Data Collection Plan for the 2002 National Transportation Availability and Use Survey

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1. INTRODUCTION

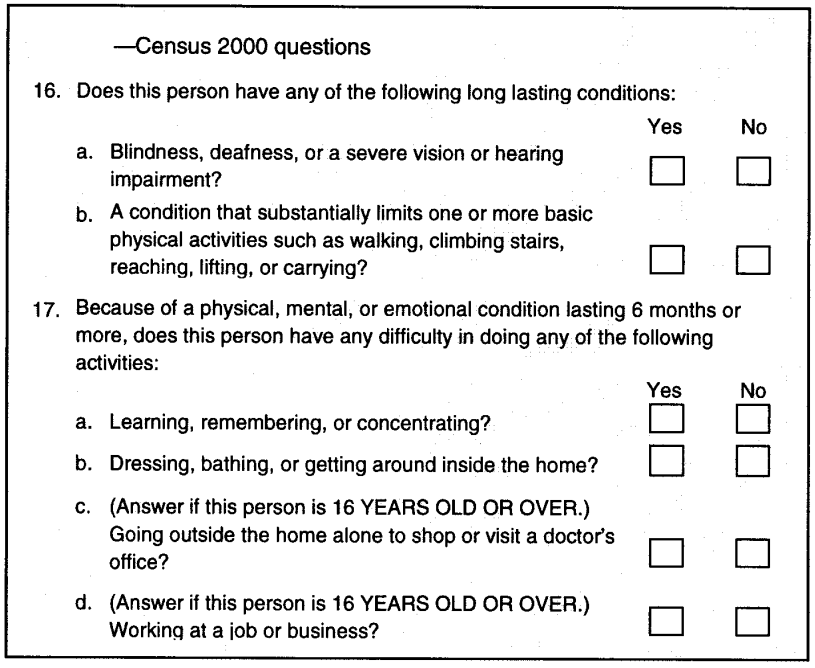
This data collection plan presents Westat's approach for conducting the 2002 National Transportation Availability and Use Survey, a national study of transportation use patterns of persons with and without disabilities. This document describes the methodology for sampling, surveying, database development, and the delivery of files for analysis by the Bureau of Transportation Statistics (BTS).

1.1 Background

The President's 2000 "New Freedom Initiative" includes an objective to expand transportation options for persons with disabilities. In order to do so, BTS first needs to "benchmark" actual transportation use, as well as determine whether the transportation needs of persons with disabilities are being met and, if not, what more is required. Only when armed with such information can policymakers recommend transportation expansion options that will truly make a positive difference to persons with disabilities.

Westat has recommended using the Census 2000 disability questions in the screener for the BTS survey. These two questions and six response items in the 2000 Census were developed by a Federal interagency work group under the auspices of the Office of Management and Budget and represent a consensus among experts in the field of disability measurement. These Census 2000 disability items appear in Exhibit 1-1, below.

Exhibit 1-1. Census 2000 disability questions



—Census 2000 questions

16. Does this person have any of the following long lasting conditions:

	Yes	No
a. Blindness, deafness, or a severe vision or hearing impairment?	☐	☐
b. A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying?	☐	☐

17. Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:

	Yes	No
a. Learning, remembering, or concentrating?	☐	☐
b. Dressing, bathing, or getting around inside the home?	☐	☐
c. (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor's office?	☐	☐
d. (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business?	☐	☐

Using these items for screening purposes in the BTS study also allows the advantage of comparisons with the Decennial Census data for weighting and many other analytical purposes. According to the Census Bureau, approximately 15.7 percent of the U.S. household population age 5 and above report a disability using at least one of these six items.[1] Another 3.3 percent of children under age 5 have a disability, using similar, age-appropriate definitions and measures.[2] As a weighted mean, approximately 15 percent of the total U.S. population, or about 42.3 million persons, currently, have a disability, and this constitutes the universe of interest for this study.

1.2 Household Counts

Another figure of major importance to the study's screening effort is the count of occupied households in the United States and the number of these units with at least one person

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[1] U.S. Census Bureau. *Sex by disability status by employment status for the civilian noninstitutionalized population 5 years and over* (p.59). www.census.gov.

[2] Eberhardt MS, Ingram DD, Makuc, DM, et al. Health, United States, 2001. Hyattsville, Maryland: National Center for Health Statistics. 2001.

who has a disability. These household counts are not yet available from the 2000 Census; however, by using similar data from the 1995 National Health Interview Survey on Disability (NHIS-D), Westat found that approximately 30 percent of occupied households in the U.S. had at least one person with a disability.[3] This information allows us to estimate how many households we need to screen in order to locate one person with a disability for the survey. In addition, we know from our analysis of the NHIS-D that in most of these households (79%), there was only one person with a disability. In 18 percent of the households there were two persons with a disability, and in the remaining 3 percent of households there were 3 or more persons with a disability. The average number of persons with a disability per qualifying household is approximately 1.25, only one of whom will be selected and interviewed for this study. In the technical approach to sampling, in Chapter 4, we present our assumptions about the number of households to screen and the estimated response rates to achieve the 4,000 completed interviews, 2,000 each, for persons with and without a disability.

The NHIS-D uses literally hundreds of different variables that can be used in various combinations to first define and then measure disability prevalence rates. The extensive variety of disability variables allows an analyst to construct disability measures that are tailored to a specific application of interest. Indeed, the National Center for Health Statistics (NCHS), which sponsored the study, cautions users not to use as a definition of disability the global measures across all the domains in the survey. Instead, NCHS recommends that each analyst use specific variables within the data set to construct one's own definition and measure of disability for analytical purposes.

One of the measures in the survey covers limitations in various major life activities, including play, school, work (including housework), and independent living, respectively, for preschool children, students, working-age adults, and the elderly. For these domains of activity, the NHIS-D uses three levels of limitation, or disability, including the inability to conduct a major activity, a limitation in the amount or kind of major activity, or a limitation in another activity, such as recreation. Collectively, about 15 percent of the household population reported a disability using these criteria. Given the ADA focus of the BTS survey, with an emphasis on limitation in major life activities, this composite definition of disability from the NHIS-D is very consistent with the research objectives of BTS.

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[3] 1995 National Health Interview Survey on Disability, original tabulations by Westat from the public use data files.

According to the NHIS-D, about 15 percent of the U.S. population has a disability using this definition and set of measures, which is consistent with the BTS estimate of between 15 and 20 percent. This NHIS-D information was extremely helpful in estimating the number of households we expect to screen for each person with a disability that we find for the extended interview, in this case about 30 percent of all households. Based on prior research (Judkins, et al., 1999; Horrigan, et al., 1999), we do not expect all these household members to report themselves as having a disability. For the purposes of this study, we estimated that this undercount will apply to about 10 percent of the households. Ten percent of 30 percent (or 3 percent) yields a net of 27 percent of households reporting at least one person with a disability.

A review of national disability survey data shows that persons with a disability are not a homogeneous group, and it was important to consider various demographic cohorts of potential interest when developing the survey, designing the sample, and preparing a plan for analysis. For example, Table 1-1 shows the age distribution of persons with a disability, nationwide, according to disability descriptors that are similar to those from the 2000 Census.

Detailed demographic data from the Census 2000 disability descriptors are not yet available; however, Table 1-1 uses similar descriptors from the 1997 and 1998 National Health Interview Survey as annual averages for estimation purposes. Disability increases with age, but there are more persons in the total U.S. population in the younger versus the older age groups. These countervailing trends result in the following age patterns among the total household population with a disability, and we expect the BTS sample to reflect this pattern as well.

Table 1-1. Age distribution of persons with disabilities

Age group	Percent (%)
Under 18	13
18-44	21
45-64	32
65-74	16
75 and over	18
Total	100

Source: National Health Interview Survey, 1997/1998

Approximately 13 percent of persons with disabilities are under age 18. We expect some of them to be receiving special education services, which are available to preschool and school-age children with disabilities. Transportation related to special education program participation may be an important issue for analysis as part of the BTS survey. In addition,

transportation for all children with disabilities for participation in various extracurricular activities is an important public policy issue for possible BTS consideration.

Among the traditional working-age population, 21 percent of persons with a disability are in the 18-44 age group and 32 percent are in the 45-64 age group. Journey to work and travel of family members for a range of purposes will be a substantial part of the transportation patterns for this age cohort.

The 65-74 age group is often one in transition between work and retirement, but persons with a disability tend to have relatively low incomes, and at least part-time work may be a reality for this age cohort. In addition, studies have shown that the elderly, themselves, are not a homogeneous group, and until age 75 or even 85, frailties associated with age often do not occur. For the total household population with disabilities, 18 percent are age 75 and over.

There are many other demographic groups of potential interest to BTS when analyzing the patterns of transportation use by persons with disabilities. These include income, gender, family status, city/suburban/rural locations, and regions of the country, among others. It is important to consider the size of cohorts of interest within these demographic categories, such as specific age groupings, when assessing the sample size and determining the reliability of estimates for subgroups of interest to BTS. We address these issues of precision in the power calculation in Chapter 4.

1.3 Questionnaire Use

This study will employ a screening questionnaire, followed by an extended survey instrument for the selected persons. Persons of any age (including children) will be interviewed for the study. Proxy interviews with a knowledgeable respondent will be required for persons under age 16 years and for persons who are unable to complete the interview for themselves due to the severity of their impairments. Because persons with disabilities may be limited in the manner in which they can respond to a study such as this, we will use data collection methods that ensure the greatest possible participation by the respondents, regardless of their limitations. This will include Internet and mail versions of the questionnaire, a Spanish version of the questionnaire, and the use of interpreters.

The study will gather information on:

- Travel outside the home, including mode of transportation, frequency of use of different modes of transportation, satisfaction with transportation services, and difficulties or problems faced when using public and private transportation;
- Availability of paratransit and respondent use of paratransit;
- Vehicle modifications and safety issues of modified vehicles;
- Respondent demographics (gender, age, ethnicity, race, disability vs. no disability, assistance needs, work or school attendance, and education level); and
- Household demographics (income, number of people, number of people with disabilities, ZIP code, interruption of telephone service within the past year, and Internet access).

1.4 Schedule of Deliverables

The following table (Table 1-2) lists each task and subtask for the project, with the due dates for completion and delivery to BTS.

Table 1-2. Schedule of deliverables

The following table provides a schedule of deliverables by the contractor and assumes contract award date of **4/12/2002**.

Task	Deliverable	Date Due
1	Attend Contract Award Meeting, receive draft questionnaire, **letter, and brochure**	4/15/02
2	Provide draft data collection plan	5/3/02
3.1	Provide questionnaire feedback	4/19/02
3.2	Report cognitive interview findings	5/17/02
3.3a	Provide testing results for instruments (CATI and Internet) Provide final screening questionnaires Provide final full study questionnaires Provide address matching procedures (for advance and reminder letters)	6/14/02 6/21/02 6/21/02 6/21/02
3.3b	Provide testing results for **paper questionnaire** Provide final **screening** questionnaire Provide final **full study** questionnaire	6/14/02 6/21/02 6/21/02
3.4	Provide interviewer training outline for review Provide training dates and sites	6/28/02 6/21/02
4.1	Undertake and complete RDD screening interviews Provide written documentation as to telephone number updates, inclusion of TTY/TDD numbers, and exclusion of institutionalized and group telephone numbers, computer, and fax numbers	7/1-9/22/02
4.2	Undertake and complete full study interviews	7/1-9/22/02
4.3	**Provide weekly progress reports**	Each Tuesday starting 7/9 through 9/24/02
5	Provide specifications for range checks, consistency edits, and valid blank checks Provide weighting specifications	7/14/02
6.1	Provide meta database	10/7/02
6.2	Provide 18 copies of public use and 2 copies of internal study data on CD-ROMs, in four formats (SAS 8.0, SPSS 10.0, Microsoft Excel for Windows, and ASCII comma delimited)	10/21/02
6.3	Provide 20 bound paper copies and 20 CD-ROM copies of study documentation in three formats (HTML; Microsoft Word for Windows; and PDF (Acrobat)	10/21/02

2. DEVELOPING AND TESTING THE SURVEY INSTRUMENTS

At Westat, our survey questionnaires generally pass through review and testing stages, each followed by consultation with the client. The first stage is an expert review that is conducted using Westat's survey development and processing personnel. Once the questionnaire is developed, we will review and test question wording, response formats, and questionnaire flow to maximize the clarity of questions posed to the respondent and facilitate their responses. The second stage includes conducting cognitive interviews and pilot testing via the telephone and at Westat facilities. These review or testing cycles are described in more detail below.

