Chapter 25: National Household Education Surveys (NHES) Program

1. OVERVIEW

The National Household Education Surveys (NHES) Program conducts telephone surveys of the noninstitutionalized, civilian population of the United States. These surveys are designed to provide information on educational issues that are best addressed by contacting households rather than schools or other educational institutions. They offer policymakers, researchers, and educators a variety of statistics on the condition of education in the United States.

Purpose

To (1) provide reliable estimates of the U.S. population regarding specific educational topics, and (2) conduct repeated measurements of the same educational phenomena at different points in time.

Components

The NHES program for a given year typically consists of (1) a screener, which collects household composition and demographic data, and (2) two or three surveys, which are each extended interviews addressing specific education-related topics. However, in 1999, the interviews collected information on key indicators from the broad range of topics addressed in previous NHES survey cycles.

Adult Education and Lifelong Learning. Surveys on this topic were administrated in 2001, 1999, 1995, and 1991.

The Adult Education and Lifelong Learning Survey (AELL-NHES:2001) was administered in 2001. It collected data such as type of program, employer support, and credential sought were collected for participation in the following types of adult educational activities: English as a second language, adult basic education, credential programs, apprenticeships, work-related courses, and personal interest courses. Some information on informal learning activities at work was gathered as well.

In 1999, the Adult Education Survey (AE-NHES:1999) included questions on educational background and work experience, participation in adult education, including educational activities through distance learning, literacy activities, community involvement, adult demographic characteristics, and household characteristics. Eligible respondents were 16 years of age or older who were not currently enrolled in 12th grade or below and not institutionalized or on active duty in the U.S. Armed Forces.

AE-NHES:1995 included questions concerning respondents' participation in basic skills courses, English as a second language (ESL) courses, credential (degree or diploma) programs, apprenticeships, work-related courses, personal development/interest courses,

BIENNIAL SAMPLE SURVEY OF HOUSEHOLD MEMBERS

NHES addresses topical issues on a rotating basis:

- Adult education and lifelong learning

- Before- and after-school programs and activities

- Civic involvement

- Early childhood education and school readiness

- Household library use

- Parent/family involvement in education

- School safety and discipline

and interactive video or computer training on the job. Information on programs or courses included the subject matter, duration, cost, location and sponsorship, and employer support. Nonparticipants in selected types of adult education were asked about their interest in educational activities and barriers to participation. Extensive background, employment, and household information was collected for each adult. Eligible respondents included civilians aged 16 and older not currently enrolled in secondary school.

In AE-NHES:1991, eligible respondents were persons 16 years of age or older, identified as having participated in an adult education activity in the previous 12 months. The information collected on programs and up to four courses included the subject matter, duration, sponsorship, purpose, and cost. A smaller sample of nonparticipants in adult education also completed interviews about barriers to participation. Information on the household and the adult's background and current employment was also collected in this survey.

Before- and After-School Programs and Activities.
This survey topic was introduced in 2001. The Before- and After-School Programs and Activities Survey (ASPA-NHES:2001) addressed relative and nonrelative care during the out-of-school hours of school-age children, as well as participation in before- and/or after-school programs, activities, and self-care.

Civic Involvement.
Civic involvement surveys were administered in 1999 and 1996. The 1999 Youth Survey (Youth-NHES:1999) expanded on the 1996 Youth Civic Involvement Survey (YCI-NHES:1996). It included questions on school learning environment, family learning environment, plans for future education, participation in activities that promote or indicate personal responsibility, participation in community service or volunteer activities, exposure to information about politics and national issues, political attitudes and knowledge, skills related to civic participation, and type and purpose of community service. A subset of youth who reported participation in community service were asked additional questions about their service experiences. Eligible respondents were youth in the 6th through 12th grades.

Three Civic Involvement Surveys were conducted in 1996: the Parent and Family Involvement in Education/Civic Involvement Survey (PFI/CI-NHES:1996), YCI-NHES:1996, and the Adult Civic Involvement Survey (ACI-NHES:1996). They included questions on sources of political information, civic participation, and

knowledge and attitudes about government. YCI-NHES:1996 also provided an assessment of the opportunities that youth have to develop the personal responsibility and skills that would facilitate their taking an active role in civic life. Eligible respondents were (1) parents of students in grades 6 through 12 (including homeschooled students in those grades), (2) youth in grades 6 through 12, and (3) adults.

Early Childhood Education and School Readiness.
Early Childhood Education surveys were conducted in 2001, 1995, and 1991, and a School Readiness survey was conducted in 1993.

The Early Childhood Program Participation Survey (ECPP-NHES:2001) was administered in 2001. It gathered information on the nonparental care arrangements and educational programs of preschool children, comprising care by relatives, care by persons to whom they were not related, and participation in day care centers and preschool programs including Head Start.

ECPP-NHES:1995 included questions on children's participation in care or education provided by relatives, nonrelatives, Head Start programs, and center-based programs. It also collected information on early school experiences of school-age children, home literacy activities, health and disability status, and parent and family characteristics. Eligible respondents to this survey were parents of children between birth and 3rd grade. The interview was conducted with the parent most knowledgeable about the child's education or care.

The Early Childhood Education Survey (ECE-NHES:1991) included questions on participation in nonparental care/education, characteristics of programs and care arrangements, and early school experiences including delayed kindergarten entry and retention in grade. In addition to questions about care/education arrangements and school, parents were asked about activities children engaged in with parents and other family members inside and outside the home. Information on family, household, and child characteristics was also collected. Eligible respondents for this survey were the parents or guardians of the sampled 3- to 8-year-olds who were most knowledgeable about the children's education.

The School Readiness Survey (SR-NHES:1993) included questions on the developmental characteristics of preschoolers, school adjustment and teacher feedback to parents for kindergartners and primary school students, center-based program participation, early school experi-

ences, home activities with family members, and health status. Extensive family and child background characteristics—including parents' language and education, income, receipt of public assistance, and household composition—were collected to permit the identification of at-risk children. Eligible respondents to this survey were the parents or guardians of sampled children aged 3 through 7 or in 2nd grade or below who were most knowledgeable about the children's education.

Household Library Use. The Household and Library Use Survey (HHL-NHES:1996) was part of the 1996 NHES screener and consisted of a brief set of questions regarding public library use. Questions addressed the distance to the closest public library, household use of a public library in the past month and year, ways in which the public library was used, purposes for which the public library was used, and detailed household characteristics. Eligible respondents were those adults who completed the Screener interview.

Parent and Family Involvement in Education. Surveys on this topic were conducted in 1996 and 1999. In 1999, the Parent Survey (Parent-NHES:1999) had six sets of questions, appropriate for six subgroups of children: children age 2 and younger, children age 3 through 6 years and not yet in kindergarten, children in kindergarten through the 5th grade, youth in the 6th through 8th grades, youth in the 9th through 12th grades, and children age 5 through 12th grade who were receiving home schooling. The survey included questions on the following topics, although not all topics were covered for all populations: demographic characteristics, current school- or center-based program enrollment status, center-based program participation before school entry, home schooling, school characteristics, school readiness skills, participation in early childhood care and programs, training and support for families of preschoolers, parents' satisfaction with children's schools, children's academic performance and behavior, family involvement with children's schools and school practices to involve families, before- and after-school programs and nonparental care, parents' expectations about children's college plans and costs, family involvement in educational activities outside of school, child health and disability, parent/guardian characteristics, and household characteristics. The Parent Survey was administered to the parent or guardian most knowledgeable about the education of each sampled child from birth through 12th grade.

In 1996, the survey was combined with one on Civic Involvement, forming PFI/CI-NHES:1996. It included questions on the schools of the sampled children, communication with teachers or other school personnel, school practices to involve parents, children's homework and behavior, and learning activities with children outside of school with their families. Other information collected in this survey pertain to student experiences in school, children's personal and demographic characteristics, household characteristics, and children's health and disability statuses. Eligible respondents were the parents or guardians of children aged 3 through 20 and in 12th grade or below who were most knowledgeable about the child's education.

School Safety and Discipline. The School Safety and Discipline Survey (SS&D-NHES:1993) included questions on school learning environment, discipline policy, safety at school, victimization, availability and use of alcohol/drugs, and alcohol/drug education. Peer norms for behavior in school and substance use were also included in this survey. Extensive family and household background information and data about characteristics of the school attended by the child were collected. Eligible respondents were the parents or guardians of sampled children in grades 3 through 12 and youth in grades 6 through 12 who were most knowledgeable about the child's education.

Periodicity

Biennial as of 1999. Earlier surveys were conducted in 1991, 1993, 1995, and 1996.

