2001 National Survey of Veterans Design and Methodology

Final Report

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EXECUTIVE SUMMARY

The 2001 National Survey of Veterans (NSV 2001) is the fifth in a series of periodic comprehensive surveys conducted by the U.S. Department of Veterans Affairs (VA). The survey target population was noninstitutionalized veterans of the U.S. uniformed services living in private households in the United States, including Puerto Rico. The NSV 2001 questionnaire reflects the needs and contributions of many VA stakeholders. Covering a full range of topics about VA benefit programs and services, the survey provides the VA with extensive data about veterans' military background, education and training, health care usage, and understanding and use of a broad array of VA benefits.

To meet the VA research objective of obtaining sufficient data from a cross section of the veteran population, Westat designed a sampling plan that employed a dual frame approach to obtain 20,000 completed veteran interviews. This approach called for the completion of 13,000 veteran interviews from randomly selected households (RDD Sample) augmented by 7,000 veteran interviews completed from a List Sample selected from the VA Compensation and Pension, and Health Care Enrollment files. The sample was allocated to obtain reliable estimates for each of the seven VA health care enrollment priority groups, and for population subgroups of particular interest such as females, Hispanics, and African Americans.

Using a computer-assisted telephone interviewing (CATI) data collection methodology, Westat collected the NSV 2001 data from February 12, 2001 through November 12, 2001. Nearly 300 interviewers participated in the data collection, which resulted in 20,048 completed interviews (12,956 from the RDD Sample and 7,092 from the List Sample). Overall administration time for the extended interview was 35.2 minutes. List Sample veterans took an average of 38.7 minutes to complete the extended interview, while RDD Sample veterans took an average of 33.3 minutes. This pattern was expected because the List Sample veterans had more medical conditions and medical experiences to report. List Sample veterans were also more likely to have a service-connected disability that required them to complete an additional survey module about that disability.

Of all the households screened from the RDD Sample, 25.8 percent had at least one potential veteran. The screener response rate was 67.6 percent. The extended interview response rate for RDD Sample veterans was 76.4 percent. The overall RDD (combined screener and extended interview) response rate was 51.6 percent. Tracking and tracing efforts achieved a location rate for List Sample

veterans of 73.6 percent. The extended interview response rate for List Sample veterans was 62.8 percent. The lower response rate for the List Sample veterans can be attributed to difficulty in locating the List Sample veterans.

The survey data were weighted so that the responses of the sampled veterans could be properly expanded to represent the entire (non-institutionalized) veteran population. The weight calculations took into account the original selection probability, nonresponse, and households with multiple residential telephone lines. We computed the weights separately for the List Sample and the RDD Sample so that, when fully weighted, the List Sample would represent the veterans from whom the sample was drawn, and the RDD Sample would represent the entire (non-institutionalized) population of veterans. In addition, the RDD sample was benchmarked to known veteran population counts from the U.S. Bureau of the Census 2000 Supplementary Survey (C2SS) to account for undercoverage in the RDD Sample. The undercoverage in the RDD Sample arises from the omission of nontelephone households and households with unlisted telephone numbers belonging to "zero-listed telephone banks" not covered in the list-assisted RDD methodology. The RDD and List Samples were combined and a single database was constructed with composite weights to represent the entire (non-institutionalized) veteran population.

1. INTRODUCTION

This report has been prepared by Westat for the U.S. Department of Veterans Affairs (VA), to document the methodology employed for the 2001 National Survey of Veterans (NSV 2001). In this first chapter, we present a comprehensive overview of the procedures we used to design and carry out the survey. The remainder of the report provides details on the survey design, data collection and quality control procedures, sample weighting, management of the database, and field results. Chapter 2 focuses on questionnaire development, including the impact of previous versions of the NSV, policy changes, and results of the 1992 National Survey of Veterans Utilization Study. We describe the sample design, selection, and management in Chapter 3. In Chapter 4, we discuss interviewer recruitment and training procedures, including details of the initial project-specific training and specialized training (e.g., refusal conversion, proxy interviewing) that took place after data collection began. Chapter 5 summarizes data collection procedures, including the computer-assisted telephone interviewing (CATI) system, interviewing operations, and special data collection operations such as proxy interviewing and tracing. In Chapter 6, we describe the construction of the sample weights used to properly expand responses of the sampled veterans to the population that the sample was selected to represent. Chapter 7 presents the quality control procedures we implemented throughout the various phases of the survey. Finally, we summarize the survey field results in Chapter 8. Appendixes A, B, and C contain the RDD screener questionnaire, List Sample verification question, and extended interview questionnaire. A list of frequently asked questions used by interviewers to address respondent concerns appears in Appendix D. Appendixes E and H are the NSV 2001 response categories and final result codes. Appendixes F and G describe the Chi-square Hierarchical Automatic Interaction Detector (*CHAID*) software and the raking procedures used for the NSV 2001.

1.1 Study Background

The 2001 National Survey of Veterans is the fifth in a series of periodic comprehensive surveys conducted by the VA with a national sample of all eligible veterans. The previous surveys were conducted in 1978, 1979, 1987, and 1993. All five surveys cover a full range of topics about VA benefit programs and services. Much of the information in these surveys is not available from any other sources that collect information about veterans, including VA administrative files and the U.S. Census of Population and Housing.

Since the 1992 NSV, the VA has undergone significant administrative change. In response to the Veterans Health Care Eligibility Reform Act of 1996, the Veterans Health Administration (VHA) reconfigured its health care system to eliminate any distinction between inpatient and outpatient care and to make primary care its major area of emphasis in meeting the health care needs of veterans. This legislation also established two health care eligibility categories and seven health care enrollment priority groups. The Veterans Benefit Administration (VBA) has experienced similar administrative reforms since the 1992 NSV. In order to plan for and evaluate the newly reconfigured health care services, programs, and policies, the VA, VHA, and VBA needed up-to-date information about the veterans they serve.

The NSV 2001 provides the VA with extensive data about veterans' military background, education and training, health care usage, and understanding and use of a broad array of VA benefits. Using these data, the VA can follow changing trends in the veteran population, compare the characteristics of veterans who use VA programs and those who do not, and perform policy analyses. The data also provide information about issues that have a direct impact on veterans, such as eligibility and health care reforms. Finally, the NSV 2001 provides information relevant to planning and budgeting VA programs and services for veterans in general, as well as for certain veteran subgroups of particular interest.

1.2 Questionnaire Design

The final NSV 2001 questionnaire reflects the needs and contributions of many VA stakeholders. It addresses the larger national agenda, current legislation about who qualifies for VA benefits, and recent developments within the VA. At the same time, it remains comparable to previous national surveys of veterans. The NSV 2001 draws on the 1992 NSV, the Department of Veterans Affairs Strategic Plan (FY 1998-2003), and the 1992 National Survey of Veterans Utilization Study conducted by Westat with numerous VA stakeholders between January and March 1999.

From the Utilization Study, we knew that data users wanted more detailed information about veterans who do not use VA programs, veterans' unmet needs, their future plans for using VA benefits, and their communication preferences. The new financial eligibility guidelines for certain VA programs and legislation expanding the definition of who qualifies for benefits created the need for more information about veterans' financial status and military background. Data users also expressed the desire

for more detailed information about veterans' health status, health insurance coverage, health care preferences, and use of medical facilities. The VA and Westat began refining these and other broad research questions into a workable survey instrument in September 2000. As part of this process, we took into consideration several practical issues:

- **Computer-assisted Telephone Interviewing (CATI) Technology.** Using CATI technology, we were able to incorporate complex skip patterns into the questionnaire design.

- **Data Collection Mode.** We accommodated the demands of telephone interviewing by ensuring that questions were easy to comprehend, that lists of response options were short but not unduly restrictive, and that the average questionnaire administration time did not exceed 30 minutes.

- **Sample Design.** We implemented a dual frame design. One frame was a random national cross section of veterans drawn using a household screening questionnaire from a random digit dialing sample of telephone numbers (RDD Sample) and the second frame was a random sample from VA administrative files (List Sample).

- **Respondent Cognitive Ability.** We accommodated veterans' varying abilities to answer survey items, including the likelihood of either having the requisite personal knowledge or the capacity to remember past events in their lives.

The final NSV 2001 instrument collected information about each respondent's military background and sociodemographic characteristics. As well, within each of six benefit modules (Health Care, Disability, Mortgage Loan, Life Insurance, Education and Training, and Burial Benefits), the survey asked about veterans' perception of need for the benefit and their recent use of the benefit. The survey also asked about other sources of assistance they used, access and barriers to use of the service, their unmet needs, future plans to use benefit programs, and how they prefer to receive information about the service. Finally, the NSV 2001 included a separate module about veterans' communication needs. This last section, a new feature of the NSV 2001, asked about veterans' recent need for VA information, preferred media, and access to and use of the Internet.

In addition to the modular questionnaire that addressed substantive topics of interest (hereinafter referred to as "the extended interview"), we designed a preliminary screening questionnaire to determine whether any member of an RDD Sample household was a veteran. Because List Sample veterans drawn from the VA files were, by definition, eligible for the survey, it was unnecessary to conduct the screening part of the interview with them. Instead, verification procedures were established to ensure that contact was made with the correct sampled veteran.

1.3 Sample Design, Selection, and Management

Sample Design

A primary VA research objective was to obtain sufficient data from a cross section of the veteran population, from each of the seven VA health care enrollment priority groups, and from population subgroups of particular interest (female, Hispanic, and African American veterans). The VA specified 95 percent confidence intervals of ∀5% for estimates of proportion equal to 0.50 for each of the above cells. To meet these objectives, Westat designed a sampling plan that called for the completion of 13,000 veteran extended interviews from randomly selected households (RDD Sample). This was augmented by 7,000 veteran extended interviews completed from a List Sample selected from the VA administrative files. By completing 20,000 veteran interviews from these two samples, we fulfilled most of the VA precision requirements.

Sample Selection

The project team prepared estimates of the number of cases in each type of sample that would be needed to yield the desired number of completed interviews. For the RDD Sample, the sampling unit was the randomly selected telephone number. Therefore, these estimates included the historical rate of residential numbers among randomly sampled telephone numbers from a list-assisted RDD sampling frame. Other factors that affected the sample estimates were the expected success rate in contacting and completing a screening interview with the households, the estimated percentage of households with at least one veteran, and the expected cooperation rate among identified veterans. Based on these estimates, we selected a sufficient sample of telephone numbers from the national sampling frame using a list-assisted RDD sampling methodology. In addition, a Puerto Rico sample was selected using a naïve approach called "RDD element sampling."

For the List Sample, we created a frame from two VA administrative files: the Health Care Enrollment File and the Veterans Compensation and Pension (C&P) File. From the total of 4.5 million veterans on the list frame, a stratified systematic random sample was drawn of veterans belonging to the mandatory health care enrollment priority groups (groups 1 through 6).

Sample Management

In managing the survey sample, we ensured two things: first, that the sample was truly representative of the universe that defined it, and second, that we reached, as closely as possible, the target quotas for each sample stratum. To achieve these goals, we monitored cases during data collection, evaluated sample yields against expectations, refined interviewing strategies, and adjusted assigned sampling rates as needed to meet the targets. As data collection progressed, our ability to project the number of cases needed to meet our targets became more precise. We periodically reprojected yields based on reports comparing actual sample performance to the original yield projections.

1.4 Interviewer Recruitment and Training

The interviewers we employed to conduct the NSV 2001 received 20 to 24 hours of training in areas specific to the NSV 2001 project, including questionnaire content, sample design, contact procedures, call results recordkeeping, problem documentation, and refusal avoidance. In addition, before project-specific training, they received 8 hours of training in general telephone interviewing techniques and use of the CATI system. Because calls to List Sample veterans did not begin until several weeks into data collection, List Sample contact procedures were covered in a supplementary session instead of during the initial training. The principal training tool was scripted interactive exercises. Interviewers were not assigned to live interviewing until they had successfully completed these exercises. Throughout the data collection period, we held specialized training sessions on such topics as interviewing proxies, converting refusals, tracing List Sample veterans, and conducting callbacks to retrieve missing data. Additionally, telephone center supervisors monitored on average approximately 8 percent of all interviewing hours.

1.5 Data Collection

Westat collected the NSV 2001 data from February 12, 2001 through November 12, 2001. As stated above, we used CATI technology to administer the questionnaire. The following sections describe the CATI methodology we used, along with special features and operations that supported the data collection effort.

CATI System

The NSV 2001 CATI system was a customized version of Westat's Cheshire CATI system, a state-of-the-art data collection tool developed and refined by Westat programmers over the past 20 years. After designing the questionnaire and sample, we developed detailed programming specifications to create the CATI software that would operate the screener and extended instruments, the database for recording the response data, and the case management, contact, and call scheduling modules. A systems analyst led a team of programmers in writing and testing the code, with a final round of testing after all modules of the system were integrated. The database administrator, the questionnaire design team, project management staff, and telephone center personnel also tested the system.

The system supported both general data collection requirements and the special needs of the NSV 2001. For administering the substantive questionnaire, we programmed the NSV 2001 CATI system with online range checks for all variables, internal consistency checks between various responses, and detailed probes for the interviewers to present to the respondent when checks failed. The CATI case management function allowed us to, among other things, control the release of the sample in waves and automatically hold refusal and proxy cases until a designated release time. Contact modules allowed interviewers to record and handle appointments, messages, and problems, as well as verify contact with the intended List Sample veteran. The CATI call scheduling system contained detailed rules and algorithms for prioritizing and assigning cases to be worked. These rules took into consideration time of day and day of the week, callback appointments scheduled, call history of the case, type of interview, and special interviewing skills required.

Telephone Interviews

Telephone interviewing for the NSV 2001 took place in six of Westat's telephone research centers. Together, the facilities contained approximately 240 telephone interviewing stations, all fully supported by the central CATI system. Approximately 300 interviewers participated in the NSV 2001 data collection. The interviewing operations were managed by a telephone center operations manager, while a group of team leaders were responsible for the daily operations in the telephone centers. Using silent monitoring stations from which to hear an interview and follow it on a CATI terminal, the telephone center project manager and team leaders continuously assessed and reassessed interviewer

performance to ensure high quality data collection. VA representatives and Westat project managers also monitored interviews during training, the pretest, and main data collection. Monitoring was the basis for direct feedback to each interviewer on his or her performance and any areas needing improvement. It also provided project staff with ideas for improving the questionnaire and survey procedures after the pretest.

Various aspects of the NSV 2001 interview required particular skills. For example, specially trained interviewers administered the RDD household screener when we encountered language problems. We trained other interviewers to identify and interview a knowledgeable proxy when a veteran was unable to respond for himself or herself because of illness, communication problems, or physical or mental incapacity. We also trained a subset of interviewers to administer a short data retrieval questionnaire to certain households that had already completed the NSV 2001 screener but had missing data regarding eligibility.

Special Data Collection Operations

To increase response rates, and to ensure that we interviewed the correct sampled veteran, Westat put into place a variety of special data collection operations. We sent all List Sample veterans an advance letter to inform them of their selection to participate in the survey, explain its purpose, urge their cooperation, and establish it as a valid project of the U.S. Department of Veterans Affairs. To improve the likelihood of locating and contacting the List Sample veterans, the advance letter listed the addressee's current contact information and included a form and business-reply envelope that the recipient could use to update the contact information. We also provided a toll-free number for the veteran to call with their contact information, questions, or concerns. Other mail operations included mailout of a background letter for RDD Sample cases who requested a written explanation of the survey before proceeding (and for List Sample cases who did not receive their advance letter), and refusal conversion letters for RDD screener refusals and any extended interview refusals for which we could obtain an address.

We further assigned teams of interviewers to carry out special purpose interviewing efforts. They conducted refusal conversion attempts on RDD screener and extended interview refusals who were not hostile. As mentioned above, we also assigned a small group of highly skilled interviewers to contact people who had previously been identified as likely proxies for veterans who were not capable of responding to the interview. Finally, we kept a special tracing operation in place throughout the data

collection period. Whenever we discovered that a List Sample veteran was not at his or her last known telephone number or address, the case was sent through one or more steps to locate the veteran.

1.6 Sample Weighting

After we collected, edited, and cleaned the survey data, we constructed sampling weights so that the responses of the sampled veterans could be properly expanded to represent the entire veteran population. The weight calculations took into account the original selection probability, nonresponse, households with multiple residential telephone lines, and undercoverage due to the omission of nontelephone households and households with unlisted telephone numbers belonging to "zero-listed telephone banks" not covered in the list-assisted RDD methodology. We computed the weights separately for the List Sample and the RDD Sample so that, when fully weighted, the List Sample would represent the veterans from whom the sample was drawn, and the RDD Sample would represent the entire population of veterans. The RDD and List Samples were combined to construct a single database with composite weights. The composite weights are adjusted weights that reflect the increased chance that a veteran on the list sampling frame has of selection.

1.7 Quality Control

Rather than relying exclusively on external or after-the-fact quality control procedures, Westat built quality control into the survey operation itself. For example, we programmed real time, online data control into the CATI instrument. Our interviewer training and monitoring procedures also added extra measures of quality to the operation. Whenever possible, tasks were automated. To assure quality control in the automation process itself, every system and program, once implemented, was tested, revised, respecified, and retested. We also subjected sample selection and management tasks to rigorous quality control checks. The database manager prepared and edited all data, coded open-ended responses, handled and documented special problems, and produced the final clean data files for weighting and analysis.

A key quality control measure was a pretest we conducted at the start of data collection. We analyzed the data collected from the first 519 completed RDD extended interviews in order to test:

- Questionnaire design, content, wording, and structure;
- Length of interview administration;
- The functioning of the computerized CATI questionnaire and the CATI case management and call scheduling software;
- The interviewer training process; and
- The interviewing process itself.

Based on this analysis, we modified our yield assumptions to reflect the actual completion rate, and made slight changes to the interviewer training program to increase focus on areas that presented problems for interviewers or respondents in the pretest. The pretest also revealed that the average length of the interview was slightly over the target of 30 minutes.

1.8 Field Results

The NSV 2001 had a total sample target of 20,000 completed extended interviews. Of this total, 13,000 were to come from the household screening of RDD telephone numbers and 7,000 were to come from the List Sample. We achieved 100.2 percent of the overall target by completing 12,956 interviews from the RDD Sample (99.7 percent of the goal) and 7,092 interviews from the List Sample (101.3 percent of the goal).

As part of the NSV 2001 sample design, we also set interview completion targets by sample stratum for both the List and RDD Samples. The main objective of the List Sample stratification was to augment the sample for veterans in the mandatory health care enrollment priority groups (groups 1 through 6) and for female veterans. We also set List Sample interview targets for Hispanic and African American veterans. The List Sample completion rate for female veterans was 99.1 percent of the target. We achieved 122.9 percent of the target for Hispanic veterans from the List Sample and 156.3 percent of the African American veterans targeted to be interviewed from the List Sample. We exceeded the List Sample targets for four out of the six priority groups. We achieved almost 96 percent of the target for priority group 5. For priority group 4, however, we reached only 59 percent. We attribute this low

completion rate to a high incidence of priority group 4 veterans being institutionalized or deceased, making them ineligible for the survey.

For the NSV 2001 sample design, we set the RDD Sample size targets according to our assumptions about the distribution of the veteran population across various subgroups. However, the observed yields across various subgroups of the veteran population depended on the true distributions and not the assumed ones. For the RDD Sample, each case's stratum was determined by the veteran's responses to the survey questions about the stratification variables (priority group, age, race, gender, etc.). For the female veterans we achieved 105.6 percent of the target. The completion rates for Hispanic and African American veterans were 107.3 percent and 92.2 percent, respectively, of their expected targets.

The average interview time was 4.1 minutes per completed RDD screener household interview. The RDD Sample veterans took 33.3 minutes on average to complete the extended interview, while the List Sample veterans took an average of 38.7 minutes per completed extended interview. We expected the List Sample veterans to take longer to complete the interview because they generally have more medical conditions and medical treatment experiences to report. List Sample veterans were also more likely to have a service-connected disability that required them to complete an additional survey module about that disability.

2. QUESTIONNAIRE DESIGN

The 2001 National Survey of Veterans (NSV 2001) was designed to collect information that will help the U.S. Department of Veterans Affairs (VA) respond to many of its policy, planning, and budgetary challenges. This survey information is crucial to the VA for program and benefit planning. To ensure that the NSV 2001 would be useful to a large, diverse group of stakeholders, we examined the 1992 NSV instrument and reviewed results of the 1992 National Survey of Veterans Utilization Study before the questionnaire design phase. (Westat conducted the Utilization Study in 1999 to determine the data and information required by various stakeholders within VA to manage the policies, programs, and services that support the veteran population.) We then assessed the feasibility of meeting those information needs and set priorities among the needs. Finally, we integrated the results of the Utilization Study into the design of the proposed NSV 2001 instrument and sampling methodology. This chapter provides an overview of the 1992 NSV, presents recommendations from the 1992 NSV Utilization Study, describes how these findings were integrated into the NSV 2001, and details the content of this most recent version of the NSV.

2.1 1992 National Survey of Veterans

The VA conducted the 1992 NSV to obtain information necessary for planning and budgeting VA programs and services for veterans in general, as well as for certain subgroups of veterans. It also studied characteristics of the veteran population. The survey was designed to collect data that would enable the VA to follow changing trends in the veteran population, compare characteristics of veterans who use VA programs versus those who do not, and provide a current data resource for policy analyses. In addition, the data provided information needed for major initiatives that have a direct effect on veterans, such as benefit eligibility reform and health care benefit reform.

To the extent permitted by changing data needs, the 1992 NSV questions were tailored to match questions in previous VA surveys to allow for trend analysis. However, new information needs, new directions and initiatives within VA, and a rapidly developing national agenda necessitated a number

of changes to the survey. These changes were reflected in each major stage of the instrument's development. Principal factors driving the design changes over time were:

- The need for more detailed information on veterans' health status, medical facilities usage, and health insurance coverage;
- New financial eligibility guidelines for certain VA programs;
- Legislation expanding the definition of military service experience eligible for veterans benefits; and
- The need to represent certain subgroups in the veteran population through:
  - A random cross section of the veterans drawn from a household survey (RDD Sample); and
  - A random sample from VA files of VA medical facilities users and veterans receiving compensation for service-connected disabilities (List Sample).

Another major factor driving the 1992 survey design was results of a pretest showing the feasibility of collecting certain information by telephone. This led to the decision to use a telephone survey as the data collection method and to use computer-assisted telephone interviewing (CATI) to conduct the interviews. The wording and structure of the survey instrument accommodated this mode of data collection. This mode required for instance, that questions be easy to comprehend on the phone, that lists of choices be kept as short as possible without unduly limiting likely responses, and that questionnaire administration time meet a target of 45 minutes on average.

2.2 1992 National Survey of Veterans Utilization Study

As the primary means for generating key information for the VA's planning process, the NSV needs to answer central questions about the VA's "clients"–veterans of the U.S. uniformed services. These questions include:

- Who are the VA's clients?
- How many veterans are eligible for VA benefits? What characteristics make them eligible?
- What are veterans' needs? How do they perceive their needs?

- How do veterans act on their needs and their perceived needs?
- How many eligible veterans actually use their VA benefits?
- How easy is it for them to access VA services?
- What are their preferences for receiving services?
- How are their needs likely to change in the near term?

Westat conducted the 1992 National Survey of Veterans Utilization Study in 1999 to identify and articulate the uses to which stakeholders both inside and outside the VA put previous NSV results and their anticipated information needs from a future NSV.[1] We conducted 51 interviews with a diverse group of 102 individuals and found that while the 1992 survey included answers to some of the above questions, it had serious gaps and did not provide some important information to VA planners.

One important topic covered in the interviews was use of the 1992 NSV final report and survey data set. Of the 51 stakeholder interviews, 36 indicated at least some use of the written NSV report, while only 18 indicated any use of the database of survey responses. All 18 database users indicated they were also users of the final report. Fifteen of those interviewed indicated using neither the report nor the database. Their reasons included:

- The report or database was not directly relevant to their needs.
- Certain subpopulations were not sufficiently represented in the data set (e.g., female, minority, and homeless veterans).
- The database was expensive to access (users had to access the database through a link with the Austin data center).
- The database was difficult to use.

Even those who reported high initial use reported less use over time because the data were no longer current or because other, more current, sources of information existed (e.g., hospital utilization data in other Veterans Health Administration [VHA] databases).

The interviews also asked about specific topics from the 1992 NSV. None was identified as a candidate to be excluded from a future study. Those interviewed suggested improvements or modifications for all but one topic area (Respondent Information). Two topic areas (Health and Activity

[1] See 1992 National Survey of Veterans Utilization Study (Westat, 1999), for more detailed information about study methodology and results.

Limitations, and Health Insurance) were targeted for major changes. Suggested improvements to the Health Insurance section called for more extensive information about other types of insurance coverage and satisfaction with various insurance policy services.

In addition to specific topics, users also made suggestions and requests about enhancements to the survey database. Many users requested the ability to find the residence location for persons in the sample to support analyses of geographic distribution of veterans and access to services. Other requests included a requirement to link survey responses to the actual use patterns of veterans as identified in current VA databases. The 1992 database users also strongly supported having access to the survey database on a CD-ROM.

Both internal and external VA stakeholders requested more detailed information on service patterns for special subpopulations to ensure fairness of service delivery and to meet special needs. Stakeholders wanted more information on minority, female, and homeless veterans, as well as other special subpopulations, such as veterans exposed to Agent Orange in Vietnam or veterans who served in the Gulf War. Others interviewed commented on the use of different sampling strategies (e.g., combining a List Sample of those receiving services with an RDD Sample).

The general pattern of the interviews showed that current users of the information would likely continue to use the results provided by another NSV. Many persons throughout the VA indicated an interest in national survey data if the data also addressed their specific program and mission responsibilities. Many in the latter group offered specific suggestions for items and for characteristics of the report or database that would encourage their increased use.

A primary finding was strong support for a survey effort to collect data that would allow analysts to distinguish between those veterans who do or do not currently use VA programs. Many of those interviewed noted an increased need for information that could be used to plan, manage, and evaluate programs. Although many of the organizations have their own survey efforts focused on their program offerings, all VA organizations indicated a desire for information on veterans who do not use VA programs as a part of their overall planning, policy, and evaluation efforts.

Based on the 1992 NSV Utilization Study, we made several structural and content changes to the survey instrument to address the VA's needs and to increase the usability of the next NSV data set and report.

2.3 Structural and Content Revisions to the NSV

The 1992 NSV Utilization Study provided the framework for setting priorities among topics and items for the next NSV. As the fifth national survey in a series, it was important that the NSV 2001 address emerging issues while maintaining comparability in some areas with past surveys. However, to keep the questionnaire to a reasonable length, we had to shorten or remove some topics. We chose priority topics and items by focusing on the planning information needs identified in the Utilization Study. We reduced the number of items used to measure service use – most notably in the area of health care – and we cut items on awareness of specific types of benefits. We also eliminated items that did not address planning questions and items that were or could be available from other sources.

Compared to the previous version, the NSV 2001 has a more direct focus on nonusers. It also addresses veterans' future plans for using education, training, and burial benefits. We added new items that assess veterans' communication preferences. We also expanded race and ethnicity categories to permit more accurate classification of veterans. Additionally, we expanded the set of items that measured combat exposure to better identify women's combat exposure and permit more detailed projections of future health care needs.

The most significant structural change to the NSV 2001 survey is the modular structure of the instrument. This modular approach allowed us to collect information about multiple program usage (and nonusage) among veterans while minimizing respondent burden by letting them skip questions about services they had not used. Grouping the questions by benefit area also simplified the respondents' cognitive burden by asking them to think about only one topic at a time. In addition, the parallel structure of the modules allowed respondents to "learn" the interview and anticipate questions, reducing perceived respondent burden and interview length. Questions in the new NSV include the following:

- Introduction;
- Military Background;
- Health Background;
- Benefit-specific modules:
  - Health care
  - Disability

- Mortgage Loan
- Life Insurance
- Education and Training
- Burial

- Communication; and
- Sociodemographic Information

These modules are described in detail in the following paragraphs. The NSV 2001 extended questionnaire (with CATI programming specifications) appears in Appendix C.

Introduction. The Introduction module identified Westat as the data collection contractor and named the study sponsor (U.S. Department of Veterans Affairs). Here we outlined the general study objective, informed the respondent that participation was voluntary, and provided the respondent an option to receive the Privacy Act Statement. The Introduction module disclosed U.S. Office of Management and Budget (OMB) clearance, provided the study's OMB clearance number, and provided VA contact and address information.

Military Background. This module collected respondent gender and date of birth, along with information on military service, including component (reserves or active), branch of service, active duty start and release dates, service era, type of discharge, geographic locations of service, and combat and other military experiences (exposure to hazards/agents, prisoner of war). This module was used to establish the basis of veteran eligibility (e.g., type of service, length of service, locations) for specific veteran entitlements, services, and benefits.

