

National Household Education Surveys Program (NHES)

Website: <http://nces.ed.gov/nhes/>

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1. OVERVIEW

The National Household Education Surveys Program (NHES) 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 education 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 education-related 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 (an interview that collects household composition and demographic data); and (2) two or three surveys (extended interviews addressing specific education-related topics). However, in 1999, the surveys collected information on key indicators from the broad range of topics addressed in previous NHES survey cycles. The NHES has been conducted approximately every other year since 1991. There was a 5-year gap in data collection between 2007 and 2012 when the NHES switched from a telephone survey to a mail survey. For more information about the NHES topics by year, see http://nces.ed.gov/nhes/studyinfo_purpose.asp.

Adult Education. Surveys on this topic were administered in 2005, 2003, 2001, 1999, 1995, and 1991. The 2005 Adult Education Survey (AE-NHES:2005) collected data about participation in the following types of formal adult education activities: English as a Second Language (ESL), basic skills and high school completion, postsecondary degree and diploma programs, apprenticeships, work-related courses, and personal interest courses. Information on a new topic, informal learning activities for personal interest, was gathered as well.

The 2003 Adult Education for Work-Related Reasons Survey (AEWR-NHES:2003) collected information about participation in college and university degree or certificate programs taken for work-related reasons, postsecondary degree programs taken for work-related reasons, apprenticeships, work-related courses, and work-related informal learning. Additionally, the survey explored factors associated with participation or nonparticipation in adult education activities.

The Adult Education and Lifelong Learning Survey (AELL-NHES:2001) was administered in 2001. It collected data on type of program, employer support, and credential sought for participation in the following types of adult education activities: ESL, 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.

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
- Early childhood education and school readiness
- Parent/family involvement in education

Before- and After-School Programs and Activities.

The Before- and After-School Programs and Activities Survey, conducted in 2005 and 2001 (ASPA-NHES:2005 and ASPA-NHES:2001), and also in 1995 and 1999, collected detailed information from parents of children in kindergarten through eighth grade about the before- and after-school arrangements in which their children participated, including care by relatives or nonrelatives in private homes, before- or after-school programs in centers and in schools, activities that might provide adult supervision in the out-of-school hours, and children's self-care. Items also addressed continuity of care arrangements, parental perceptions of quality, reasons for choosing parental care, and obstacles to participation in nonparental arrangements. Information was also collected on children's health and disability status and on characteristics of the parents and household.

Civic Involvement. Civic Involvement Surveys were administered in 1999 and 1996. The 1999 Youth Survey (Youth-NHES:1999) expanded on one of the 1996 surveys: the 1996 Youth Civic Involvement Survey (YCI-NHES:1996). It included questions on the 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 grades 6 through 12.

Three Civic Involvement Surveys were conducted in 1996: the Parent and Family Involvement in Education/Civic Involvement Survey (PFI/CI-NHES:1996), the Youth Civic Involvement Survey (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 2012, 2005, 2001, 1999, 1995, and 1991, and a School Readiness Survey was conducted in 2007, 1999, and 1993.

The Early Childhood Program Participation Survey of 2012 (ECPP-NHES:2012) was the sixth collection for this topic and provided data on the nonparental care arrangements and education programs of infants, toddlers, and preschoolers, as well as parents' reports on difficulty in finding care for their young children, home learning activities with children, and children's emerging literacy and numeracy. Eligible respondents to ECPP surveys were the parents of children between birth and age 6, not yet in kindergarten.

ECPP-NHES:2005 gathered information on the nonparental care arrangements and education programs of preschool children, consisting of care by relatives; care by persons to whom the children were not related; and participation in day care centers and preschool programs, including Head Start. The interview was conducted with the parent most knowledgeable about the child's education or care.

ECPP-NHES:2001 gathered information on the nonparental care arrangements and education programs of preschool children, which included care by relatives; care by persons to whom the children were not related; and participation in day care centers and preschool programs, including Head Start.

School Readiness Survey. School Readiness Survey was conducted in 2007, 1999, and 1993. The School Readiness Survey of 2007 (SR-NHES:2007) collected information on early learning and readiness for entering school: specifically, participation in preschool or other types of center-based care and education, including Head Start; children's developmental accomplishments, including literacy and numeracy skills; educational activities with family members; plans for kindergarten enrollment; and the role of parents in preparing their child for kindergarten. The survey also collected data on the amount and type of television viewing by preschoolers.

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 2012, 2007, 2003, 1999, and 1996. The 2012 Parent and Family Involvement in Education Survey (PFI-NHES:2012) collected information for enrolled students (PFI-Enrolled) and homeschooled students (PFI-Homeschooled). It provided data on family

involvement in students' schools and in home learning activities, school choice, school characteristics, student experiences in school, teacher feedback on the child's performance and behavior, family help with homework, factors affecting family involvement, and characteristics of homeschooling.

PFI-NHES:2007 collected information on school choice, homeschooling, school characteristics (including school type, lowest and highest grades at the school, school religious affiliation, and whether the school was a magnet or charter school), student experiences in school, teacher feedback on the child's school performance and behavior, family involvement in school, family help with homework, family involvement in activities outside of school, and factors affecting family involvement.

PFI-NHES:2003 focused on children and youth in kindergarten through grade 12 and addressed school experiences, family participation in schools, school practices to involve and support families, family involvement in schoolwork, and family involvement outside of school. Homeschooling parents were asked about their reasons for choosing, and resources for implementing, homeschooling. The involvement of nonresidential parents was also addressed, when applicable. In addition, information was collected on the child's or youth's health and disability status and on child and parent demographic characteristics. A total of 12,430 interviews were completed with parents of eligible children. The survey provided current national, cross-sectional estimates for the population of interest and provided the ability to examine change over time.

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

Periodicity

NHES has been conducted in the spring of 1991, 1993, 1995, 1996, 1999, 2001, 2003, 2005, 2007, and 2012. The next data collection is projected to occur in 2016.

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 program are:

- Adult education and lifelong learning;
- Before- and after-school programs and activities;
- Early childhood education and school readiness;
- Parent and family involvement in education; and
- NHES is preparing to field new instruments related to credentials for work and training for work for adults aged 16-65.