2.1 Expert Review

The first stage in pretesting is an in-house expert review. The project team members bring differing perspectives and expertise to bear in their review of the draft questionnaire. Project survey researchers considered the content of the questions (e.g., Do the questions ask what is needed?). Survey processing personnel considered the administration of questions during an interview (e.g., Might respondents encounter difficulties with questions and questionnaire progression or response options?). Programmers considered the structure and programming of the questionnaire (e.g., How complex are the skip patterns?). Once members of the team completed their review and evaluation, the team met with BTS staff to discuss findings and make recommendations for finalizing survey revisions.

We also used an expert panel of Westat and several outside professionals who serve persons with disabilities and represent a consumer perspective. This provided a structure to quickly review the draft instrument from BTS, convene the group to discuss recommendations for change, and provided an opportunity for BTS staff to interact with experts in the fields of disability research, transportation, and survey design. Following the expert panel meeting, Westat staff synthesized the input and made recommendations for alteration to the questionnaire. The expert panel approach allowed us to tap a range of expertise in a very cost-effective manner, providing recommendations to BTS quickly and concisely. Westat has employed this expert panel approach very successfully in our many disability studies for the Department of Housing and Urban Development (HUD), the Department of Health and Human Services (HHS), and the Social Security Administration (SSA). The expert panel includes William Frey, Westat's associate project director for the SSA's large disability study. In addition, it involves Robert

Ficke and Jon Burkhardt, the co-PIs; Mark Freedman, Westat's Vice President and director of transportation studies; and Bryna Helfer, a representative of Easter Seals, representing a consumer perspective for persons with disabilities. This meeting was held on April 18, 2002, with participation by the BTS deputy project officer.

2.2 Conduct Cognitive Interviews and Report Findings

2.2.1 Conduct One-on-One Cognitive Interviews

One-on-one cognitive testing was conducted with 20 persons with disabilities and 21 persons without a disability. Six of the one-on-one interviews were conducted in person in Westat's cognitive testing facility (see below for description); the others were conducted over the telephone. This provided an opportunity to test the questionnaire using the data collection mode for the survey. Westat ensured that a range of age, race, gender, and disabilities was represented in the cognitive testing. In addition, the questionnaire was tested with proxies responding for adults and children. Westat has strong relationships with organizations for persons with disabilities, and tapped into these resources to recruit respondents for the cognitive testing. These entities include Centers for Independent Living, Area Agencies on Aging, ARC, and other programs for persons with disabilities, including children. Westat provided accessible transportation to our cognitive testing facility for anyone who desired it.

The goal of cognitive testing was to ensure that respondents clearly understood the questions asked and that the response alternatives were appropriate. Cognitive testing has become increasingly popular over the last decade as a technique for testing survey instruments. Cognitive interviews are intensive, semistructured administrations of the instrument designed to yield insights into the cognitive sources of potential response errors. Cognitive testing addresses concerns such as the following:

Do participants in the cognitive testing adequately comprehend the instrument items?

Do these respondents recall information that is necessary for answering the items?

Are the response choices understood? Are the choices mutually exclusive and exhaustive?

The most common strategy for these interviews is to present a survey item to a respondent, allow the person to answer, and immediately probe for the basis of the response or

the interpretation of the question. The types of probes that are used in cognitive interviews vary by the types of questions that are being tested. Two generic followups are:

"What did X mean to you?" where "X" is a word or phrase in the question being tested.

"Could you repeat the question in your own words?"

The first probe determines whether a particular phrase or term is interpreted as intended. The second probe determines if the entire question is understood. For example, if a person repeats back a long question and leaves out a critical phrase (e.g., a reference period), it may be an indication that the point was not taken into consideration in making the response. The majority of the probing procedures are developed prior to the cognitive testing, so as to have a measure of standardization across interviews. However, it is important for cognitive interviewers to probe spontaneously in response to unanticipated difficulties in answering questions suggesting respondent confusion. In addition, respondents may be encouraged to "think aloud" while considering the question and generating their answer. These techniques are highly effective at detecting questionnaire problems that might otherwise go unnoticed in a standard field pretest (e.g., a respondent's interpretation of a question that differs from the researcher's intent).

It is important in developing any survey instrument that the ideas and concepts be clearly understood by respondents. For example, in our review of the draft version of the BTS questionnaire, we identified several technical terms that may not be commonly used, such as "infrastructure" or "environment." Including them in the protocol for cognitive testing will determine if respondents interpret key terms as researchers intended and provide an empirical basis for revisions. For instance, some of the key terms respondents will be asked to define in their own words include the following:

Question #	Concepts and words to be tested
B0030	■ Paratransit
C0100	■ Infrastructure ■ Travel Environment
D0045	■ Adaptive Devices

It is also important to avoid using technical terms in the questionnaire even when definitions are provided. From our experience, when a technical term is defined for respondents they often ask for the definition when the term is used again, thus adding to confusion and administration time.

After determining respondents' understanding of words and concepts, the cognitive testing will help to ensure that the flow of the questionnaire is logical, and which response options need to be read aloud to the respondents.

In addition to cognitive testing, Westat will conduct a usability analysis of the Internet version of the questionnaire. This will involve respondents accessing the questionnaire, as well as completing and submitting it under laboratory conditions. As in the cognitive testing, they will be asked to respond to predefined questions about the ease of accessing the questionnaire, navigating the site, and the other tasks involved in submitting the completed questionnaire. As appropriate, "think aloud" strategies will be used. In addition, a researcher will observe the session and record his or her observations of the usability of the Internet version of the questionnaire.

The results of the cognitive testing and feedback from the government were integrated into the questionnaire. The questionnaire was then revised based on these results.

2.2.2 Prepare Written Report

A written report of the cognitive testing was prepared, and included demographic characteristics of the respondents, procedures for conducting the cognitive interviews, and the results. The report was submitted to BTS on May 17, 2002. The written report from the usability analysis for the Internet version of the questionnaire will include the following sections, as did the report from the cognitive testing:

Demographics of participants in the cognitive testing;

Procedures for conducting cognitive testing;

Participant understanding of key terms and concepts in the questionnaire;

Discussion of the flow of the questions; and

Recommendations for modifications to the questionnaire.

2.3 Focus Group, Cognitive Lab, and Usability Testing Facility

Westat's state-of-the-art facility for conducting cognitive interviews, usability tests, and focus groups was used for the cognitive testing and usability studies. The suite features a spacious room with quality, oversized seating, soundproofed floor-to-ceiling one-way mirrors for observation by BTS staff, and soundproofed walls and ceilings. The room seats up to 16 people in comfortable conference style, and has independent climate control for any temperature demand. State-of-the-art audiovisual (A/V) equipment installed in the facility includes:

Two ceiling mounted, broadcast quality, remote controlled video cameras configured for both SVHS and VHS;

Twin high-quality SVHS/LVHS recording systems able to capture both angles simultaneously with identical audio;

Twin high-quality audio recording system that can create two backup tapes automatically;

Unobtrusive ceiling mounted microphones with a signal compression system to capture the softest to the loudest voices; and

Telescopic remote controlled lenses capable of reading the text on LCD or CRT screens.

2.4 Developing Data Collection Instruments

In this section, we present our approach for developing the CATI questionnaire, the Internet data collection instrument, and the mail version of the survey and procedures.

2.4.1 CATI Questionnaire Development

Westat has implemented hundreds of surveys utilizing computer-assisted telephone interviewing (CATI) procedures. CATI provides several advantages over traditional methods of telephone data collection and preparation. Some advantages are:

The skip pattern logic of CATI questionnaires is fully computerized so that interviewer choice in question branching is eliminated;

Validity checks of response codes for closed-ended questions are performed during the interview so that invalid codes cannot be entered into the data files;

Legal ranges for continuous variables, such as ages, dates, dollar amounts, etc., are checked during the interview;

Consistency checking between related items is performed on line, and questions with inconsistent entries are asked again or probed with additional questions to minimize both respondent error and interviewer entry error;

Because so much editing is automatically (and efficiently) performed during data collection, the need for post-data-collection machine editing is minimized, facilitating the rapid preparation of data files for analysis; and

Questionnaires can be designed to use special question series aimed at particular respondent subgroups, because the branching to and around these items is handled by the CATI software.

Westat's system of CATI software is called the Cheshire system and was developed in house especially for use on our large government surveys that demand high standards of quality for deliverable data sets. It has been, and is currently being used, on a number of large surveys.

One of the advantages of Westat's Cheshire system is a built-in scheduler that uses a "real-time" approach to distributing work and rescheduling additional interviewing. When an interviewer requires work, the system requests work from the scheduler. The scheduler process uses the priority, weight, and start/stop time of queues and the individual appointment time of interviews to select the next case available for work. For the 2002 National Transportation Availability and Use Survey, Westat will capitalize on the scheduler functionality to complete the extended interview immediately after the screener interview whenever possible. This scheduling method should maximize the number of completed extended interviews. If it is not possible to conduct the extended interview during the same CATI session, the interviewer will attempt to reschedule the extended interview for an appointed time. If an appointment cannot be made, the case will be identified as needing a "call back" to complete the extended survey.

Westat's scheduling software is designed to maximize the number of completed cases by utilizing built-in, efficient, yet flexible algorithms to keep track of the status of the interview. The highlights of Westat's standard algorithm include the following:

Cases are immediately rescheduled for an appointed time when a specific appointment is made;

Contacts without specific appointments are (1) rescheduled for the general time indicated by the respondent as good to recontact (i.e., weekday, weekend, daytime, evening) or (2) rescheduled for a time corresponding to the original successful contact;

Unsuccessful contacts are rotated among weekday, evening, and weekend recontacts on a calculated basis; and

Busy-tone calls are scheduled for recall in 15 minutes.

Once the draft screeners and questionnaires are prepared, reviewed, pretested, and revised based on the results of the cognitive testing sessions, Westat will create CATI versions of these instruments. Three major steps will be involved in the development of these CATI instruments. First, detailed specifications will be drawn up. Design tasks accomplished during this process will include the following:

Delineating the text used by the interviewer that will appear on screen;

Previewing the way questions will look to the interviewer;

Specifying different hierarchical relationships or levels between items in the questionnaires;

Establishing skip patterns;

Entering and reviewing editing specifications; and

Determining custom fills (i.e., word substitutions derived from existing data such as the interviewee's name).

The definition of specifications will be followed by instrument programming. Several staff members will be able to work on questionnaire programming simultaneously because of the modular design of the system and the structured programming language involved. Standards for programming style, internal documentation, and other general conventions will be set by the senior CATI programmer. This CATI design and programming work occurs quickly and efficiently, and it will help ensure that the actual interviewing, editing, and delivery of a final data set meets the BTS schedule.

2.4.2 Web-based Questionnaire

Westat has extensive experience in developing questionnaires for web-based administration. Those persons who cannot or will not complete the survey by CATI will be recontacted and offered the option to do so by Internet or by mail. By having such discussions occur apart from the core CATI system, the telephone interviewers can focus on securing high completion rates in an efficient manner. Separate, senior interviewer staff will be responsible for the recontacts and exploration of the alternative modes for administration. If the respondent agrees to complete the survey via the Internet, these respondents will be provided with the web address for the questionnaire.

Westat will format the screener and extended questionnaire for the survey so that the respondents will be able to submit responses over the web easily. For example, the extended questionnaire might need to be broken into modules, so that respondents can complete the survey during several short sessions. Westat will examine the skip patterns of the extended survey questionnaire, and determine whether or not skip patterns may need to be reordered for web administration. Skip patterns will be implemented via a hyperlink that makes it easy for the respondent to skip to the next question.