The Military Background module was very similar to the Eligibility and Description of Military Service sections of the 1992 NSV. Periods of service were revised so as to be comparable with Census 2000, and the set of items identifying combat exposure was expanded to ensure more accurate assessment of female veterans' combat exposure and to permit more detailed projections of future need. The items used to expand the set of combat items were adapted from the combat intensity scale developed and used by the U.S. Centers for Disease Control and Prevention (CDC).

Health Background. The Health Background module collected general information on health status and whether current health was a limiting factor in performing selected daily activities (e.g.,

climbing stairs, pushing a vacuum). This module included the VSF12 (a 12-item scale providing measures of mental and physical well-being). It identified veterans who were disabled and who had a service-connected disability, and collected the veteran's service-connected disability rating. The module asked veterans about the effects of their health problems on their ability to perform daily activities (e.g., walking, bathing, shopping, getting dressed, eating), and whether or not the veteran had received medical treatment in the past year for a list of specific health conditions (e.g., high blood pressure, stroke, heart trouble, cancer, drug abuse/alcoholism, post-traumatic stress disorder). It also collected information about the veteran's current health insurance plans or programs, including Medicare (Part A, Part B), Medicare managed care, HMO, Medigap/Medicare supplemental health insurance, Medicaid (Medi-Cal), CHAMPUS, TRICARE, other government health care programs, or private health insurance.

Health Care. The Health Care benefits module collected information on the veteran's use of VA and non-VA health care services (number of visits) within the past 12 months, including emergency room use, outpatient care, and inpatient care (number of overnights hospitalized). It asked how services were paid for (e.g., VA, CHAMPUS/TRICARE, HMO, Medicare, private health insurance) and where veterans obtained their prescription medications. This module also contained items that asked about receipt of medical care due to exposure (while in the military) to environmental hazards, in-home health care, prosthetics, psychological counseling, therapy, and alcohol or drug treatment. Finally, it collected information on reasons why the veteran did not use VA health care benefits (within the past 12 months, or ever).

Disability. The Disability module applied to veterans who indicated (in the Health Background module) that they had either a disabling condition or a service-connected disability. It collected information on application for disability benefits, reasons for not applying, and status of most recent claim. It also collected information on receipt of disability payments from the VA, including type of payment (service-connected disability compensation, nonservice-connected disability pension), receipt of aid and attendance or housebound benefits, and how these payments helped in meeting financial needs. Items in this module asked about other (non-VA) sources of monetary disability benefits, use (or nonuse) of VA and non-VA vocational rehabilitation services, how well the veteran understood VA disability entitlements, and perceived ease in obtaining benefits.

Mortgage Loan. The Mortgage Loan module collected information on use of VA or non-VA loan programs to purchase a home, make home improvements, or refinance a home loan. It also asked reasons for not using the VA home loan program.

Life Insurance. The Life Insurance module collected information on VA life insurance coverage, whether the veteran was currently covered by VA life insurance, main reasons for not using VA life insurance, and life insurance coverage from other sources. It also asked how well the veteran understood VA life insurance entitlements.

Education and Training. The Education and Training module collected information on use or nonuse of VA and non-VA education and training benefits. (This module did not include vocational rehabilitation benefits, which were addressed in the Disability Module). It contained items that asked for what purpose the VA educational benefit was used (college/university coursework leading to a degree, correspondence courses, flight training, teacher certification, or business, technical, or vocational training), how important the VA educational benefits were in meeting the veteran's educational goals or preparing the veteran for a better job, and how likely the veteran would be to use VA educational benefits in the future.

Burial. The Burial benefits module asked veterans whether they had heard of specific burial benefit programs (VA headstones and markers, burial in a national or state veteran's cemetery, Presidential Memorial Certificates for next of kin). It also collected information on veteran burial plans and preferences, reasons for wanting/not wanting to be buried in a veteran's cemetery, whether they intended to use a VA-provided headstone or marker, how well the veteran understood veteran burial benefits, and how difficult the veteran thought it would be to obtain information about veteran burial benefits.

Communication. The Communication module collected information on where veterans "think they would go" to obtain information about VA benefits. It asked how much the veteran knew about veteran benefits, how satisfied the veteran was with the ability to get information about veteran benefits, whether the veteran has needed any information about benefits in the past year, and whether the veteran had access to the Internet.

This module was a new feature of the revised NSV questionnaire. It collected general information about respondents' recent need for VA benefit information, preferred sources and media for VA benefit information, Internet access, and recent Internet use.

Questions in the communication section were adapted from the 1992 NSV and from materials used by the Centers for Medicare and Medicaid Services (formerly known as the Health Care Financing Administration) in its market research projects. Information in this module will help VA researchers identify effective media for reaching users and nonusers, and track changes in communication preferences.

Sociodemographic Information. The Sociodemographic Information module collected information on employment status (working, retired, disabled, looking for work), operation of a small business (including Federal Employer Identification Number), race/ethnicity, education, marital status, number of dependents, income (total combined family income), income sources, assets, market value of primary residence, amount of mortgage on primary residence, zip code, Social Security number, and interest in participation in future VA studies. If the veteran expressed an interest in participating in future surveys, his or her full name and address were collected.

The Sociodemographic Information module is similar to several sections of the 1992 NSV questionnaire (the Demographics and Income and the Respondent Information sections). Several items were revised based on discussions with VA staff and a desire to ensure comparability with Census 2000. Taken together with the information on Military Background, this information will be useful for:

- Assessing program eligibility;
- Analyzing current use;
- Projecting future use;
- Identifying emerging needs;
- Identifying subpopulations with special needs; and
- Modeling the effects of changes in program eligibility criteria.

3. SAMPLE DESIGN, SELECTION, AND MANAGEMENT

The National Survey of Veterans (NSV 2001) was intended to provide estimates for the entire non-institutionalized U.S. population of veterans, as well as for veteran population subgroups of special interest to the Department of Veterans Affairs (VA). The subgroups of primary interest were the seven health care enrollment priority groups. The VA was also particularly interested in data for female, African American, and Hispanic veterans. In addition, the survey was required to provide information needed for major initiatives that would have a direct effect on veterans, such as benefit eligibility reform and health care benefit reform. The sample design had to accommodate these policy issues.

3.1 Sample Design

The VA desired to obtain 95 percent confidence intervals of ±5 percent or smaller for estimates of proportion of 0.5 for each of the veteran population subgroups. The resulting design called for 20,000 interviews to be completed by random selection of veterans. As discussed later in this section, we evaluated a number of alternative sample design options and adopted a dual frame design consisting of a random digit dialing sample (RDD Sample) and a List Sample. The cost-variance optimization resulted in sample allocation of 13,000 completed interviews with random digit dialing method and 7,000 completed interviews from the List Sample. The List Sample design used the VHA Healthcare enrollment file and the VBA Compensation and Pension (C&P) file to construct the sampling frame. The VA administrative files alone could not be used for the sample design because the coverage from these files was only about 21 percent.

Veterans living in institutions were included in the survey target population only if they were in the institution for less than 6 months and also had a principal residence elsewhere. Such veterans were included in the survey as part of the RDD Sample only. Although the list frame contained institutionalized veterans, they were not interviewed as part of the List Sample because these would have to be screened for eligibility. Veterans living abroad and in the territories were also excluded from the survey target population. Therefore, a veteran sampled from the list frame was not eligible for the survey if the address was outside of the continental United States and Puerto Rico.

Allocation of Sample across Priority Groups

According to year 2000 projections of the veteran population provided by the VA, approximately 25 million veterans were living across the country. The VA manages its provision of health care services by assigning veterans who enroll in their health care system to one of seven health care enrollment priority groups, outlined as follows:

- Priority 1. Veterans with service-connected[1] conditions rated 50 percent or more disabling.
- Priority 2. Veterans with service-connected conditions rated 30 to 40 percent disabling.
- Priority 3. Veterans who are former POWs. Veterans with service-connected conditions rated 10 to 20 percent disabling. Veterans discharged from active duty for a condition that was incurred or aggravated in the line of duty. Veterans awarded special eligibility classification under 38 U.S.C., Section 1151.
- Priority 4. Veterans who receive increased pension based on a use of regular aid and attendance or by reason of being permanently housebound and other veterans who are catastrophically disabled.
- Priority 5 Veterans with nonservice-connected and veterans with noncompensated service-connected conditions who are rated zero percent disabled, and whose income and net worth are below an established threshold.
- Priority 6. All other eligible veterans who are not required to make co-payments for their care. This includes:
  - World War I and Mexican Border War veterans;
  - Veterans solely seeking care for disorders associated with exposure to a toxic substance, radiation, or for disorders associated with service in the Persian Gulf; and
  - Veterans with service-connected conditions who are rated zero percent disabled but who are receiving compensation from the VA.
- Priority 7. Veterans with nonservice-connected disabilities and veterans with noncompensated service-connected conditions who are rated zero percent disabled, and who have income or net worth above the statutory threshold and who agree to pay specified co-payments.

[1] The term "service-connected" refers to a VA decision that the veteran's illness or injury was incurred in, or aggravated by, military service.

The distribution of the total veteran population across the seven priority groups is given in Table 3-1. Further, the law defines two eligibility categories: mandatory and discretionary. Priority groups 1 through 6 are termed as mandatory, whereas priority group 7 is termed as discretionary.

Table 3-1. Distribution of total veteran population across priority groups

	Mandatory						Discretionary
Priority group	1	2	3	4	5	6	7
Percent of total	2.31	2.06	5.01	0.73	29.96	0.34	59.59

Note: These distributions do not reflect actual veteran health care enrollments. These distributions were provided by VA analysts as estimates of what the veteran population would look like if it was segmented into the seven priority groups.

Three Approaches to Sample Allocation

The VA required that the sample design produce estimates of proportions for veterans belonging to each of the seven priority groups and for female, Hispanic, and African American veterans. Therefore, different sampling rates had to be applied to the seven healthcare enrollment priority groups. In particular, priority groups 4 and 6 had to be sampled at relatively higher sampling rates to produce estimates with the required levels of reliability.

We considered three approaches to allocate the total sample across the seven priority groups: (1) equal allocation, (2) proportional allocation, and (3) compromise allocation.

Approach I – Equal Allocation

Under this approach, the sample is allocated equally to each of the seven priority groups. The equal allocation approach achieves roughly the same reliability for the priority group estimates of proportions. In other words, it achieves almost the same coefficient of variation for all priority group estimates. Because the veteran population varies across priority groups, choosing this approach would have meant that the selection probabilities of veterans would have also varied across priority groups. As a result, the variation between the sampling weights would have been very large and would have resulted in large variances for the national level estimates. We therefore did not choose this allocation because it would not have been very efficient for the national level estimates.

Approach II – Proportional Allocation

For this approach, the sample is allocated to the priority groups based on the proportion of the veteran population that each priority group represents. Under the proportional allocation approach, the priority groups with larger veteran populations would have received the larger share of the sample. In particular, priority group 7 would have received a very large sample, while the sample sizes for priority groups 4 and 6 would have been too small to produce reliable survey estimates. The proportional allocation would be the most efficient allocation for the national level estimates because the probabilities of selection are the same for all veterans irrespective of the priority group. We did not choose this allocation because reliable priority group estimates would only have been possible for the three largest groups (priority groups 3, 5, and 7).

Approach III – Compromise Allocation

As the name implies, the compromise allocation is aimed at striking a balance between producing reliable priority group estimates (*Approach I*) and reliable national level estimates (*Approach II*). A number of procedures are available to achieve this compromise. The actual procedure to be applied depends on the exact survey objectives. The simplest and most commonly used allocation is the so-called "square root" allocation. Under this allocation, the sample is allocated to the priority groups proportional to the square root of the population of the priority groups. Under the "square root" allocation, the sample is reallocated from very large priority groups to the smaller priority groups as compared with what would have been under the proportional allocation. A more general compromise allocation is the "power allocation" discussed by Bankier (1988) under which the sample is allocated proportional to x^{λ}, where x is the measure of size and the parameter λ can take values between zero and 1. The value $\lambda = \frac{1}{2}$ corresponds to the "square root allocation." The two extreme values of λ give the "equal allocation" and the "proportional allocation." In other words, $\lambda = 0$ corresponds to *Approach I*, which is "equal allocation" and $\lambda = 1$ corresponds to *Approach II*, which is "proportional allocation." Kish (1988) has also considered a number of compromise allocations including the "square root" allocation.

Because we were interested in both national level estimates and the estimates for each of the priority groups, we used the "square root" compromise allocation to allocate the sample across the seven priority groups. The sample allocation across the seven priority groups under the "square root" compromise allocation is shown in Table 3-2. The sample allocation under the proportional allocation is identical to the distribution of the veteran population across priority groups (Table 3-1) and that under the equal allocation would assign 14.3 percent of the sample to each of the priority groups. In order to achieve the "square root" allocation for minimum cost we chose a dual frame design.

Table 3-2. Allocation of NSV 2001 sample across priority groups under "square root" allocation

Priority group	1	2	3	4	5	6	7
Percent of sample	7.66	7.25	11.29	4.32	27.61	2.92	38.95

Dual Frame Sample Design

Although it would have been theoretically feasible to select an RDD Sample with "square root" allocation of the sample across priority groups, such a sample design would have been prohibitively expensive. The RDD Sample design is an Equal Probability Selection Method (epsem) design, meaning that all households are selected with equal probability. Thus, a very large RDD Sample would have to be selected in order to yield the required number of veterans in priority group 6, the priority group with the smallest proportion of veterans. The alternative was to adopt a dual frame approach so that all of the categories with insufficient sample size in the RDD Sample could be directly augmented by sampling from the VA list frame. The corresponding survey database would be constructed by combining the List and the RDD Samples with a set of composite weights. This approach allowed us to use both samples to achieve the desired level of precision for subgroups of interest to the VA.

RDD Sample Design

We used a list-assisted RDD sampling methodology to select a sample of telephone households that we screened to identify veterans. This methodology was made possible by recent technological developments (Potter et al., 1991, and Casady and Lepkowski, 1991 and 1993). In list-assisted sampling, the set of all telephone numbers in an operating telephone exchange is considered to be

composed of 100-banks. Each 100-bank contains the 100 telephone numbers with the same first eight digits (i.e., the identical area code, telephone exchange, and first two of the last four digits of the telephone number). All 100-banks with at least one residential telephone number that is listed in a published telephone directory, known as "one-plus listed telephone banks," are identified. We restricted the sampling frame to the "one-plus listed telephone banks" only and then selected a systematic sample of telephone numbers from this frame. Thus, the RDD sampling frame consisted of all the telephone numbers in the "100-banks" containing at least one *listed* telephone number.

The nonlisted telephone numbers belonging to "zero-listed telephone banks" were not represented in the sample. However, nonlisted telephone numbers that appeared by chance in the "one-plus listed telephone banks" were included in the list-assisted RDD sampling frame.

Therefore, the list-assisted RDD sampling approach has two sources of undercoverage. The first is that nontelephone households are not represented in the survey. The second is the loss of telephone households with unlisted telephone numbers in the banks having no listed telephone numbers, known as "zero-listed telephone banks." Studies have been carried out on these potential losses, and the undercoverage from the two sources is estimated to be only about 4 to 6 percent (Brick et al., 1995). As discussed in Chapter 6, an adjustment to correct for the undercoverage was applied by use of a raking procedure with estimated population counts from the Census 2000 Supplementary Survey (C2SS) conducted by the U.S. Bureau of the Census.

List Sample Design

The VA constructed the list frame from two VA administrative files, the 2000 VHA Healthcare enrollment file and the 2000 VBA Compensation and Pension (C&P) file. The files were crossed against each other, and a single composite record was created for each veteran by matching the Social Security numbers. The list frame included information about the priority group to which each veteran belonged. Table 3-3 lists the total veteran population and the percentage of population represented by the list frame for each of the priority groups.

Table 3-3. Percentage of veterans in the VA files by priority group

Priority group	Veteran population (thousands)	Percentage of veterans in the list frame
1	577.5	100.0
2	516.4	100.0
3	1,254.1	100.0
4	183.6	94.7
5	7,501.4	25.5
6	83.8	100.0
7	14,920.3	5.9
All veterans	25,037.1	21.6

As observed in Table 3-3, the two largest priority groups (groups 5 and 7) have very low coverage of the veteran population in the list frame, whereas four out of the remaining five priority groups (groups 1, 2, 3, and 6) have 100 percent coverage. The list frame provides almost 95 percent coverage for priority group 4 (the second smallest priority group). This feature of the list frame was advantageous for the dual frame sample design because the sample could be augmented from the list frame for the smaller priority groups. The VA lists covered 21.6 percent of the overall veteran population including the priority group 7 veterans. Because of the very large proportion of priority group 7 population, no List Sample was required to augment this group of veterans. After excluding priority group 7 veterans, the list frame contained a total of over 4.5 million veterans, accounting for 44.7 percent of the veteran population belonging to the mandatory health care groups (priority groups 1 through 6).

The list frame was stratified on the basis of priority group (groups 1 through 6) and gender. Thus, the veterans on the list frame were assigned to one of 12 design strata and a systematic sample of veterans was selected independently from each stratum.

Allocation of Sample to List and RDD Frames

Because it was less costly to complete an interview with a case from the List Sample than the RDD Sample, the goal was to determine the combination of List and RDD Sample cases that would achieve the highest precision at the lowest cost. The higher RDD unit cost was due to the additional screening required to identify telephone households with veterans.

The largest proportion of veterans is in priority group 7, which accounts for 59.6 percent of the total veteran population. The proposed "square root" sample allocation scheme meant that we would allocate 38.9 percent of the total sample to priority group 7 veterans. Let n be the total sample size and a be the proportion of the total sample that will be allocated to the RDD frame. Then the expected RDD sample in priority group 7 would be $0.596 \times a \times n$. The sample required for priority group 7 under the square root allocation was equal to $0.389 \times n$. Because no sample augmentation from the list frame was required for priority group 7 the RDD sample in priority group 7 must be equal to the sample required for the priority group, i. e. $0.596 \times a \times n = 0.389 \times n$, which gives $a = 0.653$. Thus, we needed to allocate 65.3 percent of the total sample to the RDD frame. Any smaller proportion allocated to the RDD frame would have had an adverse impact on the reliability of the estimates, and a larger RDD proportion would have increased the cost. Thus, 65.3 percent was the optimum allocation that minimized the cost while achieving square root allocation of the total sample across priority groups. The proportion was rounded to 65 percent for allocation purposes, that is, 65 percent of the total sample was allocated to the RDD frame.

The NSV 2001 cost assumptions were based on the previous RDD studies and the assumption that about one in four households would be a veteran household. We determined from these assumptions that it would be 1.3 times as expensive to complete an interview from an RDD household veteran as compared with a List Sample veteran. As discussed later in this chapter, a number of alternate sample designs were evaluated for the total cost and the design effects for various veteran population subgroups of interest.

Sample Size Determination

The decision on the sample size of completed extended interviews was guided by the precision requirements for the estimates at the health care priority group level and for the population subgroups of particular interest (namely, female, African American, and Hispanic veterans). The 95 percent confidence interval for a proportion equal to 0.5 was required with 5 percent or smaller confidence interval half-width for these population subgroups.

The sample size required for the 95 percent confidence interval with desired half-width (w) for a proportion of p=0.5 can be determined by solving the following equation for the sample size n_c

$$1.96\sqrt{\left(\frac{0.25}{n_c}\right)\times(deff)} = w,$$

where *deff* is the design effect for the corresponding survey estimate. As discussed later in this chapter, the *deff* of a complex sample design is the ratio of the variances under the complex design and the simple random sample design with the same sample sizes. For example, the sample size for each priority group would be 768 for 95 percent confidence interval with 5 percent margin of error for a sample design with *deff* equal to 2.0. In order to assign a sample of 768 completed interviews to priority group 6 (the priority group with smallest proportion of veterans), while maintaining "square root" allocation across priority groups, we would have to complete more than 26,000 interviews. This sample size was larger than VA was prepared to select and it was decided to reallocate the sample across priority groups by departing slightly from the proposed "square root" allocation and accepting larger sampling errors for some veteran population subgroups. As a result, the sample size of 20,000 completed interviews was sufficient to satisfy the new precision requirements.

Alternative Sample Design Options

We evaluated six sample design options with respect to cost and design efficiency for a fixed total sample of 20,000 completed interviews. Two of the sample designs were based on RDD sampling alone, whereas the remaining four designs were based on a dual frame methodology using RDD and list sampling. For each of the sample designs considered, we compared the coefficients of variation of the national estimates and those of a number of veteran population subgroups as well as the corresponding design effects. The design effects were computed to evaluate the efficiency of each of the alternative sample designs. We also obtained the cost estimates for the alternative sample designs using linear cost models incorporating screener and extended interview unit costs.

Sample Design A

This sample design is based on RDD sampling of the number of veteran households that would yield a sample of 20,000 completed extended interviews. The sample sizes across the seven veteran health care priority groups are random, and the expected sample sizes would be distributed according to their proportion in the population. Similarly, for the population subgroups of particular interest (female, African American, and Hispanic veterans), the sample sizes are also random and the expected sample sizes would be distributed in proportion to the population sizes of the respective subgroups.

Sample Design B

This is also an RDD Sample design but the sample is allocated to the priority groups according to the "square root" allocation scheme. The fixed sample sizes across priority groups are achieved through screening. The number of veteran households to be screened is determined by the sample size allocated to priority group 6, the smallest priority group, with 0.34 percent of the veteran population. The resulting sample design is a stratified sample design with "square root" allocation of the sample across the seven priority groups.

Sample Design C

This is the dual frame sample design discussed earlier, with an RDD Sample of 13,000 and a List Sample of 7,000 completed extended interviews. The list frame sample design is a stratified sample design. The first level of stratification is on the basis of priority groups 1 through 6. As noted previously, no List Sample is allocated to priority group 7. The List Sample is allocated across the remaining six priority groups to achieve the "square root" allocation of the total sample (RDD and List) across the seven priority groups. The next level of stratification is by gender within each priority group and the sample is allocated so that the sampling rate for female veterans is twice that for male veterans. The stratification by gender allowed us to increase the sample size for female veterans by sampling at a higher rate. This strategy could not be adopted for Hispanic and African American veterans because the variables to identify race/ethnicity were not available on the VA files used to construct the list frame.

Sample Design D

This sample design is essentially the same as sample design C but the List Sample is reallocated across the six priority groups by oversampling priority groups 6 and 4 and correspondingly reducing the sample size for priority group 5. Priority group 7 veterans are not selected from the list frame.

Sample Design E

This is a dual frame design with an RDD Sample of 10,000 and a List Sample of 10,000 completed extended interviews. To achieve the "square root" allocation of the total sample across the priority groups, the List Sample must be allocated to priority group 7 veterans as well. As before, the List Sample is a stratified sample and the sampling rate for female veterans is twice the sampling rate for male veterans within each priority group.

Sample Design F

This is also a dual frame design with an RDD Sample of 15,000 and a List Sample of 5,000 completed extended interviews. To achieve the "square root" allocation of the total sample across the priority groups, the RDD Sample must be screened for priority groups. The List Sample is allocated to priority groups 1 through 6. As in the case of other dual frame designs, the List Sample design is a stratified sample design, and the sampling rate for female veterans is twice the sampling rate for male veterans within each priority group.

Efficiencies of the Alternative Sample Designs

To evaluate the precision of the survey estimates, we computed the standard errors of these estimates, where the standard error of an estimate is defined as the square root of the variance of the estimate. The ratio of the estimated standard error to the survey estimate itself, called the coefficient of variation (cv) of the survey estimate can also be used to evaluate a sample design.

Another way to evaluate the efficiency of a sample design and the procedure used to develop the survey estimates is by using the design effect. Design effect is defined as the ratio of the variance of an estimate for a complex sample design and the variance of the estimate under the simple random sample design with the same sample size. Kish (1965) introduced the concept of design effect to deal with complex sample designs involving stratification and clustering. Stratification generally leads to a gain in efficiency over simple random sampling, but clustering usually leads to deterioration in the efficiency of the sample design due to positive intracluster correlation among units in the cluster. To determine the total effect of any complex design on the sampling variance in comparison to the alternative simple random sample design, the design effect *(deff)* is defined as

$$Deff = \frac{sampling\ \ variance\ \ of\ \ a\ \ complex\ \ sample\ \ design}{sampling\ \ variance\ \ of\ \ simple\ \ random\ \ sample\ \ design}.$$

We used the design effects for various survey estimates, including the estimates for priority groups, to evaluate the alternative sample designs that we considered for the NSV 2001. The smaller the design effect the more efficient is the sample design without taking the cost into consideration.

We also computed the cv of the survey estimates to check the precision requirements for the survey estimates. The precision requirement was specified in terms of margin of error of the 95 percent confidence interval, which is given by 1.96 times the cv of the estimate. Table 3-4 provides the design effects and the cv of estimates of proportions equal to 0.5 for various population subgroups, including the priority groups for the alternative sample design options.

The following sections of this chapter discuss the comparative costs of the six alternative sample design options and the cost-variance efficiencies of the alternative sample designs.

Cost Comparisons

The choice of a survey design involves comparing costs and the design efficiencies in terms of sampling variances. To estimate the total survey costs for the six alternative sample designs, we used a linear cost model. A general disposition of the total sampling cost for each of the alternative sample designs can be described as follows.

Table 3-4. Design effects and coefficients of variation (cv) for various veteran population subgroups for the alternative sample designs

Characteristic	Design Effects					
	Design A	Design B	Design C	Design D	Design E	Design F
All veterans	1.00	1.27	1.48	1.48	1.92	1.30
Priority 1	1.98	1.00	1.13	1.13	1.10	1.21
Priority 2	1.98	1.00	1.12	1.12	1.10	1.20
Priority 3	1.95	1.00	1.18	1.18	1.14	1.32
Priority 4	1.99	1.00	2.09	2.47	2.42	1.97
Priority 5	1.70	1.00	2.07	1.92	2.62	2.02
Priority 6	2.00	1.00	1.04	1.04	1.04	1.07
Priority 7	1.40	1.00	1.39	1.39	1.75	1.21
Male	1.05	1.34	1.52	1.52	1.95	1.35
Female	1.95	2.45	2.98	2.96	4.15	2.57
African American	1.92	2.44	2.50	2.52	3.20	2.36
Hispanic	1.96	2.50	2.55	2.57	3.26	2.41

Characteristic	Coefficients of Variation					
	Design A	Design B	Design C	Design D	Design E	Design F
All veterans	0.35	0.40	0.43	0.43	0.49	0.40
Priority group 1	3.30	1.28	1.36	1.36	1.34	1.40
Priority group 2	3.44	1.31	1.38	1.38	1.37	1.43
Priority group 3	2.19	1.05	1.14	1.14	1.12	1.20
Priority group 4	6.84	1.83	2.65	2.48	2.85	2.57
Priority group 5	0.86	0.68	0.97	0.98	1.10	0.96
Priority group 6	9.44	2.15	2.16	1.80	2.19	2.23
Priority group 7	0.54	0.56	0.66	0.66	0.74	0.62
Male	0.37	0.42	0.45	0.45	0.51	0.42
Female	2.18	2.47	2.43	2.44	2.77	2.32
African American	1.71	1.93	1.95	1.96	2.21	1.89
Hispanic	2.47	2.80	2.82	2.84	3.19	2.74

Selection of an RDD Sample considered for the NSV 2001 involved two interviewing processes: a household screening interview and an extended interview. Depending on an allocation method adopted in the sample design, the screening interview would be administered to screen only for the veteran households (level I screening) or for the priority groups (level II screening). Under the proportional allocation, sample sizes to be realized across seven priority groups will be random variables, but their expected sample sizes will be proportional to the population sizes of the priority groups. The interviewer would need to screen only for the veteran households (level I screening) to get the required sample size, say n_{RDD}, for the RDD Sample. The RDD Sample for sample design A, C, D, and E were classified into this category, and the general expression for such screening costs is given by

$$C_{Screen\_I} = n_{RDD} \times C_1,$$

where C_1 is the unit cost for the level I screening.

On the other hand, the square root allocation used in the RDD Sample for sample design B necessitated an additional step to screen for priority group (level II screening) as well. The RDD Sample for sample design F also must go through this step because the corresponding RDD Sample must be screened for the priority groups. That is, once the interviewer found a veteran household, he or she would need to further screen for the priority group. Determination of priority group that a veteran belongs to would require asking questions on income, assets, debts, number of dependents, and disability rating. Consequently, the corresponding unit cost C_2 for the level II screening was much larger than the unit cost C_1 for the level I screening. Also, to obtain the designated sample sizes, the screening process would need to continue until the designated sample size for priority group 6 (the smallest category) is obtained. Thus, the number of telephone numbers to be screened, denoted by m_{RDD}, would be much larger than the corresponding total number of telephone numbers to be sampled for the design, n_{RDD}. The higher unit screening cost C_2 for level II screening and the larger number m_{RDD}, of households to be screened would result in a very large total screening cost. The total screening cost for level II screening is given by

$$C_{Screen\_II} = m_{RDD} \times C_2 .$$

On completing the screening interview, the extended interview would be administered to the fixed number, n_{RDD}, of veterans. Letting $C_0^{(RDD)}$ denote the unit cost of the RDD extended interview, the total cost for the RDD extended interview is

$$C_{RDD-Extended} = n_{RDD} \times C_0^{(RDD)}.$$

This equation applies to all RDD Samples.

