

# Methodology for Conducting a Transportation Survey of Persons with Disabilities

ROY LAVE, KATHI ROSE, AND JAMES SUGRUE

The methodology described here was used to conduct a survey of persons with disabilities living in the area served by the Chicago Transit Authority (CTA). The survey was designed to learn about the travel behavior, attitudes toward modes, effect of disabilities on travel, and demographics of this population. The effectiveness of the survey is measured by the level of response from those receiving the survey. The substantive results of the survey are reported elsewhere. The survey was conducted just before the beginning of service, and intended to serve as a baseline for comparison of future survey results. It consisted of three parts. A telephone screening survey was used to obtain a random sample of persons with disabilities as well as to ascertain the incidence of disabilities in the total population. This survey revealed that 4.2 percent of the population in the CTA service area age 12 or over "have some difficulty in traveling." These respondents, plus a sample drawn from a list of registrants for the CTA's paratransit service, were mailed a 7-day travel diary, followed by telephone administration of a questionnaire covering travel behavior, preferences, attitudes, and demographic information. In spite of the length of the diary and the relatively long telephone survey, the overall response rate was 52.3 percent, aided by a \$5 financial incentive, extensive telephone follow-up, and the credibility of the sponsoring organizations.

In 1985, several persons who used wheelchairs filed suit against the Regional Transit Authority (RTA) and the Chicago Transit Authority (CTA), charging that they had been illegally denied access to public transit. The 1989 settlement of the suit included the following terms:

1. The CTA would operate 700 lift-equipped buses on selected routes for 5 years. An evaluation conducted during the 5-year period would determine the unit cost of lift-assisted bus ridership and other performance indicators. (A survey was cited in the settlement agreement as one of the evaluation techniques.)

2. The CTA would make their entire fleet accessible with wheelchair lifts if, after 5 years, the cost of rides assisted by lifts was close to the cost of CTA's Special Services rides (door-to-door reservation service offered by private contractors using small buses, vans, and sedans). If not, the CTA had to operate the 700 buses with lifts only until their retirement.

Subsequently, the RTA adopted a regional transportation policy calling for accessible mainline bus services, and the Americans with Disabilities Act was passed, rendering portions of the settlement order pointless. Nevertheless, the RTA and CTA elected to proceed with the survey because of its value as a tool for monitoring and improving accessible service.

The specific objectives of the survey were to

- Relate demographic, geographic, and personal factors to travel behavior;
- Develop a factor that would increase observed lift-use ridership to account for the fact that only one-third of the bus fleet was accessible;
- Identify impediments to lift use;
- Identify attitudes toward Special Services;
- Identify changes in travel behavior among the population of disabled persons as a result of the implementation of lift-equipped bus service; and
- Document the changes in attitudes toward public transit among persons with disabilities after lift-equipped bus service is initiated.

The benchmark survey was conducted in fall 1990 just before the introduction of the first of 700 mainline buses with wheelchair lifts. Comparisons between data from this survey and follow-up surveys planned for coming years would reveal the impact of accessible public transportation on the lives, behavior, and attitudes of mobility-limited individuals.

## OVERVIEW OF METHODOLOGY

An overview of the various issues in planning and designing the survey is described in this section. Greater detail is provided in subsequent sections.

### Definition of the Population

The population surveyed consisted of persons who have difficulty in traveling because of blindness or inability to walk or climb stairs (represented by the second largest oval in Figure 1). This is a subset of the population containing all persons with disabilities (represented by the largest oval in Figure 1). This target population was chosen because it was thought to contain those persons who would benefit from the introduction of wheelchair lifts. To concentrate on the ages

R. Lave, Systan, Inc., P.O. Drawer U, Los Altos, Calif. 94023. K. Rose, The Blackstone Group, 5 North Michigan Ave., Chicago, Ill. 60602. J. Sugrue, Regional Transportation Authority, 1 North Dearborn St., Suite 1100, Chicago, Ill. 60602.

when persons are most likely to be independent travelers, the population was restricted to those 12 years of age or over.

Another subpopulation of interest consisted of those persons eligible for CTA's Special Services program, as shown by the third oval in Figure 1. To be eligible for CTA's Special Services, a person must be unable to use regularly scheduled public transportation for one or more of the following reasons:

- Meeting the legal definitions of both blindness and deafness,
- Meeting the legal definition of blindness and not possessing the mobility skills to travel fully independently, or
- Having great difficulty in climbing, or being unable to climb, three standard motor coach steps.

A physician's certificate verifying the eligibility conditions is necessary. Not all persons eligible have chosen to be certified for CTA service, presumably because they travel by other modes or they do not travel at all. The population of those certified, shown as the shaded oval in Figure 1, was of particular interest because their response to lift service is an important factor in policy formulation and planning.