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 or grade criteria for the target populations also change. In general, there are three educational populations of interest: (1) children from birth through age 6, not yet enrolled in kindergarten; (2) school-aged children enrolled in kindergarten through grade 12; 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

Prior to 2012, the NHES samples were selected using random-digit-dialing (RDD) methods. Telephone numbers were randomly sampled, and a screener was administered to sampled households. About 45,000 to 64,000 households were screened for each administration. Individuals within households who met predetermined criteria were then sampled for more detailed or extended interviews.

The NHES:2012 sample continued this two-stage sample design; however, the sample for the 2012 NHES surveys was selected using address-based sampling methods. The first sampling stage selected residential addresses, and the second sampling stage selected an eligible child from information provided on the household mail screener. After the sample was selected, the data were collected using printed questionnaires that were mailed to the sampled respondents. The NHES:2012 included three topical surveys: the ECPP survey and the Parent and Family Involvement in Education survey for enrolled students (PFI-Enrolled) and homeschooled students (PFI-Homeschooled). In order to limit respondent burden, a within-household sampling scheme was developed to control the number of persons sampled for topical questionnaires in each household. Eligible children were selected to receive either the ECPP survey or the PFI-Enrolled or PFI-Homeschooled survey; no household received more than one survey.

Sampling Households. Several general sampling approaches have been taken with NHES, with the most recent being the two-stage address-based sampling approach. Most previous administrations used the list-assisted RDD sampling approach, with the earliest administrations in 1991 and 1993 using a modified version of the Mitofsky-Waksberg RDD procedure.

NHES:2012. The first sampling stage selected about 160,000 residential addresses; to increase the number of Blacks and Hispanics in the sample, Black and Hispanic households were sampled at a higher rate than other households by identifying census tracts with higher percentages of these residents. Also, since ECPP-eligible children comprise a smaller portion of the population than PFI-eligible children, differential sampling in households with children in both domains was applied to ensure a sufficient sample size for the surveys. The differential probabilities of selection (for households overall and also within households) are accounted for in the NHES weighting methodology.

NHES 2007. The sampling frame for NHES:2007, NHES:2005, and NHES:2003 was all telephone numbers in 100-banks (i.e., sets of numbers with the same first 8 digits of the 10-digit telephone number) with one or more listed residential telephone numbers as of the third quarter of 2006, September 2004, and

September 2002, respectively. A stratified two-phase list-assisted sample was used in order to support design goals for national-level and subdomain statistics for the NHES surveys.

In the first phase of sampling in NHES:2007, a sample of 476,170 telephone numbers was drawn, with telephone numbers in areas with high percentages of Black or Hispanic residents sampled at higher rates than those in areas with low percentages. The sampling frame contains estimates of race/ethnicity distributions from the 2000 census, which are used to identify high concentrations of Black or Hispanic telephone exchanges. The sampling rate in the high-Black or Hispanic concentration stratum was nearly twice that in the low-Black or Hispanic stratum.

In the second phase, within each race/ethnicity stratum, the sampled telephone numbers were stratified as mailable or nonmailable according to whether a mailing address was able to be matched to the telephone number. Mailable status was used because it has been found to improve the efficiency of the sample by facilitating the oversampling of mailable numbers (which are more likely to be residential). Within each of the four strata defined by the combinations of Black or Hispanic concentration and mailable status, telephone numbers were subsampled at different rates in order to attain the final phase 2 allocation. The phase 1 sample sizes were determined by calculating the minimum number of telephone numbers expected to be needed from each race/ethnicity stratum in order to attain the desired phase 2 sample sizes in the race/ethnicity-by-mailable strata, based on mailable distributions within each race/ethnicity stratum computed from NHES:2005. The screener unit response rate in 2007 was 52.8 percent

NHES:2005. In the first phase of sampling, a sample of 350,000 telephone numbers was drawn, with telephone numbers in areas with high percentages of Black and Hispanic residents sampled at higher rates than those in areas with low percentages. The sampling frame contained the Census 2000 counts of persons in the area by race and ethnicity. Race and ethnicity information was obtained for zip codes served by the telephone exchange and then aggregated. A 100-bank was classified in the high-Black or Hispanic concentration stratum if its population was either at least 20 percent Black or at least 20 percent Hispanic. The banks that did not meet this requirement were classified in the low-Black or Hispanic concentration stratum. The sampling rate in the high-Black or Hispanic concentration stratum was nearly twice that in the low-Black or Hispanic concentration stratum. While telephone exchanges do not correspond exactly to census tracts or blocks, this approach is still effective at increasing the sample yield for Blacks, Hispanics, and Asians.

In the second phase, within each Black or Hispanic stratum, the sampled telephone numbers were classified as mailable or nonmailable according to whether they could be matched to a mailing address in the white pages of the telephone directory or in another database. Within each of the four strata defined by the combinations of Black or Hispanic concentration and mailable status, telephone numbers were subsampled at different rates. In the low-Black or Hispanic stratum, telephone numbers in the mailable substratum were sampled at a rate about 72 percent higher than numbers in the nonmailable substratum; in the high-Black or Hispanic stratum, telephone numbers in the mailable substratum were sampled at a rate about twice as high as that used for numbers in the nonmailable substratum.

In this manner, a sample of 207,000 telephone numbers was initially selected for NHES:2005. The remaining 143,000 telephone numbers from the first phase sample of 350,000 were held in reserve. Assuming that 49 percent of the sampled telephone numbers would belong to households and assuming a screener unit response rate of 65 percent, it was expected that about 59,380 screening interviews would be completed. For example, 25,260 screeners were expected to be completed in stratum 1 (mailable, high-Black or Hispanic concentration). This was calculated by taking the final NHES:2005 phase 2 allocation to stratum 1 (51,490 telephone numbers) and multiplying it by the expected residency rate (84 percent) to get the approximate number of residential telephone numbers (43,250). For the 60 percent of residential numbers that were randomly designated to receive the standard protocol, a 69 percent expected response rate was used to estimate the expected number of completed screeners; for the remaining 40 percent, a 43 percent initial cooperation rate was used to estimate the expected number of completed screeners. These calculations resulted in a total of 25,260 expected completed screeners for stratum 1. However, after the release of the initial sample of 207,000 telephone numbers, it was determined that the residency rates in the mailable strata were lower than expected. Thus, an additional 34,000 telephone numbers, subsampled from the 143,000 numbers in the reserve sample at the same rates used for the original sample, were released. The total number of telephone numbers released for the study was 241,000, including the 34,000 reserve telephone numbers. The screener unit response rate was 67 percent, and the number of households with completed screening interviews was 58,140.