2. USES OF DATA

NHES provides descriptive data on the educational activities of the U.S. population and offers policymakers, researchers, and educators a variety of statistics on the condition of education in the United States. Each NHES survey collects specific data based on a set of research questions that guide the development of the questionnaire. As described above, the main subject areas for the NHES programs are:

‣ Adult Education and Lifelong Learning

‣ Before- and After-School Programs and Activities

‣ Civic Involvement

‣ Early Childhood Education and School Readiness

‣ Household Library Use

‣ Parent and Family Involvement in Education

‣ School Safety and Discipline

Analysts should review the instrument for each survey to identify areas of particular interest to them.

3. KEY CONCEPTS

See the survey documentation for definitions specific to any one NHES survey.

Household Members. Individuals who think of the sampled household as their primary place of residence, including persons who usually stay in the household but are temporarily away on business or vacation, in a hospital, or living at school in a dormitory, fraternity, or sorority.

4. SURVEY DESIGN

Target Population
Noninstitutionalized, civilian members of households in the 50 states and the District of Columbia. Because the topical surveys change from one NHES to the next, the specific age/grade criteria for the target populations also change. In general, there are three educational populations of interest: (1) younger children from birth through 5th grade; (2) older children (i.e., youth) in the 6th through 12th grades; and (3) adults not enrolled in 12th grade or below. The respondent is usually the parent or guardian of the child who is most knowledgeable about the education or care of the sampled child, the sampled youth, or the sampled adult.

Sample Design
The NHES samples are selected using random-digit-dialing (RDD) methods. Telephone numbers are randomly sampled, and a screener is administered to sampled households. About 45,000 to 64,000 households are screened for each administration. Individuals within households who meet predetermined criteria are then sampled for more detailed or extended interviews.

Sampling households. Two general sampling approaches have been taken: list assisted and a modified Mitofsky-Waksberg method. The list-assisted method has been used since the 1995 administration.

In 2001, a two-phase list-assisted method was used. In the first phase of selection, telephone numbers were stratified according to the percent minority in the exchange. Exchanges with at least 20 percent Blacks or at least 20 percent Hispanics were classified as "high minority" and

all other exchanges were classified as "low minority." Telephone numbers in the high minority stratum were sampled at a rate of about 1 in 809, and telephone numbers in the low minority stratum were sampled at a rate of about 1 in 1,562. The first phase sample of telephone numbers was processed using the Genesys ID-Plus process to identify nonworking and business numbers. As part of this process, the telephone numbers were matched to white pages listings, and the matches were flagged. Thus, for each telephone number in the first phase sample, the listed status (i.e., whether or not it is listed in the white pages) is known. Within each minority stratum, the telephone numbers in the first phase sample were stratified according to white pages listed status (the overall number of telephone numbers selected in phase 1 was 206, 182). At the second phase, telephone numbers within each of the four strata defined by the combinations of minority concentration and listed status were subsampled at different rates: 0.714 for the high minority, listed stratum; 0.950 for the high minority, unlisted stratum; 0.727 for the low minority, listed stratum; and 0.942 for the low minority, unlisted stratum. The total number of telephone numbers selected in phase 2 was 179, 211.

A list-assisted method was used in the 1995, 1996, and 1999 administrations. This approach involves selecting a simple random sample of telephone numbers from all telephone numbers in 100-banks (i.e., sets of numbers with the same first 8 digits of the 10-digit telephone number) that have at least one telephone number listed in the white pages (called the listed stratum). Telephone numbers in 100-banks with no listed telephone numbers (called the zero-listed stratum) are not sampled. Because the list-assisted approach is an unclustered design, it results in estimates with lower variances than the clustered alternative methods. However, this method also incurs a small amount of coverage bias because households in the zero-listed stratum have no chance of being included in the sample. (See section 5, "Coverage error" for a discussion of coverage bias. See "Stratified Telephone Survey Designs," by R.J. Casady and J.M. Lepkowski, in *Survey Methodology 19*(1) (1993): 103–113, for further description of the list-assisted method.)

For the surveys fielded in 1996, the goal of making estimates at the state level for characteristics of household members and for household library use also determined the number of telephone numbers selected. A target of 500 screened households per state was set. A sample of 500 households is large enough that, if 30 percent of the households in a state have a given characteristic, differences of 6 percent can be detected. Due to nonresponse

at the screener level and lower residency rates than expected in some states, 500 screeners were not completed in some states. The lower number of responses limits the ability to make estimates for some subgroups within states. Analysts should examine the standard errors for subgroups of interest to evaluate the precision of within-state estimates.

The NHES surveys fielded in 1991 and 1993 used a modified version of the Mitofsky-Waksberg method of RDD, in which a fixed number of telephone numbers is sampled from 100-banks. (See "Avoiding Sequential Sampling with Random Digit Dialing" by J.M. Brick and J. Waksberg, *Survey Methodology 17*(1) (1991): 27–42 for further description of the modified Mitofsky-Waksberg method used in the NHES.)

Oversampling households for Blacks and Hispanics. One of the goals of the NHES program is to produce reliable estimates for subdomains defined by race and ethnicity. In a 64,000-household design in which every household has the same probability of being included, the number of completed interviews would not be large enough to produce reliable estimates of many characteristics of Black and Hispanic youth. Therefore, in each NHES administration, telephone numbers in areas with high concentrations of Blacks and Hispanics are oversampled. In 1993, areas with high percentages of Asians were also sampled at a higher rate; this was discontinued in later administrations because the new vendor for numbers on the list-assisted approach of sampling did not have this information available. NHES considered reintroducing an Asian oversampling strategy in 2001. However, it was determined that more precision in other racial/ethnic groups would have been lost than was warranted given the amount of extra precision gained for Asians.

A computer file containing census characteristics for telephone exchanges is used to stratify telephone exchanges into low- and high-minority concentration strata. Any telephone exchange not found on the file is assigned to the low-minority concentration stratum. High-minority concentration areas are defined as exchanges having at least 20 percent Black or 20 percent Hispanic persons living in the area (or 20 percent Asian/Pacific Islander persons for the 1993 NHES). The telephone exchanges in the two strata are identified, and a systematic sample is drawn in each stratum. The sampling fraction used in the high-minority concentration stratum is two times the fraction used in the low-minority concentration stratum.

Oversampling by the characteristics of the telephone exchange has two effects. First, the oversampling increases the sample sizes for minorities because they are more heavily concentrated in the exchanges that are oversampled. Therefore, the sampling errors for estimates of these groups are reduced due to the increased sample sizes. On the other hand, not all minorities are found in the oversampled exchanges. Thus, differential sampling rates are applied to persons depending on their exchanges. Using differential rates increases the sampling errors of the estimates, partially offsetting the benefit of the larger minority sample. However, the net result is an increase in precision of estimates for Black and Hispanic persons. The technical report *Effectiveness of Oversampling Blacks and Hispanics in the NHES Field Test* (NCES 92–104) indicates that oversampling is successful in reducing the variances for estimates of characteristics of Blacks and Hispanics by approximately 20 to 30 percent over a range of statistics examined. The decreases in precision for estimates of the groups that are not oversampled and for estimates of totals are modest, ranging from about 5 to 15 percent.

Approaches to household enumeration. The approach to screening households has also changed over the course of the NHES program. Changes include methods of enumerating members of households that are contacted and the amount of information collected in the screener about the household and its members. In 1991, a split-enumeration design was used; all households were screened for ECE-NHES:1991, and a subset of households was screened for AE-NHES:1991. In 1993, when SR-NHES:1993 and SS&D-NHES:1993 were fielded, households were enumerated only when there were any household members aged 20 or younger. The only information collected in both 1991 and 1993 was the first name, age, and sex of household members. In both 1995 and 1996, *all* screened households were fully enumerated. The 1995 administration included a test of an expanded screener that was used in 1996, but dropped from later NHES administrations. The 1996 screener collected educational and demographic information on household members and included a brief topical survey. The 1999 screener again collected first name, age, and sex of household members, but not all households were fully enumerated, so if the screener respondent said there were no children in the household and the household was not preselected to be eligible for an adult education interview, the screener information was not collected.

Sampling within households. The within-household sample designs for the NHES collections are determined

by the specific goals of the surveys administered and by the combination of surveys administered in a specific year. Brief summaries of the within-household sampling for the various NHES administrations are given below, by year.