#### Determining Sample Size

The target population of persons with disabilities was estimated to contain 30,000 to 50,000 persons. The usual practice to find a sample would be to randomly select a sufficient number of names to ensure that the error from sampling did not exceed a specified percentage. Originally, a completed sample of about 4,000 was envisioned to ensure that it could be divided into a number of subgroups of at least 400 each, such as wheelchair users, and to ensure a sample large enough to allow analysis of these subsets with a tolerable sampling error. A large sample was also desired so that if the same group were surveyed in the future, a sufficient number could still be contacted in spite of attrition. When economic realities of conducting the survey became clear, the 4,000 sample was abandoned for a sample of about 1,000 completed surveys.

#### Selection of Sampling Frame

One means of selecting a sample is by randomly selecting names from a list enumerating the population. No such comprehensive list of persons with disabilities exists in Chicago. Although a number of lists of persons with disabilities are maintained by social service agencies, advocacy groups, and government agencies, many are privileged, restricted by law or by agreement. Moreover, the amalgamation of all such lists would certainly not comprise the total population, so a sample from the lists would be biased. Therefore, it was decided to adopt the relatively expensive procedure of telephoning randomly selected numbers to find a small but relatively unbiased sample. This telephone survey, or "screening survey," resulted in a sample of 243 persons in 227 households who represented the population of all persons with transportation disabilities.

Special Services users formed a population of interest to transit planners and policy makers, because they are likely users of accessible service, and they could provide an informed opinion on paratransit service. Although about 20 percent of the screening sample consisted of Special Services users, this was too small to support analysis. Therefore, an additional sample of about 1,900 persons was selected from the list of registrants for CTA's Special Services. Over 800 completed surveys were received from this group, a large enough sample so that this sample, together with the smaller sample of all persons with transportation disabilities, provided a sufficiently large sample to support conclusions about the two populations and their differences.

Another sampling issue was the number of days to be included in the diary. Since it was expected that the trip-making rate of the subject population would be considerably lower than the average for the total population, around three trips a day, there was concern that a sample of 1,000 persons would result in too few reported trips to support conclusions if the usual 1- or 2-day record of travel was collected. This sample is usually collected with a question such as "Please describe all the trips you made yesterday." Therefore, it was decided to ask each respondent to provide a full 7 days of

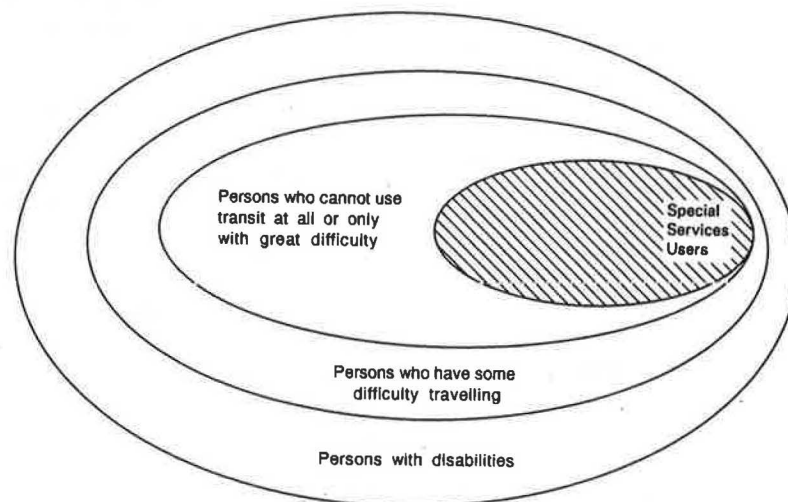


FIGURE 1 Populations of persons with disabilities.

trip-making data. The week of trips would also provide sufficient data to identify patterns on the different days of the week.

In summary, two samples were surveyed. The first consisted of the 243 persons with transportation disabilities identified in the telephone screening survey, shown as a rectangle containing the number 243 in Figure 2. This sample included persons who were eligible and who registered to use Special Services, which is indicated by the overlap of the rectangle with these two populations. The second sample consisted of the 1,959 names selected at random from the list of persons registered for Special Services, shown as the second rectangle in Figure 2.

### Selection of Mode of Administration

The concern about nonresponse bias suggested the use of a telephone survey, which usually results in higher response rates than a mailed survey. Statistics compiled by Survey Sampling, a firm specializing in random-digit sampling, indicate that 94.1 percent of the households in the Chicago metropolitan service area have telephones, making telephone interviewing a slightly less-comprehensive means of conducting a general population survey than door-to-door interviewing. Telephone interviewing has some other advantages over other data collection methods. Compared with door-to-door interviewing, telephone surveys are substantially less time consuming, costly, and dangerous. Finally, telephone interviewing yields higher participation rates and better-quality data than can be obtained from a mail survey.

There are also shortcomings to telephone surveying. Persons with disabilities tend to have low household incomes, and thus are less likely to have telephone service. Moreover, many persons who live in group or institutional settings typically do not have their own telephones. Finally, interviewing by telephone may cause underrepresentation of individuals with communication impairments or limitations, including the

deaf and non-English-speaking. In spite of these problems, which were considered minor, telephoning was selected as the major means of administering the survey.