For the List Sample, relevant information for selecting veterans is available at the outset from the frame itself. Thus, no screening cost is incurred but there is a cost associated with tracking and tracing the List Sample veterans. Moreover, the average time to administer the extended interview to List Sample veterans would be higher that that for the RDD Sample veterans. Therefore, the unit cost of the List extended interview would be higher than the RDD extended interview unit cost. The extended interview would need to be administered to the List Sample cases for all of the alternative sample designs using a dual frame methodology. If we denote by $C_0^{(List)}$ the unit cost of the List Sample extended interview then the total interview cost of the List extended interview is

$$C_{List-Extended} = n_{List} \times C_0^{(List)}.$$

Under a linear cost model, total sampling cost based on the above disposition can be obtained as the sum of the relevant components. For example, $C_{Total} = C_{Screen\_I} + C_{RDD-Extended}$ is the total survey cost for the sample design A, $C_{Total} = C_{Screen\_II} + C_{RDD-Extended}$ is the total survey cost for sample design B, $C_{Total} = \left(C_{Screen\_I} + C_{RDD-Extended}\right) + C_{List-Extended}$ is the total survey cost for sample design C, and so on. Table 3-5 provides the relative total sampling costs for the alternative sample designs, where we have set the total cost for sample design A equal to 100 to allow a standard comparison across sample designs.

Table 3-5. Cost comparison of the alternative sample designs

Sample design option	Cost relative to option A
A	100
B	519
C	93
D	93
E	89
F	104

As expected, the cost of the sample designs C and D are the same because of the same sample allocation between the list and RDD frames. On the other hand, sample design B is very expensive due to higher screening cost (level II screening).

Cost-Variance Efficiency of the Alternative Sample Designs

We considered six sample designs to meet the survey objective, which was to obtain sufficient data about a cross section of veterans for each health care priority group, while at the same time obtaining reliable survey estimates at the national level. Reliable survey estimates were also required for female veterans and for Hispanic and African American veterans. The design effects and coefficients of variation for the six sample design options were obtained and these are given in Table 3-4 for various subgroups of the veteran population. The reliabilities of the survey estimates of proportions equal to 0.5 for various domains of interest were considered for evaluating the alternative sample design options.

Although the design effects would always be less than 2 for sample design A, this design does not satisfy the survey objectives due to very small sample sizes for smaller priority groups. The design effect for sample design A is equal to $(2-d)$ when estimating a proportion equal to 0.5 for a population domain of size d relative to the entire population. On the other hand, sample design B would satisfy the survey objectives but such a design would not be feasible because of very high screening costs. Hence, neither of the two RDD Sample designs is suitable for the NSV 2001, and we used a dual frame sample design with the allocation of the total sample to the RDD and list frames as discussed earlier in this chapter.

The cost of sample design C reduces to 93 percent of sample design A because it is a dual frame design. The precision requirement is also satisfied for most veteran population subgroups. It turned out that for sample design C, the highest design effects were for priority groups 4 and 5 because coverage of these two groups by the list frame was less than 100 percent. In spite of the high design effect for priority group 5, the precision requirement was satisfied because of the larger sample size. The sample size required to satisfy the desired reliability for the priority group 4 estimates could not be achieved by the proposed "square root" sample allocation across priority groups with the total sample size of 20,000 completed interviews. Although the proportion of veterans in priority group 6 was less than that in priority group 4, the precision requirement for priority group 6 was satisfied because of its 100 percent overlap with the list frame.

The design effects for female, African American, and Hispanic veterans were also larger than 2. The female veterans account for 5.4 percent of the total veteran population, and Hispanic and African Americans are respectively 4.0 percent and 8.2 percent of the total veteran population. The precision requirements for the estimates for female veterans were achieved through oversampling the list frame. The higher sampling rate for female veterans increased the design effects slightly for the national level estimates because of increased variability in the survey weights. The precision requirements for the estimates for Hispanic veterans could not be satisfied. The List Sample size for Hispanic veterans could not be increased because the variables to define race/ethnicity were not available on the list frame. The precision requirement for the estimate for African Americans was met because of a larger sample size.

We reallocated the sample as proposed under sample design D to improve the precision of the two smallest priority groups (groups 6 and 4). Under sample design D we reallocated the sample from priority group 5 to priority groups 4 and 6 from the allocation under sample design C. Although the precision requirement for priority group 6 was satisfied because the list frame covered this group completely, the List Sample was also reallocated from priority group 5 to priority group 6. Under sample design D the 95 percent confidence interval half-width would be wider than 5.0 percent for Hispanic veterans only. Although the design effect for priority group 4 increased, the precision level improved because of an increase in the sample size due to sample reallocation. The increase in the design effect for priority group 4 resulted from fixed RDD variance for the nonoverlap part. Priority group 6 has 100 percent coverage by the list frame, and hence the design effect does not change if the List Sample size increases. Overall, when the List Sample is reallocated, the precision of the estimates for both priority groups 4 and 6 improves without significantly deteriorating the precision of the estimate for priority group 5. The precision of the estimate for Hispanic veterans decreases somewhat, but the effect is almost negligible (the design effect for Hispanic veterans increased from 2.55 under sample design C to 2.57 under sample design D). The survey cost for sample design D is the same as under sample design C due to the same sample allocation between the list and the RDD frames.

The other two dual frame designs (sample designs E and F) differ from sample design C in sample allocation between the RDD and list sampling frames. Under design E, the cost is reduced only slightly (89 for design E versus 93 for design C) by over-allocating the sample to the list frame, but the reliability of the survey estimates is affected for several categories of estimates. Sample design F achieves better precision levels for some of the categories and worse for others, but the overall cost increases because of higher screening costs (level II screening). Sample design F requires screening for priority

group in order to achieve "square root" allocation of the sample at the priority groups. The cost of sample design F is 104 as compared with 93 for sample designs C and D. Therefore, sample design D provides a solution that satisfies the survey objectives of producing reliable estimates and controlling the overall cost of the survey.

The sampling parameters of sample design D (sample allocation and sample sizes) are given in Table 3-6. The table also gives the effective sample size, defined as the total sample size divided by the design effect. The minimum effective sample size must be 384 in order to achieve the required 5 percent half-width for 95 percent confidence interval of the estimate of proportion equal to 0.5. Thus, for sample design D, the only veteran population subgroup for which the precision requirement could not be met was Hispanics.

Table 3-6. Sample allocation for sample design D

Characteristic	Sample size RDD	List	Total	Design Effect	Effective sample size
All veterans	13,000	7,000	20,000	1.48	13,489
Priority group 1	295	1,240	1,535	1.13	1,357
Priority group 2	271	1,199	1,470	1.12	1,308
Priority group 3	661	1,636	2,296	1.18	1,939
Priority group 4	69	931	1,000	2.47	405
Priority group 5	3,731	1,231	4,962	1.92	2,589
Priority group 6	36	764	800	1.04	773
Priority group 7	7,937	0	7,937	1.39	5,712
Male	12,338	6,419	18,757	1.52	12,344
Female	662	581	1,243	2.96	420
African American	1,066	574	1,640	2.52	650
Hispanic	520	280	800	2.57	311

3.2 Sample Selection

The samples from the list and RDD frames were selected independently. The RDD Sample consists of a sample of telephone households, and the List Sample consists of veterans sampled from the VA list frame. This section describes sampling procedures for each of the two components.

List Sample Selection

The List Sample is a stratified sample with systematic sampling of veterans from within strata. The strata were defined on the basis of priority group and gender. The first level of stratification was by priority group and then each priority group was further stratified by gender. Thus, the sample had 12 strata (priority group by gender).

Under the assumption of an 80 percent response rate to the main extended interview, a List Sample of about 8,750 veterans was anticipated to yield 7,000 complete interviews. We also decided to select an additional 50 percent reserve List Sample to be used in the event that response rates turned out to be lower than expected. Therefore, the total sample size selected from the list frame was 13,125 veterans. With the systematic sampling methodology, we achieved a total sample of 13,129 veterans from the list frame, out of which a sample of 4,377 veterans was kept as a reserve sample.

The allocation of the List Sample to the six priority groups, in combination with the RDD Sample, corresponded to sample design D. Female veterans were sampled at twice the rate as male veterans while keeping the List Sample size fixed at 13,129. Table 3-7 provides the allocation of the List Sample to the 12 sampling strata.

Table 3-7. Allocation of List Sample to sampling strata

Priority group	Gender	Stratum	Sample Size
1	Male	11	2,082
	Female	12	242
2	Male	21	2,027
	Female	22	224
3	Male	31	2,798
	Female	32	270
4	Male	41	1,637
	Female	42	110
5	Male	51	2,127
	Female	52	182
6	Male	61	1367
	Female	62	63
Total sample			13,129

Based on the sizes of the 12 sampling strata on the list frame and the allocated sample size for each stratum given in Table 3-7, we used a systematic random sampling procedure within each stratum to select List Sample veterans.

We also determined release groups by assigning sequential numbers to each veteran in the List Sample starting with 1. The release groups were defined for sample management purposes as discussed later in this chapter. The List Sample was divided into 15 release groups by assigning veterans numbered *i, i+15, i+30, i+45,* etc. to the i^{th} release group, where $i = 1,2,...,15$. The first 4 release groups contained 876 veterans each and the remaining 11 release groups contained 875 veterans each. From those 15 release groups, we selected two sets (waves) consisting of 5 release groups each for the March 2001 and the May 2001 List Sample releases. These were selected by using two sequential systematic samples of release groups from the 15 release groups. We used the remaining 5 release groups as a reserve sample to be released only if the actual response rates turned out to be lower than the assumed response rate of 80 percent.

Although the cooperation rates were quite high, the List Sample targets could not be met with the initial two waves of the List Sample. This happened because of out-of-scope sample cases (e.g., deceased, institutionalized veterans) and sampled cases that could not be traced. Thus, we released the final wave, which also consisted of 5 release groups, in June 2001.

RDD Sample Selection

National RDD Sample

We selected the RDD Sample of households using the list-assisted RDD sampling method. This method significantly reduces the cost and time involved in such surveys in comparison to dialing numbers completely at random. The general approach we employed was a two-stage sampling procedure in which we initially selected a sample of telephone numbers and successfully screened for households with veterans.

Using the list-assisted sampling methodology, we selected a random sample of telephone numbers from "one-plus listed telephone banks." This list-assisted RDD sampling methodology is implemented in the GENESYS sampling system, which employs a single-stage equal probability

sampling method to select the telephone numbers. The "one-plus listed telephone banks" are initially sorted by geographic variables, such as state, metropolitan, and nonmetropolitan, and also by area codes and five digit prefixes. These sorts construct the sampling frame. The frame is then divided into implicit strata (almost) equal in size while preserving the sort ordering. The total number of such implicit strata is the same as the desired sample size. Then a single telephone number is selected independently from within each implicit stratum.

Based on propensity estimates from the 1992 NSV RDD Sample, we estimated that we needed a sample of 135,440 telephone numbers to obtain 13,000 completed extended interviews for the RDD component of the sample. Our assumptions were:

- Residential numbers – 60 percent;
- Response to screening interview – 80 percent;
- Households with veterans – 25 percent; and
- Response to extended interview – 80 percent.

The sample yields at various steps during the RDD Sample selection are given in Figure 3-1.

Telephone Numbers	181,000
Residency Rate	45%
Identified Residential Households	81,450
Screener Response Rate	80%
Screened Households	65,160
Households with Veterans	25%
Identified Veteran Households	16,290
Extended Interview Response Rate	80%
Completed Extended Interviews	13,032

Figure 3-1. Expected RDD sample yield

From the above calculation, we determined that we required an RDD Sample of 181,000 telephone numbers to yield 13,032 completed extended interviews. We also decided to select an

additional 30 percent reserve RDD Sample to be used in the event that the yield assumptions did not hold (in other words, if the response rate turned out to be lower than expected). Thus, a total of 235,300 telephone numbers were to be selected from the RDD frame but we increased the sample size to 240,000 telephone numbers so that 186,000 telephone numbers could serve as the main RDD Sample and the remaining 54,000 as the reserve sample. We selected the sample of 240,000 telephone numbers from the GENESYS RDD sampling frame as of December 2000.

To maintain better control over the RDD sampling yields, the 240,000 telephone numbers selected were divided into 80 release groups, with each group containing 3,000 telephone numbers. To determine release groups, sequential numbers starting from 1 were assigned to the telephone numbers in the RDD Sample. The sampled telephone numbers were kept in the same order in which they were originally listed in the GENESYS sampling frame to preserve the implicit stratification of the sample. The telephone number with the sequence numbers *i, i+80, i+160, i+240*, etc. constituted release group i, where $i = 1,2,...,80$. From the 80 release groups, systematic samples of 10 release groups (or waves) were selected almost every month for the sampling process. The first release (wave) contained 20 release groups because it included the pretest effort. The sample released in August contained 19 release groups or 57,000 sampled telephone numbers. Early in data collection it became clear that the sample yield assumptions were very optimistic and even the entire RDD Sample of 240,000 telephone numbers would not be sufficient to produce the required 13,000 completed extended interviews. Therefore, we decided to select a supplementary RDD Sample of 60,000 telephone numbers.

Supplementary RDD Sample

Based on the result of the interim RDD Sample yields, we selected a supplementary sample of 60,000 telephone numbers from the GENESYS RDD sampling frame as of June 2001. The supplementary sample was divided into 20 release groups, and the release groups were assigned the sequential numbers from 81 to 100. The supplementary sample of 60,000 telephone numbers and the one last release group from the initial RDD Sample were also released in August 2001.

Puerto Rico RDD Sample

No listed household information was available for Puerto Rico. As a result, we used a naïve RDD sampling approach called "RDD element sampling" (Lepkowski, 1988) instead of the list-assisted

RDD method that we used for the national RDD Sample. With this methodology, all possible 10-digit telephone numbers were generated by appending four-digit suffixes (from 0000 to 9999) to known 6-digit exchanges consisting of 3-digit area code and 3-digit prefix combinations. A commercially available[2] database contained 325 Puerto Rico residential exchanges. Thus, the Puerto Rico RDD frame was constructed to have 3,250,000 telephone numbers and a systematic sample of 5,500 telephone numbers was drawn to achieve 176 completed extended interviews.

Before sampling, the frame file was sorted by 6-digit exchange and place name (or service name).[3] This implicit stratification permitted a better representation of the population of households. Also, the required 176 completed extended interviews was determined proportionally to the ratio of the Puerto Rico population size (3,803,610) to the U.S. population size (281,421,906) as of April 1, 2000 from the size of the main RDD completed interviews (13,000). To achieve this target sample size of 176 completed extended interviews, the total of 5,500 telephone numbers was calculated by assuming the residency rate, the screener response rate, the veteran household rate, and the extended interview response rate as 20 percent,[4] 80 percent, 25 percent and 80 percent, respectively. Unlike the latter three rates, the assumed residential rate is much lower than that of the national RDD Sample. This is because RDD element sampling, unlike the list-assisted RDD sampling, does not have any information on the "one-plus listed telephone banks."

3.3 Sample Management

Conduct of the NSV 2001 required not only an effective sample design but also careful management of the entire sampling process, from creating the sampling frame to the end of data collection. Before each sampling step, project staff identified the goals, designed the process, and prepared detailed specifications for carrying out the procedures. At each stage, we carried out quality control procedures that involved checks of counts, cross-tabulations, valid values, and other measures of

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[2] The 643 exchange numbers were obtained from the "Terminating Point Master Vertical & Horizontal Coordinates Data (abbreviated as TPM-VHCD)" file provided by Telcordia Technologies. As of December 7, 2000, 325 of them were associated with a regular (Plain Old) Telephone Service (abbreviated as POTS). No such numbers shared with paging for Puerto Rico.

[3] This is a character field in the TPM-VHCD file, which identifies the general location or service of each area code and is used by many customer-billing processes to appear on bills. Refer to TPM-VHCD – Data Set/File Specification, Appendix A-1, Page 5.

[4] According to Lepkowski (1988, p. 83), fewer than 25% of all potential telephone numbers (generated by appending 4-digit random numbers to known area-prefix combinations) are assigned to a household.

correct file processing, transfer, and handling. The remainder of this section describes the principal areas of sample management.

Sampling Frames

List Frame

Based on the sample design and the data available from the VA source files, we developed specifications for constructing the list sampling frame. It included rules for:

- Defining each sample stratum;
- Determining the source file and variable for each data element needed to construct and stratify the frame; and
- Defining other needed data items and their sources, such as identification and contact information about the veteran.

The VA staff matched the two source files – the VHA Healthcare enrollment file and the VBA Compensation and Pension (C&P) file.

RDD Frame

The national RDD Sample was selected at two different times, and hence two different frames were used. The RDD frames, differing in the reference period as of December 2000 and June 2001, consisted of all "one-plus listed telephone banks" covering the fifty states and the District of Columbia. The GENESYS Sampling System provided the RDD sampling frames. As of December 2000, GENESYS had supplied 2,487,468 "one-plus listed telephone banks" in the frame. Thus, the size of the national RDD sampling frame was 248,746,800 (2,487,468×100). Westat obtains an updated sampling frame quarterly from GENESYS for conducting RDD surveys. The updated frame as of June 2001 contained 2,538,453 "one-plus listed telephone banks." As described earlier, the frames were sorted in geo-metro order before sampling so that the resulting RDD Samples represented the entire population of households.

Sample Release Groups

To ensure that the sample remained unbiased during the data collection process, we partitioned both the RDD and List Samples into a number of release groups so that each release group was a random sample. The sample was released to data collection staff in waves. Each of these sample waves comprised a number of release groups, which were selected at random. The small size and independence of sample release groups gave precise control over the sample. During data collection, we monitored sample yield and progress toward our targets. When we noticed that a sufficient number of sample cases from the previous waves had been assigned final result codes, we released new waves of the sample. Tables 3-8 and 3-9 show the release dates of sample waves and the corresponding number of cases in each wave for the RDD and List Samples.

We carefully monitored the sample to ensure that we met the data collection goal of 20,000 completed extended interviews, and that the sample was representative of the veteran population across the sample waves (see Table 3-10). Tables 3-11 and 3-12 compare the sample yield distributions with respect to priority groups and the other demographic variables of age, gender, and race/ethnicity across sample waves. Similarly, Table 3-13 compares the sample yield distribution with respect to levels of education across waves and Table 3-14 compares that with respect to census regions.

Table 3-8. RDD Sample waves

Sample wave	Date released	Number of cases
1	February 12, 2001	60,000
2	March 16, 2001	30,000
3	May 18, 2001	30,000
4	June 11, 2001	30,000
5	July 11, 2001	30,000
6	August 21, 2001	57,000
7	August 30, 2001	63,000
Puerto Rico	April 16, 2001	5,500

Table 3-9. List Sample waves

Sample wave	Date released	Number of cases
1	April 9, 2001	4,376
2	May 14, 2001	4,377
3	July 27, 2001	4,376

In Table 3-10 the sample yield is defined as the ratio of the number of completed extended interviews and the number of sampled cases expressed as a percent. The sample yield was quite uniform over the List Sample waves but it decreased monotonically over the RDD Sample waves. The reason for decreasing sample yield for the RDD Sample was that interviewers had less calling time for the sample waves released later during the data collection. At various times during data collection we closed earlier sample waves. Had we not done so, the difference in yields would have been even larger. Puerto Rico is not included in these analyses because the Puerto Rico sample was not released in waves.

Table 3-10. Sample yield by sample wave (RDD and List Samples)

Sample	Wave	Cases sampled (A)	Cases completed (B)	Percent yield (B/A) * 100
RDD	1	60,000	2,840	4.73
	2	30,000	1,374	4.58
	3	30,000	1,318	4.39
	4	30,000	1,307	4.36
	5	30,000	1,241	4.14
	6	57,000	2,394	4.20
	7	63,000	2,431	3.86
	Total	300,000	12,905	4.30
List	1	4,376	2,384	54.48
	2	4,377	2,317	52.94
	3	4,376	2,391	54.64
	Total	13,129	7,092	54.02

Table 3-11. Distribution of completed sample cases by health care priority group within each wave (RDD and List Samples)

		Health care priority group						
Sample	Wave	1	2	3	4	5	6	7
RDD	1	2.75	3.27	7.99	0.14	16.97	11.76	57.11
	2	3.28	1.82	8.81	0.00	17.54	11.28	57.28
	3	3.19	3.11	9.18	0.00	18.06	11.46	55.01
	4	3.14	2.52	8.80	0.08	15.46	12.55	57.46
	5	3.46	1.93	9.11	0.00	18.53	10.72	56.24
	6	3.63	2.72	10.03	0.08	17.63	10.57	55.35
	7	3.54	2.26	9.13	0.08	18.92	9.91	56.15
	Total	3.27	2.60	8.98	0.07	17.63	11.09	56.36
List	1	21.48	18.62	26.13	1.47	18.54	6.63	7.13
	2	21.92	19.16	26.15	0.91	18.17	6.65	7.03
	3	22.12	18.44	27.48	1.25	18.40	5.98	6.32
	Total	21.84	18.74	26.59	1.21	18.37	6.42	6.82

The List Sample allocated to female veterans was 8.3 percent and Table 3-12 shows that the proportion of female veterans in the completed List Sample was 8.2 percent. Thus, the proportions allocated and completed were very close and the distribution by gender showed no bias. The female veterans in the List Sample would have been 9.5 percent if the proportion of female veterans on the list frame had been the same as that in the overall veteran population. In fact, the proportion of female veterans on the list frame was about 4.3 percent as compared to 5.4 percent in the overall veteran population. Therefore, the proportion of female veterans in the completed List Sample cases was 8.2 percent because the sampling rate for female veterans was twice that for male veterans.

Table 3-12. Distribution of completed sample cases by demographic variables (age, gender, and race/ethnicity) within each wave (RDD and List Samples)

		Demographic variables								
		Race/Ethnicity				Gender		Age		
Sample	Wave	Hispanic	Black	Other	White	Male	Female	Under 50	50-64	Over 64
RDD	1	3.73	8.63	4.08	83.56	94.96	5.04	25.92	34.65	39.44
	2	4.15	6.48	5.24	84.13	94.54	5.46	25.62	34.93	39.45
	3	4.02	7.36	4.25	84.37	94.23	5.77	24.89	33.92	41.20
	4	3.90	6.81	4.59	84.70	94.49	5.51	25.48	34.35	40.17
	5	4.83	7.57	3.79	83.80	94.20	5.80	29.90	33.76	36.34
	6	3.68	7.89	5.22	83.21	94.65	5.35	27.78	35.76	36.47
	7	3.91	7.36	4.90	83.83	94.61	5.39	26.66	34.43	38.91
	Total	3.95	7.61	4.61	83.83	94.60	5.40	26.60	34.65	38.74
List	1	4.82	12.37	5.96	76.85	91.99	8.01	24.83	34.27	40.90
	2	5.48	12.56	7.25	74.71	91.80	8.20	22.57	34.57	42.86
	3	4.27	13.01	6.27	76.45	91.59	8.41	23.00	34.96	42.03
	Total	4.85	12.65	6.49	76.02	91.79	8.21	23.48	34.60	41.92

Table 3-13. Distribution of completed sample cases by level of education within each wave (RDD and List Samples)

		Education level			
Sample	Wave	No High School	High School Diploma	Some College	Bachelor's Degree or Higher
RDD	1	13.35	31.16	28.27	27.22
	2	14.05	29.55	29.84	26.56
	3	12.67	30.05	29.51	27.77
	4	11.94	28.16	30.76	29.15
	5	14.26	30.86	28.28	26.59
	6	13.74	29.62	28.91	27.74
	7	13.57	30.52	28.92	26.98
	Total	13.41	30.14	29.06	27.39
List	1	20.64	27.60	30.03	21.73
	2	21.10	26.15	30.08	22.66
	3	19.62	27.56	31.45	21.37
	Total	20.45	27.12	30.53	21.91

Table 3-14. Distribution of completed sample cases by census region within each wave (RDD and List Samples)

		Census region			
Sample	Wave	Northeast	Midwest	South	West
RDD	1	18.70	24.08	36.90	20.32
	2	18.85	22.56	37.77	20.82
	3	21.17	22.31	37.03	19.50
	4	18.44	24.71	36.88	19.97
	5	17.32	25.38	35.86	21.43
	6	18.71	25.10	36.51	19.67
	7	16.95	25.96	35.50	21.60
	Total	18.48	24.47	36.57	20.48
List	1	15.94	20.43	43.16	20.47
	2	14.98	21.71	42.73	20.59
	3	14.39	20.83	44.42	20.37
	Total	15.10	20.98	43.44	20.47

We used chi-square statistics to test for homogeneity of distributions of the sample yield by priority group (Table 3-11), demographic variables (Table 3-12), level of education (Table 3-13), and census region (Table 3-14) across waves and found that none of the chi-square values was significant at 5 percent level of significance (Table 3-15). Thus, the time effect produced no evidence of bias across different sample waves.

Table 3-15. Chi-square values for testing homogeneity of distribution of the sample yield by various characteristics (RDD and List Samples)

Sample	Characteristic	Chi-square	Degrees of freedom	Probability
RDD	Priority	44.64	36	0.15
	Age	19.15	12	0.09
	Gender	1.53	6	0.96
	Race/Ethnicity	19.03	18	0.39
	Education	12.44	18	0.82
	Region	22.53	18	0.21
List	Priority	7.30	12	0.84
	Age	4.16	4	0.39
	Gender	0.25	2	0.88
	Race/Ethnicity	8.07	6	0.23
	Education	4.47	6	0.61
	Region	3.77	6	0.71

4. INTERVIEWER RECRUITMENT AND TRAINING

Westat's telephone interviewer and supervisor training program maximizes trainee involvement, thereby providing the trainer with ample opportunity to observe and evaluate individual performance. Given that our interviewers come to us with different levels of skill and experience, our training program is designed to ensure that they all finish training with the same understanding of survey research in general, the specific project goals, the substantive content of the survey, and Westat's performance expectations. Project training for the 2001 National Survey of Veterans (NSV 2001) began on February 10, 2001 with an initial group of 31 interviewers. In the 5 months following the first training session, another 267 interviewers were trained in ten separate sessions, bringing the total number of interviewers trained for the NSV 2001 to 298. After production was underway, we also conducted additional training sessions on special topics, such as proxy interviewing, refusal conversion, tracing calls, and language problem cases. Interviewers selected to participate in these special sessions possessed skills relevant to the operation for which they were trained.

4.1 Recruitment

We screened prospective interviewers over the telephone, and invited those with clear, articulate voices for an in-person interview. During the hiring interview, we asked about related interviewing and telephone experience and had the potential hire conduct a mock telephone interview. We then invited individuals with relevant skills and experience into a training group. We also assigned veteran Westat interviewers to the project.

4.2 Initial Training

Interviewers were recruited and trained in six Westat Telephone Research Centers (TRC). The TRC operations manager conducted all training sessions, and the project's telephone center supervisors (team leaders) attended every session. To ensure that each training group received identical information, session content was scripted ahead of time and presented verbatim from the prepared text. During the training program, the trainer and team leaders observed interviewer performance on interactive exercises and role plays. At the end of each day of training, the trainer and team leaders shared their

observations, evaluated interviewer progress, and identified problems to address the next day. Individuals who consistently failed to meet performance expectations were released from the project.

Before the project-specific training, new interviewers attended General Interviewing Techniques training. This 8-hour training covered Westat's basic telephone interviewing conventions, including listening skills and probing techniques. We used interactive exercises to teach interviewers how to answer respondent questions, establish rapport, and gain their cooperation. Each new interviewer was also required to attend computer-assisted telephone interviewing (CATI) training, a tutorial on how to operate a CATI terminal, and the data entry and response-recording conventions used in Westat's CATI system.

Interviewer training was divided into sessions devoted to specific topics. For example, Session 1 included an introduction to the study, a demonstration of an extended interview, a review of frequently asked questions and answers, and detailed instructions on contact procedures and administering the screener portion of the interview. Other topics included how and when to select a proxy for an extended interview, refusal avoidance, the use of study forms and materials, and the advance notice letters mailed to the veterans from the U.S. Department of Veterans Affairs (VA) and Westat. Trainers also explained the differences in the procedures used for the RDD and List Samples, such as the verification questions administered to confirm that the correct sampled veteran had been reached from the List Sample. Exhibit 4-1 shows the NSV 2001 training agenda.

To reinforce information presented in the first session, interviewers next participated in scripted role plays. The CATI screening instrument and extended questionnaire were displayed on each interviewer's CATI terminal, as well as on overhead screens for the group to view together. Following the sequence of the questionnaire, each interactive script reviewed section-specific concepts and definitions. The interviewers took turns asking the questions from their terminal screens and the trainer, acting as respondent, gave the scripted answers. The answers simulated specific situations and problems that interviewers would encounter in actual interviews, and provided practice with a variety of likely skip pattern scenarios. As another means of simulating live interviews, interviewers were paired with each other to practice additional scripted role plays. Finally, interviewers completed a written exercise designed to test their knowledge of the presented material.