Westat will pay particular attention to issues that are specific to Internet questionnaire development. These issues include ensuring that:

The questions are easy to read on the screen;

The action required to select a particular response category is clear;

The response choices are clear,

The ordering of response choices is consistent;

The focus of the presentation is the questionnaire, rather than the background; and

Options for backing up or moving forward are clearly identified.

A test version of the Internet questionnaire will be placed on a password-protected web site for testing by BTS and Westat.

Because this is a survey of persons with disabilities, it is especially important that the Internet questionnaire be accessible to persons with various types of disabilities. Westat is very familiar with the requirements of the Section 508 Electronic and Information Technology Accessibility Standards for Internet-based surveys, and has experience in implementing Internet surveys that are compliant with these guidelines. Westat will ensure that the questionnaire developed for Internet administration of the BTS survey will follow the accessibility guidelines.

2.5 Instrument Testing

Westat will test the CATI screener, the CATI extended questionnaire, and the Internet version of the extended questionnaire. This testing will take place in two phases.

In the first phase, testing under the direction of a testing coordinator will occur at the item, questionnaire, and system levels. The test data will include records that have identifiable errors of every sort contained in edit checks and complicated response patterns. This level will ensure that:

All of the questions and response categories are correctly presented in the CATI and Internet versions;

Skip patterns are being implemented appropriately for each response;

All sections of the questionnaire are included for each response scenario;

On-line interviewer prompting is occurring appropriately; and

On-line edit checks are being performed where necessary.

During the second phase of instrument testing, Westat will conduct a test of the full system to ensure that the study can be conducted and completed according to schedule. Since the respondent population may affect several aspects of the survey, such as comprehensibility, administration time, and accessibility, Westat proposes to perform a simulated test of the CATI and Internet interview processes with a small sample of persons with a disability. Westat maintains ready access to individuals who qualify and are willing to participate in survey testing activities such as this. Westat will make every effort to recruit individuals with diverse natures of disabilities, so that any particular difficulties for specific groups of disabled respondents will be identified and improvements can be made to either the CATI or the Internet administration process.

After the test of the full system is completed, Westat will implement any procedural changes that are advisable to improve the efficiency of the administration process, or compensate for difficulties experienced by individual respondent groups.

2.6 Mail Questionnaire Development and Testing

Westat has extensive experience developing mail versions of questionnaires. We will utilize the CATI and Internet versions to guide the development of the mail version of the instrument. The mail survey instrument will be reviewed by Westat and BTS staff to insure that it is easy to complete and that it follows the format of the CATI and Internet surveys. The instrument will also be formatted so that data management staff can easily enter the results into the CATI system. We will then test the instrument with people with disabilities and those without disabilities. Any changes to the questionnaire that the testing suggests will be discussed with BTS staff before those changes are made.

3. INTERVIEWER HIRING AND TRAINING

3.1 Screening, Hiring, and Training Interviewers

Interviewer Qualifications and Selection. Westat will select interviewers from our personnel system that includes more than 4,700 interviewers. Whenever possible, personnel who have worked for Westat in the past and have proven themselves will be given a high priority in the selection process. Westat maintains a computer database listing all the experienced telephone interviewers that we have used and who are available for continued work. These files contain performance evaluations to aid in the selection of qualified candidates. Westat uses this database to easily identify and contact these experienced interviewers to allow our surveys to be quickly staffed.

In addition to our pool of experienced interviewers, Westat has the ability and experience to hire new interviewers should it be necessary to do so. In general, Westat looks for the following characteristics when evaluating interviewers:

- Communication skills, the ability to interact with respondents on the telephone;
- Reading skills, the ability to follow instructions, and giving attention to detail;
- Motivation to produce high quality work; and
- Availability to work the hours needed to perform the necessary tasks.

To assess these characteristics in potential personnel, we will rely on personal interviews, contact with personal references, an assessment of previous experience, and observations during training sessions.

Westat will use the following techniques to ensure that the process of hiring interviewing staff yields the best candidates possible:

- If a candidate has worked on previous Westat studies, the candidate's former Westat supervisor will be contacted for an evaluation of the candidate's performance. Reference checks will also be conducted for each candidate we are considering.

- All candidates will be required to complete a standardized form requesting detailed information about their educational and work histories, their specific data collection experience, references, and availability.

- Personal interviews will be conducted with each candidate. The candidates will be administered a standardized practice interview, so that we can judge their reading abilities, pacing, and voice quality.

- Finally, each data collector will receive formal training for each survey. If performance during this training session is inadequate, interviewers will be retrained or dismissed before starting work on the survey. New staff also will be subject to a 30-day probationary period when they begin work on a survey. If performance during the probationary period is inadequate, interviewers will be retrained or dismissed.

3.2 Training of Interviewing Staff

Westat's TRC interviewer training follows a structured process based on decades of experience in preparing interviewers to conduct interviews in a professional, controlled, and consistent manner. The main purpose of the training is for all interviewers to familiarize themselves with all interview-related terms, every question on the survey and related screener, and all answer categories and answer-dependent skip patterns. Thorough training contributes to increased response rates because the interviewers become familiar with the survey instrument during training. This allows them to sound confident on the telephone, and to easily answer questions respondents may have about the study.

3.2.1 Generic Training

Every new interviewer participates in a 4-hour General Interviewing Techniques (GIT) session; this training is supported by Westat and is not charged to the project. In GIT training, new interviewers are introduced to Westat and to survey research, shown samples of types of survey questions and recording conventions, and taught basic ways to obtain accurate data through listening and probing. They learn confidentiality procedures and methods for gaining respondent cooperation. The format includes a video presentation that is interspersed with exercises, interactive lectures, role plays, a question-and-answer period, and practice exercises. Each interviewer receives a manual that documents the material presented in the session. This session also allows staff to identify those interviewers whose reading and speaking skills are inappropriate for the study.

3.2.2 Study-Specific Training

Interviewer preparation for the administration of the BTS survey will be accomplished through the development of a training program and materials designed specifically for this survey. The main training document is the interviewer manual. This manual will document all survey procedures for the interviewer, and will provide an overview of the BTS survey, with question-by-question specifications for each item in the questionnaire. Training material provided by BTS will be included in the manual, and emphasized during training. Additionally, the manual will contain a section on being sensitive to the needs of people with disabilities (e.g., interviewing those who have hearing, other physical, or mental impairments, as well as advice on getting past “gatekeepers”). The manual will also provide detailed information on contacting respondents and avoiding refusals. Finally, it will provide space for memos and procedural updates to be filed.

Westat’s telephone operations manager will also prepare a series of interactive lectures and role plays covering such topics as contact procedures, a review of the specifications for each of the interviewer questions, methods to ensure confidentiality and cooperation, and administrative matters. Written exercises will be developed to assist trainees in absorbing important terms and their meaning, and test their understanding of the survey procedures.

3.2.3 Conduct of Training

Training will begin with an introduction to the survey and an interactive lecture, during which the specifications for each question in each of the data collection instruments are reviewed. This lecture is followed by a group role play, in which a trainer will take on the role of a respondent while the trainees take turns at being interviewers. During this exercise, the interviewers are encouraged to raise questions about areas of confusion. Ways of handling these areas and "problem" responses are discussed during this exercise. Interviewers who are having problems are identified during the group role-plays and are followed more closely and given special assistance, if needed, during the rest of the training sessions.

Just prior to beginning live interviews, trainees will participate in dyad role plays. One trainee acts as the respondent, using a script provided by the trainers. The other trainee acts as the interviewer, and must decide how to code respondent responses, practice probing, and utilize refusal avoidance techniques. After completing one role play, trainees switch roles as interviewer and respondent. These role plays are designed to further familiarize the interviewer with the wording and skip patterns in the questionnaire, and also allows telephone center supervisors to observe the interviewing skills of the trainees. Any trainees needing further training are helped. No trainees are allowed to conduct live interviews until the telephone center staff observes them successfully completing the role play interviews. To the extent possible, the dyad role plays are conducted in the TRC so that each interviewer has an opportunity to conduct an interview using the telephone. Each dyad is observed closely by a member of the training staff, using the TRC's equipment to monitor voice and data collection.

The interviewers are also thoroughly trained in the survey contact procedures and in refusal avoidance techniques to help with the more difficult participants.

Training will be conducted at the telephone facility just prior to the start of data collection. Interviewers will begin work on live interviews immediately following the end of the project specific training. The last session of each interviewer training program will involve on-line interviewing with actual respondents under the close observation of trainers and supervisors.

3.3 Issues and Challenges in Interviewing People Living with Disabilities

Of equal importance for this study is training interviewers to be sensitive to the needs of people with disabilities. Project staff with disability expertise will have a significant level of involvement in this portion of the training. Interviewers will be trained on issues related to interviewing persons living with disabilities including those with hearing or other physical disabilities and/or cognitive or mental health disabilities. We will discuss methods to accommodate individual's needs (e.g., use of an interpreter, use of proxies when appropriate, breaking interviews up into two or more sessions, speaking slowly, communicating with people who have difficulty concentrating or communicating, repeating questions, etc.). We will also discuss how various disabilities affect the person's ability to communicate, and that a difficulty communicating does not suggest problems with intelligence or understanding. We will train interviewers to remember that these interviews are really no different from other telephone interviews. Everyone who participates in a survey should be treated with respect. Interviewers will be trained to attempt to interview the person directly, and to not assume that a difficulty in communicating will require an interpreter or a proxy. They will be given guidelines to use to determine when an interpreter or a proxy will be necessary, but the final decision will be left to supervisory personnel. Proxy interviews will only be allowed under specific limited circumstances, and when the respondent is a child under the age of 16. All interviewers will be carefully monitored throughout the data collection period to ensure that they are conducting themselves in an appropriate manner.

In this section, we discuss in greater detail some of the challenges of interviewing respondents who live with disabilities, as well as some suggested tips for handling these situations.

Interviewers will be trained to first examine their attitudes towards those who live with disabilities. Feeling awkward and unsure about how to communicate with those who live with disabilities can result in an interviewer seeming stiff and insincere, and thereby creating a barrier between them and the respondent. Interviewers will be told it is important to be sensitive and patient, as well as matter-of-fact, when interviewing this population (or any population).

Those who live with disabilities often experience bigger day-to-day variation in how they feel. This can affect how willing and able they are to participate as a survey respondent. Interviewers may have to be more sensitive to the need to call back on another day to do the interview (or to complete it).

Generally speaking, those who live with disabilities are more likely to experience fatigue during an interview. The interviewer will have to judge whether the respondent shows signs of fatigue, which could interfere with his or her ability to complete the interview. Interviewers will be trained to be alert to the respondent's fatigue, and to suggest calling back and completing the interview during another session.

Most importantly of all, having a disability does not usually mean the person's intelligence is affected. There are many people living with disabilities who are well-educated and well-spoken. Some people are born with their disabilities; others acquire disabilities due to illness or injury. Interviewers will be reminded they are interviewing people. They are not interviewing people who are different or deserving of pity or less deserving of their respect. Interviewers will be told to conduct this interview as they would any other–with kindness, patience, and respect. Once any respondent senses the interviewer's willingness to listen, and their respect for what they have to say, they will be cooperative and informative.

Types of disabilities interviewers may encounter:

- Cerebral Palsy (person may have speech impairments)
- Traumatic Brain Injury (person may have short- or long-term memory impairments)
- Blindness/Visual Impairment (Most people who are "blind" do have some sight.)
- Stroke (may have speech, memory, and processing impairments)
- Deafness/Hearing Impairment (may need an interpreter)
- Cognitive Impairment (may need an interpreter)
- Paralysis due to illness or injury (may need to have the interview broken into more than one session, depending on how the paralysis has affected them)

No one disability is manifested in each individual in the same way. Some respondents may not need any accommodations at all to complete the interview, whereas someone with the same disability may need several accommodations. Interviewers will need to handle each interview as they occur. The best advice is to assume the person will not need accommodations, then provide them if needed. As a result, the interviewer will not be starting each interview with the idea that it will be difficult or arduous. The respondent will pick up on a negative attitude. With an attitude that this interview will be no different from any other

interview, the interviewers may find themselves making slight adjustments when needed, and not even realizing they did so until the interview is over.