NHES:2003. In the first phase of sampling, a sample of 144,300 telephone numbers was drawn, with telephone numbers in areas with high percentages of Black and Hispanic residents sampled at higher rates than those in areas with low percentages of Black and Hispanic residents. The sampling frame used in the study contained the Census 2000 counts of persons in the area

by race and ethnicity. A 100-bank was classified in the high-Black or Hispanic concentration stratum if its population was either at least 20 percent Black or at least 20 percent Hispanic. The banks that did not meet this requirement were classified in the low-Black or Hispanic concentration stratum. The sampling rate in the high-Black or Hispanic concentration stratum was nearly twice that in the low-Black or Hispanic stratum.

In the second phase, within each Black or Hispanic stratum, the sampled telephone numbers were classified as mailable or nonmailable according to whether they could be matched to a mailing address in the white pages of the telephone directory or in another database. Within each of the four strata defined by the combinations of Black or Hispanic concentration and mailable status, telephone numbers were subsampled at different rates. In the low-Black or Hispanic stratum, telephone numbers in the mailable substratum were sampled at a rate about 47 percent higher than numbers in the nonmailable substratum; in the high-Black or Hispanic stratum, telephone numbers in the mailable substratum were sampled at a rate about 63 percent higher than numbers in the nonmailable substratum.

In this manner, a sample of 109,800 telephone numbers was selected for NHES:2003. (The remaining 34,500 telephone numbers from the first-phase sample of 144,300 were held in reserve. The reserve sample was not used.) Assuming that 49 percent of the telephone numbers would belong to households and assuming a screener unit response rate of 69 percent, it was expected that about 37,000 screening interviews would be completed. However, the actual unweighted residency rate was 45 percent, and the screener unit response rate was 65 percent. Thus, the number of households with completed screening interviews was 32,050.

NHES:2001. In 2001, a two-phase list-assisted method was also used. In the first phase of sampling, telephone numbers were stratified according to the percent of Black or Hispanic residents in the exchange. Exchanges with at least 20 percent Blacks or at least 20 percent Hispanics were classified as high-Black or Hispanic, and all other exchanges were classified as low-Black or Hispanic. Telephone numbers in the high-Black or Hispanic stratum were sampled at a rate of about 1 in 810, and telephone numbers in the low-Black or Hispanic stratum were sampled at a rate of about 1 in 1,560. 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 race/ethnicity stratum, the telephone numbers in the

first-phase sample were stratified according to the white pages listed status; the overall number of telephone numbers selected in phase 1 was 206,180.

In the second phase, telephone numbers within each of the four strata defined by the combinations of Black or Hispanic concentration and listed status were subsampled at different rates: 0.71 for the high-Black or Hispanic listed stratum; 0.95 for the high-Black or Hispanic unlisted stratum; 0.73 for the low-Black or Hispanic listed stratum; and 0.94 for the low-Black or Hispanic unlisted stratum. The total number of telephone numbers selected in phase 2 was 179,210.

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. For example, 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, areas with high concentrations of Blacks and Hispanics are oversampled.¹

For NHES:2012, Black and Hispanic households were sampled at a higher rate than other households by identifying census tracts with higher percentages of these residents. For previous NHES administrations, a computer file containing census characteristics for telephone exchanges was used to stratify telephone exchanges into low- and high-Black or Hispanic concentration strata. Any telephone exchange not found in the file was assigned to the low-Black or Hispanic concentration stratum. High-Black or Hispanic concentration exchanges were defined as those having at least 20 percent Black or 20 percent Hispanic persons living in the area.² The telephone exchanges in the two strata were identified, and a systematic sample was drawn in each stratum. The sampling fraction used in the high-Black or Hispanic concentration stratum was two times the fraction used in the low-Black or Hispanic concentration stratum. Oversampling by the characteristics of the telephone exchange had two effects. First, the oversampling increased the sample

sizes for Blacks and Hispanics because they were more heavily concentrated in the exchanges that are oversampled. Second, the sampling errors for estimates of these groups were reduced due to the increased sample sizes. On the other hand, not all race/ethnicity groups were found in the oversampled exchanges. Thus, differential sampling rates were applied to persons depending on their exchanges.

Using differential rates increases the sampling errors of the estimates, partially offsetting the benefit of the larger Black and Hispanic sample. However, the net result is an increase in precision of estimates for Blacks and Hispanics. The technical report *Effectiveness of Oversampling Blacks and Hispanics in the NHES Field Test* (Mohadjer 1992) 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 have been made in the 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 2012, NHES screener questionnaires were sent by mail. The first question on the screener asked, “Are there any youth or children age 20 or younger living in this household?” If the answer was no, respondents were instructed to return the questionnaire. If the answer was yes, respondents were instructed to provide name, age, sex, enrollment status, and grade level for each child or youth in the household. In 2001, 2003, 2005, and 2007, all household members in all screened households were fully enumerated by the phone interviewers.

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.

2012 NHES surveys—ECPP-NHES:2012, and PFI-NHES:2012. The NHES:2012 sample was selected using a two-stage address-based sampling frame. The first sampling stage selected residential addresses, and the second sampling stage selected an eligible child from information provided on the household mail screener.

¹ In 1993, areas with high percentages of Asians/Pacific Islanders were also sampled at a higher rate; this was discontinued in later administrations because the new vendor for numbers used in the list-assisted sampling did not have this information available. NHES considered reintroducing an Asian/Pacific Islander 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 that would have been gained for Asians/Pacific Islanders.

² For the 1993 NHES, high Asian/Pacific Islander concentration exchanges were defined as those having at least 20 percent Asian/Pacific Islander persons living in the area.

The respondent to the ECPP questionnaire was a parent or guardian in the household who knew about the sampled child. The respondent was asked detailed questions about the sampled child's current nonparental care arrangements, finding and choosing care for the child, family activities, and things the child may be learning. The respondent was also asked basic demographic questions about the child, as well as questions about the child's health and disability status, parent/guardian characteristics, and household characteristics. Multiple follow-up attempts were made to obtain completed questionnaires from respondents who did not respond to the first questionnaire that was mailed to them. The survey questionnaires were sent in both English and Spanish. ECPP Screener questionnaires were completed by 99,590 households, for a weighted screener unit response rate of 73.8 percent. ECPP questionnaires were completed for 7,893 children, for a weighted unit response rate of 78.7 percent and an overall estimated weighted unit response rate (the product of the screener weighted unit response rate and the ECPP unit weighted response rate) of 58.1 percent.