The 7-day diary presented a problem for telephone surveying, since existing studies suggested that people cannot accurately recall trips made several days in the past. This fact argued for collecting trip-making records contemporaneously, either by having them recorded by the respondent or by having interviewers make daily telephone calls to respondents. Since daily calling appeared to be prohibitively costly, it was decided that the diary would be a mailed, self-reporting format and the rest of the survey would be conducted by telephone. It was hoped that urging respondents to call for more information would encourage respondents to participate.

### Use of Cash Incentives

Mailing of a survey with a token cash incentive enclosed is believed to be effective in encouraging the return of the survey. It was decided to include \$1 with the diary when mailed, and to promise a second cash payment of \$4 upon completion of the telephone survey.

### Avoiding Nonresponse Bias

The resulting survey design, which combined a 7-day diary and a 20- to 30-min telephone survey, was ambitious in that it required considerable effort by the respondents—effort that could discourage participation, especially among the high proportion of older respondents in the population. Low participation raises the possibility of a substantial nonresponse bias, that is, a skewing of the results if the persons who refuse to respond are significantly different from those who do respond. To control this bias, a number of measures were taken to ensure a target response rate of 50 percent, which was deemed to be sufficiently high to allow valid conclusions. The

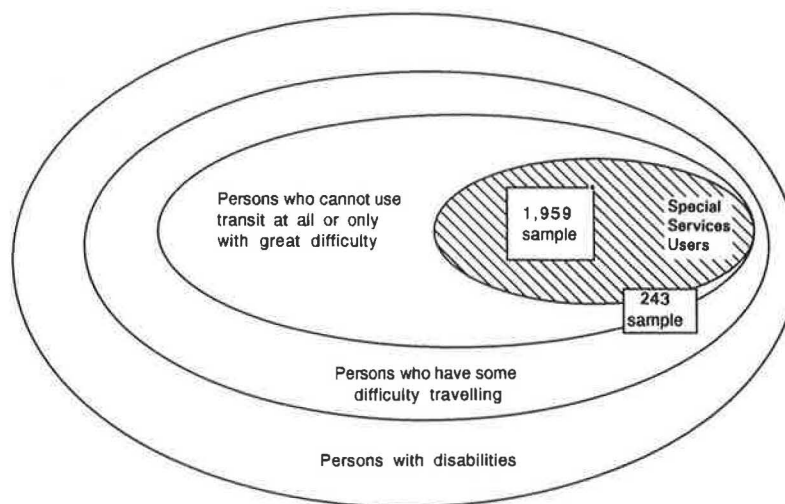


FIGURE 2 Source and size of two samples.

measures used to increase the rate of response included extensive pretesting to ensure that the conduct of the survey did not discourage respondents, extensive follow-up to offer help and encourage responses, small cash incentives, and the identification to the respondents of a number of sponsoring organizations to establish credibility for the survey.

### Trips Wanted but Not Made

Since one purpose of the survey was to extrapolate observed trips to estimate the number that might occur when more buses in the system became accessible, respondents were asked to identify the trips they wanted to make but did not make on each day. The literature contains caveats against asking people whether they will make hypothetical trips or use hypothetical modes, so some skepticism concerning this part of the diary is justified. On the other hand, such questions have been used successfully for demand estimation when they have been specific and tied to performing daily functions, as was done in this case. However, the use of this approach is as much a research effort as a data collection effort. The ability to survey several times over a period of years may provide a unique test of this means of assessing latent demand.

## METHODOLOGY

### Overview

As described above, a three-part survey was used consisting of a telephone screening survey to identify persons with disabilities in the general population, a self-completion travel diary to gather information on individuals' actual and desired travel behavior during a 1-week period, and a telephone interview, called the telephone survey, to elicit disability, attitudinal, and demographic data. The following sections cover the methodologies used for each component of the survey and the method of pretesting.

### Telephone Screening Survey

#### Purpose

As noted above, a screening survey, conducted among a random sample of households served by the CTA, had the following purposes:

- To determine the percentage of households in the CTA service area containing one or more persons with mobility limitations,
- To obtain some basic information about individuals with mobility limitations, and
- To recruit 200 to 400 mobility-limited individuals to receive the diary and participate in the telephone survey, by which they would provide the basis of comparison to reveal the differences between the Special Services registrants and all persons with mobility limitations.

### Procedure

To ensure that households with both listed and unlisted telephone numbers were represented, the numbers used were computer-generated random combinations of digits within the valid telephone exchanges for the CTA service area.