3.3.1 Physical Disabilities

Physical disabilities have many causes, including:

- A disability from birth;
- Accidents;
- Osteoporosis;
- Arthritis and rheumatism, which may cause severe pain and disability;
- Stroke that can leave the person weak or paralyzed; and
- Other illnesses.

A number of respondents will have disabilities that result in limitations in their activities of daily living. Interviewers will be told that stroke patients, and some people living with other physical disabilities, may have hearing, visual, and speech disabilities as well. In addition, they may have difficulty processing quickly what is said to them, or in remembering details, and in reading and writing. (Stroke victims may also cry or laugh more easily than they did prior to their stroke. It is important that an interviewer realize that a stroke victim who is crying may not really be upset—the crying may be an involuntary act which has little to do with an emotional upset.)

Physical disabilities often manifest themselves in limitations in mobility and in language function.

3.3.2 Limitations in Language Function

Limitations in language function have many causes. People living with limitations in language function probably know what they want to say, but are unable to form words. Or conversely, the interviewer might not be able to understand what they have said until they repeat themselves. Interviewers will be reminded to not assume these people lack intelligence. They are often frustrated by their inability to communicate.

The following are tips that interviewers will be given on handling limitations in language:

- Give the respondent time to answer without pressure and be attentive.
- Repeat back to the respondent what they said, offering them the opportunity to correct the interviewer if they did not hear them correctly
- Say, “I’m sorry. I did not understand what you said. Would you mind repeating it?”

3.3.3 Limitations in Mobility and Other Health Problems

If a person is limited in mobility or has experienced paralysis, or has some other disabling health condition (i.e., has a respiratory condition that requires the use of oxygen, or the respondent is a cancer patient and in pain, etc.) interviewers will also need to be sensitive to the fact that the respondent may not be able to do the entire interview in one session.

When conducting a telephone interview with people living with physical impairments and other serious health problems/conditions, interviewers will be reminded that:

- The respondent may not be able to sit for long periods of time and may have to get off the telephone and move around, before they continue with the interview.
- The respondent may tire more easily or be limited in how long they can speak and the interviewer may have to allow them to rest and possibly reschedule and complete the interview in another session. In such circumstances, the interviewer will need to be considerate of the respondent’s needs.

3.3.4 Cognitive Impairments

Some people lose their cognitive abilities due to illness, injury, or age, or they are born with a cognitive impairment. Because this impairment is not an indicator of intelligence, the interviewer may be faced with deciding if the person has the ability to complete the interview on their own, or if they may need an interpreter. The respondent may tell the interviewer they need to have an interpreter. Or, the interview may need to be conducted with a proxy. Proxy interviews are a last resort, and will require approval.

Interviewers will be given the following tips for interviewing people with a cognitive impairment:

- Read each part of the question separately.
- Repeat introductory sections/available responses as needed (i.e. “So, would you agree or disagree?” “Would that be strongly agree or agree?” etc.).
- Slow down the pace of interviewing (being careful not to sound condescending).

3.3.5 Hearing Impaired Individuals

A person with a hearing loss has learned to communicate using visual cues and some individuals with hearing impairments have also learned to use their residual hearing. It will not be obvious to the interviewer which modes of communication (sign language, using residual hearing, or lip reading) the person with hearing impairments feels most comfortable using. It is therefore important to ask if the person wishes to have an interpreter, prior to the interview.

Hearing loss may cause the respondent to misunderstand words, which the interviewer might misinterpret as confusion on the part of the respondent. Higher frequency sounds such as *z*, *s*, and *sh* may not be heard by a person with a high frequency hearing loss. Therefore, the interviewer may need to lower the pitch of their voice, if they can, to accommodate this type of high frequency hearing loss, and repeat the question.

Persons with hearing problems must concentrate much harder to understand sounds which then become meaningful words and phrases, especially when the topic and the speaker are unfamiliar to them. Hard of hearing people may tire easily and give up. So, interviewers will need to be patient and keep the sentences short and the language simple.

A common misconception is that the interviewer should speak more loudly with a hearing impaired person. Unless the hearing impaired person asks the interviewer to do so, speaking louder can lead to further confusion and distort the message. Interviewers will be told to speak in a natural and unexaggerated way.

In summary, some of the behavioral manifestations of hearing loss are:

- A tendency to confuse words which sound alike or occur out of context;
- Asking for statements to be repeated; becoming confused over verbal statements or questions; and
- Shorter attention span because of the tremendous effort it takes to understand spoken English (as opposed to American Sign Language which is easier to understand for most hearing impaired individuals)

Hearing impairment affects daily life in such a way that as a result a hearing-impaired person might be:

- Incorrectly judged as forgetful;
- Incorrectly regarded as confused;
- Withdrawing to protect their dignity; and
- Depressed at the loss of sounds important to them, i.e. bird song, children's voices, music, etc.

Interviewers will be given these tips for communicating with persons living with a hearing impairment:

- Speak in a normal voice, unless otherwise instructed by the hearing impaired person.
- Lower the pitch of their voice.
- Speak a little slower than their normal rate, but not so slow that they sound stilted (or even worse, condescending).
- If the person living with a hearing impairment does not appear to understand what is being said, rephrase the statement in short, simple sentences. Of course, interviewers may not rephrase the interview questions, but will need to simply repeat the question as necessary.
- Whenever possible, give the person living with a hearing impairment a clue to the topic of conversation, such as "Now we're going to talk about…"
- Some consonants are louder than others. For example, "k" is slightly louder than "m." Therefore, some words or parts of conversation may be more easily heard or understood than others.
- Persons living with a hearing impairment may take longer to respond.

If the respondent does have a serious hearing problem, an interview with an interpreter present should be set up. If absolutely necessary, a proxy can be interviewed. However, it is preferable to arrange for an interpreter.

Getting Past Gatekeepers

When attempting to contact the respondent, interviewers may first have to "get through" another person before they can speak with the respondent directly. For example, the respondent's parent, spouse, or son or daughter may question the interviewer a great deal about why they need to speak with the respondent. We call such individuals "gatekeepers."

It is extremely important that the interviewer makes as good an impression as they can on the respondent's gatekeeper. They will be trained to answer his/her questions and concerns about the study as completely as possible. Interviewers can offer to mail out study literature if a gatekeeper seems particularly resistant, or refer them to the web survey.

3.3.6 Use of Proxy Respondents

Under specified circumstances, interviewers may need to request a proxy to complete the interview. This is to be done only after the interviewer attempts to interview the person either directly or through the use of an interpreter. Proxy respondents will be necessary for children under the age of 16 years, and for children who are 16 or 17 years old and whose parents do not give permission for them to be interviewed directly. Proxy respondents will also be necessary for respondents who are unable to complete the interview by telephone, even with an interpreter (e.g., sign language or language other than Spanish), or on the Internet or by mail.

3.3.7 Most Common Situations Requiring Proxies

We do anticipate that many of the adult respondents will be able to complete the questionnaire by themselves (or with an interpreter); however, the need to rely on some proxies for interviews may be necessary. If s/he is able to communicate, the respondent's own responses are preferable to those of a proxy. With people living with disabilities, it is all too easy to decide the person cannot complete the interview because they may have difficulty communicating or the manifestations of their disability may appear to the interviewer as an inability to be able to respond for themselves. An interpreter can be arranged for, and the interviewer can reschedule the interview.

However, there may be a few situations where a proxy will be needed, such as:

- All children's interviews will be conducted with a proxy if the child is under the age of 16 (or the parent of a 16- or 17-year-old will not allow us to interview the child directly).
- The respondent is too confused, forgetful, or disoriented to answer the questions, even with the aid of an interpreter.
- The person has intellectual limitations, which affect their ability to comprehend and respond to the questions, even with the aid of an interpreter.
- The person refuses to answer the questions, but indicates they would prefer to have a proxy respond for them.
- The "gatekeeper" or other family member refuses to allow the interviewer to speak with the respondent. In this case, the interviewer will probe to find out exactly why the family member/caretaker is taking this position. If needed, the interviewer will remind them all answers are confidential; the interview can be completed in several sessions, etc. If the additional information the interviewer provides does not change their mind, the interviewer will be told to get the full name and telephone number of the proxy, and code the case for the supervisor to review. The supervisor will review the case and recommend strategies to the refusal conversion interviewer who will be calling back to the household. The refusal converter will speak with the proxy and once more request to speak with the respondent. If the proxy still refuses to allow the respondent to complete the interview, or to act as an interpreter for the respondent, the interview will be conducted with the proxy.

One situation that is *not* a good reason for a proxy:

- The interview is taking a long time because of the use of an interpreter or because of other communication challenges. Unless the respondent insists on a proxy, the interviewer will reassure them they would prefer speaking directly with them, and that the interviewer is willing to take as long as necessary to complete the interview.

Once the interviewer has contacted the proxy respondent, the interviewer will explain why they are calling and begin the questionnaire, verifying the respondent's information with the proxy. Before the interviewer reads the actual interview questions, they will remind the proxy they are answering the questions *AS IF* they were the respondent. The interviewer will instruct the proxy to:

- Answer as objectively as possible based on his or her knowledge of the respondent;
- Not interject his/her own views or opinions;
- Answer "DON'T KNOW" **whenever** s/he is unsure of how the respondent feels on a given response item (e.g., questions pertaining to emotional states or satisfaction with services.)

3.4 BTS Representatives at Training

Westat is accustomed to client representation at training. BTS representatives in attendance at training will be welcomed, and their willingness to answer interviewers' questions will be appreciated. Government representatives add to the training for interviewers: the representatives convey the importance of the data collection and their enthusiasm for the project to our interviewers.

3.5 Internal Quality Control Measures

Westat implements quality control measures during every phase of data collection. These include the procedures listed below.

3.5.1 Quality Control Prior to the Start of Telephone Interviewing

To develop the sample frame, obtain addresses, and conduct automated tritone and business screening, Westat will use vendors that we have worked with on numerous studies. Just one individual will interact with these vendors to ensure that specifications and procedures are consistent and unambiguous. Westat survey methodologists will review the screening questions to ensure that terminology used will reduce the incidence of under-or over-coverage of persons with disabilities. The CATI and Internet software will undergo thorough testing to ensure that the programs mimic hard copy questionnaire specifications. Our quality control procedures during the prescreener mailing will ensure that each household where an address is available will be mailed a letter prior to receiving a telephone call.

3.5.2 Quality Control Procedures for Interviewer Monitoring and Supervision

Interviewers will be monitored by management and supervisory staff throughout the data collection period. Interviewers will be unaware of the monitoring while it occurs. Their handling of contacts, administration of the questionnaire, probing, and demeanor will be assessed. Each monitoring session will be recorded on a monitoring form. After monitoring, interviewers will be apprised of their strengths and areas needing improvement. General adjustments or specific instructions for the interviewing process will be made as a result of the monitoring findings. As appropriate, individuals will be retrained or released from the study. Once data collection begins, close coordination is essential to maintain consistency across interviewers. The telephone center operations manager will conduct a daily conference to discuss ad hoc issues with the lead supervisors. The supervisors will disseminate the information to the interviewers at the start of each shift.

3.5.3 Quality Control During the Screening of Households

Westat has extensive experience in interviewing persons with disabilities and obtaining parental/caregiver proxies. We will devote tremendous resources to the training of interviewers to ensure that they understand study-specific terminology and are able to screen effectively and identify the right respondent for each person with a disability selected for the full study questionnaire. Interviewers will be monitored to ensure that they are implementing strategies for refusal avoidance, recording information accurately, and adhering to the study's protocol.

3.5.4 Quality Control for Paper Questionnaires

Paper questionnaires will be tracked by a case identification number (from the CATI system). Cases that are referred for mail out of a paper questionnaire will be coded in the CATI system as "referred for mail out." The name and address will be sent to project staff. Project staff will send the questionnaire and a copy of the advance letter to the respondent. If no response is received in 10 days, we will send another survey to the household. Should we still not have a completed questionnaire after 4 weeks, we will recontact the household. Each time a mail questionnaire is sent out, the date will be recorded next to the case identification number. Since the Internet option will be given when the mail survey is sent out, we will also check to see if the respondent has completed the survey on the Internet before mailing another questionnaire or recontacting the household.