The respondent to the PFI questionnaire was also a parent or guardian in the household who knew about the sampled child. The respondent was asked questions about school choice, homeschooling, school characteristics, student experiences, teacher feedback on school performance and behavior, family involvement in the school, school practices to involve and support families, satisfaction with different aspects of the school, family involvement in schoolwork, and family involvement in activities with students. The respondent was also asked basic demographic questions about the child, as well as questions about the child's health and disability status, parent/guardian characteristics, and household characteristics. Multiple follow-up attempts were made to obtain completed questionnaires with respondents who did not respond to the first questionnaire that was mailed to them. The survey questionnaires were sent in both English and Spanish. The total number of completed PFI questionnaires was 17,563, representing a population of 53.4 million students when weighted to reflect national totals.

2007 NHES surveys—SR-NHES:2007, and PFI-NHES:2007. Originally, an Adult Education for Work Related Reasons (AEWR) module was planned. The sampling scheme took this survey into account. The sampling scheme for within-household sampling was designed to satisfy the sample requirements discussed earlier, while keeping respondent burden to a minimum. To carry out this sampling scheme, several flags and/or random numbers were set prior to screening (i.e., at the time the sample of telephone numbers was drawn). The first specified whether the adult sampling algorithm was to be run for a particular

household (in order to determine whether an adult was to be selected). Each telephone number received one of three possible designations: household was designated for the adult sampling algorithm to be run; household was designated for the adult sampling algorithm to be run only if there were no eligible children in the household; or household was not designated for the adult sampling algorithm to be run. The expected number of completed screeners for stratum 1 was calculated in the following manner: First, the final NHES:2007 phase 2 allocation to stratum 1 (74,480 telephone numbers) was multiplied by the expected residency rate for cases in this stratum (73 percent) to get the expected number of residential telephone numbers in stratum 1 (54,370). Next, for the 60 percent of those residential numbers that were randomly designated to receive the standard protocol, a 63 percent expected response rate was applied to the expected number of residential telephone numbers; for the remaining 40 percent, a 39 percent initial cooperation rate was applied. These calculations resulted in a total of 29,190 expected completed screeners for stratum 1.

Once the enumeration of the appropriate household members was completed in the screener, the sampling of household members for the extended interviews was done by computer. The PFI interviews were conducted with the parents or guardians of sampled children and youth in kindergarten through 12th grade with a maximum age of 20. Following the enumeration of children, if the household had at least one preschooler, then exactly one was randomly sampled for the SR survey. If the household had at least one child ages 3 through 20 enrolled in kindergarten through 12th grade, then exactly one was randomly sampled for the PFI survey. For each survey, pre-assigned random numbers were used to sample from among all eligible children in the household. In households in which an adult was sampled, adult education participants had twice the probability of selection of nonparticipants.

2005 NHES surveys—ECPP-NHES:2005, ASPA-NHES:2005, and AE-NHES:2005. To limit respondent burden, a within-household sampling scheme was developed to control the number of persons sampled for extended interviews in each household. In all households with children age 15 or younger, children were enumerated. To determine whether adults would be enumerated, the sample of telephone numbers was randomly divided into three groups. The first group (80,850 telephone numbers, or approximately one-third of the sample) was designated for adult enumeration. The second group (40,070 telephone numbers, or about one-sixth of the sample) was designated for adult enumeration only if there were no eligible children in the household. The third group (120,080 telephone numbers, or about one-half of the sample) was designated for no adult enumeration.

Once the enumeration of the appropriate household members was completed in the screener, the sampling of household members for the extended interviews was done by computer. The ECPP and ASPA interviews were conducted with the parents or guardians of sampled children from birth through age 15 who were in grade 8 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 grade), one child in this age/grade range was also sampled. The sampling of infants (newborn through age 2), elementary school children (kindergarten through 5th grade), and adults was conducted using an algorithm designed to attain the sampling 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 to 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. If no children were selected and there were multiple adults with less than a high school diploma or the equivalent, up to two adults could be selected.

2003 NHES surveys—PFI-NHES:2003 and AEW-NHES:2003. Sampling within households for NHES:2003 followed a similar methodology as in 2005. In all households with children and youth age 20 or younger, children and youth were enumerated. To determine whether adults would be enumerated, the sample of telephone numbers was randomly divided into three groups. The first group (63,620 telephone numbers, or approximately 44 percent of the sample) was designated for adult enumeration. The second group (63,730 telephone numbers, or about 44 percent of the sample) was designated for adult enumeration only if there were no eligible children or youth in the household. The third group (16,950 telephone numbers, or about 12 percent of the sample) was designated for no adult enumeration.

Once the enumeration of the appropriate household members was completed in the screener, the sampling of household members for the extended interviews was done by computer. The PFI interviews were conducted with the parents or guardians of the sampled children and youth in kindergarten through 12th grade (with a maximum age of 20). If there were one or two eligible children or youth, all were selected with certainty. In households with more than two eligible children or youth, two were selected with equal probability. The sampling of adults was conducted using an algorithm designed to attain the sampling rates required to meet

the target sample sizes while minimizing the number of interviews per household. The within-household sample size was limited to two eligible children and one eligible adult. 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.

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 (89,600 telephone numbers, or approximately 50 percent of the sample) was designated for adult enumeration. The second group (44,990 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 (44,630 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 the parents or 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 to 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.

Data Collection and Processing

Prior to the NHES:2012 data collection, NHES program surveys were collected by Westat and used computer-assisted telephone interviewing (CATI). For the 2012 NHES survey, data collection was conducted by the U.S. Census Bureau utilizing printed mail surveys.

Reference dates. Most data items refer to the time of data collection or to the interval of time between the data collection and September of the 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 typically takes place over a 3- to 4-month period beginning in January of each survey year. The 2012 NHES data collection was conducted from January to August 2012 using mailed surveys, while all previous data collections used CATI. For NHES:2012, an address-based sample covering the 50 states and the District of Columbia was used. NHES screeners were then completed by adults at sampled addresses. An eligible child, if any, was chosen from each returned screener. Then a topical survey was mailed to the parent or guardian of the sampled child.