Two general questions on transportation were asked to initiate the interview. In addition to having research value for the CTA, these questions served as "warm-ups," confirming the survey's bearing on transportation issues and making respondents comfortable before answering personal questions about mobility limitations. Recognizing the influence of question wording on individuals' willingness to identify themselves or members of their households as having an impairment, it was decided to use the phrase "difficulty in traveling" on the grounds of simplicity and general comprehensibility, rather than such terms as "mobility limitation" or "disability."

A sample of 9,000 randomly generated telephone numbers with the exchanges used in the 38 communities in the CTA service area was purchased from a vendor. Interviewers were briefed on the purpose of the study and the procedures for administering the screening questionnaire. They also took part in mock interviews that emphasized the importance of tact and sensitivity in interacting with participants.

Interviewing began in September 1991 and concluded in early November 1991. Interviewers made three attempts to reach a head of household at each working telephone number in the sample.

### Results

A classification of the screening telephone calls is as follows:

<i>Item</i>	<i>No.</i>
Total calls	15,150
Incomplete calls	
No answer/busy/call back	6,515
Disconnected/business/FAX	2,425
Answering machine	1,838
Foreign language	100
	<hr/> 10,878
Initial refusals	987
Terminations—out of area	213
Nonqualifying households interviewed	
No mobility-limited members	2,745
Nonqualifying medical condition	10
All mobility-limited members under age 12	3
	<hr/> 2,758
Qualifying households interviewed	
Recruited for diary receipt and telephone survey	227
Refused recruitment	87
	<hr/> 314

The screening survey found that 10.2 percent of the households in the CTA service area contain one or more persons aged 12 or over who had "some difficulty in traveling." The household data translate to the finding that 4.2 percent of the total population have mobility-limiting disabilities. A total of 243 mobility-limited individuals in 227 households were re-

cruited for participation in the diary and telephone portions of the survey.

Of the calls that reached a respondent at a working residential telephone number, 23.1 percent resulted in an initial refusal to participate in the survey. Additionally, just over one-fourth (27.7 percent) of the qualifying households interviewed in the screening survey refused recruitment for the remainder of the survey.

### *Evaluation of Procedure*

A number of findings concerning the efficacy of the telephone screening survey are described below.

- Telephone interviewing using random-digit sampling was an appropriate and workable, but time-consuming, method of conducting the screening survey. The purchased sample of telephone numbers contained a high proportion of nonresidential and nonworking numbers, which had to be called before being eliminated. This consumed a good deal of time. Nevertheless, randomly generated numbers must be used in order to include unlisted as well as listed telephone numbers, because the characteristics of households with unlisted telephone numbers may differ significantly from those with listed numbers.

- Cooperation with the survey was excellent. According to Survey Sampling, the average noncooperation rate for telephone surveys conducted in the North Central census region, which includes Illinois, is 42.9 percent. In this study, only 23.1 percent of all calls that reached a respondent at a working residential telephone number resulted in an initial refusal. Respondents' willingness to cooperate was due in large measure to the credibility of the survey's sponsor, the RTA, and to the brevity of the interview, as well as to interviewer training that stressed the importance of attempting to persuade those expressing reluctance to participate.

- The questionnaire for the screening survey was easy to administer. Respondents had no difficulty in understanding the questions. The lead-in questions on general transportation issues served a valuable purpose by easing respondents into the mobility-limitation questions, which might otherwise have seemed abrupt and offensive.

- Few foreign language households were found. Of the households containing no mobility-limited individuals, 2.8 percent were interviewed in Spanish, and 3.2 percent of the households identified as having one or more mobility-limited members responded in Spanish. The only other foreign language encountered in more than a handful of households was Polish, spoken by less than 1 percent of the individuals contacted in the screening survey.

- Despite efforts to make the survey as comprehensive as possible, some segments of the mobility-limited population were excluded. Mobility-limited persons in hospitals, nursing homes, and other institutions were not included because of logistical difficulties. A few individuals with hearing impairments may have remained unidentified as a result of the close resemblance between the high-pitched tone emitted by facsimile machines and the sound heard on reaching a telephone device for the deaf (TDD). According to Bell's Service Center

for the Disabled, most TDDs are operated by government offices and public agencies, and households with TDDs frequently have lines connected to standard telephones for the use of non-hearing-impaired family members. This information suggests that the number of residential TDDs occurring in the screening survey sample was small.

Other factors bearing on the comprehensiveness of the screening survey included the decision not to recruit the small number of individuals identified as having temporary conditions, those expected to persist for less than 2 months, on the grounds that their choice of travel mode was unlikely to be changed by a temporary disability, and the tendency of very elderly persons and of individuals reporting that they never leave their homes to refuse recruitment for the diary and telephone parts of the survey. Thus, the sample recruited through the screening survey may slightly overrepresent the younger and more active segments of the general mobility-limited population.

### **Pretest of Diary and Telephone Interviews**

#### *Procedure*

Pretesting is a standard survey procedure to discover and correct any problems or weaknesses in the study plan and the survey instruments before undertaking the main survey. In this case it was also used to evaluate alternative strategies for achieving a high response rate.