Exhibit 4-1. NSV 2001 interviewer training agenda

SESSION 1		
TIME	**LENGTH**	**TOPIC**
9:00-9:15 am	15 minutes	Introduction to the Study
9:15-9:45 am	30 minutes	Demonstration of Extended Interview
9:45-10:15 am	30 minutes	Review of Frequently Asked Questions and Answers
10:15-10:30 am	*15 minutes*	*Break*
10:30-10:55 am	25 minutes	Screener Interactive 1 with Question by Question Review
10:55-11:30 am	35 minutes	Screener Interactives 2, 3, and 4
11:30-1:00 pm	1 hr 30 minutes	Screener Contact Procedures
SESSION 2		
2:00-2:30 pm	30 minutes	Screener Contact Exercise
2:30-4:00 pm	1 hr 30 minutes	Extended Interactive 1 with Question by Question Review
4:00-4:15 pm	*15 minutes*	*Break*
4:15-4:45 pm	30 minutes	Identifying Proxies
4:30-5:00 pm	30 minutes	Extended Contact Procedures
5:00-5:30 pm	30 minutes	Key Concepts Review (Glossary)
SESSION 3		
9:00-10:00 am	60 minutes	Contact Role Plays
10:00-11:15 am	1 hr 15 minutes	Extended Interactive 2 with Question by Question Review
11:15-11:30 am	*15 minutes*	*Break*
11:30-11:45 am	15 minutes	Discussion of RDD Sample and List Sample
11:45-12:00 am	15 minutes	Use of Comments
12:00-12:30 pm	30 minutes	Verifying List Sample Veterans
12:30-12:45 pm	15 minutes	Review of Forms (Problem Sheet, Mailout, Q & A's, Coding Special Contacts)
12:45-1:00 pm	15 minutes	Interviewer Questions
SESSION 4		
2:00-3:00 pm	60 minutes	Refusal Avoidance Exercise
3:00-4:00 pm	60 minutes	Role Plays
4:00-4:15 pm	*15 minutes*	*Break*
4:15-6:00	1 hr 45 minutes	Role Plays (cont.)

We provided all interviewers with two reference documents, which were used both in training and during data collection. The *NSV Interviewer Training Manual* contained background on the study as well as the specific procedures to be used while on the telephone. The manual included sections on contacting respondents, answering respondent questions, recording the results of different contact situations, and handling contact problems. The *NSV Question-by-Question Specifications* contained detailed examples, explanations, and definitions for each survey question in the extended portion of the questionnaire. Both training documents are provided as separate volumes.

Language Problem Training

Bilingual Spanish-speaking interviewers were first tested for fluency. Those we determined sufficiently fluent were trained to call households previously identified as Spanish-speaking and determine whether an English-speaking person lived there.

Proxy Interview Training

In a number of cases, we determined that veterans could not answer the questions for themselves. If, for example, the sampled veteran had difficulty hearing or speaking, or was ill or incapacitated, interviewers were instructed to code the case "Proxy Needed" and obtain the name and telephone number of the person most knowledgeable about that veteran's health and medical situation. Cases coded this way were automatically put into a special CATI work class, ensuring that only interviewers trained to conduct proxy interviews were assigned to them. Over the course of data collection, 23 highly-skilled interviewers were selected from the NSV 2001 staff and trained to conduct proxy interviews. With slight modifications, the same CATI questionnaire used to interview the veterans themselves was also used for the proxy respondents. Therefore, we carefully instructed proxy interviewers to re-phrase each question so that it was clear to proxies that they were being asked about the veteran, not themselves. The proxy interview training took about 1 hour.

Tracing Training

We conducted a 1-hour tracing training at the Rockville telephone center with six interviewers possessing previous tracing experience and excellent probing skills. Training included instruction on the tracing sheet that listed all previous contact information collected for the veteran, the use of directory assistance to locate a good telephone number, and the procedures for documenting all call attempts and their results. Additionally, trainers reviewed the procedures for following up on a potential lead and verifying that a telephone number, when not listed under the List Sample veteran's name, was nevertheless one at which we could reach that veteran.

Refusal Conversion Training

For refusal conversion training, we selected experienced interviewers who had above average cooperation rates. In this 2-hour session, interviewers discussed the kinds of refusals they had already encountered and shared ideas for addressing respondent objections. To sharpen interviewer presentation and timing of responses to refusals, session participants conducted role play exercises. Other participants observed the role playing pair and provided feedback and additional ideas for responding to refusals. Interviewers made notes of their favorite ideas for converting refusing respondents and incorporated them into their own repertoire.

5. DATA COLLECTION

Nearly 300 interviewers collected data for the 2001 National Survey of Veterans (NSV 2001) over a 9-month period. This chapter describes the computer system we used to collect the data, the procedures we employed to ensure successful interviews with respondents, and the special operations we instituted to enhance response rates.

5.1 The CATI System

Questionnaire Administration

Westat's proprietary Cheshire computer-assisted telephone interviewing (CATI) system is designed to handle very large and complex survey instruments. Not only does this system greatly enhance data quality by automating most data collection tasks, it also reduces respondent burden by streamlining the questions. The CATI system is particularly appropriate for the NSV 2001, with its complicated questionnaire, List and RDD Sample types, and household screening requirements for RDD Sample cases. By using the CATI system, we ensured that the NSV 2001 instrument was administered correctly, the samples were managed efficiently, and data were recorded properly. For example, the software guided interviewers through the programmed skip patterns; performed range, logic, and consistency checks; determined when cases should be called and how often; kept track of which cases belonged to each sample; and stored all data to a common database. Detailed descriptions of these and other CATI system capabilities follow.

- **Display.** The standardized display of survey questions, interviewer instructions, and response options contributed to better data quality by helping to ensure that each interviewer administered the instrument in the same manner. The program also displayed all relevant respondent information, automatically inserting into question text personalized data such as the respondent's name.

- **Sample Management.** The CATI system differentiated between the RDD and List Samples, and provided the appropriate questions for the interviewer to ask. RDD Sample respondents automatically received the household screening questionnaire (see Appendix A), while List Sample members were administered a verification question (see Appendix B). The program implemented decision rules based on military service questions in the screening questionnaire and the extended questionnaire to determine eligibility. It then selected eligible persons for an interview

and prompted interviewers to terminate the interview for ineligible respondents. The CATI system also was able to evaluate the samples separately in reference to their target production goals.

- **Online Data Entry.** Data were captured instantly in the CATI system when interviewers typed respondent answers as they conducted the interview. The program offered a variety of ways to correct keying errors. Interviewers corrected data entry mistakes immediately by backing up through the CATI screens, reentering information, then moving forward again through the corrected question path. For mistakes discovered after the interview was over, or those too time consuming to correct during the interview, interviewers entered online comments for review by the database manager, or submitted a hard copy problem sheet to their shift supervisor. (See Chapter 7 for a more thorough discussion of database management.)

- **Skip Patterns.** The NSV 2001 questionnaire contained numerous, often complicated, skip patterns. Once the questionnaire was programmed into the CATI system, however, these skips were administered automatically and consistently. As the interviewer entered a respondent's answers, the program determined and then displayed the correct question path. The CATI system accessed the sample file or other data collected from the respondent and presented specific sections of the instrument or different versions of the questions in accordance with programming instructions. The software also used existing data to determine whether or not to administer certain questions. For example, if the veteran provided exact dates of induction and release from active duty in the Military Background section of the main interview, the CATI system calculated and automatically entered that veteran's periods of service. This feature reduced response burden for some veterans, which decreased overall survey administration time.

- **Range Checks.** The CATI system is capable of performing both hard and soft range checks. Hard range checks set the upper and lower limits of allowable item responses. Hard ranges were required for all variables. A question with response categories of 1 through 12 accepted only those values, in addition to the required missing values of "Don't Know" and "Refused." Exhibit 5-1 is an example of a hard range check. Soft range checks queried implausible responses but allowed the entry to stand if unchanged after being probed by the interviewer. We used soft ranges for questions about dates or quantitative information. Exhibit 5-2 is an example of a soft range check.

- **Logic and Consistency Checks.** Logic checks ensured that data collected at different points in the interview were internally consistent. If responses were inconsistent, interviewers were prompted through a series of custom screens to verify the recorded data. The program accepted corrected data when obtained. If the responses remained inconsistent, the case was flagged for review by the database manager and the interview continued. Exhibit 5-3 is an example of a logic check.

Exhibit 5-1. Example of CATI specifications with hard range

PROGRAMMER NOTE 1:

IN ALL MONTH FIELDS, HARD RANGE = 1 – 12.

IN ALL INSTANCES WHERE OTHER SPECIFY = YES PROVIDE 30 CHARACTER OTHER SPECIFY FIELD.

IN MB0a, RANGE FOR YEAR = 1885 – (1983).

VETS.DOBMM, VETS.DOBYYYY
MB0a. First, I'd like to ask you for the month and year you were born.

|__|__| MONTH

|__|__|__|__| YEAR

REFUSED..... -7
DON'T KNOW..... -8

1. JANUARY
2. FEBRUARY
3. MARCH
4. APRIL
5. MAY
6. JUNE
7. JULY
8. AUGUST
9. SEPTEMBER
10. OCTOBER
11. NOVEMBER
12. DECEMBER

Exhibit 5-2. Example of CATI specifications with soft range

PROGRAMMER NOTE 63:

IN (SD13) DEPEND HARD RANGE = 0 – 15. SOFT RANGE = 0 – 10.

[O6a.]
VETS.DEPEND
SD13. During the year 2000, how many children depended on you for at least half of their support?

NUMBER..... |__|__|
REFUSED..... -7
DON'T KNOW..... -8

Exhibit 5-3. Example of CATI logic check

```
1.1501 MB15A 100010300101 - (410) 555-7834 - 16:13


 I have recorded that you were released from active duty on
 January 5, 1934. That date is earlier than the
 date you began active duty. Please tell me the date you
 began your active duty.


  (5 ) (5 ) (1931 )
  MONTH DAY YEAR

  1. JANUARY          7. JULY
  2. FEBRUARY         8. AUGUST
  3. MARCH            9. SEPTEMBER
  4. APRIL           10. OCTOBER
  5. MAY             11. NOVEMBER
  6. JUNE            12. DECEMBER
```

```
1.1502 MB15B 100010300101 - (410) 555-7834 - 16:13


 And again, what was the date you were released from active duty?


  (1 ) (5 ) (1945 )
  MONTH DAY YEAR

  1. JANUARY          7. JULY
  2. FEBRUARY         8. AUGUST
  3. MARCH            9. SEPTEMBER
  4. APRIL           10. OCTOBER
  5. MAY             11. NOVEMBER
  6. JUNE            12. DECEMBER
```

- **Data Storage.** The CATI system stored all administrative and substantive data collected during each interview administration. One segment of the software recorded each attempted contact with every respondent. It stored the date and time of the call attempt, interviewer identification, work class, disposition code, and termination information. Another segment recorded every keystroke made during every interview. If an interview was interrupted and data lost due to computer failure, this file was used to restore the original responses. The system also stored all hard range failures and soft range overrides.

CATI Case Management and Call Scheduling

Telephone numbers loaded into the CATI system became available to interviewers through the CATI scheduler. An autodialer dialed the numbers, reducing interviewer dialing time as well as eliminating the possibility of dialing a telephone number incorrectly. The CATI scheduler kept track of the number of calls made to each telephone number and automatically closed out those that had reached the maximum number of contact attempts without completing an interview. The CATI scheduler also ensured that cases were called at the appropriate times, using rules developed to minimize the number of calls to any given household and to reduce nonresponse. For example, the week was divided into day and time period categories through which the system moved each case in a specified pattern of call attempts. If the first call attempt was in the evening and resulted in no answer, the CATI scheduler automatically set the next call attempt for another time of day and a different day of the week. For cases where the interviewer made contact and scheduled an appointment to complete the screener, or to begin or continue the extended interview, the system held the case then released it to the next available interviewer at the scheduled day and time. Screener interviews that were interrupted were restarted at the beginning of the screening questionnaire when the household was reached again. Interrupted extended interviews began again at the beginning of the questionnaire section from which the case had exited. Cases with scheduled appointments were given priority over all other cases.

Another function of the CATI scheduler was to manage the flow and assignment of cases to interviewers. The scheduling system analyzed a number of factors when determining what case to assign to a particular interviewer, including interviewer skills required, call history, time zone of the respondent, day of the week, time of day, and priority weighting of cases by sample group. This analysis required no indepth knowledge on the part of the interviewer, and it maximized the number of completed interviews while minimizing the number of nonproductive interviewer hours. The CATI scheduling system also appropriately assigned to specially trained interviewers those cases that needed to be traced, refusal cases,

language problems, and cases requiring proxy interviews. Finally, the system maintained a log of all call attempts and their results.

The CATI scheduler was customized to accommodate the two NSV 2001 samples in a variety of ways. First, we programmed the CATI system to track multiple telephone numbers for each List Sample veteran. When an interviewer learned of a new telephone number for a veteran, it was entered directly into the system and dialed at the next call attempt. Project staff or the database manager entered telephone numbers collected offline from sources other than household members (such as the VA and directory assistance). Multiple telephone numbers were also tracked for RDD veterans (for example, veterans who had moved out of the household they were living in at the time the screener survey was completed).

We further programmed the CATI scheduler to optimize when and how often a case was called based on sample type. Calls to List Sample members were made primarily in the evenings and on weekends because we were much more likely to contact a household resident during those hours. Initial calls to the RDD Sample were made primarily during the day. While this did not optimize household contact, interviewers were able to quickly close out the nonworking and business numbers that remained even after the sample had been prescreened for them.

Programming and Testing the CATI System

The CATI development staff was led by a systems analyst who was responsible for coordinating all survey programming and testing activities. The systems analyst worked closely with the questionnaire designers to ensure that the CATI program specifications addressed every aspect of the NSV 2001 instrument. The specifications included variable name and location, valid response categories, and instructions for item nonresponse. The programming staff then used those specifications to program the instrument, verifying that the resulting instrument conformed to the specifications and ensuring that no errors were hidden in the specifications.

Westat thoroughly tested all features of the system, including those associated with scheduling, interviewing, data storage, and editing. After each section was programmed, it went through multiple rounds of intensive internal testing. In the first round, the programmers used the specifications to proof the screens, check the data dictionary, and match the programmed language flow against the survey

instrument's skip patterns. The next round of testing focused on transitions from one questionnaire section to another. We also tested restart points to ensure that the flow between sections and topics was smooth, and that questionnaire sections appeared in the proper sequence.

For the final round of testing, result codes, randomization routines, standard function keys, database fields, flags, array variables, timing variables, audit trails, and database structure were validated. We proofed all text on the screens a final time and confirmed the accurate collection of data into the survey database. Testing scenarios also targeted the questionnaire delivery system (the CATI scheduler). The focus here was on the proper delivery of cases to interviewers, whether appointments were correctly made and kept, and how interview break-offs were treated.

Just as during the data collection period, forms were filled out whenever a potential problem was found. These problem sheets described the situation, listed key variables, indicated expected results, and documented the actual result. The database manager logged each problem sheet and routed it to the appropriate person. Once the problem was resolved and the changes were implemented in the testing environment, the database manager sent the problem sheet back to the originator so that the test could be rerun. This process ensured that at least two people verified that a problem had been resolved. Westat kept its CATI program and systems documentation, test plans, and test sets up to date, thus ensuring that changes to the instrument could be easily incorporated and tested. CATI system version control software maintained a history of changes.

5.2 Interviewing Operations

Data collection for the NSV 2001 began on February 12, 2001 and ended November 12, 2001. Interviewing was conducted from six of Westat's Telephone Research Center (TRC) facilities. The telephone centers operated seven days a week.

Management, Staffing, and Scheduling

The telephone operations manager coordinated all training and interviewing activities with supervisory staff in the six TRCs. For training, the operations manager prepared the agenda, produced the manuals, scripts, and interviewer forms, and created exercises and role plays. The operations manager

also developed procedures for special operations such as refusal conversion, proxy interviewing, and tracing. During data collection, the operations manager reviewed and resolved problem cases. To help evaluate the progress of data collection, the operations manager produced and presented to the project team a weekly summary of the status of all cases by screener and main interview, by interim and final results, and by sample type. Finally, the operations manager oversaw all interviewer scheduling and staffing.

Interviewers made most calls in the evenings and on weekends, when people were most likely to be home. We assigned primary responsibility for handling language problem cases to experienced Spanish-speaking interviewers. A case was coded as a language problem if an interviewer was unable to communicate with the respondent in English. Spanish-speaking interviewers then recontacted the case to determine if an English-speaking person lived in the household. We trained interviewers who had clear, deep voices to follow up with hearing problem cases. We chose skilled interviewers at all six TRC facilities to conduct refusal conversion interviewing. We selected interviewers at one location to perform the majority of tracing calls, and updated the CATI system with the List Sample telephone numbers obtained through those efforts.

Interviewer Monitoring

Supervisors regularly monitored interviewer performance. Because most refusals occur at the point of contact, supervisors paid particular attention to the initial contact. Monitoring sessions lasted a minimum of ten minutes, during which supervisors made notes of interviewers' strengths and weaknesses on a monitoring form. Supervisors discussed the results with each interviewer immediately following a monitoring session. They provided positive feedback along with pointers for improvement in areas such as gaining cooperation and probing. Supervisors also used a weekly interviewer productivity report to identify candidates for training on more difficult tasks such as refusal conversion, as well as interviewers who needed additional training.

Confidentiality

All Westat personnel, including interviewers and professional staff, signed a statement that they would maintain the confidentiality of all survey data. During data collection, interviewers assured

each respondent that his or her answers were protected under the Privacy Act (see Exhibit 5-8) and informed respondents that a copy of the Privacy Act statement was available upon request (see "Providing a Privacy Act Letter" later in this chapter).

5.3 Special Operations

In addition to the standard data collection operations described in the previous sections, Westat employed a variety of strategies unique to the NSV 2001 for achieving the maximum possible response rates. These special operations included contact information update measures, proxy interviewing, and response rate enhancement measures such as refusal conversion and data retrieval.

Contact Information Update Measures

Cleaning the List Sample and Matching Addresses

Before loading the List Sample contact information into our CATI system, we processed the file through a series of automated and manual cleaning procedures that standardized the appearance of all addresses. Once the sample was cleaned, we matched cases with address information against the National Change of Address Registry to ensure that we had the most recent address. We also matched all cases with address and/or telephone information against the databases of two address matching vendors. This step allowed us to either obtain a telephone number for those cases with no telephone numbers or to update existing telephone numbers. Those veterans for whom we had a telephone number but no address were loaded into the CATI system without mailing an advance letter. Those cases for which we had a Social Security number and an address, but no telephone number, were sent to a credit bureau for telephone information searching by Social Security number. Those cases for which we had an address but no telephone number were sent an advance letter, which asked for updated contact information, including a telephone number. These cases, along with those for which we had neither a telephone number nor address, were sent immediately to our tracing operation. During the cleaning process, veterans identified as institutionalized were coded as out of scope so that no further contact attempts would be made.

Sending an Advance Mailing

After List Sample cleaning and address matching, we sent each List Sample veteran an advance mailing that included a letter from the Secretary of the Department of Veterans Affairs and a letter from the Westat project director (see Exhibits 5-4 and 5-5). The letters informed veterans about the study and the importance of their participation. We included an address update form and postage-paid envelope so that veterans could update their names, addresses, or telephone numbers by mail. Veterans were also given the option to call the NSV 2001 dedicated toll-free number to provide their current address and telephone information. To help us identify institutionalized veterans, the address update form also asked veterans to indicate whether the address was for a private residence, hospital, assisted living facility, retirement home, or nursing home. (As discussed in Chapter 3, we did not interview List Sample institutionalized veterans.)

We mailed 13,010 advance letters in two waves. In response to the advance mailings, we received 4,061 address update forms through the mail. Of those, however, less than half contained contact information updates. Those with no update did indicate whether their address was for a private residence or some other type of residence. We reviewed all additional information we received about a veteran, then entered it into the CATI Update system where it became effective immediately. Table 5-1 shows the type of information received on the address update form.

Table 5-1. List Sample advance mailout responses

Address update	825
Telephone number update	917
Name correction	48
Deceased	197
Not a veteran	1
Form returned with no update	2,073
Total responses received	4,061

Exhibit 5-4. VA advance letter

THE SECRETARY OF VETERANS AFFAIRS

WASHINGTON

March 28, 2001

Dear Veteran:

As the new Secretary of Veterans Affairs, I am pleased to write you and ask for your help. In the next few weeks, the Department of Veterans Affairs (VA) will begin a very important National Survey of Veterans. This letter outlines why we're doing this survey, who will conduct it, what type of information will be collected, and who you can call for questions. ***I'm requesting your personal participation. Your response to the survey is crucial to its success.***

Why Are We Conducting a Survey?
We are conducting a National Survey of Veterans to get an accurate, up-to-date picture about the U.S. veteran population so we can improve our benefits and services to veterans. We'll use this updated picture as a basis to ensure that VA benefits and services meet your needs.

Who Will Conduct the Survey?
VA selected an independent contractor, Westat, to conduct the National Survey of Veterans. Westat was chosen based on its reputation, the assurance of courtesy to you, and the guarantee that the information you give will be treated confidentially and protected under current laws and regulations, including the Privacy Act. Your participation is voluntary and you may ask to skip any question that you do not wish to answer or stop the discussion at any time. The responses you give may only be used to evaluate VA programs—not for any individual claim or other purpose. Within the next few weeks, a representative of Westat will contact you by telephone to conduct the interview (survey).

What Type of Information Will Be Collected?
Westat will collect information from veterans of all services and service periods. The survey will ask about different situations experienced by veterans, such as military background, health, disabilities, and education. Westat will also collect information about your needs for services like medical care, housing, and education.

Who Can You Call if You Have Questions?
If you want to speak to someone at VA to verify the survey and Westat's role, you may call the following toll-free number: 1-800-827-1000. You don't need to identify yourself.

With your help, I'll be in a better position to improve veterans' benefits and services. Please accept my personal thanks for your time and thoughts to this important survey.

Sincerely yours,

Anthony J. Principi

Anthony J. Principi

Exhibit 5-5. Westat advance letter

WESTAT

National Survey of Veterans

1650 Research Blvd. • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

<<DATE>>

<<BASMID>>
<<FULLNAME>>
<<ADDR1>>
<<ADDR2>>
<<CITY>>, <<STATE>> <<ZIP>>

Dear <<FULL_LOWER>>:

The Department of Veterans Affairs (VA) has chosen Westat to conduct its National Survey of Veterans. The enclosed letter from Anthony J. Principi, Secretary of Veterans Affairs, explains that the VA is conducting this survey to obtain information for planning benefits and services for all veterans.

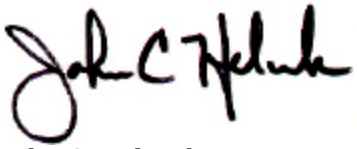
A Westat interviewer will call you in the next few weeks to conduct a telephone interview. Your answers, and those of other participating veterans, will give the VA an up-to-date picture of the whole U.S. veteran population. If you wish to verify Westat's role in the survey, please call the toll-free VA number mentioned in Secretary Principi's letter: 1-800-827-1000.

While your participation is voluntary, you are one of only a few thousand randomly selected veterans whose answers will represent all 25 million veterans. Your individual participation will have a significant impact on the survey's outcome. We cannot interview another veteran in your place. I want to assure you that the information you provide is protected under the Privacy Act and section 5701 of Title 38 of the U.S. Code. The VA will use the information you provide to evaluate current VA policies, programs and services for veterans and in deciding how to help veterans in the future.

Enclosed is a National Survey of Veterans Address Correction and Update Form. Westat will call you at the phone number printed on this form. If this phone number or address is incorrect, please provide the correct information and mail the form to Westat in the postage-paid envelope provided. If you prefer, you may call Westat toll-free at 1-888-258-2194 to provide a correct phone number and address. Ask to speak with the Veterans Survey Manager.

Thank you. We greatly appreciate your help.

Sincerely,



John C. Helmick
Project Director

Conducting Tracing Operations

Tracing is a process by which we attempt to find valid contact information for veterans for whom we have no or incomplete information in our records. For some List Sample veterans, we did not have a valid telephone number, the existing number was nonworking, or we did not have a telephone number at all. In an effort to contact these veterans, we placed directory assistance calls. We pursued two leads per tracing case. If the veteran was not listed at the address in our records, and there were six or fewer listings with that veteran's last name in the town or surrounding area, tracing interviewers requested the first two telephone numbers. The interviewers called both households asking for information about the veteran. When we identified new telephone numbers, we entered them into the CATI system within 24 hours. Over the course of data collection, tracing interviewers worked 5,350 cases.

Contacting Cases With Unpublished Telephone Numbers

During the tracing operation, we often encountered List Sample veterans who had an address in our records but whose telephone number was not published. We mailed these veterans a letter requesting their participation in the study and providing a toll-free number for them to contact us (see Exhibit 5-6). We mailed these letters to 555 veterans, of whom 124 completed the extended interview. We also learned that 17 of the 555 had died and 4 were institutionalized.

Contacting Cases With No Telephone Numbers

We had no telephone number and only a Post Office Box address for 65 List Sample veterans. Without a street address, we were unable to process these cases through our tracing operation. Instead, we mailed a letter to these veterans asking them to call the NSV 2001 toll-free number for an interview (see Exhibit 5-7). Of the 65 veterans who received this letter, 15 completed an extended interview. One was reported deceased.

Exhibit 5-6. Letter to veterans with unpublished telephone numbers

WESTAT
National Survey of Veterans
1650 Research Blvd. • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

DATE

«BASMID»
«FULLNAME»
«ADDR1»
«CITY», «STATE» «ZIP»

Dear «FULL_LOWER»:

We need your help. The Department of Veterans Affairs (VA) has chosen Westat to conduct its National Survey of Veterans. We would like to interview you for the survey. Unfortunately, we have been unable to reach you because your telephone number is unpublished.

The VA is conducting this survey to obtain information for planning benefits and services for all veterans. While your participation is voluntary, you are one of only a few thousand randomly selected veterans whose answers will represent all 25 million veterans. Your individual participation will have a significant impact on the survey's outcome. We cannot interview another veteran in your place. Your answers, and those of other participating veterans, will give the VA an up-to-date picture of the whole U.S. veteran population.

I want to assure you that the information you provide is protected under the Privacy Act and section 5701 of Title 38 of the U.S. Code. The VA will use the information you provide to evaluate current VA policies, programs and services for veterans and in deciding how to help veterans in the future.

We understand your desire to keep your telephone number closely guarded. For that reason, we invite you to call Westat toll-free at 1-888-258-2194 to begin an interview or schedule an appointment at a time that is convenient for you. Please ask to speak with the Veterans Survey Manager. Or, you may provide us with your telephone number on the enclosed National Survey of Veterans Address Correction and Update Form and mail it to Westat in the postage-paid envelope. Your telephone number will only be used to contact you for completing the National Survey of Veterans and will not be disclosed for any other purposes.

Thank you. We greatly appreciate your help.

Sincerely,

John C. Helmick
Project Director

Exhibit 5-7. Letter to veterans with no telephone number

WESTAT
National Survey of Veterans
1650 Research Blvd. • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

DATE

FNAME LNAME
ADDRESS
CITY, STATE ZIP

Dear Mr./Ms./Mrs. LNAME:

Thank you for your recent reply to our letter regarding the National Survey of Veterans. Westat is conducting this study for the Department of Veterans Affairs.

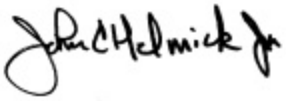
Based on your response, we understand that you are not able to receive a telephone call in order to complete the survey. Since it is necessary that all surveys be completed by telephone, and your responses are very important to us, we would like to provide you an option that would make it possible for you to participate in the survey.

To allow us the opportunity to complete a survey with you, we are asking that you call our toll-free telephone number and ask to speak to one of our telephone interviewers. Please tell our staff that you are calling to complete the **National Survey of Veterans**. Once you have identified the survey for which you are calling to participate, you will need to give your survey identification number. This number is listed below as the **ID Number**. Please try to call within the next 2 weeks and during the hours outlined below.

Phone Number:	**1-888 258-2194**
Project:	**National Survey of Veterans**
ID Number:	**BASMID**
Calling Hours:	
Monday-Friday	**9:00 am – 10:00 pm (Eastern Daylight Time)**
Saturday	**10:00 am – 4:00 pm (Eastern Daylight Time)**
Sunday	**2:00 pm – 8:00 pm (Eastern Daylight Time)**

Thank you very much for helping us with this important study. We look forward to hearing from you.

Sincerely,



John C. Helmick, Jr.
Project Director

Searching Credit Bureaus

We sent the Social Security numbers of veterans for whom we had no telephone number (or an invalid telephone number) to a credit bureau. Toward the end of data collection, we performed the same operation on all cases coded as nonlocatable and all cases in our tracing queue. Some of these nonlocatable and tracing cases were likely the same ones that had been processed through the credit bureau at the beginning of the study. Most, however, were cases for which we had incomplete contact information. The cases returned from the credit bureau with addresses were then sent to our address matching vendors for telephone numbers. Table 5-2 shows the results of the end-of-data collection credit bureau search.

