

National Household
Education Surveys Program

**National
Household Education Survey
2016 (NHES:2016)
Full-scale Data Collection**

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Part B**

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TABLE OF CONTENTS

	<u>Page</u>
DESCRIPTION OF STATISTICAL METHODOLOGY.....	1
B.1 Respondent Universe and Statistical Design and Estimation.....	1
B.1.1 Sampling Households.....	1
B.1.2 Within-Household Sampling.....	2
B.1.3 Expected Yield.....	4
B.1.4 Reliability.....	5
B.1.5 Estimation Procedures.....	6
B.1.6 Nonresponse Bias Analysis.....	6
B.2 Statistical Procedures for Collection of Information.....	9
B.3 Methods for Maximizing Response Rates.....	11
B.4 Tests of Procedures and Methods.....	17
B.5 Individuals Responsible for Study Design and Performance.....	17

List of Tables

<u>Table</u>		<u>Page</u>
1	Expected percentage of households with eligible children or adults, by sampling domain.....	4
2	Expected numbers sampled and expected numbers of completed screeners and topical surveys.....	5
3	Numbers of completed topical interviews in previous NHES surveys administrations	5
4	Margins of error for screener.....	5
5	Margins of error for topical surveys.....	6

List of Figures

<u>Figure</u>		
1	Mail Screener Data Collection Plan.....	12
2	Web Screener Data Collection Plan.....	13
3	Mail ECPP/PFI Data Collection Plan.....	14
4	Mail ATES Data Collection Plan.....	15
3	Web Topical Data Collection Plan.....	16

PART B. DESCRIPTION OF STATISTICAL METHODOLOGY

B.1 Respondent Universe and Statistical Design and Estimation

Historically, an important purpose of the National Household Education Surveys Program (NHES) has been to collect repeated measurements of the same phenomena at different points in time. Decreasing response rates during the past decade required NCES to redesign the NHES. This redesign involved changing the sampling frame from a list-assisted Random Digit Dial (RDD) to an Address-Based Sample (ABS) frame. The mode of data collection also changed from telephone, interviewer administered to mail, self administered.

The last NHES data collection prior to the redesign was conducted in 2007 and included the PFI and the School Readiness (SR) survey¹. The NHES:2012, comprised of the PFI and ECPP topical surveys, was the first full-scale data collection using an addressed-based sample and a self-administered questionnaire. The overall screener plus topical response rate was approximately 58 percent for both the PFI and the ECPP in 2012, compared to the 2007 overall response rate of 39-41% (depending on the survey). The results suggest that the new methodology has the ability to increase response rates and address coverage issues identified in the 2007 data collection.

The NHES:2016 will be an address-based sample covering the 50 states and the District of Columbia and will be conducted from January through August 2016. The household target population is all residential addresses (excluding P.O. Boxes that are not flagged by the United States Postal Service [USPS] as the only way to get mail) and is estimated at 126,115,692 addresses.

Households will be randomly sampled as described in section B.1.1, and a screening questionnaire will be sent to each sampled household.² Demographic information about household members provided on the screener will be used to determine whether anyone is eligible for the Early Childhood Program Participation (ECPP) survey, the Parent and Family Involvement in Education-Enrolled (PFI-E) survey, the Parent and Family Involvement-Homeschooled (PFI-H) survey, or the Adult Training and Education Survey (ATES). In addition, the study will include a seeded sample of 1,000 adults with educational certificates who will receive the ATES. This supplemental sample will not be included in the screener portion of NHES:2016.

The target population for the ECPP survey consists of children age 6 or younger who are not yet in kindergarten. The target population for the PFI-E survey includes children/youth ages 20 or younger who are enrolled in kindergarten through twelfth grade. The target population for the PFI-H survey includes children/youth ages 20 or younger who are homeschooled for kindergarten through twelfth grade. The target population for the ATES survey includes adults ages 16-65 who are not enrolled in grade 12 or below or homeschooled for equivalent grades. Ages will be calculated based on information provided in the screener.

B.1.1 Sampling Households

A nationally representative sample of 206,000 addresses will be used. The sample will be drawn in a single stage from a file of residential addresses maintained by a vendor, Marketing Systems Group (MSG), based on the USPS Computerized Delivery Sequence File (CDSF). MSG provided the sample for NHES:2012 and for the NHES Feasibility Study (NHES-FS) in 2014. As in past NHES surveys, the NHES:2016 will oversample black and Hispanic households using Census data. This oversampling is necessary to produce more reliable estimates for subdomains defined by race and ethnicity. NHES:2016 will use the stratification methodology that was used for the NHES:2012 administration. The sampling design concentrates on achieving a significant sample of black and Hispanic households. The universe consists of Census tracts likely to contain relatively high proportions of these subgroups. The three strata for the NHES:2016 are defined as households in:

- 1) Tracts with 25 percent or more Black persons
- 2) Tracts with 40 percent or more Hispanic persons (and not 25 percent or more Black persons)
- 3) All other tracts

The Hispanic stratum contains a high concentration of households in which at least one adult age 15 or older speaks Spanish and does not speak English very well and will be used for the assignment of bilingual screener mailing materials. The sample allocation to the three strata will be 20 percent to the black stratum, 15 percent to the

¹ NHES:2007 also included an adult education module, but data collection was stopped due to low response rates.

² In the web experiment, each household will receive a letter with a user identification code and URL address asking someone in the household to complete the survey by web rather than a letter with a screening questionnaire.

Hispanic stratum and 65 percent to the third stratum. This allocation will provide improvement in the precision of estimates by race/ethnicity compared to use of a uniform sampling rate across each stratum, and will protect against unknown factors that may affect the estimates for key subgroups, especially differential response rates.

In addition to stratifying by the race/ethnicity groups mentioned above, these three strata will be sorted by a poverty variable and the sample will be selected systematically from the sorted list in order to maintain the true poverty level proportions in the sample. The Census tracts will be used to define the two categories of poverty level as households in:

- 1) Tracts with 20% or more below the poverty line
- 2) Tracts with less than 20% below the poverty line

Households will be randomly assigned to the web experiment data collection treatment (web treatment) or the standard mail data collection treatment (mail treatment). A total of 35,000 households out of the 206,000 sampled will be chosen for the web experiment.

B.1.2 Within-Household Sampling

Among households that return a completed screener and report members eligible for one or more topical surveys, a four-phase procedure will be used to select a single household member to receive a topical questionnaire. In order to minimize household burden, only one eligible member from each household will be sampled; therefore, each household will receive only one of the four topical surveys. The topical sampling procedure works by randomly assigning three pre-designations to each household. Depending on the composition of the household, some or all of these pre-designations are used to assign the household to one of the four topical surveys. If the household has more than one member eligible for the survey for which it is selected, the final phase of sampling randomly selects one of these members for that survey. The remainder of this section provides additional detail on each of the four phases, and provides examples of how this procedure would work for three hypothetical households.

First-Phase sampling: Homeschooling Status (PFI-H or Other Survey)

In the first phase of sampling, each address will be randomly pre-designated as either a “PFI-H household” or an “other household.” This pre-designation will be referred to as the homeschooling pre-designation. A household will be pre-designated as a “PFI-H household” with a .8 probability and as an “other household” with a .2 probability. This pre-designation will only be used when a household has at least one member eligible for the PFI-H and at least one member eligible for one of the other topical surveys, to determine which person in the household should be sampled. If a household only has a member or members eligible for the PFI-H, that household will receive the PFI-H regardless of pre-designation. Likewise, if a household only has members eligible for one of the other surveys, that household will receive a non-homeschooling survey regardless of pre-designation. The purpose of sampling for the PFI-H in the first phase of topical sampling is to increase the number of homeschooled children for whom data are collected. NHES is the only nationally representative survey that collects information about homeschooled children in the United States. Because this is such a small sub-population, prior NHES administrations, which did not sample households separately for the PFI-H³, have typically collected homeschooling data from only a few hundred households. Based on preliminary analysis, sampling households for the PFI-H with high probability in the first phase of topical sampling is expected to approximately double the PFI-H sample size, relative to what would be obtained from the sampling design used in prior administrations. Due to the small number of households with homeschooling children, this is expected to have a minimal impact on sample sizes and design effects for the other topical surveys.