2001 NHES surveys—AELL-NHES:2001, ASPA-NHES:2001, and ECPP-NHES:2001. A within-household sample scheme was developed to control the number of persons sampled for extended interviews in each household. The sample of telephone numbers was randomly divided into three groups. The first group (89,597 telephone numbers or approximately 50 percent of the sample) was designated for adult enumeration. The second group (44,985 telephone numbers or about 25 percent of the sample) was designated for adult enumeration only if there were no eligible children in the household. The third group (44,629 telephone numbers or about 25 percent of the sample) was designated for no adult enumeration. Once the enumeration of the appropriate household members was completed in the Screener, the sample of household members for the extended interviews was done by computer. The ECPP and ASPA interviews were conducted with parents/guardians of sampled children from birth through age 15 who were in 8th grade or below. In households with one or more preschoolers (children age 3 through 6 and not yet in kindergarten), one child in this age/grade range was sampled. In households with middle school students (6th through 8th grades), one child in this age/grade range was also sampled. The sampling of infants (newborn through age 2), elementary school children (kindergarten through grade 5), and adults was conducted using an algorithm designed to attain the sample rates required to meet the target sample sizes while minimizing the number of interviews per household. The within-household sample size was limited to three eligible children if no adults were to be selected or two eligible children and one eligible adult. No more than one child from any given domain (i.e., infants, preschoolers, elementary students, middle school students) was sampled in any given household. This sampling algorithm was designed to limit the amount of time required to conduct interviews with parents in households with a large number of eligible children.

1999 NHES surveys—AE-NHES:1999, Parent-NHES:1999, and Youth-NHES:1999. The overall screening sample was largely determined by the need to produce precise estimates of indicators for young children, particularly preschoolers. Since sample requirements were most stringent for preschoolers (children ages 3–6 not yet in kindergarten), it was decided to sample one preschooler in every household that had such children. Another goal was that no more than three persons per household be sampled, with a maximum of four extended interviews per household. To accomplish this, several flags were set prior to screening. The first specified whether adults in the household were to be enumerated, as well as the conditions under which an adult was to be sampled. This flag was set such that households without eligible children/youth were sampled for an Adult Education Survey at approximately twice the rate of households with eligible children/youth (about 26 percent vs. 13 percent). Additionally, this flag enabled one- and two-adult households with no adult education participants to be further subsampled at a fixed, prespecified rate (25 percent for one-adult households and 75 percent for two-adult households). The second flag designated whether an infant was to have been sampled, if the household had two other sampled children/youth. A third flag designated whether a younger child or an older child was to be sampled, if the household had children in both groups, only one was to be selected. In households in which an adult was to be sampled, each adult education participant was given a probability of selection 2.5 times as large as the probability of selection assigned to nonparticipants.

1996 NHES surveys—ACI-NHES:1996, HHL-NHES:1996, PFI/CI-NHES:1996, and YCI-NHES:1996. The number of interviews for which household members could be selected was limited by creating two separate samples—Parent/Youth and Adult. A sample of 161,446 telephone numbers was selected and randomly divided into two groups. The first group (153,374 telephone numbers or 95 percent of the sample) was allocated to the Parent/Youth sample. A screening interview was conducted in these households, and eligible children and youth were sampled, respectively, for PFI/CI-NHES:1996 or for both PFI/CI-NHES:1996 and YCI-NHES:1996. For PFI/CI-NHES:1996, if there were one or more children from age 3 through 5th grade (younger children), one child in this age range in the household was sampled for the survey. If the household included one or more children in 6th through 12th grades (older children), one child in this grade range was sampled from that household. If an older child was sampled as the subject of a PFI/CI-NHES:1996 interview, the child was asked to complete the YCI-NHES:1996. Because households may have had up to two Parent PFI/CI interviews (one for a younger child and one for an older child), the maximum number of interviews per sampled household was three. The other group (8,072 telephone numbers or 5 percent of the

sample) contained those telephone numbers allocated to the ACI-NHES:1996. For households in that group, a screening interview was conducted and the ACI-NHES:1996 was administered to one eligible adult.

1995 NHES surveys—AE-NHES:1995 and ECPP-NHES:1995. Interviews for ECPP-NHES:1995 were conducted with the parents or guardians who were most knowledgeable about the education of the sampled children aged 0 to 10 years who were in the 3rd grade or below. The within-household sample size was limited to two eligible children. Children in kindergarten were sampled at 1.5 times the rate for other children to improve the precision of single-year estimates for kindergartners. Any adult aged 16 years or older not currently enrolled in secondary school was eligible for sampling for AE-NHES:1996. Sampled adults who said they were on active duty in the U.S. Armed Forces were classified as ineligible for the interview.

1993 NHES surveys—SR-NHES:1993 and SS&D-NHES:1993. For the 1993 NHES surveys, children within households were subsampled. For SR-NHES:1993, interviews were conducted with the parents or guardians who were most knowledgeable about the education of children aged 3 through 7 and children aged 8 or 9 who had not completed 2nd grade. If there were one or two eligible children in a household, all the children were sampled. If there were more than two, two were randomly sampled from the household. Any child enrolled in grades 3 through 12 and below the age of 21 was eligible for sampling for the SS&D-NHES:1993 interview with the parent. Sampling was limited to one child in 3rd through 5th grades and no more than two children in any household. No more than one youth was subsampled per household for the youth interview. If a child was enrolled in the 6th through 12th grades but did not live with a parent or guardian, he or she was considered an emancipated youth. A special emancipated youth interview was conducted, including some questions usually asked only of parents.

1991 NHES surveys—AE-NHES:1991 and ECE-NHES:1991. All 3- to 8-year-olds in sampled households were included in ECE-NHES:1991, as were 9-year-olds who had not completed 2nd grade. All children 2 to 9 years old were sampled to ensure that nearly all children eligible for the extended interviews were identified, even if a rounding error was made in reporting the ages of the children. The respondent for the interview was the parent or guardian of the sampled child reported to be the most knowledgeable about the child's care and

education. Only a subset of households was screened for AE-NHES:1991. In the screened households, all adults identified as participating in adult education activities were sampled, half of the full-time degree-seeking students were sampled, and about 7 percent of the nonparticipants in adult education activities were sampled. After a few weeks of data collection, the number of sampled households screened for AE-NHES:1991 was reduced because the required number of interviews had been completed and therefore additional households did not need to be contacted; altogether, 18,463 households out of 60,300 completed screeners (31 percent) were screened for AE-NHES:1991. In addition, the sampling rate for nonparticipants was increased from 7 percent to 12 percent.

Data Collection and Processing

NHES program surveys are conducted using computer-assisted telephone interviewing (CATI). Westat has been the contractor on all surveys to date.

Reference dates. Most data items refer to the time of data collection or since September of the current school year. Other items are asked retrospectively for different time frames. For example, in the 1996 NHES surveys, respondents were asked about family involvement with children outside of school (e.g., reading with a child, visiting a library) in the past week and past month; civic involvement (reading about or watching national news) in the past week; political activities in the past 12 months; voting activities in the past 5 years; working for pay during the past week and the past 12 months; job-hunting in the past 4 weeks; child's communications with the noncustodial parent in a typical month and in the past year; youth's discussion of future educational plans with parents in the past month; books read in the past 6 months; home visits by professionals during the past 12 months; and religious service participation in the past year. The adult education information is based on participation in the past 12 months.

Data collection. Data collection for the NHES surveys takes place over a 3- to 4-month period beginning in January of each survey year. The data are collected using CATI. The NHES screeners are completed with an adult household member in households selected using random-digit-dialing techniques. (See Sample Design above.)

Over a period of about 3 weeks just prior to data collection, more than 300 interviewers undergo intensive training in general interviewing techniques, use of the CATI system, and the conduct of the survey.

Most responses were coded at the time of the interview. Most of the items in the surveys are close ended, meaning respondents are given a short list of response options. Interviews simply record the response as a one- or two-digit code which is entered directly into the data file as the interview progresses. However, most close-ended items do have "other, specify" options that allow interviews to record responses that do not fit the precoded response categories. The interviewer types in these "open-ended" responses as one or more sentences. "Other, specify" responses to close-ended items are rare. There are also a small number of items in some of the surveys that are designed to be open ended. That is, precoded categories do not exist and interviewers type in verbatim responses from respondents. Once the survey is completed, data preparation staff and survey managers review these open-ended responses to determine how they can be coded into a limited set of response categories. Coding of additional items was required for the Adult Education surveys administered in 1991 and 1995. These items included adult education courses, major fields of study for college and vocational programs, industry, and occupation. A double-blind coding procedure was used, in which two coders independently assigned a code to the response. When the coding was discrepant, an "adjudication" coder reviewed the case and assigned an appropriate final code.

