National Immunization Survey

A User's Guide for the 2009 Public-Use Data File

Centers for Disease Control and Prevention

**National Center for Immunization
and Respiratory Diseases**

and

National Center for Health Statistics

Presented by:

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Convention for Bolding Text

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1. Introduction

In 1992 the Childhood Immunization Initiative (CII) (CDC 1994) was established to 1) improve the delivery of vaccines to children; 2) reduce the cost of vaccines for parents; 3) enhance awareness, partnerships, and community participation; 4) improve vaccinations and their use; and 5) monitor vaccination coverage and occurrences of disease. Subsequently, the Healthy People 2000 and 2010 objectives established the goal of having at least 90 percent of 2-year-old children fully vaccinated with each recommended vaccine and 80 percent of 2-year-old children vaccinated with the basic immunization series. To fulfill the CII mandate of monitoring vaccination coverage and marking progress toward achieving those goals, the National Immunization Survey (NIS) has been implemented by the National Center for Immunization and Respiratory Diseases (NCIRD) and the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC).

The target population for the NIS is children ages 19 to 35 months living in households in the United States at the time of the interview. The official coverage estimates reported from the NIS are rates of being up-to-date with respect to the recommended numbers of doses of all recommended vaccines (CDC 2010a). These vaccines and their recommended numbers of doses are:

- diphtheria and tetanus toxoids and acellular pertussis vaccine, diphtheria and tetanus toxoids and pertussis vaccine, or diphtheria and tetanus toxoids vaccine (DTaP/DTP/DT) – 4 doses;

- poliovirus vaccine (polio) – 3 doses;

- measles/mumps/rubella vaccine (MMR) – 1 dose;

- haemophilus influenzae type b vaccine (Hib) – 3 or 4 doses depending on product type;

- hepatitis B vaccine (Hep B) – 3 doses;

- varicella zoster (chicken pox) vaccine, –1 dose;

- pneumococcal vaccine – 4 doses;

- hepatitis A vaccine (Hep A), 2 doses; and

- influenza vaccine (For recommended number of doses of influenza vaccine, see http://www.cdc.gov/vaccines/pubs/ACIP-list.htm or (CDC 2008)).

- rotavirus vaccine (RV) – 2 or 3 doses depending on product type

In addition to these vaccines, interest focuses on vaccine series, including the 4:3:1:3:3:1 series (4+ DTaP/DTP/DT, 3+ polio, 1+ MCV, 3+ Hib, 3+ Hep B, and 1+ varicella at or after 12 months of age) and the 4:3:1:3:3:1:4 series, which is 4:3:1:3:3:1 series plus 4+ PCV.

The NIS collects data on each of these vaccines. Varicella vaccine was added in Quarter 3, 1996, pneumococcal vaccine in Quarter 4, 2000, influenza vaccine and hepatitis A vaccine in Quarter 1, 2003, and rotavirus vaccine in Quarter 3, 2007. The remainder of the vaccines have been included in the NIS from its start in 1994. In October 2000, the Advisory Committee on Immunization Practices recommended that all children ages 2 to 23 months receive 4 doses of pneumococcal vaccine (CDC 2000). Influenza vaccine was recommended for children aged 6-23 months starting with the 2004-05 season (CDC 2003). Estimates of influenza vaccination coverage for the 2008-09 season can be obtained from the 2009 NIS.

The NIS uses random digit dialing (RDD) telephone survey methodology to identify households containing children in the target age range and interviews the adult who is most knowledgeable about the child's vaccinations. With consent of the child's parent or guardian, the NIS also contacts (by mail) the child's health care provider(s) to request information on vaccinations from the child's medical records.

Samples of telephone numbers are drawn independently, for each calendar quarter, within selected geographical areas, or strata. **In 2009, there were 64 geographic strata for which vaccine coverage levels can be estimated, including 13 primarily urban city/county areas (including the District of Columbia); the remaining 51 are either an entire state (including U.S. Virgin Islands) or a "rest of state" area. This design makes it possible to produce annual estimates of vaccination coverage levels for each state (including U.S. Virgin Island) and for each of the 13 primarily urban city/county**

areas with a specified degree of precision (a coefficient of variation of approximately 7.5 percent). Further, by using the same data collection methodology and survey instruments in all estimation areas, the NIS produces comparable vaccination coverage levels among estimation areas and over time.

When the NIS was established in 1994, 78 areas were chosen for sampling strata, including the 50 states, 6 urban areas that receive federal Section 317 immunization grants (Bexar County, TX; Chicago, IL; District of Columbia; Houston, TX; New York City; Philadelphia County, PA), and 22 other urban areas. These areas were called "Immunization Action Plan" (IAP) areas in reference to plans developed to improve immunization coverage following the resurgence of measles during 1989-1991. In 2005 and 2006, selected non-grantee IAP areas were "rotated off" (i.e., not oversampled), and replaced by new areas "rotated on" (i.e., oversampled). Starting in 2007, the base NIS geographic strata included 56 areas (6 grantee urban areas and 50 state or "rest of state" areas). In addition, starting in 2007, state immunization programs could choose city/county areas of interest to be oversampled, using their grant funds. **In 2009, the seven additional areas chosen included: Los Angeles County, CA; Lake County, IN; Marion County, IN; City of Baltimore, MD; Dallas County, TX; El Paso County, TX; and Eastern/Western Washington, WA, comprising the following counties: Adams, Asotin, Benton, Chelan, Clallam, Columbia, Cowlitz, Douglas, Ferry, Franklin, Garfield, Grant, Gray's Harbor, Island, Jefferson, Kitsap, Kittitas, Klickitat, Lewis, Lincoln, Mason, Okanogan, Pacific, Pend Oreille, San Juan, Skagit, Skamania, Stevens, Thurston, Wahkiakum, Walla Walla, Whatcom, and Whitman. Note that 2009 was also the first time NIS data were collected in the U.S. Virgin Islands; as noted throughout this report, several of the sampling, data collection, and estimation procedures differed for the U.S. Virgin Islands when compared to the rest of the U.S., including the creation of separate survey weight variables for analysis that is to include the U.S. Virgin Islands.**

The $64 = 56 + 7 + 1$ (U.S. Virgin Islands) areas are called *estimation areas*, or simply *strata*. Table 10 in Section 7 shows cross-walk of estimation areas between years.

To maintain consistency with past NIS public use data files, variable names and descriptions continue to use the term "IAP" to designate areas included as strata, which was the term used prior to 2008. The changing geographic strata over time will not cause a problem with bias in estimation of state and national coverage levels since the geographic strata are nested within state.

For the 2009 NIS, the household interviews began on January 6, 2009 and ended on February 10, 2010. Provider data collection extended from January 2009 to April 2010. A total sample of approximately 6.3 million telephone numbers yielded household interviews for 25,241 children, 17,313 of whom had provider data adequate to determine whether the child was up-to-date with respect to the recommended immunization schedule. The 2009 NIS public-use data file contains data for the 25,241 children with completed household interviews, and more extensive data for the 17,313 children with adequate provider data (including 173 zero-shot children).

Major changes to the NIS in 2009 include:

Sample design: A key difference between 2008 and 2009 was a change in sampling areas. In 2009, interviews were conducted in the U.S. Virgin Islands for the first time. In addition, one sampling area that was not singled out as a separate estimation domain in 2008 was rotated into the sample (Marion County, IN); one new sampling area was created and rotated into the sample (Lake County, IN); and six estimation areas were rotated out (Santa Clara County, CA; Northern CA, comprising the following counties: Del Norte, Siskiyou, Modoc, Lassen, Shasta, Trinity, Humboldt, Mendocino, Tehama, Plumas, Butte, Glenn, Colusa, Lake, and Sierra; Miami-Dade County, FL; Orange County, FL; Madison & St. Clair Counties, IL; and Twin Cities, MN). These "rotated out" areas remained in the sampling design but were not allocated large enough sample sizes to support individual estimates. The 2009 design supports direct estimation for the aforementioned 64 geographic areas.

Published tables of vaccination coverage estimates for 2009 will be available on the National Center for Immunization and Respiratory Diseases website, http://www.cdc.gov/vaccines/stats-surv/imz-coverage.htm#nis.

The accompanying codebook (NCHS 2010) documents the contents of the 2009 NIS public-use data file. For reference, Appendix F (Alphabetical Listing of Variables in the 2004-2009 Public-Use Data Files) provides a full list of variables in the 2009 public-use data file.

Additional information on the NIS is available at:

http://www.cdc.gov/nchs/nis.htm

For additional information on the NIS public-use data file, please contact the NCHS Information Dissemination Staff:

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2. Sample Design

The NIS uses two phases of data collection to obtain vaccination information for a large national probability sample of young children: an RDD telephone survey designed to identify households with children 19 to 35 months of age, followed by the Provider Record Check Study, a mailed survey to children's immunization providers. This section summarizes these two phases of data collection. Other descriptions of the sample design are given by Ezzati-Rice et al. (1995), Zell et al. (2000), Smith et al. (2001a, 2005), and NORC (2009).

2.1. The NIS RDD Telephone Survey

The NIS RDD telephone survey phase uses independent, quarterly samples of telephone numbers in the estimation areas. Table G.1 (in Appendix G) lists the 64 estimation areas for the 2009 NIS by state and shows the estimated number of children living in each state and estimation area in 2009.

The NIS uses the list-assisted method of RDD (Lepkowski 1988). This method selects a random sample of telephone numbers from "banks" of 100 consecutive telephone numbers (e.g., 773-256-0000 to 773-256-0099) that contain at least one directory-listed residential telephone number. **(Because directory listings were unavailable for the U.S. Virgin Islands, the U.S. Virgin Islands sample was selected from all banks of telephone numbers, not just those containing at least one directory-listed residential telephone number.)** The sampling frame of telephone numbers is updated each quarter to reflect new telephone exchanges and area codes. Although the number of cellular telephone users in the U.S. has increased rapidly, most households with children continue to maintain landline telephone service (Blumberg and Luke, 2010). Preliminary results from the July-December 2009 National Health Interview Survey (NHIS) indicate that the number of households with only wireless telephones continues to increase. Approximately 25.9 percent of all children under 18 years of age—more than 18 million children—live in households with only wireless telephones (Blumberg and Luke, 2010). Also, most cellular telephone users have to pay for incoming calls, which makes it burdensome for respondents to participate in the survey. While research is

underway on sampling households via cell telephone, the NIS frame excluded cellular telephone exchanges in 2009.

The target sample size of completed telephone interviews in each estimation area is designed to achieve an approximately equal coefficient of variation of 7.5 percent for an estimator of immunization coverage derived from provider-reported immunization histories, given a true coverage parameter of 50 percent. In 2009, 68.6 percent of children with a completed household interview were determined to have adequate provider data. The phrase "adequate provider data" means that sufficient vaccination history information was obtained from the provider(s) to determine whether the child is up-to-date with respect to the recommended vaccination schedule. (See Section 5.4.2. Disposition and Determination of Adequate Provider Data in NORC (2009).) The percentage of children with adequate provider data varies among estimation areas (54.5 percent in Los Angeles County, CA to 76.1 percent in Minnesota). Starting with the 2002 public-use data file, the definition of children with adequate provider data was expanded to include unvaccinated children. These are children for whom the respondent reported, during the household interview, that the child had received no vaccinations and either has no immunization providers or has one or more immunization providers, but those providers all reported administering no vaccinations. An NCHS Series 2 Report on the statistical methodology of the NIS (Smith et al. 2005) includes details of how unvaccinated children are included in the estimates of vaccine coverage. This report can be viewed at http://www.cdc.gov/nchs/data/series/sr_02/sr02_138.pdf. This modification to the NIS produces only small changes in vaccination coverage for estimation areas and states, because the number of unvaccinated children in the sample is very small (only 173 in 2009).

The design and implementation of the NIS sample involve four procedures. First, statistical models predict the number of sample telephone numbers needed in each estimation area to meet the target precision requirements. Second, the sample for an estimation area is divided into random sub-samples called replicates. By releasing replicates as needed, it is possible to spread the interviews for each sampling area evenly across

the entire calendar quarter. Third, an automated procedure eliminates a portion of the non-working and non-residential telephone numbers from the sample before the interviewers dial them. Fourth, the sample telephone numbers are matched against a national database of residential telephone numbers in order to obtain usable mailing addresses for as many sample households as possible. To promote participation in the NIS, an advance letter is sent to these addresses approximately two weeks prior to the household interview. **(For U.S. Virgin Islands sample, mailing addresses were not obtained, and advance letters were not sent.)**

2.2. The NIS Provider Record Check Study

At the end of the household interview, consent to contact the child's vaccination provider(s) is requested from the parent/guardian. When oral consent is obtained, each provider is mailed an immunization history questionnaire. This mail survey portion of the NIS is the Provider Record Check Study.

The instructions ask vaccination providers to mail or fax the immunization history questionnaire back upon completion. Two weeks after the initial mailing, a thank you/reminder letter is sent to each provider. If no response has been received, another questionnaire packet is mailed five weeks after the initial mailing. Finally, seven weeks after the initial mailing, a telephone call is made to providers who have still not responded, to remind and encourage them to complete the form and either mail or fax the information back. In some instances, provider-reported vaccination histories are completed over the telephone. In certain key periods during the year, the above seven-week schedule is accelerated in order to obtain as many questionnaires as possible prior to the closing date for accepting questionnaires. In the accelerated schedule, telephone calls are made to providers two weeks after the initial mailout, timed to coincide with receipt of the thank you/reminder letter. The data from the questionnaires are edited, entered, cleaned, and merged with the household information from the RDD survey to produce a child level record.

2.3. Summary of Data Collection

Table 1 presents selected operational results of NIS data collection for calendar year 2009 for the entire sample. (**To facilitate comparisons with prior NIS surveys, the numbers in Table 1 are presented both excluding and including the U.S. Virgin Islands sample; the numbers quoted in the text here exclude U.S. Virgin Islands sample**.) Children ages 19 to 35 months during 2009 data collection were born between January 2006 and July 2008. The original sample (in replicates that were released for use) consisted of 6,310,629 telephone numbers. Of those, 2,934,598 were eliminated before release to the telephone centers by the automated procedure as non-working, non-residential, cell telephone, or "take me off the list" numbers. The remaining 3,376,031 numbers were sent to the telephone centers to be dialed, and 1,114,670 households were identified, as shown in Rows 3 and 6. Among the identified households, 1,030,376 (92.4 percent) were successfully screened. Of these, 1,001,463 did not contain an age-eligible child, and 28,913 (2.81 percent) contained one or more age-eligible children. Among these households, 24,068 (83.2 percent) completed the household interview.

Table 1: Selected Operational Results of Data Collection, National Immunization Survey, 2009

Row	Key Indicator	Number (Excluding U.S. Virgin Islands)	Percent (Excluding U.S. Virgin Islands)	Number (Including U.S. Virgin Islands)	Percent (Including U.S. Virgin Islands)	Formula for Percentages
	Household Phase					
1	Total Selected Telephone Numbers in Released Replicates	6,310,629	–	6,392,229	–	–
2	Phone Numbers Resolved before Computer-Assisted Telephone Interviewing	2,934,598	46.5%	2,988,237	46.7%	(Row 2/Row 1)
3	Total Phone Numbers Released for Computer-Assisted Telephone Interviewing	3,376,031	–	3,403,992	–	–
4	Advance Letters Mailed	1,579,190	46.8%	1,579,190	46.4%	(Row 4/Row 3)
5	Resolved Phone Numbers* – *Resolution Rate*	5,228,200	82.8%	5,301,685	82.9%	(Row 5/Row 1)
6	Households Identified – *WRN Rate*	1,114,670	21.3%	1,128,810	21.3%	(Row 6/Row 5)
7	Households Successfully Screened for Presence of Age-Eligible Children – *Screening Completion Rate*	1,030,376	92.4%	1,043,826	92.5%	(Row 7/Row 6)
8	Households with no Age-Eligible Children	1,001,463	97.2%	1,014,414	97.2%	(Row 8/Row 7)
9	Households with Age-Eligible Children – *Eligibility Rate*	28,913	2.81%	29,412	2.82%	(Row 9/Row 7)
10	Households with Age-Eligible Children with Completed Household Interviews–*Interview Completion Rate*	24,068	83.2%	24,491	83.3%	(Row 10/Row 9)
11	CASRO Response Rate**	–	63.7%	–	63.9%	(Row 5 x Row 7 x Row 10)
12	Age-Eligible Children with Completed Household interviews***	24,809	–	25,241	–	–
	Provider Record Check Phase					
13	Children with Consent to Contact Vaccination Providers	19,681	79.3%	20,050	79.4%	(Row 13/Row 12)

Row	Key Indicator	Number (Excluding U.S. Virgin Islands)	Percent (Excluding U.S. Virgin Islands)	Number (Including U.S. Virgin Islands)	Percent (Including U.S. Virgin Islands)	Formula for Percentages
14	Immunization History Questionnaires Mailed to Providers	25,164	–	25,785	–	–
15	Immunization History Questionnaires Returned from Providers	23,626	93.9%	24,137	93.6%	(Row 15/Row14)
16	Children with Adequate Provider Data	17,053 (includes 172 unvaccinated children)	68.7%	17,313 (includes 173 unvaccinated children)	68.6%	(Row 16/Row 12)
17	Age-Eligible Children with Completed Household Interview and Completed HIM	20,059	80.9%	20,426	80.9%	(Row 17/Row 12)

*Includes telephone numbers resolved before release to the telephone centers (Row 2).

**CASRO, Council of American Survey Research Organizations.

***Rows 12 through 17 exclude children found to be ineligible based on the "best" date of birth.

A standard approach for measuring response rates in telephone surveys has been defined by the Council of American Survey Research Organizations (CASRO 1982). The CASRO response rate is equivalent to "RR3" of AAPOR Standard Definitions (AAPOR, 2006). In 2009, the CASRO response rate (Row 11) was 63.7 percent. The CASRO response rate equals the product of the resolution rate (82.8 percent, Row 5), the screening completion rate (92.4 percent, Row 7), and the interview completion rate among eligible households (83.2 percent, Row 10). The resolution rate is the percentage of the total telephone numbers selected that are classifiable as non-working, non-residential, or residential. The screening completion rate is the percentage of known households that are successfully screened for the presence of age-eligible children. The interview completion rate is the percentage of households with one or more age-eligible children who complete the household interview.

Row 12 of Table 1 shows that 24,809 age-eligible children completed household interviews. Rows 13 through 16 give results for the Provider Record Check phase. Specifically, Row 13 gives the rate of obtaining oral consent from household respondents to contact their children's vaccination providers – 79.3 percent in

2009. The number of immunization history questionnaires mailed to vaccination providers exceeds the number of completed interviews for children with consent, because some children have more than one vaccination provider.

Of the questionnaires mailed to providers, 23,626 (93.9 percent, Row 15) were returned. Among the children with completed household interviews, 17,053 (68.7 percent, Row 16) had adequate vaccination histories based on provider reporting (16,881) or were determined to be unvaccinated (172). The other 31.3 percent of children lacked adequate provider data for a variety of reasons, such as the parent did not give consent to contact the child's provider(s), or the provider(s) did not have medical records for the child.

In 2009, data from the Health Insurance Module (HIM) were collected. Among the 24,809 age-eligible children with completed household interviews, 20,059 (80.9 percent, Row 17) completed the HIM module.

For each estimation area and each state, Table G.1 (see Appendix G) shows the number of children with completed household interviews and the number of children with adequate provider data.

2.4. Informed Consent, Security, and Confidentiality of Information

The advance letter, introduction to the telephone survey, and oral consent assure the respondent of the confidentiality of his/her responses and the voluntary nature of the survey. Informed consent is obtained from the person in the household most knowledgeable about the eligible child's immunization history (generally the parent or guardian of the child). Informed consent to contact the child's vaccination provider(s) is obtained at the end of the interview.

Information in the NIS is collected and processed under high security. To ensure privacy of the respondents and confidentiality of sensitive information, NCHS has established standards for release of data from all NCHS surveys. All CDC staff and contractor staff involved with the NIS sign the NCHS confidentiality agreement and follow instructions to prevent disclosure.

All information in the NIS is collected under strict confidentiality and can be used only for research [Section 308(d) of the Public Health Service Act, 42 U.S. Code 242m(d), the Privacy Act of 1974 (5 U.S. Code 552a), and the Confidential Information Protection and Statistical Efficiency Act (5 U.S. Code). Prior to public release, the contents of the public-use data file go through extensive review by the NCHS Disclosure Review Board to protect participant privacy as well as data confidentiality.

3. Content of NIS Questionnaires

This section describes the questionnaires used in the 2009 NIS telephone interview of households and in the NIS Provider Record Check Study.

3.1. Content of the Household Questionnaire

The computer-assisted telephone interview (CATI) questionnaire used in the RDD phase of NIS data collection consists of two parts: a screener to identify households with children ages 19 to 35 months and an interview portion. The questionnaire is modeled on the Immunization Supplement to the National Health Interview Survey (NHIS) (NCHS 1999). The NIS CATI questionnaire has been translated into Spanish, and Language Line Services (formerly part of AT&T) is used for real-time translation into many other languages (Wall et al. 1995). Table 2 summarizes the content of each section of the NIS household interview. The CATI questionnaire is available at http://www.cdc.gov/nchs/nis/data_files.htm.

In the screener, the purpose of the survey is explained to the respondent, and the household is screened to determine whether it contains any children ages 19 to 35 months. If the household has an eligible child, the respondent is asked whether he/she is the most knowledgeable person for the child's vaccination history. If the respondent indicates that another person in the household is more knowledgeable, the interviewer asks to speak to him/her at that time. If that person is unavailable to be interviewed, the interview proceeds to Section MR, the name of the most knowledgeable person is recorded, and a "callback" is scheduled for a later date.

Table 2: Content of the Household Interview, National Immunization Survey, 2009

Questionnaire Section	Content of Section
Section S	Screening questions to determine eligibility, roster of eligible children, availability of shot records
Section MR	Most-knowledgeable-respondent callback questions
Section A	Vaccination history (asked if shot records are available)
Section B	Vaccination history (asked if shot records are not available)
Section C	Demographic and socioeconomic questions
Section D	Provider information and request for consent to contact the eligible child's vaccination provider(s)
Section E	Health Insurance Module

During the screener section, the person being interviewed is also asked whether he/she has a written record (shot card) of the child's vaccination history, and whether it is easily accessible. If a shot card is available, the respondent is asked to provide information directly from it in Section A. If the child does not have a shot card or the shot card is not easily accessible, the interview proceeds with Section B, which asks the respondent to recall from memory information about the child's vaccinations.

Section C obtains information that includes relationship of respondent to the child, race of the child, household income, educational attainment of the mother, and other information on the socioeconomic characteristics of the household and its eligible children. This section is asked of all respondents upon completion of Section A or Section B.

In Section D of the NIS household interview, identifying information (such as name, address, and telephone number) for the child's vaccination provider(s) is requested, as well as the full names of the child(ren) and the respondent, so that NIS personnel can contact the provider(s) and identify the child(ren) whose immunization information the NIS is requesting. After this information is obtained, consent to contact the

child's vaccination provider(s) is requested. When oral consent and sufficient identifying information are obtained, the immunization history questionnaire is mailed to the child's vaccination provider(s).

Beginning in 2006, a Health Insurance Module (HIM) was administered **upon completion of Section D** to collect data regarding the types of medical insurance coverage the child has had since birth. If a respondent provided consent to contact medical providers and completed Section D, he/she flowed directly into the HIM. If, however, consent or any other critical provider question was refused, the call was terminated; only upon callback on which consent was granted or a second refusal given within Section D was the respondent asked the HIM. See Section 7.10 of this user's guide for information on the HIM variables included on the public-use data file.