Second-Phase Sampling: Age Group (Child or Adult)

The second phase of sampling is at the age group level (child or adult). In addition to the homeschool pre-designation, each household will be randomly pre-designated as either a “child household,” or an “adult household.” This pre-designation will be referred to as the age group pre-designation. A household will be pre-designated as a “child household” with a .8 probability and an “adult household” with a .2 probability. Because eligible children comprise a smaller portion of the population compared to eligible adults, differential sampling is applied to ensure a sufficient sample size for the ECPP, PFI-E, and PFI-H surveys. The pre-designation will only be used when a household was not selected for the PFI-H in the first phase of sampling, and has both an eligible

³ In prior administrations, a household received the PFI-H if the household was sampled for the PFI, and the individual child sampled in the final phase of sampling was identified on the screener as a homeschooler.

child/children and an eligible adult/adults, to determine which person in the household should be sampled. If a household only has an eligible child/children and no eligible adults, that household will receive a child topical survey, regardless of pre-designation. Likewise, if a household only has an eligible adult/adults and no eligible children, that household will receive an adult topical survey, regardless of pre-designation.

Third-Phase Sampling for Households Selected to Receive a Child Topical Survey: Domain (ECPP or PFI)

The third phase of sampling is at the topical survey level, or the domain level. Because households are sampled for the PFI-H in the first phase of topical sampling, there are two topical surveys that a child could possibly be eligible for in the third phase: the ECPP or the PFI-E survey. A child's age, among other factors, will determine if the child is eligible for the ECPP or the PFI-E topical surveys. The eligibility criterion only allows a child to be eligible for one of the topical surveys, not both.

In addition to the homeschool and age group pre-designations, each household will be pre-designated as an "ECPP household" with a .7 probability or a "PFI-E household" with a .3 probability. This pre-designation will be referred to as the child topical survey pre-designation. Because children eligible for the ECPP survey comprise a smaller portion of the population compared to children eligible for the PFI-E survey, differential sampling is done to ensure a sufficient sample size of the ECPP group. This designation will only be used when a household was not selected for the PFI-H in the first phase, was selected for a child survey in the second phase, and has a child/children eligible for the ECPP topical survey and a child/children eligible for the PFI-E topical survey, to determine which person in the household should be sampled. If a child household only has a child/children eligible for the ECPP topical survey and not the PFI-E topical survey, that household will receive an ECPP topical survey, regardless of pre-designation. Likewise, if a child household only has a child/children eligible for the PFI-E topical survey and not the ECPP topical survey, that household will receive a PFI-E topical survey, regardless of pre-designation.

Fourth-phase Sampling: Person Level

The fourth phase of sampling is at the person level. If any household has only one person that is eligible for the domain that was selected in the first three phases of sampling, that person is selected to receive that topical survey. If any household has two or more people eligible for the domain that was selected in the first three phases of sampling, one of those persons will be randomly selected (with equal probability) to receive the appropriate topical survey. Therefore, at the end of the four phases of sampling, one eligible child or one eligible adult within each household that has a completed screener will be sampled for the ECPP/PFI topical survey or the ATES topical survey, respectively.

Topical Sampling Examples

The use of the topical pre-designations can be illustrated by considering hypothetical households with members eligible for various combinations of the topical surveys. First, consider a household with six people: one member eligible for the ECPP, two members eligible for the PFI-E, one member eligible for the PFI-H, and two members eligible for ATES. Suppose that the household is pre-designated as an "other household" in the first phase, a "child household" in the second phase, and a "PFI-E household" in the third phase. The first pre-designation indicates that the household should not receive the PFI-H; the second pre-designation indicates that the household should receive a child survey rather than an adult survey; and the third pre-designation indicates that the household should receive the PFI-E. Because the household has two children eligible for the PFI-E, one of these children is randomly selected for the PFI-E with .5 probability in the final phase.

Second, consider a household with two people: one member eligible for the PFI-H and one member eligible for ATES. Suppose that the household is pre-designated as a "PFI-H household" in the first phase, an "adult household" in the second phase, and an "ECPP household" in the third phase. Because the household has a member eligible for the PFI-H, the first pre-designation is used to assign the household to the PFI-H. Therefore, the other two pre-designations are not used. Because only one member is eligible for the PFI-H, this child is selected with certainty for the PFI-H in the final phase.

Third, consider a household with three people: one member eligible for the ECPP and two members eligible for ATES. Suppose that the household is pre-designated as a "PFI-H household" in the first phase, a "child household" in the second phase, and a "PFI-E household" in the third phase. Because the household has no members eligible for the PFI-H, the first pre-designation is not used. Because the household has both eligible adults and an eligible non-homeschooling child, the second pre-designation is used to assign the household to a child survey. However,

because the household only has an ECPP-eligible child, the third pre-designation is not used, and the household is assigned to receive the ECPP. Because only one member is eligible for the ECPP, this child is selected with certainty for the ECPP in the final phase.

Finally, consider a household with three people: one member eligible for ATES, one member eligible for the PFI-E, and one member eligible for the ECPP. Suppose that the household is pre-designated as an “other household” in the first phase, an “adult household” in the second phase, and a “PFI-E household” in the third phase. Due to the lack of homeschoolers in the household, the first pre-designation is not used. The second pre-designation assigns the household to ATES, and the third pre-designation is therefore not used.

B.1.3 Expected Yield

As described above, the initial sample will consist of approximately 206,000 addresses. An expected screener response rate of approximately 64.021 percent and an address ineligibility⁴ rate of approximately 9.375 percent are assumed, based on results from the 2014 NHES-FS and expected differences in screener eligibility and response rates between the sampling strata and experimental treatment groups. Under this assumption, the total number of expected screeners is 119,520.

The ECPP/PFI or the ATES topical surveys will be administered to households with completed screeners that have eligible children or adults, respectively. For the NHES:2016, we expect to achieve a total percentage of households with eligible children of approximately 31.6 percent, and for eligible adults a total percentage of approximately 77.8 percent.⁵ Expected estimates of the percentage of households with eligible children or adults overall and in each sampling domain are given in Table 1, as well as the expected number of screened households in the nationally representative sample of 206,000, based on the distribution of household composition and assuming 119,520 total completed screeners.

Table 1. Expected percentage of households with eligible children or adults, by sampling domain

Household composition	Percent of households	Expected number of screened households
Total households with eligible adults	77.810	92,999
Total households with eligible children	31.649	37,827
Households with at least one PFI-E eligible child and no PFI-H or ECPP eligible children	19.139	22,875
Households with at least one PFI-H eligible child and no PFI-E or ECPP eligible children	0.474	566
Households with at least one ECPP eligible child and no PFI-E or PFI-H eligible children	5.751	6,874
Households with at least one PFI-E eligible child, at least one PFI-H eligible child, and no ECPP eligible children	0.163	195
Households with at least one PFI-E eligible child, at least one ECPP eligible child, and no PFI-H eligible children	5.857	7,000
Households with at least one PFI-H eligible child, at least one ECPP eligible child, and no PFI-E eligible children	0.182	218
Households with at least one PFI-E eligible child, at least one PFI-H eligible child, and at least one ECPP eligible child	0.082	98

NOTE: The distribution in this table assumes 119,520 screened households. Detail may not sum to totals because of rounding. Estimates are based on calculations from the 2014 NHES Feasibility Study (NHES-FS).