Table 5-2. Results of end-of-data collection credit bureau search

Number of cases sent to the credit bureau	3,197
Number for which a telephone number was obtained	513
Complete extended interviews	150
Deceased	6
Institutionalized	5

Proxy Interviewing

The NSV 2001 data collection plan permitted veterans with serious health, cognitive, or communication problems to be represented in the final sample, despite the fact that many of these veterans were unable to respond for themselves or, at least, unable to respond to a telephone interview. Veterans with such disabilities were:

- Too mentally incapacitated to understand the questions or to remember or formulate their responses;
- Too physically incapacitated, too ill, or too weak to listen and respond to the questions for the duration of the interview;
- Too hearing-impaired to hear the interview questions; or
- Too speech-impaired to communicate their responses to the interviewer.

We included the responses of veterans with these disabilities (referred to as the sampled veterans) by allowing proxy respondents to participate in the survey for them. Our estimates of the number of cases that would require proxies, while large enough to confirm the need for a proxy interview

protocol, did not justify an entirely separate data collection instrument and methodology. Instead, the proxy interview protocol used a modified form of the existing CATI data collection instrument and telephone methodology.

We established rules to help interviewers determine when a proxy interview was appropriate, permitting them only under the four circumstances described above. We did not interview proxy respondents for any other reason, such as convenience, personal preference, temporary unavailability of the veteran, or temporary illness from which the veteran would recover before the end of the data collection period. The most common way in which interviewers identified the need for a proxy was when a friend or relative (and occasionally the veterans themselves) reported that the sampled veteran was incapable of participating in the study. In much rarer situations, the veteran was willing to be interviewed, but during the course of the interview it became apparent that he or she could not comprehend the questions or remember any reasonable amount of information about himself or herself.

We also trained interviewers to identify a suitable proxy for veterans who could not participate and to secure the telephone number needed to call the proxy. Such a proxy needed to be familiar with the sampled veteran's circumstances and possess some specific knowledge of his or her health and medical history. In most cases, the person who informed the interviewer of the veteran's inability to respond was the appropriate proxy, and the proxy was often located at the same telephone number. If the potential proxy was not knowledgeable enough about the veteran or was unavailable, interviewers attempted to find another proxy. If no proxy could be found or the suitable proxy refused to respond, the final result of the case reflected the sampled veteran's situation, not the outcome of contacting the proxy.

We trained a small group of interviewers to conduct proxy interviews. If a proxy interviewer identified the need for a proxy in the course of ordinary contact attempts, and the proxy was available, he or she proceeded directly with the proxy interview. If, however, an interviewer without proxy interview training identified such a need, an appointment was made and the case was held in the CATI scheduler proxy work class for a proxy interviewer. To accommodate the time needed to identify and train proxy interviewers, we did not begin proxy interviewing until April, 2001. All proxy cases from the beginning of data collection were held in the proxy work class until that time, and proxy interviewing continued through the end of data collection.

As noted earlier, we knew that relatively few veterans would require a proxy interview. This fact, coupled with our desire for comparable data from the proxy cases and the self-respondents, led us to modify the existing questionnaire rather than create a separate proxy instrument. We identified all questions in the NSV 2001 questionnaire that proxies would likely be able to answer for the sampled veterans. We eliminated some questions (such as the VSF12 items in the Health Background section) that were too personal for a proxy to answer adequately. Finally, we trained proxy interviewers to rephrase select questions in the third person to remind proxies that while the questions were directed at them, they were in fact about the sampled veteran. Rather than program the CATI instrument to display all the third person pronouns, we trained the proxy interviewers to use the third person as they read the questions. We chose this cost effective measure because few questions actually needed rephrasing, and any rephrasing usually occurred within a pattern of repeating questions. Furthermore, the interviewers doing the rephrasing, in addition to being highly skilled, also had at least 2 months of experience administering the questionnaire before proxy interviewing began.

We expected "Don't Know" responses to be more common among proxy respondents than self-respondents. We found, however, that proxy respondents were often very knowledgeable about the sampled veteran's background information, military service, medical conditions, and treatment. When proxies did have limited knowledge in certain areas, interviewers encouraged them to provide the best response they could. In a few cases, attempts to contact the proxy resulted in the discovery that a sampled veteran could, after all, respond for himself or herself. In these instances, we conducted the interview with the veteran, and the case was correctly coded as a regular, nonproxy interview.

We identified 1,031 cases as needing a proxy respondent. We completed interviews with 734 proxy respondents. Another 28 cases turned out to be ineligible for the study. Of the cases initially identified as needing proxies, an additional 45 interviews were eventually conducted with the sampled veteran. Thus, only 3.7 percent of all interviews were conducted with proxies.

Response Rate Enhancement Measures

Establishing a Toll-free Telephone Number

We established a toll-free telephone number dedicated solely to the NSV 2001. Only supervisory staff answered this number. We included this number on all mailout materials, and provided it to respondents who wanted more information about the study before consenting to an interview.

Veterans with no telephone in the household called the toll-free number to complete an interview (see the previous sections on "Contacting Cases with Unpublished Telephone Numbers" and "Contacting Cases with No Telephone Numbers"). Difficult-to-reach respondents often called the toll-free line to participate, or at least tell us when they would next be available for an interview.

Respondents who wished to contact the VA directly about the NSV 2001 were also provided with the VA's main toll-free number (800-827-1000). This number offered an automated menu where veterans could obtain information about various VA benefits, or remain on the line for the next available counselor. Because information about the NSV 2001 was not part of the automated menu, veterans had to wait for a counselor in order to inquire about the legitimacy of the survey. This posed two, somewhat isolated, problems. The first is that veterans were only able to get help with their questions during business hours, when customer service representatives/benefits counselors were available. The second is that a few VA customer service representatives were unaware of the study, and hence unable to reassure respondents of its legitimacy.

Developing a Brief and Effective Introduction to the Survey

In our experience, most telephone survey refusals occur in the first few seconds of the call. With that in mind, we scripted an introduction that briefly stated who Westat is, the sponsoring agency, and the importance of the study. With such an introduction, we intended to quickly provide respondents with enough information to decide, at the very least, to listen to and answer our screening questions (or in the case of the List Sample, the verification question).

Preparing a List of Frequently Asked Questions

We developed a list of what we anticipated would be Frequently Asked Questions about the NSV 2001, Westat's role in the study, and VA goals (see Appendix D). We then required interviewers to learn the answers to these questions well enough that they could talk about the study with respondents naturally, instead of sounding like they were reading the answers.

Providing a Privacy Act Letter

Some veterans requested written information about the study, saying they would not participate until they received it. Within one business day of such requests, we mailed a letter that described the NSV 2001 and respondents' rights under the Privacy Act (see Exhibit 5-8) or a background letter (Exhibit 5-4). We assigned a "mailout needed" code to these cases and held them for two weeks before calling them again. We mailed letters to 3,923 households over the course of data collection.

Developing Standard Refusal Conversion Procedures

If, at the initial contact, a respondent (or anyone in the household) refused to participate in the survey, the CATI scheduler moved that person's case to the refusal work class and put it on hold for a period of time. After this "cooling off" period, the CATI scheduler assigned the case to a refusal conversion interviewer. The cases of respondents who refused again, after one conversion attempt, were held for another cooling off period and released again. We rereleased some cases up to two times. We did not attempt to recontact hostile refusers. Overall, our rate of refusal conversion was 33.0 percent for screener cases, 80.9 percent for RDD Sample extended interviews, and 82.1 percent for List Sample interviews.

Mailing Letters to Refusals and Hard-to-Locate Veterans

About halfway through data collection, we began mailing letters to cases that had refused twice and cases that were hard to locate. The refusal conversion mailout was conducted weekly from late July through late October, 2001. We mailed a letter in a business size envelope with first class postage, addressed "To the Family At" to RDD Sample cases with whom we had been unable to make contact, or that had refused during the household screening interview (see Exhibit 5-9). We sent a letter by overnight delivery to List Sample and RDD Sample cases that we had been unable to recontact for an extended interview, or that had refused to complete an extended interview (see Exhibit 5-10 and Exhibit 5-11). Our address matching vendor provided addresses for 70 percent of the RDD Sample. We did not have reliable names for these cases, though, so we addressed the letters "To the Veteran At." We personalized the List Sample letters. Along with the letters to extended interview refusers (or hard-to-locate cases), we enclosed the same letter from the Secretary of the VA that we included in the advance mailing to List Sample members. Between 2 and 5 days after we mailed the letters, we made available for calling these

Exhibit 5-8. Privacy Act statement

September 5, 2001

«TRC_ID»
«F_NAME» «L_NAME»«SUFFIX»
«ADDR1A»
«ADDR1B»
«CITY1», «STATE1» «ZIP1»

Dear «F_NAME» «L_NAME»«SUFFIX»:

Recently you were contacted by a Westat interviewer as part of a study being conducted for the Department of Veterans Affairs. At that time you stated you would like to receive a copy of the Privacy Act Statement that applies to this study. The text of this statement is provided below.

Privacy Act Statement – ***National Survey of Veterans 2001***

Authority: 10 U.S.C 2358: E.O.9397

PRINCIPAL PURPOSE: This survey collects veteran current demographic and socioeconomic characteristics, veteran health status, medical services usage and needs, health insurance coverage, and veteran knowledge about and use of various VA programs. Social Security Numbers are requested and will be used for two purposes. First, it will be used to ensure that each respondent is interviewed only once. Second, it will be used to obtain additional information from VA files and other sources to better understand veteran needs.

ROUTINE USES: None.

DISCLOSURE: Voluntary. Maximum participation is encouraged so that data will be complete and representative, but there are no adverse consequences for individuals who decline to participate.

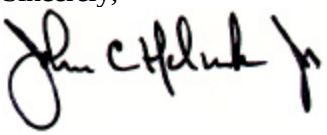
I hope that the information provided here answers any questions you have regarding this study. Should you wish to obtain additional information you may contact:

Department of Veterans Affairs
Office of Policy and Planning
Attn: Ms. Susan Krumhaus 008A Phone: (202) 273-5108
810 Vermont Avenue, NW
Washington, D.C. 20420

If you need general information on programs and benefits offered by the Department of Veterans Affairs, you may call their toll-free hotline: **(800) 827-1000**.

Thank you for your assistance in this important study.

Sincerely,



John C. Helmick, Jr.
Senior Study Director

Exhibit 5-9. Screener refusal letter (RDD Sample)

WESTAT
National Survey of Veterans
1650 Research Blvd. • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

«DATESENT»

ID #«MAILID»
To the Family At
«ADDRESS»
«CITY», «STATE» «ZIP»

Dear Respondent:

We need your help. Recently, one of our telephone interviewers called and asked you or someone in your household to take part in a survey about veterans of the United States military. At this time, we have not finished an interview with you. This survey is sponsored by The Department of Veterans Affairs (VA). It will help the VA to evaluate their current policies, programs and services.

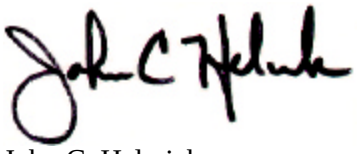
Your answers to this survey will help us determine whether there are any veterans in the household. We can't talk to every person in the country. Instead, we scientifically selected a few people to represent the nation as a whole. This means no other person can take your place. Your individual participation will have a significant impact on the survey's outcome. Thus, even if there are no veterans in your household, we would still like to speak with you briefly.

I want to assure you that the information you provide is protected under the Privacy Act and section 5701 of Title 38 of the U.S. Code.

We would be happy to speak with you at a time that is convenient for you. If you would like to begin an interview or schedule an appointment, please call Westat toll-free at 1-888-258-2194. Ask to speak with the Veterans Survey Manager.

Thank you. We greatly appreciate your help.

Sincerely,



John C. Helmick
Project Director

Exhibit 5-10. Extended refusal letter (List Sample)

WESTAT
National Survey of Veterans
1650 Research Blvd. • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

«DATESENT»

ID #«MAILID»
«NAME»
«ADDRESS»
«CITY», «STATE» «ZIP»

Dear «LOWERNME»:

We need your help. Recently, one of our telephone interviewers called and asked you to take part in the National Survey of Veterans. At this time, we have not finished an interview with you. This survey is sponsored by the Department of Veterans Affairs (VA). It will provide valuable information for planning benefits and services for all veterans.

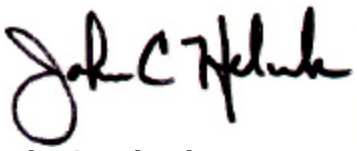
While your participation is voluntary, you are one of only a few thousand randomly selected veterans whose answers will represent all 25 million veterans. Your individual participation will have a significant impact on the survey's outcome. We cannot interview another veteran in your place. Your answers, and those of other participating veterans, will give the VA an up-to-date picture of the whole U.S. veteran population.

I want to assure you that the information you provide is protected under the Privacy Act and section 5701 of Title 38 of the U.S. Code. The VA will use the information you provide to evaluate current VA policies, programs and services for veterans and in deciding how to help veterans in the future.

We would be happy to arrange an interview at a time that is convenient for you. If you would like to begin an interview or schedule an appointment, please call Westat toll-free at 1-888-258-2194. Ask to speak with the Veterans Survey Manager.

Thank you. We greatly appreciate your help.

Sincerely,



John C. Helmick
Project Director

Exhibit 5-11. Extended refusal letter (RDD Sample)

WESTAT

National Survey of Veterans

1650 Research Blvd. • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

«DATESENT»

ID #«MAILID»
To the Veteran At
«ADDRESS»
«CITY», «STATE» «ZIP»

Dear Veteran:

We need your help. Recently, one of our telephone interviewers called and asked you to take part in the National Survey of Veterans. At this time, we have not finished an interview with you. This survey is sponsored by the Department of Veterans Affairs (VA). It will provide valuable information for planning benefits and services for all veterans.

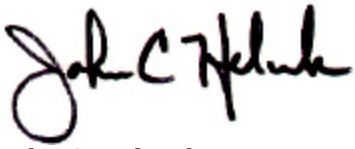
While your participation is voluntary, you are one of only a few thousand randomly selected veterans whose answers will represent all 25 million veterans. Your individual participation will have a significant impact on the survey's outcome. We cannot interview another veteran in your place. Your answers, and those of other participating veterans, will give the VA an up-to-date picture of the whole U.S. veteran population.

I want to assure you that the information you provide is protected under the Privacy Act and section 5701 of Title 38 of the U.S. Code. The VA will use the information you provide to evaluate current VA policies, programs and services for veterans and in deciding how to help veterans in the future.

We would be happy to arrange an interview at a time that is convenient for you. If you would like to begin an interview or schedule an appointment, please call Westat toll-free at 1-888-258-2194. Ask to speak with the Veterans Survey Manager.

Thank you. We greatly appreciate your help.

Sincerely,



John C. Helmick
Project Director

screener and extended cases. RDD Sample cases for which we were unable to obtain an address received the telephone followup without a mailout. The release of the refusal conversion mailout cases occasionally overlapped with the release of new sample. This created a huge volume of work such that the refusal cases sometimes did not get called until up to several weeks after they received the letters. Table 5-3 shows the number of RDD screener, RDD extended, and List Sample extended interview cases to which we mailed letters, and the percentage of those cases for which we were able to complete an interview.

Table 5-3. Results of mailout to refusal and hard-to-locate cases

Interview Type	Number of cases to which a letter was mailed	Percent of mailed cases with a completed interview
Screener interview	28,482	2.2
RDD Sample extended interview	2,746	20.6
List Sample extended interview	1,571	28.4

Matching Deceased Veterans to the SSA Date-of-Death File

During the course of data collection, we noticed that a large number of List Sample veterans were reported as deceased either on the advance letter update form or when we attempted to contact them over the telephone. To ensure that we had the most accurate information possible about our List Sample cases, toward the end of data collection we matched all List Sample cases against the Social Security Administration (SSA) Date-of-Death File. Through this effort, we were able to identify 317 cases of previously unknown status as deceased. We also confirmed that 202 cases we had already identified as deceased were, indeed, deceased.

Retrieving RDD Screener Data

For 24 RDD Sample cases, we discovered that some screened interview information required to determine whether someone in the household was eligible for an interview was missing. We called these households again to collect the missing information. We retrieved the missing data in all 24 cases, identifying 13 of them as eligible for the study. As a result of this effort, we completed seven additional interviews. The other six eligible veterans refused to participate.

Scheduling Additional Releases of Cases

The CATI scheduler followed certain rules for determining when to close cases with which we did not make contact. At the same time, we wanted to ensure that we made every attempt to reach respondents who might have been out of town or otherwise unavailable during our initial contact attempts. Therefore, we programmed the CATI scheduler to automatically release such noncontact cases after a designated "resting" period. Doing so improved our chances of making contact with these difficult-to-reach cases.

Conducting End-of-Study Measures

Toward the end of data collection, we used three additional methods to increase the number of household contacts. First, on one day during each of the last 4 weeks of data collection, interviewers left a message every time they reached an answering machine. Second, 2 weeks before the end of data collection, we increased the number of times we called outstanding List Sample cases, of which there were 498. To do this, we removed all outstanding (noncompleted) cases from the CATI scheduler. We continued to try to make contact using a paper call record. Doing so permitted us to identify the cases with which we had had little or no contact, attempt to call them at times different from the previous calls, and call multiple times during one day. Third, on the final Saturday of data collection, we asked interviewers to let telephones ring longer than usual before hanging up.

6. SAMPLE WEIGHTING

After the data collection and editing phases of the 2001 National Survey of Veterans (NSV 2001) were completed, we constructed the sampling weights for the data collected from the sampled veterans so that the responses could be properly expanded to represent the entire veteran population. The weights were the result of calculations involving several factors, including original selection probabilities, adjustment for nonresponse, households with multiple residential telephones, and benchmarking to veteran population counts from external sources. We produced a separate set of weights for the List and the RDD Samples and then combined them to produce the composite weights for use with the combined List and RDD Samples.

Our objectives in carrying out the sample weighting in the NSV 2001 were to:

- Enable the production of tabulations that provide estimates of the number of veterans in the population for the various categories selected;
- Compensate for disproportionate sampling of various subgroups in the List Sample;
- Compensate for the higher chance of selection of households with multiple residential telephone lines;
- Reduce biases arising from the fact that nonrespondents may be different from those who participated;
- Compensate, to the extent possible, for noncoverage in the sample due to inadequacies in the sampling frame or other reasons for noncoverage, such as veterans in households without telephones; and
- Reduce variances of the estimates by using auxiliary variables that are highly correlated with the study variables.

We also constructed a set of replicate weights for each respondent veteran and appended them to each record for use in estimating variances. This chapter describes the calculation of the full sample composite weights and replicate composite weights. We start with a description of the List and RDD Sample weights because the two sets of weights were constructed independently.

6.1 List Sample Weights

The List Sample weights are used to produce estimates from the List Sample that represent the population of veterans who are on the list frame. As described in Chapter 3, the list frame was constructed from the VHA Healthcare enrollment file and the VBA Compensation and Pension (C&P) file. The steps involved in constructing the List Sample weights are the calculation of a base weight, poststratification adjustment to known list frame population counts, and adjustments to compensate for veterans with unknown eligibility, and for nonresponse. These steps are described in detail below.

Calculation of List Sample Base Weights

The base weight for each veteran is equal to the reciprocal of his/her probability of selection. The probability of selection of a veteran is the sampling rate for the corresponding sampling stratum. If n_h out of N_h veterans are selected from a stratum denoted by h, then the base weight (or design weight) assigned to the veterans sampled from the stratum was obtained as

$$w_{hi} = \frac{N_h}{n_h}; \quad i \in h. \tag{6-1}$$

Properly weighted estimates using the base weights (as given above) would be unbiased if the eligibility status of every sampled veteran could be determined and every eligible sampled veteran agreed to participate in the survey. However, the eligibility status of each and every sampled veteran could not be determined (for example, some sampled veterans could not be located). Moreover, nonresponse is always present in any survey operation, even when participation is not voluntary. Thus, weight adjustment was necessary to minimize the potential biases due to unknown eligibility and nonresponse. In order to improve the reliability of the estimates we also applied a poststratification adjustment. Normally, the poststratification adjustment is applied after applying the nonresponse adjustment, but we carried this out before the nonresponse adjustment because determining the eligibility status of every veteran on the list frame would not have been feasible.

Poststratification Adjustment

Poststratification is a popular estimation procedure in which the base weights are adjusted so that the sums of the adjusted weights are equal to known population totals for certain subgroups of the population. We defined the poststrata to be the cross classification of three age categories (under 50, 50-64, over 64), gender (male, female), and census regions (Northeast, Midwest, South, and West), which resulted in 24 poststrata.

Let N_g denote the number of veterans on the list frame that belong to the poststratum denoted by g $(g = 1,2,\text{L},24)$ as obtained from the list frame, and let $\hat{N}_g$ be the corresponding estimate obtained by using the List Sample base weights. Then the ratio $N_g \big/ \hat{N}_g$ is used as an adjustment to define the poststratified weight $w_{hi}^{(pst)}$ as

$$w_{hi}^{(pst)} = \left(\frac{N_g}{\hat{N}_g} \right) w_{hi};\ (hi) \in g. \tag{6-2}$$

The superscript (*pst*) denotes that it is a poststratified weight. Because a veteran denoted by (*hi*) can belong to one and only one of the poststrata, the poststratified weights are uniquely defined. The advantage of poststratified weighting is that the reliability of the survey estimates is improved. The minimum sample size for poststratification cells was set at 30 veterans. For 2 out of the 24 poststrata, the sample sizes were fewer than 30 veterans. The two deficient cells were female veterans in the age group 50-64 in census regions "Northeast" and "Midwest." Their sample sizes were equal to 16 and 29, respectively. We collapsed these two cells in order to achieve the sample size of more than 30 in the collapsed poststratum. Thus, the poststratified weights were computed using the auxiliary veteran population counts from the list frame for 23 poststrata.

For the sake of simplicity we will denote by w_i the poststratified weight of the i^{th} List Sample veteran. These weights are the input weights for adjustments for unknown eligibility and nonresponse.

Adjustments for Unknown Eligibility and Nonresponse

The List Sample cases can be divided into respondents and nonrespondents. Further, the respondents can be either eligible or ineligible (out of scope) for the survey. The eligibility of the nonrespondent veterans could not always be determined. For example, a sampled veteran who could not be located could have been deceased and hence ineligible for the survey. Or, an eligible veteran might have moved and new contact information (address and telephone number) might not be obtainable. Therefore, the nonrespondents were classified into two categories: (1) eligible nonrespondents and (2) nonrespondents with unknown eligibility. In order to apply the adjustments for unknown eligibility and nonresponse, the List Sample cases were grouped into four response status categories (Figure 6-1):

Category 1: **Eligible Respondents.** This group consists of all eligible sampled veterans who participated in the survey, namely those who provided usable survey data. The category includes the final result codes CE and CX.

Category 2: **Ineligible or Out of Scope.** This group consists of all sampled veterans who were ineligible or out of scope for the survey, such as veterans who had moved abroad and were therefore ineligible for the survey. The information that was obtained was sufficient to determine that these veterans were indeed ineligible for the survey.

Category 3: **Eligible Nonrespondents.** This group consists of all eligible sampled veterans who did not provide usable survey data. The information that could be obtained was sufficient to ascertain that the veteran was eligible for the survey.

Category 4: **Eligibility Unknown.** This group consists of all sampled veterans whose eligibility could not be determined. For example, sampled veterans who could not be located were placed in this category.

We used the final List Sample extended interview result codes *(MAINRSLT)* and the variable *"MCURSECT"* to assign the sampled veterans to one of the four response categories defined above. The groupings of the extended interview result codes and the *"MCURSECT"* values that define the above response categories are given in Appendix E. A list of final extended interview result codes are included in Appendix H. For incomplete cases, the variable *"MCURSECT"* indicates the point at which the interview broke off and that the interview could not be completed after that. We should note that the eligibility could not be determined when the Military Background module of the extended interview was not completed. Also, we interpreted cases with result code *"IA"* (not a veteran) as "hidden" refusals and assigned them to the category "eligible nonrespondents" irrespective of the *"MCURSECT"* value.

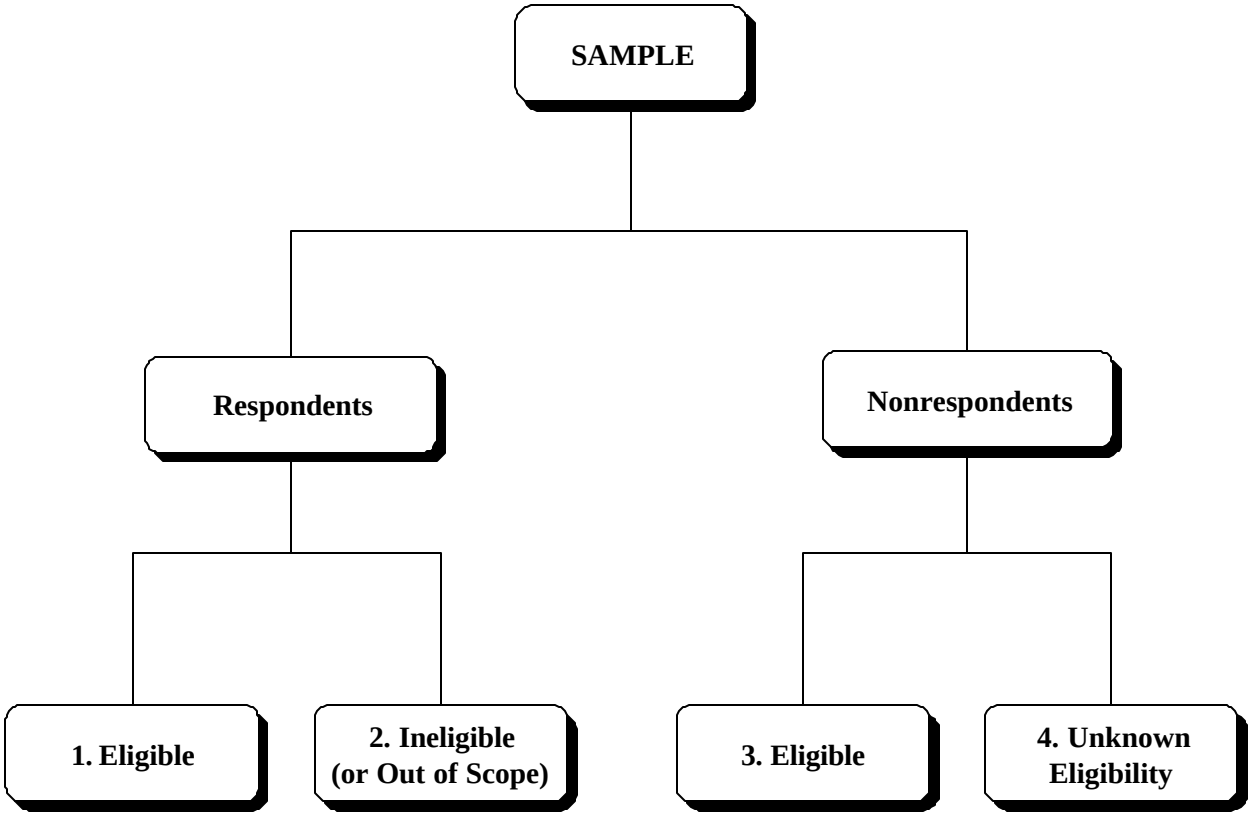


Figure 6-1. Categories of response status

The nonresponse adjustment was applied in two steps. In the first step the poststratified weights of the veterans with unknown eligibility (Category 4) were distributed proportionally over those with known eligibility (Categories 1, 2, and 3). As stated earlier, let w_i denote the poststratified weight of the i^{th} veteran sampled from the list frame. Then the adjustment for unknown eligibility was obtained as

$$A^{(ue)} = \frac{\sum_{i \in R} w_i + \sum_{i \in N} w_i + \sum_{i \in O} w_i + \sum_{i \in U} w_i}{\sum_{i \in R} w_i + \sum_{i \in N} w_i + \sum_{i \in O} w_i}, \qquad (6\text{-}3)$$

where R represents veterans who were survey respondents (Category 1), O represents out-of-scope or ineligible veterans (Category 2), N represents eligible nonrespondents (Category 3), and U represents the sampled veterans whose eligibility could not be determined (Category 4). The adjustment factor $A^{(ue)}$ to account for unknown eligibility was applied to the poststratified weights of the eligible respondents (Category 1), out-of-scope or ineligible veterans (Category 2), and eligible nonrespondents (Category 3). Thus, the List Sample weight w_i^* adjusted for unknown eligibility was computed as

$$w_i^* = A^{(ue)} w_i \text{ if the } i^{th} \text{ veteran belongs to response Category 1, 2 or 3.} \qquad (6\text{-}4)$$

The weights of the veterans with unknown eligibility (Category 4) were set to zero.

The adjustment for unknown eligibility was applied within homogeneous adjustment classes. These adjustment classes were determined with *CHAID* (Chi-square Hierarchical Automatic Interaction Detector) software described in Appendix F.