Once a completed mail questionnaire is received by Westat, it is checked to verify that the respondent has clearly marked all answers and that skip patterns were followed. Sometimes respondents answer questions they did not need to answer, or write comments on the questionnaire. Project staff will not change answers, but will clarify answers respondents have given. For example, many times a respondent will answer "other," but the answer they give can be coded into one of the answer categories for the question. Respondents sometimes also do not write clearly, and project staff can interpret their handwriting. If necessary, we will recontact the household to clarify any responses that are unclear, and to obtain answers to questions respondents may have skipped.

Once the questionnaire has been checked and verified, project staff will enter the responses into the CATI system.

4. SAMPLING

4.1 Telephone Frame Universe of all Possible Residential Telephone Numbers

Westat will use list-assisted RDD techniques to select a nationally representative set of telephone numbers within all valid telephone exchanges in the United States for the study. This process will involve restricting the sampling frame to all 100 banks[4] with at least one residential number listed in a published telephone directory. A simple systematic sample of telephone numbers will be selected from the frame with a random start. This approach includes unlisted telephone numbers in the sample as well.

Westat will allow a minimum of 10 rings on random days and at random times for households not responding to the initial contact attempts. Interviews will be completed in both English and Spanish. After a "rest period," households that initially refuse to participate in the study will be routed to interviewers trained in refusal conversion. If the household refuses a second time, it will be finalized as a refusal.

Westat has extensive experience interviewing persons with disabilities and anticipates that the majority of household screening interviews will be completed by telephone using list-assisted RDD interviewing techniques. However, a small percentage of households are expected to include household members with a disability, such as hearing loss, that does not permit them to participate by telephone. A subset of these households (those with addresses) would have received the prescreener letter. This letter will contain both a toll-free number and an email address. We anticipate that a few of these individuals will try and reach us via email or have a caregiver/interpreter contact us via the toll-free number. Our interviewers will be trained to classify the rest of these as language problems if the phones are answered, but we are unable to understand the language. Westat will implement procedures to handle these households on a case-by-case basis. This screening process will involve communications via the Internet, mail, and telephone with either a household member or an interpreter for the household. In addition, Westat accommodates TTY/TDD numbers in its telephone interviewing (see below).

Initially, cases coded as language problems are given to interviewers who speak Spanish. If the language spoken in the household is not Spanish, the household will be called

[4] A "100 bank" is the set of phone numbers with the same area code, exchange and all but the final two digits identical to each other. For example, all phone numbers 301-315-59xx constitute a 100 bank.

back at another time (usually in the evening or on the weekend) to see if we can speak with a household member who does speak English or Spanish. Usually there is an adult who speaks at least some English. If we do contact a person who speaks English, we will try to determine if they can complete the interview, or know someone who can act as a translator for them. If it is determined that the language problem is due to hearing loss, we will send the respondent a questionnaire through the mail with information on how to complete the interview on the Internet. We will also include a toll free number, so that the interview could be completed by telephone, using an interpreter.

4.1.1 Business and Nonworking Numbers

Once the sample of telephone numbers is selected, the next task is to determine if a sample number is residential, business, or nonworking. Two methods for reducing the cost of identifying nonresidential numbers will be used in the survey. One method is a computer match of all the sampled telephone numbers against a file of Yellow Page listings of business numbers. Any telephone number identified in this matching process as being only in the Yellow Pages is classified as nonresidential and excluded from dialing. The second method is to use an automated procedure that dials all the sampled telephone numbers prior to the start of the field period to detect a tritone message (the distinctive three-bell sound heard when a nonworking number is reached). Phone numbers with a tritone message are classified as nonworking and excluded from dialing by interviewers. Computer software identifies the “tritones” as nonworking numbers. Computer cross-referencing with business Yellow Pages identifies nonresidential numbers. Still, TRC interviewers must confirm such status information, because computer editing will not identify all out-of-scope numbers.

4.1.2 TTY/TDD Telephone Numbers

The process Westat uses to select the sample of list-assisted RDD numbers does not exclude any TTY/TDD telephone numbers. However, these households cannot be contacted through the normal telephone dialing process. We have confirmed that the audible tone is very distinct for TTY/TDD, compared to a fax machine or modem. We plan to use trained staff to call the flagged phone numbers to identify the TTY/TDD lines. We then will attempt to contact these numbers through Maryland Relay Service (MRS) to identify which ones are households, versus businesses/organizations, and to arrange for surveying these households through the alternative

methods that are part of our BTS contract (Internet or mail). For those phone numbers where the MRS operator receives a verification from the number that it is a TTY/TDD telephone number of a residence, we will either try to complete the screening and extended interviews through the MRS operator or encourage the person to complete the Internet or mail version of the interview.

4.1.3 Cellular, Computer, and Fax Telephone Numbers

Westat's sample frame will not include any cellular numbers as these 100 banks are excluded during the first sampling stage. However, the sample that interviewers call will include some computer and fax telephone numbers. This occurs because the automated list-assisted business purge discussed above does not exclude all business and fax numbers. Westat has standardized procedures that interviewers use to code numbers that they identify as used for fax or business purposes only.

4.1.4 Numbers in Institutions and Group Quarters

The sample frame will include telephone numbers for institutions and group quarters. However, it has been our experience that people who answer the phones in these quarters quickly volunteer the information that the phone number does not belong to a regular housing unit. We expect that this will occur on this survey as well, either when we ask whether anyone in the household has disabilities or when we ask them to apply a birthday sampling rule. Our interviewers will be trained to interrupt these interviews and classify the phone number as ineligible. Additionally, we will have some questions in the demographic section of the extended interview to catch any residents of group quarters who did not self-identify themselves.

4.2 Sample Selection

The sampling procedure will be the list-assisted approach that has recently become the standard for RDD surveys (Brick, Waksberg, Kulp, & Starer, 1995; Giesbrecht, Kulp, & Starer, 1996). As we stated above, we will only sample from 100 banks with one or more listed residential telephone numbers. We will match against Yellow Page listings and conduct tests to exclude nonresidential and nonworking (tritone) numbers prior to screening. CATI screening will be used to identify households with one or more occupants with a disability of any age. In all

such households, we will randomly select one person with a disability using the birthday rule that the person with the nearest impending birthday will be chosen as the sample person. If there are also one or more occupants without disabilities, we will make a random decision to select one of them. If the random outcome is to select a person without disabilities in addition to a person with disabilities, the birthday rule will be applied separately in the two groups of occupants. An extended interview will then be conducted with the sampled person(s), either by self or by proxy, depending on age (under 16 years old or 16 and 17 years if parents will not allow direct interview) and condition (respondent not able to respond for themselves). In a subsample of households with no persons with a disability, we will also randomly select one person of any age for an extended interview using the birthday rule. The subsampling will be designed to achieve roughly equal numbers of interviewed persons with and without disabilities.

Given the choice of an RDD survey of the household population, it seems likely that estimates of transportation patterns of persons with a disability will be somewhat underestimated due to the exclusion of those who do not have telephone service. We will adjust the weights of respondents to reduce the bias due to exclusion of the household population without telephone service (as discussed in Section 4.4.2). To support this adjustment, we have proposed adding questions to the extended interview on tenure (owner versus renter), and telephone service interruptions. Information from these questions will be used to adjust the weights of households with interruption in telephone service to account for nontelephone households excluded in a RDD survey. Details of the procedures for weighting the sample are discussed in Section 4.4.2.

4.3 Contingency Planning

We and other research companies have discovered on several surveys that persons who are the narrow target of an intense screening effort may become less visible during the screening process (Judkins et al., 1999; Horrigan et al., 1999). We assume that this is a form of hidden refusal, but very little is known about this process. For example, Canadian researchers have found that simple screening questions miss substantial numbers of the population with disabilities. (Langlet, 1999). We are using the Census 2000 disability descriptors, plus one question on special education participation, and two questions related to the ADA. Based on prior research (Judkins, et al., 1999; Horrigan, et al., 1999), we do not expect all these household members to report themselves as having a disability. For the purposes of this study, we estimated that this undercount will apply to about 10 percent of the households. Ten percent of 30 percent is 3 percent, for a net of 27 percent of households reporting at least one person with a disability.

Although we are assuming an eligibility rate of 27 percent of households, the final figure could be less. In case the eligibility rate is less that expected, a supplemental sample will be released to achieve the sample goals of the study. The additional sample is part of a reserve sample drawn at the same time the original sample was selected. Sample adjustment decisions will be made midway (fourth week) in a 12-week data collection period. At the beginning of the filed period, we will release the first replicate consisting of at least two-thirds of the original sample. The reaming sample numbers will be released at the beginning of the fifth week We will develop systems to measure eligibility and response rates on a weekly basis. We will revise our projections of these critical rates based upon the results of 2 weeks of interviewing, the time required to obtain stable projections. In consultation with BTS, we will decide if we need to release a supplemental sample. The supplemental sample, if needed, will be released at the beginning of the fifth week, when the second replicate is released. In this way, the second replicate and the possible additional sample will be worked for 7 weeks.

While eligibility rates can also be difficult to project, sometimes they are well projected based on just 2 weeks of interviewing. For the BTS survey, we suspect that persons with disabilities may be home to answer their telephone more often than persons without disabilities. If this turns out to be true, eligibility rates will decline steadily throughout the field period. (The households screened last will be those who spend the least time at home.) Without respect to the size of the deviation, however, we will make no additional adjustment in the sample past the fifth week. To do so would result in unacceptably low response rates. If we hit the 4,000 completed interview mark prior to the end of the planned field period, we will continue to work the sample just as intensively as before in order to maximize the response rate.

4.4 Sample Yields

Table 4-1 shows critical assumptions that have been made in designing the sample. We propose to select a sample of nearly 31,000 phone numbers. Of these, we project that 40 percent (or 12,346) will be residential voice lines and that we will get screener responses from 65 percent (or 8,025) of those.

Table 4-1. Sample sizes and yields

	Assumed rates (%)	Subject counts
Sample phone numbers		30,864
Residential rate	40	
Sampled households		12,346
Screener response rate	65	
Screened households		8,025
Percent of households that screen as having one or more disabled members:	0.27	
Type S Households: Those with one or more disabled members		2,167
Type O Households: Other households		5,858
Subsampling rate for Type O households	30.3	
Subsampled Type O households		1,773
Subsampled persons without disabilities in Type S households		393
Total sample persons		4,333
Interview response rate	92.3	
Interviewed persons in Type S households		2,363
With disability		2,000
Without disability		363
Interviewed persons in Type O households		1,637
Total interviewed persons with disabilities		2,000
Total interviewed persons without disabilities		2,000
Total interviewed persons		4,000

We project that about 27 percent (or 2,167) of the screened households will report one or more members who meet one of the disability criteria in the screener questionnaire (see Introduction). We will select one person with a disability from each of these and try to get an interview. Of the 2,167 households, we estimate that about 60 percent will also have one or more occupants without disabilities. We will select about 400 of these occupants. We will also select one random person from a subsample of about 1,800 of the households with no members who screen as having a disability. The total sample of persons without disabilities will then be about 2,200. With an extended interview response rate of about 92 percent, we will have 2,000 completed interviews with persons without a disability.

In summary, among those selected during the screening interviews, we are projecting that most (92.3 percent) will continue with the extended instrument. Multiplying this with the screener response rate of 65 percent gives an overall response rate of 60 percent. This response rate then yields 2,000 interviews with persons with and 2,000 without a disability. The power for various analyses that will be delivered by these sample sizes is discussed in Section 4.4.1.