Table 2 summarizes the expected numbers of completed interviews for the NHES:2016. These numbers take into account within-household sampling. Based on results from the NHES:2012, a topical response rate of approximately 79.245% is expected for the ECPP, approximately 79.242% for the PFI-E, and approximately 79.171% for the PFI-H. A response rate of approximately 74.245 percent is assumed for ATES based on the 2014

⁴ Ineligible addresses are those that are undeliverable. Screener mailings for an address where one or more mailings are returned as a postmaster return (PMR) and no mailings are returned complete or refused will lead to an address being coded as ineligible.

⁵ Percentages based on estimates from the 2014 NHES Feasibility Study (NHES-FS) screener.

NHES-FS.⁶ Based on an initial sample of 206,000 addresses and an expected eligibility rate of 90.625 percent, the expected number of completed screener questionnaires is 119,520. Of these, we expect to have approximately 9,540 children selected for the ECPP, 20,224 children for the PFI-Enrolled, 869 children for the PFI-Homeschooled, and 63,855 adults selected for the ATES questionnaire.

Table 2. Expected number of sampled and completed screeners and topical surveys for households

Survey	Expected number sampled NHES:2016	Expected number of completed interviews NHES:2016
Household screeners	206,000	119,520
ECPP	9,540	7,560
PFI-Enrolled	20,224	16,026
PFI-Homeschooled	869	688
ATES	63,855	47,409

Table 3 shows the number of ECPP and PFI completed interviews from previous NHES surveys administrations.

Table 3. Numbers of completed topical interviews in previous NHES surveys administrations

Number of completed topical interviews	NHES surveys administration								
	1993	1995	1996	1999	2001	2003	2005	2007	2012
ECPP	†	7,564	†	6,939	6,749	†	7,209	†	7,893
PFI	19,144	†	17,774	17,652	†	12,422	†	10,681	17,563

† Not applicable; children in this category were not eligible for these topical interviews.

B.1.4 Reliability

The reliability of the sample sizes is measured by the margins of error. The reliability of the screener sample size is shown in Table 4. The “value of p” represents a survey estimate proportion. So, if an estimated proportion is 70 percent, the margin of error will be below .01 for the overall population, as well as within subgroups that constitute 50 percent, 20 percent, and 10 percent of the population. The same is true for survey estimate proportions of 60 or 50 percent, with the exception of estimates within subgroups that constitute 10 percent of the population—for these, the margin of error will slightly exceed .01.

Table 4. Margins of error for screener†

Survey	value of p	1.96 times standard error - overall	1.96 times standard error - 50% characteristic	1.96 times standard error - 20% characteristic	1.96 times standard error - 10% characteristic
Screener	0.7	0.0030	0.0042	0.0067	0.0094
	0.6	0.0032	0.0045	0.0071	0.0101
	0.5	0.0033	0.0046	0.0073	0.0103

†Based on preliminary analysis, a design effect of 1.317 was used for the calculations in this table. This represents the design effect due to unequal weighting at the screener level.

The margins of error for the topical surveys are shown in Table 5.

Table 5. Margins of error for topical surveys†

Survey	value of p	1.96 times standard error - overall	1.96 times standard error - 50% characteristic	1.96 times standard error - 20% characteristic	1.96 times standard error - 10% characteristic
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⁶ Expected topical response rates represent rounded weighted averages of the response rates expected within each experimental group.

ECPP	0.7	0.0142	0.0200	0.0317	0.0448
	0.6	0.0151	0.0214	0.0339	0.0479
	0.5	0.0155	0.0219	0.0346	0.0489
PFI-Enrolled	0.7	0.0108	0.0152	0.0241	0.0341
	0.6	0.0115	0.0163	0.0257	0.0364
	0.5	0.0117	0.0166	0.0263	0.0372
PFI-Homeschooled	0.7	0.0448	0.0634	0.1003	0.1418
	0.6	0.0479	0.0678	0.1072	0.1516
	0.5	0.0489	0.0692	0.1094	0.1547
ATES	0.7	0.0073	0.0103	0.0163	0.0231
	0.6	0.0078	0.0110	0.0175	0.0247
	0.5	0.0080	0.0113	0.0178	0.0252

†Based on preliminary analysis, the following design effects were used in the calculations for this table: 1.880 for the ECPP, 2.304 for the PFI-E, 1.715 for the PFI-H, and 3.133 for ATES. These represent the design effects due to unequal weighting at the screener and topical levels.

B.1.5. Estimation Procedures

The data sets from the NHES:2016 will have weights assigned to facilitate estimation of nationally representative statistics. All households responding to the screener will be assigned weights based on their probability of selection and a non-response adjustment, making them representative of the household population. All individuals in the national sample responding to the topical questionnaires will have a record with a person weight designed such that the complete data set represents the target population. The 1,000 seeded certificate sample cases who receive the ATES survey will be excluded from the weighting procedures since they were not selected using a probabilistic sampling procedure.

The estimation weights for the NHES:2016 surveys will be formed in stages. The first stage is the creation of a base weight for the household, which is the inverse of the probability of selection of the address. The second stage is a screener nonresponse adjustment to be performed based on characteristics available on the frame and screener.

The household-level weights are the base weights for the person-level weights. For each completed topical questionnaire, the person-level weights also undergo a series of adjustments. The first stage is the adjustment of these weights for the probability of selecting the person within the household. The second stage is the adjustment of the weights for topical survey nonresponse to be performed based on characteristics available on the frame and screener. The third stage is the raking adjustment of the weights to Census Bureau estimates of the target population. The variables that may be used for raking at the person level include race and ethnicity of the sampled person, household income, home tenure (own/rent/other), region, age, grade of enrollment, gender, family structure (one parent or two parent), and highest educational attainment in household. These variables (e.g., family structure) have been shown to be associated with response rates. The final raked person-level weights include undercoverage adjustments as well as adjustments for nonresponse.

Standard errors of the estimates will be computed using a jackknife replication method. The replication process repeats each stage of estimation separately for each replicate. The replication method is especially useful for obtaining standard errors for the statistics that the NHES:2016 produces.

B.1.6 Nonresponse Bias Analysis

To the extent that those who respond to surveys and those who do not differ in important ways, there is a potential for nonresponse biases in estimates from survey data. The estimates from NHES:2016 are subject to bias because of unit nonresponse to both the screener and the extended topical surveys, as well as nonresponse to specific items. Per NCES statistical standards, a unit-level nonresponse bias analysis will be conducted if the NHES:2016 overall unit response rate (the screener response rate multiplied by the topical response rate) falls below 85 percent (as is expected). Additionally, any item with an item-level response rate below 85 percent will be subject to an examination of bias due to item nonresponse.