Some changes were made to the NIS questionnaire during 2009. These are listed below.

In Q1/2009, the following changes were made.

- **Two questions (C21_06Q3_CELL and C_USUAL_USE_CELL) were added to section C of the interview. These questions collected the number of working cell phones in the household and the number of the cell phones that are usually used by the focus child's parents or guardians. C21_06_Q3_CELL reads "Next I have some questions about cell phones in your household. In total, how many working cell phones do you and your household members have available for personal use? Please don't count cell phones that are used exclusively for business purposes." C_USUAL_USE_CELL reads "How many [of these] cell phones do [LIST ALL ELIGIBLE CHILDREN]'s parents and guardians usually use?"**

In Q2/2009, the NIS was conducted in the United States Virgin Islands (USVI); as a result, the following changes were made to the questionnaires for interviews conducted with respondents in the USVI.

- The response option of "Dominican" was added to C2_A_06Q3 and C8_A_06Q3 which ask "Is [CHILD]/Are you/Is [CHILD]'s mother Mexican, Mexican-American, Central American, South American, Puerto Rican, Cuban, other Spanish-Caribbean, or Dominican?"

- Respondents in the USVI were not asked C19A through C19B. Immediately after collecting the family income respondents were instead asked C_ISLAND, "On what island do you live?" After this question the respondents in the USVI went to C19C.

- Questions INS_2, INS_3, INS_3A, and INS_4 were not asked of respondents in the USVI.

- The response options of S-CHIP, Medigap, and Indian Health Service were removed for USVI cases for question INS_7A and INS_10. The text of INS_10 was also updated to remove mention of S-CHIP, Medigap, and Indian Health Service so that it read "During the months when [CHILD] DID have health coverage, what kinds of health coverage did [CHILD] have? Medicaid, Medicare, Military, Private Health Insurance, or another insurance type?"

- Question INS_13 was updated to remove mention of the State Children's Health Insurance Program so that is read "Has [CHILD] ever been covered by any Medicaid plan?"

For interviews conducted in the areas other than the USVI, the following changes were made.

- Respondents in Kansas and New Jersey were no longer asked INS_2 ("At this time, is [CHILD] covered by any Medicaid plan? Medicaid is a health insurance program for persons with certain income levels and persons with disabilities. [FILL IF APPLICABLE: In this state, the program is sometimes called [STATE PROGRAM].") and INS_3 ("At this time, is [CHILD] covered by the State Children's Health Insurance Program or S-CHIP? In this state, the program is sometimes called [S-CHIP PROGRAM NAME].") Instead, they were asked INS_3A ("At this time, is [CHILD] covered by any Medicaid plan or the State

Children's Health Insurance Program, which are health insurance programs for persons with certain income levels and persons with disabilities? In this state, it is sometimes called [STATE PROGRAM].")

- Respondents in Massachusetts, Tennessee, and Vermont began being asked INS_2 and INS_3 and were no longer asked INS_3A ("At this time, is [CHILD] covered by any Medicaid plan or the State Children's Health Insurance Program, which are health insurance programs for persons with certain income levels and persons with disabilities? In this state, it is sometimes called [STATE PROGRAM].")

- INS_13 was also changed for respondents in Kansas, New Jersey, Massachusetts, Tennessee, and Vermont.

    o Previously, respondents in Kansas and New Jersey were read "Has [CHILD] ever been covered by any Medicaid plan or the State Children's Health Insurance Program? In this state, it is sometimes called [STATE PROGRAM]." In Q2/2009 the sentence "In this state, it is sometimes called [STATE PROGRAM]" was removed.

    o In Massachusetts, Tennessee, and Vermont the question previously read "Has [CHILD] ever been covered by any Medicaid plan or the State Children's Health Insurance Program?" In Q2/2009 the sentence "In this state, it is sometimes called [STATE PROGRAM]" was added to the end of the question for these three states.

In Q3/2009, the following changes were made.

- An exit script was added for households with no members over 17 years of age. MINOR_EXIT reads "Those are all the questions I have. I'd like to thank you on behalf of the Centers for Disease Control and Prevention for the time and effort you've spent answering these questions."

- Questions regarding the pneumococcal vaccine (PCV or Prevnar shot) were added to both section A and B of the interview (AN9, AD9, and B6_P).

- The question that previously asked about the flu shot (AN8) was updated to include the "flu shot or flu vaccine sprayed in his/her nose". AD8 was updated to read "What is the date (on the record) for the [first, second, etc] flu vaccination?" from "What is the date (on the record) for the [first, second, etc] flu shot?"

- In section B of the interview questions were added that asked specifically about the flu vaccine spray (B9 and B9DM).

- There were three questions that were added to the instrument in Q3/2009 for respondents in the states of California and New York only:

  o B6_BRTH read "Do you recall if the first Hepatitis B shot was given at the facility where the child was born, prior to discharge?"

  o D6_BF asked "Did you include the facility where the child was born in the number you reported?" and D6A_BF read "Please tell me which of the providers you listed was the birthing facility."

In Q4/2009 the following changes were made.

- S_NUMB2 ("Just to confirm, there are 0 children between the ages of 12 months and 3 years living or staying in your household") was removed from the questionnaire. Respondents who answered "0" as S_NUMB were instead taken to S3_TERM.

- The questions that collect the age of the child when they had chicken pox (if the respondent cannot remember the exact age), A5_F and B6_E, were updated to allow only a response that is equal to or less than the child's age.

- The on-screen frequently asked questions (FAQs) and answers were updated for several questions (D5, D6A_1, D8, D9, and D7) in section D of the interview.

- As a result of the H1N1 flu pandemic several changes were made in sections A and B of the interview:

  - AH1_INTRO was added as an introductory statement to the flu questions in section A.

  - AH18 was added to collect the type of flu vaccination: "Was this the seasonal flu vaccine or the 2009 H1N1, swine, or pandemic flu vaccine?"

  - Questions AH18RDA, AH18RD, and AH1T8 were added in section A to ask about the H1N1 or swine flu vaccination.

  - A8RS and A8RDA were added to ask about the seasonal flu vaccine.

  - A8RD was modified to read "During what month and year did [CHILD] receive the seasonal flu vaccine that is NOT listed on the shot record?" A8RT (which is asked immediately after A8RD) was added and read "Was this a shot or the spray?"

  - BH1_INTRO was added as an introductory statement to the flu questions in section B.

  - BHQ2, BHQ2A, BHQ2B, BHQ2B_C, BHQ2T were added in section B to ask about the H1N1 or swine flu vaccination.

  - B8 was updated to read "Next, I will ask about the seasonal flu vaccine. During the past 12 months has [CHILD] had a seasonal flu shot? A flu shot is usually given in the fall and protects against influenza for the flu season." and B8DMA was added to capture the number of times the child received the seasonal flu shot or vaccine in the past 12 months.

  - B8DM was updated to read "During what month and year did [CHILD] receive the [first, second, etc.] seasonal flu shot?"

  - B9 and B9DM were updated to capture information on the seasonal flu nasal spray and B9DMA was added to capture the number of times the child received the seasonal flu nasal spray in the past 12 months.

3.2. Content of the Immunization History Questionnaire

The immunization history questionnaire administered to the vaccination providers is designed to be simple and brief, to minimize provider burden and encourage survey participation. The structure and content of this form were initially derived from the National Immunization Provider Record Check Study (NHIS/NIPRCS), which collected and reconciled immunization data from the providers of respondents to the Immunization Supplement to the National Health Interview Survey. The immunization history questionnaire consists of two double-sided pages. Page 1 includes space for the label that gives the child's name, date of birth, and gender. The remainder of page 1 contains questions about the facility and vaccination provider. Page 2 gives instructions for filling out the shot grid, which appears on page 3. Page 4 thanks the vaccination provider for providing the information, and lists websites and telephone numbers that can be used to obtain more information about the NIS and the National Center for Immunization and Respiratory Diseases. The Immunization History Questionnaire is available at http://www.cdc.gov/nchs/nis/data_files.htm.

There were modifications made to the IHQ that was used in 2009. On page 1, the IHQ skip pattern was changed to direct providers to answer practice-related questions 5 through 9 even when they did not have records for a particular child. Previously these questions were asked only of providers who had records for the NIS child. In addition, a response option was added to questions 7 and 8 to account for providers who do not administer vaccines.

The following changes were made to the shot grid on page 3 of the IHQ.

- The DTP section was renamed DTaP, dose types were changed to reflect this update, and one new combo shot was added to the dose types. The dose types prior to 2009 were 1) DTP, 2) DTaP, 3) DTaP-Hib, 4) DTP-Hib, 5) DTaP-HepB-IPV. The new list included 1) DTaP/DTP, 2) DTaP-Hib, 3) DTaP-HepB-IPV, 4) DTaP-IPV-Hib (*NEW*).

- The Hib section was updated to incorporate manufacturers, remove DTP combo shots, and add one new type. The dose types prior to 2009 were 1) Hib, 2) HepB-Hib, 3) DTaP-Hib,

4) DTP-Hib. The new list included 1) Hib-Merck, 2) Hib-sanofi, 3) HepB-Hib, 4) DTaP-Hib, 5) DTaP-IPV-Hib (*NEW*). In Q4/2009 an additional change was made to remove "Hib" from dose types 1 and 2 and add GSK as the third dose type/manufacturer.

- The Polio section was updated to include the new combo shot DTaP-IPV-Hib.

- The Rotavirus section was updated to incorporate the following two types: 1) RotaTeq®-Merck and 2) Rotarix®-GSK.

- In Q4/2009 the Influenza section was renamed Seasonal Influenza.

- In Q4/2009 a new section called 2009 H1N1 (Pandemic Influenza) was added to the shot grid with check boxes for two dose types: 1) Injected flu vaccines – MIV and 2) inhaled nasal flu spray – LAMV.

4. Data Preparation and Processing Procedures

The household data collection and provider data collection in the NIS incorporate extensive data preparation and processing procedures. During the household interview, the CATI system supports reconciliation of critical errors as interviewers enter the data. After completion of interviewing for a quarter, post-CATI editing and data cleaning produce a final interview data file. The editing of the provider data begins with a manual review of returned immunization history questionnaires, data entry of the questionnaires, and cleaning of the provider data file. After the provider data are merged with the household interview data and responses from multiple providers for a child are consolidated into a child level data record, the editing continues.   A quality assurance check is performed, from all sources of the date-of-birth information, to ensure that the provider completed the questionnaire for the correct child and to confirm age-eligibility of 19-35 months at time of interview. Editing of the provider-reported vaccination dates then attempts to resolve specific types of discrepancies in the provider data. The end product is an analytic file containing household and provider data for use in estimating vaccination coverage.

4.1. Data Preparation

The editing and cleaning of NIS data involve several steps. First, the CATI system enables interviewers to reconcile potential errors while the respondent is on the telephone. Further cleaning and editing take place in a post-CATI clean-up stage, involving an extensive review of data values, cross tabulations, and the recoding of verbatim responses for race, ethnicity, and vaccinations. The next step involves the creation of numerous composite variables. Provider data are cleaned in a separate step. After these steps have been completed, imputations are performed for item non-response on selected variables, and weights are calculated. The procedures and rules of the National Health Interview Survey serve as the standard in all stages of data editing and cleaning (http://www.cdc.gov/nchs/nhis.htm).

4.1.1.　Editing in the CATI System

The CATI software checks consistency across data elements and does not allow interviewers to enter invalid values. Catching potential errors early increases the efficiency of post-survey data cleaning and processing.

To prevent an overly complicated CATI system, out-of-range and inconsistent responses produce a warming screen, allowing the interview to correct real time errors. This allows the interviewer to reconcile errors while respondent is on the telephone. CATI warning screens focus on items critical to the survey, such as those that determine a child's eligibility (e.g., date of birth).

A CATI system cannot simultaneously incorporate every possible type of error check and maximize system performance. To reconcile this trade-off, post-CATI edits are used to resolve problems that do not require access to the respondent, as well as unanticipated logic problems that appear in the data.

4.1.2.　Post-CATI Edits

The post-CATI editing process produces final, cleaned data files for each quarter. The steps in this process, implemented after all data collection activities for a quarter are completed, are described below.

Initial Post-CATI Edits and File Creation

After completion of interviewing each quarter, the raw data are extracted from the CATI data system and used to create two files: the sample file and the interview data file. The sample file contains one record for each sample telephone number and summary information for telephone numbers and households. The interview data file contains one record for each eligible sample child and all vaccination data the household reported for the child.

Following creation of these two files, a preliminary analysis of each file identifies out-of-range values and extraneous codes. The first check verifies the eligibility status of children, based on date of birth and date of

interview. Once the required corrections are verified, invalid values are replaced with either an appropriate data value or a missing value code.

Frequency Review

After the pre-programmed edits are run, frequency distributions of all variables in each file are produced and reviewed. Each variable's range of values is examined for any invalid values or unusual distributions. If blank values exist for a variable, they are checked to see whether they are allowable and whether they occur in excessive numbers. Any problems are investigated and corrected as appropriate.

File Crosschecks

Crosscheck programs ensure that cases exist across files in a consistent manner. Specifically, checks ensure that each case in the interview data file is also present in the sample file and that each case in the sample file was released to the telephone center. Checks also ensure that no duplicate households exist in the sample file and no duplicate children exist in the interview data file.

When all checks have been performed, the final quarterly interview data file is created. Programmers and statisticians then create composite variables constructed from basic variables for each child. Sampling weights (described in Section 6 of this Guide) are added to each record.

4.1.3. Editing of Provider Data

Six to eight weeks after the close of household data collection for a quarter, the majority of the immunization history questionnaires have been collected from providers. The data from the hard-copy questionnaires are entered and independently re-entered to provide 100 percent verification. The provider data file is cleaned, in a similar fashion to the household data file, for out-of-range values and consistency. A computer program back-codes all "other shot" verbatim responses into the proper vaccine category (e.g., Engerix B counts as Hep B, and Tetramune counts as DTP and Hib). These translations come from a file that contains all such verbatim responses ever encountered in the NIS. Also, the provider data file is checked for duplicate records,

and exact duplicates are removed. If the provider data contain a date of birth of the child, gender of the child, or child name that differs from the household interview for that child, the questionnaire is re-examined to see whether it may have been filled out for the incorrect child. Provider data that appear to have been filled out for the wrong child are removed from the provider database. When a child has data from multiple providers, decision rules are applied to produce the most complete picture of the child's immunization history.

Once these data have been cleaned, they are combined with the household data file. Information from up to five providers can be added to a child's record. If more than one provider reported vaccination data for the child, the data from the multiple provider reports are combined into a single history for the child, called the "synthesized provider-reported vaccination history". The determination of whether the child is up-to-date for recommended vaccines and vaccine series is based on the child's synthesized provider-reported vaccination history.

Many variables in the household data file are checked against or verified with the provider data file. For example, a child's date of birth as recorded by the provider is checked against the date of birth as given by the household, to verify that the provider was reporting for that specific child and to form a "best" date of birth for the child. Vaccination dates are also compared, and any discrepancies are examined by hand. In most instances, the provider data are used in preference to the household data.

4.2. Limitations of Data Editing Procedures

Although data editing procedures were used for the NIS, the data user should be aware that some inconsistent data might remain in the public-use data file. The variables that indicate whether a child is up-to-date on each vaccine or series (on which the estimates of vaccination coverage are based) are derived from provider-reported data. Hence, the household-reported vaccination dates (from interviews conducted with a shot card) are not edited for discrepancies beyond the built-in checks in the CATI system.

The NIS does not re-contact households or providers to attempt to reconcile potential discrepancies in provider-reported vaccination dates or to resolve date-of-birth reporting errors. However, beginning with the 1999 NIS, the provider-reported data are manually reviewed and edited to correct specific reporting errors. The *National Immunization Survey: Guide to Quality Control Procedures* (CDC 2002) discusses the change in editing procedures in more detail. Some children with adequate provider data may have incomplete vaccination histories. These incomplete histories arise from three primary sources: 1) the household does not identify all vaccination providers, 2) some but not all providers respond with vaccination data, and 3) all identified providers respond with vaccination data but fail to list all the vaccinations in the child's medical record. Even with these limitations, the NIS overall is a rich source of data for assessment of up-to-date status and age-appropriate immunization. Also, NIS is the only source to provide comparable vaccination data across states and local areas in the US.

4.3.   Variable-Naming Conventions

The names of variables follow a systematic pattern as much as possible. The codebook for the public-use data file groups the variables into ten broad categories according to the source of the data (household or provider) and the content of the variable (NCHS 2010). See Section 7 of this report for detailed information on the contents of the public-use data file.

4.4.   Missing Value Codes

Missing value codes for each variable can be found in the codebook (NCHS 2010). For household variables, the missing value codes usually are 77 for DON'T KNOW and 99 for REFUSED. Some household variables may also contain blanks, if the question was not asked. The variables developed from the immunization history questionnaire generally do not have specific missing value codes.

4.5.   Imputation for Item Non-Response

The NIS uses imputation primarily to replace missing values in the socioeconomic and demographic variables used in weighting. Missing values of these variables are imputed for all children with a completed household

interview – i.e., all children appearing on the public-use data file. **(An exception is the indicator of eligibility for the Vaccines for Children program (VFC_I); see Section 7.10 of this user's guide for more information on VFC_I.)** A sequential hot-deck method is used to assign imputed values (Ford 1983). Class variables are used to separate respondents into cells. Donors and recipients must agree on the categories of the class variables, which include estimation area. Within the categories of the class variables, respondents are sorted by variables related to the variable to be imputed. The last case with an observed value is used as the donor for up to four recipients. The "Notes" line for each variable in the codebook (NCHS 2010) identifies variables that contain imputed values. These variables include the gender, Hispanic origin, race, and first-born status of the child, and the education level, age group, marital status, and mobility status of the mother.

The count of vaccinations for a specific vaccine is based on the number of unique vaccination *dates* reported by the child's provider(s). In filling out the immunization history questionnaire a provider may not know the date of the first dose of hepatitis B, which is typically given at birth. The provider does, however, have the option of checking the "Given at Birth" box for the first dose of hepatitis B. If it was checked "yes" and the date of the birth dose of hepatitis B was not reported, a program assigns the date of the birth dose for this vaccine. If the household used a vaccination record to report vaccination dates, those dates are examined to see whether the date of the birth dose can be taken from that record. If it is not reported in the vaccination record, a value is imputed from the distribution of provider-reported dates for the birth dose of hepatitis B in the most recent four quarter Child Level Analysis File. The birth dose for this imputation is defined as being given in the first 7 days of life--between the date of birth (i.e., 0 days) and the date of birth plus 6 days. This imputation procedure was first implemented for Quarter 1, 2000 – Quarter 4, 2000. For Quarter 1, 2009 – Quarter 4, 2009 a total of 83 children had the date of the birth dose of hepatitis B assigned using the above procedure (see HEP_FLAG). The date of the birth dose was taken from the household's vaccination record for 16 children. For the remaining 70 children, the value was imputed from the distribution of provider-reported dates for the birth dose.

Table 3 shows the distribution of age in days at the birth dose of hepatitis B for children in Quarter 1, 2009 – Quarter 4, 2009 with a provider-reported birth dose. A similar table is included in the 2000-2008 data user's guides. For 1997, 1998, and 1999, Section 5 of the data user's guide provides information on the distribution of age in days for the birth dose of hepatitis B vaccine and gives guidance on imputing age in days at birth dose for children with a missing date, but for whom the provider checked the box indicating that a dose was administered at birth (see HEP_BRTH).

Table 3:   Distribution of Age (in Days) at the Birth Dose of Hepatitis B Vaccine, National Immunization Survey, 2009

Age in Days at Birth Dose	Unweighted Percentage Of Birth Doses†
0	55.9
1	27.0
2	10.4
3	2.7
4	1.6
5	1.0
6+	1.4

† Excludes U.S. Virgin Islands.

4.6.   Vaccine-Specific Recoding of Verbatim Responses

During the household interview, respondents are given the option to report vaccinations in addition to, or instead of, the categories specifically read to them. Similarly, on the IHQ providers can list vaccinations in the "other" section of the IHQ shot grid. These verbatim responses are entered into the CATI system by the interviewer and stored in the interview data file. After data collection, they are reclassified into the listed categories, if possible, using a vaccination recoding table. This table is reviewed by National Center for Immunization and Respiratory Diseases personnel to ensure the shots are recoded into the appropriate category or categories (for combination shots).

4.7. Composite Variables

A number of composite variables (constructed from basic variables) are created and included in the NIS public-use data file. Composite variables assist users and data analysts by eliminating duplication of effort and making NIS data easier to use.

Since the initial years of NIS data collection, the household composite variables have included up-to-date status on individual vaccinations, race of child, household income, and up-to-date status on several vaccination series. Many of these household composite variables are included in the NIS public-use data file. See Section 7 of this report for information on the key variables that are included.

In Quarter 3, 1999 the NIS race questions (see questions C3, C9 and C10 in the household questionnaire) were expanded to include Alaska Native, Native Hawaiian, and Pacific Islander, implementing the revised Office of Management and Budget (OMB) standards for classification of race and ethnicity (http://www.whitehouse.gov/omb/inforeg/statpol.html). The composite race variables in the 2002 through present NIS public-use data files, however, contain only three categories: non-hispanic white alone; non-hispanic black alone; and non-hispanic all other races alone and non-hispanic multi-racial. (The variable RACE_K classifies each child into one of these three categories, while the variable RACEETHK includes a separate "Hispanic" category.) The "all other races alone" category includes Asian, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and other races. If more than one race was selected during administration of the child race questions, the child is classified as multi-racial. Because of small sample sizes and risk of disclosure within estimation areas, the 2002 through present public-use data files do not contain any variables with separate multiple-race categories. Rather, the multi-racial children are included in the "all other races" category. Table 4 shows some characteristics of the current race/ethnicity categories.

Table 4: Weighted Distribution of Children by Race/Ethnicity and Corresponding 4:3:1:3, 4:3:1:3:3:1, Pneumococcal, and Varicella Vaccination Coverage Rates, National Immunization Survey, 2009

Race/Ethnicity Classification (RACEETHK)	Weighted Distribution of Children ages 19-35 Months in U.S. Estimate (%)	Weighted Percentage 4:3:1 UTD Estimate (%)	Weighted Percentage 4:3:1 UTD Standard Error (%)	Weighted Percentage 4:3:1:3:3:1 with Hib excluded UTD Estimate (%)	Weighted Percentage 4:3:1:3:3:1 with Hib excluded UTD Standard Error (%)	Weighted Percentage 4+ Pneumococcal Estimate (%)	Weighted Percentage 4+ Pneumococcal Standard Error (%)	Weighted Percentage 1+ Varicella at 12+ Months Estimate (%)	Weighted Percentage 1+ Varicella at 12+ Months Standard Error (%)
Hispanic	28.05	80.41	1.33	78.17	1.35	80.63	1.29	90.71	0.95
Non-Hispanic white only	50.27	83.50	0.58	78.14	0.66	83.40	0.59	89.23	0.48
Non-Hispanic black only	12.67	76.57	1.61	73.74	1.66	73.23	1.67	88.18	1.33
Non-Hispanic American Indian or Alaska Native only	0.89	80.61	4.23	76.59	4.60	76.19	4.68	89.17	3.22
Non-Hispanic Asian only	3.03	84.04	3.10	80.28	3.24	72.51	4.77	89.50	2.66
Non-Hispanic Native Hawaiian or Pacific Islander only	0.42	92.45	2.54	90.28	3.10	70.11	13.52	97.52	1.27
Multiracial	4.68	78.35	2.35	74.76	2.46	73.10	2.87	90.55	1.58
Non-Hispanic white/black	2.04	73.18	3.68	70.17	3.81	68.03	3.83	88.38	2.76

Race/Ethnicity Classification (RACEETHK)	Weighted Distribution of Children ages 19-35 Months in U.S. Estimate (%)	Weighted Percentage 4:3:1 UTD Estimate (%)	Weighted Percentage 4:3:1 UTD Standard Error (%)	Weighted Percentage 4:3:1:3:3:1 with Hib excluded UTD Estimate (%)	Weighted Percentage 4:3:1:3:3:1 with Hib excluded UTD Standard Error (%)	Weighted Percentage 4+ Pneumococcal Estimate (%)	Weighted Percentage 4+ Pneumococcal Standard Error (%)	Weighted Percentage 1+ Varicella at 12+ Months Estimate (%)	Weighted Percentage 1+ Varicella at 12+ Months Standard Error (%)
Non-Hispanic white/ American Indian or Alaska Native	0.73	71.04	7.90	65.61	8.09	69.26	9.14	86.69	5.03
Non-Hispanic white/Asian	0. 99	84.97	3.81	79.76	4.23	85.15	3.76	94.22	2.08
Non-Hispanic other combination	0.93	88.44	3.32	86.70	3.52	74.43	8.03	94.46	2.22

Note: Weighted by PROVWT. Children with an unknown Hispanic origin and/or race were imputed by a hot-deck method. This table excludes U.S. Virgin Islands.