After the data collection, response rates will be computed for BTS. While the use of response rates as a single measure of the quality of a survey is unjustified, Madow et al. (1983) suggests that response rates provide valuable information on the success of the survey at representing the population sampled. Response rates are defined as the ratio of completed interviews to eligible reporting units. However, the application of this definition is more difficult than it may appear, especially in RDD surveys. One problem in estimating response rates in RDD surveys is the determination of the eligibility of some of the sampled numbers. Some telephone numbers are never answered or are only picked up by answering machines, even after being called many times over many days. This may occur for many reasons, as discussed by Shapiro et al. (1995). The eligibility of these numbers cannot be determined directly and this adds ambiguity to the definition of a response rate.

The approach we propose to use to resolve this ambiguity is a relatively new technique Westat has developed. Telephone numbers with unknown eligibility are assigned to be either eligible or ineligible based on what we call the survival method (Brick, Montaquila, and Scheuren 2002). This approach is an extension of the CASRO method and appears to be a better estimate of the percentage that are residential. This method takes into account the effort (number of calls) made to determine the status of a number (i.e., residential, nonresidential). In this method, the estimated proportion of unknown residential telephone numbers (i.e., ring no answer and answering machine) considered residential is computed using a survival method with censored data. Under this model, the "treatment" is the number of calls made to the telephone number until it is resolved as either residential or not. The term "censored data" means that for practical reasons, not all numbers were called indefinitely, and the status of some will remain unknown. The estimated proportion is used in weighting and in the computation of response rates.

4.4.1 Projections of Statistical Power

Table 4-2 shows minimum detectable differences between respondents with and without a disability for a variety of configurations of sample size and baseline prevalence. As discussed in Section 4.4, we anticipate 2,000 interviews with people with disabilities. The sample sizes smaller than 2,000 are shown for use in projecting power for analyses of subgroups such as those defined by age, race, and sex. We have defined a minimum detectable difference as one that can be detected with 80 percent power using a two-sided hypothesis test with a size of alpha=0.05. We show these minimum detectable differences in two forms: one as straight differences called "minimum detectable absolute differences" and one as the difference as a

percent of the reference point called “minimum detectable relative differences.” For example, if 10 percent of the sample of 2,000 persons without a disability reported a transportation pattern of some sort, then the corresponding percentage among the sample of 2,000 persons with a disability would need to be at least 3.5 percentage points higher in order for the difference to be detectable with 80 percent power. Looking now at Table 4-3, we see that this corresponds to a relative difference of 35 percent.

Given our impression of the transportation patterns of the population with a disability, it would not surprise us to find differences of this magnitude. It thus seems likely to us that the sample sizes provide adequate power for the stated objective.

Table 4-2. Minimum detectable absolute differences* between persons with and without a disability

Sample size from each of the populations with and without a disability	Prevalence of trait among the population with a disability				
	0.100	0.125	0.250	0.375	0.500
100	0.188	0.198	0.229	0.239	0.232
500	0.077	0.080	0.098	0.106	0.107
1,000	0.050	0.055	0.069	0.075	0.076
2,000	0.035	0.038	0.048	0.053	0.054

* These are minimal detectable differences where the trait is more common among the population with a disability than among those without. Minimum detectable differences when the trait is less common among those with a disability than without are generally smaller for prevalence levels under 50 percent, although they are undefined for the top left corner. For prevalence levels above 50 percent, the minimum detectable downward difference is equal to the minimum detectable upward difference for 100-p.

Table 4-3. Minimum detectable relative differences between persons with and without a disability

Sample size from each of the populations with and without a disability	Prevalence of trait among the population without a disability				
	0.100	0.125	0.250	0.375	0.500
100	188%	159%	92%	64%	46%
500	74%	64%	39%	28%	21%
1,000	50%	44%	27%	20%	15%
2,000	35%	30%	19%	14%	11%

The power to detect differences among various subdomains of the population with a disability such as young and old, male versus female, and so on, will not be as good since the applicable sample sizes will be smaller. For example, if two groups each with a sample size of 500 are compared, and the prevalence rate of the trait of interest is 0.25 in a group with the lower

prevalence, the prevalence in the other group would need to be at least 0.348 (0.25+0.098) in order to have 80 percent power to detect the difference.

4.4.2 Weighting

There will be several components to the weighting process. To create the final person weight we begin with the household base weights. In an RDD sample, the base weight of a telephone number is computed as the ratio of the total numbers in 100 banks with at least one listed telephone number to the number of telephone numbers sampled for screening. The base weight $HHBSW_{hi}$ for the *i*-th telephone number in strata *h* is computed as:

$$HHBSW_i = \frac{N \cdot 100}{n},$$

where N is total number of banks; and n the number of telephone numbers in the sample.

The next step in weighting estimates the number of residential telephone numbers among those classified as unknown residential (answer machines or ring never answered by a person). The unknown residential status adjusted weight, $HHA1W_i$, is:

$$HHA1W_i = HHA1F_i \cdot HHA1W_i$$

where

$$HHA1F_i = \begin{cases} \dfrac{\sum_{i \in RES} HHA1W_i + \sum_{i \in UNK\_RES} p \cdot HHA1W_i}{\sum_{i \in RES} HHA1W_i} & \text{If } i \in RES \\ 0 & \text{If } i \notin RES \end{cases}$$

where *RES* is the set of telephone numbers found to be residential; *UNK_RES* the telephones with unknown residential status; and p the proportion of unknown numbers estimated to be residential.

The proportion of unknown residential that are considered residential households (p) will be computed using the survival method with censored data. Under this model, the treatment is the number of calls made to the telephone number until it is resolved as either

residential or not. It is censored because numbers are not called indefinitely and the number of attempts is restricted and only a sample has a larger number of calls.

After adjusting the weight for unknown eligibility, only the telephone numbers for residential households have positive weights. However, not all of the residential households completed the screener. In this step, we adjust the household weight to account for households that did not complete the screener interview. The screener nonresponse adjusted household weight, $HHA2W_i$, is:

$$HHA2W_i = HHA2F_c \cdot HHA1W_i$$

where

$$HHA2F_c = \begin{cases} \dfrac{\sum_{i \in SC\_R, SC\_NR} HHA1W_i}{\sum_{i \in SC\_R} HHA1W_i} & i \in SC\_R \\ 0 & i \in SC\_NR \end{cases}$$

and *SC_R* are screener respondents; *SC_NR* screener nonrespondents; and c the screener nonresponse adjustment cell.

The nonresponse adjustment cells will be created using the telephone mail status (known address/mailed letter, unknown address) and information from geographic databases about the compositions of the areas served by telephone exchanges. There are differences between the response rates due to the effect of the notification letter sent to households with a known address and these cells capture that response variation.

At the end of the screener interview, we collect information about the existence of additional telephone numbers and their use in the household. If the additional telephone number is used for residential purposes (not solely for business, computer use, etc.), the household has a greater probability

of selection because it could have been selected through the other number. If this is the case, we need to adjust the household weight to reflect the increased probability of selection. The multiple telephone adjusted household weights, $HHA3W_i$, is computed as:

$$HHA3W_i = HHA2F_i \cdot HHA2W_i$$

where

$$HHA3F = \begin{cases} 1/\text{NT} & \text{If the household has more than one residential telephone number} \\ 1 & \text{Otherwise} \end{cases}$$

and NT is the number of telephone numbers for residential use in the household.

In the next step, the household weights are adjusted for household subsampling of where no one screens as having a disability. In this case, the household subsampling adjusted weights, $HHA3W_i$, is computed as:

$$HHA3W_i = HHA2F_i \cdot HHA3W_i$$

where

$$HHA3F = \begin{cases} 1/0.303 & \text{If the household was subsampled} \\ 1 & \text{Otherwise} \end{cases}$$

The previous expression will give us a household weight. Using the household weights, we will then create the initial person weights. The expression for the person initial weight, $ADA0W_i$, is:

$$ADA0W_i = \frac{1}{ADPROB_i} \cdot HHA3W_i$$

where $ADPROB_i$ is the probability of selection for the sample person.

In some households where the screener interview was completed, the sampled adult will not
complete the extended interview. To account for sampled adults who do not complete the extended interview, we adjust the adult initial weight for extended interview nonresponse. The adult nonresponse adjusted weight, *ADA1W*, is:

$$ADA1W_i = ADA1F_c \cdot ADA0W_i$$

where $ADA1F_c$ is the nonresponse adjustment factor. The factor is computed using both the geographic data just mentioned, as well as information from the screener. In this category, we will have available the household size, the types of disabilities reported for the entire household, the number of household members with disabilities, the age and sex of all persons in the household with disabilities including the sample person with a disability, the number of voice telephone lines, and a single transportation-related desensitizing question. To carry out this adjustment, we will form a logistic regression model of response status using the variables just mentioned. We will then stratify the sample by predicted nonresponse propensity, and calculate weighted empirical response rates in each stratum. The nonresponse-adjusted weight for a person will equal the quotient of the person-level initial weight and the response rate. This is a standard procedure that we have applied to a number of our surveys including the Current Population Survey for the Bureau of Labor Statistics (Judkins and Lo, 1993). That will give us a set of nonresponse-adjusted person weights.

We will then poststratify the nonresponse-adjusted person weights to control totals from the 1999 National Survey of America's Families (NSAF). This survey is one of the few surveys in recent years that has included the "Keeter" questions on telephone service interruptions. We will also explore the use of other national surveys, such as the National Health Interview Survey, that have questions about the absence of phone service. The cells for the poststratification will be defined in terms of telephone service interruption. Depending on sample sizes, we may have as few as two cells (yes, there was a recent interruption, or no, there was not), or we may have several. Households where everyone is over the age of 65 will not be covered in this adjustment because these households were ineligible for the NSAF. Although these control totals will be a little stale, we will follow this adjustment with another adjustment to fresh control totals from the Current Population Survey.

The form of the Keeter poststratified person weight $AD2W_i$ is:

$$AD2W_i = AD2F_c \cdot AD1W_i$$

where

$$AD2F_c = \frac{CNT_c}{\sum_{i \in c} AD2W_i}$$

where CNT_c is the control total for cell c derived from the 1999 NSAF.

After applying the Keeter adjustment with the 1999 NSAF, or other data set, we will poststratify the Keeter-adjusted person weights to control totals from the Current Population Survey (CPS) for March of 2002. The expression is similar to the one for the Keeter poststratification, where the control totals are computed using CPS. The poststratification cells will be created based on geographic region and demographic variables. A discussion of the guidelines for the selection of variables and sources for poststratification follows. The primary objective of poststratification is to dampen biases arising from a combination of response errors, sampling frame undercoverage, and nonresponse. A second objective is the reduction of sampling errors that is important when sample sizes are fairly modest for some groups. Four guiding principles that determine the poststratification adjustment procedure in a survey are:

1. Estimates from other surveys should be used as controls for poststratification only if they have both low bias and significantly lower variances than unadjusted BTS estimates. Any biases included in control totals will be transmitted directly to the BTS estimates, so it is important to avoid using biased estimates as control totals. For the same reason, estimates with unknown and potentially large biases should be avoided. If controls have about the same or higher sampling variances as unadjusted BTS estimates, their use in poststratification will result in sampling variances that are as high or higher than unadjusted estimates.

2. Preference is given to control totals based on well-defined and consistently reported variables such as age, race, sex, and telephone status. Key survey outcome and conceptually complex variables, such as disability and income, are avoided whenever possible. For example, Decennial Census, Current Population Survey, and Survey of Income and Program Participation estimates of income are mutually inconsistent with each other, conceptually and as a result of differences in questions, mode, etc.

3. Control totals are based on relatively current data or use variables that are very stable over time.

4. In general, decisions about poststratification are made without examining the unadjusted BTS estimates. If poststratification decisions were made based on looking at BTS estimates of disability, income, and other survey findings, the integrity of the survey estimates may be open to question. Critics could claim that estimation was changed because an analyst did not like the initial estimates derived from the survey. It is acceptable, however, to modify specific details of poststratification, based on technical criteria specified in advance. For example, it is acceptable to have a prespecified rule that poststratification adjustment cells are collapsed if fewer than 30 cases are in a cell.