Unit nonresponse

To identify characteristics associated with unit nonresponse, a multivariate analysis will be conducted using a categorical search algorithm called Chi-Square Automatic Interaction Detection (CHAID). CHAID begins by identifying the characteristic of the data that is the best predictor of response. Then, within the levels of that characteristic, CHAID identifies the next best predictor(s) of response, and so forth, until a tree is formed with all of the response predictors that were identified at each step. The final result is a division of the entire data set into cells by attempting to determine sequentially the cells that have the greatest discrimination with respect to the unit response rates. In other words, it divides the data set into groups so that the unit response rate within cells is as constant as possible, and the unit response rate between cells is as different as possible. Since the variables considered for use as predictors of response must be available for both respondents and nonrespondents, demographic variables from the sampling frame provided by the vendor (including household education level, household race/ethnicity, household income, age of head of household, whether the household owns or rents the dwelling, and whether there is a surname and/or phone number present on the sampling frame) and data from the screener (including number of children and the number of adults in the household) will be included in the CHAID analysis. The results of the CHAID analysis will be used to statistically adjust estimates for nonresponse. Specifically, nonresponse-adjusted weights will be generated by multiplying each household's unadjusted weight (the reciprocal of the probability of selection, reflecting all stages of selection) by the inverse response rate within its CHAID cell.

An alternative method for identifying characteristics associated with unit nonresponse is to use regression trees to model all the covariate relationships in the data rather than CHAID. Each covariate is then put into one regression model to predict unit nonresponse. We plan to calculate nonresponse adjustments using both the CHAID method and regression tree method in 2016 to see if differences in estimates would result. Depending on the results of this analysis, we could decide to provide either one or two sets of weights to data analysts on the 2016 file and we can evaluate whether to use CHAID or regression trees for nonresponse adjustments to future NHES collections.

The extent of potential unit nonresponse bias in the estimates will be analyzed in several ways. First, the percentage distribution of variables available on the sampling frame will be compared between the entire eligible sample and the subset of the sample that responded to the screener. While the frame variables are of unknown accuracy and may not be strongly correlated with key estimates, significant differences between the characteristics of the respondent pool and the characteristics of the eligible sample may indicate a risk of nonresponse bias. Respondent characteristics will be estimated using both unadjusted and nonresponse-adjusted weights (without the raking adjustment), in order to assess the potential reduction in bias attributable to statistical adjustment for nonresponse. A similar analysis will be used to analyze unit nonresponse bias at the topical level, using both sampling frame variables and information reported by the household on the screener.

In addition to the above, the magnitude of unit nonresponse bias and the likely effectiveness of statistical adjustments in reducing that bias will be examined by comparing estimates computed using adjusted weights to those computed using unadjusted weights. The unadjusted weight is the reciprocal of the probability of selection, reflecting all stages of selection. The adjusted weight is the extended interview weight adjusted for unit nonresponse (without the raking adjustment). In this analysis, the statistical significance of differences in estimates will be investigated only for key survey estimates including, but not limited to, the following:

All surveys

- Age/grade of child or age of adult
- Census region
- Race/ethnicity
- Parent 1 or adult's employment status
- Parent 1 or adult's home language
- Educational attainment of parent 1/adult
- Family type
- Household income
- Home ownership

Early Childhood Program Participation (ECPP)

- Child receiving relative care
- Child receiving non-relative care

- Child receiving center-based care
- Number of times child was read to in past week
- Someone in family taught child letters, words, or numbers
- Child recognizes letters of alphabet
- Child can write own name
- Child is developmentally delayed
- Child has health impairment
- Child has good choices for child care/early childhood programs

Parent and Family Involvement in Education (PFI)

- School type: public, private, homeschool
- Whether school assigned or chosen
- Contact from school about child’s behavior
- Contact from school about child’s school work
- Child’s overall grades
- Parents participate in 5 or more activities in the child’s school
- Parents report school provides information very well
 - About how child is doing in school
 - About how to help child with his/her homework
 - About why child is placed in particular groups or classes
 - About how to help child plan for college or vocational school
 - About the family’s expected role at child’s school
- Parents attended a general school meeting (open house), back-to-school night, meeting of parent-teacher organization
- Parents went to a regularly scheduled parent-teacher conference with child’s teacher
- Parents attended a school or class event (e.g., play, sports event, science fair) because of child
- Parents acted as a volunteer at the school or served on a committee
- Parents check to see that child’s homework gets done

Adult Training and Education Survey

- Certification or license
- Certificate
- Completed work experience program
- Labor force participation and employment status

The final component of the bias analysis will include comparisons between respondent characteristics and known population characteristics from extant sources including the Current Population Survey (CPS) and the American Community Survey (ACS). Additionally, for substantive variables, weighted estimates will be compared to prior NHES administrations if available. While differences between NHES:2016 estimates and those from external sources as well as prior NHES administrations could be attributable to factors other than bias, differences will be examined in order to confirm the reasonableness of the 2016 estimates.

Item nonresponse

In order to examine item nonresponse, all items with response rates below 85 percent will be listed. Alternative sets of imputed values will be generated by imposing extreme assumptions on the item nonrespondents. For most items, two new sets of imputed values—one based on a “low” assumption and one based on a “high” assumption—will be created. For most continuous variables, a “low” imputed value variable will be created by resetting imputed values to the value at the fifth percentile of the original distribution; a “high” imputed value variable will be created by resetting imputed values to the value at the 95th percentile of the original distribution. For dichotomous and most polytomous variables, a “low” imputed value variable will be created by resetting imputed values to the lowest value in the original distribution, and a “high” imputed value variable will be created by resetting imputed values to the highest value in the original distribution. Both the “low” imputed value variable distributions and the “high” imputed value variable distributions will be compared to the unimputed distributions. This analysis helps to place bounds on the potential for item nonresponse bias through the use of “worst case” scenarios.

B.2 Statistical Procedures for Collection of Information

This section describes the data collection procedures to be used in the NHES:2016. These procedures represent a combination of best practices to maximize response rates based on findings from the ATES 2010 Pilot Study, the

NHES:2011 Field Test, NHES:2012, the 2013 National Adult Training and Education Survey (NATES), and the 2014 NHES-Feasibility Study (NHES-FS) within NCES's cost constraints. The NHES is a two-phase self-administered survey. In the first phase, households are screened to determine if they have eligible adults or children. In the second phase, a detailed topical questionnaire is sent to households with the eligible adults or children. The NHES employs multiple contacts with households to maximize response. These include an advance letter and up to four questionnaire mailings for both the screener and the topical surveys. In addition, households will receive one reminder postcard after the initial mailing of a screener or topical questionnaire. Respondent contact materials are provided in Appendix 1 and survey instruments in Appendix 2.

Screener Procedures

Advance letter. The NHES:2016 data collection will begin with the mailing of an advance notification letter in early January 2016. The NHES:2011 Field Test showed that using an advance letter was effective at raising response rates to the first questionnaire mailing which reduces the amount of followup required. Based on this finding, NHES:2012, NATES, and NHES-FS also used an advance letter.

Screener package. Households will be randomly designated as either a mail treatment household or a web treatment household. As shown in Figure 1, mail treatment households will be mailed a questionnaire package one week after the advance letter. The packages will contain a cover letter, household screener, business reply envelope, and a cash incentive. Figure 2 presents the data collection plan for the web treatment households. The initial mailing will include an advance letter by mail (which includes the web survey URL and log-in credentials) and a cash incentive.

Incentive. Many years of testing in the NHES have shown the effectiveness of a small cash incentive on increasing response. The NHES:2011 Field Test showed that a \$5 incentive was more effective at increasing screener response than a \$2 incentive. The NHES-FS confirmed the positive effects on response rates of a \$5 incentive versus no incentive. NHES:2016 will include an experiment to further evaluate alternative incentive structures. Specifically, households selected for the targeted incentive experiment will receive either no or a \$2, \$5, or \$10 incentive depending on their modeled response propensity. A smaller group will be selected to automatically receive \$2 regardless of predicted response propensity to enable additional analysis of the sensitivity of different types of households to the incentive amount. Households not allocated to one of these treatment groups will receive \$5 regardless of predicted response propensity. Web treatment households are not included in the targeted incentive experiment and will all receive the standard \$5 incentive with the initial mailing. Part A, section A.9 of this submission provides a detailed description of the targeted incentive experiment.