Editing. Intensive data editing is a feature of both the data collection and file preparation phases of the NHES collections. Range checks for allowable values and logic checks for consistency between items are included in the online CATI interview so that many unlikely values or inconsistent responses can be resolved while the interviewer is speaking with the respondent.

Postinterview editing is conducted throughout data collection and after data collection is completed. In addition to range and logic edits, the postinterview editing process includes checks for the structural integrity of the hierarchical CATI database and integrity edits for complex skip patterns. It also includes a review of comments provided by interviewers and problem sheets completed by interviewers. Following the resolution of any problems, data preparation staff review frequency distributions and crosstabulations of the data sets in order to identify any remaining skip pattern inconsistencies. Editing is repeated following completion of imputation.

Estimation Methods

The NHES surveys use weighting to adjust for the fact that the sampling is not simple random sampling. It is also used to adjust for potential undercoverage bias and potential unit nonresponse bias. Imputation is performed to compensate for item nonresponse.

Weighting. The objective of the NHES surveys is to make inferences about the entire noninstitutionalized, U.S. civilian population and about subgroups of interest. Although only telephone households are sampled, the estimates are adjusted to totals of persons living in both telephone and nontelephone households derived from the Current Population Survey (CPS) to achieve this goal. (CPS is an annual household survey conducted by the U.S. Bureau of the Census for the U.S. Bureau of Labor Statistics.) As a result, any undercoverage in CPS for special populations, such as the homeless, are also reflected in NHES estimates. The potential for bias due to sampling only telephone households has been examined for virtually all the population groups sampled in NHES. Generally, the bias in the estimates due to excluding nontelephone households is small. (See section 5, "Coverage error," for further discussion.) The weighting procedures across NHES surveys are very similar. Weighting consists of two stages: household-level weighting and person-level weighting, as described below.

Household weights. The household weights take into account all factors that might have resulted in adjustments due to the telephone numbers being sampled at different rates. Two factors common to all NHES years are (1) the adjustment to account for the differential sampling rates by minority concentration and (2) the adjustment to account for households that have more than one telephone number and, hence, chance of being sampled. In 1991 and 1993, an adjustment was also made to account for the modified Mitofsky-Waksberg method of random-digit-dialing sampling. (See earlier section on Sample Design.) The 1996 NHES included an adjustment for the oversampling in 18 states to bring the minimum expected number of completed screeners up to 500.

Response rates declined after 1993, requiring analyses to be conducted to study if nonresponse bias was becoming a significant problem in the data. For example, for the 1995 administrations, the variables correlated with the response rate were then used to define nonresponse adjustment classes, and the inverse of the response rate in a class was used as the weight adjustment. The nonresponse adjustment classes were based on the following variables: metropolitan status, census division, percent renters, percent owner occupied, percent college graduates, median income, percent Black, percent Hispanic, and

percent aged 0 to 17. The nonresponse-adjusted weights were then used in all other stages of weighting in the 1995 NHES surveys in an effort to reduce nonresponse bias. Similar analyses were conducted in later years.

In 1996, for the first time, household weights were needed to produce estimates from the Household and Library data file. The 1996 household weights were adjusted to known national totals of households using raking to ensure that the estimates conformed to national totals, to reduce the bias associated with sampling only telephone households, and to adjust for nonresponse bias. As a result of raking, the household estimates match control totals of the number of households within each state and the District of Columbia defined by the following dimensions: the presence of children under age 18, owned or rented home, urban or rural location, and race of the oldest household member (not taking into account Hispanic ethnicity). The control totals were the March 1995 CPS total household estimate distributed according to the 1990 decennial Census of Population and household distributions. In some states, all four of the dimensions were defined and used for raking; in other states, only three dimensions were used because the expected number of completed screeners fell below 50 in a given cell when four dimensions were considered. NHES also raked household weights to national totals for the 1999 and 2001 surveys. The approach used was similar to that described above, but the control totals were from the March 1998 CPS and March 2000 CPS, respectively.

Person weights. The second stage of weighting forms person weights for each extended interview. For example, in 1991, person weights were developed for each sampled child in ECE-NHES:1991 even if the same parent responded to both interviews. Thus, the estimates from this survey correspond to the population of children eligible for the survey. Person weights are prepared for each extended interview in every NHES program survey.

The first step in creating the person weights is to assign the appropriate household weight to the sampled person as a base weight that can then be modified to account for other stages of sampling, nonresponse, and adjustments to known population totals from CPS. The first modification to the base weight accounts for the within-household sampling of persons. The appropriate sampling factor for each survey and survey year is multiplied by the base weight to produce an initial person weight for each completed interview.

The second step is to adjust the person weights to account for nonresponse. This step was not necessary for

ECE-NHES:1991 and ECPP-NHES:1995 because the completion rates were so high for all the sampled children. In most of the surveys, some characteristics about the sampled person are collected in the screener and used to form nonresponse adjustment classes. These characteristics include age, sex, grade in school, adult education participation status, and education level. The nonresponse adjustment for respondents within a class is the inverse of the within-class completion rate for the extended interviews. If the completion rates for a survey do not vary much from one class to the next, the nonresponse adjustments are relatively constant over the classes. Adjustments can vary substantially if there is greater variation in completion rates. There was a person-level nonresponse adjustment in ECE-NHES:2001.

The third and final step in developing person weights is the raking of the nonresponse-adjusted person weights so that the survey estimates match appropriate control totals for the population being surveyed. This raking procedure is identical to the one described above for the final household weights in the NHES surveys administered in 1996, the only difference being the substitution of person weights and counts for household weights and counts. The source of the control totals for the number of persons is the CPS for the month corresponding most closely to the NHES survey for which comparable estimates can be produced. For the NHES surveys administered in 1996, however, the weights were raked to national totals obtained by multiplying the percentage distributions from the October 1994 CPS (which contained additional variables) by the estimates of the number of children from the March 1995 CPS (the most current population data). Although the variables used to form the control totals vary from year to year and survey to survey, they are very similar since the main purpose of the raking is to reduce the bias in the estimates arising from the failure to sample nontelephone households. Typically, the control totals involve some combination of the following variables: home owned or rented, race/ethnicity, household income, Census region (Northeast, South, Midwest, West), urban or rural location, and age or grade. The final person weights on the public release data files are the raked person weights. The same October CPS/March CPS approach was used in all other collection years as well.

Imputation. Item response rates for most data items collected in NHES surveys are very high. Nevertheless, virtually all items with missing data (including "don't know" and "refused" responses) are imputed in NHES surveys. In the two NHES surveys administered in 1991, only variables that were used for the development of weights

or derived variables were fully imputed. Text responses (for example, in Youth-NHES:1999, type of service activity, or, in AE-NHES:1999, name of company) were not imputed in any year. Occasionally, "don't know" and "refused" responses are of analytic interest so are not imputed. For example, in the Youth-NHES:1999 survey, "don't know" and "refused to answer" responses to the knowledge about government items were not imputed.

Imputations are done in the NHES program for three reasons. First, complete responses are needed for the variables used in developing the sampling weights. Second, users compute estimates employing a variety of methods, and complete responses should aid their analysis. Third, imputation may reduce bias due to item nonresponse, by obtaining imputed values from donors that are similar to the recipients. The procedures for imputing missing data are discussed below.

A standard (random within class) hot-deck procedure has been used to impute missing responses in every NHES collection. In this approach, the entire file is sorted into cells defined by characteristics of the respondents. The variables used in the sorting are general descriptors of the interview and also include any variables involved in the skip pattern for the items. All of the observations are sorted into cells defined by the responses to the sort variables, and then divided into two classes within the cell depending on whether or not the item being imputed is missing. For an observation with a missing value, a value from a randomly selected donor (observation in the same cell but with the item completed) is used to replace the missing value. After the imputation is completed, edit programs are run to ensure that the imputed responses do not violate edit rules.

For some items, the missing values are imputed manually rather than using the hot-deck procedure. This happens most often when the variable is collected only once for the household or involves complex relationships. Manual imputation is also used if a small number of edit failures are found after the hot-deck imputations are completed. In the 1999 NHES surveys, manual imputation was done to (1) impute certain person-level characteristics from the screener; (2) impute whether a child is homeschooled, if the child attends regular school for some classes, and the number of hours the child attends regular school; (3) correct for a small number of inconsistent imputed values; (4) impute for a few cases when no donors with matching sort variable values could be found.

After values have been imputed for all observations with missing values, the distribution of the item prior to imputation (i.e., the respondent's distribution) is compared to the post-imputation distribution of the imputed values alone and of the imputed values together with the observed values. This comparison is an important step in assessing the potential impact of item nonresponse bias and ensuring that the imputation procedure reduces this bias, particularly for items with relatively low response rates (less than 90 percent).