We will explore the possibility of using data from the Census Bureau related to disability, analyzing how well the BTS data reflects the Census findings. In case the results are similar, there might be gains in using these totals for variance reduction rather than dampening biases. On the other hand, even if reasonable control totals were available, such an adjustment would have no effect on comparisons between persons with and without disabilities. It would only affect blended estimates (of little interest in this survey) and estimated total numbers of persons with disabilities (again totals are not a prime survey purpose). The variance of these estimated totals would be smaller since they are controlled to a known total with no sampling variability.

4.4.3 Variance Estimation

We will provide variance estimation codes on the file to enable BTS to calculate variance estimates with SUDAAN. We will also provide instructions and a few examples. Since SUDAAN
version 8 supports jackknifed weights, we propose also to provide replicate weights in addition to the more traditional SUDAAN “NEST” variables. This will allow the variance effects of nonresponse adjustment, the Keeter adjustments, and poststratification to be reflected in the variance estimates. We will include a discussion of these issues in the technical documentation with the data file.

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5. ADMINISTERING THE QUESTIONNAIRE

We anticipate that we will be able to complete the majority of the full study interviews by telephone and the Internet. Selected subjects that are not able to respond by phone or the Internet will be offered a mail version of the survey. The mail version of the survey will be accompanied by an offer to complete the survey via the Internet.

5.1 Processing Telephone Numbers and Handling Study Mailout Materials for the Sample

The mailing of notification letters prior to the first telephone call to households has been shown to improve overall cooperation rates. After the list-assisted RDD sample frame is developed, Westat will pass the sample through databases to remove nonworking and nonresidential phone numbers. This process eliminates about 25 to 30 percent of telephone numbers. The remaining telephone numbers will be passed through the databases of multiple vendors. The vendors will be asked to append mailing addresses for the sampled telephone numbers.

Based on our experience from other national surveys, we will be able to obtain addresses for 85 percent of in-scope telephone numbers. Households for whom mailing addresses have been obtained will be sent a prenotification package. The package will contain a cover letter that will contain the names and toll-free numbers for staff members at BTS and Westat whom the household can contact with questions and comments and a brochure describing the study. The materials will be designed and developed by BTS staff with Westat support. Westat will print and then mail the final materials via first class mail to each household where an address is available, shortly before the start of data collection. In addition, Westat will use a combination of refusal conversion techniques, including callbacks, by interviewers trained and experienced in refusal conversion, with a followup mailing for those households we are unable to contact initially or during followup by telephone.

5.2 Select the Household Members Eligible for the Full Study Interview

One of the main purposes of the household screener will be to identify households with persons with disabilities. The screener will determine whether we will be able to complete the full study interview directly with the person selected. If the person selected is under age 16, Westat will request that the screener respondent serve as proxy. Selected respondents who are 16 and 17 years old will be interviewed directly. We will obtain permission of parents of children ages 16 and 17 prior to completing the interview with them. If the parent refuses permission, we will ask the parent to serve as a proxy for these respondents. If the person is 16 and over and unable to complete the interview by either phone, the Internet, or by mail, Westat will obtain the name of the individual who can serve as a proxy. This individual could be a household member or a nonhousehold member, such as a family caregiver. If a nonhousehold member, Westat will obtain contact information such as a telephone number or email address.

5.3 CATI Extended Interview

To maximize response rates, we will attempt to complete the majority of the interviews by telephone. The 12-week data collection period for this study will improve response rates beyond what would have been possible over a shorter field period. However, many of Westat's surveys, such as the National Household Travel Survey, have much longer field periods, which improves response rates further. The study design will call for the first attempt to complete the full study interview to be immediately following the completion of the screener interview. The CATI questionnaire will be programmed to take into consideration the age of the selected respondent and his/her ability to respond by himself/herself and automatically prompt the interviewer with the appropriate path to take.

If the selected household member is under age 16 (or for 16-and 17-year-old respondents whose parents will not allow us to interview them), the interviewer will first attempt to complete the full study interview with the adult screener respondent. If she/he is not able to be a proxy for the selected respondent, then the interviewer will ask to speak to the next available adult household member. If this adult is not able to come to the phone, the interviewer will set an appointment to call back to complete the interview. If no adult household member is able to respond for the underage respondent, the interviewer will get the name of the adult who can serve as a proxy for the selected respondent.

For selected respondents who are aged 18 and older but not able to respond by telephone, the interviewer will first attempt to get the screener respondent to act as a proxy (or interpreter) for the selected respondent. If this is not feasible, the next steps will be to ask for or make an appointment to speak with an adult household member or the caregiver/interpreter for the selected respondent. During callbacks to households coded as refusals or problems, we will offer the mail and Internet versions of the questionnaire as options to complete the survey.

Interviews will be conducted in English and Spanish. If the selected respondent speaks neither language but an adult household member is able to serve as an interpreter for the selected respondent, then interviewers will attempt to go this route before coding the case as a language problem. Interviewers trained in refusal conversion techniques will contact and attempt to convert all respondents who initially refuse to participate in the study. Westat will make up to 10 call attempts, on randomly selected days and times, for households not responding to our initial contacts. This will be done to complete a screener and an extended interview with each individual selected for a full study interview. This will ensure as high a response rate as possible, maximizing precision.

5.4 Internet Response

Selected respondents who are not able to complete the full study questionnaire by telephone will be offered the Internet as an option. During callbacks to households coded as refusals or problems, we will offer the Internet version of the questionnaire as an option to complete the survey. If the respondent indicates that this option is feasible, the interviewer will provide information such as the web address, an identification number, and password to access the questionnaire. Interviewers will also ask the respondent to provide us with an email address. Westat will use this address to email the Internet access information provided over the phone to the respondent. This will ensure that errors in jotting down the access information do not prevent the respondent from completing the questionnaire.

Westat will review, on a daily basis, those cases selecting the web as an option, to determine whether the questionnaires have been fully or partially completed. If the information provided is incomplete or if the respondent has not completed the survey at all, Westat will use the email address to communicate with the respondent. The first communication from Westat will occur 3 days following the day we provided the respondent with web access information. Westat will also investigate the option of recontacting the respondent via the telephone if no response has

been obtained via the web. The Internet database will be merged electronically with the CATI database to avoid transcription errors.

5.5 Mail Response

If the respondent is not able to complete the interview by telephone or the Internet, we will send them a mail version of the questionnaire. During callbacks to households coded as refusals or problems, we will also offer the mail version of the questionnaire as an option to complete the survey. Interviewers will obtain the correct mailing address and send out the questionnaire with a stamped addressed return envelope. If the completed questionnaire is not received from the respondent within 10 days, we will send another questionnaire and return envelope. Should we still not have a completed questionnaire after 4 weeks, we will recontact the household.

If we are not able to reach a household where the telephone ring indicates a possible TTY/TDD (and we have not been able to contact the household through Maryland Relay Service), we will also send a mail questionnaire to that household, if we have a valid address for the household. Included with the mail questionnaire will be information on how to complete the survey via the Internet, with a password for the respondent to use. We will be able to determine if the respondent has completed the Internet questionnaire. If they have not, we can send them a second mail questionnaire after 10 days.

We do not have an estimate of the total number of TTY/TDD lines we will identify or the number that are households. However, we think it is important to try to reach those numbers, so that we do not summarily exclude people with hearing impairments. In prior CATI studies, of the total number of telephone numbers, approximately 2.5 percent are usually identified as fax/modems. This 2.5 percent will be the telephone numbers we will call to determine if they are TTY/TDD lines, using automated methods.

Data from completed mail questionnaires will be entered into the CATI system by project staff. Trained staff will key in these mail responses. This will allow that data to be combined with the rest of the data from telephone interviews. Therefore, we will not need data entry staff, and the mail survey data will be reported with the rest of the data from the survey.

5.6 Interviewing People with Disabilities

Westat has extensive experience locating and interviewing people with disabilities. As stated in the Westat/CESSI interviewer training manual for our recently completed Independent Living Evaluation states, when surveying people living with disabilities, it is necessary to acknowledge that no one disability is manifested in each individual in the same way. Some people may not need any accommodations at all to complete the survey, whereas someone else with the same disability may need several accommodations. We will determine during the screening process for this study if the respondent will need accommodations to complete the survey instrument. Accommodations might include the respondent completing the survey on the Internet, by mail, or arranging for a telephone survey with an interpreter present. If so, we will arrange for those accommodations. We do not anticipate that many of the respondents will be unable to complete the questionnaire for this survey by themselves; and if they are able to respond, their own responses are always preferable. Interpreters can help a respondent provide their responses by serving as an intermediary between the interviewer and the respondent. It is important to note that interpreters are not the same as proxies. Interpreters simply help facilitate the interview. If the respondent is under age 16 or an adult unable to respond for himself or herself, a proxy will be interviewed.

People living with disabilities may take longer to answer their telephones. The interviewer will allow the telephone to ring 10 times before hanging up on randomly selected days and times for households not responding to our initial contacts. This should be sufficient time for a respondent to get to the telephone. In addition, we will leave a message on respondents' answering machines. From prior experience we know that some respondents are not able to quickly reach their telephones, and may become frightened if no message is left (they think someone is trying to find out if their residence is unoccupied). In addition, Westat will provide a toll-free number for participants to call if they have questions about the study or want to verify its legitimacy.

5.7 Procedures to Encourage Respondent Cooperation

All interviewers will be monitored, evaluated, and provided with instant feedback on their performance to eliminate interaction patterns or telephone demeanor that might be detrimental to achieving cooperation. In addition to the training techniques discussed in Chapter 3

and the prenotification letter (Section 5.1), Westat will implement the following procedures to encourage respondent cooperation:

- **Flexibility in Scheduling Interviews.** Being available to speak to people when it is most convenient for them is sometimes overlooked as a factor that can tip the balance in favor of cooperation for an individual who has doubts about participating. Survey interviewer hours will be scheduled to coincide with the hours when people are most likely to be at home.

- **Materials to Aid Interviewer Practice.** Project staff will develop a sheet answering questions frequently asked by respondents, including questions that are specific to the BTS survey. The interviewers will post these in their carrels for easy reference.

- **Dyad Role Play Scripts.** All of the training materials will be fully scripted to ensure consistency and standardization of material delivered across trainers and training sessions. This will be one of the measures to assure cross-interviewer reliability. All materials required for training will be incorporated into a trainer's manual.

- **Refusal Avoidance Techniques.** These are exercises and discussions about ways to avoid refusal in general and specifically for the situations and populations covered by the BTS survey; and

- **Procedures to Encourage Participation.** For each case in which the respondent refuses to participate, the interviewer will complete a Non-Interview Report Form (NIRF). The form will capture information about key characteristics of the refusing respondent and the stated reason(s) for refusing to participate. Special training sessions, led by highly experienced supervisors, will be held for a select group of interviewers. The sessions will include participating in analysis of survey-specific and generic reasons for refusals, preparing answers and statements that are responsive to the objections, effective use of voice and manner on the telephone, and role playing of different situations. This team of customer cooperation interviewers will re-contact the reluctant respondents. Westat's conversion program has consistently yielded conversion rates of 25 to 30 percent for individual interviews.

5.8 Quality Control During the Administration of the Full Study Questionnaire

The computer-assisted telephone interviewing (CATI) questionnaire and the Internet questionnaire will have built-in range and logic checks to enable editing to occur interactively. Our experience with interviewing has shown that unbiased probing skills will be a must to obtain accurate responses and therefore improve data quality and item response rates. Our interviewer

monitoring and timely review of responses provided via the Internet and the mail will allow for timely feedback and a resulting improvement in overall data quality.

6. DATA PROCESSING AND DELIVERY

6.1 Introduction

For this study, Westat is responsible for all of the data collection and processing tasks necessary to prepare a quality assured database of questionnaire responses. Three modes of data collection are being utilized: computer-assisted telephone interviewing (CATI), a web-based questionnaire, and a mail questionnaire. Westat anticipates that almost all of the interviews will be completed via CATI. Regardless of the method used to collect the data, it will be edited and combined into one database for delivery.

The remainder of this document details Westat's plan for managing the BTS data.