Reminders and nonresponse follow-up. A thank you/reminder postcard will be sent to all sampled addresses approximately one week after the first mailing. Three nonresponse follow-up questionnaire mailings follow this postcard. All nonresponse follow-up questionnaire mailings for mail treatment households will contain a cover letter, replacement screener questionnaire, and business reply envelope. A second questionnaire mailing will be sent to nonresponding households approximately two weeks after the postcard. Approximately three weeks after the second mailing, a third questionnaire mailing will be sent to non-responding households using rush delivery (FedEx or USPS Priority Mail⁷). Results from the 2009 and 2011 tests indicated that households with eligible children tend to respond to later mailings. For this reason we added a mailing to our process and extended the data collection period for the NHES:2012 and NHES-FS. We will continue that protocol in the NHES:2016. The fourth questionnaire package will be sent to nonresponding households approximately three weeks after the third questionnaire mailing.

Web treatment households who do not respond to the first mailing will be sent a reminder postcard followed by another letter with their log-in credentials. Nonrespondent web treatment households will be merged into the mail treatment data collection stream after the second mailing—they will receive a cover letter, paper questionnaire, and business reply envelope in the third (FedEx or USPS Priority Mail) and fourth mailings.

Language. The following criteria were used in NHES:2012 and are proposed again for NHES:2016 to determine which addresses receive a bilingual screener package:

- First mailing criteria: An address is in the Hispanic stratum, or a Hispanic surname is associated with the address, or the address is in a Census tract where 10 percent or more of households meet the criterion of being linguistically isolated Spanish-speaking.

⁷ Because FedEx cannot deliver to P.O. Boxes, P.O. Box-only addresses will be delivered using USPS Priority Mail.

- Second mailing criteria: An address is in the Hispanic stratum, or a Hispanic surname is associated with the address, or the address is in a Census tract where 3 percent or more of households meet the criterion of being linguistically isolated Spanish-speaking.
- Third and fourth mailing criteria: An address is in the Hispanic stratum, or a Hispanic surname is associated with the address, or the address is in a Census tract where 2 percent or more of households meet the criterion of being linguistically isolated Spanish-speaking, or the address is in a Census tract where 2 percent or more of the population spoke Spanish.

Topical Procedures

Topical survey mailings will follow procedures similar to the screener procedures. As described earlier, households with at least one eligible person will be assigned to one of four topical survey mailing groups:

- (1) Households that have been selected to receive an ECPP questionnaire;
- (2) Households that have been selected to receive a PFI-Enrolled questionnaire;
- (3) Households that have been selected to receive a PFI-Homeschooled questionnaire; and
- (4) Households that have been selected to receive an ATES questionnaire.

Within each group, questionnaires will be mailed in waves to minimize the time between the receipt of the screener and the mailing of the topical. Regardless of wave, households with a selected sample member will have the same topical contact strategy within the mail treatment group and the web treatment group. The initial topical mailing for sampled households in the mail treatment group will include a cover letter, questionnaire, business reply envelope, and a cash incentive. A reminder/thank you postcard is then sent to all topical sample members. A total of three nonresponse follow-up mailings follow. All nonresponse follow-up mailings will contain a cover letter, replacement questionnaire, and business reply envelope.

Web treatment cases that break off prior to completing any topical questionnaire items and those for which the screener respondent is not the sampled household member for the topical survey will receive a initial topical mailing (with the web survey URL and log-in credentials) and a \$5 incentive. Web nonrespondents will receive a 2nd followup mailing with the URL and log-in credentials. In the 3rd and 4th mailings, web nonrespondents will be moved to the mail treatment group process, receiving a paper-and-pencil instrument and business reply envelope each time.

Incentive. The NHES:2011 Field Test, the NHES:2012, and the NHES-FS showed that a \$5 incentive was effective with most respondents at the topical level. However, late screener respondents (those that responded after the third or fourth mailing) were more likely to respond to the \$15 incentive amount. As a result, we will offer these late screener responders a \$15 prepaid incentive with their first topical questionnaire mailing. All other respondents in the main sample will receive \$5 with their initial mailing. Households with low response propensity in the targeted incentive experiment who received a \$10 incentive for the screener will also receive a \$10 incentive for the topical survey, unless they are a late screener responder in which case they will receive a \$15 incentive. One week after the initial topical mailing, all households will receive a thank you/reminder postcard. Web treatment households that complete the topical instrument online immediately after completing the screener will receive no additional incentive. Web treatment households that break off before completing any topical items or for whom the screener respondent is not the sampled household member will receive a \$5 topical incentive with the initial topical mailing. Late screener respondents in the web treatment will receive a \$15 incentive comparable to the those in the mail treatment.

Language. Households in the mail treatment group will receive a topical package in English or Spanish depending on the language they used to complete the screener. Households that prefer to complete the topical questionnaire in a different language from that used to complete the screener will be able to contact the Census Bureau to request the appropriate questionnaire. Households in the web treatment group will be able to toggle between Spanish and English at any time in the web topical instruments.

Reminders and nonresponse follow-up. Nonresponding households in the mail treatment group will be mailed a second topical questionnaire approximately two weeks after the reminder postcard. If households that have been mailed a second topical questionnaire do not respond, a third package will be mailed by rush delivery (FedEx or USPS Priority Mail) approximately three weeks after the second mailing. Most households will be sent packages

via FedEx delivery; only those households with a P.O. Box-only address will be sent USPS Priority Mail. If the household does not respond to the third mailing, a fourth mailing will be sent via USPS First Class mail. Figures 3 and 4 show the topical data collection plan for mail treatment households for the ECPP/PFI and ATES, respectively. Nonresponding households in the web treatment groups will receive a second letter with the survey URL and log-in credentials. If they do not respond by web after the second mailing, they will be merged into the mail treatment data collection stream receiving a cover letter, paper questionnaire, and business reply envelope in the third (FedEx or USPS Priority Mail) and fourth mailings. Figure 5 shows the topical data collection plan for web treatment households.

Experiment-related Procedures

One objective of the web experiment is to assess the feasibility of using e-mail to follow-up with respondents to the web survey. For this reason, half of the web experiment sample will be asked to provide an email address for the topical respondent. From this embedded experiment, we will have data about the expected proportion of web respondents who will break off after being asked for someone's email address and the expected proportion of web respondents who will skip the question item that asks for an email address. We would also like to know the expected proportion of email addresses that we collect that are bouncebacks or otherwise invalid and unuseable. To find this rate, we plan to send emails in monthly waves to the last set of emails collected from the web respondents. If the respondent completed the topical survey, the email will say: "Thank you for participating in the 2016 National Household Education Survey. If you are interested in further information about NHES, please see <http://nces.ed.gov/nhes/index.asp>." If the respondent completed the screener only, the email will say, "Thank you for your household's participation in the 2016 National Household Education Survey. If you are interested in further information about NHES, please see <http://nces.ed.gov/nhes/index.asp>." In the latter case, the emails will not be received by the screener respondents until August 2016, the end of data collection so that the opportunity remains open for the topical respondent to respond to NHES for as long as possible. We will track email bouncebacks from this procedure.

Survey Monitoring

Mail survey returns will be processed upon receipt, and reports from the survey management system will be prepared at least weekly. The reports will be used to continually assess the progress of data collection.

B.3 Methods for Maximizing Response Rates

The NHES:2016 design incorporates a number of features to maximize response rates. This section discusses those features.