For NHES:2012, an address-based sample covering the 50 states and the District of Columbia was used. NHES screeners were then completed by adults at sampled addresses. CATI system training was conducted over the three-week period preceding data collection; this involved intensively training more than 300 interviewers in general interviewing techniques, in use of the CATI system, and in administration of the survey. Most responses to survey items were coded at the time of the interview and were close ended, so respondents chose from a short list of response options. Interviewers then recorded the response as a one- or two-digit code entered directly into the data file as the interview progressed. However, most close ended items had an "other" option that allowed interviewers to record responses that did not fit the precoded response categories.

A small number of items in some of the surveys are designed to be open-ended. That is, precoded categories do not exist and interviewers typed in verbatim responses from respondents. Once the survey was completed, data preparation staff and survey managers reviewed these open-ended responses to determine how

they can be coded into a limited set of response categories. Coding of additional open-ended items was required for the Adult Education Surveys administered in 1991 and 1995. These items were for 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. Data from NHES:2012 mail surveys underwent a series of data processing procedures after receipt of the keyed questionnaire data. These procedures were data capture and imaging; the reformatting of keyed data; a preliminary interview status classification; a series of computer edits (to check that the data were in range, were consistent throughout a questionnaire record, and follow the correct skip pattern); school coding (where applicable); a final interview status classification; and a set of imputation procedures used to generate values for all appropriate questionnaire items with missing information. After imputation was completed, the editing procedures were repeated to ensure that no errors were introduced during imputation. Prior to NHES:2012, 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 could be resolved while the interviewer was speaking with the respondent.

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

Estimation Methods

The NHES surveys use weighting to adjust for the fact that the sampling method used 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. To accomplish this, weighting occurs in multiple stages: household-level weighting and person-level weighting, as described below.

In NHES:2012, information from the screener was used to create the household-level base weights, including the probability of sampling each address from the sampling frame based on the race/ethnicity stratum and the probability of selection based on PO Boxes which were designated by the United States Postal Service (USPS) as the only way to get mail (OWGM) versus those PO Boxes which were not OWGM. The household weight was then adjusted for screener nonresponse.

For 2012, a within-household sampling scheme was developed to control the number of persons sampled for topical questionnaires in each household, to limit respondent burden. Eligible children were selected to receive either the ECPP survey or the PFI-Enrolled or PFI-Homeschooled survey, with no household receiving more than one survey. Responses were then weighted using the probabilities of selection of the respondents and other adjustments to account for nonresponse and coverage bias; the weight used for PFI estimates represented the characteristics of the school-age children, and the weight used for ECPP estimates represented the characteristics of the children not yet enrolled in kindergarten.

The person-level weight in NHES:2012 was computed to account for five factors: the probability of sampling the person's domain (ECPP or PFI) in a given household, the probability of sampling the child of all eligible children in the household for the given domain (ECPP or PFI), the probability of sampling a child in a joint custody arrangement at both parents' addresses, nonresponse, and raking the nonresponse-adjusted person-level weights to national totals obtained using the number of children from the 2011 annual American Community Survey (ACS). CPS was used for raking in prior NHES administrations, but ACS was used for NHES:2012 because its sample size was larger than CPS, allowing for more accurate control totals and greater precision in the NHES estimates. Please see *NHES:2012 Data File User's Manual* (McPhee et al. forthcoming) for additional information.

For NHES surveys prior to 2012, only households with landline telephones were sampled. Estimates were then adjusted to totals of persons living in both telephone and nontelephone households derived from the Current Population Survey 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, was also reflected in NHES estimates. The potential for bias due to sampling only telephone households had been examined for virtually all the population groups sampled in NHES. Generally, the bias in the estimates due to excluding nontelephone households was small in 2007 and earlier. (See "Coverage error" section below for further discussion.)

Household weights prior to NHES:2012. The household weights take into account adjustments that need to be made for different sampling rates. One adjustment, common to all survey years previous to 2012, accounts for households that have more than one telephone number. The 1996 NHES included an adjustment for the oversampling in 18 states to bring the minimum expected number of completed screeners up to 500. In 1991 and 1993, an additional adjustment was made to account for the modified Mitofsky-Waksberg method of RDD sampling. (See "Sample Design" section above.)

In NHES 2007, the primary purpose of the screener was to provide the information required to assess the eligibility of household members for an extended interview. Household-level information that is of analytic interest was also collected during the extended interview. Since no data intended for analyses were collected at the household level only, household-level weights were calculated solely for use as a basis for computing person-level weights for the analysis of the extended interview data. The household-level weight was the product of five factors:

1. The weight associated with the differential sampling of telephone numbers based on the Black or Hispanic stratum of the exchange and the mailable status of the telephone number;
2. An adjustment for subsampling of cases for nonresponse follow-up;
3. An adjustment for the subsampling of screener nonresponse cases;
4. An adjustment for the number of telephone numbers in a household; and
5. A poststratification adjustment to compensate for the fact that only landline telephone households were eligible for the NHES:2007 surveys.

The calculation of the household weight, taking into account these five factors, is discussed below.

The first step was to assign the weight associated with the differential sampling of telephone numbers based on the Black or Hispanic concentration stratum of the exchange and the mailable status of the telephone

number. The RDD sampling method used in NHES:2007 was a list-assisted method (the same basic method as was used in NHES:1995, NHES:1996, NHES:1999, NHES:2001, NHES:2003, and NHES:2005). In NHES:2007, as in NHES:2001, NHES:2003, and NHES:2005, a two-phase approach was used. In the first phase, a single-stage sample of telephone numbers was selected from strata defined by the Black or Hispanic concentration status of the exchange. Telephone numbers in high-Black or Hispanic exchanges were sampled at a rate approximately twice that of those in low-Black or Hispanic exchanges. An attempt was made to match each telephone number selected in the first phase to an address listing. In the second phase, telephone numbers were subsampled differentially within each Black or Hispanic concentration stratum based on the mailable status (i.e., whether a mailing address was obtained for the telephone number).

The second step in creating the household weight was to adjust for the subsampling of screener nonresponse cases.

The third weighting factor adjusted for households that did not respond to the NHES:2007 screener.

The fourth step in adjusting the household weight was to adjust for the number of telephone numbers in a household. A weighting factor of one was assigned to households reporting one telephone number in the household. An adjustment factor of one-half was assigned to households with exactly two residential telephone numbers, and an adjustment factor of one-third was assigned to households with three or more residential telephone numbers. Technically, if the other telephone numbers of households with multiple residential telephone numbers are in the zero-listed stratum, the household should get a weight adjustment of one. However, looking up the other numbers to determine whether each is in the zero-listed stratum is impractical, and the percentage of such numbers in the zero-listed stratum is small.