In the second step, we calculated an adjustment factor to account for the eligible nonrespondent veterans. The extended list interview nonresponse adjustment factor was calculated as the ratio of the sum of the weights (adjusted for unknown eligibility) for eligible respondents and eligible nonrespondents to the sum of the weights for only the eligible respondents. Thus, we calculated the nonresponse adjustment factor $A^{(nr)}$ to be the ratio of the sums as

$$A^{(nr)} = \frac{\sum_{i \in R} w_i^* + \sum_{i \in N} w_i^*}{\sum_{i \in R} w_i^*}, \qquad (6\text{-}5)$$

where w_i^* is the weight obtained after applying the adjustment for unknown eligibility, R represents eligible respondents (Category 1), and N represents eligible nonrespondents (Category 3). The adjustment factor $A^{(nr)}$ is applied only to the weights of the eligible respondents (Category 1) in the sample. That is, the nonresponse-adjusted weight w_i^{**} is computed as

$$w_i^{**} = A^{(nr)} w_i^* \text{ if the } i^{th} \text{ sampled veteran is a respondent (Category 1).} \quad (6\text{-}6)$$

We applied the nonresponse adjustment, $A^{(nr)}$, within homogeneous nonresponse adjustment classes, which were also defined using *CHAID* software. The final List Sample weight for each eligible respondent was computed by multiplying the weight w_i^* by the appropriate nonresponse adjustment factor as defined above. The final List Sample weight for the eligible nonrespondent veterans was set to zero. The final List Sample weight of the out-of-scope/ineligible veterans is the weight obtained after applying the adjustment factor for unknown eligibility. The weights for the out-of-scope/ineligible veterans could be used to estimate the ineligibility rate of the list frame that we used to select the List Sample.

6.2 RDD Sample Weights

The calculation of the RDD Sample weights consisted of five main steps. The steps included computing the base weight and various adjustments at the screener interview level and the extended interview level. In summary, we:

- Computed base weight as the inverse of the probability of selection of the telephone number associated with the household;
- Applied an adjustment to account for household level nonresponse during screening;
- Applied an adjustment for multiple telephone lines as the reciprocal of the number of "regular residential" telephone numbers used by the household (excluding telephone numbers used only for business purposes, fax machines, cellular phones, pagers, or mobile phones);
- Applied an adjustment to correct for the nonresponse to the extended interview; and
- Benchmarked to known veteran population counts from the Census 2000 Supplementary Survey (C2SS) that the U.S. Bureau of the Census conducted.

The final RDD Sample weights were obtained as the product of the base weight and the various adjustments applied to the base weights. The steps involved in computing these weights are described in detail below.

RDD Sample Base Weights

As described in Chapter 3, the RDD Sample was selected with the list-assisted RDD sampling methodology except for the Puerto Rico RDD Sample, for which an RDD sample of telephone numbers was selected from all possible telephone numbers for Puerto Rico. The base weights for the two RDD Samples were defined accordingly.

List-assisted RDD Sample Base Weights

The base weight is defined as the reciprocal of the probability of selection. With the list-assisted RDD methodology, the telephone numbers were selected with equal probabilities of selection. We used a systematic sampling scheme to select telephone numbers, and the probability of selecting a telephone number when n telephone numbers from a pool of N numbers is selected is given by $f = n/N$. Because the national RDD Sample was selected from two RDD frames constructed at two different times (see Chapter 3) the selection probabilities were computed according to whether a telephone number was eligible for selection from both frames or from only one of the frames. Let F_1 and F_2 denote the RDD frames constructed at the two time periods, and N_1 and N_2 be their corresponding sizes. A random sample of n_1 (=240,000) telephone numbers was selected from the frame F_1 and a random sample of n_2 (=60,000) telephone numbers was selected from the frame F_2. The selection probabilities of the sampled telephone numbers were computed as follows.

$$\mathrm{Prob}(t) = \begin{cases} \dfrac{n_1}{N_1} + \left(1 - \dfrac{n_1}{N_1}\right)\dfrac{n_2}{N_2} & \text{if t was in both } F_1 \text{ and } F_2 \\ \dfrac{n_1}{N_1} & \text{if t was in } F_1 \text{ only} \\ \dfrac{n_2}{N_2} & \text{if t was in } F_2 \text{ only} \end{cases} \tag{6-7}$$

where *t* denotes a sampled telephone number. The base weight of a telephone number selected from the RDD frames is given by the reciprocal of the corresponding probability of selection.

Puerto Rico Sample Base Weights

The Puerto Rico RDD Sample was a pure RDD sample due to the fact that information was not available on the telephones to construct the sampling frame for list-assisted RDD methodology. The base weight was defined to be the inverse of the selection probability.

RDD Sample Weight Adjustments

RDD Sample weight adjustments include weight adjustments for the national (list-assisted) RDD Sample and the Puerto Rico RDD Sample.

List-assisted RDD Sample Weight Adjustments

List-assisted RDD Sample weight adjustments were applied as screener interview nonresponse adjustment, adjustment for multiple telephone lines, and an adjustment for nonresponse at the extended interview.

Screener Nonresponse Adjustment. The base weights were adjusted to account for the households (telephones) with unknown eligibility during the screening interview. We defined the four categories listed below and assigned sampled telephone numbers to each based on the final screener result (*SCRNRSLT*) codes as given in Appendix E.

Category 1: **Eligible Respondents.** This category consists of all sample households that completed the screening questionnaire and contained at least one veteran eligible for the extended interview. The category includes the RDD screener final result codes CO or household selection flag (HSF) equal to 1 (YES).

Category 2: **Ineligible or Out of Scope.** This category consists of all sample households (telephones) that were ineligible or out of scope for the survey. For example, these included households with no veterans or telephone numbers that were business numbers.

Category 3: **Eligible Nonrespondents.** Although we defined an "eligible nonrespondents" category, no cases were assigned to it because once someone in the household responds to the screening questionnaire, the persons enumerated in that household can be categorized as either eligible respondents or ineligible/out of scope. Otherwise, the household is assigned to the category "Eligibility Unknown."

Category 4: **Eligibility Unknown.** This category consists of all sample telephones for which sufficient information could not be collected to determine whether or not there was a veteran in the household.

The assignment of sampled households (telephones) to the three response categories (categories 1, 2 and 4) was based on the final screener result codes (*SCRNRSLT*) and household selection flag (HSF) as given in Appendix E. A list of final screener result codes is included in Appendix H.

The base weights corresponding to the households (telephones) with unknown eligibility (Category 4) were distributed proportionally over those with known eligibility (Categories 1 and 2). To carry out the adjustment for unknown eligibility, the telephones with unknown eligibility were divided into two sub-categories: (1) those that we could determine were residential and (2) those for which we could not make a residential determination.

The adjustment for unknown eligibility was then applied in two separate steps. In the first step, we adjusted for those telephones whose type – residential, business, or nonworking – could not be determined. The weight adjustment was applied within homogeneous adjustment classes that were determined through the *CHAID* analysis.

In the second step, nonworking and business telephone numbers were removed and the weights were adjusted to account for the residential telephone numbers for which the eligibility for the NSV 2001 could not be determined. The adjustment for unknown eligibility in the second step was computed as the ratio of the sum of the weights adjusted in the first step of all residential sample cases (both with known and unknown eligibility) to those with known eligibility. It should be noted that the nonworking and business telephone numbers had been eliminated at this stage. The weights of those with known eligibility were adjusted by multiplying with the adjustment factor for the second step of unknown eligibility, and the weights of those with unknown eligibility were set to zero. The adjustment for the

second step of unknown eligibility was also applied within homogeneous adjustment classes defined using the *CHAID* software.

Adjustment for Multiple Residential Lines. If every household had exactly one residential telephone number, then the weight for a household would be the same as the base weight of the corresponding telephone number. The adjustment for multiple residential telephone households prevents households with two or more residential telephone numbers from receiving a weight that is too large by reflecting their increased probability of selection. In theory, the household weight would be obtained by dividing the base weight by the number of residential telephone lines in the household. We assigned an adjustment factor of ½ to the households with more than one residential telephone number because the number of households with more than two residential telephone numbers would be small. A weighting factor of unity was assigned to households reporting only one telephone number in the household, and an adjustment factor of ½ was assigned to households with more than one residential telephone number.

RDD Extended Interview Nonresponse Adjustment. The RDD Sample required administration of both a household screening questionnaire and the extended NSV 2001 questionnaire, and included the possibility of identifying multiple veterans in a single household. Because the screener survey interview screened for the households with potential veterans, a small fraction of persons who were screened in were not actually eligible for the NSV 2001. Once the extended interview began, it was still necessary to establish with certainty that the selected person was indeed a veteran, so further screening took place at the beginning of the extended interview in the Military Background module. If the responses to the set of eligibility questions during the extended interview indicated that the person was not an eligible veteran, the interview was terminated. Moreover, for some cases that were screened in, no information could be collected from the extended interview to ascertain their eligibility (e.g., the potential veteran could not be contacted for the extended interview). Thus, the screened-in sample contained cases with unknown eligibility as well as eligible and ineligible cases. Further, the eligible cases contained respondents and nonrespondents. Therefore, the screened-in RDD Sample cases were grouped into the same four categories as the List Sample cases.

Category 1: **Eligible Respondents.** This group consists of all eligible sample veterans who participated in the survey, namely those who provided usable survey data. The category includes the final result codes CE and CX.

Category 2: **Ineligible or out of scope.** This group consists of all sample cases that were determined to be ineligible or out of scope for the survey, such as a screened-in person who was not a veteran and hence was ineligible for the survey.

Category 3: **Eligible Nonrespondents.** This group consists of all eligible sample veterans who did not provide usable survey data. The information that could be obtained was sufficient to ascertain that the veteran was eligible for the survey.

Category 4: **Eligibility Unknown.** This group consists of all sample cases whose eligibility could not be determined. For example, sample persons who could not be contacted were placed in this category.

The screened-in sample cases were assigned to the four response categories on the basis of final extended interview result codes (*MAINRSLT*) and the variable *"MCURSECT."* The groupings of the extended result codes, along with the *"MCURSECT"* values corresponding to the four response categories, are given in Appendix E. These categories are very similar to those for the List Sample extended interviews. We should note that the extended result code *"IA"* (not a veteran) for the List Sample cases was interpreted as a "hidden" refusal and hence was assigned to the category "eligible nonrespondents." The RDD Sample cases with the result code *"IA"* were assigned to the "ineligible" category because the eligibility status for RDD Sample cases was determined during the extended interview.

The weights of the cases with unknown eligibility (Category 4) were proportionally distributed over the other 3 categories (Categories 1, 2, and 3). These adjustment factors were calculated separately for homogeneous classes defined with *CHAID* analysis.

The next step in the RDD Sample weighting was the extended interview nonresponse adjustment. The RDD extended interview nonresponse adjustment factor was calculated as the ratio of the sum of weights for eligible RDD extended interview respondents and eligible RDD extended interview nonrespondents to the sum of the weights for only the eligible RDD extended interview respondents. Separate nonresponse adjustment factors were computed within homogeneous nonresponse adjustment cells. The nonresponse adjustment cells were determined with the *CHAID* software.

Puerto Rico Sample Weight Adjustments

We screened 96 households with potentially 102 veterans for which extended interviews were attempted. We completed only 51 extended interviews from the Puerto Rico RDD Sample. The nonresponse adjustment factors for the screener interview and extended interview were computed similarly to those for the national RDD Sample except that the screener nonresponse adjustment was

computed separately for two age groups (under 60, over 59) and a single nonresponse adjustment was computed for the extended interviews. This was due to the small sample size for the Puerto Rico RDD Sample.

After applying the screener interview and extended interview nonresponse adjustments, the national (list-assisted) RDD and the Puerto Rico RDD Samples were combined into one RDD Sample. The base weights adjusted for nonresponse were further adjusted in a raking procedure, discussed in a later section. The raked weights were the final RDD Sample weights that were used to compute the composite weights for the combined List and RDD Samples.

Comparison of RDD Estimates with VA Population Model Estimates

As a check, we compared the RDD Sample estimate of number of veterans based on the weights before raking with the estimate from the Vetpop 2000 model[1], VA population projection model. The NSV 2001 target population includes only noninstitutionalized veterans living in the U.S. The reference period for the NSV 2001 is the year 2000[2]. The VA population model estimates are also for the year 2000 and these are based on the 1990 Census. These estimates are derived by incorporating survival rates and information on veterans leaving military service. The VA population model estimate for the entire veteran population is 25,372,000 veterans, whereas the estimate from the RDD Sample is 23,924,947 veterans, which is 5.7 percent lower than the VA population model estimate. The difference of 5.7 percent can be attributed to the combination of the differences from exclusion of the institutionalized veterans and RDD undercoverage of nontelephone households and households with unlisted telephone numbers belonging to "zero-listed telephone banks."

The portion of undercoverage due to nontelephone households and households with unlisted numbers belonging to "zero-listed telephone banks" was addressed with the raking procedure, described in the next section. The control total of veteran population for the raking procedure was 25,196,036 veterans. Thus, the estimated undercoverage due to nontelephone households and households with

[1] The Vetpop 2000 is a veteran population projection model developed by the office of the Actuary, Department of Veterans Affairs. It is the official VA estimate and projection of the number and characteristics of veterans as of September 30, 2000. Details of all aspects of the development and content of the model are available from the office of the Actuary, Department of Veterans Affairs, 810 Vermont Avenue NW, Washington DC 20420.

[2] The data collection field period for the survey was February through November 2001. Nearly all of the survey items that address use or nonuse of VA Health Care Services use a reference period of "during the past 12 months," and individual and household income questions are for the year 2000.

unlisted telephone numbers belonging to "zero-listed telephone banks" would be only about 5.0 percent. After correcting for the undercoverage from these two sources, the difference between the NSV 2001 and the Vetpop 2000 estimates is less than one percent, which is from institutionalized veterans and veterans living abroad.

Raking Ratio Estimation/Undercoverage Adjustment

The raking ratio estimation procedure is based on an iterative proportional fitting procedure developed by Deming and Stephan (1940), and involves simultaneous ratio adjustments to two or more marginal distributions of the population counts. Raking was proposed by Deming and Stephan (1940) as a way to ensure consistency between complete counts and sample data from the 1940 U.S. Census of population. The methodology is referred to as raking ratio estimation because weights are raked using ratio adjustments based on the known marginal population totals. Typically, raking is used in situations where the interior cell counts of cross-tabulation are either unknown or sample sizes in some cells are too small for efficient estimation. The purpose of the raking procedure in this survey is to improve the reliability of the survey estimates, and to correct for the bias due to missed households, namely, households without telephones and households with unlisted telephone numbers belonging to "zero-listed telephone banks." As described in Chapter 3, households without telephones and households with unlisted telephone numbers belonging to the "zero-listed telephone banks" are not included in the list-assisted RDD sampling frame.

The raking procedure is carried out in a sequence of adjustments. First, the base weights are adjusted to one marginal distribution and then to the second marginal distribution, and so on. One sequence of adjustments to the marginal distributions is known as a cycle or iteration. The procedure is repeated until convergence is achieved. The criteria for convergence can be specified either as maximum number of iterations or absolute difference (or relative absolute difference) from the known marginal population totals.

We used a two-dimensional raking procedure for the RDD Sample. The computational details of the two-dimensional raking procedure are given in Appendix G. We formed the two raking dimensions from the cross classification of veterans according to the demographic/education/region characteristics of the veterans. These characteristics were also obtained during the screening interview. The first dimension was formed from the cross classification of three age categories (under 50, 50-64,

over 64) with four education levels (no high school diploma, high school diploma, some college, bachelor's degree or higher) and four race categories (Hispanic, Black, Other, and White), resulting in 48 cells. The second dimension was formed from the cross classification of gender (male, female) and the four census regions (Northeast, Midwest, South, and West), resulting in 8 cells. By using a set of cross classified variables for each raking dimension, the internal correlation structure of the data could be better preserved. The sample sizes for the race categories "Hispanics," "African American," and "Other" in the age group under 50, and education "no high school diploma" were 21, 15, and 17, respectively. These three cells in the first raking dimension were collapsed to achieve sufficient cell sample size. Thus, the number of cells for the first raking dimension was reduced to 46 after collapsing the three cells with deficient sample sizes. The sample sizes were more than 25 for all cells used for the raking.

We used the Census 2000 Supplementary Sample (C2SS) data from the U.S. Bureau of the Census to define the control totals for the raking procedure. We also included the Puerto Rico RDD Sample in the raking procedure. Because the C2SS did not include Puerto Rico in the survey target population, we estimated the Puerto Rico veteran population counts for the year 2000 from the Census 1990 population counts based on a model. The methodology for the veteran population counts to be used as control totals for the raking procedure is discussed briefly in the next section.

We applied the convergence criteria in terms of percent absolute relative difference, which was specified to be no more than 0.01 percent for all marginal population counts. The raking procedure converged in 8 iterations.

The above variables were chosen as the raking variables due to significant differences in the telephone coverage by categories of these variables, and hence maximum bias reduction would be achieved. The sample sizes at the adjustment cell level would become very small if we had used too many variables in the cross classification to define marginal distributions for raking.

Veteran Population Counts for the Raking Procedure

The independent estimates of veteran population counts for the raking procedure were obtained from the Census 2000 Supplementary Survey (C2SS). The C2SS sample does not cover Puerto Rico, and we used the 1990 Census data to obtain model-based estimates of the Puerto Rico veteran population counts for the year 2000. The methodology of the model-based estimates for Puerto Rico is

discussed later in this section. For the purpose of the raking procedure Puerto Rico data were combined with the census region "South."

Estimates from the Census 2000 Supplementary Survey (C2SS)

The U.S. Bureau of the Census conducted the Census 2000 Supplementary Survey (C2SS). The survey covers the 50 states and the District of Columbia. The sample for the C2SS used a two stage stratified design with a sample of approximately 890,000 housing units designed to measure socioeconomic and demographic characteristics of housing units and their occupants. The C2SS sample of housing units was selected from the Master Address File (MAF). The MAF was created by combining the 1990 Census Control file, the Delivery Sequence File of the United States Postal Service (USPS), and addresses listed for the Census 2000. The first stage sampling involved dividing the United States into primary sampling units (PSUs) and grouping these PSUs into homogeneous strata. The C2SS design employed 1,925 PSUs. The strata were constructed so that they are as homogeneous as possible with respect to social and economic characteristics that are considered important by C2SS data users. A pair of PSUs was selected from each stratum with probability proportional to size (PPS) sampling. In the second stage of sampling, a sample of housing units within the sampled PSUs was drawn using a systematic sampling procedure.

The data were collected from more than 700,000 housing units. Our assumption was that 1 in 4 households contains a veteran and hence, the estimates of veteran population counts from the C2SS data will be based on approximately 175,000 interviewed veterans. The Census 2000 Supplementary Survey universe is limited to the household population and excludes the population living in institutions, college dormitories, and other group quarters. Because the NSV 2001 also excludes the institutionalized veteran population and veterans living abroad, the estimated veteran population counts from the C2SS could be used to benchmark the NSV 2001 estimates.

Model-based Estimates for Puerto Rico

The C2SS sample does not cover Puerto Rico, and external data for Puerto Rico for the raking variables is not available from any other source. We used the 1990 Census data to obtain the distribution of the Puerto Rico veteran population by the variables used for raking. We made the

assumption that the distribution of the Puerto Rico veteran population by the raking variables has not changed between 1990 and 2000. Thus, we could use the total Puerto Rico veteran population in 2000 and the 1990 Census distribution to obtain the veteran population counts for the cells defined for the raking procedure. We used the Puerto Rico total veteran population for 2000 as derived from the veteran population model developed by VA (Vetpop 2000). According to the Veteran Population model, the Puerto Rico veteran population for 2000 was 142,680 veterans. We used these model-based estimates of Puerto Rico veteran population counts for 2000 to adjust the veteran population control totals obtained from C2SS so that the raking procedure could be used with the RDD sample, including the Puerto Rico RDD Sample. The Puerto Rico data were assigned to the census region "South" for raking.

6.3 Composite Weights

Integration of samples from multiple frames into a single micro-data file with a single weight requires, at a minimum, the ability to tell which of the veterans had more than one chance of selection. This is enough to create unbiased weights. The Social Security numbers (SSNs) of all the veterans on the list frame were known. To identify the RDD Sample veterans on the list frame, we needed to obtain their SSNs during data collection so that the overlap RDD Sample would be identified by matching the SSNs of the veterans in the RDD Sample with the list frame. However, out of 12,956 completed extended RDD interviews (including Puerto Rico), we were able to obtain an SSN from only 6,237 veterans, which is 48.1 percent of the RDD completed extended interviews. The veterans sampled as part of the RDD Sample could thus only be categorized as belonging to the overlap RDD Sample or nonoverlap RDD Sample if the SSN was reported. For others (those who did not report their Social Security numbers), we used a prediction model to impute the overlap status. The imputation of the overlap status and the construction of composite weights are discussed in the following sections.

Imputation of Overlap Status of Veterans Not Reporting SSN

We used the following model to predict the probability that a veteran in the RDD Sample for whom an SSN could not be obtained would actually belong to the overlap domain.

$$prob(Overlap) = prob(SSN) \times prob(Overlap \mid SSN) + prob(\overline{SSN}) \times prob(Overlap \mid \overline{SSN}), \qquad (6\text{-}8)$$

where $prob(Overlap)$ is equal to the probability that a veteran in the completed RDD Sample belongs to the overlap domain; $prob(SSN)$ is the probability that a veteran in the completed RDD Sample reported the SSN; $prob(Overlap \mid SSN)$ is the conditional probability that a veteran in the completed RDD Sample with a reported SSN belongs to the overlap domain; $prob(\overline{SSN})$ is equal to the probability that a veteran in the completed RDD Sample did not report a SSN, which is given by $\{1 - prob(SSN)\}$; and $prob(Overlap \mid \overline{SSN})$ is the conditional probability that a veteran in the completed RDD Sample with unreported SSN belongs to the overlap domain.

We needed to determine the probability of overlap that was conditional on not reporting an SSN (i.e., $prob(Overlap \mid \overline{SSN})$). This can be computed from the above expression because all other probabilities are known. We used *CHAID* analysis to determine homogeneous classes of overlap for those reporting SSNs in order to impute the overlap status within each class for those not reporting an SSN. We used demographic and socioeconomic variables, such as age, gender, race, education, income, and priority group as predictor variables in the *CHAID* model. The probability of overlap conditional on not reporting an SSN (i.e. $prob(Overlap \mid \overline{SSN})$) was determined independently for each cell, and the overlap status was imputed by taking a random sample of the veterans out of those who did not report an SSN. In other words, the overlap status of the veterans with an unreported SSN within a class was imputed as belonging to the overlap domain such that the proportion belonging to the overlap was as close to the desired probability as possible. The proportion belonging to the overlap domain was based on the weighted counts. Thus, the above approach is an imputation approach that effectively uses auxiliary variables, such as demographic variables and enrollment priority groups, to impute the overlap status of the RDD Sample veterans who did not provide Social Security numbers.

The veterans in the overlap RDD Sample (including the imputed cases) also had a chance of being selected in the List Sample, and hence, had an increased chance of selection. These RDD cases are referred to as the overlap sample because they represent the portion of the RDD frame that overlaps with the list frame. A composite weight was created for the identified overlap RDD Sample (both observed and imputed) and List Sample cases using the principles of composite estimation so that the combined RDD and List Sample file could be used for analysis.

Calculation of Composite Weights

Composite weights were calculated using an approach developed by Hartley (1962). We selected this approach because it could be adapted to take into account the design effects of the RDD and List Sample designs when combining the two samples. The List and RDD Samples were combined into one file, consisting of 12,956 completed extended interviews from the RDD Sample, and 7,092 completed extended interviews from the List Sample, resulting in a combined sample of 20,048 completed extended interviews.

In composite estimation, the estimates being combined are assumed to be independent, and are unbiased estimates of the same population parameter. In other words, the List Sample and the overlap RDD Sample cases theoretically represent the same population (i.e., veterans on the list frame). Therefore, a linear combination of the two independent estimates would also produce an unbiased estimate. The parameter for constructing the composite weights is chosen so that the variance is minimized. The composite weight for each veteran in the RDD Sample and List Sample was calculated as

$$w_{comp} = \begin{cases} \lambda \times w_1 & \text{if veteran is in the List Sample} \\ (1-\lambda) \times w_2 & \text{if veteran is in the overlap RDD Sample} \\ w_2 & \text{if veteran is in the nonoverlap RDD Sample} \end{cases} \quad (6\text{-}9)$$

where

w_1 = original List Sample weight; and

w_2 = original RDD Sample weight.

The parameter λ ($0 < \lambda < 1$) defines the composite weight that is used to produce the composite estimate as a linear combination of the List Sample estimate and the overlap domain RDD Sample estimate. The optimum value of the parameter λ for estimating a proportion is given by

$$\lambda = \frac{s_2^2}{s_1^2 + s_2^2}, \quad (6\text{-}10)$$

where

s_1^2 = variance of a proportion from the List Sample; and

s_2^2 = variance of a proportion from the overlap RDD Sample.

The composite weight gives increased weight to the estimates with smaller variance, namely a smaller value of s^2. Thus, the weight assigned to each of the estimates is inversely proportional to the corresponding variance. In practice, the survey estimates of proportions are produced for several characteristics and each would have its own optimum value of the parameter l. It would not be practical to have a separate set of weights for these characteristics and a common l value is highly desirable for the sake of internal consistency of the estimates. Therefore, the l values corresponding to these estimates were averaged according to the formula

$$l = \frac{\sum_i l_i \left(n^{(RDD)} / deff_i^{(RDD)} + n^{(List)} / deff_i^{(List)} \right)}{\sum_i \left(n^{(RDD)} / deff_i^{(RDD)} + n^{(List)} / deff_i^{(List)} \right)}, \qquad (6\text{-}11)$$

where

l_i = l for the i^{th} estimated proportion;

$deff_i$ = design effect for the i^{th} estimated proportion;

n = number of responding veterans;

RDD = overlap RDD Sample; and

$List$ = List Sample.

In the above formula, the sample size when divided by the design effect represents the effective sample size as compared with simple random sampling because of such design features as clustering and unequal probabilities of selection. Thus, the value of l is obtained by taking the weighted average of the individual l values where the weights are proportional to the corresponding effective sample sizes. The rationale for the above averaging formula was that it gave more weight to the l values that are based on larger effective sample sizes.

The composite weight gives increased weight to the estimate with the smaller variance (or larger effective sample size). There would be some loss of variance efficiency from using a common l value for all of the characteristics instead of optimum l for each of the characteristics. The increase in the variance for a characteristic would depend on the absolute difference between the common (average) l value and the optimum l value for the particular characteristic.

We computed the estimates of proportions and their variances for 16 statistics identified as key variables by the VA for the List Sample and the overlap portion of the RDD Sample. These variables are listed in Table 6-1.

Table 6-1. VA key variables

MB24:	Combat or War Zone Exposure (Yes/No)
DIS1:	Ever Applied for VA Disability Benefits (Yes/No)
HB21:	Currently Covered by Medicare (Yes/No)
HC1:	Emergency Room Care During Last 12 Months (Yes/No)
HC4a:	VA Paid for Emergency Room Care (Yes/No)
HC5:	Outpatient Care During Last 12 Months (Yes/No)
HC6:	VA Facility for Outpatient Care (Yes/No)
HC9:	Hospitalized Overnight in a VA Hospital (Yes/No)
SD14d:	VA Service Connected Disability Compensation in 2000 (Yes/No)
SD14e:	VA Non-Service Connected Pension in 2000 (Yes/No)
SD14j:	Income Source: Public Assistance in 2000 (Yes/No)
ET1:	Ever Received Any VA Education or Training Benefits (Yes/No)
ML3a:	Ever Used VA Loan Program to Purchase Home (Yes/No)
ML3b:	Ever Used VA Loan Program for Home Improvement (Yes/No)
ML3c:	Ever Used VA Loan to Refinance Home (Yes/No)
PRIORITY:	Priority Group (Mandatory/Discretionary)

The weighted average of the individual l's based on the variables in the above table was computed according to the formula given in equation 6-11. The average l value turned out to be 0.7272 and was used to construct the composite weights for the combined sample. The individual l values ranged from 0.56 to 0.88.

Raked Composite Weights

The composite weights obtained by combining the List and RDD Samples were also raked using the same two dimensional raking procedure that was used for the RDD sample raking. The only difference was that we did not need to collapse the cells in the first raking dimension, which was defined

by cross classification of age, education, and race/ethnicity. The RDD Sample sizes for three cells in the first raking dimension were not sufficient and these cells had to be collapsed for the raking procedure. The combined RDD and List Sample sizes were more than 30 for all 48 cells used for the first raking dimension and hence we did not need to collapse cells.