The procedure for conducting the pretest was essentially the same as the final survey described below, although some improvements were made as a result of the pretest.

The cover letter accompanying the transportation diary was designed to

- Communicate the nature, purpose, and legitimacy of the research effort;
- Emphasize the importance of participating;
- Encourage recipients to seek help in filling out the diary; and
- Test various strategies for achieving a high response rate.

In pursuit of the last objective, four different versions of the pretest cover letter were used. One version asked respondents to return their completed diaries to the RTA and offered a bonus of \$2 for those completing the full study. The second version used the RTA return address but offered a bonus of \$4. The third version used the name of the consultant as the return address and offered a \$2 bonus. The last versions used the consultant's name and offered a \$4 bonus.

#### *Evaluation*

The following conclusions are based on the pretest findings.

In general, the study design functioned as expected. Placing the diary in respondents' hands by mailing it and asking them to keep track of their own travel gave them a sense of personal involvement in the project. Administering the remaining por-



tions of the survey by telephone provided an important opportunity to correct the diary data.

The response rate of 42.6 percent was above the norm for conventional mail or telephone surveys. A key element in achieving a high level of response was the combination of the initial cash incentive of \$1 and the bonus check on completion of the main survey. The incentive created good will by demonstrating the RTA's interest in their opinions and represented a significant amount of money for some respondents, many of whom have household incomes of less than \$5,000 per year.

Telephone contacts played a significant role in encouraging diary recipients to participate in the survey. The pretest results revealed that many of the mobility-limited individuals represented in the study had little formal education. This fact, coupled with individuals' physical, cognitive, or other impairments, made it difficult for them to read, understand, and, in some cases, write in the diary. Although interviewers making reminder calls encountered few overt refusals to participate, they found many instances in which recipients had been unable to understand what they were supposed to do and had simply set the diary aside. Therefore, the primary objective of the telephone follow-up effort shifted from reminding to explaining and offering assistance.

In addition to contributing to the level of response, the telephone contacts fostered good will toward the survey effort by giving diary recipients opportunities to express their considerable frustration with the Special Services program.

Recipients found it difficult to absorb the written instructions for filling out the diary. In sorting and editing the returned diaries and in speaking with recipients, the study team identified a number of common misunderstandings about the procedures for completing the diary:

1. Individuals doing little or no traveling were convinced that their opinions could be of no value. Even after pointing out that there was a "made no trips today" box on each page of the diary, interviewers had difficulty persuading household-bound persons or their families to participate.
2. Those claiming not to use public transportation or Special Services also believed that the RTA would not be interested in including them in the survey. Other individuals thought that they should record only the trips they made via Special Services.
3. A number of diary recipients did not understand the importance of recording trips at the time they were made and of providing information for consecutive days. Some individuals supplied details of trips they had taken over the past several years ("Let me tell you about my 10 best trips!"). The reminder calls disclosed that many individuals believed that they should wait to begin the diary until they made a trip, and that they should record information only for days on which they went somewhere.
4. The "trips wanted but not made" pages baffled a sizable number of diary recipients. Why the RTA would want to know about "imaginary trips," as one respondent put it, required considerable interviewer ingenuity to explain. Moreover, for many individuals represented in the study, the knowledge that they could not go anywhere made it almost impossible for them to say what they would have done if their

mobility limitations and the unavailability of suitable transportation had not hindered them.

While pointing up the need for clearer and more effective instructions, the pretest did not reveal any significant problems with the diary's 7-day format or with the categories of information requested for each trip.

The pretest supported a decision to use the RTA's address and to offer a \$4 check in the main survey. The overall returns showed that individuals who received the cover letter specifying that the diary be returned to the RTA were somewhat more likely to participate than were those whose letters mentioned returning the diary to the consultant. The distinctly higher response rate generated by the offer of a bonus check for \$4, rather than \$2, made it worthwhile to offer the larger amount to individuals in the main study sample.

## Diary Distribution and Telephone Interviews

### Procedure

From the list of persons registered for the CTA Special Services, CTA selected every sixth record from a random starting point, creating a random sample of users. These names together with the names of persons recruited in the screening survey were placed in a data base, and a unique identification number was assigned after duplicates from the two lists were eliminated.

The use of personalized letters and the inclusion of a \$1 cash incentive are recognized direct-mail and mail survey techniques to encourage recipients to read the cover letter and to reinforce the message that each individual's participation is valued. To reinforce the legitimacy of the project, the letter was printed on RTA stationery and included a list of co-sponsoring organizations that serve persons with disabilities. The letter also provided help for recipients by listing a toll-free telephone number, the number of the RTA Public Affairs Office, and the RTA's TDD number.

A sample "trips made" page of the diary is shown in Figure 3 and a sample page for "trips wanted but not made" in Figure 4. The respondents were asked to provide the following information: origin and destination, time started and time arrived, purpose(s), mode(s) (for "trips made"), and reasons for not making trip (for "trips wanted but not made").