Total Design Method/Respondent-Friendly Design. Surveys that take advantage of respondent-friendly design have demonstrated increases in survey response (Dillman, Smyth, and Christian 2008; Dillman, Sinclair, and Clark 1993). We have honed the design of the NHES forms through multiple iterations of cognitive interviewing and field testing. These efforts have focused on the design and content of all respondent contact materials. In recent months, we conducted cognitive testing of all Spanish-language materials, including letters and questionnaires. As noted previously, we will include a respondent incentive in the initial screener mailing. Respondent incentives will also be used in the initial topical mailing. Many years of testing in the NHES have shown the effectiveness of a small cash incentive on increasing response. The Census Bureau will maintain an email address and a toll-free questionnaire assistance (TQA) line to answer respondent questions or concerns. If a respondent chooses to provide their information to the TQA staff, staff will be able to collect the respondent's information on an Internet-based screener questionnaire. Additionally, the questionnaires contain frequently asked questions (FAQs) and contact information for the Project Officer.

Engaging Respondent Interest and Cooperation. The content of respondent letters and FAQs is focused on communicating the legitimacy and importance of the study. Past experience has shown that the NHES child survey topics are salient to most parents. In the NHES:2012, Census Bureau "branding" was experimentally tested against Department of Education branding. Response rates to Census Bureau branded questionnaires were higher compared to Department of Education branded questionnaires. Based on this finding, we will use Census Bureau-branded materials in the data collection.

Nonresponse Follow-up. The data collection protocol includes several stages of nonresponse follow-up at each phase. In addition to the number of contacts, changes in method (USPS First Class mail, FedEx, and automated reminder phone calls) are designed to capture the attention of potential respondents.

