibid.

⁴⁴ These groups **may** overlap, because some persons **may** use more than one **type** of aid or **may** have more than one kind of disability.

⁴⁵ This number includes persons using crutches, walkers, wheelchairs, scooters, and other mobility equipment, but **not** persons using leg braces and/or canes and walking sticks.



Project ACTION, National Easter Seals Society

Actual demand for accessible service is difficult to predict.

services. For fixed-route intercity service, if all OTRBs were accessible today, total trips made annually by persons with sensory and/or mobility impairments might include the following:⁴⁶

- 180,000 trips by persons using wheelchairs.
- 210,000 trips by persons using walkers.
- 380,000 trips by persons using any mobility devices.⁴⁷
- Up to 1.8 million trips by persons with hearing impairments.

- 500,000 trips by persons using hearing technology devices.
- 630,000 trips by persons with sight impairments that make independent travel difficult.
- 140,000 trips by persons who are legally blind.
- 33,000 trips by persons using vision technology devices.

Similarly, for charter and tour services, total trips made annually by persons with sensory and/or mobility impairments might include the following.⁴⁸

- 1.7 million trips by persons using wheelchairs.
- 2.0 million trips by persons using walkers.
- 3.6 million trips by persons using any mobility devices.⁴⁹
- Up to 16 million trips by persons with hearing impairments.
- 4.7 million trips by persons using hearing technology devices.
- 5.9 million trips by persons with sight impairments that make independent travel difficult.
- 1.3 million trips by persons who are legally blind.
- 0.3 million trips by persons using vision technology devices.

These numbers are only estimates. Estimating travel demand figures is notoriously difficult for services that have not yet been introduced. Travel preferences are often unique to the individual and only experience with a particular transportation

⁴⁶ The following numbers do not include persons using leg braces or persons using canes or walking sticks, who might also require assistance, especially in the form of a lower first step, in boarding OTRBs. OTA calculates the number of fixed-route trips made annually by persons using leg braces as 110,000 and the number of fixed-route trips by persons using canes or walking sticks as 550,000.

⁴⁸ The following numbers do not include persons using leg braces or persons using canes or walking sticks, who might also require assistance, especially in the form of a lower first step, in boarding OTRBs. OTA calculates the number of charter and tour trips made annually by persons using leg braces as 1.0 million, and the number of fixed-route trips by persons using canes and walking sticks as 5.1 million.

⁴⁹ This number includes persons using crutches, walkers, wheelchairs, scooters, and other mobility equipment, but not persons using leg braces and/or canes and walking sticks.

system can give credible estimates of future travel on that system.⁵⁰

However, compared with the total number of OTRB passengers, there is no doubt that the annual number of additional trips by persons with disabilities is likely to be small. These riders may increase usage of OTRB services. But if the provision of accessible service requires bus companies to raise rates, certain passengers who are price sensitive may choose to ride other forms of public transportation, go by automobile, or not

travel at all. Combined with the actual ridership of passengers with disabilities, this change in ridership might result in either a net increase or decrease. Indeed, since the ridership of OTRBs experiences large fluctuations for other reasons (due to changes in the general economy and points served by OTRBs), it will probably be impossible to discern if changes in ridership are due to accessibility requirements, even retrospectively.

⁵⁰ Demand forecasts rely heavily on previous usage data. U.S. Congress, Office of Technology Assessment, *Airport System Development*, OTA-STI-231 (Washington, DC: U.S. Government Printing Office, August 1984), pp. 159-185.