Formatting the diary proved to be a challenge. The experience of the Chicago Area Transportation Survey (CATS) suggested that better returns resulted when data for a trip were arranged vertically, rather than horizontally. On the basis of this experience, each diary page was made large enough to contain four vertically oriented boxes, representing four trips. The need to ensure the readability of the type, given the prevalence of vision impairments in the large elderly population of persons with disabilities, also argued for the use of large diary pages. Therefore the diary was printed on 8½- × 14-in. pages in landscape orientation and folded in half to create a 7- × 8½-in. booklet that would be portable and easy to mail.

To overcome confusion that surfaced during the pretest of the transportation diary, the following six bullet points were printed on the front cover of the diary:

# TRIPS MADE: Date: \_\_\_\_\_ Day of Week: \_\_\_\_\_

**DAY 1**

If you made any trips today, please record each and every trip longer than two (2) blocks.

**Where did you start your first trip today?**  
☐ Home ☐ Somewhere else (Where?) \_\_\_\_\_

☐ Made no trips today.

**Then where did you go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time Started: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time Arrived: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of your trip? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social / Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal business  
☐ Other (What?) \_\_\_\_\_

**How did you get there? (Check as many as apply.)**  
☐ Auto (passenger) ☐ CTA bus  
☐ Auto (driver) ☐ Taxi  
☐ Special Services ☐ Wheelchair  
☐ CTA/Metra Train ☐ Walking  
☐ Other (What?) \_\_\_\_\_

**Then where did you go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time Started: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time Arrived: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of your trip? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social / Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal business  
☐ Other (What?) \_\_\_\_\_

**How did you get there? (Check as many as apply.)**  
☐ Auto (passenger) ☐ CTA bus  
☐ Auto (driver) ☐ Taxi  
☐ Special Services ☐ Wheelchair  
☐ CTA/Metra Train ☐ Walking  
☐ Other (What?) \_\_\_\_\_

**Then where did you go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time Started: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time Arrived: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of your trip? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social / Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal business  
☐ Other (What?) \_\_\_\_\_

**How did you get there? (Check as many as apply.)**  
☐ Auto (passenger) ☐ CTA bus  
☐ Auto (driver) ☐ Taxi  
☐ Special Services ☐ Wheelchair  
☐ CTA/Metra Train ☐ Walking  
☐ Other (What?) \_\_\_\_\_

**Then where did you go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time Started: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time Arrived: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of your trip? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social / Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal business  
☐ Other (What?) \_\_\_\_\_

**How did you get there? (Check as many as apply.)**  
☐ Auto (passenger) ☐ CTA bus  
☐ Auto (driver) ☐ Taxi  
☐ Special Services ☐ Wheelchair  
☐ CTA/Metra Train ☐ Walking  
☐ Other (What?) \_\_\_\_\_

FIGURE 3 "Trips Made" page from travel diary.

# TRIPS WANTED BUT NOT MADE: Date: \_\_\_\_\_ Day of Week: \_\_\_\_\_

**DAY 1**

Please record each and every trip longer than two (2) blocks that you wanted to make but could not make on this day.

**Where did you want to start your first trip today?**  
☐ Home ☐ Somewhere else (Where?) \_\_\_\_\_

☐ Made every trip wanted today  
☐ Did not want to make any trips today.

**Where did you want to go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time wanted to start: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time wanted to arrive: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of the trip you wanted to take? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social/Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal Business  
☐ Other (What?) \_\_\_\_\_

**Why did you not make this trip? (Check as many as apply.)**  
☐ Change in plans ☐ Weather  
☐ Could not afford ☐ Health  
☐ No vehicle available  
☐ No attendant available  
☐ No one available to drive  
☐ Couldn't make Special Services Reservation  
☐ Other (What?) \_\_\_\_\_

**Then where did you want to go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time wanted to start: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time wanted to arrive: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of the trip you wanted to take? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social/Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal Business  
☐ Other (What?) \_\_\_\_\_

**Why did you not make this trip? (Check as many as apply.)**  
☐ Change in plans ☐ Weather  
☐ Could not afford ☐ Health  
☐ No vehicle available  
☐ No attendant available  
☐ No one available to drive  
☐ Couldn't make Special Services Reservation  
☐ Other (What?) \_\_\_\_\_

**Then where did you want to go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time wanted to start: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time wanted to arrive: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of the trip you wanted to take? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social/Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal Business  
☐ Other (What?) \_\_\_\_\_

**Why did you not make this trip? (Check as many as apply.)**  
☐ Change in plans ☐ Weather  
☐ Could not afford ☐ Health  
☐ No vehicle available  
☐ No attendant available  
☐ No one available to drive  
☐ Couldn't make Special Services Reservation  
☐ Other (What?) \_\_\_\_\_

**Then where did you want to go? (Check one.)**  
☐ Downtown Chicago  
☐ Chicago neighborhood or suburb (Name?) \_\_\_\_\_  
☐ Intersection (Street names?) \_\_\_\_\_  
☐ Building (Name?) \_\_\_\_\_

Time wanted to start: \_\_\_\_\_ ☐ a.m. ☐ p.m.  
 Time wanted to arrive: \_\_\_\_\_ ☐ a.m. ☐ p.m.