4.8. Sub-Sets of the NIS Data

The NIS public-use data file contains data for all children ages 19 to 35 months who have a completed household interview. An interview is considered complete if the respondent completed Section C of the questionnaire. As explained in Section 6 of this guide, each child with a completed household interview is assigned a weight (**RDDWT for U.S. proper; RDDWTVI for U.S. proper plus U.S. Virgin Islands**) for use in estimation.

The NIS uses the synthesized provider-reported vaccination histories to form the estimates of vaccination coverage because the provider data are considered more accurate than household-reported data. Thus, the most important sub-set of the data consists of children with adequate provider data. For these children, one or more providers returned the immunization history questionnaire, and the vaccination information reported by those providers is sufficient to determine whether the child is up-to-date on the recommended vaccinations. Unvaccinated children are also considered to have adequate provider data. As discussed in Section 7 below, the PDAT variable identifies the children with adequate provider data (PDAT=1). These children have a separate weight (**PROVWT for U.S. proper; PROVWTVI for U.S. proper plus U.S. Virgin Islands**), which should be used to form estimates of vaccination coverage (see Section 6).

4.9. Confidentiality and Disclosure Avoidance

To prevent identification of participants in the NIS and the resulting disclosure of information, certain items from the questionnaires are not included in the public-use data file. In addition, some of the released variables either are top- or bottom-coded, or have their categories collapsed. Variable labels indicate which variables have been re-coded in these ways.

5. Quality Control and Quality Assurance Procedures

A major contributor to NIS data quality is its sample management system, which in 2009 managed over 200 estimation area by quarter samples and used a number of performance measures to track their progress toward completion. Important aspects of the quality assurance program for the RDD component of the NIS included on-line interviewer monitoring; on-line provider look-ups in a database system integrated with the CATI system, including names, addresses, and telephone numbers of vaccination providers; and automated range-edits and consistency checks. These and other quality assurance procedures contributed to a reduction in total data collection cost by minimizing interviewer labor and overall burden to respondents. Khare et al. (2000), Khare et al. (2001), and the *National Immunization Survey: Guide to Quality Control Procedures* (CDC 2002) describe quality assurance procedures.

The Provider Record Check component used quality control measures at four junctions: prior to mailing packets to providers; during the telephone prompting effort; during the editing of returned questionnaires; and during and after their data entry. The final quality assurance activities are implemented during post-processing of the returned questionnaires or vaccination records. All returned questionnaires were examined to identify and correct any obvious errors prior to data entry and then key-entered with 100 percent verification. The keying error rate is estimated, by way of a second verification process, to be less than 1 percent.

6. Sampling Weights

Each of the two phases of data collection results in a separate sampling weight for each child who has data at that phase. The RDD-phase sampling weights permit analyses of data from children with completed household interviews. Each child with adequate provider data (the sub-set on which official estimates of vaccination coverage are based) has a provider-phase sampling weight. **In 2009, the RDD-phase sampling weights are called RDDWT for the U.S. proper (i.e., set to missing for the U.S. Virgin Islands, to be used to produce estimates excluding the U.S. Virgin Islands) and RDDWTVI for the U.S. proper plus the U.S. Virgin Islands (i.e., to be used to produce estimates including the U.S. Virgin Islands). The provider-phase sampling weights of children with adequate provider data are called PROVWT for the U.S. proper (i.e., set to missing for the U.S. Virgin Islands, to be used to produce estimates excluding the U.S. Virgin Islands) and PROVWTVI for the U.S. proper plus the U.S. Virgin Islands (i.e., to be used to produce estimates including the U.S. Virgin Islands).** As discussed below, revisions in weighting methodology were made on various occasions and the names of the weight variables were also changed to keep track of the revisions. The RDD sampling weights were called HY_WGT in 1995-2001, RDD_WT in 2002, WGT_RDD in 2003 and 2004, RDDWT in 2005-2008, **and RDDWT/RDDWTVI at present**. The provider-phase sampling weights were called W0 in 1995-2001, WT in 2002, WGT in 2003 and 2004, PROVWT in 2005-2008, **and PROVWT/PROVWTVI at present**.

A sampling weight may be interpreted as the approximate number of children in the target population that a child in the sample represents. Thus, for example, the sum of the sampling weights of children who are up-to-date (on a particular vaccine or series of vaccines) yields an estimate of the total number of children in the target population who are up-to-date. Dividing this sum by the total of the sampling weights for all children gives an estimate of the corresponding vaccination coverage rate.

This section describes how these weights are developed and adjusted so as to achieve an accurate representation of the target population. The base weights reflect each child's probability of being selected

into the sample; the adjustments take into account non-resolution of residential/non-residential/non-working status of a telephone number, non-response to the screener and household interviews, number of telephone lines in the household, non-coverage of households that do not have landline telephones, and non-response by providers.

6.1. Base Sampling Weight

In each quarterly NIS sample, each child with a completed household interview receives a base sampling weight. This weight is equal to the total of telephone numbers in the sampling frame for the estimation area divided by the total of telephone numbers that were randomly sampled from that sampling frame and released for interview during that quarter.

6.2. Adjustments for Non-Resolution of Telephone Numbers, Screener Non-Response and Interview Non-Response

Non-response occurs in population-based surveys when respondents refuse to participate, are not available at the time of the interview, or could not be reached during the survey period. Thus, the sum of the base sampling weights of children with completed household interviews will underestimate the size of the target population in the estimation area, because not all sampled households respond to all stages of data collection up to the household interview. As a result, the base sampling weights must be adjusted so they accurately reflect the number of children in the target population that each sampled child with a completed household interview represents.

Some sampled households with age-eligible children fail to complete the household interview because of unit non-response: some telephone numbers are never determined to be residential despite multiple call attempts; some households cannot be determined to have age-eligible children; and some households with age-eligible children do not complete the household interview. To compensate for these three types of unit non-response, the sampling weights of children with a completed household interview are adjusted to account for the estimated number of age-eligible children in households whose telephone numbers are never determined

to be residential, the estimated number of age-eligible children in households that fail to complete the screening interview, and the number of identified age-eligible children for whom the household interview is not completed. Each of these adjustments is carried out within estimation areas by forming weighting cells based on the residential directory-listed status of the sample telephone number, percent of the population that is white in the telephone exchange, and MSA status of the telephone exchange (e.g., weighting cells were formed from directory-listed versus non-directory-listed telephone number; by telephone exchanges with 75 percent or higher white population versus telephone exchanges with less than 75 percent white population; and MSA/non-MSA status). Each cell in each stage of adjustment is assured of having sufficient resolved/responding cases (usually 20) at that stage of adjustment. The cells with a deficient number of responding cases are collapsed with neighboring cells. The order of the variables in cell collapsing is MSA status, percent of population that is white, and directory listed status of the telephone number. Once the adjustment cells are formed, the weights of the unresolved/non-responding records from the previous adjustment step are distributed to the weights of the resolved/responding records within each cell.

6.3. Adjustment for Multiple Telephone Lines and Deriving Annual Weights

Once the non-response-adjusted interview weights for households are computed, these weights are adjusted for additional telephone lines in the household. Because households with multiple telephone lines have a greater chance of being sampled, each child's household interview weight is adjusted by dividing it by the total number of residential telephone lines reported in the household (up to a maximum of 3). Prior to 2005, the adjustment for multiple telephone lines was made by adjusting the base sampling weights before making any other adjustments. Beginning in 2005, the adjustment for multiple telephone lines has been shifted after the interview non-response adjustment, because the information on the number of telephone lines in a household is available only for households with completed household interviews. This shifts the adjustment for multiple telephone lines to the point where the information about the number of telephone lines is actually collected.

Up to the previous step, the sampling weights are adjusted separately for each quarter and the weights in each quarter pertain to the entire target population. However, annual vaccination coverage estimates are obtained from data for four consecutive quarters, so the weights in each quarterly file are adjusted when the data from the four quarters are combined. The adjustment factor is proportional to the number of households with completed household interviews in each quarter within an estimation area.

6.4. Post-Stratification, Including Adjustment for Households Without Landline Telephone

The NIS sampling frame includes only households that have landline telephones. Because the target population consists of all children ages 19 to 35 months living in households, regardless of whether they have landline telephones, non-response-adjusted base sampling weights need to be adjusted to compensate for the non-coverage of children living in households without landline telephones. The non-covered children include children from both wireless-telephone-only and non-telephone households. Data from the NHIS suggest that, of children under the age of 18, approximately 1.9 percent lived in non-telephone households and approximately 25.9 percent lived in wireless-telephone-only households in July - December, 2009, and that this latter percentage is rapidly increasing as the number of households with wireless-telephones only increases (Blumberg and Luke, 2010). Although earlier analysis of NHIS data, which samples both "landline telephone" and "non-landline telephone" households, indicated that children living in households without telephones may have lower vaccination coverage (Bartlett et al., 2001), recent analyses of NIS and NHIS data suggest little or no difference in vaccination coverage rates has been found between children living in households with landline telephones and those living in households with wireless telephones only (Copeland et al. 2009, Molinari et al. 2008). Differences in findings may be due to the differences in what constitutes non-landline telephone households – whereas a decade ago non-landline telephone households were primarily households with no telephone, wireless-only households now constitute the vast majority of non-landline telephone households.

The main part of the adjustment builds on findings (from other surveys) that households that have a telephone at the time of the survey but have experienced an interruption (of more than one week) in their telephone service during the previous year are often similar to households that do not have a telephone. In essence, the resulting adjustment projects from the non-interruption part of the sample to the non-interruption part of the population and from the interruption part of the sample to both the interruption and non-landline-telephone parts of the population.

The first step in adjusting for households without landline telephones involves a post-stratification adjustment where two cells within each estimation area are formed based on the interruption status in telephone service. Then the weights are adjusted to the control totals of the respective groups, defined below, within each estimation area. The weights of the children with interruption in telephone service are adjusted to the control total representing themselves and the children in non-landline-telephone households, while the weights of the children without interruption in telephone service are adjusted to the control total representing themselves only, i.e., the children in households without interruption in telephone service.

The control totals used for the NIS are derived from current natality data from the National Center for Health Statistics (NCHS 2006). **Natality data for 2007 could not be obtained in time, and hence, to represent NIS eligible children that were born in 2007, natality data from 2006 were inflated to represent eligible children born in 2006 and 2007.** Because the Vital Statistics data give the counts of all live births in the U.S., regardless of whether the household has landline telephone service, the control totals include children in both landline-telephone and non-landline-telephone households. These counts are adjusted for infant mortality, immigration, and migration between estimation areas. The control total for children in non-landline-telephone households or in landline-telephone households with interruption are derived from the estimation area-level control total by estimating the percentage of children in non-landline-telephone households and the percentage of children in landline telephone households with interruption within each estimation area. For 2009, data in the 5-percent Public-Use Microdata Sample (PUMS) from the

2000 Census were used to develop initial estimates of the percentage of target children with telephone coverage for each estimation area. The percentages range from 87.3 percent (Mississippi) to 98.7 percent (Washington Rest-of-State). These initial estimates are then adjusted by the estimates of children in landline-telephone households from the Current Population Survey (CPS). The CPS estimates by census region for 2000 and 2009 are used to make a ratio-adjustment of the PUMS estimates of the percentage of children in telephone households. The estimates of the percentage of children in landline-telephone households with interruption by estimation area are obtained from the NIS sample itself. These two percentage estimates are applied to the control total for the estimation area to estimate the control totals for the two post-stratification cells within the estimation area.

The next step in the adjustment is a simple post-stratification that separates the sample of completed interviews into cells defined by characteristics related to non-coverage. The post-stratification variables are race/ethnicity of the child's mother, level of educational attainment of the child's mother, and age of the child. The control total for each post-stratification cell is derived from the NCHS natality file from 2006. **As mentioned previously, 2006 births were inflated to account for eligible children born in 2007 (children born between July 1, 2006 and November 30, 2007 would have been 19-35 months on June 30, 2009).** Use of the natality data to form the required population control totals for the NIS has three limitations: 1) the natality file provides a universe of live births and therefore does not reflect infant mortality; 2) the natality file does not include children born outside the United States who immigrate to this country before reaching ages 19 to 35 months; and 3) the natality file records residence at time of birth, and some children may move from one estimation area to another by the time they reach 19 to 35 months of age. Adjustments are made to the natality data to account for these three factors. For 2009, the methodology is similar to that for 2003-2008 – using data primarily in the 5-percent PUMS from the 2000 Census to make the revised adjustments.

To reduce sampling variability and improve the precision of estimation, extreme weights are trimmed and then recalibrated to control totals. Since 2003, RDD sampling weight values exceeding the median weight plus six times the interquartile range of the weights within an estimation area have been truncated to that threshold. This weight trimming prevents children with unusually large weights from having an unusually large impact on immunization coverage estimates.

The final step in adjusting the RDD sampling weights is a raking adjustment (Deming 1943) of the trimmed, post-stratified weights. The raking procedure used estimation area-level control totals for maternal education categories, maternal race/ethnicity, age group of the child, and gender of the child. Briefly, raking takes each variable in turn and applies a proportional adjustment to the current weights of the children who belong to the same category of the variable. After a number of iterations over all the variables, the raked weights have totals that match all the desired control totals. Raking makes it possible to incorporate additional variables into the weighting and to use more detailed categories for those variables. Smith et al. (2005) and NORC (2009) give the details of various aspects of the NIS estimation procedures.

The base sampling weights after all the foregoing adjustments constitute the "RDD sampling weights" (**RDDWT for U.S. proper; RDDWTVI for U.S. proper plus U.S. Virgin Islands**).

6.5. Adjustment for Provider Non-Response

Among the 25,241 children with a completed household interview **(including U.S. Virgin Islands)**, 17,313 (68.6 percent) had adequate provider data. Starting with the 2002 public-use data file, the definition of children with adequate provider data includes unvaccinated children. These are children for whom the respondent reported during the household interview that the child had received no vaccination and has no immunization providers, or for whom one or more immunization providers were reported but those providers reported administering no vaccinations. Among the 17,313 children with adequate provider data, 173 were unvaccinated children. Failure to obtain adequate provider data for the remaining 31.4 percent was attributable to:

- parent or guardian not identifying any providers or not giving consent to contact the child's vaccination provider(s) (20.4 percent);

- children with one identified provider but inadequate information to contact the provider, or the provider did not respond, or the provider responded but did not report any immunization information for the child (9.0 percent); and

- children with two or more identified providers but not all the providers responded, and responding providers did not report sufficient information to determine the child's vaccination status (2.0 percent).

The 7,928 children for whom a household interview was completed but adequate provider data were not obtained are classified as "partial non-responders" because they have only a partial response to the NIS as a whole.

Empirical results suggest that children with adequate provider data have characteristics believed to be associated with a greater likelihood of being up-to-date, compared with children who had missing provider data. Specifically, children with adequate provider data are more likely to live in households that have higher total family income, have a white mother, and live outside a central city of a Metropolitan Statistical Area. Also, a child with missing provider data is less likely to live in the state where the mother lived when the child was born and less likely to have a parent/guardian who could locate a shot card. These factors indicate a potential lack of continuity of health care, and are associated with lower vaccination rates (Coronado et al. 2000). If no adjustment is made to the RDD sampling weights to account for these differences, estimated vaccination coverage rates may be biased.

To reduce potential bias in estimators of vaccination coverage attributable to partial non-response, a weighting-class adjustment is used in each estimation area (NORC 2009; Brick and Kalton 1996). This adjustment involves three steps. In the first step, sampled children are classified according to the quintile of their estimated probabilities of having adequate provider data. In the statistical literature these probabilities

are called response propensities (Rosenbaum and Rubin 1983, 1984; Rosenbaum 1987). Children who have similar response propensities will also be similar with respect to variables that are strongly associated with the probability of having adequate provider data. In this important respect, children in each class are comparable. Because of this comparability, any sub-sample of children in a class may represent all children in the class. Therefore, the weighting-class adjustment uses the children with adequate provider data to represent all children in the class.

In the second step of this weighting-class adjustment, within each class an adjustment factor redistributes the RDD sample weights of the children with missing provider data to the weights of the children who have adequate provider data. These adjusted sampling weights of children with adequate provider data are initial non-response-adjusted provider-phase weights.

Within an estimation area, the sums of non-response adjusted weights of children with adequate provider data for the various levels of important socio-demographic variables (such as race/ethnicity) may not be equal to corresponding population totals. To reduce bias attributable to these differences, raking was used in the third step to adjust the non-response adjusted weights to match estimation area control totals. Control totals for these variables were estimated using the weighted totals from the sample of children with completed household interviews. Smith et al. (2001b, 2005) describe the development of this approach in more detail. These raked weights of children with adequate provider data are called "final provider-phase weights" (**PROVWT for U.S. proper; PROVWTVI for U.S. proper plus U.S. Virgin Islands**). Because of the comparability of children within each weighting class, any estimate that uses data only from the children with adequate provider data, along with their provider-phase sampling weights, will have less bias attributable to differences between children with adequate provider data and children with missing provider data.

Appendix B summarizes the distribution of the sampling weights (RDDWTVI and PROVWTVI) in each estimation area.

NIS public-use data files for 1995 to 2001 do not include sampling weights that account for the effect of unvaccinated children. An assessment of the effect of accounting for unvaccinated children for the period 1995 to 2003 was made. Weights were calculated for each year with and without unvaccinated children and the vaccination coverage estimates compared. Details of this assessment and the results are available in the user's guide for the 2004 public-use data file. At the national level, accounting for unvaccinated children had very little effect on the estimates of 4:3:1:3 vaccination coverage. Within estimation areas also, the two coverage estimates differed little. The largest difference (in either direction) was most often around 2 percentage points. Differences of that magnitude are small relative to the standard errors of the estimates. Although accounting for unvaccinated children has a small effect on estimates of vaccination coverage, data users who use the public-use data files to examine estimation area-level trends over time are advised to interpret the results with appropriate caution.

6.6. Sampling Weights for the U.S. Virgin Islands

The standard NIS weighting process was followed as closely as possible for U.S. Virgin Islands. Due to differences in how the data were collected in 2009 and availability of external data sources for U.S. Virgin Islands, slight changes were necessary to accurately estimate vaccination rates for this area. These differences are stated below.

In step 6.2, each of the non-response adjustments for U.S. Virgin Islands was done at the estimation area level. That is, no weighting cells were formed for U.S. Virgin Islands.

In step 6.4, the estimate of the percentage of children living in landline-telephone households was derived differently. The national (U.S. proper) CPS estimates for 2000 and 2009 were used to make a ratio-adjustment of the PUMS U.S. Virgin Islands estimate of the percentage of children living in landline-telephone households.

The model used for creating the adequate provider propensity scores in step 6.5 was modified slightly. The standard model used for U.S. proper includes MSA status, while MSA status is excluded in the model for U.S. Virgin Islands.

After sampling weights were calculated for all children in the 50 states, District of Columbia, and U.S. Virgin Islands, they were stored in the variables **RDDWTVI** and **PROVWTVI**. These weight variables permit one to conduct analysis of all estimation areas, including the U.S. Virgin Islands. The weight variables **RDDWT** and **PROVWT** are equal to **RDDWTVI** and **PROVWTVI** for all children, except for children in U.S. Virgin Islands, for whom the value of these weight variables is blank or missing. **RDDWT** and **PROVWT** permit one to conduct analysis of all estimation areas, excluding U.S. Virgin Islands.

7. Contents of the Public-Use Data File

The NIS public-use data file contains a record for each eligible child for whom Section C of the household interview was completed, along with household-reported vaccination information and demographic information about the child and the child's mother. (Because of reporting and recall errors, the household report of vaccinations is not used to produce vaccination coverage rates. Vaccination coverage rates are based on the provider-reported data.) For children with Immunization History Questionnaires (IHQs) containing vaccination data returned by one or more providers, the file also contains provider characteristic variables, as well as variables based on the child's synthesized provider-reported vaccination history: the age of the child at each vaccination, the number of each type of vaccination received, and indicators of whether the child is up-to-date with respect to various recommended vaccines and vaccine series.

The public-use data file consists of ten sections, the contents of which are described below in detail. For additional information, users are encouraged to consult the codebook (NCHS 2010). The codebook is divided into the ten sections described below and contains variable names, labels, and response frequencies (for categorical variables). For select variables, the codebook also gives additional information about the variable in the "Notes" field.