For each data item for which any values are imputed, an imputation flag variable is created so that users can identify imputed values. Users can employ the imputation flag to delete the imputed values, use alternative imputation procedures, or account for the imputation in computation of the reliability of the estimates produced from the data set.

Recent Changes

A two-phase sample design was used in the NHES surveys administered in 2001, and the NHES program adopted a new procedure for replication variance estimation for two-phase samples.

Future Plans

According to the current plan, three surveys will be included in each NHES collection. In 2001, and at subsequent 4-year intervals, the surveys will be Early Childhood Program Participation, Before- and After-School Programs and Activities, and Adult Education and Lifelong Learning. In alternate collections (2003 and subsequent 4-year intervals), the surveys will be School Readiness, Parent and Family Involvement in Education, and Adult Education for Work-Related Reasons. However, in 2003, School Readiness will not be fielded due to budgetary constraints.

5. DATA QUALITY AND COMPARABILITY

In addition to the data quality activities inherent in the NHES design and survey procedures, activities specifically designed to assess the quality of data are undertaken for each collection. Reinterviews and analysis of telephone coverage bias are two activities conducted during every survey administration. Other data quality activities address specific concerns related to a topical survey. Issues of data quality and comparability are discussed below.

Sampling Error

The two major methods of producing approximate standard errors for complex samples are replication methods and Taylor Series approximations. Special software is available for both methods, and the NHES data support either type of analysis. (Further information on the use of replication and Taylor Series methods is provided in *A Guide to Using Data from the National Household Education Survey (NHES)*, NCES 97–561.)

Since the 2001 NHES surveys used a two-phase sample design, a new procedure for replication variance estimation was also used. The replicate base weights under two-phase sampling are calculated using a two-step procedure. First, the initial replicate base weights of the first-phase units are calculated using the standard jackknife procedure. In the second step, the final replicate base weights for the second-phase sample are computed by redistributing the initial replicate weights of first-phase units not selected in the second phase to the initial replicate weights of the second-phase units within the same second-phase stratum. That is, for unit i, the replicate weight for the jth replicate is

$$w_{2i}^j = \begin{cases} w_{1i}^j \dfrac{\sum\limits_{k \in S_{1h}} w_{1k}^j}{\sum\limits_{k \in S_{2h}} w_{1k}^j}, & i \in S_{2h} \\[2em] 0, & i \notin S_{2h} \end{cases}$$

where

h denotes the second phase stratum,

S_{1h} denotes the first phase sample in stratum h,

S_{2h} denotes the second phase sample in stratum h, and

w_{1i}^j denotes the initial replicate j base weight for unit i.

Note that the sum of the final replicate base weights of the second-phase units is the same as the sum of the initial replicate base weights of the first-phase units within the same second-phase stratum. The procedure involves only the calculation of the telephone number-level replicate base weights. All full-sample weighting and all subsequent adjustments to the replicate weights are done using the same methodology used for a single-phase sample.

The *replication method* used in the NHES surveys for single-phase samples involves splitting the entire sample into a set of groups, or replicates, based on the actual sample design of the survey. The survey estimates can then be estimated for each of the replicates by creating replicate weights that mimic the actual sample design and estimation procedures used in the full sample. The variation in the estimates computed from the replicate weights can then be used to estimate the sampling errors of the estimates from the full sample. The procedures used to develop the full weights are used to produce each replicate weight. Replicate weights have been included in all of the NHES data files to make this application relatively simple. Various software packages such as WesVar, SUDAAN, etc. can properly apply replicate weights.

Nonsampling Error

Sample estimates also are subject to bias from nonsampling errors. It is more difficult to measure the magnitude of these errors. They can arise for a variety of reasons: nonresponse; undercoverage; differences in the respondent's interpretation of the meaning of questions; memory effects; misrecording of responses; incorrect editing, coding, and data entry; time effects; or errors in data processing.

Coverage error. Every household survey is subject to some undercoverage bias—the result of some members of the target population being either deliberately or inadvertently missed in the survey. Telephone surveys like those in the NHES program are subject to an additional source of bias because not all households in the United States have telephones: approximately 6 percent of adults aged 16 years or older (and not enrolled in elementary or secondary school) and about 7 percent of children age 20 or younger and in grade 12 or below live in households without telephones. Even more problematic is the fact that the percentage of households without telephones varies from one subgroup of the population to another. If all telephone households are included in the survey and respond to the required interviews, the difference between the estimate from the survey and the actual population value (which includes the responses of persons living in nontelephone households) is the bias due to incomplete coverage. Since NHES surveys are based on a sample, the bias is defined as the expected or average value of this difference over all possible samples.

Special analyses of the bias associated with telephone coverage and its potential impact on estimates from the NHES surveys are conducted for each cycle of the

survey. Data from CPS are used to evaluate the differences between estimates for telephone households and estimates for the entire population. (CPS is an annual household survey conducted by the U.S. Bureau of the Census for the U.S. Bureau of Labor Statistics.) The results of these analyses show that, for most estimates, the bias due to sampling only telephone households is small. However, for subgroups with characteristics highly correlated with not having a telephone (e.g., the poor, high school dropouts), coverage bias may be large. Raking adjustments do often reduce such coverage bias, though no adjustments have been found to adequately reduce the amount of bias across all measures that might be affected by coverage issues. (See, for example, *Undercoverage Bias in Estimates of Characteristics of Households and Adults in the 1996 National Household Education Survey,* NCES 97–39.)

Additional undercoverage results when some telephone households are excluded from the sampling frame. This was a disadvantage of the list-assisted method of random-digit-dialing sampling used in earlier administrations of NHES surveys. (See section 4, Sample Design.) Households in the zero-listed stratum had no chance of being included in the sample. Empirical findings that address questions of coverage bias show that the percentage of telephone numbers in the zero-listed stratum that are residential is very small (about 1.4 percent) and that about 3 to 4 percent of all telephone households are in the zero-listed stratum. The findings also show that the bias resulting from excluding the zero-listed stratum is generally small. (See "Bias in List-assisted Telephone Samples," by J. M. Brick, J. Waksberg, D. Kulp, and A. Starer, in *Public Opinion Quarterly 59*(2) (1995): 218–235.)

Nonresponse error. Nonresponse in NHES surveys is handled in ways designed to minimize the impact on data quality—through weighting adjustments for unit nonresponse and through imputation for item nonresponse.

Unit nonresponse. Household members are identified for extended interviews in a two-stage process. First, screener interviews are conducted to enumerate and sample households for the extended interviews. The failure to complete the first-stage screener means that it is not possible to enumerate and interview members of the household. The completion rate for the first stage is the percentage of screeners completed by households. The completion rate for the second stage is the percentage of sampled and eligible persons with completed interviews. The survey response rate is the product of the first- and second-stage

completion rates (*screener completion rate* x *interview completion rate = survey response rate*, see table 11, on the next page). All of the rates are weighted by the inverse of the probability of selecting the units.

Item nonresponse. For most of the items collected in the NHES surveys, the item response rate is high. The median item response rate for items with any missing values for the surveys administered in 1995, 1996, and 1999 ranged from 98.4 to 99.5, except for HHL-NHES:1996, where the median response rates for imputed items was 95.0 for household-level characteristics and 99.5 for person-level characteristics. For SR-NHES:1993, three items had response rates of less than 95 percent; for SS&D-NHES:1993, there were two such items. None of the ECE-NHES:1991 items had response rates of less than 94 percent, while most of the AE-NHES:1991 items had response rates of more than 99 percent; however, there was one item from the 1991 screen which had a response rate of 92 percent.

Measurement error. In order to assess item reliability and inform future NHES surveys, most administrations also include a subsample of respondents for a reinterview. Reinterviews were conducted for ECE-NHES:1991, both SR-NHES:1993 and SS&D-NHES:1993, AE-NHES:1995, and both Parent-NHES:1996 and Youth-NHES:1996.

In a reinterview, the respondent is asked to respond to the same items on different occasions. In order to limit the response burden of the reinterview program, only selected items are included in the reinterview. The item selection criteria focus on the inclusion of key survey statistics (e.g., frequency of reading to children), items that are expected to have a potential for measurement error based on cognitive laboratory or field test findings, and items required to control the question skip patterns for the reinterview. The results of the reinterviews are used to modify subsequent NHES surveys and to give some guidance to users about the reliability of responses for specific items in the data files. (See *Use of Cognitive Laboratories and Recorded Interviews in the National Household Education Survey*, NCES 96–332.) However, the reinterview procedure does not account for all measurement errors in the interviewing process, such as systematic errors that would be made in both the original interview and the reinterview.