6.2 Monitor Results and Provide Reports

6.2.1 Systems and Procedures to Track and Report Progress on a Weekly Basis

The Telephone Research Center operations manager routinely provides weekly status reports to project staff. These reports include information on the weekly and cumulative status of all cases being worked in the telephone center for the project. The report shows the number of completed interviews, as well as the number of cases that have interim codes, such as households where no one has answered the telephone and a message has been left, or where an appointment has been set for a return call to the household for both the screener and extended interviews. Project and telephone center staff monitor these reports, using them to decide how best to concentrate interviewing efforts.

The report on the screener interview will show the number of available telephone numbers, the number released, and the number of telephone numbers the telephone center has attempted to call. The report will also show the number of cases with interim codes (such as initial refusals, language problems, etc.), and the number of interviews with final results. These final results will show for example, the number of completed screeners, out-of-scope numbers (i.e., businesses), and cases that were referred for mailout or Internet completion of the survey. Exhibit 6-1 is an example of a screener interview report shell.

Exhibit 6-1. Screener

2002 National Transportation Availability and Use Study
SCREENER and EXTENDED Report
As of COB __/__/____

Screener

No. of Telephone #s Available
No. Released
No. Called

No. of Interim Cases
INITIAL REFUSAL
REFUSAL
LANGUAGE
Cases referred for TTY/TDD Investigation
Cases referred for Mailout
Cases referred to Internet

No. of Final HH Cases
No. Out of Scope (Ineligible)

Nonworking
Nonresidential

No. Out of Scope (@Load) TOTAL
No. Out of Scope (@Load)
Nonresidential (Bus/Tri)
No. Out of Scope (@Load)
Cases referred for TTY/TDD Investigation

No. Scope Undetermined TOTAL
No. Scope Undetermined No Contact
No. Scope Undetermined No Human Contact

No. In Scope

Complete HH Int

Refusal

Language Problem
Cases referred for Mailout
Cases referred to Internet

Max-Call
Other NR

Exhibit 6-2 is an example of a weekly extended interview report shell. This report will give interim and final result codes for the extended interview. We will report how many total interviews have been completed, and show the results by the number completed by the respondent, by a proxy for someone under the age of 16, and interviews completed by a proxy for someone over the age of 16. The results will also be given for cases where we found nonworking numbers, where we were not able to contact the respondent again, and where the respondent refused to complete the extended interview.

6.2.2 Convene Weekly Teleconferences with the Bureau of Transportation Statistics (BTS)

Because of the weekly reports provided by telephone center management, Westat can easily report the progress of the telephone interviewing process weekly to the BTS each Tuesday beginning July 9, 2002. The BTS and project staff will set a mutually convenient time for the weekly teleconferences. Westat will take the responsibility of placing the call to the BTS each Tuesday during data collection. Project staff will also be available to speak with the BTS to discuss any concerns that arise during the length of the project.

6.3 Process Collected Data

6.3.1 Integrate Data Results into One Database and Provide Interim Data

Westat will combine all data from completed interviews into one central database. Because we anticipate receiving very few responses via the web or mail, Westat plans to have a CATI interviewer enter responses received via these modes into the CATI database thus ensuring that all data will be edited in a consistent manner. Because the mail questionnaire will present questions in the same order as the CATI instrument, this will be a simple data entry procedure. The Internet responses will be printed out on a case-by-case basis from the web database in the order it is presented in CATI. A CATI interviewer will then enter the data for an individual into the CATI database from this printout. Data collected or entered using CATI will be loaded into the central database on a daily basis.

Westat will provide BTS with an interim, unweighted data set that will include CATI data collected through the 6th week of the survey. The interim data set will be delivered

within 2 weeks from the end of the 6th week of data collection. The interim data set will be provided in both SAS and SPSS formats.

Exhibit 6-2. Extended Report

2002 National Transportation Availability and Use Study
SCREENER and EXTENDED Report
As of COB __/__/____

	Extended			
	With Disabilities	**Without Disabilities**	**Both**	**TOTAL**
No. of Eligible Persons				
No. Interim Cases				
	---	---	---	---
INITIAL REFUSAL (Case being worked for refusal conversion)				
LANGUAGE				
Cases referred for TTY/TDD Investigation				
Cases referred for Mailout				
Cases referred to Internet				
Possible Nonresidential (Business) and Tri-Tone				
No Contact				
Problems				

No. of Final Cases		**Extended**		
	---	---	---	---
Total Number Completes				
No. Completed Int - Self				
No. Completed Int - Proxy 16+				
No. Completed Int - Proxy <16				
No. Refusal-Final refusal				
No. Language Problem				
Cases referred for TTY/TDD Investigation				
Cases referred for Mailout				
Cases referred to Internet				
No. Max-Call				
No. Other Nonresponse				
No. Deceased				
No. Nonworking				
No. No Contact				

6.3.2 Edit the Data for Consistency

Westat will employ a number of methods to edit data to ensure valid ranges, consistency, and completeness.

Valid Codes (Range Checks). The CATI system provides a full range of data editing capabilities during the interview. In addition to basic range checking for individual variables, this includes the capability to define and trigger hard and soft consistency checks between multiple variables. A "hard" range check is a logical inconsistency so inconceivable that it must be reviewed and corrected with the respondent immediately. A simple example is age: the questionnaire designers may decide that an age greater than 150 may not be entered. When a hard range check fails, the interviewer will see a screen describing the items that are inconsistent, and selects one item to re-ask and re-enter. By definition, the interview may not proceed until the hard range check has been satisfied. Soft ranges, however, are designed to point out unusual or unlikely situations so that the interviewer may verify them with the respondent; the same items are shown on the screen, but the interviewer has an additional option to proceed with the interview without changing any data items.

Consistency. Although the range and logic checks are built into the CATI system, it is still necessary to perform machine edits on the data files after they are received from the Telephone Research Center. It is necessary to repeat the logic checks after any manual updates have been made. This ensures that only the intended data are entered into the database of survey responses. For instance, if a respondent's response to the question "Is the vehicle modified with adaptive devices?" is changed, it has implications for the types of followup questions that are asked. If, upon review of the data during the course of data collection, we discover unanticipated combinations of conditions, we will create the appropriate machine edit. Whenever a discrepancy is noted, an editor will review all available data and make any necessary corrections.

Valid Blank Checks. After the interview is completed, manual review will include review of the frequency distribution of collected data items to identify errant skip patterns (if any) and uncover obvious coding anomalies. Computer-assisted editing will be performed to ensure data consistency and reconcile hierarchical database segments. For example, the edit program will check to make sure that there are detailed records when the respondent indicates that a certain method of transportation is used. The program will also identify outliers and soft range edits through the use of Westat's range verification utility that passes all response entries through the data dictionary range specifications and produces a report flagging all items that exceed the

range. Computerized edit checks will also verify the completeness of each finalized case and flag partially completed cases for final disposition.

6.4 Error Resolution Procedures

Although CATI does produce data that are cleaner by several orders of magnitude than those produced using conventional techniques, it cannot be assumed that CATI absolutely guarantees perfectly clean data. Despite the best quality control efforts, errors may occur in programming the CATI software or in making off-line database updates.

Our data management plan for error resolution includes three main points: identifying problems, investigating problems, and correcting problems. Each of these is discussed below.

Identifying Problems. Westat will use a number of different techniques to identify potential data problems in the BTS database. Computer programs incorporating these techniques will be set up prior to the start of data collection. Most of these programs will be run on a biweekly basis. Some of the problem-identification materials that we will produce and review for the BTS survey – frequencies, crosstabulations, interviewer comments and update sheets, range error listings, and alignment error listings – are discussed below.

- **Frequencies.** Using Cheshire utility programs, Westat will run and review one-way frequencies for all variables on a biweekly basis through the data collection period.

- **Crosstabulations.** Data preparation staff will specify all crosstabulations of two or more variables that are needed to verify skip patterns and see that consistency checks are working properly. Programmers will implement these routines in Cheshire.

- **Interviewer Comments and Update Sheets.** The COMMENTS file holds information provided by the interviewer that may augment or correct previously collected data. In addition, interviewers routinely complete CATI update sheets to communicate questions or problems to the programmers and data preparation staff. These comments and update sheets will be reviewed daily.

Investigating Problems. After using the tools discussed above to identify potential problems in the BTS survey data, Westat's data preparation staff, as necessary, will conduct further investigations to determine the source of the problem and how it should be fixed.

Correcting Problems. Once a particular data problem has been identified and investigated, Westat's data preparation staff will make any necessary corrections to the project database. These updates will be carried out using the Cheshire System's standard update transaction processing program. Each transaction record will include the ID, the segment name and variable name, and both the old and new values of the variable to be corrected. This utility features a number of safeguards to protect the data against erroneous updates:

- The ID number specified on the transaction must match an existing database record;
- The segment name and variable name are specified, rather than the column position and length;
- The "old value" must be specified and must match the current (incorrect) value on the database; and
- The "new value" must conform to the definitions (range and type) of the variable in the data dictionary.

Update transactions that fail these checks will be rejected by the procedure.

Both successful and unsuccessful update transactions will be logged in the update BTS Transaction Journal. The journal will provide monitoring of all updating activities, as well as provide a complete history of all transactions for a particular case.

6.5 Prepare and Provide Deliverables

6.5.1 Metadatabase

Westat will prepare survey documentation, codebook materials, and metadata used to control and conduct the survey components of the study. All materials will reside in a metadata repository, consisting of:

- For each survey, a codebook (in Word format) containing a description of each variable (definition and format), admissible values and ranges for the variable, and edit criteria for the variable[5];
- For each variable, the section number, question number, and question text related to the variable;
- The variable labels and record layout;
- A metadata source describing the survey period dates, eligibility criteria, and other rules governing the conduct of the survey; and
- Any other documentation and descriptive material related to the conduct of the survey.

Concurrent with the development of the metadata repository, Westat will develop and provide a detailed description of the contents of the repository. The metadatabase will be provided in either a Microsoft Excel or Microsoft Access format.

6.5.2 Study Data

Westat will provide BTS with study data suitable for public use as well as a dataset for internal use. Each dataset will be delivered in the format described below. Missing values will not be imputed. No calculations will be performed on the questionnaire data.

CD-ROMs for Public Use. Westat will develop a "subset" dataset that will be suitable for public use and distribution. This dataset will consist of the data for those variables that BTS has deemed appropriate for public distribution, and will not contain identifying information. The public-use dataset will be copied to CD-ROM in several formats. Each CD-ROM will contain the public-use data in SAS 8.0 format, including label statements; SPSS 10.0 format; Microsoft Excel for Windows spreadsheet format; and an ASCII, comma-delimited file. Westat will produce 18 copies of the public-use CDs.

Internal Use Files. Westat will provide a complete dataset that will be suitable for internal use and distribution. This dataset will consist of data for all the survey variables. The internal-use dataset will be copied to CD-ROM in several formats. Each CD-ROM will contain the internal data in SAS 8.0 format, including label statements; SPSS 10.0 format; Microsoft

[5] This is an operational version of the codebook, which will be used by data coders and data entry operators during the survey data file construction process.

Excel for Windows spreadsheet format; and an ASCII, comma-delimited file. Westat will produce two copies of the internal-use CDs.

6.6 Study Documentation

Within 2 weeks after the data files are delivered, Westat will provide a report that contains the complete documentation for the study. The report will include the following items:

- Introduction;
- Background;
- Detailed sample design;
- Study weights;
- Instructions for calculating variance estimates;
- Data collection methodology;
- Data collection dates;
- Number of cases in universe prior to screening;
- Number in sample after screening;
- Number of completed cases by disposition code;
- Number in population;
- Response rates for each phase and final response rate with formulae;
- Reasons for nonresponse;
- Interviewer recruiting, hiring, and training outline;
- Outline of the standard interviewer training;
- Interview method summary;
- Methods of call attempts and callbacks;
- Data quality control methods; and
- Weighted and unweighted frequencies with calculated standard errors.

The documentation will be provided in three formats: HTML, Microsoft Word for Windows, and PDF Adobe Acrobat file. Westat will provide 20 copies of the documentation on CD and 20 bound paper copies of the documentation.