Table 5 lists key NIS variables commonly used in analyses. A full list of variables appearing on the 2004-2009 public-use data files appears in Appendix F, along with the reason for the addition, subtraction, or modification of the variables in 2005, 2006, 2007, 2008, or 2009. Information on changes made between 1995-2004 can be found in the *Alphabetical Listing of Variables that are Not Available in All Public-Use Data Files, National Immunization Survey, 1995-2004.* http://www.cdc.gov/nchs/data/nis/pufvariables1995to2004.pdf

Table 5: NIS Variables Commonly Used in Analyses or for Published Estimates

ID Variables	
SEQNUMC – unique child ID variable	
SEQNUMHH – unique household ID variable	

Geographic Variables	
ESTIAP09 – estimation area number (introduced in 2008; ITRUEIAP used through 2004; ESTIAP in 2005; ESTIAP06 in 2006; ESTIAP07 in 2007; ESTIAP08 in 2008)	
STATE – state FIPS code	
CEN_REG – census region	Northeast Midwest South West

Child Demographic Variables	
AGEGRP – age category of child	19-23 months 24-29 months 30-35 months
RACEETHK – race/ethnicity of child (introduced in 2002; RACEKIDR used in 1995-2001)	Hispanic White alone, non-Hispanic Black alone, non-Hispanic All other races alone and multi-racial, non-Hispanic
SEX – gender of child	Male Female
FRSTBRN – firstborn status of the child	No Yes

Mother Demographic Variables	
EDUC1 – education of the mother	<12 years 12 years >12 years, not a college graduate College graduate
MARITAL2 – marital status of mother	Currently married Never married, widowed, divorced, separated, or deceased
M_AGEGRP – age group of mother	<=19 years 20-29 years 30 years or older

Poverty Variables	
INCPOV1 – poverty status (introduced in 2005; INCPOV1R used through 2004)	At or above poverty level, income > $75,000 At or above poverty level, income <= $75,000 Below poverty level Not determined
INCPORAR – income-to-poverty ratio (introduced in 2005; INCPORAT used through 2004)	

WIC Variables	
CWIC_01 – child ever participated in WIC program	Yes No Never heard of WIC Don't know Refused Missing

CWIC_02 – child currently participating in WIC program	Yes No Don't know Refused Missing

Breastfeeding Variables

CBF_01 – child ever fed breast milk	Yes No Don't know Missing
BF_ENDR06 – length of time in days child was fed breast milk	
BF_EXCLR06 – length of time in days child was exclusively fed breast milk or formula (introduced in 2006)	
BF_FORMR08 – age in days when child was first fed formula (introduced in 2008; BF_FORMR06 used in 2006 and 2007)	

Chicken Pox Variables

HAD_CPOX – did child ever have chicken pox (introduced in 2005; I_HADCPX used through 2004)	Yes No Don't know Refused Missing
AGECPOXR – age in months when child had chicken pox (introduced in 2005; IAGECPXR used through 2004)	0-6 months 7-12 months 13-18 months 19-24 months 25-30 months 31 months or older Missing

Presence of Provider Data Variables

PDAT – adequate provider data indicator	Yes No

Number of Provider-Reported Doses of Vaccine Variables

P_NUMDTP – total number of DTP/DTaP doses	
P_NUMPOL – total number of polio doses	
P_NUMMMR – total number of MCV doses	
P_NUMHIB – total number of Hib doses	
P_NUMHEP – total number of hepatitis B doses	
P_NUMVRC – total number of varicella doses	
P_NUMPCV – total number of pneumococcal doses	
P_NUMFLU – total number of seasonal influenza doses	
P_NUMHEA – total number of hepatitis A doses	
P_NUMROT – total number of rotavirus doses	

Provider Characteristic Variables

PROV_FAC – provider facility type	All public facilities All hospital facilities All private facilities All military/other facilities All WIC clinic providers Mixed types Unknown

VFC_ORDER – do child's providers order vaccines for children from state/local health department? (introduced in 2006)	All providers Some but not all providers No providers Unknown
REGISTRY – provider(s) reported child's vaccination(s) to state or community immunization registry	All providers Some but not all providers No providers Unknown

Before describing the sections of the public-use data file below, we first summarize the differences between the 2008 and 2009 public-use data files:

- **Because the 2009 estimation areas differ from those used in 1995-2004 and from those used in 2005, 2006, 2007, and 2008, a new 2009 estimation area variable has been added (ESTIAP09) and the 2008 estimation area variable (ESTIAP08) has been dropped.**

- **As described in Section 6, RDDWT and PROVWT continue to be the household- and provider-phase weights for the U.S. proper and have been set to missing for U.S. Virgin Islands children. RDDWTVI and PROVWTVI have been added as the household- and provider-phase weights for the all children, including those in the U.S. Virgin Islands.**

- **The influenza section of the household questionnaire was modified in Q2/2009, modified again in Q3/2009, and modified yet again in Q4/2009. Because consistent Flu questions were not asked throughout 2009, the variable containing the number of household-reported influenza vaccinations received (HH_FLU) has been dropped from the 2009 public-use data file.**

- **Variable RENT_OWN has been added to the public-use data file and contains the household tenure of the child (household's home is owned or being bought; is rented; or is occupied by some other arrangement).**

- **Variables NUM_PHONE, NUM_CELLS_HH, and NUM_CELLS_PARENTS have been added to the public-use data file and contain the number of landline telephone numbers for the household (NUM_PHONE), the number of working cell phones household members**

have available for personal use (NUM_CELLS_HH), and the number of working cell phones usually used by parents or guardians in the household (NUM_CELLS_PARENTS).

- Beginning with the Q1/2009 IHQ, in the DTaP section of the shot grid the DTP and DTaP boxes were combined into a single DTaP/DTP box, the DTP-Hib box was removed, and a new DTaP-IPV-Hib box was added. Therefore, variables that stored the number of vaccinations the child received of the vaccine types that were removed (P_NUMDHB, P_NUMDHM, P_NUMDTM, P_NUMTPM) were dropped. Variable P_NUMDIH was added to store the number of DTaP-IPV-Hib vaccinations received, and a new vaccine type code of "D3" (DTaP-IPV-Hib) was created. This new vaccine type code has become part of the codeframe for the variables containing provider-reported vaccine types (XDTPTY1-XDTPTY9).

- Beginning with the Q1/2009 IHQ, in the Hib section of the shot grid the Hib and DTP-Hib boxes were removed, and new Hib-Merck, Hib-Sanofi, and DTaP-IPV-Hib boxes were added. Beginning in Q4/2009, a new Hib-GSK box was added. New vaccine type codes were created ("HM" for Hib-Merck; "H2" for Hib-Sanofi/GSK; and "D3" for DTaP-IPV-Hib) and have become part of the codeframe for the variables containing provider-reported vaccine types for the Hib-containing vaccine category (i.e., XHIBTY1-XHIBTY9). Variables P_NUMHM, P_NUMH2, and P_NUMHION have been added to the public-use data file to store the number of shots in the synthesized history of type Hib-Merck, Hib-Sanofi/GSK, and Hib-only but unknown type respectively.

- Beginning with the Q1/2009 IHQ, in the Polio section of the shot grid a new DTaP-IPV-Hib box was added. A new vaccine type code was created ("D3" for DTaP-IPV-Hib) and has become part of the codeframe for the variables containing provider-reported vaccine types for the Pneumococcal-containing shot category (i.e., XPCVTY1-XPCVTY9).

- Beginning with the Q1/2009 IHQ, in the Rotavirus section of the shot grid new RotaTeq®-Merck and Rotarix®-GSK boxes were added. New vaccine type codes were created ("RM"

for RotaTeq®-Merck; "RG" for Rotarix®-GSK; and "RO" for Rotavirus-unknown type) and new variables have been added to store the vaccine types of provider-reported Rotavirus-containing shots (i.e., XROTTY1-XROTTY9). Variables P_NUMRM, P_NUMRG, and P_NUMRO have been added to the public-use data file to store the number of shots in the synthesized history of type RotaTeq®-Merck, Rotarix®-GSK, and Rotavirus of unknown type respectively.

- Beginning in 2009, the number of doses required to be up-to-date for Hib and Rotavirus depends on the manufacturer of the vaccine: fewer doses are required if the manufacturer for Hib is Merck and if the manufacturer for Rotavirus is Glaxo-Smith-Kline (i.e., if the Rotavirus type is "Rotarix®"). Variables P_UTDHIB_ROUT_S, P_UTDHIB_SHORT_S, and P_UTDROT_S have been added to indicate up-to-date status for Hib and Rotavirus based on the manufacturer of the vaccinations received. Variables P_UTD431H_ROUT_S, P_UTD431H3_ROUT_S, P_UTD431H31_ROUT_S, P_UTD431H313_ROUT_S, and P_UTD431H314_ROUT_S have been added to indicate up-to-date status for vaccinations series involving Hib, based on the manufacturer of the Hib vaccinations received. See Sections 7.8.2 and 7.8.3 of this user's guide for more information.

- Variable VFC_I has been added to the public-use data file to indicate whether the child is eligible for the Vaccines for Children (VFC) program. The VFC program is a federally-funded program that provides vaccines at no cost to children who might not otherwise be vaccinated because of inability to pay. A child on the public-use data file is considered to be VFC-eligible if he or she is on Medicaid, uninsured, American Indian or Alaska Native, or both underinsured and attending a Federally-Qualified Health Center. (A child is treated as underinsured if he or she is covered by private insurance that does not provide coverage of vaccines.) VFC_I was derived based on imputed versions of the NIS Health Insurance Module variables, imputed race of the child, imputed provider facility type, and imputed income-to-poverty ratio. (These imputed source variables are not included on the public-use

data file.) VFC_I is only valid for children with adequate provider data who live in the U.S. proper (i.e., VFC_I has been set to missing for children without adequate provider data and for U.S. Virgin Islands children).

7.1. Section 1: ID, Weight, and Flag Variables

SEQNUMHH and **SEQNUMC** are the unique household and child identifiers, respectively. **PDAT** indicates which children are considered to have adequate provider data. As described in Section 6 of this report, **RDDWT** (**RDDWTVI if U.S. Virgin Islands is to be included**) and **PROVWT** (**PROVWTVI if U.S. Virgin Islands is to be included**) are the final household- and provider-phase weights, respectively, with each child on the file assigned an RDDWT and children with adequate provider data (PDAT=1) assigned a PROVWT. PROVWT should be used when analyzing the provider-reported data, i.e., the variables in Sections 7, 8, and 9 of the public-use data file. **RDDWT and PROVWT should be used when producing estimates for the U.S. proper (i.e., excluding U.S. Virgin Islands); RDDWTVI and PROVWTVI should be used when producing estimates that include the U.S. Virgin Islands.**

7.2. Section 2: Household-Reported Vaccination Information

Respondents who have shot cards available for the children are administered Section A of the household questionnaire; for each type of vaccine they are asked for the number of vaccinations listed on the shot card and the dates of those vaccinations.

Respondents who do not have a shot card available are administered Section B of the household questionnaire, where they are asked whether they recall the child getting each type of vaccination.

Section 2 of the public-use data file contains variables derived from the information collected in Section A and Section B of the household questionnaire. Variable **SHOTCARD** indicates whether the respondent had a shot card available for the child (i.e., SHOTCARD indicates whether Section A or Section B of the household questionnaire was administered). For each type of vaccine asked about in Sections A and B, a set

of variables store the number of vaccinations reported by the respondent in that vaccine category. (Note that these variables were new starting with the 2006 public-use file.) These variables are named "HH_" followed by the vaccine category abbreviation. For example, **HH_HEPB** has five values, corresponding to zero hepatitis B doses received, at least one hepatitis B dose received, "all" hepatitis B doses received, and responses of "don't know" or "refused" from the respondent. An additional set of variables indicates whether the child is up-to-date for the vaccine category, based on the household shot card report of vaccinations received by the child. (These variables were new starting with the 2006 public-use file.) These variables are named "SC_" followed by the vaccine category abbreviation. For example, **SC_HEPB** indicates whether the child has three or more hepatitis B vaccinations indicated on the shot card.

Section 2 also contains variables indicating whether respondent reported that the child has had chicken pox disease (**HAD_CPOX**) and the child's age in months at chicken pox disease (**AGECPOXR**).

7.3. Section 3: Demographic, Socio-Economic, and Other Household/Child Information

Section 3 of the public-use data file consists of information collected during the household screening interview and Section C of the household main interview. To protect confidentiality, many of these variables have been collapsed, top-coded, or bottom-coded from the original, fully-detailed versions; the variable labels (see the public-use date file codebook) indicate which variables have had such actions taken.

AGEGRP is the age of the child in years in three categories (19-23 months, 24-29 months, 30-35 months), based on the child's best date of birth and the screener completion date. **SEX** gives the gender of the child, and **FRSTBRN** indicates whether the child is the first born, with missing values of these variables imputed. The language in which the interview was conducted is stored in variable **LANGUAGE**, and **C5R** gives the relationship of the respondent to the child.

The breastfeeding variables include whether the child was ever fed breast milk (**CBF_01**), length of time in days the child was fed breast milk (**BF_ENDR06**), the age in days when the child was first fed formula (**BF_FORMR08**), and the length of time in days the child was exclusively fed breast milk or formula (**BF_EXCLR06**). Two types of inconsistencies arise in the breastfeeding data: 1) duration of any breastfeeding can exceed age of the child, and 2) age when the child was first fed formula can exceed the age of the child. **BFENDFL06** is set equal to 1 when BF_ENDR06 exceeds the age of the child (with a buffer), and **BFFORMFL06** is set equal to 1 when BF_FORMR08 exceeds the age of the child (with a buffer). Appendix C provides details on how the flags were created. Data users are cautioned to review Appendix C before analyzing any of the breastfeeding variables.

The WIC variables include whether the child ever participated in the WIC program (**CWIC_01**) and whether the child is currently participating (**CWIC_02**).

C1R and **CHILDNM** give the number of people and children, respectively, in the household. The child's Hispanic origin indicator, race with three categories, and race/ethnicity with four categories are presented in variables **I_HISP_K**, **RACE_K**, and **RACEETHK**, respectively; for each of these variables, missing values have been imputed. The age, education level, and marital status of the mother of the child are stored in variables **M_AGEGRP**, **EDUC1**, and **MARITAL2 (married vs. not married)**, with missing values imputed.

The categorized total combined income for the child's family is given by **INCQ298A**; **INCPOV1** gives the family's poverty status (at or above poverty, income > $75,000; at or above poverty, income <= $75,000; below poverty; unknown), and **INCPORAR** gives the ratio of the family's income to the poverty level. **Household tenure is given by RENT_OWN.**

The number of landline telephone numbers in the household, the number of working cell phones household members have available for personal use, and the number of these cell phones that are usually used by parents or guardians are given by **NUM_PHONE, NUM_CELLS_HH,** and **NUM_CELLS_PARENTS,** respectively.

Variable **CEN_REG** gives the census region of the respondent's current residence, and **MOBIL_I** indicates whether the mother's current state of residence is the same as her state of residence at the time of the child's birth.

7.4. Section 4: Geographic Variables

Variables **ESTIAP09** and **STATE** give the 2009 estimation area and state of residence, respectively, for each child.

7.5. Section 5: Number of Providers Identified and Consent Variables

Variable **D7** indicates whether the respondent gave consent to contact the child's providers. If D7=1, then consent was granted; if D7=2 then consent was explicitly denied; and if D7 is missing, consent was not granted because the respondent broke off the interview before being explicitly asked for consent.

Variable **D6R** gives the number of providers identified by the respondent. Note that sometimes respondents report erroneous provider counts and sometimes report the same provider more than one time, and D6R does not reflect cleaning or de-duplication of the initially-reported provider count.

7.6. Section 6: Number of Responding Providers Variables

Variable **N_PRVR** indicates the number of providers returning IHQs with vaccination information for the child. That is, N_PRVR is the number of IHQs that were returned for the child that contain information on the IHQ shot grid. **DISPCODE** is the provider record check disposition code for the child. Children with DISPCODE = 1 to 6 or 8 to 11 or who are unvaccinated (as defined earlier) are considered to have adequate

provider data (PDAT=1); children (excluding unvaccinated children) who do not have provider vaccination data (DISPCODE = MISSING) or have provider vaccination data that are not adequate to determine up-to-date vaccination status of the child (DISPCODE = 7) are not considered to have adequate provider data (PDAT=2). The definition of the values of DISPCODE can be found in Appendix D.

7.7. Section 7: Characteristics of Providers Variables

The variables in this section of the public-use file summarize the information collected in IHQ questions 6, 7, and 8 across the child's providers who returned IHQs containing vaccination (i.e., shot grid) data.

PROV_FAC indicates the facility type of the child's vaccination providers based on responses to IHQ question 6. If all of the child's providers that returned IHQs containing shot grid data (see Section 6 variable N_PRVR) reported their facility type to be:

- a federally-qualified health center or a public health department-operated clinic, then PROV_FAC=1 (all public facilities);

- a hospital, then PROV_FAC=2 (all hospital facilities);

- a private practice, then PROV_FAC=3 (all private facilities);

- a WIC clinic, then PROV_FAC=7 (all WIC clinic providers);

- a military or other type of facility, then PROV_FAC=4 (all military/other facilities)

If the responses of providers that returned IHQs containing shot grid data fell into more than one of the above bulleted categories, PROV_FAC=5 (mixed); otherwise, if at least one of the child's providers returned an IHQ containing shot grid data, PROV_FAC=6 (unknown). If none of the child's providers returned an IHQ containing shot grid data, PROV_FAC is set to missing.

VFC_ORDER, based on responses to IHQ question 7, indicates whether the child's vaccination providers order vaccines from a state or local health department to administer to children. If all of the child's providers that returned IHQs containing shot grid data (see Section 6 variable N_PRVR) reported that they order

vaccines from a state or local health department to administer to children, then VFC_ORDER=1 (all providers); if at least one of the child's providers that returned an IHQ containing shot grid data reported that the practice orders vaccines from a state or local health department to administer to children and the child's other providers that returned IHQs containing shot grid data reported either that they did not order such vaccines or that they did not know whether or not they did, then VFC_ORDER=2 (some but possibly or definitely not all providers); if all of the child's providers that returned IHQs containing shot grid data reported that they do not order vaccines from a state or local health department to administer to children, then VFC_ORDER=3 (no providers); if none of the conditions for VFC_ORDER=1, 2, or 3 was met but at least one of the child's providers returned an IHQ containing shot grid data, VFC_ORDER=4 (unknown). If none of the child's providers returned an IHQ containing shot grid data, VFC_ORDER is set to missing.

REGISTRY is based on responses to IHQ question 8 and indicates whether the child's vaccination providers reported the child's vaccinations to a community or state registry. If all of the child's providers that returned IHQs containing shot grid data (see Section 6 variable N_PRVR) indicated that they reported to a registry, then REGISTRY=1 (all providers); if at least one of the child's providers that returned an IHQ containing shot grid data indicated that the practice reported to a registry and the child's other providers that returned IHQs containing shot grid data indicated that they did not report to a registry, that they did not know whether or not they reported to a registry, or that the question is not applicable, then REGISTRY=2 (some but possibly or definitely not all providers); if all of the child's providers that returned IHQs containing shot grid data indicated that they did not report to a registry or that the question is not applicable, then REGISTRY=3 (no providers); if none of the conditions for REGISTRY=1, 2, or 3 was met but at least one of the child's providers returned an IHQ containing shot grid data, REGISTRY=4 (unknown). If none of the child's providers returned an IHQ containing shot grid data, REGISTRY is set to missing.

7.8. Section 8: Provider-Reported Up-To-Date Vaccination Variables

This section contains vaccination count and up-to-date variables based on the child's synthesized provider-reported vaccination history. To facilitate data processing and to accommodate the large and continually growing number of vaccination types covered by the NIS, the provider-reported vaccination data are organized around the concept of vaccine categories and vaccine types within vaccine category. The vaccine categories correspond to the sections of the IHQ shot grid, and the vaccine types correspond to the type boxes on the IHQ shot grid. (For each vaccine category, an "unknown" vaccine type is created for vaccinations that are reported without a type box being checked. Also, a few vaccine types, such as Measles-Mumps, arise through the backcoding of shots initially reported in the "other" section of the IHQ shot grid.) Table 6 shows the vaccine categories and types for the 2009 NIS. Note that a single vaccination can fall into more than one vaccine category; for example, an MMR-Varicella vaccination is part of both the Measles-containing and Varicella-containing vaccine categories. (The full list of vaccine type codes can also be found in Appendix I.)

For each vaccine category, Section 8 of the public-use data file contains a variable typically named **P_NUM***YYY* – where "YYY" is the vaccine category abbreviation given in Table 6 – that stores the number of vaccinations in that vaccine category in the child's synthesized provider-reported vaccination history. For each vaccine type in Table 6, Section 8 also contains a variable that stores the number of vaccinations of that vaccine type in the child's synthesized provider-reported vaccination history. For example, **P_NUMDHI** is the number of DTaP/HepB/IPV shots in the child's history.

Table 6:   Vaccine Categories and Vaccine Types, National Immunization Survey, 2009

Vaccine Category Abbreviation	Vaccination Category Description	Vaccine Type Code	Vaccine Type Description
DTP	DTaP/DTP-containing vaccine	03	DTaP/DTP-containing, unknown type
		04	DTaP
		07	DTaP-Hib
		08	DTaP-HepB-IPV
		D3	**DTaP-IPV-Hib**
POL or POLIO	Polio-containing vaccine	08	DTaP-HepB-IPV
		20	OPV
		21	IPV
		22	Polio-containing, unknown type
		D3	**DTaP-IPV-Hib**
MCV or MMR	Measles-containing vaccine	30	MMR
		31	Measles only
		32	Measles-mumps
		33	Measles-rubella
		MM	Measles-containing, unknown type
		VM	MMR-Varicella
HIB	Hib-containing vaccine	07	DTaP-Hib
		43	HepB-Hib
		44	Hib-only, unknown type
		D3	**DTaP-IPV-Hib**
		HI	Hib-containing, unknown type
		HM	**Hib-only (Merck)**
		H2	**Hib-only (Sanofi or GSK)**
HEPB or HEP	Hep B-containing vaccine	08	DTaP-HepB-IPV
		43	HepB-Hib
		60	HepB-only
		HB	HepB-containing, unknown type
VRC	Varicella-containing vaccine	VA	Varicella-containing, unknown type
		VM	MMR-Varicella
		VO	Varicella-only
PCV	Pneumococcal-containing vaccine	70	Conjugate
		71	Polysaccharide

Vaccine Category Abbreviation	Vaccination Category Description	Vaccine Type Code	Vaccine Type Description
		72	Pneumococcal-containing, unknown type
HEPA or HEA	Hepatitis A-containing vaccine	HA	Hepatitis A
FLU	Seasonal influenza vaccine	FL	Seasonal flu, unknown type
		FM	Seasonal flu spray
		FN	Injected seasonal flu
MP	Mumps-only vaccine	MP	Mumps-only
MPRB or MPR	Mumps-Rubella-only vaccine	MB	Mumps-Rubella-only
RB	Rubella-only vaccine	RB	Rubella-only
ROT	Rotavirus-containing vaccine	**RG**	**Rotarix® (GSK)**
		RM	**RotaTeq® (Merck)**
		RO	**Rotavirus, unknown type**

This section of the public-use data file also contains up-to-date indicators for a variety of recommended vaccines and vaccine series. These variables' names typically begin with **"P_UTD"**. Additional variables indicate whether the child is up-to-date for various vaccine series. For example, **P_UTD431** indicates whether the child has received 4 or more DTaP/DTP shots, 3 or more polio shots, and one or more measles-containing shot. The variable labels indicate what is needed to be considered up-to-date for each variable, and the "Notes" field in the codebook shows the vaccine type codes (see Table 6) being included when determining whether the child is up-to-date.

Note that it is possible that the administration of the NIS interview itself prompts some respondents to vaccinate their children following the interview; to ensure that the vaccination rate estimates aren't artificially boosted because of this, the synthesized vaccination history count and up-to-date variables in this section of the public-use data file count only vaccinations received before the date the household interview was completed.

7.8.1. Seasonal Influenza Up-To-Date Variables

Since 2003, two influenza vaccine up-to-date variables have been created (NCHS 2010). The two variables are:

P_UTDFL1: Vaccinated – For interviews conducted during year x (defined using year variable associated with the quarter), child was of age between 6 and 23 months during the entire span from 9/1 through 12/31 of year x-1, and child received at least one influenza vaccination during this period.

Not Vaccinated – For interviews conducted during year x (defined using year variable associated with the quarter), child was of age between 6 and 23 months during the entire span from 9/1 through 12/31 of year x-1, and child received no influenza vaccine during this period.

Not eligible – For interviews conducted during year x (defined using year variable associated with the quarter), child's age fell outside the span of 6 and 23 months at any point between 9/1/x-1 and 12/31/x-1.

and

P_UTDFL2: Vaccinated – For interviews conducted during year x (defined using year variable associated with the quarter), child was of age between 6 and 23 months during the entire span from 9/1 through 12/31 of year x-1, and either a) received no doses of influenza vaccine prior to 9/1/x-1, but then received two between 9/1/(x-1) and whichever is earlier, date of interview or 1/31/x or b) received at least one dose of influenza vaccine prior to 9/1/x-1 and then received one during the period 9/1/x-1 through 12/31/x-1.

Not vaccinated – For interviews conducted during year x (defined using year variable associated with the quarter), child was of age between 6 and 23 months during the entire span from 9/1 through 12/31 of year x-1, but does not qualify for the above definition.