The major emphasis of the 1991, 1993, and 1995 reinterview studies was to measure response variability. Overall, the results were positive. For example, within the AE-NHES:1995 reinterview study, only three items

Table 11. Weighted response rates for selected NHES surveys

Questionnaire	Screener/1st stage	Interview/2nd stage	Overall
ECE-NHES:1991	81.0	94.5	76.5
AE-NHES:1991	81.0	84.7	68.6
SR-NHES:1993	82.1	89.6	73.6
SS&D-NHES:1993 – Parents, 3rd–5th	82.1	89.4	73.4
SS&D-NHES:1993 – Parents, 6th–12th	82.1	89.6	73.6
SS&D-NHES:1993 – Students, 6th–12th	82.1	83.0	68.1
ECPP-NHES:1995	73.3	90.4	66.3
AE-NHES:1995	73.3	80.0	58.6
PFI/CI-NHES:1996	69.9	89.4	62.5
YCI-NHES:1996	69.9	76.4	53.4
ACI-NHES:1996	69.9	84.1	58.9
Parent-NHES:1999	74.1	90.0	66.7
Youth-NHES:1999	74.1	78.1	57.9
AE-NHES:1999	74.1	84.1	62.3
AELL-NHES:2001	69.2	77.2	53.4
ECPP-NHES:2001	69.2	86.6	59.9
ASPA-NHES:2001	69.2	86.4	59.7

SOURCE: Brick and Broene, *Unit and Item Response, Weighting, and Imputation Procedures in the 1995 National Household Education Survey (NHES:95)* (NCES Working Paper 97–06). Brick, Collins, Celebuski, Nolin, Squadere, Ha, Wernimont, West, Chandler, Hausken, and Owings, *National Household Education Survey Adult and Course Data Files User's Manual* (NCES 92–019). Brick, Collins, Celebuski, Nolin, Squadere, Ha, Wernimont, West, Chandler, Hausken, and Owings, *National Household Education Survey Preprimary and Primary Data Files User's Manual* (NCES 92–057). Brick, Tubbs, Collins, and Nolin, *Unit and Item Response, Weighting, and Imputation Procedures in the 1993 National Household Education Survey (NHES:93)* (NCES Working Paper 97–05). Collins, Montaquila, Nolin, Kim, Kleiner, and Waits, *National Household Education Surveys of 2001 Data File User's Manual, Volume I* (forthcoming). Montaquila and Brick, *Unit and Item Response Rates, Weighting, and Imputation Procedures in the 1996 National Household Education Survey* (NCES Working Paper 97–40). Nolin, Montaquila, Nicchitta, Kim, Kleiner, Lennon, Chapman, Creighton, and Bielick, *NHES:1999 Methodology Report* (NCES 2000–078).

in one subject area had high response variability. The reinterview responses were consistent for most items; only minor modifications were suggested. (See *Measurement Error Studies at the National Center for Education Statistics*, NCES 97–464.)

Data Comparability

The NHES data can be compared with estimates from several other large-scale data collections, as described below.

Comparisons of methodology with other household surveys. For analysts wanting to compare the NHES surveys with another household survey, the Survey of Income and Program Participation (SIPP)—a longitudinal household survey conducted by the U.S. Bureau of the Census—provides an appropriate comparison. The first wave of data collection in SIPP is always done by personal visit to the household. Subsequent data collection is conducted primarily by telephone but may also be done in person. The response rates for SIPP are much higher

than those that could be expected using a random-digit-dialing screening sample, as in the NHES program. With personal interviews, there are more opportunities to obtain participation (including activities such as speaking with neighbors), and it is easier to demonstrate the importance of the sampled person's cooperation. It should be noted that, while the difference in response rates is largely the result of the different modes of sampling and data collection, the Census Bureau's response rates are generally higher than those achieved by other collection organizations.

Comparisons of topical data. Specific data from NHES surveys can be compared with data from several other surveys, as described below.

Early childhood education. Over the years, several NHES surveys have collected similar information in early childhood education: ECPP-NHES:2001, ECPP-NHES:1995, ECE-NHES:1991, and SR-NHES:1993. These data can be compared with data from three other surveys. The *Current Population Survey (CPS)—October Education*

Supplement (conducted by the U.S. Bureau of the Census) collects information on nursery school enrollment. (See chapter 26.) CPS estimates of participation in early childhood programs and estimates of retention in early grades can be compared with NHES estimates. In addition, the 1990 CPS—October Education Supplement replicated several NHES items on home activities in which parents engage with their children. NHES data can also be compared with the *National Health Interview Survey Child Health Supplement of 1988* (conducted by the National Center for Health Statistics), which collected information on participation in child care and early childhood education programs and extensive information on the health status of children. Finally, *SIPP* (described above) periodically includes a supplement that collects information on the child care and early childhood program participation of children of mothers who are employed or enrolled in school or job training.

Before- and after-school programs and activities. ASPA-NHES:2001 covered some topics addressed in previous years by other NHES surveys. Parent-NHES:1999 and PFI/CI-NHES:1996 both collected information on school contacts with households about children. Parent-NHES:1999 also collected information on type of care and basic statistics on after-school program participation. Basic enrollment totals and demographic characteristics, as well as public and private school enrollment, can be compared with *CPS* estimates.

Adult education. Both NHES surveys (AELL-NHES:2001, AE-NHES:1999, AE-NHES:1995, and AE-NHES:1991) and *CPS* provide estimates of adult education participation. (See chapter 26.) CPS collected information on adult education participation every 3 years from 1969 through 1984. The 1992 CPS also included a brief set of questions on adult education that replicated items used to estimate the Adult Education participation rate in AE-NHES:1991.

School safety and discipline. Estimates from SS&D-NHES:1993 can be compared with three other surveys. *Monitoring the Future* (conducted by the National Institute on Drug Abuse) gathers information annually on the prevalence and incidence of the illicit drug use of 12th graders. In addition, it contains questions designed to describe and explain changes in many important values, behaviors, and lifestyle orientations of American youth. The *School Crime Supplements* of the 1989 and 1995 *National Crime Victimization Surveys* (conducted by the U.S. Department of Justice, Bureau of Justice Statistics) provide detailed information on personal crimes of vio-

lence and theft that were committed inside a school building or on school property. Finally, the NCES *National Education Longitudinal Study of 1988 (NELS:88)* provides data on educational issues such as school environment issues, school discipline issues, victimization at school, and drug and alcohol education. (See chapter 6.)

Parent involvement in education. Estimates from PFI/CI-NHES:1996 can be compared with data from *NELS:88*. (See chapter 6.) Data analysts may wish to examine NELS:88 data in conjunction with the PFI estimates on school contacts to parents (by parent report) and frequency of parents helping the child with his or her homework.

Civic involvement and other characteristics. Estimates from the NHES Adult and Youth Civic Involvement surveys can be compared with seven other surveys. The *1995 CPS—October Education Supplement* included sets of items measuring the percentage distribution of the adult population, age and sex of the adult population, household income distributions, and race/ethnicity by highest level of education. (See chapter 26.) The *1992 National Adult Literacy Survey* collected data on adults' activities in daily life that require English literacy skills. (See chapter 23.) Areas common to the *1994 General Social Survey* and ACI-NHES:1996 include organizational membership, various political or civic activities, and attitudes about freedom of speech. The *National Election Study* collects data on voting, public opinion, and political participation and knowledge during election years. Several items addressing political knowledge in ACI-NHES:1996 were drawn from the National Election Study and can be used for direct comparisons. The *Citizens' Political and Social Participation Survey* measures the extent and variety of voluntary social and political activity among Americans and the causes of that engagement. *The Washington Post/ Kaiser Family Foundation/Harvard University Survey Project* provides information on public knowledge, perceptions, and attitudes about the role of American government. Finally, the *National Survey of High School Seniors* elicits detailed information on political and relevant nonpolitical matters so that parent-child similarities and differences can be assessed.

6. CONTACT INFORMATION

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Chapter 26: Current Population Survey (CPS)—October and September Supplements

1. OVERVIEW

The Current Population Survey (CPS) is a monthly survey of about 50,000 households conducted by the Bureau of the Census, part of the U.S. Department of Commerce, for the Bureau of Labor Statistics (BLS), U.S. Department of Labor. The "Basic CPS" collects data about the employment, unemployment, and other characteristics of the civilian noninstitutional population in the United States; it excludes military personnel and their families living on post, inmates of institutions, and homes for the aged. Since the mid-1960s, NCES has sponsored the October Supplement to the CPS to capture information on school enrollment status and related topics for household members 3 years old and older, thus providing current estimates of school enrollment, as well as of the social and economic characteristics of students. Beginning in September 2001 NCES, in conjunction with several other federal agencies, began cosponsoring an annual survey about household and individual use of computers and the Internet. Prior to this point, computer and Internet items had been occasionally added to various CPS monthly supplements, including the October supplements.