The RDD Sample was raked mainly to correct for undercoverage because of nontelephone households and households with unlisted numbers in the "zero-listed telephone banks" that were missed in the list-assisted RDD sampling methodology. The composite weights were raked to achieve consistency with the C2SS estimates, and to improve the precision of the survey estimates. The improvement in the precision of the survey estimates would depend on the strength of correlation between the study variable and the variables employed in the raking procedure. The raking procedure is most beneficial if the estimation domains are defined on the basis of the raking variables, or if these variables are highly correlated with the study variables. We used the first raking dimension by cross classification of the variables age, education, and race/ethnicity to preserve the correlation structure among these variables. Similarly, the second dimension was defined by cross classification of the variables gender and census region. The variances of the national level estimates of totals of the variables used in the raking procedure would be identically equal to zero, which is an additional benefit of the raking procedure.

6.4 Replicate Weights

A separate set of replicate weights was created for the RDD Sample and the List Sample. These were then combined to construct the preliminary composite replicate weights. The final composite replicate weights were obtained by using the same two dimensional raking procedure with the preliminary composite replicate weights as the input weights that were used for the composite full sample weights.

List Sample Replicate Weights

A set of 51 Jackknife 1 (JK1) replicate weights was created for the List Sample for use in variance estimation. The replicate weights were designed for the JK1 replication method. To create the replicate weights, the entire List Sample, including ineligible and nonresponding veterans, was sorted by the twelve sampling strata, and by the order of selection within strata. The strata were not explicitly used in the assignment of replicates but the gains due to stratification were reflected in sorting the sample cases

by strata. Records 1, 1+51, 1+2*51, 1+3*51, and so on were assigned to the first replicate group. Records 2, 2+51, 2+2*51, 2+3*51, and so on were assigned to the second replicate group. The same approach was used with each succeeding replicate group without regard for strata boundaries, until all records were assigned to one of the 51 replicate groups. The replicate base weights for the r^{th} replicate were created by setting to zero the base weights for the records in the r^{th} replicate group and reweighting the base weights in the remaining replicate groups by the factor 51/50.

The same adjustments applied to the full List Sample base weights to obtain the full List Sample final weights were applied to the replicate base weights to obtain the List Sample replicate final weights. This included poststratification and the extended interview nonresponse adjustments that were recalculated for each replicate, so that the sampling variability in the response rates would be captured in the replicate weights. The randomness in the number of sampled ineligible cases is also reflected in the varying number of sampled eligible veterans in each replicate.

RDD Sample Replicate Weights

A set of 51 JK1 replicate weights was also created for the veterans identified from the RDD Sample. JK1 replicates were assigned by first sorting the entire RDD Sample of telephone numbers, both eligible and ineligible, in the order of selection of the 10-digit numbers that determined each original RDD Sample. Records 1, 1+51, 1+2*51, 1+3*51, and so on were assigned to the first replicate group. Records 2, 2+51, 2+2*51, 2+3*51, and so on were assigned to the second replicate group. The same approach was used with each succeeding group, until all records were assigned to one of the 51 replicate groups. The replicate base weights for the r^{th} replicate were created by setting to zero the base weights for the records in the r^{th} replicate group and reweighting the base weights in the remaining replicate groups by the factor 51/50. The replicate base weights for the Puerto Rico RDD Sample were computed in the same way as those for the national (list-assisted) RDD Sample.

The replicate base weights were adjusted following the same steps as those applied to the full sample base weights. These included the screener level nonresponse adjustment, adjustment for multiple residential telephone lines, extended interview level nonresponse adjustment, and raking to the external veteran population counts obtained from the Census 2000 Supplementary Survey. By raking the replicate weights in the same manner as the full sample weights, the sampling variability in the raking

adjustment factors would be reflected in the replicate weights, and hence included in the overall variance estimate. The raking procedure was carried out on the combined national and Puerto Rico RDD Samples.

If there were two or more veterans in a household, each respondent in the household received the same set of replicate base weights but the adjusted weights could differ because they could belong to different adjustment cells.

Composite Replicate Weights

To create the composite replicate weights, each replicate weight from the List Sample was multiplied by the same value of parameter l (=0.7272) that was used for creating the composite full sample weight. For the overlap RDD Sample cases, each replicate weight was multiplied by a factor of $(1-l)$. The remaining RDD Sample cases were assigned composite replicate weights equal to their original RDD Sample replicate weights. Finally, the composite replicate weights were raked to the veteran population counts estimated from the C2SS in a two dimensional raking procedure as was done for the composite full sample weights. The convergence criteria for the composite replicate weights was modified so that the percent absolute relative difference was no more than 0.1 percent for all marginal population counts. We recall that the convergence criteria for the composite full sample weights was that the percent absolute relative difference was no more than 0.01 percent for all marginal population counts.

6.5 Reliability of the Survey Estimates

Because estimates are based on sample data, they differ from figures that would have been obtained from complete enumeration of the veteran population using the same instrument. Results are subject to both sampling and nonsampling errors. Nonsampling errors include biases from inaccurate reporting, processing, and measurement, as well as errors from nonresponse and incomplete reporting. These types of errors cannot be measured readily. However, to the extent possible, each error has been minimized through the procedures used for data collection, editing, quality control, and nonresponse adjustment. The variances of the survey estimates are used to measure sampling errors. The variance estimation methodology is discussed in the next section.

Estimation of Variances of the Survey Estimates

The variance of an estimate is inversely proportional to the number of observations in the sample. Thus, as the sample size increases, the variance decreases. For the NSV 2001 the variance estimation methodology for estimates of totals, ratios (or means) and difference of ratios is based on the JK1 replication method, and the corresponding variance is given as:

$$v(\hat{q}) = \frac{R-1}{R}\sum_{r=1}^{R}\left(\hat{q}_{(r)} - \hat{q}\right)^2, \qquad (6\text{-}12)$$

where

q is an arbitrary parameter of interest;

$\hat{q}$ is the estimate of q based on the full sample;

$\hat{q}_{(r)}$ is the estimate of q based on the observations included in the r^{th} replicate;

R is the total number of replicates formed; and

$v(\hat{q})$ is the estimated variance of $\hat{q}$.

We have constructed the composite full sample and composite replicate weights for the combined List and RDD Samples corresponding to the JK1 replication methodology. The WesVar[3] variance estimation system can be used to produce the survey estimates based on the composite full sample weights and the corresponding variances of these estimates using the variance formula given in equation 6-12.

Construction of Confidence Intervals

Each of the survey estimates has an associated standard error, which is defined as the square root of the variance of the estimate. Consider the example of estimating the proportion of veterans with a certain characteristic, such as a service-connected disability. We denote by $\hat{p}$ the estimated proportion of

[3] WesVar is software for analyzing data from complex surveys. The software was developed by Westat and can be downloaded from Westat's website (www.westat.com/wesvar) for a 30-day free trial.

veterans with the particular characteristic of interest and let $v(\hat{p})$ be the corresponding variance estimate. Then the standard error of the estimated proportion $\hat{p}$ is given by

$$se(\hat{p}) = \sqrt{v(\hat{p})}. \tag{6-13}$$

The 95 percent confidence interval is the interval such that the unknown proportion p would have a 95 percent probability of being within the interval. The 95 percent confidence interval is given by

$$\hat{p} \pm t_{(0.025,50)} \times se(\hat{p}) . \tag{6-14}$$

The lower limit of the interval is $\hat{p} - t_{(0.025,50)} \times se(\hat{p})$, and the upper limit of the interval is $\hat{p} + t_{(0.025,50)} \times se(\hat{p})$. The width $t_{(0.025,50)} \times se(\hat{p})$ is known as half-width of the 95 percent confidence interval. The factor $t_{(0.025,50)}$ is the t-value at $a = 0.025$ with 50 degrees of freedom, which is approximately equal to 2.0. The smaller the half-width of the confidence interval, the more precise is the survey estimate.

Alternatively, the precision of the survey estimate can also be expressed in terms of the coefficient of variation (cv) of the estimate. The cv of an estimate is defined as the ratio of the standard error of the estimate and the magnitude of the estimate expressed in percent. Thus, the cv of the estimated proportion $\hat{p}$ is given by

$$cv(\hat{p}) = 100.0 \times {se(\hat{p})}\Big/{\hat{p}} , \tag{6-15}$$

where $se(\hat{p})$ is the standard error of the estimated proportion $\hat{p}$. The smaller the cv of the estimate, the more precise is the estimate. The percent margin of error at the 95 percent confidence level can also be obtained by multiplying the cv of the estimate by the factor $t_{(0.025,50)}$.

6.6 Bias and Precision in the Combined Sample

We investigated two main issues associated with the use of the combined sample versus the separate RDD and List Samples. These were: (1) potential biases incurred in the estimates as a result of the matching involved in creating the composite weights, and (2) the gains in precision from the increased

sample sizes of the combined sample. The reason that both of these issues are important is that the total mean square error (*MSE*) of a survey estimate is equal to the sum of its variance and the square of the bias, ($MSE = Variance + (Bias)^2$). In surveys with large sample sizes, the *MSE* may be dominated by the bias term. When sample sizes are small, the variance may be a greater cause for concern.

To address the first issue of bias, the potential risk of bias would be due mainly to imputing the overlap status of those RDD sample respondents who did not provide their Social Security numbers. We obtained an SSN from only 48 percent of the RDD Sample respondent veterans. Thus, the overlap status had to be imputed for those who did not report their SSNs. The question arises as to whether the cases that reported an SSN are different from those that did not. To answer this question, statistical comparisons were made for the two groups to see whether their distributions differed with respect to age and to other key statistics. Pairwise t-tests showed that those not reporting an SSN are:

- More likely to be in the over 50 age group;
- More likely to be in the higher income group;
- More likely to have a higher education; and
- More likely to belong to a discretionary priority group.

All comparisons are significant at the alpha = 0.05 level. For those who reported an SSN, we compared the characteristics of those who were on the list frame with those who were not on the list frame. The significant variables for this comparison were priority group, income, outpatient care, VA loan, and VA service-connected disability compensation. We used these variables as predictor variables in the *CHAID* analysis to determine homogeneous cells for imputing the overlap status for those who did not report their SSN. Therefore, the risk of potential bias was minimized due to imputing the overlap status within homogenous imputation cells.

The precision of the estimates can be evaluated by comparing the standard errors (SEs) of the estimates from the combined sample with those from the RDD Sample alone. In this situation, the population of analytical interest is the population of all noninstitutionalized veterans living in the U.S. The statistics of interest for the purpose of this analysis are proportions for various key statistics identified by the VA. As can be seen from the comparison of SEs in Table 6-2, the increased sample sizes of the combined sample always result in a significant reduction in sampling variability. The standard errors of the combined estimates are always lower than the standard errors of the corresponding estimates from the

RDD Sample alone. The design effects for the combined sample would generally be higher than the corresponding RDD Sample design effects due to increased variation in the sampling weights. The standard error of a survey estimate is inversely proportional to the square root of the effective sample size, where effective sample size is defined as the number of cases sampled divided by the design effect. Thus, the standard errors of the combined estimates would be lower than the RDD estimates as long as the increase in the design effect is less than the increase in the sample size. The ratio of the sample sizes for the combined sample and the RDD Sample alone is 1.54 (combined sample size divided by RDD Sample size). The standard error of the combined estimates therefore would be less than the standard error of the estimate from the RDD Sample alone as long as the design effect ratio is less than 1.54. We note from Table 6-2 that the design effect ratios for all the variables are less than 1.54. In fact, the design effect ratios are less than 1 for priority groups 1 through 4 and the service-connected disability (SD14d).

We recall that the List Sample design is a stratified design, where stratification is based on the health care priority groups (groups 1 through 6) and gender (male, female). The List Sample covered only the mandatory priority groups (groups 1 through 6). The gains from stratification for priority groups 1 through 4 more than offset the losses due to increased variation in the combined sample weights. Hence, the combined sample design effects are less than the RDD Sample design effect. The gains from stratification for priority groups 5 and 6 were not very large because of "strata jumpers." Many veterans who were thought to belong to priority groups 5 and 6 were actually observed as belonging to priority group 7. Therefore, the combined sample design effects for priority groups 5 and 6 are higher than the RDD Sample design effects. The combined sample design effect for the variable "SD14d" (service-connected disability) is lower than the RDD Sample design effect because of a high correlation between "SD14d" and the priority groups.

The efficiency of the combined sample as compared with the RDD Sample can also be defined as the ratio of the corresponding variances expressed as percentage. We denote by $Eff\left(Combined \quad vs. \quad RDD\right)$ the efficiency of the combined sample as compared with the RDD Sample alone, then

$$Eff\left(Combined \quad vs. \quad RDD\right) = 100 \times \frac{\text{var}\left(RDD\right)}{\text{var}\left(Combined\right)}, \tag{6-16}$$

Table 6-2. Comparison between RDD and composite estimates

Question Number	Variable Description	Value	RDD only				Composite				RDD vs. Composite	
			Est(%)	SE	n	Deff	Est(%)	SE	n	deff	Deff Ratio	Var Ratio
	Priority Group	1	3.3	0.15	425	0.95	3.2	0.11	1974	0.83	0.87	1.86
		2	2.6	0.16	337	1.30	2.7	0.09	1666	0.60	0.46	3.16
		3	9.0	0.25	1162	0.96	9.0	0.18	3048	0.82	0.86	1.93
		4	0.1	0.03	10	1.17	0.1	0.02	96	0.55	0.47	2.25
		5	18.5	0.31	2296	0.82	18.4	0.26	3599	0.89	1.08	1.42
		6	10.9	0.31	1432	1.30	10.9	0.29	1887	1.77	1.36	1.14
		1 – 6	44.4	0.43	5662	0.99	44.3	0.38	12270	1.20	1.22	1.28
		7	55.6	0.43	7294	0.99	55.7	0.38	7778	1.20	1.22	1.28
MB24	COMBAT1	Yes	39.2	0.47	5145	1.18	39.2	0.46	9253	1.74	1.48	1.04
		No	60.8	0.47	7811	1.18	60.8	0.46	10795	1.74	1.48	1.04
ET1	EDUCTRG1	Yes	40.2	0.48	5369	1.25	40.2	0.42	8266	1.46	1.17	1.31
		No	59.8	0.48	7587	1.25	59.8	0.42	11782	1.46	1.17	1.31
HC1	ERYOU1	Yes	24.1	0.33	3107	0.75	24.1	0.32	5628	1.10	1.46	1.06
		No	75.9	0.33	9849	0.75	75.9	0.32	14420	1.10	1.46	1.06
HB21	MEDICARE1	Yes	39.3	0.23	5356	0.29	39.4	0.20	8789	0.35	1.22	1.32
		No	60.7	0.23	7600	0.29	60.6	0.20	11259	0.35	1.22	1.32
SD14d	VADISCMP	Yes	11.1	0.29	1436	1.10	11.2	0.18	5991	0.68	0.61	2.60
		No	88.9	0.29	11520	1.10	88.8	0.18	14057	0.68	0.61	2.60
SD14j	WELFARE	Yes	2.1	0.13	266	1.11	2.0	0.12	451	1.54	1.39	1.17
		No	97.9	0.13	12690	1.11	98.0	0.12	19597	1.54	1.39	1.17

where $\text{var}(RDD)$ and $\text{var}(Combined)$ are, respectively, the variances of the RDD Sample alone and the combined sample. The efficiency values of more than 100 percent imply that the combined sample estimates are more efficient than the estimates based on the RDD Sample alone. We notice that efficiencies are greater than 100 percent for all variables in Table 6-2 and the efficiency values range from 104 percent to 316 percent. Thus, the combined sample with the corresponding composite weights should be used for all VA analyses.

7. QUALITY CONTROL

Through all phases of the 2001 National Survey of Veterans (NSV 2001), Westat paid strict attention to the accuracy of our work. Because we integrated quality control procedures into every aspect of the research process, we included descriptions of these procedures in our discussions of each project component in the previous chapters of this report. This chapter briefly presents the measures taken primarily to enhance quality. It also presents detailed information about two key quality control measures – the NSV 2001 pretest and managing the database.

Designing and Programming the Questionnaire

The NSV 2001 questionnaire went through several design drafts and a number of iterations for the computer-assisted telephone interviewing system (CATI) program specifications. To assure that design decisions accurately reflected study goals, we kept a detailed log of questionnaire revisions. Westat and VA project staff thoroughly reviewed each draft to assess its effectiveness in addressing NSV 2001 data requirements.

The decision to use CATI was guided by the need for quality control. As noted in Chapter 5 (Data Collection), using a CATI system to conduct telephone interviews facilitates proper administration of the questionnaire. However, this is the case only if we develop and correctly implement the questionnaire specifications. We took several steps to make certain that the specifications were accurate. Questionnaire designers and CATI programmers worked together to develop the specifications for programming the CATI instrument. By using this team approach, we ensured that the CATI instrument accurately reflected the NSV 2001 questionnaire. Once the instrument was programmed, the team put it through numerous rounds of testing. Testing covered every aspect of the CATI program, including screen displays, transitions from one section to the next, skip patterns, data storage, sample management, result codes, randomization routines, and delivery of cases to interviewers. As part of the testing process, we documented all potential problems and had at least two project staff members verify that each was resolved. Finally, we maintained a history of all changes.

Training and Supervising Interviewers

The NSV 2001 interviewers were central in our effort to collect accurate information, and to meet our data collection goal of 20,000 completed interviews. As a company, Westat spends a great deal of time honing our training techniques. Two important aspects of training are the high level of interviewer involvement and the consistent manner in which the training exercises are administered. Trainee involvement is critical because it allows trainers to observe and evaluate individual performance. Trainers can then decide early on who should be released from the program because of failure to meet Westat performance standards. Even more important, trainers can identify specific areas of difficulty, and tailor the program accordingly. Scripted exercises and role plays allow trainers to maintain a high level of consistency across multiple training sessions (there were eleven such sessions for the NSV 2001). Scripting the mock interviews in advance also ensured that interviewers had the opportunity to practice responding to various scenarios they were likely to encounter during administration of the NSV 2001, better equipping them to overcome initial respondent refusals.

During data collection, the primary method of ensuring that interviewers continued to accurately administer the NSV 2001 questionnaire was through our monitoring sessions. Project staff and telephone center supervisors monitored an average of 8 percent of all NSV 2001 interviews. We assessed interviewers' administration of the questionnaire, recording of responses, probing, handling of contacts, and professional demeanor. Monitors reported the results of each session on a monitoring form, then shared them with interviewers (who were unaware they were being monitored until after the session was over). Interviewers were apprised of their strengths as well as areas needing improvement. If needed, we provided additional training, or made adjustments to the interviewing process in general. In conjunction with the monitoring sessions, we used summary reports of the number of call attempts, successful contacts, refusals, and completions to assess interviewer performance. Based on these reports, we were able to identify interviewers with skills that could be matched to operational areas specific to the NSV 2001, such as proxy interviewing, tracing calls, refusal conversion, and language problem cases. Finding the best interviewers for these particular tasks ensured that they were carried out with the highest levels of accuracy and skill.

Sampling

We prepared several sample design approaches and analyzed these before the final design was chosen. Our detailed analyses assessed coverage of the veteran population and subgroups of interest, precision, cost, and operational demands. We developed detailed specifications for constructing the list and RDD frames to assure their accuracy and statistical validity. To minimize bias from time effects, we created sample release groups and made each one available for calling at separate intervals throughout the data collection period. As a means of tracking the List and RDD Samples separately, we developed a system of IDs that differentiated cases from each sample. Finally, we checked all steps in the sample file creation and other sample processing stages of data collection by designing and producing frequencies and cross-tabulations of appropriate variables.

NSV 2001 Pretest

To determine if, under live interviewing conditions, our data collection procedures would work as we had anticipated, we conducted a pretest of the NSV 2001. The objectives of the pretest were to:

- Test item wording, survey flow, skip patterns, ease of administration, respondent comprehension of the survey questions, and other factors related to the instrument itself;
- Check that all functions of the CATI system, including data storage, call scheduling and case management, were working properly;
- Establish the average length of time it took to administer the instrument;
- Evaluate our training procedures; and
- Solicit feedback from interviewers about all aspects of the interviewing process.

An additional benefit of the NSV 2001 pretest was that it afforded the VA an excellent opportunity to observe the methodologies and procedures planned for the main data collection phase.

The NSV 2001 pretest was conducted at one Telephone Research Center between February 12, 2001 and March 4, 2001. During that period, the List Sample contact procedures were still in development, so the pretest was administered using RDD Sample cases only. The entire pretest effort was

based on an initial RDD Sample of 60,000 cases, all of which were loaded into the CATI system. Of the 60,000 telephone numbers, 17,616 were eliminated from calling because they were either business or nonworking telephone numbers. Therefore, 42,384 telephone numbers remained available for dialing during the pretest.

Pretest interviewers called 21,609 telephone numbers. During the screening portion of the telephone interviews, interviewers completed 2,928 screening questionnaires and identified 901 potential veterans in 852 households as eligible to participate in the NSV 2001. This rate of 1.06 veterans per eligible household varied little throughout the entire data collection effort. At the conclusion of the pretest, interviewers had completed 519 extended interviews. Figure 7-1 is a flowchart that summarizes the magnitude of the pretest sample and workload, as well as the outcome of calls during the pretest. On March 16, 2001, Westat briefed the VA on these pretest call results.

The pretest revealed that the CATI instrument worked as we intended it to. Nor did we discover any problems with the CATI system's call scheduling, case management, or data storage functions. We did, however, modify our yield assumptions to reflect the actual completion rates. (See Chapter 8 for a more detailed discussion of completion rates.). We also learned from the pretest that the average length of the interview was slightly over the target of 30 minutes. Finally, we revised our training program to increase the focus on one area that presented difficulties for interviewers and respondents in the pretest – correctly identifying current household members.

Managing the Database

Database managers for the NSV 2001 had two key responsibilities: ensuring that the data collected were consistent, valid, and within the specified ranges, and ensuring that result codes[1] accurately reflected the status of cases. In the course of this work, database managers also ensured that the CATI instrument was operating correctly, that the responses were being recorded correctly in the database, and that interviewers were administering the questions and using the response categories correctly. Database managers at Westat employed several methods to carry out these responsibilities. We programmed an automated data check, manually reviewed question by question response frequency

[1] A result code is the disposition that reflects the case's entire call history, as well as the status of that case at the time the last contact was made.

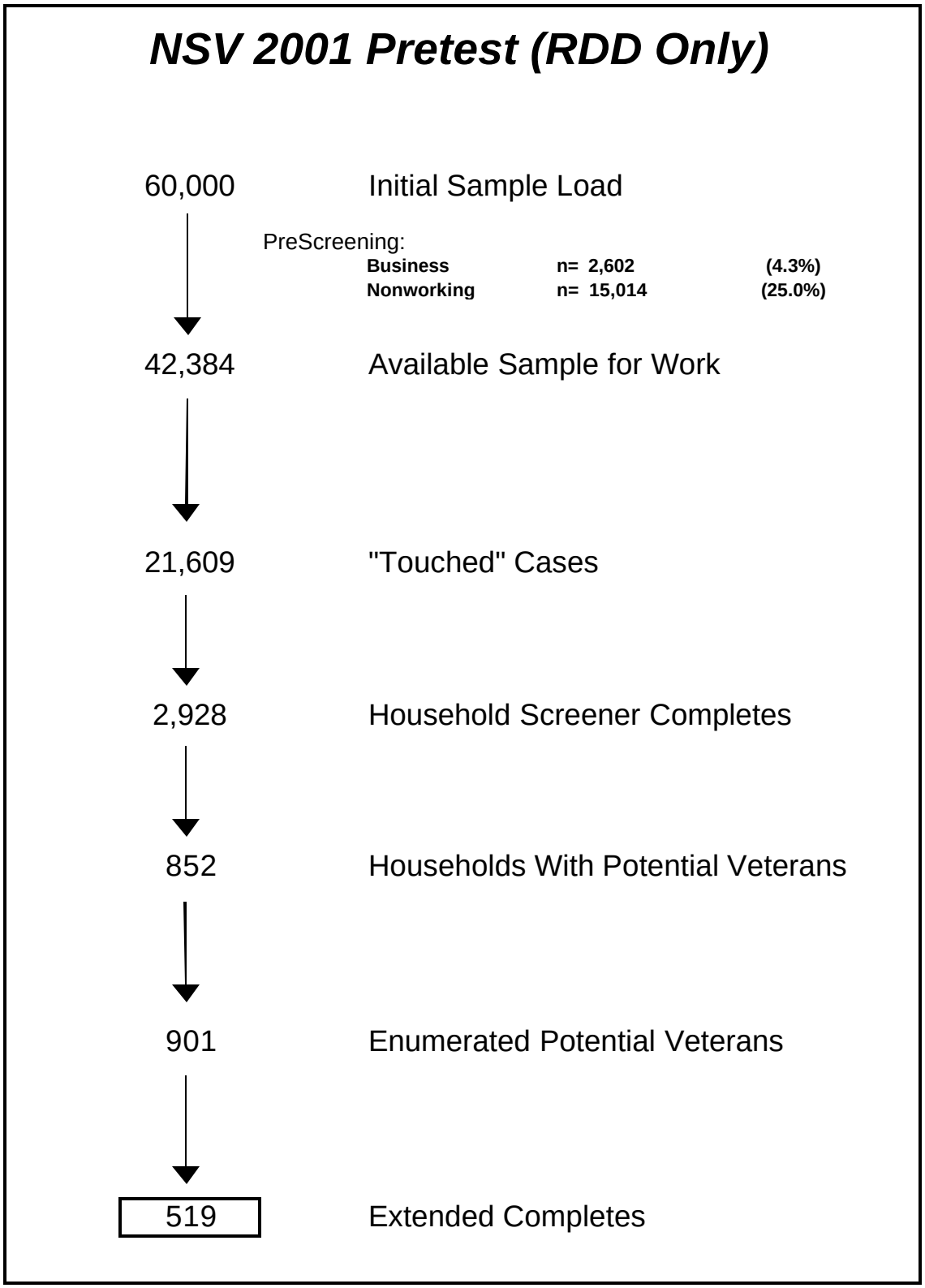


Figure 7-1. Flowchart of NSV 2001 pretest sample activities

reports, reviewed and recoded open-ended responses as necessary, and reviewed interviewer comments. This section describes each of these methods in turn, along with the additional steps we took to prepare the database for delivery after the close of data collection.

It is important to note that we did not impute missing data during this phase of the project. We did, however, impute a few variables that were required for the weighting effort. (See Chapter 6 for details about data weighting for the NSV 2001.)

Automated Data Checking. To reduce survey administration time, we programmed item MB18 to automatically determine and store the veterans' service eras based on their responses to questions about when they began and were released from active duty. The programming logic for this item was complicated, using dozens of "if-then" statements. Because it would have been difficult to identify errors by doing a manual review of this item, not to mention unreasonably time consuming, we created a SAS® program that evaluated the various sets of variables defining each respondent's entry and exit dates from the military, and used that information to derive a corresponding date range. This date range was then compared to the preestablished date range of each service era to determine whether the respondent was in the military at that time. Finally, the program compared its findings to the service era flags that were set automatically by the CATI system and noted any discrepancies. We ran this program every 3 to 4 weeks during data collection. On those rare occasions when errors were found, they were easily corrected because they were simply the result of one or two variables being missed during a manual update.

Review of Question by Question Response Frequency Reports. Several times throughout data collection we created a question by question response frequency report. Using this report, we checked that responses fell within the allowable range for each question, verified that the relationships of responses across individual questionnaires were logical, and ensured that the data accurately reflected the instrument's skip patterns. We produced this report after the first 100 cases were completed, at the end of the pretest, about halfway through data collection, and after data collection closed.

The set of questions that asked veterans about the dates they were on active duty comprised a complicated, and somewhat lengthy, series of items. Veteran responses to those questions then determined which categories would be displayed in survey item MB20 ("Now I'm going to read a list of places. Please tell me if you served in, sailed in, or flew missions over each of the following while on active duty."). To check that the proper categories were displayed, and that data were correctly recorded

at MB20, we had to rely on more than just the frequency report. We generated detailed cross-tabulation reports that allowed us to examine the logical relationships among these items. Any discrepancies we found in the expected relationships were corrected by updating the affected variables.

The frequency report allowed us to conduct range checks of every variable. The range checks compared the specified ranges in the CATI data dictionary with the responses entered during interviewing or derived by the CATI programs. The few out-of-range responses we found were verified as representing valid answers that happened to be outside the range we had anticipated.

In a few instances, our review of the frequency report revealed the need to update the CATI program. In the first instance, responses entered at the Gender verification screen as "F" for "female" rather than "2" (the usual code for "female") resulted in eight cases in which the respondents were not asked whether they served in branches reserved for women (survey items MB23f – MB23l). The variables that should have contained valid responses in those eight cases were set to the value "Not Ascertained."

We also updated survey item SD19 ("What is the market value of your primary residence?") to allow a value as low as zero, made minor wording changes to survey item SD13 ("During the year 2000, how many children depended on you for at least half of their support?") and survey item SD17 ("Excluding your primary residence, what is the total amount of assets your family owns?"), and added a category to survey item BB3 ("What do you want done with your ashes?"). At the request of the VA, we changed survey items SD10 and SCD10 ("I am going to read you a list of racial categories. Please select one or more to describe your race.") to ensure that it matched the approach to collecting race items used by the U.S. Bureau of the Census.