Not eligible – For interviews conducted during year x (defined using year variable associated with the quarter), child's age fell outside the span of 6 and 23 months at any point between 9/1/x-1 and 12/31/x-1.

Starting 2007, another influenza vaccine up-to-date variable (**P_UTDFL3**) has been created. It is similar to the P_UTDFL2 variable but with slight modification in the definition of "not vaccinated". The difference between P_UTDFL2 and P_UTDFL3 is shown in Table 7.

7.8.2. Hib Up-To-Date Variables

A Hib vaccine shortage and interim recommendation to suspend the booster dose for healthy children occurred December 2007 to September 2009 (CDC 2010b). Furthermore, the NIS has historically considered children to be up-to-date for Hib if the child had 3 or more doses of any Hib-containing vaccine, but for some Hib vaccine product types, 4 doses are required. Because the NIS has historically not distinguished between product types for Hib vaccine, children who received 3 doses of a vaccine product that required 4 doses were misclassified as up-to-date for Hib (CDC 2010b).

Because of the Hib vaccine shortage and because of the dependence of the Hib recommendation on product type, in 2009 the IHQ was modified to capture the manufacturer of the Hib vaccinations the child has received. Beginning with the 2009 NIS public-use data file, new up-to-date variables have been added to indicate up-to-date status based on Hib recommendation (i.e., the primary series recommended during the shortage vs. the full series) and on the Hib manufacturer.

Table 7: Comparison of Old Flu Up-to-Date Indicator (P_UTDFL2) and New Flu Up-to-Date Indicator (P_UTDFL3)[1]

Number of Doses in Season 1 Before 9/1/[YEAR[2]-2]	Number of Doses in Season 2 9/1/[YEAR-2] to 9/1/[YEAR-1], Left Inclusive	Number of Doses in Season 3 9/1/[YEAR-1] to 12/31/[YEAR-1][3] Inclusive	Fully Vaccinated According to P_UTDFL2	Fully Vaccinated According to P_UTDFL3	Different
0	0	0	No	No	
0	0	1	No	No	
0	0	2	Yes	Yes	
0	1	0	No	No	
0	1	1	Yes	No	X
0	1	2	Yes	Yes	
0	2	0	No	No	
0	2	1	Yes	Yes	
0	2	2	Yes	Yes	
1	0	0	No	No	
1	0	1	Yes	Yes	
1	0	2	Yes	Yes	
1	1	0	No	No	
1	1	1	Yes	Yes	
1	1	2	Yes	Yes	
1	2	0	No	No	
1	2	1	Yes	Yes	
1	2	2	Yes	Yes	
2	0	0	No	No	
2	0	1	Yes	Yes	
2	0	2	Yes	Yes	
2	1	0	No	No	
2	1	1	Yes	Yes	
2	1	2	Yes	Yes	
2	2	0	No	No	
2	2	1	Yes	Yes	
2	2	2	Yes	Yes	

[1] For children who were between the ages of 6 and 23 months (inclusive) for the entire span of 9/1/[YEAR-1] and 12/31/[YEAR-1].

[2] In this table, YEAR refers to the sampling year for the child.

[3] This date does not apply to the first three rows of this table; for the first three rows (i.e., 0 doses received prior to 9/1/[YEAR-1]) the date is INTERVIEWDATE or 1/31/[YEAR], whichever is earlier.

Table 8 shows the Hib up-to-date variables appearing on the public-use-date file beginning in 2009: in addition to the existing up-to-date indicator based on 3+ Hib of any type (P_UTDHIB), an indicator based on the "shortage" (i.e., primary series) recommendations accounting for manufacturer (3+ Hib of any type or 2+ Hib of Merck types) and an indicator based on the "routine" (i.e., full series) recommendations accounting for manufacturer (4+ Hib of any type or 2

Hib of Merck types followed by 1 Hib of any type) have been added. Table 9 shows the up-to-date series variables that include Hib appearing on the public-use-date file beginning in 2009: in addition to the existing vaccine series up-to-date variables based on 3+ Hib of any type (PUTD4313, PUT43133, PU431331, PU4313313, PU4313314), variables based on the "routine" (i.e., full series) Hib recommendations accounting for manufacturer (4+ Hib of any type or 2 Hib of Merck types followed by 1 Hib of any type) have been added have been added (P_UTD431H_ROUT_S, P_UTD431H3_ROUT_S, P_UTD431H31_ROUT_S, P_UTD431H313_ROUT_S, P_UTD431H314_ROUT_S).

Note that for these Hib up-to-date variables that account for the manufacturer, if the manufacturer is unknown because the provider failed to check a type box on the IHQ, it has been assumed that the manufacturer of the Hib vaccine is not Merck; that is, these variables are based on a "strict" treatment of Hib vaccinations of unknown type, erring on the side of classifying the child as not up-to-date.

Table 8: Up-To-Date Variables for Hib, National Immunization Survey, 2009

Name	Description	Up-To-Date Criteria
P_UTDHIB	Historical UTD flag for Hib.	3+ of any type (07,43,44,D3,HG,HI,HM,HS)
P_UTDHIB_SHORT_S	UTD flag for Hib-shortage (i.e., primary series) recommendation, accounting for manufacturer. New starting 2009.	3+ of any type (07,43,44,D3,HG,HI,HM,HS) OR 2+ Merck types (HM,43)
P_UTDHIB_ROUT_S	UTD flag for routine (i.e., full series) Hib recommendation, accounting for manufacturer. New starting 2009.	4+ of any type (07,43,44,D3,HG,HI,HM,HS) OR 2 Merck types (HM,43) followed by 1 of any type (07,43,44,D3,HG,HI,HM,HS)

Table 9: Up-To-Date Variables for Vaccine Series Including Hib, National mmunization Survey, 2009

Name	Description
PUTD4313	UTD flag for the 4:3:1:3 series using the 3+ any type UTD definition for HIB
P_UTD431H_ROUT_S	UTD flag for the 4:3:1:3 series using the routine (i.e., full series) UTD definition for HIB
PUT43133	UTD flag for the 4:3:1:3:3 series using the 3+ any type UTD definition for HIB
P_UTD431H3_ROUT_S	UTD flag for the 4:3:1:3:3 series using the routine (i.e., full series) UTD definition for HIB
PU431331	UTD flag for the 4:3:1:3:3:1 series using the 3+ any type UTD definition for HIB
P_UTD431H31_ROUT_S	UTD flag for the 4:3:1:3:3:1 series using the routine (i.e., full series) UTD definition for HIB
PU4313313	UTD flag for the 4:3:1:3:3:1:3 series using the 3+ any type UTD definition for HIB
P_UTD431H313_ROUT_S	UTD flag for the 4:3:1:3:3:1:3 series using the routine (i.e., full series) UTD definition for HIB
PU4313314	UTD flag for the 4:3:1:3:3:1:4 series using the 3+ any type UTD definition for HIB
P_UTD431H314_ROUT_S	UTD flag for the 4:3:1:3:3:1:4 series using the routine (i.e., full series) UTD definition for HIB

7.8.3.   Rotavirus Up-To-Date Variables

The up-to-date status for Rotavirus vaccine depends on the manufacturer of the vaccines received; the requirement is two or more doses of Rotarix® (GSK) or three or more doses of Rotavirus vaccine of any type. Beginning with the 2009 NIS public-use data file, an up-to-date variable for Rotavirus vaccine (P_UTDROT_S) has been added to indicate up-to-date status, accounting for the manufacturer (3+ Rotavirus doses of any type or 2+ Rotarix® doses).

Note that for this Rotavirus up-to-date variable, if the manufacturer is unknown because the provider failed to check a type box on the IHQ, it has been assumed that the Rotavirus vaccine dose is not Rotarix®; that is, this variable is based on a "strict" treatment of Rotavirus vaccinations of unknown type, erring on the side of classifying the child as not up-to-date.

7.9. Section 9: Provider-Reported Age-At-Vaccination Variables

This section contains variables storing the child's age in days and months at each vaccination in the synthesized provider-reported vaccination history, along with the vaccine types of those vaccinations.

For each vaccine category, variables named **D***YYY***1** - **D***YYY***9** and ***YYY*_AGE1** - ***YYY*_AGE9** store the age in days and months, respectively, of the child when the vaccination was administered for up to nine vaccinations in the child's synthesized provider-reported vaccination history, where "YYY" is the vaccine category abbreviation given in Table 6. For vaccine categories that contain multiple vaccine types, variables **X***YYY***TY1** - **X***YYY***TY9** give the corresponding vaccine type code (see Table 6).

Unlike the vaccination count and up-to-date variables in Section 8 of the public-use data file, the variables in Section 9 include vaccinations given both before and after the household interview was completed. If desired, users can limit the Section 9 variables to only those before the household interview date by examining the corresponding Section 8 "P_NUM" variable and limiting the analysis of the Section 9 variables to only the first *n* variables, where *n* is equal to the number of vaccinations in the vaccine category before the household interview date as indicated by the corresponding "P_NUM" variable.

7.10. Section 10: Health Insurance Module Variables

The Health Insurance Module (HIM) was introduced in 2006 to gather information on the health insurance coverage of the child. HIM data were included in the NIS public-use data file for the first time in 2007. The NIS public-use file contains seven variables as follows:

- **INS_1** – "Is child covered by health insurance provided through employer or union?";

- **INS_2** – "Is child covered by any MEDICAID plan?";

- **INS_3** – "Is child covered by S-CHIP?";

- **INS_3A** – "Is child covered by any MEDICAID plan or S-CHIP?";

- **INS_4_5 – "Is the child covered by Indian Health Service, Military Health Care, TRICARE, CHAMPUS, or CHAMP-VA?";**

- **INS_6** – "Is child covered by any other health insurance or health care plan?"; and

- **INS_11** - "Anytime when child was not covered by health insurance?"

Note that INS_4_5 combines the responses at questions INS_4 and INS_5. Each variable has "Yes", "No", "Don't Know", and "Refused" as response options. Also, users will encounter blanks or missing values in each variable. There are several reasons for the missingness. First, in order to reach the HIM section, the respondent must first finish Section D. Since the NIS public-use data file contains records for all respondents completing Section C, and because some of these Section C respondents did not complete Section D, some records are for respondents who did not reach the HIM. Second, there is a possibility that the respondent began the HIM but broke off the interview before finishing. Finally, there are skip patterns in the module. That is, depending on the respondent's answers to previous questions, certain questions may be skipped. Figure 1 illustrates the flow of questions for the eight variables included in the NIS public-use data file.

The first question (INS_1) was asked of all respondents who reached the HIM. If the name of the Medicaid and S-CHIP programs were the same in the child's state, the respondent skipped to INS_3A; if the names of the Medicaid and S-CHIP programs were different in the child's state, the respondent was instead asked questions INS_2 and INS_3. **(Note that U.S. Virgin Islands respondents were not asked about Medicaid and S-CHIP; such cases skipped INS_2, INS_3, and INS_3A.)** Questions INS_4, INS_5, and INS_6 were asked of all U.S. proper HIM respondents. **(U.S. Virgin Islands respondents were not asked about Indian Health Insurance at INS_4.)** Based on the respondent's answers to previous HIM questions (some of which are not included in the public-use file), if it was determined that the child currently had health insurance or if the child's insurance status was unknown, the respondent was asked if the child was ever uninsured at question INS_11.

VFC_I indicates whether the child is eligible for the Vaccines for Children (VFC) program. The VFC program is a federally-funded program that provides vaccines at no cost to children who might not otherwise be vaccinated because of inability to pay. A child is considered to be VFC-eligible if he or she is on Medicaid, uninsured, American Indian or Alaska Native, or both underinsured and attending a Federally-Qualified Health Center. (A child is underinsured if he or she is covered by private insurance but that coverage does not include vaccines.) VFC_I is derived based on imputed versions of the NIS Health Insurance Module variables, imputed race of the child, imputed provider facility type, and imputed income-to-poverty ratio. (These imputed source variables are not included on the public-use data file.) VFC_I is valid only for children with adequate provider data who live in the U.S. proper (i.e., VFC_I has been set to missing for children without adequate provider data and for U.S. Virgin Islands children).

Figure 1:   Question Flow for the Eight Health Insurance Variables included in the Public Use File
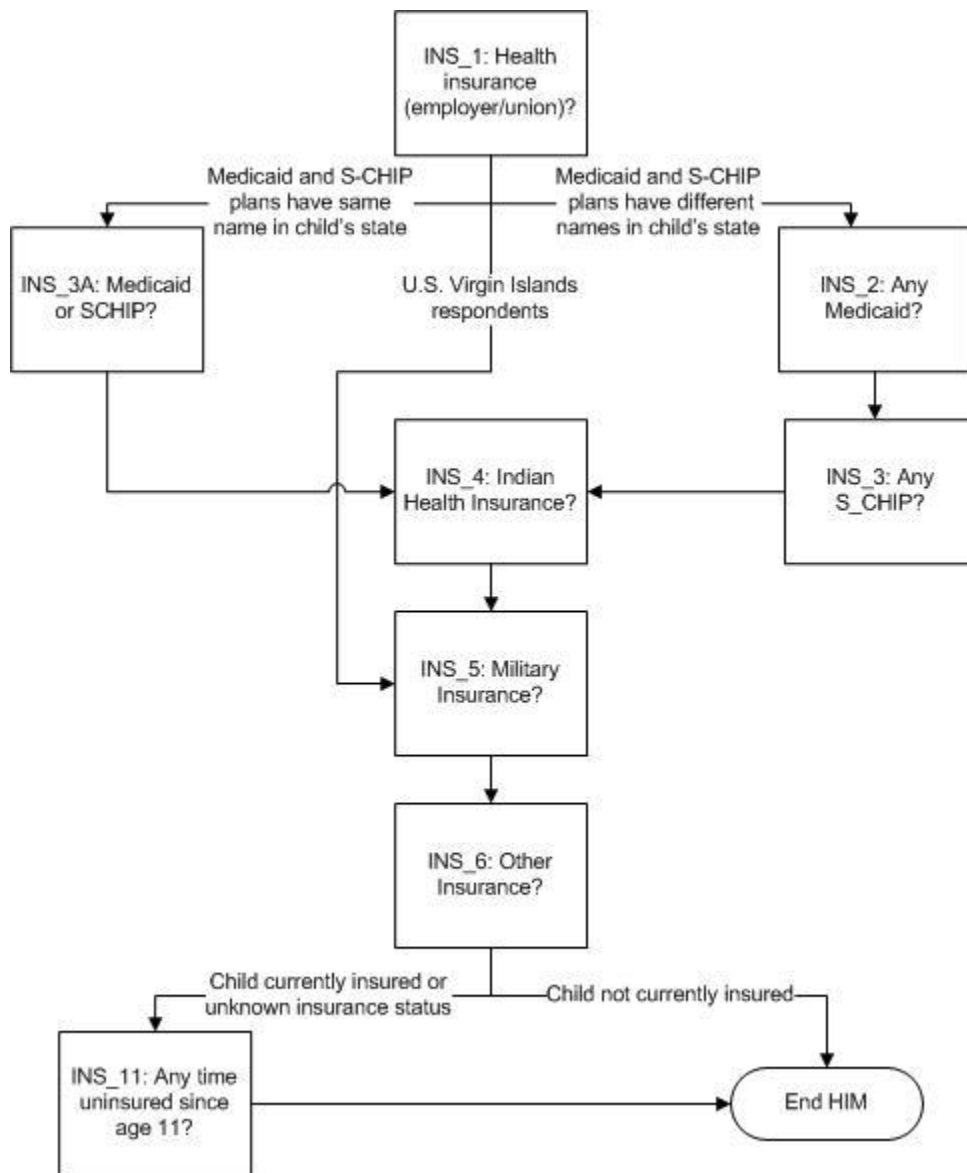
8. Analytic and Reporting Guidelines

Data from the NIS public-use data file can be used to produce national, state, and estimation area estimates of vaccination coverage rates using the PROVWT weight **(PROVWTVI if U.S. Virgin Islands is to be included)**. Information in the data file can also be used to calculate standard errors of the estimated vaccination coverage rates that reflect the complex sample design of the NIS. The file includes estimation area and state identifiers (ESTIAP09 and STATE). The sample is stratified by the 64 estimation areas, and the estimation area identifier and the coded household identifier (SEQNUMHH) are key variables for obtaining standard errors for estimation area, state, and national estimates of vaccination coverage rates. Demographic and socioeconomic variables in the file can be used to obtain national vaccination coverage rates for sub-groups of the population. Data users should, however, be aware that estimates for such sub-groups at the state or estimation area level will generally have large standard errors because of small sample sizes. The NCHS standard for precision of sub-group estimates is that the ratio of the standard error to the estimate should be less than or equal to 0.3, and each analytic cell should contain at least 30 respondents.

8.1. Use of NIS Sampling Weights

The NIS public-use data file contains two child level weights. The RDDWT variable **(RDDWTVI if U.S. Virgin Islands is to be included)** gives the household weight for each child. It should be used to form estimates from children with completed household interviews. This weight reflects the stratified sample design and also adjusts for unit non-response, for post-stratification to population control totals, and for the exclusion of non-telephone children. The weight variable that applies to children with adequate provider data is PROVWT **(PROVWTVI if U.S. Virgin Islands is to be included)**. This weight should be used to form estimates of vaccination coverage. Each child with adequate provider data (PDAT = 1) has a positive value for PROVWT/PROVWTVI. Starting with the 2002 file, the definition of children with adequate provider data was expanded to include unvaccinated children (as discussed in Section 2).

The NIS public-use data file does not contain any provider-level weights. The NIS does not sample providers directly; rather, they are included in the survey through the children they vaccinate. A user of the file should not attempt provider-level analyses (e.g., estimate the percentage of providers in the U.S. that are private providers), because the NIS sample was not designed for that purpose.

8.2. Estimation and Analysis

8.2.1. Estimating Vaccination Coverage Rates

Vaccination coverage rates are ratio estimators, as described in the statistical literature on methods for complex sample surveys. Because of the adjustment to the sampling weights for provider-phase non-response, statistical analyses require only data from children with adequate provider data (PDAT = 1), along with their final provider sampling weights (PROVWT/PROVWTVI). To summarize the statistical methodology by which vaccination coverage rates and their standard errors are obtained from these data, let Y_{hij} be an indicator, for the jth child with adequate provider data in the ith sampled household in the hth stratum of the NIS sampling design, equal to 1 if the child is up-to-date according to the provider data and 0 otherwise. Also, let W_{hij} denote the value of PROVWT for this child. Then, letting $\hat{Y}_h = \sum_{i=1}^{n_h} \sum_{j=1}^{m_{hi}} W_{hij} Y_{hij}$ and

$\hat{T}_h = \sum_{i=1}^{n_h} \sum_{j=1}^{m_{hi}} W_{hij}$, the national estimator of the vaccination coverage rate may be expressed as

$$\hat{\theta} = \frac{\sum_{h=1}^{L} \hat{Y}_h}{\sum_{h=1}^{L} \hat{T}_h}$$

where L denotes the number of strata (the 64 estimation areas), n_h denotes the number of sampled households containing children with adequate provider data in the hth estimation area, and m_{hi} denotes the number of age-eligible children with adequate provider data in the ith household in the hth stratum.

Letting L instead denote the number of estimation areas in a state, the above formula can also be used to calculate vaccination coverage rates for states (regardless of whether the state contains only one or more than one estimation area).

8.2.2. Estimating Standard Errors of Vaccination Coverage Rates

The Taylor-series method can be used to estimate the sampling variance of vaccination coverage rates for the U.S., the states, and estimation areas. Letting $Z_{hij} = \dfrac{W_{hij}(Y_{hij} - \hat{\theta})}{\sum\limits_{h=1}^{L} \hat{T}_h}$, $Z_{hi} = \sum\limits_{j=1}^{m_{hi}} Z_{hij}$, and $\bar{Z}_h = \dfrac{\sum\limits_{i=1}^{n_h} Z_{hi}}{n_h}$

yields an estimator of the variance of the estimated vaccination coverage rate, $\hat{\theta}$, equal to

$$v(\hat{\theta}) = \sum_{h=1}^{L} \frac{n_h}{n_h - 1} \sum_{i=1}^{n_h} (Z_{hi} - \bar{Z}_h)^2 \ .$$

The standard error is the square root of the variance. The estimation of standard errors for estimates of vaccination coverage rates in the NIS can be implemented in specialized statistical software such as SUDAAN (Research Triangle Institute 2008), SAS (SAS Institute Inc. 2003), R (Lumley, 2010), and Stata (Stata Corporation 2009). Appendix E gives several examples of the use of SAS, R, and SUDAAN to estimate vaccination coverage rates and their standard errors for estimation areas and states. For all procedures, the option of with-replacement sampling of primary sampling units within stratum is used, because the sampling fractions for households within an estimation area are all quite small. In these applications the estimation area (ESTIAP09) is used as the stratum variable and the household identifier (SEQNUMHH) as the primary sampling unit identifier. The data file should be sorted first on ESTIAP09 and then on SEQNUMHH within ESTIAP09 before running the programs for SUDAAN and SAS. **As indicated above, PROVWT is used as the weight variable for analysis excluding the U.S. Virgin Islands; PROVWTVI is used as the weight variable for analysis including the U.S. Virgin Islands.**

8.3. Combining Multiple Years of NIS Data

8.3.1. Estimation of Multi-Year Means

With release of the 2009 NIS public-use data file, fifteen years of NIS data are now available. The precision of estimates of vaccination coverage for sub-domains (e.g., by race/ethnicity of child) within estimation areas or states can be improved by combining two or more years of NIS data. Data users should, however, be aware that estimates from combined years of NIS data represent an average over two or more years. Although combining several years of NIS data will yield a larger sample size for estimation areas and states, the composition of the population in a geographic area may change over time, making interpretation of the results difficult. Furthermore, if vaccination administration schedules or vaccination coverage changes over time, the estimate of vaccination coverage for the combined time period applies to a hypothetical population that existed at the middle of the time period, making interpretation of the results even more difficult. Given the use of independent RDD samples in the NIS, it is also possible that a child could appear in more than one public-use data file.

To estimate a multi-year mean for a given NIS variable, the weights in each participating file (RDD-phase weights HY_WGT in 1995-2001, RDD_WT in 2002, WGT_RDD in 2003-2004, RDDWT in 2005-2009; and provider-phase weights W0 in 1995-2001, WT in 2002, WGT in 2003-2004, PROVWT in 2005-2009) should be divided by the number of years being combined. For example, if data for 2004 and 2005 for children with adequate provider data are to be combined, then the weights in the two files – WGT in 2004 and PROVWT in 2005 – should be divided by 2 to obtain revised weights, which should be saved as a new variable, say NEWWT. It is necessary to use NEWWT in the analysis to obtain correct weighted estimates for children ages 19 to 35 months. Furthermore, the child and household ID numbers (SEQNUMC and SEQNUMHH) in the files are unique only within a year, not across years. It is important for the user to create revised, unique ID numbers when combining data from multiple years.

The following SAS code can be used:

YRSEQC = 1 * (YEAR || SEQNUMC);

YRSEQHH = 1 * (YEAR || SEQNUMHH);

YEAR is the 4-digit year variable for the NIS data year (e.g., 2001).

To produce valid estimates of sampling variability and valid confidence intervals for multi-year coverage rates and other multi-year means, it is necessary to use specialized software such as SAS or SUDAAN.