Purpose
The October Supplement is designed to collect information on the school enrollment of household members in any type of public, parochial, or other private school in the regular school system. Such schools include nursery schools, kindergartens, elementary schools, high schools, colleges, universities, and professional schools. The September Supplement is designed to collect information on the availability and use of computers and the Internet at school, home, and work.

Components
The October and September Supplements are components of CPS. The information collected is described below. An adult member of each household provides information for all members of the household.

October Supplement. The October Supplement collects information on school enrollment status and educational attainment of household members 3 years old and over, including highest grade completed, level and grade of current enrollment, attendance status, number and type of courses, degree or certificate objective, and type of organization offering instruction for each member of the household. A dozen core questions on the interview instrument for the October Supplement have remained unchanged since 1967. Since 1987, additional questions have been included on business, vocational, technical, secretarial, trade, and correspondence courses; on the grade the student

TWO ANNUAL SUPPLEMENTS TO THE CPS

CPS Supplements collects data on household members 3 years old and over:
‣ School enrollment status

‣ Availability and use of computers and the Internet at school, home, and work

was attending last year; on the calendar year that the student received his/her most recent degree; on whether or not the student completed high school by means of an equivalency test (such as the GED); and on whether or not children aged 3 to 5 are enrolled in any kind of nursery school, kindergarten, or elementary school. From time to time, additional items address such topics as private school tuition, adult education, vocational education, computer usage, and student mobility.

September Supplement. The September Supplement collects information on computer and Internet use, including whether there is a personal computer, laptop, or WebTV in the household; the number of computers or laptops; whether the newest is owned or leased, and by whom; when the newest computer was obtained; whether computers are used by students in school; and if computers are used by students for school assignments. The questions on Internet include use of Internet from the home; whether household members connect to the Internet via a computer or WebTV; the main reason for stopping Internet service if they have done so; how the Internet connection is paid for and how much is paid; which Internet service provider is used; whether long distance charges are paid to connect to the Internet service provider; how household members use the Internet including whether the Internet is used for school assignments; whether household members use the Internet outside the home including where they use it; and how concerned household members are that personal information provided to an Internet service provider may not be kept confidential.

Basic CPS. The Basic CPS collects monthly data on household membership, household characteristics, demographic characteristics, and labor force participation of the civilian noninstitutional population 16 years of age and over. The Basic CPS is collected each month from a probability sample of approximately 50,000 occupied households.

Periodicity
The October and September Supplements to the CPS are annual supplements. The Basic CPS is conducted monthly.

2. USES OF DATA

The October Supplement provides important education data to policymakers and researchers on school enrollment and educational attainment. Data from the October Supplement, together with data from the Basic CPS and the March Supplement, provide the basis for descriptive and analytic reports that portray the social and economic characteristics of students in relation to the specifics of their school enrollment. From these sources it is possible to derive retention, completion, and graduation rates, as well as high school dropout rates. Some of the October Supplements also provide policy-relevant data on private school tuition, adult education, vocational education, early childhood education, and student mobility.

The data provided by the September Supplement allows policymakers and researchers to analyze computer access and Internet use by various demographic and geographic segments of the population. Policymakers will use statistics from this supplement to come up with programs and policies that would make computer technology and the Internet as accessible as possible for as many Americans as possible.

3. KEY CONCEPTS

Some of the key concepts in the CPS October Supplement are defined below. For additional terms relevant to the October Supplement, as well as to the Basic CPS, refer to *School Enrollment—Social and Economic Characteristics of Students* (U.S. Department of Commerce, Bureau of the Census, Current Population Reports P20–413, by Robert Kominski. Washington, DC: 1987). The definition of the Internet given to respondents is also provided below.

Household. All persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room, is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters, that is, when the occupants do not live and eat with any other persons in the structure and there is direct access from the outside or through a common hall.

School Enrollment. Anyone who has been enrolled at any time during the current term or school year in any type of public, parochial, or other private school in the regular school system. Such schools include nursery schools, kindergartens, elementary schools, high schools, colleges, universities, and professional schools. Attendance may be either full-time or part-time, during the day or night. Regular schooling is that which may advance a person toward an elementary or high school diploma, or

a college, university, or professional school degree. Enrollment is excluded if in schools that are not in the regular school system or that do not advance students to regular school degrees (e.g., enrollment in trade schools, business colleges, and schools for the mentally handicapped).

Level of School. Nursery school, kindergarten, elementary school (first to eighth grades), high school (9th to 12th grades), and college or professional school. The last group includes graduate students in colleges or universities. Persons enrolled in elementary, middle school, intermediate school, or junior high school through the eighth grade are classified as in elementary school. All persons enrolled in 9th through 12th grade are classified as in high school.

Nursery School. A group or class that is organized to provide educational experiences for children during the year or years preceding kindergarten. This includes Head Start programs or similar programs sponsored by local agencies to provide preschool education to young children.

Public or Private School. A public school is defined as any educational institution operated by publicly elected or appointed school officials and supported by public funds. Private schools include educational institutions established and operated by religious bodies, as well as those that are under other private control. In cases where enrollment is in a school or college that is both publicly and privately controlled or supported, enrollment is counted according to whether it is primarily public or private.

Modal Grade. For descriptive and analytic purposes, enrolled persons are classified according to their relative progress in school; that is, whether the grade or year in which they were enrolled was below, at, or above the modal (or typical) grade for persons of their age at the time of the survey. The modal grade is the year of school in which the largest proportion of students of a given age is enrolled.

Vocational School Enrollment. Vocational school enrollment includes enrollment in business, vocational, technical, secretarial, trade, and correspondence courses not counted as regular school enrollment and not for recreation or adult education classes.

Educational Attainment. Highest level of school a person has completed or highest degree a person has received.

Internet. The Internet is an electronic network that connects more than 300 million users across the world. These users are linked to the Internet by computer or various telecommunication devices, and use it to communicate through e-mail, to obtain information, to purchase products, etc.

4. SURVEY DESIGN

Target Population

All household members aged 3 years and older in the civilian noninstitutional population of the 50 states and the District of Columbia. Excludes military personnel and their families living on post, inmates of institutions, and homes for the aged.

Sample Design

The Basic CPS is based upon a probability sample of about 50,000 housing units. Each month, interviewers contact the sampled units to obtain basic demographic information on all persons residing at the address and detailed labor force information on all persons aged 15 or over. To improve the reliability of estimates of month-to-month and year-to-year change, eight panels are used to rotate the sample each month. A sample unit is interviewed for 4 consecutive months, and then, after an 8-month rest period, for the same 4 months a year later. Every month, a new panel of addresses, or one-eighth of the total sample, is introduced. Thus, in a particular month, one panel is being interviewed for the first time, one panel for the second, ..., and one panel for the eighth and final time.

The first stage sample selection is carried out in three major steps: definition of the PSUs; stratification of the PSUs within each state; and selection of the sample PSUs in each state. The CPS national design as of January 1996 contains 754 stratification PSUs. Using a Maximum Overlap procedure, one PSU is selected per stratum with probability proportional to its 1990 population. This procedure uses mathematical programming techniques to maximize the probability of selecting PSUs that are already in sample while maintaining the correct overall probabilities of selection.

The second stage of the CPS sample design is the selection of sample housing units within PSUs. These ultimate sampling unit (USU) clusters consist of a geographically compact cluster of approximately four addresses, corresponding to four housing units at the time of the census.

Each month, about 59,000 housing units are assigned for data collection, of which about 50,000 are occupied and thus eligible for interview. The remainder are units found to be destroyed, vacant, converted to nonresidential use, containing persons whose usual place of residence is elsewhere, or ineligible for other reasons. Of the 50,000 housing units, about 6.5 percent are not interviewed in a given month due to temporary absence (vacation, etc.), other failures to make contact after repeated attempts, inability of persons contacted to respond, unavailability for other reasons, and refusals to cooperate (about half of the noninterviews). In 1999, information was obtained each month on about 94,000 persons 16 years of age or older and on approximately 29,000 persons under the age of 16.