The final step in computing the household weight was to account for household-level undercoverage due to sampling only landline telephone households. Poststratification was used to accomplish this task.

Person weights prior to NHES:2012. The second stage of weighting forms person weights.

The base weight for each of the person-level (SR and PFI interview) weights was computed using the household-level weight in NHES:2007. The person-level weight for sampled person k in household j , PW_{jk} , is the product of the household weight and four weight adjustment factors:

1. The weight associated with sampling the person's domain in the given household;
2. The weight associated with sampling the person from among all eligible persons in the given domain in the household;
3. The weight associated with extended interview (SR or PFI) unit nonresponse; and
4. An adjustment associated with raking the person-level weights to Census Bureau estimates of the number of persons in the target population.

The development of the person-level weights, taking into account these four factors, is discussed below.

The first step was to account for the probability of sampling the person's domain in the given household. For both the SR and PFI interviews, if there was an eligible child in the household, then at least one child was selected; however, only one child was sampled for each survey in households with eligible children. Thus, the factor for sampling in both the SR and PFI domain was always equal to 1.

The second adjustment accounted for the probability of sampling the person from among all eligible persons in the given domain in the household. For each sampled person, the unadjusted person-level weight can be written as the product of the household-level weight and the adjustments for within-household sampling.

The third step was to adjust for persons who did not respond to the extended interview (i.e., the most knowledgeable parents or guardians in the case of the SR and PFI interviews). Each extended interview case was classified as either a respondent or a nonrespondent, depending on whether or not the extended interview was completed for the sampled person. The unadjusted person-level weights of the nonrespondents were distributed to the unadjusted person-level weights of the respondents within a nonresponse adjustment cell. For the SR and PFI Surveys, the nonresponse adjustment cells were created using combinations of home tenure (owned or rented), the four census regions, and age/grade combinations: unenrolled children age 3 through 6, preschoolers, kindergarteners, and children enrolled in each single grade for grade 1 through grade 12. (Enrolled children with no grade equivalent were included in the cell containing the modal grade for their age; that is, they were assigned to the grade in which most children their age are enrolled.) For PFI, whether the child attended regular school or was home schooled was also used. These variables were used because they are available for all sampled children (both respondents and

nonrespondents) and are associated with SR/PFI interview response propensity.

The final stage of person-level weighting involved raking the nonresponse-adjusted person-level weights to national control totals. The raking procedure is carried out in a sequence of adjustments: first, the base weights are adjusted to one marginal distribution (or dimension) and then 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 of weighted totals to all sets of marginal distributions is achieved. This additional raking adjustment, following the household-level poststratification adjustment, is required because the extended interviews involve new eligibility criteria and a new level of sampling. That is, although the household-level poststratification adjustment aligned the weighted totals of the household weights with the household-level control totals, the raking of the person-level weights is required in order to align the person-level weights with the person-level control totals and adjust for differential coverage rates at the person level. The raking procedure for the SR and PFI weights involved raking the nonresponse-adjusted person-level weights to national totals obtained using the percentage distributions from the October 2005 CPS and the total number of children from the March 2006 CPS.

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. For NHES:2012, items with missing data were again imputed; for more extensive information on item response rates, etc., please refer to the *NHES:2012 Data File User’s Manual* (McPhee et al. forthcoming).

In NHES:2007, for the SR and PFI Surveys, the median item response rates were 99.28 percent and 99.04 percent, respectively, and the median total response rates (the product of the item response rate and overall unit response rate) were 40.41 percent and 38.72 percent, respectively. Numeric and categorical data items with missing data in the file were imputed. (In general, character string variables, such as countries of origin, languages, or “other/specify” responses, were not imputed. School characteristics merged to the PFI data file from the NCES Common Core of Data [CCD] and Private School Universe Survey [PSS] files also 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, data 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 data collection. The methodology used for imputation in NHES:2007 was very similar to that used in previous NHES survey administrations. (The NHES:2007 procedures were based on those used in NHES:1996, NHES:1999, NHES:2001, NHES:2003, and NHES:2005.) In the hot-deck 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 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 (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. In NHES:2007, manual imputation was done (1) to impute certain person-level demographic characteristics; (2) to impute whether a child is homeschooled, whether the child attends regular school for some classes, and the number of hours the child attends regular school; (3) to correct for a small number of inconsistent imputed values; and (4) to impute for a few cases when no donors with matching sort variable values could be found.

Some person-level characteristics from the screener as well as from several sections of the SR and PFI interviews (age confirmation, household relationships, and child and parent language) were imputed manually because they typically involve complex relationships and/or constraints that would have required extensive programming in order to impute using a hot-deck procedure. The same is true of the items indicating whether a child is homeschooled, whether the child attends regular school for some classes, and the number of hours the child attends regular school. Furthermore, the reasonableness of imputed values for these person-level characteristics can often be assessed by examining the values of these variables for other members of the household. The use of the manual imputation approach in this situation permits the review of the characteristics of household members when imputing the missing values for the person-level variables.

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 dataset.

Recent Changes

As a result of declining response rates for all telephone surveys, and the increase in households that only or mostly use cellphones instead of landlines, the data collection method for 2012 was changed to a mail survey. The new design utilizes an Address-based sample (ABS) and primarily collects data using a self-administered paper questionnaire that is mailed to sampled households. For more information about the mail data collection and ABS design, see *NHES:2012 Data File User's Manual* (McPhee et al. forthcoming).

Future Plans

As mentioned, NHES was redesigned for the 2012 collection in order to address falling response rates and potential coverage issues associated with the landline list-assisted RDD design. NHES:2016 will feature a new component called the Credentials for Work Survey (CWS), which will survey adults age 16-65 about the attainment of non-degree credentials, including industry-recognized certifications, occupational licenses, and educational certificates. A second new component, the Training for Work Survey (TWS), will focus on enrollment in education and training that prepares people for work. The TWS is currently slated for NHES:2019.

The NHES will experiment with a web-based self-administered survey instrument in 2016. If successful, web surveys will become a permanent design feature of NHES data collection.

5. DATA QUALITY AND COMPARABILITY

In addition to the data quality activities inherent in the NHES design and survey procedures, activities designed specifically to assess data quality are undertaken for each collection. Reinterviews and analysis of telephone coverage bias are two activities conducted during many survey administrations. 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* [Collins and Chandler 1997].)