Figure 1: Mail Screener Data Collection Plan

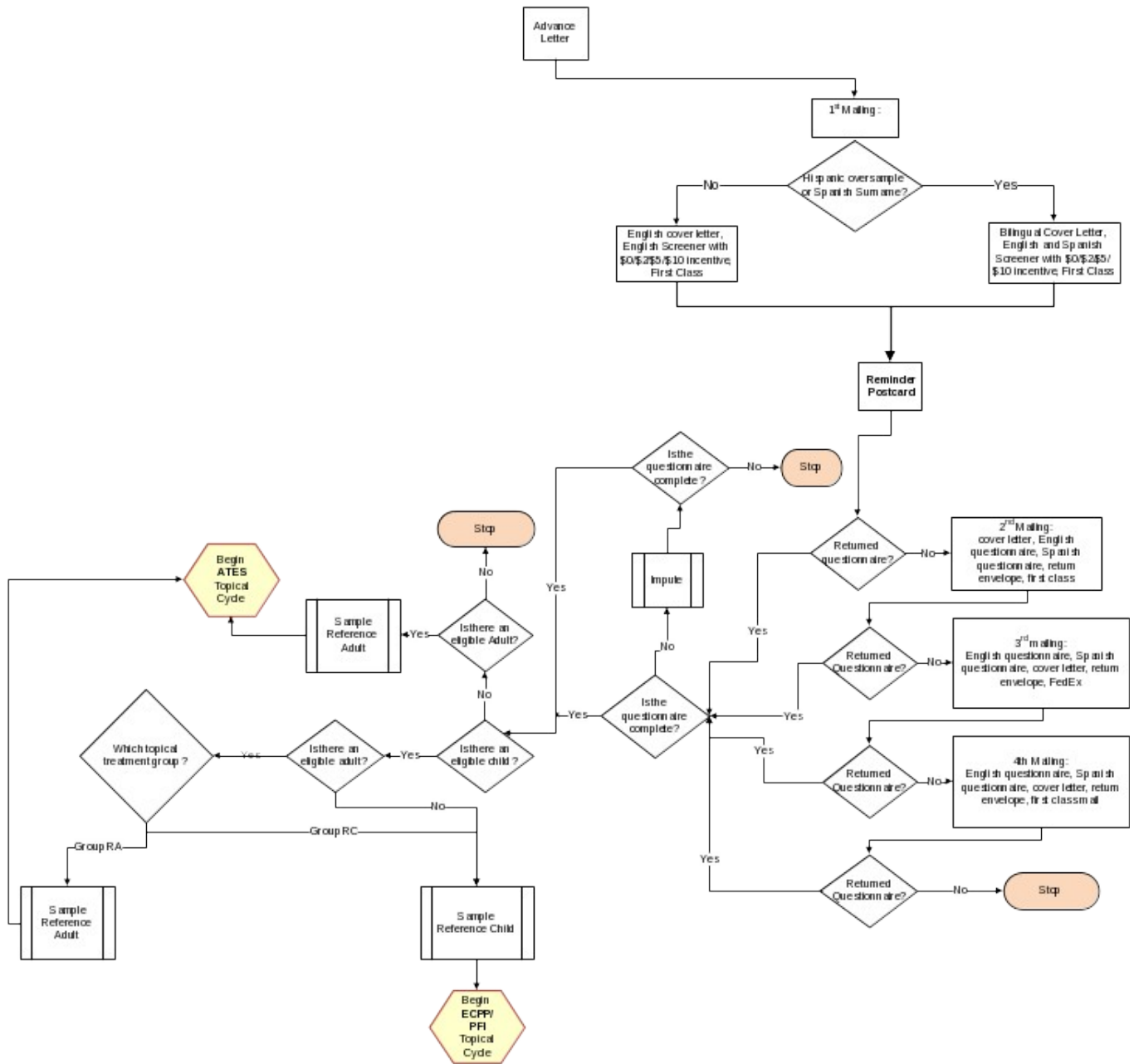


Figure 2: Web Screener Data Collection Plan

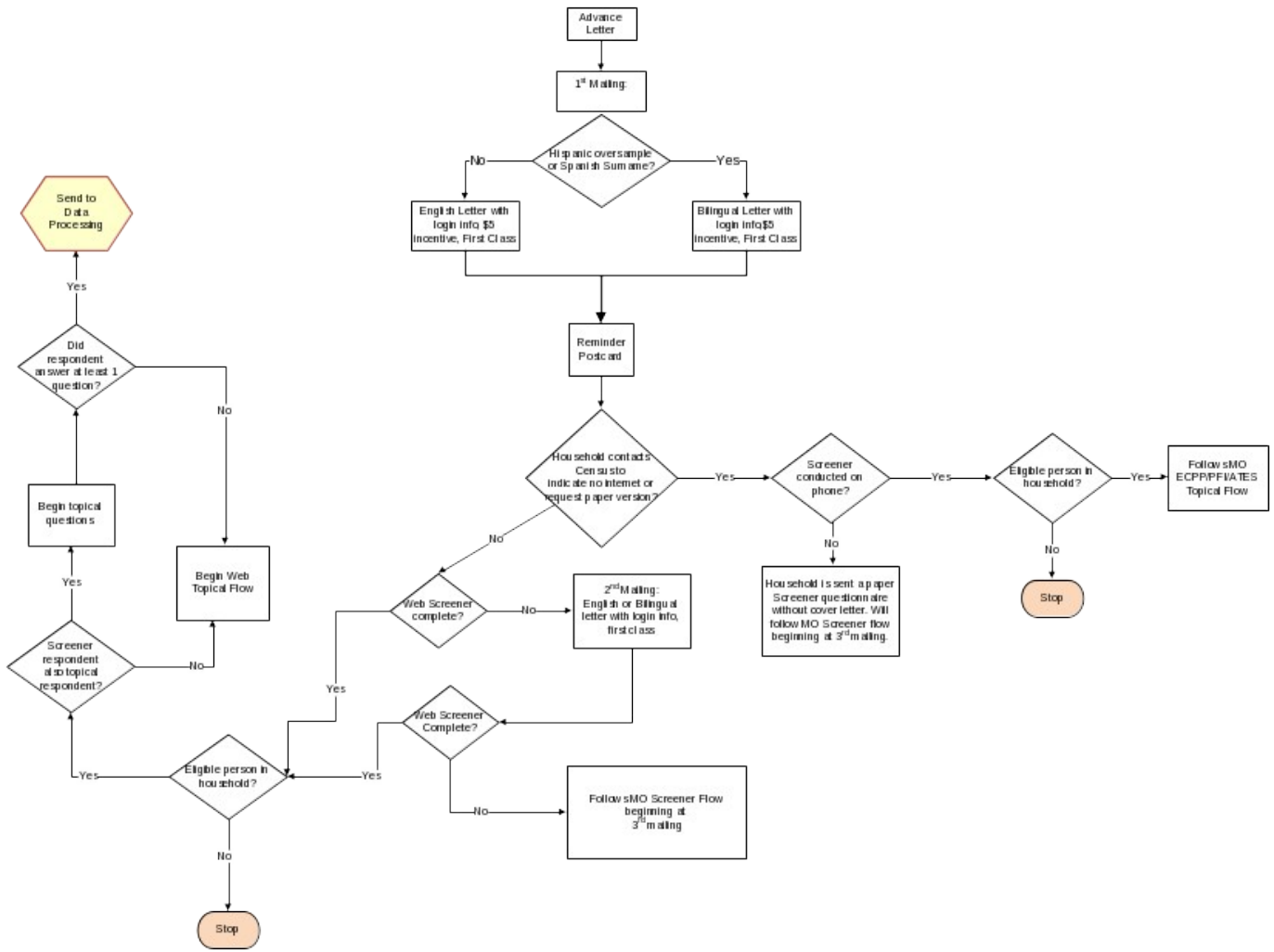


Figure 3: Mail Topical Data Collection Plan – ECPP/PFI

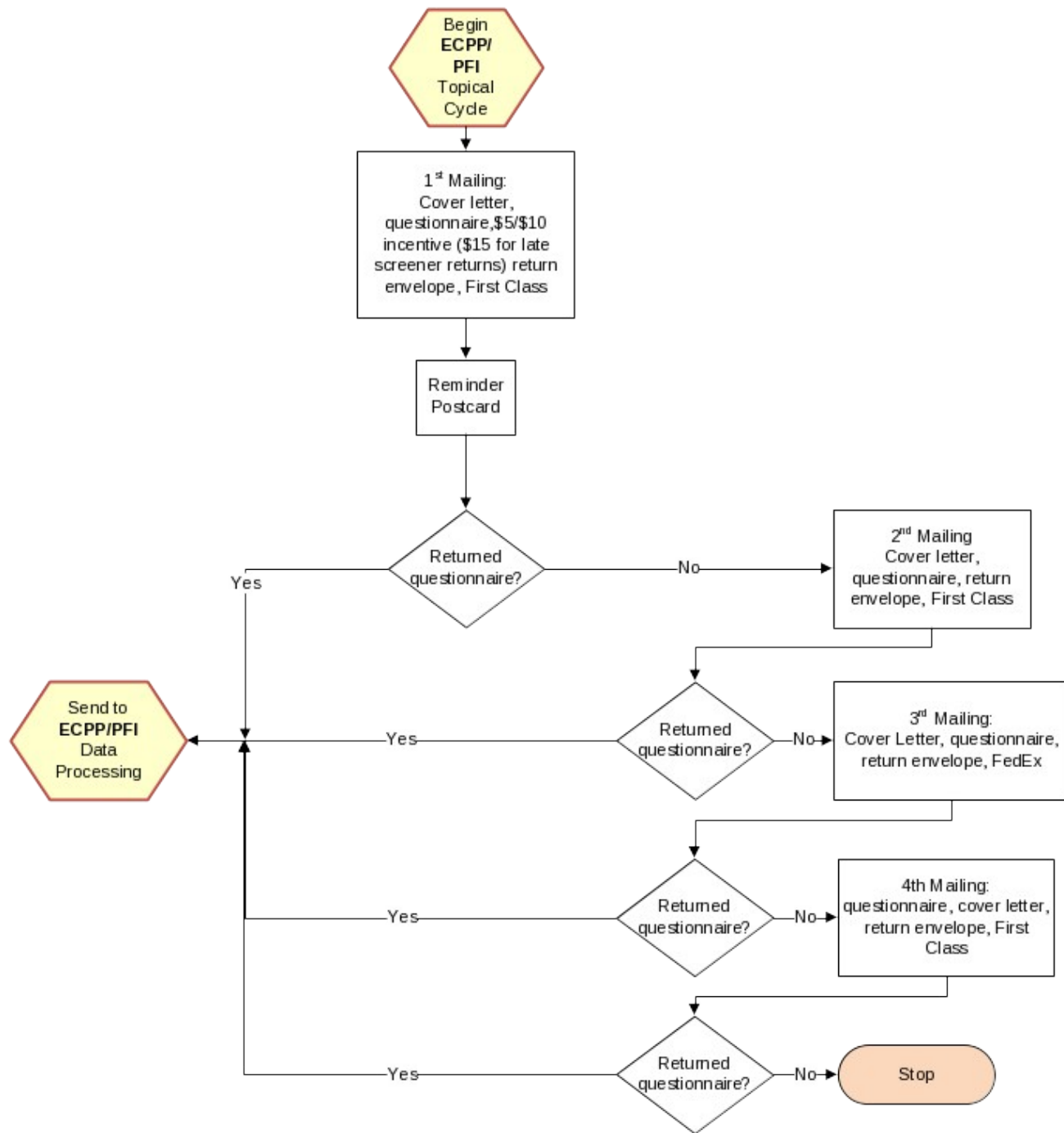


Figure 4: Mail Topical Data Collection Plan – ATEs

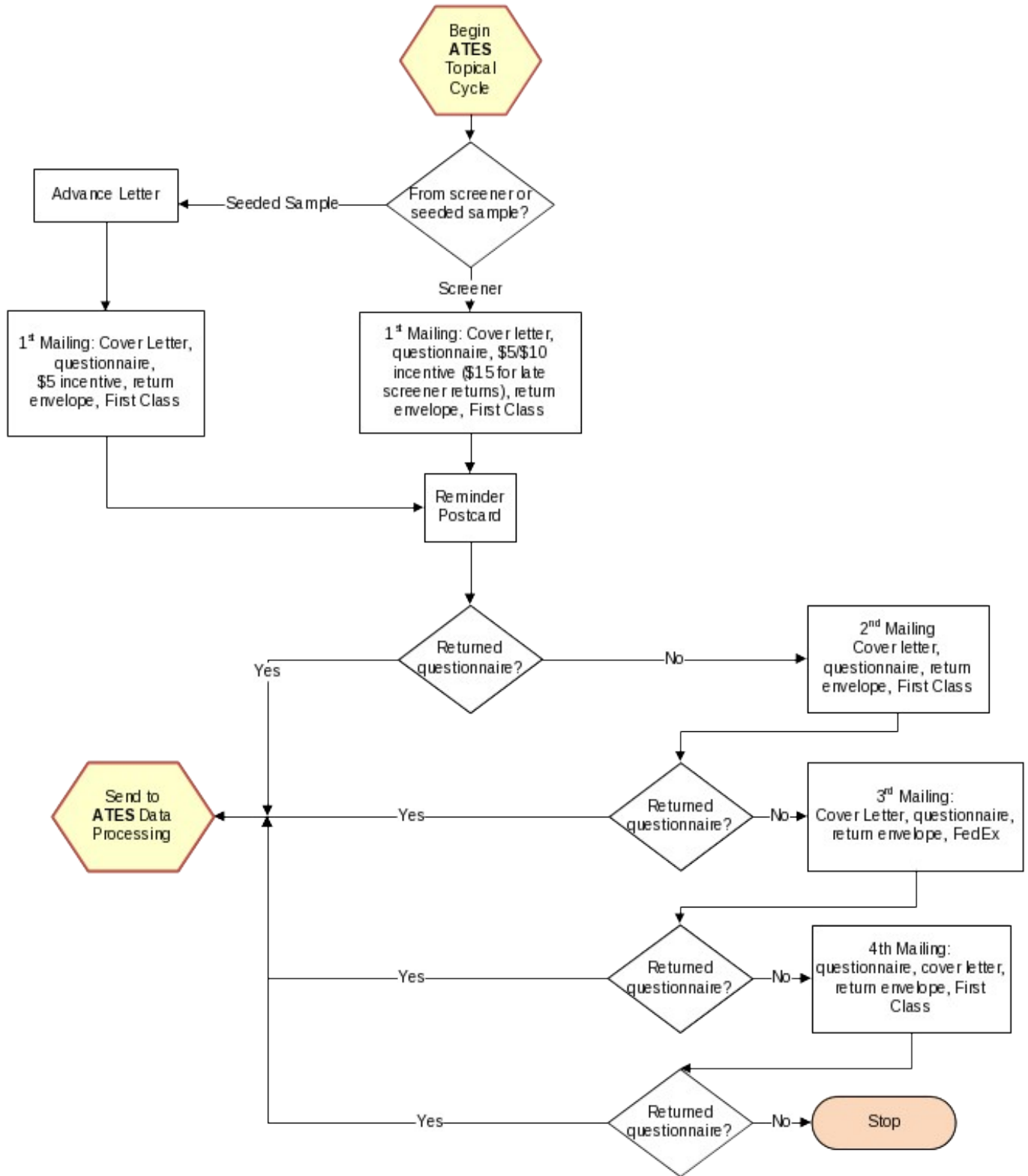
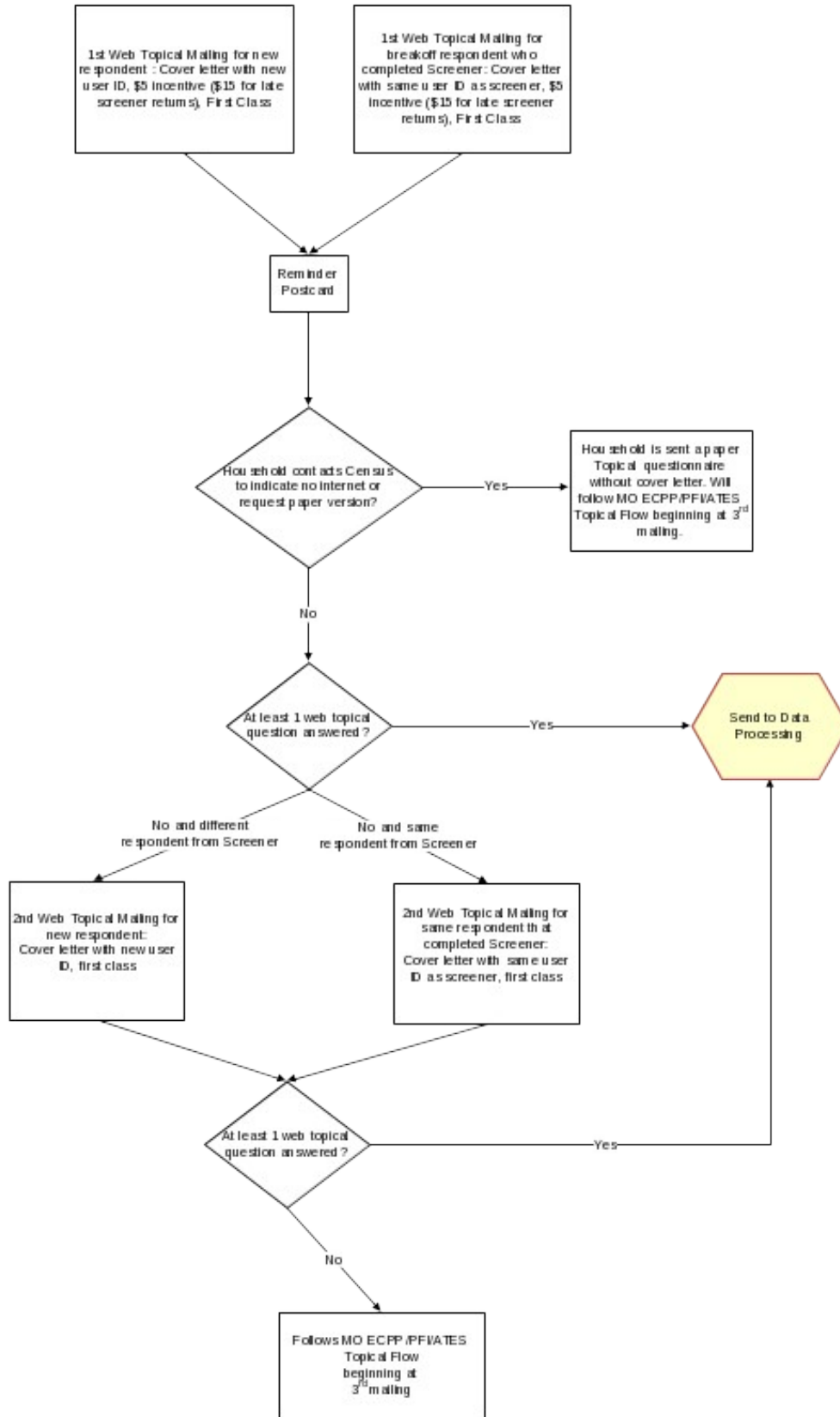


Figure 5: Web Topical Data Collection Plan



B.4 Tests of Procedures and Methods

Web Experiment: As described in Part A, section A.1, of this submission, the NHES:2016 will include a self-response internet experiment to determine if asking respondents to complete the survey on the internet results in an acceptable response rate. If an acceptable response rate is achieved, self-response internet surveys will be considered as a main mode of data collection in the future. A total of 35,000 of the 206,000 screened households will be selected for the web experiment.

Targeted Incentive Experiment: As described in Part A, sections A.1 and A.9 of this submission and section B.2 of this document, the NHES:2016 will also include an incentive experiment designed to examine the effectiveness of leveraging auxiliary frame data to target (a) lower screener incentives to households with a higher modeled propensity to respond and (b) higher screener incentives to households with a lower modeled propensity to respond. A total of 45,000 households will be allocated to this experiment: 35,000 to a modeled incentive group for which the incentive amount will be determined based on the modeled response propensity, and 10,000 to receive \$2 regardless of response propensity. Only households not selected for the web experiment will be eligible for the targeted incentive experiment.

Seeded Sample Experiment: As described in Part A, section A.1, of this submission, the NHES:2016 will include an opportunity sample of 1,000 known holders of educational certificates to evaluate the characteristics of true certificates and to assess the number of false positive responses. The seeded sample is not included in the 206,000 screener sample and none of the seeded sample cases will be included in the web experiment or the targeted incentive experiment.

B.5 Individuals Responsible for Study Design and Performance

The persons listed below participated in the study design and are responsible for the collection and analysis of the data:

Sarah Grady, NCES

Sharon Boivin, NCES

Lisa Hudson, NCES

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Carolyn Pickering, Census

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