Data Collection and Processing

The U.S. Bureau of the Census is the collection agent for the CPS and its supplements. Additional details on data collection and processing are provided in *The Current Population Survey: Design and Methodology* (Technical Paper 63).

Reference dates. The reference period for the October Supplement is the current school year, which is assumed to be in progress in the interview month of October. The reference period for the labor force questions on the underlying Basic CPS is the week that contains the 12th of the month. The reference period for the September Supplement is the current year.

Data collection. Each month, Bureau of the Census field representatives attempt to collect data from the sample units during the week containing the 19th of the month. For the first month-in-sample interview, the interviewer visits the sample address to determine if the sample unit exists, if it is occupied, and if some responsible adult will provide the necessary information. If someone at the sample unit agrees to the interview, the interviewer uses a laptop computer to administer the interview. In most cases, the interviewer conducts subsequent interviews by telephone (use of telephone interviewing must be approved by the respondent) and does not actually visit the sample unit again until the fifth month-in-sample interview, the first interview after the 8-month resting period. Fifth-month households are more likely than any other household to be a replacement household; that is, a household in which all the previous month's residents have moved out and been replaced by an entirely different group of residents. However, any person can change his/her household status during the time in sample: a person

who leaves the household is deleted from the roster; a person who moves into the household is added to the roster.

Most month-in-sample 2 through 4 and 6 through 8 interviews are conducted by telephone (e.g., 87 percent in December 1996). Interviewers continue to visit households without telephones, with poor English-language skills, or which decline a telephone interview.

The interview begins with questions about the housing unit and the people who consider this address their usual residence. Basic demographic information is collected for each household member. Labor force information is collected for each civilian 15 years of age or older, although the data for 15-year-olds are not used in official BLS estimates. After the labor force information has been collected for all eligible household members, supplemental questions particular to that month's interview may be asked of specific family members or the entire household.

Editing. Completed interviews are electronically transmitted to a central processor where the responses are edited for consistency and various codes are added. The edits effectively blank out all entries in inappropriate questions and ensure that all appropriate questions have valid entries.

Estimation Procedures

Weighting is used in the CPS to adjust for sampling and unit nonresponse, and imputation is used to adjust for item nonresponse.

Weighting. For the Basic CPS, the estimation procedure involves weighting the data from each sample person by the inverse of the probability of the person's housing unit being in the sample. With some exceptions, sample persons within the same state have the same probability of selection. The CPS uses raking ratio estimation to derive the weights used to tabulate total U.S. and state estimates. The goal is to control the survey estimates of the population in specific subgroups to independently derived estimates of the civilian noninstitutional population in the 50 states and the District of Columbia. In addition, household and family weights provide a basis for household-level estimates and estimates for married couples living in the same household.

For all CPS data files, a final weight is prepared and used to compute the monthly labor force status estimates. The final weight, which is the product of several adjustments,

including a nonresponse adjustment, is used to produce estimates for the various characteristics covered in the full monthly CPS. This weight is constructed from the basic weight for each person, which represents the probability of selection for the survey. For supplements, such as the October Supplement, separate data processing is required, not only to edit responses for consistency and impute for missing values, but also to incorporate special weighting procedures to account for the fact that the supplement is targeting a special universe, such as school-age children, in contrast to the working-age labor force emphasis of the Basic CPS. However, there is no supplement weight associated with the October 1998 School Enrollment Supplement.

Starting with the data collected in the October 1994 CPS, independent estimates are based on civilian noninstitutional population controls for age, race, and sex established by the 1990 decennial census and adjusted for an undercount of about 1.6 percent. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the size of the Armed Forces.

Imputation. When a response is not obtained for a particular data item, or an inconsistency in reported items is detected, an imputed response is entered in the field. Note that edits are run in a deliberate sequence: demographic variables are edited first because several of those variables are used to allocate missing values in the other modules, and the labor force module is edited next since labor force status and related items are used to impute missing values for industry and occupation codes and so forth.

CPS edits use three imputation methods: relational imputation, longitudinal edits, and hot-deck imputation. Relational imputation infers the missing value from other characteristics on the person's record or within the household. Longitudinal edits are used primarily in the labor force edits. If a question is blank and the record is in the overlap sample, the edit looks at the previous month's data to determine whether the person had responded then for that item. If so, the previous month's entry is assigned; otherwise, the item is assigned a value using the appropriate hot deck. The hot-deck method assigns a value from a record with similar characteristics. Hot decks are always defined by age, race, and sex. Other characteristics used in hot decks vary depending on the nature of the question being referenced. The imputation procedure is performed one item at a time. In a typical month, the imputation rate for demographic items is less than 1 percent. The rates for labor force items are slightly over 1 percent. Over all earnings items, the imputation rate is near 10 percent, with some items having much higher and others much lower nonresponse rates. In October 1998, the imputation rate for the basic school enrollment items ranged from 4–7 percent per item.

Future Plans

The October Supplement will always include the traditional enrollment questions; questions on other topics will be added as occasion warrants. For example, the October Supplement for 1997 included questions on computer use, and the October Supplement for 1999 included questions on English language proficiency, disabilities, and grade retention. The 2000 and 2001 October Supplements included only the enrollment questions. Plans for additional questions in future years have yet to be determined. The September Supplement will continue to include questions about computer and Internet access and use for the foreseeable future with some topical flexibility to account for the rapidly changing computer and telecommunications environment.

5. DATA QUALITY AND COMPARABILITY

Sampling Error

Although the estimation methods used in the CPS do not produce unbiased estimates, biases for most estimates are believed to be small enough so that these confidence interval statements are approximately true. Standard error estimates computed using generalized variance functions are provided in *Employment and Earnings* and other BLS publications. Using replicate variance techniques, standard error estimates are generated. As computed, these standard error estimates reflect contributions not only from sampling error but also from some types of nonsampling error, particularly response variability. Because replicate variance techniques are somewhat cumbersome, simplified formulas called generalized variance functions (GVFs) have been developed for various types of labor force characteristics. The GVF can be used to approximate an estimate's standard error, but this only indicates the general magnitude of its standard error rather than a precise value.

Nonsampling Error

Although the full extent of nonsampling error in the CPS is unknown, special studies have been conducted to

quantify some of the possible sources. The effect of nonsampling error should be small on estimates of relative change, such as month-to-month change. Estimates of monthly levels would be more severely affected by nonsampling error.

Coverage error. Undercoverage in the CPS results from missed housing units and missed persons within sample households. The CPS covers about 92 percent of the decennial census population (adjusted for the undercount). It is known that the CPS undercoverage varies with age, sex, race, and Hispanic origin. Generally, undercoverage is larger for men than for women and larger for Blacks, Hispanics, and other races than for Whites. Ratio adjustment to independent age/sex/race/origin population controls, as described previously, partially corrects for the biases due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics than interviewed persons in the same age/sex/race/origin group.

The independent population estimates used in the estimation procedure may be a source of error although, on balance, their use substantially improves the statistical reliability of many of the figures. Errors may arise in the independent population estimates because of underenumeration of certain population groups or errors in age reporting in the 1990 census (which serves as the base for the estimates) or similar problems in the components of population change (mortality, immigration, etc.) since that date.

Nonresponse error.
Unit nonresponse. Unit nonresponse may have a number of components. A respondent may refuse to participate in the survey, may not be capable of completing the interview, or may not be available to the interviewer during the specified survey period. If the entire household does not participate, this situation is referred to as a "Type A noninterview." There is also another type of (partial) unit nonresponse, namely that one or more individual persons within the household refuses to be interviewed. This is not a major problem in the CPS since any responsible adult may be able to report information for other persons as a proxy reporter. There are other variations on unit nonresponse; detailed consideration of these may be found in The Current Population Survey: Design and Methodology (Technical Papers 40 and 63). For the October 2000 basic CPS, the nonresponse rate was 6.8 percent and for the school enrollment supplement the nonresponse rate was an additional 3.1 percent for a total supplement nonresponse rate of 9.7 percent.

Item nonresponse. Although an imputation procedure is implemented for item nonresponse in the CPS, there is no way of assuring that the errors of item imputation will balance out and that any potential bias has been avoided.

Measurement error. The main sources of nonsampling variability in the responses to the October Supplement are those inherent in the survey instrument. The question of current enrollment may not be answered accurately for various reasons. Some respondents may not know current grade information for every student in the household, a problem especially prevalent for households with members in college or in nursery school. Confusion over college credits or hours taken by a student may make it difficult to determine the year in which the student is enrolled. Problems may occur with the definition of nursery school (a group or class organized to provide educational experiences for children), where respondents' interpretations of "educational experiences" vary.

6. CONTACT INFORMATION

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