Since the 2001 NHES surveys used a two-phase sample design, a new procedure for replication variance estimation was used thereafter. 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.

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 and SUDAAN, can properly apply replicate weights. For NHES:2012, the estimates and standard errors were produced using the jackknife 1 option as a replication procedure. See also *NHES:2012 Data File User's*

Manual (McPhee et al. forthcoming) for more specific information.

Nonsampling Error

Sample estimates also are subject to bias from nonsampling errors; however, it is more difficult to measure the magnitude of these errors. They can arise for a variety of reasons: nonresponse; undercoverage; differences in respondents' interpretations 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, such as NHES administrations prior to 2012, are subject to an additional source of bias because not all households in the United States have telephones. Even more problematic is the fact that the percentage of households without telephones varies from one subgroup of the population to another. Differential rates among population subgroups, such as those defined by region, age, race/ethnicity, and household composition, are of concern to telephone survey methodologists because they can introduce bias in the estimates. Coverage bias in the telephone survey is probably due to the prevalence of nontelephone households (nontelephone households include cellular phone-only households, in addition to households with no telephone service) and the differences between such households and those with telephones.

Based on recent findings (Blumberg and Luke, 2014) 24.5 percent of households had only a wireless telephone in 2009. Tucker et al. (2002) and Blumberg et al. (2006) examined differences in characteristics among persons and households having no telephone service, cellular service only, and landline service (including both landline only, and landline and cellular). Although there are differences in landline coverage (e.g., young adults, adults in 1-person households, renters, and Hispanics have lower landline coverage rates than other groups), raking is used in NHES to statistically adjust for and reduce undercoverage bias.

Special analyses of the bias associated with telephone coverage and its potential impact on estimates from the NHES surveys were conducted for each cycle of the survey prior to 2012. CPS data were used to evaluate the differences between estimates for telephone households and estimates for the entire population. The results of these analyses show that, for most estimates, the bias due to sampling only telephone households was small. However, for subgroups with characteristics highly correlated with not having a telephone (e.g., the poor, high school dropouts), coverage bias may have

been large. Recent studies suggest that between 5-20 percent of the population may be missed by using list assisted RDD methods (Boyle et al. [2009] and Fahimi et al. [2009]). Raking adjustments can 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. Additionally, as the coverage bias increases, it becomes more difficult for raking to adequately adjust (See, for example, Montaquilla, Brick, and Brock [1997].)

Additional undercoverage results when some telephone households were excluded from the sampling frame. This was a disadvantage of the list-assisted method of RDD sampling used in earlier administrations of NHES surveys. (See “Survey Design” section above.) Households in the zero-listed stratum had no chance of being included in the sample. Empirical findings that addressed questions of coverage bias showed that the percentage of telephone numbers in the zero-listed stratum that were residential was very small (about 1.4 percent) and that about 3 to 4 percent of all telephone households were in the zero-listed stratum. The findings also showed that the bias resulting from excluding the zero-listed stratum was generally small. (See Brick et al. [1995].)

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). All of the rates are weighted by the inverse of the units' probability of selection (see table NHES-1).

NHES:2012 sampling frame variables were used for the unit nonresponse bias analysis for the screener and topical surveys. Analysis of unit nonresponse bias showed evidence of bias based on the distributions of the sample characteristics for the survey respondents when compared to the full eligible sample. However, this bias was greatly reduced by the nonresponse weighting adjustments. See “Bias study” section below

Table NHES-1. Weighted response rates for selected NHES surveys: 1991–2012

| Questionnaire | Screener/1 st stage | Interview/2 nd 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, 3 rd –5 th | 82.1 | 89.4 | 73.4 |
| SS&D-NHES:1993 – Parents, 6 th –12 th | 82.1 | 89.6 | 73.6 |
| SS&D-NHES:1993 – Students, 6 th –12 th | 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 |
| AEWR-NHES:2003 | 64.6 | 76.2 | 49.2 |
| PFI-NHES:2003 | 64.6 | 83.3 | 53.8 |
| AE-NHES:2005 | 66.9 | 71.2 | 47.6 |
| ASPA-NHES:2005 | 66.9 | 84.1 | 56.3 |
| ECPP-NHES:2005 | 66.9 | 84.4 | 56.4 |
| AEWR-NHES:2007 | 52.8 | 62.4 | 33.0 |
| PFI-NHES:2007 | 52.8 | 74.1 | 39.1 |
| SR-NHES:2007 | 52.8 | 77.0 | 40.7 |
| ECPP-NHES:2012 | 73.8 | 78.7 | 58.1 |
| PFI-NHES:2012 | 73.8 | 78.4 | 57.8 |

SOURCE: Brick, J.M., and Broene, P. (1997). *Unit and Item Response, Weighting, and Imputation Procedures in the 1995 National Household Education Survey (NHES:95)* (NCES Working Paper 97-06). National Center for Education Statistics, U.S. Department of Education. Washington, DC. Brick, J.M., Tubbs, E., Collins, M., and Nolin, M. (1997). *Unit and Item Response, Weighting, and Imputation Procedures in the 1993 National Household Education Survey (NHES:93)* (NCES Working Paper 97-05). National Center for Education Statistics, U.S. Department of Education. Washington, DC. Collins, M., Montaquila, J., Nolin, M., Kim, K., Kleiner, B., and Waits, T. (2003). *National Household Education Surveys of 2001 Data File User's Manual, Volume I* (NCES 2003-079). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Montaquila, J., and Brick, J. M. (1997). *Unit and Item Response Rates, Weighting, and Imputation Procedures in the 1996 National Household Education Survey* (NCES Working Paper 97-40). National Center for Education Statistics, U.S. Department of Education. Washington, DC. Nolin, M., Montaquila, J., Nicchitta, P., Kim, K., Kleiner, B., Lennon, J., Chapman, C., Creighton, S., and Bielick, S. (2000). *NHES:1999 Methodology Report* (NCES 2000-078). National Center for Education Statistics, U.S. Department of Education. Washington, DC. Mamedova, S. and Redford, J. (2013). *Early Childhood Program Participation, From the National Household Education Surveys Program of 2012* (NCES 2013-029), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Noel, A., Stark, P., and Redford, J. (2013). *Parent and Family Involvement in Education, From the National Household Education Surveys Program of 2012* (NCES 2013-028), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. (2013-029 & 2013-029, pp. 1)

for further discussion, as well as the *NHES:2012 Data File User's Manual* (McPhee et al. forthcoming).