The years 2005 to 2009 bring an important new complication for variance estimation not encountered in previous NIS years, because some traditional estimation areas were removed and other new areas were defined and introduced to the survey (see Section 2 above for more information about rotating estimation areas). The variance strata for 2004 and all prior years are defined by the variable ITRUEIAP, while the variance strata for 2005-2009 are defined by the variables ESTIAP, ESTIAP06, ESTIAP07, ESTIAP08, and ESTIAP09, respectively. The variables ITRUEIAP, ESTIAP, ESTIAP06, ESTIAP07, ESTIAP08, and ESTIAP09 define mutually exclusive and exhaustive geographic areas. However, they are not exactly the same areas. For example, Boston and Rest of Massachusetts are both strata in 2006, 2004 and all prior years, while statewide Massachusetts is a stratum in 2005 and 2007-2009. Other areas, such as New York City and Rest of New York, are strata in all years, including 2005-2009.

To make inferences concerning multi-year means, the user must take two actions. First, he/she must define and save a new stratum variable with a common name for all years included in the analysis. Second, he/she must define a common set of estimation domains that can be supported by each of the files included in the multi-year analysis. To take these actions, the user should follow the following seven-step procedure (or its equivalent):

i. Compute and save the new, common variance-stratum variable for each year participating in the analysis. The variable should be defined by the equation

STRATUMV   =   ITRUEIAP   , for children in the 2004 or prior years' public-use data

files

=   ESTIAP   , for children in the 2005 public-use data file

=   ESTIAP06   , for children in the 2006 public-use data file

=   ESTIAP07   , for children in the 2007 public-use data file

=   ESTIAP08   , for children in the 2008 public-use data file

=   ESTIAP09   , for children in the 2009 public-use data file

ii.   Compute and save the new, common weight variable, NEWWT, as instructed above for each year participating in the analysis.

iii.   Compute and save the new, unique child and household identification numbers, YRSEQC and YRSEQHH, as instructed above for each year participating in the analysis.

iv.   Compute and save a variable defining the common estimation domains to be studied for each year participating in the analysis. For example, one could use the LCDIAP (Least Common Denominator Estimation Area) variable set forth in Table 10 or states as geographic domains.

v.   Merge the multiple files into one consolidated file in a format compatible with the specialized software to be used.

vi.   Sort the consolidated file by YEAR, STRATUMV, and YRSEQHH.

vii.   Run the specialized software on the consolidated file, computing estimates, variance estimates, and confidence intervals.   For SUDAAN users, sampling levels or stages may be specified by the statement

NEST YEAR STRATUMV YRSEQHH / PSULEV = 3;

the specification of weights by

WEIGHT NEWWT;

and the specification of estimation domains, for example, by the two statements

CLASS YEAR LCDIAP STATE;
TABLES LCDIAP;

or

```
CLASS YEAR LCDIAP STATE;
TABLES STATE;
```

8.3.2. Estimation of Multi-Year Contrasts

Considerations similar to those for multi-year means arise in the estimation of contrasts between NIS years. For example, a typical contrast of interest would be the difference between the immunization coverage parameters in 2004 and in 2005.

To make inferences concerning a multi-year contrast, the user will need to work with the original weights reported on the files and store them in a common variable. One must not divide the original weights by the number of years included in the contrast. For the example, one may define the new, common weight variable as

NEWWT2   =   PROVWT   , if the child is in the 2005 PUF

         =   WGT   , if the child is in the 2004 PUF.

The user should follow the seven-step procedure set forth in the section on multi-year means, using NEWWT2 in lieu of NEWWT. In SUDAAN, the user should also specify the contrast of interest through use of a CONTRAST statement or an appropriate regression model. For example, to compare the 4:3:1:3:3:1 up-to-date estimate from 2004 to the 2005 estimate, SUDAAN users can use the following WEIGHT, VAR, and CONTRAST statements:

```
WEIGHT NEWWT2;
VAR PU431331;
CONTRAST YEAR = (-1 1);
```

Table 10: Cross-Walk Between ITRUEIAP, ESTIAP, ESTIAP06-ESTIAP09, and Least Common Denominator Estimation Area (LCDIAP), National Immunization Survey, 2009

LCDIAP	Area Name	ITRUEIAP (1995-2004)	ESTIAP (2005)	ESTIAP06 (2006)	ESTIAP07 (2007)	ESTIAP08 (2008)	ESTIAP09 (2009)
	Alabama						
20	AL-Jefferson County	21	21	20	20	20	20
20	AL-Rest of State	20	20	20	20	20	20
74	Alaska	74	74	74	74	74	74
	Arizona						
66	AZ-Maricopa County	67	67	67	66	66	66
66	AZ-Rest of State	66	66	66	66	66	66
46	Arkansas	46	46	46	46	46	46
	California						
68	CA-Fresno County	68	68	84	68	68	68
69	CA-Los Angeles County	69	69	69	69	69	69
68	CA-Northern CA	68	68	85	68	85	68
68	CA-San Diego County	71	68	71	68	68	68
68	CA-Santa Clara County	70	68	70	68	70	68
68	CA-San Bernardino County	68	80	68	80	68	68
68	CA-Alameda County	68	79	68	79	68	68
68	CA-Rest of State	68	68	68	68	68	68
	Colorado						
60	CO-Denver	60	81	60	60	60	60
60	CO-Rest of State	60	60	60	60	60	60
1	Connecticut	1	1	1	1	1	1
13	Delaware	13	13	13	13	13	13
12	District of Columbia	12	12	12	12	12	12
	Florida						
22	FL-Miami-Dade County	24	22	24	24	24	22
22	FL-Duval County	23	23	23	22	22	22
22	FL-Orange County	22	22	22	22	91	22
22	FL-Rest of State	22	22	22	22	22	22
	Georgia						
25	GA-Fulton/DeKalb Counties	26	26	26	25	25	25
25	GA-Rest of State	25	25	25	25	25	25
72	Hawaii	72	72	72	72	72	72
75	Idaho	75	75	75	75	75	75
	Illinois						
35	IL-City of Chicago	35	35	35	35	35	35
34	IL-Madison and St. Clair Counties	34	34	34	34	92	34
34	IL-Rest of State	34	34	34	34	34	34
	Indiana						
36	IN-Lake County	36	36	36	36	36	96
36	IN-Marion County	37	36	37	37	36	37
36	IN-Rest of State	36	36	36	36	36	36
56	Iowa	56	56	56	56	56	56

LCDIAP	Area Name	ITRUEIAP (1995-2004)	ESTIAP (2005)	ESTIAP06 (2006)	ESTIAP07 (2007)	ESTIAP08 (2008)	ESTIAP09 (2009)
	Kansas						
57	KS-Eastern KS	57	57	86	57	57	57
57	KS-Rest of State	57	57	57	57	57	57
27	Kentucky	27	27	27	27	27	27
	Louisiana						
47	LA-Orleans Parish	48	47	47	47	47	47
47	LA-Rest of State	47	47	47	47	47	47
4	Maine	4	4	4	4	4	4
	Maryland						
14	MD-City of Baltimore	15	15	15	14	15	15
14	MD-Rest of State	14	14	14	14	14	14
	Massachusetts						
2	MA-City of Boston	3	2	3	2	2	2
2	MA-Rest of State	2	2	2	2	2	2
	Michigan						
38	MI-City of Detroit	39	39	39	38	38	38
38	MI-Rest of State	38	38	38	38	38	38
	Minnesota						
40	MN-Twin Cities	40	40	40	40	93	40
40	MN-Rest of State	40	40	40	40	40	40
28	Mississippi	28	28	28	28	28	28
	Missouri						
58	MO-St. Louis County/City	58	82	58	58	58	58
58	MO-Rest of State	58	58	58	58	58	58
61	Montana	61	61	61	61	61	61
59	Nebraska	59	59	59	59	59	59
	Nevada						
73	NV-Clark County	73	83	73	73	73	73
73	NV-Rest of State	73	73	73	73	73	73
5	New Hampshire	5	5	5	5	5	5
	New Jersey						
8	NJ-City of Newark	9	9	9	8	8	8
8	NJ-Rest of State	8	8	8	8	8	8
	New Mexico						
49	NM-Southern NM	49	49	88	49	49	49
49	NM-Rest of State	49	49	49	49	49	49
	New York						
11	NY-City of New York	11	11	11	11	11	11
10	NY-Rest of State	10	10	10	10	10	10
29	North Carolina	29	29	29	29	29	29
62	North Dakota	62	62	62	62	62	62
	Ohio						
41	OH-Cuyahoga County	42	42	42	41	41	41
41	OH-Franklin County	43	43	41	41	41	41
41	OH-Rest of State	41	41	41	41	41	41
50	Oklahoma	50	50	50	50	50	50
76	Oregon	76	76	76	76	76	76
	Pennsylvania						
16	PA-Allegheny County	16	16	87	16	16	16

LCDIAP	Area Name	ITRUEIAP (1995-2004)	ESTIAP (2005)	ESTIAP06 (2006)	ESTIAP07 (2007)	ESTIAP08 (2008)	ESTIAP09 (2009)
17	PA-Philadelphia County	17	17	17	17	17	17
16	PA-Rest of State	16	16	16	16	16	16
6	Rhode Island	6	6	6	6	6	6
30	South Carolina	30	30	30	30	30	30
63	South Dakota	63	63	63	63	63	63
	Tennessee						
31	TN-Davidson County	33	33	31	31	31	31
31	TN-Shelby County	32	32	32	31	31	31
31	TN-Rest of State	31	31	31	31	31	31
	Texas						
55	TX-Bexar County	55	55	55	55	55	55
54	TX-City of Houston	54	54	54	54	54	54
52	TX-Dallas County	52	52	52	52	52	52
53	TX-El Paso County	53	53	53	53	53	53
51	TX-Rest of State	51	51	51	51	51	51
64	Utah	64	64	64	64	64	64
7	Vermont	7	7	7	7	7	7
18	Virginia	18	18	18	18	18	18
	Washington						
77	WA-Eastern WA	77	77	771	77	774	774
77	WA-Western WA	77	77	77	773	774	774
77	WA-King County	78	78	78	77	77	77
77	WA-Rest of State	77	77	772	77	77	77
19	West Virginia	19	19	19	19	19	19
	Wisconsin						
44	WI-Milwaukee County	45	45	45	44	44	44
44	WI-Rest of State	44	44	44	44	44	44
65	Wyoming	65	65	65	65	65	65
-	U.S. Virgin Islands	-	-	-	-	-	95

9. Summary Tables

Appendix G contains seven tables. Appendix Table G.1 lists the 64 estimation areas for the 2009 NIS by state. For the U.S. and for each state and estimation area, it provides the estimated population total of children ages 19 to 35 months of age in 2009, and (from 2009 NIS data collection) number of children with completed household interviews and number of children with adequate provider data.

Appendix Tables G.2 through G.5 summarize pairs of variables: age group of child by maternal education (Appendix Table G.2), age group by family poverty status (Appendix Table G.3), race/ethnicity by family poverty status (Appendix Table G.4), age group by race/ethnicity (Appendix Table G.5), and age group by gender (Appendix Table G.6). Each of these tables gives the unweighted and weighted counts of children who have completed household interviews and the unweighted and weighted counts of children with adequate provider data.

Appendix Table G.7 gives unweighted counts of children for shot card use by presence of adequate provider data.

Appendix Table G.8 presents estimates of vaccination coverage and asymmetric 95-percent confidence intervals obtained from SUDAAN. The data user should obtain the same estimates from the 2009 public-use data file.

Appendix H contains two tables and two time-series charts. Table H.1 and Figure H.1 show key components of the NIS response rates and the overall CASRO response rates by year of the survey. Table H.2 and Figure H.2 show vaccination coverage rates since 1995.

10. Limitations

The findings in this report are subject to at least three limitations. First, because NIS is a telephone survey, results are weighted to be representative of all children aged 19-35 months. Although statistical adjustments were made to account for nonresponse and households without landline telephones, some bias might remain. Second, underestimates of vaccination coverage might have resulted from the exclusive use of provider-reported vaccination histories because completeness of these records is unknown. Finally, although national estimates of vaccination coverage are precise, estimates for state and local areas should be interpreted with caution because their sample sizes are smaller and their confidence intervals generally are wider than those for national estimates.

11. Citations for NIS Data

In publications please acknowledge the original data source. The citation for the 2009 NIS public-use data file is:

U.S. Department of Health and Human Services (DHHS). National Center for Health Statistics. The 2009 National Immunization Survey, Hyattsville, MD: Centers for Disease Control and Prevention, 2010.

Information about the NIS is located at http://www.cdc.gov/nchs/nis.htm

The NIS public-use data file is located at http://www.cdc.gov/nchs/nis/data_files.htm.

Please place the acronym "NIS" in the titles, keywords, or abstracts of journal articles and other publications in order to facilitate retrieval of such materials in bibliographic searches.

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Appendix A

Glossary of Abbreviations and Terms

3:3:1
The series of 3 or more DTaP vaccinations, 3 or more polio vaccinations, and 1 or more MCV vaccinations

4:3:1
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, and 1 or more MCV vaccinations

4:3:1:3
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, and 3 or more Hib vaccinations of any type

4:3:1:H
(routine Hib)
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, and 3 or 4 Hib vaccinations depending on manufacturer (routine recommendation)

4:3:1:3:3
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or more Hib vaccinations of any type, and 3 or more hepatitis B vaccinations

4:3:1:H:3
(routine Hib)
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or 4 Hib vaccinations depending on manufacturer (routine recommendation), and 3 or more hepatitis B vaccinations

4:3:1:3:3:1
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or more Hib vaccinations of any type, 3 or more hepatitis B vaccinations, and 1 or more varicella vaccinations given at age 12 months or older

4:3:1:H:3:1
(routine Hib)
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or 4 Hib vaccinations depending on manufacturer (routine recommendation), 3 or more hepatitis B vaccinations, and 1 or more varicella vaccinations given at age 12 months or older

4:3:1:3:3:1:3
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or more Hib vaccinations of any type, 3 or more hepatitis B vaccinations, 1 or more varicella vaccinations given at age 12 months or older, and 3 or more pneumococcal vaccinations

4:3:1:H:3:1:3
(routine Hib)
The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or 4 Hib vaccinations depending on manufacturer (routine recommendation), 3 or more hepatitis B vaccinations, 1 or more varicella vaccinations given at age 12 months or older, and 3 or more pneumococcal vaccinations

4:3:1:3:3:1:4	The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or more Hib vaccinations of any type, 3 or more hepatitis B vaccinations, 1 or more varicella vaccinations given at age 12 months or older, and 4 or more pneumococcal vaccinations
4:3:1:H:3:1:4 (routine Hib)	**The series of 4 or more DTaP vaccinations, 3 or more polio vaccinations, 1 or more MCV vaccinations, 3 or 4 Hib vaccinations depending on manufacturer (routine recommendation), 3 or more hepatitis B vaccinations, 1 or more varicella vaccinations given at age 12 months or older, and 4 or more pneumococcal vaccinations**
CATI	Computer-assisted telephone interviewing
CDC	Centers for Disease Control and Prevention
CII	Childhood Immunization Initiative
DOB	Date of birth
DTaP	Diphtheria and tetanus toxoids and acellular pertussis vaccine
DTP	Diphtheria and tetanus toxoids and pertussis vaccine
DT	Diphtheria and tetanus toxoids vaccine
FLU	Seasonal influenza vaccine
Hep A	Hepatitis A vaccine
Hep B	Hepatitis B vaccine
Hib	Haemophilus influenzae type b vaccine
Hib routine recommendation	**Four or more doses of Hib vaccine of any type, or two or more doses of Hib vaccine of Merck types followed by one dose of Hib vaccine of any type**
Hib shortage recommendation	**Three or more doses of Hib vaccine of any type or two or more doses of Hib vaccine of Merck types**
IAP	Immunization Action Plan areas
IHQ	Immunization history questionnaire
IPV	Inactivated poliovirus vaccine
MCV	Measles-containing vaccine
MMR	Measles, mumps, and rubella vaccine
NCHS	National Center for Health Statistics

NCIRD	National Center for Immunization and Respiratory Diseases
NIS	National Immunization Survey
NHIS	National Health Interview Survey
NIP	National Immunization Program
OPV	Oral poliovirus vaccine
PCV	Pneumococcal vaccine
PRC	Provider Record Check Study
PUF	Public-use file
RDD	Random digit dialing
ROT	Rotavirus vaccine
SC	Shot card
UTD	Up-to-date
VFC	Vaccines for Children program
VRC	Varicella vaccine

Appendix B

Summary Statistics for Sampling Weights by Estimation Area

Table B.1: **Distribution of Sampling Weights for Children with Completed Household Interviews (RDDWT/RDDWTVI), National Immunization Survey, 2009**

State/Estimation Area	n	Sum	Minimum	Maximum	Mean	Coefficient of Variation (%)
Total U.S.[1]	24,809	6,297,797.01	2.85	7,634.92	253.85	141.52
Alabama	372	92,187.44	45.81	1,020.48	247.82	64.00
Alaska	295	15,712.21	15.44	124.97	53.26	46.46
Arizona	486	155,016.19	59.93	1,381.51	318.96	68.82
Arkansas	432	59,192.94	15.77	805.49	137.02	75.45
California						
CA-Los Angeles County	356	228,291.26	34.13	1,681.47	641.27	50.62
CA-Rest of State	309	610,711.77	8.48	7,634.92	1976.41	50.89
Colorado	510	105,244.97	24.90	1,344.70	206.36	124.29
Connecticut	349	63,243.28	25.67	590.56	181.21	75.58
Delaware	390	17,292.28	10.64	178.25	44.34	56.69
District of Columbia	537	11,271.75	2.85	121.81	20.99	85.29
Florida	505	355,764.99	37.07	2,481.82	704.49	66.35
Georgia	425	222,822.20	75.93	2,072.42	524.29	80.03
Hawaii	352	27,067.60	21.17	199.68	76.90	53.20
Idaho	279	34,919.48	47.45	423.14	125.16	48.55
Illinois						
IL-City of Chicago	516	67,607.00	8.54	780.40	131.02	87.03
IL-Rest of State	448	196,940.06	74.72	1,991.57	439.60	67.27
Indiana						
IN-Rest of State	322	96,463.87	14.77	1,024.17	299.58	77.57
IN-Marion County	359	22,801.49	19.40	242.81	63.51	54.57
IN-Lake County	380	10,107.77	5.85	99.91	26.60	62.37
Iowa	371	57,903.48	51.74	364.50	156.07	53.55
Kansas	292	62,455.12	16.72	847.44	213.89	72.96

State/Estimation Area	n	Sum	Minimum	Maximum	Mean	Coefficient of Variation (%)
Kentucky	482	84,126.66	32.97	551.68	174.54	51.14
Louisiana	407	92,237.27	25.05	944.69	226.63	69.13
Maine	361	20,462.79	15.63	157.77	56.68	46.92
Maryland						
MD-City of Baltimore	382	14,645.34	7.76	150.18	38.34	60.81
MD-Rest of State	284	102,474.40	7.81	1,583.59	360.83	79.94
Massachusetts	390	115,448.31	19.40	819.18	296.02	62.86
Michigan	471	187,622.38	11.26	1,740.91	398.35	73.83
Mississippi	524	63,991.40	18.43	567.28	122.12	68.83
Missouri	467	118,685.65	62.92	1,050.19	254.14	66.76
Minnesota	360	107,991.80	17.21	908.38	299.98	51.80
Montana	350	18,121.20	11.57	238.30	51.77	68.21
Nebraska	346	38,422.11	33.02	359.09	111.05	53.98
Nevada	434	61,202.09	17.18	581.71	141.02	64.10
New Hampshire	339	21,601.56	21.18	143.16	63.72	39.42
New Jersey	536	172,980.37	61.58	1,421.80	322.72	64.99
New Mexico	466	42,442.28	15.99	395.80	91.08	70.17
New York						
NY-City of New York	365	179,452.13	37.51	1,644.94	491.65	52.68
NY-Rest of State	353	187,635.15	19.47	2,296.72	531.54	53.96
North Carolina	345	189,944.69	41.06	2,355.42	550.56	70.16
North Dakota	276	11,678.48	26.73	91.37	42.31	25.30
Ohio	394	220,642.72	137.09	2,456.61	560.01	56.51
Oklahoma	433	79,326.01	31.76	882.58	183.20	63.45
Oregon	429	72,095.43	30.00	505.52	168.05	58.30
Pennsylvania						
PA-Philadelphia County	437	33,837.02	19.33	227.93	77.43	41.03
PA-Rest of State	350	183,243.46	6.04	1,605.32	523.55	51.69
Rhode Island	429	19,629.44	6.79	169.91	45.76	86.33
South Carolina	367	90,912.45	68.19	726.51	247.72	45.33
South Dakota	335	16,785.90	16.71	199.34	50.11	49.31
Tennessee	499	124,974.67	22.52	1,127.06	250.45	71.74
Texas						
TX-Bexar County	385	38,487.92	25.58	513.87	99.97	73.06
TX-City of Houston	348	73,434.73	29.81	1,385.34	211.02	67.33
TX-Dallas County	336	66,675.90	25.90	1,109.90	198.44	74.67

State/Estimation Area	n	Sum	Minimum	Maximum	Mean	Coefficient of Variation (%)
TX-El Paso County	416	21,143.13	12.75	153.48	50.82	51.48
TX-Rest of State	373	389,670.55	32.05	4,516.14	1044.69	66.07
Utah	389	74,687.94	45.45	729.90	192.00	72.85
Vermont	473	10,052.76	4.73	61.70	21.25	41.97
Virginia	409	160,570.99	6.97	2,116.19	392.59	82.96
Washington						
WA-Eastern/Western WA	386	38,990.16	18.61	233.47	101.01	44.90
WA-Rest of State	282	90,509.47	44.07	801.34	320.96	41.92
West Virginia	327	29,332.83	19.52	443.04	89.70	69.89
Wisconsin	420	107,649.67	58.28	1,094.78	256.31	68.12
Wyoming	369	10,960.66	14.78	112.88	29.70	50.30
U.S. Virgin Islands[2]	432	2,863.55	1.67	17.30	6.63	44.30

[1] 'Total U.S.' excludes the U.S. Virgin Islands.   The sampling weight variable for these records is RDDWT.
[2] For U.S. Virgin Islands records, the sampling weight variable is RDDWTVI.