Recoding of "OTHER (SPECIFY)". Because all response data were written to the CATI database directly from the interviewer data entry function, and the instrument included no open-ended questions that required post-coding, the NSV 2001 data posed no significant coding requirements. However, 24 closed-ended questions gave veterans an opportunity to add an "OTHER (SPECIFY)" response when they felt that the precoded response categories did not adequately cover their situation. We reviewed the "OTHER (SPECIFY)" responses weekly for the first 6 weeks of the survey period. In subsequent weeks we reviewed them less frequently. When data collection was complete, we conducted a final review of all "OTHER (SPECIFY)" responses. We checked whether the "OTHER (SPECIFY)" responses duplicated a precoded response already given by the veteran, provided amplified or more specific information about a precoded response already given by the veteran, or duplicated a precoded

response that had not been given by the veteran. Only in the last instance did we reset the response category to reflect the additional information. Overall, very few of the "OTHER (SPECIFY)" responses required that we reset them to precoded response categories.

Review of Interviewer Comments. NSV 2001 interviewers had the opportunity to record their assessments of irregular cases in four places. Interviewers could type their reports directly into the CATI Comments, Non-Interview Report, or Message Files. Or, they could fill out a paper problem sheet. Sometimes, their remarks qualified or, in some cases altered, a veteran's responses in some way that did not fit the categorical values of the survey variables. Other times, these remarks had more general ramifications that affected the handling of the case or interpretation of the data.

Comments File. The Westat CATI system permits an interviewer to record a comment at any point in the interview. The comment is automatically linked to the specific case and item at which it was recorded. Interviewers used this function to record veteran comments that clarify or correct information entered into the questionnaire. On a daily basis, we reviewed Comments File output for potential changes or updates to the data. We permanently retained all comments in the file.

The majority of the comments were simply the veteran's elaboration on answers that had been properly recorded, and therefore required no further action. However, in some cases the comments clearly affected responses in ways that required data updates. For example, as veterans cycled through questions, a few realized they had not understood the original question and had replied incorrectly. When this occurred at a point in the interview where it was impractical to back up and change the original response, interviewers would make a comment to change the previous response. The database managers would then correct the original response and, where appropriate, update all related responses.

Non-Interview Report File (NIRF). For all refusal cases, language or hearing problems, or other special problem cases, interviewers recorded their assessment of the situation in the NIRF. While it is primarily interviewers who use the NIRF, it is an additional source of information for database managers and project management staff to use when deciding how to handle cases that require attention beyond that of the telephone supervisory staff. For the NSV 2001, we periodically checked the NIRF, but seldom had occasion to use it for this purpose.

Message File. At the end of every telephone contact, the Message File gives interviewers one more opportunity to record their observations about cases that require special attention. Interviewers

and supervisors used this file to communicate more detailed information about cases to other interviewers, database managers, and project management. Database managers used the file to interpret inconsistent responses and pose general questions about the cases. As with the NIRF, we checked this file regularly but rarely had to use it.

Paper Problem Sheets. Interviewers and telephone center staff used paper problem sheets to record data entry errors and request updates to specific cases. Problem sheets were reviewed daily and handled by database managers in the same way as the electronic Comments File. Interviewers also used problem sheets to note instances where they thought the CATI system had not functioned as they expected. These notes were checked daily and resolved by database managers and programming staff as needed.

Final Review of the Database. After the close of data collection, we conducted a final, comprehensive review of the entire database of completed interviews. We again ran the MB18 automated data check, the detailed cross-tabulations, and the question by question response frequency report described earlier.

In addition, we verified that every final result code had been assigned according to project definitions. (See Appendix H for a list of NSV 2001 final result codes.) We did this through a series of cross-tabulations that examined sample type and responses to specific survey questions. The majority of result codes were correct. We changed a few extended interview result codes to reflect that a proxy rather than the sampled veteran had completed the interview.

Weighting

Statistical staff prepared detailed specifications for developing the weighting systems for the List and RDD Samples. To validate the implementation of these specifications, the systems staff and the statistical staff independently checked the computer codes used to calculate and assign weights. We checked the calculation of nonresponse adjustment factors cell by cell. We also verified the calculation of nonresponse adjusted weights, in part by examining the variation in the nonresponse adjustment factors and the nonresponse adjusted weights. For the key veteran population subgroups, we designed, developed and checked cross-tabulations of appropriate variables during each step of the weighting process. Additionally, we compared the weighted total from the RDD Sample to the estimate from the VA

population model, Vetpop2000, to ensure consistency between the two. For construction of the composite weights for the combined List and RDD Samples, we prepared detailed specifications and checked their implementation by reviewing the computer code used to calculate and assign the composite weights. To ensure that the weight file created for delivery to the VA was without error, we produced several summary statistics from it and compared those statistics to the summary statistics produced from the original Westat file.

8. SURVEY FIELD RESULTS

This chapter presents the field results of the 2001 National Survey of Veterans (NSV 2001) data collection effort. We first examine the final sample yields and response rates of completed interviews against the sample design targets. Next, we detail the call results for each type of instrument and sample. We also present analyses of selected operating statistics such as location and cooperation rates.

8.1 Completed Interviews

The NSV 2001 had sample targets of 13,000 completed extended interviews from the household screening of RDD telephone numbers and 7,000 completed extended interviews from the List Sample, for a total of 20,000 completed extended interviews. Overall, we achieved 100.2 percent of that target. For the RDD sample, we achieved 99.7 percent of the target and for the List Sample, we achieved 101.3 percent of the target.

8.2 Completed Interviews by Sample Stratum

List Sample

The NSV 2001 sample design set interview completion targets by sample stratum for both the List and RDD Samples. The main objective of the List Sample stratification was to augment the sample with veterans in the mandatory health care enrollment priority groups (groups 1 through 6), and with female veterans. The List Sample target for the female veterans was 581 completed extended interviews, and we achieved 99.1 percent of that target (576 completed interviews with female veterans). The List Sample targets for African American and Hispanic veterans were 574 and 280, respectively. We completed 897 extended interviews with African American veterans, and 344 extended interviews with Hispanic veterans. Thus, we almost met the target for female veterans and exceeded the targets for African American and Hispanic veterans. We attribute the higher than expected number of completed extended interviews for these two groups to the fact that the list frame contained a higher proportion of these minority groups than exists in the veteran population, and the latter rate is what we had assumed for sample design purposes.

We also compared the target and achieved List Sample completed extended interviews by priority groups (Table 8-1). PRIOADJ3 represents the priority group as it appeared on the list frame.

Table 8-1. Target versus achieved List Sample completed extended interviews by priority group (PRIOADJ3)

PRIOADJ3	Target	Achieved	Percent of Target
1	1,239	1,410	113.8
2	1,200	1,354	112.8
3	1,636	1,758	107.5
4	931	549	59.0
5	1,231	1,179	95.8
6	763	842	110.4
TOTAL LIST	7,000	7,092	101.3

We exceeded the target for four out of the six mandatory priority groups. The two groups where we fell short were priority group 5, for which we achieved almost 96 percent of the target, and priority group 4, for which we achieved only 59 percent of the target. It turns out that we underestimated the proportion of priority group 4 veterans that would be ineligible for the survey because they were institutionalized or deceased. The proportion ineligible among the priority group 4 veterans was 30.9 percent, whereas less than 5 percent of veterans in priority groups 2, 3 and 6 were ineligible, and just over 7 percent of priority groups 1 and 5 veterans were ineligible (see Table 8-4).

The target List Sample counts by priority group were derived from the list frame variable, PRIOADJ3. Information on the List frame was for a particular point in time. It is possible that by the time we interviewed the veteran this information had changed, thus putting that veteran in a different priority group. Table 8-2 gives the cross-tabulation of the priority group as it appeared on the list frame (PRIOADJ3) and that determined from survey responses (Observed Priority). Based on the survey responses, the number of completed extended interviews for priority group 4 veterans was much smaller than expected based on the number of priority group 4 veterans on the list frame. In fact, many veterans recorded on the list frame as belonging to priority group 4 turned out to be priority group 5 veterans. As a result, only 81 of the List Sample eligible respondents who were priority group 4 veterans on the list frame were actually categorized as belonging to priority group 4 on the basis of their survey responses. At the same time, a large number of veterans recorded on the List frame as priority group 5 or priority group

6 turned out to belong to other priority groups. From priority group 5, 253 veterans were observed to belong to priority group 7. From priority group 6, 419 veterans gave survey responses that categorized them as belonging to priority groups 3, 5 or 7.

Table 8-2. List priority (PRIOADJ3) by observed priority

	Observed Priority							
PRIOADJ3	1	2	3	4	5	6	7*	ALL
1	1,308	28	14	1	16	16	27	1,410
2	85	1,105	54	4	36	16	54	1,354
3	23	65	1,475	1	61	34	99	1,758
4	13	6	10	94	345	8	73	549
5	7	4	15	4	839	51	259	1,179
6	14	23	72	1	194	395	143	842
TOTAL LIST	1,450	1,231	1,640	105	1,491	520	655	7,092

* 113 cases with unknown "Observed Priority" have been combined with priority 7.

We did not ask questions about catastrophically disabled veterans on the survey. These veterans fall into priority group 4. Pensioners receiving aid and attendance were classified into either priority group 4 or priority group 5. Priority group 6 veterans on the List sampling frame were those enrolled for VA health care who were coming or planning to come to the VA solely for treatment for disorders associated with exposure to a toxic substance, radiation, or for disorders associated with service in the Persian Gulf. Veterans who did not meet the criteria for priority groups 1 through 5 and indicated exposure (regardless of whether they were presently enrolled for this type of care) were classified into priority group 6. Priority group 6 also included compensated veterans with a zero percent rating who did not meet the criteria for priority groups 1 through 5.

RDD Sample

We made assumptions about the distribution of the veteran population across various subgroups, and used those assumptions to arrive at our sample design targets for each subgroup. Because of sampling variability, we expected the observed yields to differ somewhat from those targets, even if

our assumptions were correct. However, since the observed yields depended on the actual (not assumed) distributions of the veteran population across subgroups, the difference could be larger.

We set an RDD Sample target of 662 completed extended interviews with female veterans, and actually completed 699 interviews (105.6 percent of the target). The targets for African American and Hispanic veterans were 1,066 and 520 completed extended interviews, respectively. We completed 983 extended interviews with African American veterans (92.2 percent of the target), and 558 extended interviews with Hispanic veterans (107.3 percent of the target) .

Table 8-3 shows that, while we met the overall target for the RDD Sample, there was considerable variability among the individual priority groups. According to the veteran population distribution used for the NSV 2001 sample design (see Chapter 3), the two smallest priority groups were groups 4 and 6. However, the number of veterans in priority group 4 turned out to be only a fraction (17.4 percent) of what we projected from our assumed distribution. On the other hand, the number of veterans belonging to priority group 6 was 41 times what we expected. This could be partially due to the fact that the absolute numbers for the RDD targets for priority groups 4 and 6 were also very low, which led to large percentage differences. Also, for Priority 6 the definition for the target population was slightly different than what was used to count the achieved number. Data used to estimate the target population was only available for veterans using VA facilities solely for treatment of environmental exposures, whereas the observed population considered anyone stating they had been exposed to environmental hazards regardless of treatment. The RDD Sample completed extended interviews for priority group 5 also fell significantly short, at just over 70 percent of the target.

Table 8-3. Target versus achieved RDD Sample completed extended interviews by priority group

Observed Priority	Target	Achieved	Percent of Target
1	295	371	125.8
2	271	300	110.7
3	661	741	112.1
4	69	12	17.4
5	3,731	2,636	70.7
6	36	1,479	4,108.3
7*	7,937	7,417	93.4
TOTAL RDD	13,000	12,956	99.7

* 61 cases with unknown “Observed Priority” have been combined with priority 7.

8.3 List Sample Extended Interview Results and Response Rates

For the NSV 2001 List Sample, we attempted to complete extended interviews with a total of 13,129 individuals. With 7,092 of these, we were successful in our attempts. Of the remaining cases, we determined that 1,151 were out of scope, principally because they were deceased or institutionalized, and 427 were, for a variety of reasons, eligible nonrespondents. We could not determine the eligibility of 4,459 cases, mainly because the veterans could not be located.

As described in Chapter 6, we divided sample cases into four eligibility and response categories – eligible respondents, ineligible (out of scope), eligible nonrespondents, and eligibility unknown. Table 8-4 shows these response status categories for the six priority groups, as represented by the list frame variable PRIOADJ3. The proportion of eligible respondents was much lower for priority group 4 veterans as compared to the other priority groups. This was due to the large proportion of priority group 4 veterans that were ineligible (out of scope) for the survey. The proportion of eligible nonrespondent veterans was roughly the same across all priority groups except priority group 6, for which that proportion was slightly lower.

Table 8-4. Response status by priority group (List Sample)

PRIOADJ3	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
1	60.7	3.8	7.1	28.4
2	60.1	3.4	4.3	32.2
3	57.3	3.0	3.9	35.8
4	31.4	3.0	30.9	34.7
5	51.1	3.4	7.4	38.1
6	58.9	2.7	4.1	34.3
TOTAL LIST	54.0	3.2	8.8	34.0

Table 8-5 shows telephone interviewing results by age group (less than 50, 50 to 64, and over 64). The proportion of ineligible persons increased monotonically with age because the incidence of institutionalized and deceased persons increases with age. On the other hand, the proportion of eligibility unknown respondents decreased monotonically with age because it is more difficult to locate younger

Table 8-5. Response status by age group (List Sample)

Age Group	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
Less than 50	48.0	2.9	1.9	47.2
50-64	59.5	2.6	4.0	33.9
Over 64	53.7	3.9	16.7	25.7
TOTAL LIST	54.0	3.2	8.8	34.0

veterans. The proportion of eligible nonrespondents was slightly higher for elderly veterans (over 64 years) mainly because these persons were more likely to be too incapacitated to respond to the survey. For the same reason that younger veterans (less than 50 years) were more likely to fall into the eligibility unknown category, a lower proportion of them were eligible respondents.

Table 8-6 gives the distribution of response status for male and female veterans. The proportion of ineligible male veterans was almost twice that of female veterans, mainly because males are more likely to be institutionalized or deceased. On the other hand, the proportion of eligibility unknown respondents was higher for female veterans because we had less information with which to locate them. As a result, the proportion of eligible female veteran respondents was slightly lower than that of male veterans.

Table 8-6. Response status by gender (List Sample)

Gender	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
Male	54.1	3.3	9.1	33.5
Female	52.8	3.2	4.8	39.2
TOTAL LIST	54.0	3.2	8.8	34.0

Table 8-7 shows the List Sample veteran response status distributed across census regions. The proportion of eligibility unknown respondents in the Midwest region was slightly lower and the proportion of eligible respondents slightly higher than those in the other three regions. The proportion of ineligible persons was slightly lower in the West, although the proportion of eligible nonrespondents was almost the same in that region as in all others.

Table 8-7. Response status by census region (List Sample)

Census Region	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
Northeast	51.6	3.0	10.5	34.9
Midwest	56.8	3.6	9.7	29.9
South	54.1	3.2	8.6	34.1
West	53.0	3.2	6.8	37.0
TOTAL LIST	54.0	3.2	8.8	34.0

8.4 RDD Household Screening Results and Response Rates

As discussed in Chapter 6, the RDD Sample screening criteria was somewhat loose. Since we asked one household member to report military service for all other household members, we knew that some screener respondents would not have enough knowledge to provide definitive information for determining veteran status. Therefore, we asked detailed military service questions of all potential veterans (or their knowledgeable proxies) identified and selected for an extended interview through the screening process. The results of this approach are shown in Tables 8-8 and 8-9. A total of 305,500 telephone numbers were sampled for the RDD Sample. Of these, 300,000 were sampled from the 50 states and District of Columbia using a list-assisted random digit dialing method (national RDD Sample) and 5,500 were sampled from Puerto Rico using a naïve RDD sampling method (Puerto Rico RDD Sample).

Of the 300,000 telephone numbers sampled for the national sample, 205,949 were dialed. We did not call the remaining 94,051 numbers because we had identified them as nonworking or business numbers before data collection began. Table 8-8 shows the household level screening interview response status for the 205,949 list-assisted RDD Sample telephone numbers and the 5,500 Puerto Rico RDD Sample telephone numbers for which calls were attempted. As discussed in Chapter 6, there were no households with a response status of eligible nonrespondent because, by definition, a completed screening interview can be categorized as eligible or ineligible. Hence, we were able to assign an eligible or ineligible status to all completed screening interviews. If the household did not complete a screening

Table 8-8. Household screener interview results by sample type

Sample Type	Eligible Respondents	Ineligible	Eligibility Unknown
RDD National	18,810	116,212	70,927
RDD Puerto Rico	96	4,137	1,267
TOTAL RDD	18,906	120,349	72,194

interview, then we assigned the response status eligibility unknown. The RDD screener response rate was 67.6 percent.[1]

We identified 18,906 RDD Sample households (national and Puerto Rico) as containing potential veterans and 120,349 as ineligible. We could not determine eligibility for the remaining 72,194 numbers. Of the 120,349 ineligible telephone numbers, 54,304 were residential telephone numbers (i.e., telephones for households with no veterans in them), and the rest were either business or nonworking telephone numbers. Thus, a total of 73,210 telephone households were identified during RDD screening and 18,906 had at least one potential veteran.

Table 8-9 shows the comparative results of the household screening process, in terms of the yield of households with potential veterans. Of all households screened, 25.8 percent (18,906) had at least one potential veteran. Because of the deliberately relaxed criteria for identifying potential veterans at this stage of the screening, the proportion of households with a potential veteran found during our screening process was higher than the proportion determined by the extended interview (22.1 percent). The assumption we made for the purpose of the sample design was that one out of every four households would be a veteran household (see Chapter 3).

Table 8-9. Distribution of telephone households by number of potential veterans in the household

	Households with number of Veterans in the Household equal to				All Households
	0	1	2	3 or more	
Count	54,304	17,936	909	61	73,210
Percent	74.2	24.5	1.2	0.1	100.0

[1] RDD screener response rate = (eligible respondents + ineligible respondents)/total dialed telephone numbers.

Table 8-9 also shows that 17,936 of the 18,906 veteran households (94.9 percent) had one potential veteran, while 4.8 percent of the veteran households contained two potential veterans. Only 61 households (0.3 percent of the veteran households) had more than two potential veterans.

8.5 RDD Sample Extended Interview Results and Response Rates

From the 18,906 RDD Sample screened household with potential veterans, we identified 19,950 potential veterans. Nearly two-thirds of these (12,956 out of 19,950 or 64.9 percent) completed the extended interview. Only 3.1 percent were eligible nonrespondents and 11.5 percent were out of scope (ineligible) for the survey because they were not actually veterans. The proportion with eligibility unknown was 20.5 percent.

The RDD Sample extended interview response rate, at 76.4 percent, was better than that for the List Sample (62.8 percent).[2] In part this is because a relatively higher proportion of List Sample veterans could not be located, which also meant they could not be contacted. The overall RDD Sample (screener and extended interview) response rate was 51.6 percent.[3] Of the RDD Sample respondents, 64.9 percent were eligible veterans who completed the interview and 11.5 percent responded to the extended interview eligibility questions but were determined not to be veterans. Of the List Sample respondents, 54.0 percent were eligible veterans who completed the interview and 8.8 percent were determined not to be eligible. We could not determine eligibility for 20.5 percent of the screened RDD Sample cases or for 34.0 percent of the List Sample cases. The main reason for the higher proportion of List Sample cases with unknown eligibility was, again, our inability to locate them. This was not an issue for RDD Sample cases because contact was made during the household screening interview. There were no notable differences in the proportion of eligible nonrespondents between the RDD and List Samples (3.1 percent for the RDD Sample versus 3.2 percent for the List Sample). In the following sections, we compare the distributions of response status categories across age groups (Table 8-10), gender (Table 8-11) and census regions (Table 8-12).

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[2] Extended interview response rate = eligible respondents + ineligible respondents/total [List or RDD] Sample.

[3] Overall RDD Sample response rate = screener response rate * extended interview response rate.

Table 8-10. Distribution of response status by age groups (RDD Sample)

Age Group	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
Less than 50	59.1	2.9	17.0	21.0
50-64	63.6	2.6	12.3	21.5
Over 64	70.9	3.7	6.5	18.9
TOTAL RDD	64.9	3.1	11.5	20.5

Table 8-11. Distribution of response status by gender (RDD Sample)

Gender	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
Male	65.4	3.1	11.0	20.5
Female	58.1	2.8	19.6	19.5
TOTAL RDD	64.9	3.1	11.5	20.5

Table 8-12. Distribution of response status by census region (RDD Sample)

Census Region	Eligible Respondent	Eligible Nonrespondent	Ineligible	Eligibility Unknown
Northeast	64.7	3.5	11.8	20.0
Midwest	65.6	2.9	11.5	20.0
South	63.7	3.1	11.9	21.3
West	66.7	2.7	10.8	19.8
TOTAL RDD	64.9	3.1	11.5	20.5

Table 8-10 shows that the ineligibility rate decreased monotonically with age. That is, the proportion of potential veterans identified during the screening interview that were not actually veterans decreased with age. The proportion of elderly veterans (over 64) that did not respond to the extended interview was also higher than in the other two age groups.

The ineligibility rate was also higher for potential female veterans (Table 8-11). Household members tended to be more uncertain about identifying potential female veterans during the screening interview than they were about identifying potential male veterans. There was no significant difference in the distribution of response status across census regions (Table 8-12).

8.6 List Sample Location Rates

We located 73.6 percent of List Sample veterans. By definition, location rates for the response categories eligible respondent, ineligible and eligible nonrespondents were 100 percent. The location rate for veterans of unknown eligibility was 22.2 percent. Although we located these veterans, we assigned them to the eligibility unknown category because they did not provide the information necessary to determine their eligibility. Table 8-13 gives the location rate by three age groups (less than 50, 50 to 64, over 64). We found it more difficult to locate younger veterans than older ones, perhaps because younger people in general tend to be more mobile or less likely to have a telephone or address listing in their name.

Table 8-13. List Sample location rates by age group

Age Group	Location Rate (Percent)
Less than 50	58.6
50-64	72.5
Over 64	83.9
TOTAL LIST	73.6

The location rate was also higher for male veterans than for female veterans (74.3 percent for male veterans versus 66.1 percent for female veterans). We may have had difficulty locating female veterans because they are less likely to have a telephone or address listing in their own or maiden names.

Table 8-14 gives the List Sample location rates by census region. Our location rate was highest in the Midwest region and somewhat lower in the West.

Table 8-14. List Sample location rates by census region

Census Region	Location Rate (Percent)
Northeast	74.1
Midwest	77.4
South	73.6
West	69.7
TOTAL LIST	73.6

8.7 Cooperation Rates

Survey cooperation rates are one indicator of interviewers' ability to complete an interview after contact has been established with sampled individuals. They also demonstrate the effectiveness of interviewer training. The calculation for cooperation rates uses completed interviews and refusals only. Included with the completed interview cases are all ineligible (out-of-scope) cases (as determined by completion of the required screening questions). We calculated cooperation at two stages: at the initial attempt to complete an interview and after making all attempts to persuade those who initially refused to participate in the survey (refusal conversion). Table 8-15 shows the number of initial refusal cases, number of refusal conversion cases, and the refusal conversion rates by sample type. One-third of initial refusals at the RDD Sample screening interview were converted to completed interviews while more than 80 percent of initial refusals at the RDD and List Sample extended interview level were converted.

Table 8-15. Refusal conversion rates by sample type

Sample Type	Initial Refusals	Refusal Conversions	Refusal Conversion Rate
RDD Screener	54,781	18,072	33.0
RDD Extended	1,935	1,566	80.9
List Extended	983	807	82.1

Table 8-16 presents the initial cooperation rates, the conversion rates for those who initially refused, and the net cooperation rates after both stages for the RDD Sample screening interview, and RDD and List Sample extended interview. The percentages are based only on those cases for which a telephone interview was attempted.

Table 8-16. Cooperation rate by sample type

Sample Type	Initial Cooperation Rate	Refusal Conversion Rate	Final Cooperation Rate
RDD Screener	50.1	33.0	66.5
RDD Extended	86.5	80.9	96.4
List Extended	85.8	82.1	95.1

The RDD screening interview had an initial cooperation rate of 50.1 percent, a conversion rate of 33.0 percent and a net cooperation rate of 66.5 percent. Among individuals selected for the RDD extended interview, the initial cooperation rate was 86.5 percent, the conversion rate was 80.9 percent, and the net cooperation rate was 96.4 percent.

The List Sample veterans' initial cooperation rate, at 85.8 percent, was slightly lower than that of the RDD Sample. On the other hand, the List Sample extended interview refusal conversion rate of 82.1 percent was slightly higher than the RDD Sample rate. The List Sample net cooperation rate (95.1 percent) for the extended interview was slightly lower than the RDD Sample extended interview net cooperation rate (96.4 percent).

8.8 Questionnaire Administration Timing

Table 8-17 presents selected statistics about the amount of time it took veterans to complete the screening and extended interviews. The average and median administration times for the RDD screening interview were 4.1 and 3.8 minutes, respectively. The average administration time is higher than the median time because the distribution is skewed to the right. List Sample veterans took an average of 38.7 minutes to complete the extended interview, while the RDD Sample took 33.3 minutes. It is not surprising that List Sample veterans took longer, since they generally have more medical conditions and medical treatment experiences to report, and those sections of the interview were the most time-consuming to complete. Table 8-17 also shows that the median time for the List Sample extended interviews was 36.1 minutes as compared with 31.3 minutes for the RDD Sample extended interviews.

Table 8-17. Questionnaire administration time in minutes by sample type

Sample Type	Number Completed	Mean	Lower Quartile	Median	Upper Quartile	Maximum
RDD Screener	18,906	4.1	3.3	3.8	4.5	27.2
RDD Extended	12,956	33.3	26.6	31.3	37.6	136.5
List Extended	7,092	38.7	30.7	36.1	43.8	137.6

The upper and lower quartile values of interview administration time and the maximum value are also shown in Table 8-17 for the RDD screener, RDD and List Sample extended interviews. Seventy five percent of the RDD screener interviews were completed in less than four-and-half minutes. While 75 percent of the RDD extended interviews were completed in less than 38 minutes, the comparable figure for the List Sample extended interviews was almost three-quarters of an hour. Although a few extended interviews took over two hours, 95 percent of the extended interviews took under 52 minutes for the RDD Sample and just over an hour for the List Sample. Overall (both RDD and List Sample cases), 654 extended interviews took more than an hour. The NSV 2001 cooperation rates in themselves are testimony to the sampled veterans' support of the survey effort. The fact that 654 veterans were willing to devote over an hour of their time to the interview further substantiates that support.

8.9 Telephone Call Statistics

Table 8-18 presents dialing statistics for completed interviews. It shows, for each sample type, how many calls had to be made to complete an interview. Overall, just over 30 percent of the RDD screener cases were completed in one call and almost half of these cases were completed in two calls. More than 95 percent of the RDD screener cases were completed within 12 calls. The average number of calls per screened household was 3.9 calls.

Over 48 percent of the RDD extended interviews were completed in one call and just over 23 percent of the List Sample extended interviews were completed in one call. Almost 62 percent of extended interviews were completed within 2 calls for the RDD Sample, and just over 40 percent of List Sample extended interviews were completed within 2 calls. When the count rises to 3 calls, there was still a significant difference in the proportion of completed extended interviews by sample type, at 70 percent for the RDD Sample and 53 percent for the List Sample. After five calls, the completion rates for the RDD and List Sample cases were 80 percent and 71 percent, respectively. The average number of calls per completed extended interview was 3.6 for the RDD Sample and 4.9 for the List Sample. It took fewer calls to recontact the RDD Sample cases, for which contact had already been established at the screening interview stage, than the List Sample cases, where the extended interview was our first contact. For the combined RDD and List Samples, 91 percent of the extended interviews were completed within 10 calls, 94 percent within 12 calls, and 96 percent within 14 calls.

Table 8-18. Number of completed cases by number of calls for each sample type

Number of Call	Sample Type					
	RDD Screener		RDD Extended		List Extended	
	Number	Percent	Number	Percent	Number	Percent
1	5,771	30.5	6,243	48.2	1,654	23.3
2	3,609	19.1	1,734	13.4	1,201	16.9
3	2,594	13.7	1,041	8.0	884	12.5
4	1,727	9.1	751	5.8	731	10.3
5	1,264	6.7	592	4.6	529	7.5
6	870	4.6	471	3.6	353	5.0
7	641	3.4	359	2.8	301	4.2
8	523	2.8	291	2.2	250	3.5
9	379	2.0	255	2.0	214	3.0
10	303	1.6	176	1.4	141	2.0
11	244	1.3	171	1.3	149	2.1
12	190	1.0	140	1.1	127	1.8
13	154	0.8	131	1.0	109	1.5
14	116	0.6	124	1.0	79	1.1
15 or more	521	2.8	477	3.7	370	5.2
Total Completed	18,906	100.0	12,956	100.0	7,092	100.0

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