**What was the main purpose of the trip you wanted to take? (Check one.)**  
☐ Home ☐ Shopping  
☐ Medical ☐ Social/Recreation  
☐ Work ☐ Religious  
☐ School ☐ Personal Business  
☐ Other (What?) \_\_\_\_\_

**Why did you not make this trip? (Check as many as apply.)**  
☐ Change in plans ☐ Weather  
☐ Could not afford ☐ Health  
☐ No vehicle available  
☐ No attendant available  
☐ No one available to drive  
☐ Couldn't make Special Services Reservation  
☐ Other (What?) \_\_\_\_\_

FIGURE 4 "Trips Wanted" page from travel diary.

- Start immediately. Don't wait until you make a trip to begin.
- Fill out the diary for seven consecutive days.
- Record trips as you make them. Don't record past or future trips.
- Fill out the diary even if you don't go anywhere.
- Fill out the diary even if you don't use the RTA or the CTA.
- Read the instructions and examples in the diary first.

To help individuals recognize that they could record days on which they did not make or did not want to make any trips, the pertinent sections in the diary instructions were highlighted and the "made no trips today" and "did not want to make any trips today" boxes were made prominent.

Because difficulties in understanding the written instructions for the diary were prevalent in the pretest sample, interviewers offered to fill out diaries for individuals. Additionally, the consultants started new diaries in the office for individuals whose original diaries came back with such major errors that they could not be corrected. Travel data for these individuals were also obtained through daily calls.

The Chicago grid system was used to code the trip origins and destinations recorded in the transportation diaries. Because spatial references according to the Chicago grid are in common use in Chicago and the suburbs, this approach made coding easier than it might have been in other cities.

The 1,959 diary packets were mailed in early November 1990. A phone contact was made immediately after the diary mailing so that interviewers could brief respondents on the proper procedures for completing the diary before they had the chance to fill it out incorrectly or set it aside. Interviewers made three attempts to complete a call at each working number. Reminder postcards, sent about 1 week after the mailing of the diaries, served to remind individuals who were finishing up their diaries to return them, and informed those who had not yet gotten started that they could still participate. Another postcard to nonresponsive individuals was mailed about 3 weeks later. Five days later, interviewers began telephoning nonrespondents to see whether they would agree to receive daily calls to collect their travel information.

Diary correction and telephone calling began about 3 weeks after the mailing and continued for 7 weeks. Interviewers made at least four attempts to conduct telephone interviews with individuals who had completed transportation diaries. Letters were mailed to more than 70 respondents with incomplete study materials who could not be reached by telephone.

The average amount of time required to administer the telephone questionnaire was just under 25 min. To achieve this time, interviewers skipped the opinion questions when interviewing someone other than the mobility-limited individual, except in cases where the interviewee was communicating with the mobility-limited person and relaying his or her responses during the interview.

During the data collection phase of the main survey, over 300 calls for assistance from survey participants were handled by the consultants.

In developing the coding schemes for the transportation diary and telephone questionnaire, the answers on more than 25 percent of the completed documents were examined. Coded documents were inspected for completeness and accuracy.

The data were entered and 100 percent verified. Data cleaning efforts included correcting day-date inconsistencies in the travel data and checking out-of-range codes.

## Results

The breakdown of the diaries mailed and returned is summarized as follows:

<i>Item</i>	<i>No.</i>
Main study diaries mailed	1,959
Diaries believed to have reached qualified respondents	1,779
Diaries sent back, not completed	75
Unusable diaries	36
Usable completed diaries	
Filled out by recipients	677
Done or redone in office	325
Done in person	8
	1,010

The results of the telephone interviews of those who returned diaries were as follows:

<i>Item</i>	<i>No.</i>
Interviews attempted (based on usable diaries)	1,010
Total calls made to correct diaries and conduct interviews	2,102
Break-offs and refusals	33
Unable to contact for interview	43
Deceased after completing diary	3
Complete interviews	931

Of the individuals who received diaries and were qualified to participate in the main survey, 56.8 percent completed usable diaries and 92.2 percent of those individuals completed the telephone interview. The overall response rate for the main study was 52.3 percent. The results for the two samples were essentially identical: 52.4 percent (814 persons) of the Special Services registrants responded and 51.5 percent (117 persons) of the screening sample completed the survey.

## Evaluation

The following findings provide an assessment of the main survey.