Table B.2: **Distribution of Sampling Weights for Children with Adequate Provider Data (PROVWT/PROVWTVI), National Immunization Survey, 2009**

State/Estimation Area	n	Sum	Minimum	Maximum	Mean	Coefficient of Variation (%)
Total U.S.[1]	17,053	6,297,794.20	3.66	11,499.87	369.31	150.81
Alabama	249	92,187.44	59.45	1,672.27	370.23	73.46
Alaska	192	15,712.21	23.80	252.31	81.83	55.67
Arizona	317	155,016.19	82.61	2,011.42	489.01	69.21
Arkansas	298	59,192.94	35.70	1,245.31	198.63	72.75
California						
CA-Los Angeles County	194	228,291.26	187.81	4,350.13	1,176.76	52.95
CA-Rest of State	192	610,711.77	13.23	11,499.87	3,180.79	52.63
Colorado	337	105,244.97	46.98	2,896.84	312.30	129.99
Connecticut	229	63,243.28	39.37	2,135.37	276.17	110.60
Delaware	251	17,292.28	16.63	315.84	68.89	60.76
District of Columbia	355	11,271.75	3.66	253.07	31.75	96.97
Florida	326	355,764.99	54.65	3,746.18	1,091.30	68.27
Georgia	297	222,822.20	168.97	2,733.10	750.24	77.74
Hawaii	221	27,067.60	31.74	354.12	122.48	59.06
Idaho	207	34,919.48	55.12	445.50	168.69	50.34
Illinois						
IL-City of Chicago	320	67,607.00	27.34	1,565.06	211.27	91.24
IL-Rest of State	311	196,940.06	97.07	4,122.25	633.25	83.25
Indiana						
IN-Rest of State	219	96,463.87	24.54	1,773.75	440.47	79.72
IN-Marion County	252	22,801.49	38.02	397.09	90.48	66.46
IN-Lake County	237	10,107.77	5.85	165.54	42.65	67.17
Iowa	266	57,903.48	83.98	721.51	217.68	59.40
Kansas	218	62,455.12	67.96	1,394.19	286.49	79.42
Kentucky	350	84,126.66	45.36	919.39	240.36	53.68
Louisiana	266	92,237.27	41.43	1,416.19	346.76	67.82
Maine	261	20,462.79	30.43	235.39	78.40	53.48
Maryland						
MD-City of Baltimore	276	14,645.34	9.86	223.27	53.06	69.18
MD-Rest of State	209	102,474.40	8.07	2,895.41	490.31	91.51
Massachusetts	275	115,448.31	27.62	1,721.97	419.81	64.12
Michigan	331	187,622.38	9.67	3,578.70	566.83	92.76

State/Estimation Area	n	Sum	Minimum	Maximum	Mean	Coefficient of Variation (%)
Mississippi	339	63,991.40	27.79	1,051.47	188.77	69.33
Missouri	326	118,685.65	102.02	2,345.56	364.07	77.61
Minnesota	274	107,991.80	141.63	1,215.10	394.13	55.06
Montana	262	18,121.20	15.44	403.17	69.16	77.67
Nebraska	247	38,422.11	33.02	655.96	155.56	61.21
Nevada	320	61,202.09	32.67	696.22	191.26	67.48
New Hampshire	236	21,601.56	24.96	226.50	91.53	42.82
New Jersey	353	172,980.37	81.25	2,086.75	490.03	66.44
New Mexico	342	42,442.28	18.22	663.02	124.10	76.22
New York						
NY-City of New York	219	179,452.13	120.93	2,391.65	819.42	60.25
NY-Rest of State	233	187,635.15	33.50	2,883.33	805.30	54.84
North Carolina	262	189,944.69	65.98	3,195.11	724.98	72.90
North Dakota	206	11,678.48	31.79	123.92	56.69	30.57
Ohio	280	220,642.72	170.28	3,412.52	788.01	67.23
Oklahoma	306	79,326.01	64.86	1,325.75	259.24	64.09
Oregon	316	72,095.43	41.47	882.24	228.15	66.70
Pennsylvania						
PA-Philadelphia County	261	33,837.02	30.40	415.49	129.64	55.04
PA-Rest of State	248	183,243.46	9.82	2,399.73	738.88	53.24
Rhode Island	307	19,629.44	9.77	369.29	63.94	96.41
South Carolina	257	90,912.45	107.84	1,159.28	353.74	49.27
South Dakota	230	16,785.90	31.83	280.67	72.98	46.98
Tennessee	339	124,972.84	28.98	1,474.41	368.65	70.00
Texas						
TX-Bexar County	242	38,487.92	40.57	632.56	159.04	71.08
TX-City of Houston	233	73,434.73	37.60	2,245.11	315.17	77.50
TX-Dallas County	235	66,675.90	34.27	1,242.33	283.73	70.50
TX-El Paso County	313	21,143.13	23.35	201.43	67.55	49.74
TX-Rest of State	243	389,670.55	43.82	8,834.27	1,603.58	72.28
Utah	289	74,687.94	50.87	1,217.13	258.44	77.91
Vermont	331	10,052.76	6.43	120.98	30.37	52.97
Virginia	278	160,570.02	10.88	3,129.42	577.59	85.49
Washington						
WA-Eastern/Western WA	274	38,990.16	28.81	376.67	142.30	48.17
WA-Rest of State	198	90,509.47	167.91	1,333.11	457.12	51.03

State/Estimation Area	n	Sum	Minimum	Maximum	Mean	Coefficient of Variation (%)
West Virginia	212	29,332.83	35.61	582.14	138.36	65.44
Wisconsin	317	107,649.67	88.82	1,566.18	339.59	65.60
Wyoming	269	10,960.66	18.00	154.38	40.75	57.31
U.S. Virgin Islands[2]	260	2,863.55	1.98	37.22	11.01	50.03

[1] 'Total U.S.' excludes the U.S. Virgin Islands. The provider-stage weight for these records is PROVWT.
[2] For U.S. Virgin Islands records, the provider-stage weight is PROVWTVI.

Appendix C

Flags for Inconsistent Values in the Breastfeeding Data

Two different types of inconsistency can arise in breastfeeding data. The first is that the duration of any breastfeeding can exceed the age of the child, and the second is that the age of the child when first fed formula can exceed the age of child. BF_ENDR06 stores the duration of any breastfeeding, and BF_ENDFL06 flags the inconsistency; BF_FORMR08 stores the age of the child when first fed formula, and BF_FORMFL06 flags the inconsistency.

1. **Both BF_ENDR06 and BF_FORMR08 are formulated using the following conversion factors:**

   if unit=1(days) then BF_ENDR06 = number x 1
   if unit=2(weeks) then BF_ENDR06 = number x 7
   if unit=3(months) then BF_ENDR06 = number x 30.4375
   if unit=4(years) then BF_ENDR06 = number x 365.25

   if unit=1(days) then BF_FORMR08 = number x 1
   if unit=2(weeks) then BF_FORMR08 = number x 7
   if unit=3(months) then BF_FORMR08 = number x 30.4375
   if unit=4(years) then BF_FORMR08 = number x 365.25

2. **Flagging BF_ENDR06 when the duration of any breastfeeding exceeds the age in days with a buffer for different units:**

   if unit=1(days) flag when BF_ENDR06 > age + 1
   if unit=2(weeks) flag when BF_ENDR06 > age + 3
   if unit=3(months) flag when BF_ENDR06 > age + 15
   if unit=4(years) flag when BF_ENDR06 > age + 182

The different buffers allow for the impact of rounding durations upward in the specified units (for example, 50 days might be reported as 2 months).

3. **Flagging BF_FORMR08 when the age when first fed formula exceeds the age in days with a buffer for different units:**

   if unit=1(days) flag when BF_FORMR08 > age + 1
   if unit=2(weeks) flag when BF_FORMR08 > age + 3
   if unit=3(months) flag when BF_FORMR08 > age + 15
   if unit=4(years) flag when BF_FORMR08 > age + 182

The different buffers allow for the impact of rounding durations upward in the specified units (for example, 50 days might be reported as 2 months).

Appendix D

Disposition of Children with Respect to Provider Record Check

Table D.1: Disposition of Children with Respect to Provider Record Check, National Immunization Survey, 2009[1]

Number of Children	Disposition Code Number and Definition
4,814	1 = All identified providers responded, no problems indicated in cross-check between household and provider shot dates.
11,043	2 = All identified providers responded, no NIS shot card to cross check.
268	3 = All identified providers responded, poor immunization history matching results.
37	4 = All identified providers responded, poor immunization history matching results, additional mismatch indicators present.
484	5 = Some but not all identified providers responded, but provider information indicates 4:3:1:3:3 up-to-date.
8	6 = Some but not all identified providers responded, but provider information matches NIS shot card immunization history.
0	7 = Some but not all identified providers responded, completeness of provider immunization history is unknown.
6	8 = Some but not all identified providers responded, but provider information indicates 4:3:1:3:3 up-to-date when post-RDD-interview immunizations are included.
25	9 = Some but not all identified providers responded, but provider information indicates at least as many doses for each vaccine as the RDD respondent (or at least 1 dose for MCV).
196	10 = Some but not all identified providers responded, but the household reported an inexact number of vaccinations ("All","Don't Know," "Refused," or missing) for one or more vaccines and any exact responses meet previous criteria (for DISPCODE 9).
0	11 = Some but not all identified providers responded, but a definite number of shots was reported by household not from a shot card for one or more vaccines and any other vaccines meet previous criteria (for DISPCODE 9 or 10).
16,881	TOTAL

[1] Excludes U.S. Virgin Islands

Notes: The criteria for all dispositions (except 7) are applied in order. A case where some but not all providers responded is assigned disposition 7 if it does not qualify for dispositions 5, 6, 8, 9, 10 or 11.

When checking the criteria for dispositions 10 and 11, the provider history must contain at least three distinct vaccination dates (visits) for the provider immunization count to be accepted for vaccines for which an inexact response was reported, from recall, in the household survey.

Appendix E

Programs for Estimation: Examples of the Use of SUDAAN, SAS and R to Estimate Vaccination Coverage Rates and Their Standard Errors, and an Example of the Production of a Cross-Tabulation and Chart

A. SUDAAN

```sas
*********************;
title1 'SUD_IAP.SAS';
*************************************************************************
THIS PROGRAM WILL PRODUCE ESTIMATION AREA ESTIMATES AND STANDARD ERRORS
FOR PUTD4313 USING SAS CALLABLE SUDAAN.
SUDAAN NOTES:
1. ALL VARIABLES USED MUST BE NUMERIC.
2. VARIABLES IN THE SUBGROUP STATEMENT MUST HAVE VALUES 1,2,..K
WHERE K IS THE NUMBER OF LEVELS FOR EACH VARIABLE.
3. DATA MUST BE SORTED ACCORDING TO THE SAMPLE DESIGN VARIABLES
(STRATUM AND PRIMARY SAMPLING UNIT), SPECIFIED IN THE
NEST STATEMENT.
*************************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;

*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;
%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION AREA VARIABLE TO USE ---*;
%let wt=provwt; * --- WEIGHT TO USE ---*;
                 *Note: Use PROVWT for analyses excluding the U.S Virgin
                   Islands.  To include USVI, use PROVWTVI;
```

```sas
Proc format;
/*
THE FOLLOWING FORMAT WILL BE USED FOR PUTD4313.
ORIGINAL VALUES OF PUTD4313 ARE 1,0.
MUST BE CONVERTED TO 1,2 IN SUDAAN.
*/
value put4313f
1='4:3:1:3 Up-to-Date'
2='Not 4:3:1:3 Up-to-Date';

value estiapf
. = "Missing"
 0 = "US Total"
 1 = "CT"
 2 = "MA"
 4 = "ME"
 5 = "NH"
 6 = "RI"
 7 = "VT"
 8 = "NJ"
10 = "NY-Rest of State"
11 = "NY-City of New York"
12 = "DC"
13 = "DE"
14 = "MD-Rest of State"
15 = "MD-City of Baltimore"
16 = "PA-Rest of State"
17 = "PA-Philadelphia County"
18 = "VA"
19 = "WV"
20 = "AL"
22 = "FL"
25 = "GA"
27 = "KY"
28 = "MS"
29 = "NC"
30 = "SC"
31 = "TN"
34 = "IL-Rest of State"
35 = "IL-City of Chicago"
36 = "IN-Rest of State"
37 = "IN-Marion County"
38 = "MI"
40 = "MN"
41 = "OH"
44 = "WI"
46 = "AR"
47 = "LA"
49 = "NM"
50 = "OK"
51 = "TX-Rest of State"
52 = "TX-Dallas County"
53 = "TX-El Paso County"
54 = "TX-City of Houston"
55 = "TX-Bexar County"
```

```
      56 = "IA"
      57 = "KS"
      58 = "MO"
      59 = "NE"
      60 = "CO"
      61 = "MT"
      62 = "ND"
      63 = "SD"
      64 = "UT"
      65 = "WY"
      66 = "AZ"
      68 = "CA-Rest of State"
      69 = "CA-Los Angeles County"
      72 = "HI"
      73 = "NV"
      74 = "AK"
      75 = "ID"
      76 = "OR"
      77 = "WA-Rest of State"
      95 = "U.S. Virgin Islands"
      96 = "IN-Lake County"
      100 = "WA-Eastern/Western WA"
      ;
run;
data sud_file;
set &in_file(keep= seqnumhh seqnumc putd4313 &estiap &wt);
if putd4313=0 then putd4313=2; *--- CONVERT PUTD4313=0 TO PUTD4313=2 ---*;
nseqnumh=1*seqnumhh; *---CONVERT HOUSEHOLD ID SEQNUMHH FROM CHARACTER TO
NUMERIC ---*;
if &estiap.=774 then &estiap.=100; *--- RENUMBER ESTIMATION AREA 774 ---*;
run;
*=== SORT BY NEST VARIABLES: ESTIAP (STRATUM) NSEQNUMH (PRIMARY SAMPLING
UNIT) ===*;
proc sort;
by &estiap nseqnumh;
run;
proc crosstab data=sud_file filetype=sas design=wr;
weight &wt;
nest &estiap nseqnumh;
subgroup &estiap putd4313 ;
levels 100 2 ;
tables &estiap * putd4313 ;
print nsum wsum rowper serow/style=nchs ;
rtitle "4:3:1:3 ESTIMATES BY Estimation Area";
rformat &estiap estiapf.;
rformat putd4313 put4313f.;
output rowper serow/filename=sud_est filetype=sas;
run;
proc print data=sud_est(where=(putd4313=1 and rowper ne .)) noobs label;
format &estiap estiapf.;
var &estiap rowper serow ;
label
rowper='Percent 4:3:1:3 Up-to-Date'
serow='Standard Error'
;
```

```
title "4:3:1:3 ESTIMATES BY Estimation Area";
run;


*********************;
title1 'SUDSTATE.SAS';
**************************************************************************
THIS PROGRAM WILL PRODUCE STATE ESTIMATES AND STANDARD ERRORS
FOR PUTD4313 USING SAS CALLABLE SUDAAN.
NOTE : THE STATE VARIABLE IS BASED ON FIPSTATE CODES ,THERE ARE
NO STATES WITH FIPS CODES 3,7,14,43,52,57-77.
SUDAAN NOTES:
1. ALL VARIABLES USED MUST BE NUMERIC.
2. VARIABLES IN THE SUBGROUP STATEMENT MUST HAVE VALUES 1,2,..K
WHERE K IS THE NUMBER OF LEVELS FOR EACH VARIABLE.
3. DATA MUST BE SORTED ACCORDING TO THE SAMPLE DESIGN VARIABLES
(STRATUM AND PRIMARY SAMPLING UNIT), SPECIFIED IN THE
NEST STATEMENT.
**************************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;

*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;
%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION VARIABLE TO USE ---*;
%let wt=provwt; *--- WEIGHT TO USE ---*;
                *Note: Use PROVWT for analyses excluding the U.S Virgin
                   Islands.  To include USVI, use PROVWTVI;

PROC FORMAT;
/*
THE FOLLOWING FORMAT WILL BE USED FOR PUTD4313.
ORIGINAL VALUES OF PUTD4313 ARE 1,0.
MUST BE CONVERTED TO 1,2 IN SUDAAN.
*/
value put4313f
1='4:3:1:3 Up-to-Date'
2='Not 4:3:1:3 Up-to-Date'
;
value statef
0 ='U.S. Total'
1 ='Alabama '
2 ='Alaska '
4 ='Arizona '
5 ='Arkansas '
6 ='California '
8 ='Colorado '
9 ='Connecticut '
10 ='Delaware '
11 ='District of Columbia'
12 ='Florida '
13 ='Georgia '
```

```
15 ='Hawaii '
16 ='Idaho '
17 ='Illinois '
18 ='Indiana '
19 ='Iowa '
20 ='Kansas '
21 ='Kentucky '
22 ='Louisiana '
23 ='Maine '
24 ='Maryland '
25 ='Massachusetts '
26 ='Michigan '
27 ='Minnesota '
28 ='Mississippi '
29 ='Missouri '
30 ='Montana '
31 ='Nebraska '
32 ='Nevada '
33 ='New Hampshire '
34 ='New Jersey '
35 ='New Mexico '
36 ='New York '
37 ='North Carolina '
38 ='North Dakota '
39 ='Ohio '
40 ='Oklahoma '
41 ='Oregon '
42 ='Pennsylvania '
44 ='Rhode Island '
45 ='South Carolina '
46 ='South Dakota '
47 ='Tennessee '
48 ='Texas '
49 ='Utah '
50 ='Vermont '
51 ='Virginia '
53 ='Washington '
54 ='West Virginia '
55 ='Wisconsin '
56 ='Wyoming '
78 ='U.S. Virgin Islands '
;
run;
data sud_file;
set &in_file(keep= seqnumhh seqnumc putd4313 &estiap state &wt);
if putd4313=0 then putd4313=2; *** CONVERT PUTD4313=0 TO PUTD4313=2 ***;
nseqnumh=1*seqnumhh; *** CONVERT HOUSEHOLD ID SEQNUMH FROM CHARACTER TO
NUMERIC ***;
run;
*=== SORT BY NEST VARIABLES: ESTIAP (STRATUM) NSEQNUMH (PRIMARY SAMPLING
UNIT) ===*;
proc sort;
by &estiap nseqnumh;
run;
proc crosstab data=sud_file filetype=sas design=wr;
```

```
weight &wt;
nest &estiap nseqnumh;
subgroup state putd4313 ;
levels 56 2 ;
tables state * putd4313 ;
print nsum wsum rowper serow/style=nchs ;
rtitle "4:3:1:3 ESTIMATES BY STATE";
rformat state statef.;
rformat putd4313 put4313f.;
output rowper serow / filename=sud_est2 filetype=sas;
run;
*** EXCLUDE 3,7,14,43,52,57-77 THERE ARE NO STATES WITH THESE FIPS CODES ***
;
proc print data=sud_est2(where=(putd4313=1
& state notin (3,7,14,43,52) & not(57<=state<=77))) label noobs;
format state statef.;
var state rowper serow ;
label
rowper='Percent 4:3:1:3 Up-to-Date'
serow='Standard Error'
;
title "4:3:1:3 ESTIMATES BY STATE";
run;

********************;
title1 'PROG_3.SAS';
************************************************************************
THIS PROGRAM WILL PRODUCE A TABLE OF HAD_CPOX BY STATE FOR ALL RDD
COMPLETES USING RDDWT. THE PROGRAM USES SAS CALLABLE SUDAAN.
SUDAAN NOTES:
1. ALL VARIABLES USED MUST BE NUMERIC.
2. VARIABLES IN THE SUBGROUP STATEMENT MUST HAVE VALUES 1,2,..K
WHERE K IS THE NUMBER OF LEVELS FOR EACH VARIABLE.
3. DATA MUST BE SORTED ACCORDING TO THE SAMPLE DESIGN VARIABLES
(STRATUM AND PRIMARY SAMPLING UNIT), SPECIFIED IN THE
NEST STATEMENT.
************************************************************************;
options ps=78 ls=90 obs= max;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;

*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;
%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION VARIABLE TO USE ---*;
%let wt=rddwt; *--- WEIGHT TO USE ---*;
                *Note: Use RDDWT for analyses excluding the U.S Virgin
                    Islands.  To include USVI, use RDDWTVI;

PROC FORMAT;
/*
THE FOLLOWING FORMAT WILL BE USED FOR PUTD4313.
```

```
ORIGINAL VALUES OF PUTD4313 ARE 1,0.
MUST BE CONVERTED TO 1,2 IN SUDAAN.
*/
value hadcpoxf
1='Yes'
2='No'
;
value statef
0 ='U.S. Total '
1 ='Alabama '
2 ='Alaska '
4 ='Arizona '
5 ='Arkansas '
6 ='California '
8 ='Colorado '
9 ='Connecticut '
10 ='Delaware '
11 ='District of Columbia'
12 ='Florida '
13 ='Georgia '
15 ='Hawaii '
16 ='Idaho '
17 ='Illinois '
18 ='Indiana '
19 ='Iowa '
20 ='Kansas '
21 ='Kentucky '
22 ='Louisiana '
23 ='Maine '
24 ='Maryland '
25 ='Massachusetts '
26 ='Michigan '
27 ='Minnesota '
28 ='Mississippi '
29 ='Missouri '
30 ='Montana '
31 ='Nebraska '
32 ='Nevada '
33 ='New Hampshire '
34 ='New Jersey '
35 ='New Mexico '
36 ='New York '
37 ='North Carolina '
38 ='North Dakota '
39 ='Ohio '
40 ='Oklahoma '
41 ='Oregon '
42 ='Pennsylvania '
44 ='Rhode Island '
45 ='South Carolina '
46 ='South Dakota '
47 ='Tennessee '
48 ='Texas '
49 ='Utah '
50 ='Vermont '
```

```
51 ='Virginia '
53 ='Washington '
54 ='West Virginia '
55 ='Wisconsin '
56 ='Wyoming '
78 ='U.S. Virgin Islands '
;
run;
data sud_file;
set &in_file(keep= seqnumhh seqnumc &estiap state had_cpox &wt);
nseqnumh=1*seqnumhh; *** CONVERT HOUSEHOLD ID SEQNUMH FROM CHARACTER TO
NUMERIC ***;
run;
*=== SORT BY NEST VARIABLES: ESTIAP (STRATUM) NSEQNUMH (PRIMARY SAMPLING
UNIT) ===*;
proc sort;
by &estiap nseqnumh;
run;
proc crosstab data=sud_file filetype=sas design=wr;
weight &wt;
nest &estiap nseqnumh;
subgroup state had_cpox ;
levels 56 2 ;
tables state * had_cpox ;
print nsum wsum rowper serow/style=nchs ;
rtitle "HAD_CPOX ESTIMATES BY STATE";
rtitle "WEIGHT = &WT";
rformat state statef.;
rformat had_cpox hadcpoxf.;
output rowper serow / filename=sud_est3 filetype=sas;
run;
*** EXCLUDE 3,7,14,43,52,57-77 THERE ARE NO STATES WITH THESE FIPS CODES ***
;
proc print data=sud_est3(where=(had_cpox=1
& state notin (3,7,14,43,52) & not(57<=state<=77))) label noobs;
format state statef.;
var state rowper serow ;
label
rowper='Percent HAD_CPOX = Yes'
serow='Standard Error'
;
title "CHILD HAD CHICKEN POX BY STATE";
run;


*********************;
title1 'PROG_4.SAS';
********************************************************************************
TABLE OF PUTD4313 BY INCPOV1 BY RACE_K. SAVE % UTD
ESTIMATES (NOT S.E.'S) FOR USE IN THE PROGRAM CHART_4.
THIS PROGRAM WILL PRODUCE ESTIMATES USING SAS CALLABLE SUDAAN.
SUDAAN NOTES:
1. ALL VARIABLES USED MUST BE NUMERIC.
2. VARIABLES IN THE SUBGROUP STATEMENT MUST HAVE VALUES 1,2,..K
WHERE K IS THE NUMBER OF LEVELS FOR EACH VARIABLE.
```

```
3. DATA MUST BE SORTED ACCORDING TO THE SAMPLE DESIGN VARIABLES
(STRATUM AND PRIMARY SAMPLING UNIT), SPECIFIED IN THE
NEST STATEMENT.
***********************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;

*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;
/*libname out 'c:\nispuf06'; *--- SPECIFY THE PATH FOR WHERE YOU WANT THE
CHART OUTPUT TO GO ---*;*/

libname out 'c:\nispuf09'; *--- SPECIFY THE PATH FOR WHERE YOU WANT THE CHART
OUTPUT TO GO ---*;

%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION VARIABLE TO USE ---*;
%let wt=provwt; *--- WEIGHT TO USE ---*;
                *Note: Use PROVWT for analyses excluding the U.S Virgin
                   Islands.  To include USVI, use PROVWTVI;
%let qtr_lab=Q1/2009 - Q4/2009; *NIS 4 QUARTER PERIOD*;

PROC FORMAT;
/*
THE FOLLOWING FORMAT WILL BE USED FOR PUTD4313.
ORIGINAL VALUES OF PUTD4313 ARE 1,0.
MUST BE CONVERTED TO 1,2 IN SUDAAN.
*/
value put4313f
1='4:3:1:3 Up-to-date'
2='Not 4:3:1:3 Up-to-date'
;
VALUE RACE_KF
1 = "WHITE ONLY"
2 = "BLACK ONLY"
3 = "OTHER AND MULTIPLE RACE"
;
VALUE INCPVR2F
1 = "ABOVE, > $75,000"
2 = "ABOVE, <= $75,000"
3 = "BELOW"
4 = "UNKNOWN"
;
value statef
0 ='U.S. Total '
1 ='Alabama '
2 ='Alaska '
4 ='Arizona '
5 ='Arkansas '
6 ='California '
8 ='Colorado '
9 ='Connecticut '
```

```
10 ='Delaware '
11 ='District of Columbia'
12 ='Florida '
13 ='Georgia '
15 ='Hawaii '
16 ='Idaho '
17 ='Illinois '
18 ='Indiana '
19 ='Iowa '
20 ='Kansas '
21 ='Kentucky '
22 ='Louisiana '
23 ='Maine '
24 ='Maryland '
25 ='Massachusetts '
26 ='Michigan '
27 ='Minnesota '
28 ='Mississippi '
29 ='Missouri '
30 ='Montana '
31 ='Nebraska '
32 ='Nevada '
33 ='New Hampshire '
34 ='New Jersey '
35 ='New Mexico '
36 ='New York '
37 ='North Carolina '
38 ='North Dakota '
39 ='Ohio '
40 ='Oklahoma '
41 ='Oregon '
42 ='Pennsylvania '
44 ='Rhode Island '
45 ='South Carolina '
46 ='South Dakota '
47 ='Tennessee '
48 ='Texas '
49 ='Utah '
50 ='Vermont '
51 ='Virginia '
53 ='Washington '
54 ='West Virginia '
55 ='Wisconsin '
56 ='Wyoming '
78 ='U.S. Virgin Islands '
;
run;
data sud_file;
set &in_file(keep= seqnumhh seqnumc putd4313 &estiap race_k incpov1 &wt);
nseqnumh=1*seqnumhh; *** CONVERT HOUSEHOLD ID SEQNUMH FROM CHARACTER TO
NUMERIC ***;
if putd4313=0 then putd4313=2; *** CONVERT PUTD4313=0 TO PUTD4313=2 ***;
run;
*=== SORT BY NEST VARIABLES: ESTIAP (STRATUM) NSEQNUMH (PRIMARY SAMPLING
UNIT) ===*;
```

```
proc sort;
by &estiap nseqnumh;
run;
proc freq;
tables putd4313 incpov1 race_k;
run;
title3 "Table 4A. &qtr_lab: Unweighted Frequencies";
proc crosstab data=sud_file filetype=sas design=wr;
weight &wt;
nest &estiap nseqnumh;
subgroup incpov1 race_k putd4313 ;
levels 4 3 2 ;
tables (incpov1 * race_k * putd4313) ;
print nsum wsum rowper="4:3:1:3 Up-to-Date (ROWPER)"
serow="Standard Error (SEROW)" /style=nchs ;
rtitle "Table 4B. &qtr_lab, Percent 4:3:1:3 Up-to-Date and Estimated Standard
Errors";
rtitle "WEIGHT = &WT";
rformat putd4313 put4313f.;
rformat incpov1 incpvr2f.;
rformat race_k race_kf.;
output rowper serow / filename=sud_est4 filetype=sas;
run;
data out.sud_est4;
set sud_est4(where=(putd4313=1 & incpov1 > 0 & race_k > 0));
keep incpov1 race_k rowper serow;
label rowper='4:3:1:3 Up-to-Date';
format rowper 5.2;
format serow 5.2;
run;
proc print data=out.sud_est4 label;
format race_k race_kf.;
format incpov1 incpvr2f.;
title "&qtr_lab: 4:3:1:3 ESTIMATES AND STANDARD ERRORS BY INCPOV1 BY RACE_K";
run;

*******************;
title1 'SAS_GRAPH_4.SAS';
*************************************************************************
THIS PROGRAM BUILDS OFF OF THE PROGRAM SAS_PROG_4. IT PRODUCES A CHART OF
PUTD4313 BY INCPOV1 BY RACE_K. IT CREATES A BAR CHART IN SAS GRAPH FOR
THE 4X3 = 12 CELLS. THE OUTPUT OF THE FOLLOWING EXAMPLE IS ATTACHED AT THE
END.
*************************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;

%let out='c:\nispuf09'; *--- SPECIFY THE PATH FOR WHERE YOU WANT THE CHART
OUTPUT TO GO ---*;


%let in_file=dd.sud_est4; *--- NAME OF SAS DATASET OUTPUT FROM PROG_4 ---*;
%let qtr_lab=Q1/2009 - Q4/2009; *NIS 4 QUARTER PERIOD*;
PROC FORMAT;
```

```
VALUE INCPVR2F
1 = "ABOVE, > $75,000"
2 = "ABOVE, <= $75,000"
3 = "BELOW"
4 = "UNKNOWN"
;
VALUE RACE_KF
1 = "WHITE ONLY"
2 = "BLACK ONLY"
3 = "OTHER/MULT RACE"
;
run;
data sud_est4;
set &in_file;
format rowper 3.
race_k race_kf.
incpov1 incpvr2f.
;
label
race_k = 'Race of Child'
incpov1 = 'Poverty Status'
;
filename odsout &out;
ods listing close;
/* SET THE GRAPHICS ENVIRONMENT */
goptions reset=global gunit=pct border
ftext=swissb htitle=4 htext=1.5
device=gif
;
ods html body='graph_4_sud.html' path=odsout;
TITLE1 HEIGHT=3 "Percentage of Children Up-to-date with Vaccine Series
4:3:1:3";
TITLE2 HEIGHT=3 "by Race and Poverty Status, National Immunization Survey,
2009";
footnote j=r 'graph_4sud';
pattern1 value = solid color = blue;
pattern2 value = x3 color = green;
pattern3 value = l3 color = red;
pattern4 value = empty color = lib;
axis width = 3;
run;
proc gchart data=sud_est4;
vbar race_k
/frame
discrete
sumvar=rowper
group=incpov1
gspace = 5
gaxis = axis
raxis = axis
name = 'graph_4_sud'
patternid = midpoint
;
run;
quit;
```

```
ods html close;
ods listing;
ods html close;
ods listing;
```