Item nonresponse. For most of the items collected in the NHES surveys, the item response rate is high. For the ECPP and PFI surveys in NHES:2012, the median item response rates were 96.4 percent and 97.9 percent, respectively. From 2001 to 2007, the median item response rate for the administered surveys ranged from 99.3 to 98.8 percent. For SR-NHES:2007 and PFI-NHES:2007, the median item response rates were 99.28

percent and 99.04 percent, respectively, and the median total response rates (the product of the item response rates and overall unit response rates) were 40.41 percent and 38.72 percent, respectively.

Measurement error. In order to assess item reliability and inform future NHES surveys, many administrations also included 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; both PFI-NHES:1996 and

YCI-NHES:1996; and ASPA-NHES:2001, AEW-NHES:2003, and AE-NHES:2005.

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* [Nolin 1997].) 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.

Bias study. The NHES:2012 included a bias analysis to evaluate whether nonresponse at the unit and item levels impacted the estimates. The term “bias” has a specific technical definition in this context: It is the expected difference between the estimate from the survey and the actual population value. For example, if all households were included in the survey (i.e., if a census was conducted rather than a sample survey), the difference between the estimate from the survey and the actual population value (which includes persons who did not respond to the survey) would be the bias due to unit nonresponse. Since NHES is based on a sample, the bias is defined as the expected or average value of this difference over all possible samples. Unit nonresponse bias, or the bias due to the failure of some persons or households in the sample to respond to the survey, can be substantial when two conditions hold: the differences between the characteristics of respondents and nonrespondents must be relatively large, and the unit nonresponse rate must be relatively high.

The NHES:2012 sampling frame variables were used for the unit nonresponse bias analysis for the screener and topical surveys. The analysis of unit nonresponse bias showed evidence of bias based on the distributions of the sample characteristics for the survey respondents compared to the full eligible sample. However, this bias was greatly reduced by the nonresponse weighting adjustments. In the post-adjusted Screener estimates, the number of estimates showing measurable and practical differences was reduced in half. The percentage of estimates with measurable survey and sample differences greater than 1 percentage point was

reduced from 22 to 6 percent for the ECPP survey by the nonresponse weighting adjustments.

When key NHES:2012 survey estimates generated with unadjusted and nonresponse adjusted weights were compared, only a small number of measurable differences were observed. This suggests that none of these variables were powerful predictors of unit response. Therefore, the unit nonresponse adjustment had little effect on the potential bias, but it is also possible that there was limited bias to be removed to begin with, or that nonresponse bias may be present in other variables that were not studied. For this reason, other methods of examining unit nonresponse bias were considered. Since one such method compares NHES estimates to other sources, NHES estimates were compared with estimates from the American Community Survey, Current Population Survey, and previous NHES collections. Comparisons were made on common variables of interest—such as child’s race/ethnicity, and sex; key questionnaire items; and parents’ education and household income—to discover any indication of potential bias that may exist in the NHES:2012 data. The results indicate that NHES survey estimates are comparable to other data sources.

As part of the 2007 NHES administration a comprehensive bias study was conducted to look at the impact of non response and coverage issues on the NHES. The bias study utilized a separately drawn area probability sample and compared results to the RDD study. The study did not identify systematic patterns of bias in the key NHES statistics. However, some potential for bias was found in five estimates and concern over the ability of a landline frame to maintain adequate coverage in the future was raised. (See *An Evaluation of Bias in the 2007 National Household Education Surveys Program Results from a Special Data Collection Effort* [Van de Kerckhove et al. 2009]).

Data Comparability

Due to declining response rates for all telephone surveys, and due to the increase in the number of households that use cellphones instead of landlines, the 2012 data collection method was changed to a mail survey. As a result, readers should use caution when comparing estimates to prior NHES administrations. However, the NHES data can be compared with estimates from several other large-scale data collections, as described in the “Comparisons of topical data” section below.

Comparisons of methodology. 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 an RDD 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 on early childhood education: ECPP-NHES:2012, SR-NHES:2007, ECPP-NHES:2005, 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 CPS October Education Supplement collects information on nursery school enrollment. (See Current Population Survey chapter.) 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 that parents engage in with their children. NHES data can also be compared with data from 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 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 which is comparable with NHES data.

Before- and after-school programs and activities. PFI-NHES:2012 and PFI-NHES:2007 collected information on topics such as participation in literacy-related activities with family members, school size, contacts from the school, parent involvement with the school, disability conditions, and parent and household characteristics. ASPA-NHES:2005 and ASPA-NHES:2001 covered some topics addressed in previous years by other NHES surveys.

AELL-NHES:2001, AE-NHES:1999, AE-NHES:1995, and AE-NHES:1991) and CPS provide estimates of adult

education participation. (See Current Population Survey chapter.) 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 estimates from three other surveys. The Monitoring the Future Survey (conducted annually by the National Institute on Drug Abuse) gathers information 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 Supplement of the 1989 and 1995 National Crime Victimization Survey (conducted by the U.S. Department of Justice, Bureau of Justice Statistics) provides detailed information on personal crimes of violence and theft that were committed inside a school building or on school property. (See School Survey on Crime and Safety in the Crime and Safety chapter.) Finally, the NCES National Education Longitudinal Study of 1988 (NELS:88) provides data on educational issues such as the school environment, school discipline, victimization at school, and drug and alcohol education.

Parent involvement in education. Estimates from PFI/CI-NHES:1996 can be compared with data from NELS:88. Data analysts may wish to examine NELS:88 data in conjunction with the PFI estimates on school contacts with parents (by parent report) and the frequency of parents helping their 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 estimates from 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 Current Population Survey chapter.) The 1992 National Adult Literacy Survey (NALS) collected data on adults' activities in daily life that require English literacy skills. (See National Adult Literacy Survey chapter.) Areas common to the 1994 General Social Survey, sponsored by the National Science Foundation, 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, a part of the CPS, elicits detailed information on political and relevant nonpolitical matters so that parent-child similarities and differences can be assessed. ACI-NHES:1999 expanded on the 1996 Youth Civic Involvement Survey by including more questions about youth service activities.

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7. METHODOLOGY AND EVALUATION REPORTS

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