- The survey plan was effective in achieving a high response rate. The methodology employed in the main survey accomplished the RTA's objective of producing a response rate over 50 percent.
- The characteristics of the Special Services and screening survey samples had important consequences for the execution of the survey. Interviewers for the main telephone survey uncovered a potential source of bias when some diary recipients told them of fears that their Special Services privileges would be withdrawn if they did not report enough travel activity. Concerns over the possible loss of service may also have fostered the belief held by some individuals that they should report only trips made on Special Services.
- Recipients seemed to feel that the information provided in the cover letter was useful. Several inquiries and appreciative comments were received about the list of organizations included with the cover letter.



- Many individuals required assistance with the diary. Diary data were collected by telephone for more than one-third of the individuals who participated in the full study, because either the individuals could not fill out the diaries themselves or they had mailed back unusable diaries. This telephone collection was something of an experiment. Before the daily calls started, there was some concern that individuals might object to the repeated phone contacts. Another consideration was that respondents might not have been reachable on a daily basis, which could have introduced gaps and biases into their travel data.

The actual experience of conducting the daily diary calls did much to lessen these concerns. In general, individuals were relieved to have someone else take responsibility for filling out the diary. Many looked forward to the interviewer's call each day and expressed disappointment when the diary was completed. Nor did respondent availability prove to be an insurmountable problem. Interviewers who were unsuccessful in reaching respondents one day usually managed to speak with them the next day. In general, respondents seemed able to recall their wanted trips for 1 or 2 days before a contact, because this population probably makes relatively few trips.

- The follow-up procedures were effective. Timed to take place just after individuals received the diary, the telephone contacts encouraged recipients to begin filling it out, while the postcard, mailed 1 week after the diary, reminded them to send it back.

An additional follow-up effort, undertaken in mid-December 1990, brought in a number of diaries by mail, but was most effective in recruiting individuals to participate by telephone. The relative ease with which 100 previously nonresponsive individuals were persuaded to provide daily diary information supported the conclusion that their previous failure to respond had been due primarily to an inability to fill out the diary, not to an unwillingness to participate.

- The telephone questionnaire presented some difficulties for respondents. The telephone interview was particularly long for the elderly who participated in this survey. Questions asked about services the respondent did not use confused respondents. Questions that required the respondents to understand the difference between regular, mainline bus transit and Special Services caused difficulties, as did questions that required them to remember which mode was being discussed in a series of questions. Questions constructed so that they seemed repetitive, such as asking for ratings on a number of characteristics, annoyed a number of respondents. On the other hand, there was generally no resistance to terms used to discuss disabilities, contrary to fears expressed by some reviewers before the survey.

- Only a limited number of in-person interviews was required. The number of persons requesting face-to-face help proved to be considerably smaller than anticipated, since most respondents were able to participate by telephone.

- Mother nature helped the survey. In November and December when the preponderance of the trip data was collected, the weather was unseasonably mild and dry. Daytime

temperatures ranged from the upper 40s to the low 70s, with rain falling on only a few days, conditions favorable to trip-making that probably did not distort individuals' travel behavior.

## RECOMMENDATIONS

The survey team's experience in planning and administering the 1990 survey led to the following recommendations for possible future replications of the survey.

1. Consider collecting all travel data, including the diary, by telephone. Using trained interviewers to record trip information offers the advantages of higher response rates; more complete, higher-quality data; and substantial time and cost savings by eliminating the need for follow-up efforts, diary correction, and extensive assistance to respondents. The feasibility of this approach was demonstrated by the actual completion of 325 transportation diaries by telephone.

2. Maintain the two-sample design of the survey. The two-sample design provides a cost-effective means of studying both populations of mobility-limited individuals that may be affected by accessible services.

3. Simplify the telephone questionnaire. The questions that were difficult for the respondents should be simplified.

4. Continue to provide a financial incentive and a free help number. The cash incentives seemed to be an important inducement to participation. The toll-free number encouraged respondents to call with their questions, which were useful in making the survey team aware of methodology that needed improvement.

5. Consider strategies for ensuring that individuals who make few or no trips are represented. Persons who do little or no traveling resisted participation in a survey about transportation, so that persons with the most severe mobility limitations are underrepresented in the 1990 survey. If future studies aim to develop a comprehensive picture of the mobility-limited population, finding ways to secure the participation of individuals who do not travel will be important.

## ACKNOWLEDGMENTS

The authors acknowledge the assistance of the working group for the design and oversight of the survey, which included William Stage from the RTA; Darwin Stuart, Diane Mitchell-Bey, Sarah LaBelle, and James Mulqueeny, all of the CTA; Drew Browning, Gloria Nichols, Lei-Ann Marshall-Cohen, Jo Holzer, Larry Gorski, and Linda Hoke, members of the Joint Implementation Committee, an 11-member committee formed to advise and oversee the implementation and evaluation of lift-equipped, mainline bus service; Ashref Hashim of The Blackstone Group; and Ashish Sen of the University of Illinois, Chicago.