Percentage of Children Up—to—date with Vaccine Series 4:3:1:3 by Race and Poverty Status, National Immunization Survey, 2009
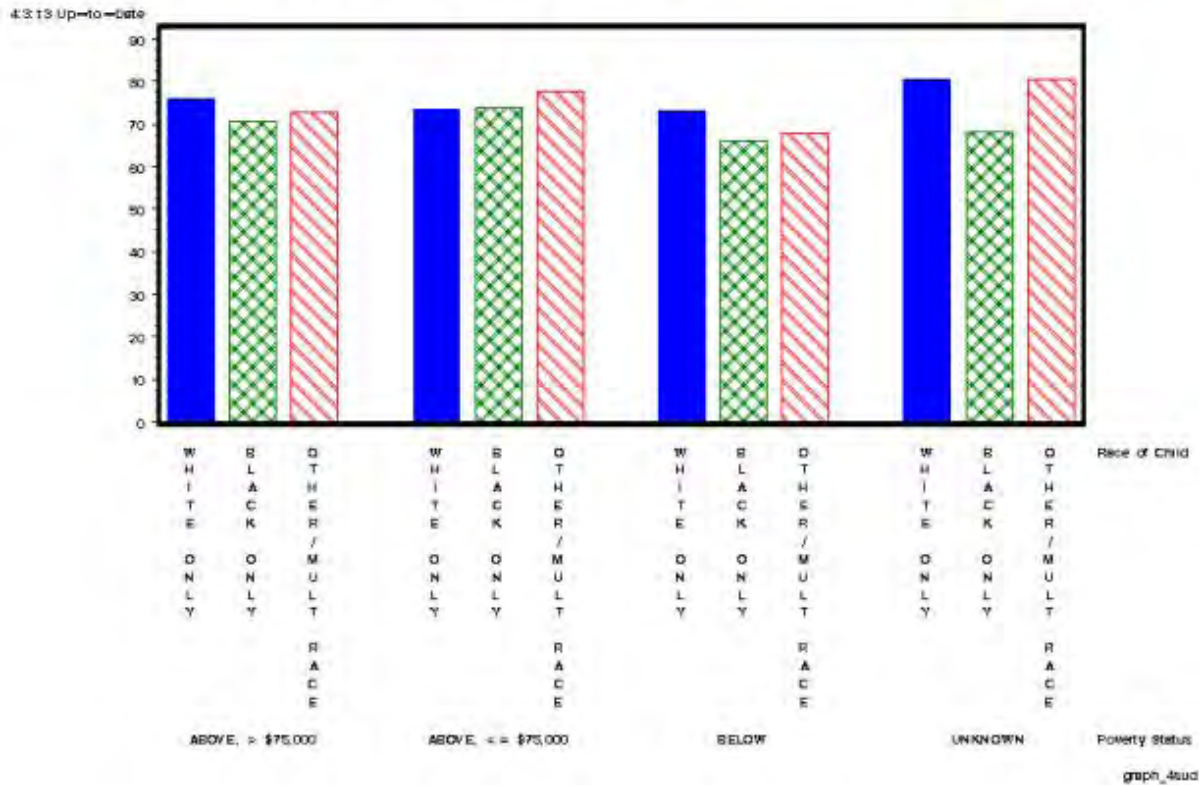
B. SAS

```
*********************;
title1 'SAS_IAP.SAS';
**********************************************************************
THIS PROGRAM WILL PRODUCE ESTIMATION AREA ESTIMATES AND STANDARD ERRORS
FOR PUTD4313 USING SAS.
*********************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;

*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;
%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION AREA VARIABLE TO USE ---*;
%let wt=provwt; * --- WEIGHT TO USE ---*;
                    *Note: Use PROVWT for analyses excluding the U.S Virgin
                     Islands.  To include USVI, use PROVWTVI;
proc format;
value put4313f
0='Not 4:3:1:3 Up-To-Date'
1='4:3:1:3 Up-To-Date';

value estiapf
. = "Missing"
 0 = "US Total"
 1 = "CT"
 2 = "MA"
 4 = "ME"
 5 = "NH"
 6 = "RI"
 7 = "VT"
 8 = "NJ"
10 = "NY-Rest of State"
11 = "NY-City of New York"
12 = "DC"
13 = "DE"
14 = "MD-Rest of State"
15 = "MD-City of Baltimore"
16 = "PA-Rest of State"
17 = "PA-Philadelphia County"
18 = "VA"
19 = "WV"
20 = "AL"
22 = "FL"
25 = "GA"
27 = "KY"
28 = "MS"
29 = "NC"
30 = "SC"
31 = "TN"
```

```
34 = "IL-Rest of State"
35 = "IL-City of Chicago"
36 = "IN-Rest of State"
37 = "IN-Marion County"
38 = "MI"
40 = "MN"
41 = "OH"
44 = "WI"
46 = "AR"
47 = "LA"
49 = "NM"
50 = "OK"
51 = "TX-Rest of State"
52 = "TX-Dallas County"
53 = "TX-El Paso County"
54 = "TX-City of Houston"
55 = "TX-Bexar County"
56 = "IA"
57 = "KS"
58 = "MO"
59 = "NE"
60 = "CO"
61 = "MT"
62 = "ND"
63 = "SD"
64 = "UT"
65 = "WY"
66 = "AZ"
68 = "CA-Rest of State"
69 = "CA-Los Angeles County"
72 = "HI"
73 = "NV"
74 = "AK"
75 = "ID"
76 = "OR"
77 = "WA-Rest of State"
95 = "U.S. Virgin Islands"
96 = "IN-Lake County"
774 = "WA-Eastern/Western WA"
;
run;
data sas_file;
set &in_file(keep= seqnumhh seqnumc putd4313 &estiap &wt);
run;
proc sort data = sas_file;
by &estiap;
run;
title1 '4:3:1:3 ESTIMATES BY Estimation Area';
ods output Statistics=sas_est;
proc surveymeans data = sas_file nobs sum mean stderr;
stratum &estiap;
cluster seqnumhh;
weight &wt;
class putd4313;
var putd4313;
```

```sas
by &estiap;
format putd4313 put4313f.;
format &estiap estiapf.;
run;
data sas_est;
set sas_est;
mean = mean*100; *CONVERT TO PERCENT ESTIMATES;
stderr = stderr*100;
run;
proc print data=sas_est(where=(varlevel='4:3:1:3 Up-To-Date')) noobs
label;
format &estiap estiapf.;
format mean stderr 5.2;
var &estiap mean stderr;
label
mean='Percent 4:3:1:3 Up-to-Date'
stderr='Standard Error';
title "4:3:1:3 ESTIMATES BY Estimation Area";
run;

********************;
title1 'SASSTATE.SAS';
******************************************************************
THIS PROGRAM WILL PRODUCE STATE ESTIMATES AND STANDARD ERRORS
FOR PUTD4313 USING SAS.
NOTE : THE STATE VARIABLE IS BASED ON FIPSTATE CODES ,THERE ARE
NO STATES WITH FIPS CODES 3,7,14,43,52,57-77.
*******************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;
*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;

%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION AREA VARIABLE TO USE ---*;
%let wt=provwt; * --- WEIGHT TO USE ---*;
                *Note: Use PROVWT for analyses excluding the U.S Virgin
                    Islands.  To include USVI, use PROVWTVI;
proc format;
value put4313f
0='Not 4:3:1:3 Up-To-Date'
1='4:3:1:3 Up-To-Date';
value statef
. ="Missing"
0 ='U.S. Total '
1 ='Alabama '
2 ='Alaska '
4 ='Arizona '
5 ='Arkansas '
6 ='California '
8 ='Colorado '
9 ='Connecticut '
```

```
10 ='Delaware '
11 ='District of Columbia'
12 ='Florida '
13 ='Georgia '
15 ='Hawaii '
16 ='Idaho '
17 ='Illinois '
18 ='Indiana '
19 ='Iowa '
20 ='Kansas '
21 ='Kentucky '
22 ='Louisiana '
23 ='Maine '
24 ='Maryland '
25 ='Massachusetts '
26 ='Michigan '
27 ='Minnesota '
28 ='Mississippi '
29 ='Missouri '
30 ='Montana '
31 ='Nebraska '
32 ='Nevada '
33 ='New Hampshire '
34 ='New Jersey '
35 ='New Mexico '
36 ='New York '
37 ='North Carolina '
38 ='North Dakota '
39 ='Ohio '
40 ='Oklahoma '
41 ='Oregon '
42 ='Pennsylvania '
44 ='Rhode Island '
45 ='South Carolina '
46 ='South Dakota '
47 ='Tennessee '
48 ='Texas '
49 ='Utah '
50 ='Vermont '
51 ='Virginia '
53 ='Washington '
54 ='West Virginia '
55 ='Wisconsin '
56 ='Wyoming '
78 ='U.S. Virgin Islands '
;
run;
data sas_file;
set &in_file(keep= seqnumhh seqnumc putd4313 &estiap state &wt);
run;
proc sort data = sas_file;
by state;
title1 '4:3:1:3 ESTIMATES BY STATE';
ods output Statistics=sas_est2;
run;
```

```sas
proc surveymeans data = sas_file nobs sum mean stderr;
stratum &estiap;
cluster seqnumhh;
weight &wt;
class putd4313;
var putd4313;
by state;
format putd4313 put4313f.;
format state statef.;
run;
data sas_est2;
set sas_est2;
mean = mean*100; *CONVERT TO PERCENT ESTIMATES;
stderr = stderr*100;
run;
proc print data=sas_est2(where=(varlevel='4:3:1:3 Up-To-Date')) noobs
label;
format state statef.;
format mean stderr 5.2;
var state mean stderr;
label
mean='Percent 4:3:1:3 Up-to-Date'
stderr='Standard Error';
title "4:3:1:3 ESTIMATES BY STATE";
run;

********************;
title1 'SAS_PROG_3.SAS';
*************************************************************************
THIS PROGRAM WILL PRODUCE A TABLE OF HAD_CPOX BY STATE FOR ALL RDD
COMPLETES USING RDDWT. THE PROGRAM USES SAS.
*************************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;
*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;

%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION VARIABLE TO USE ---*;
%let wt=rddwt; *--- WEIGHT TO USE ---*;
                *Note: Use RDDWT for analyses excluding the U.S Virgin
                   Islands.  To include USVI, use RDDWTVI;
PROC FORMAT;
value hadcpoxf
1='Yes'
2='No'
;
value statef
0 ='U.S. Total '
1 ='Alabama '
2 ='Alaska '
4 ='Arizona '
```

```
 5 ='Arkansas '
 6 ='California '
 8 ='Colorado '
 9 ='Connecticut '
10 ='Delaware '
11 ='District of Columbia'
12 ='Florida '
13 ='Georgia '
15 ='Hawaii '
16 ='Idaho '
17 ='Illinois '
18 ='Indiana '
19 ='Iowa '
20 ='Kansas '
21 ='Kentucky '
22 ='Louisiana '
23 ='Maine '
24 ='Maryland '
25 ='Massachusetts '
26 ='Michigan '
27 ='Minnesota '
28 ='Mississippi '
29 ='Missouri '
30 ='Montana '
31 ='Nebraska '
32 ='Nevada '
33 ='New Hampshire '
34 ='New Jersey '
35 ='New Mexico '
36 ='New York '
37 ='North Carolina '
38 ='North Dakota '
39 ='Ohio '
40 ='Oklahoma '
41 ='Oregon '
42 ='Pennsylvania '
44 ='Rhode Island '
45 ='South Carolina '
46 ='South Dakota '
47 ='Tennessee '
48 ='Texas '
49 ='Utah '
50 ='Vermont '
51 ='Virginia '
53 ='Washington '
54 ='West Virginia '
55 ='Wisconsin '
56 ='Wyoming '
78 ='U.S. Virgin Islands '
;
run;
data sas_file;
set &in_file(keep= seqnumhh seqnumc &estiap state had_cpox &wt);
run;
proc sort data = sas_file;
```

```
by state;
title1 'HAD_CPOX ESTIMATES BY STATE';
ods output Statistics=sas_est3;
run;
proc surveymeans data = sas_file nobs sum mean stderr;
stratum &estiap;
cluster seqnumhh;
weight &wt;
class had_cpox;
var had_cpox;
by state;
format had_cpox hadcpoxf.;
format state statef.;
run;
data sas_est3;
set sas_est3;
mean = mean*100; *CONVERT TO PERCENT ESTIMATES;
stderr = stderr*100;
run;
proc print data=sas_est3(where=(varlevel='Yes')) noobs label;
format state statef.;
format mean stderr 5.2;
var state mean stderr;
label
mean='Percent HAD_CPOX = Yes'
stderr='Standard Error';
title "CHILD HAD CHICKEN POX BY ESTIMATION AREA";
run;


*********************;
title1 'SAS_PROG_4.SAS';
***********************************************************************
TABLE OF PUTD4313 BY INCPOV1 BY RACE_K. SAVE % UTD
ESTIMATES (NOT S.E.'S) FOR USE IN THE PROGRAM SAS_GRAPH_4.
THIS PROGRAM WILL PRODUCE ESTIMATES USING SAS.
***********************************************************************;
options ps=78 ls=90 obs= max;

libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;
libname library 'c:\nispuf09'; *--- IF DATASET WAS CREATED WITH FORMATS
STORED ---*;
*--- PERMANENTLY SPECIFY PATH TO LIBRARY ---*;
*--- OTHERWISE COMMENT THIS STATEMENT OUT ---*;

libname out 'c:\nispuf09'; *--- SPECIFY THE PATH FOR
WHERE YOU WANT THE CHART OUTPUT TO GO ---*;

%let in_file=dd.nispuf09; *--- NAME OF SAS DATASET ---*;
%let estiap=estiap09; * --- ESTIMATION VARIABLE TO USE ---*;
%let wt=provwt; *--- WEIGHT TO USE ---*;
                 *Note: Use PROVWT for analyses excluding the U.S Virgin
                   Islands.  To include USVI, use PROVWTVI;
%let qtr_lab=Q1/2009 - Q4/2009; *NIS 4 QUARTER PERIOD*;
PROC FORMAT;
```

```
value put4313f
0='Not 4:3:1:3 Up-To-Date'
1='4:3:1:3 Up-To-Date'
;
VALUE RACE_KF
1 = "WHITE ONLY"
2 = "BLACK ONLY"
3 = "OTHER AND MULTIPLE RACE"
;
VALUE INCPVR2F
1 = "ABOVE, > $75,000"
2 = "ABOVE, <= $75,000"
3 = "BELOW"
4 = "UNKNOWN"
;
run;
data sas_file;
set &in_file(keep= seqnumhh seqnumc putd4313 &estiap race_k incpov1 &wt);
run;
proc sort data = sas_file;
by incpov1 race_k;
run;
proc freq;
tables putd4313 incpov1 race_k;
title1 "Table 4A. &qtr_lab: Unweighted Frequencies";
run;
data sas_file;
set sas_file;
if putd4313 < 0 | incpov1 < 0 | race_k < 0 | &wt. < 0 then delete;
run;
proc surveymeans data = sas_file nobs sum mean stderr;
ods output Domain=sas_est4;
stratum &estiap;
cluster seqnumhh;
weight &wt;
class putd4313;
var putd4313;
domain incpov1*race_k;
format putd4313 put4313f.;
format incpov1 incpvr2f.;
format race_k race_kf.;
run;
data sas_est4;
set sas_est4;
mean = mean*100; *CONVERT TO PERCENT ESTIMATES;
stderr = stderr*100;
run;
proc print data=sas_est4(where=(varlevel='4:3:1:3 Up-To-Date')) noobs
label;
format incpov1 incpvr2f.;
format race_k race_kf.;
format mean stderr 5.2;
var incpov1 race_k mean stderr;
label
mean='4:3:1:3 Up-To-Date'
```

```
stderr='Standard Error';
title1 "Table 4B. &qtr_lab, Percent 4:3:1:3 Up-to-Date and Estimated
Standard Errors";
run;
data out.sas_est4;
set sas_est4(where=(varlevel='4:3:1:3 Up-To-Date'));
keep incpov1 race_k mean;
label mean='4:3:1:3 Up-to-Date';
format mean 5.2;
run;


*********************;
title1 'SAS_GRAPH_4.SAS';
************************************************************************
THIS PROGRAM BUILDS OFF OF THE PROGRAM SAS_PROG_4. IT PRODUCES A CHART OF
PUTD4313 BY INCPOV1 BY RACE_K. IT CREATES A BAR CHART IN SAS GRAPH FOR
THE 4X3 = 12 CELLS. THE OUTPUT OF THE FOLLOWING EXAMPLE IS ATTACHED AT THE
END.
***********************************************************************;
options ps=78 ls=90 obs= max;


libname dd 'c:\nispuf09'; *--- SPECIFY PATH TO SAS DATASET ---*;


%let out='c:\nispuf09'; *--- SPECIFY THE PATH FOR WHERE YOU WANT THE CHART
OUTPUT TO GO ---*;



%let in_file=dd.sas_est4; *--- NAME OF SAS DATASET OUTPUT FROM PROG_4 ---
*;
%let qtr_lab=Q1/2009 - Q4/2009; *NIS 4 QUARTER PERIOD*;
PROC FORMAT;
VALUE INCPVR2F
1 = "ABOVE, > $75,000"
2 = "ABOVE, <= $75,000"
3 = "BELOW"
4 = "UNKNOWN"
;
VALUE RACE_KF
1 = "WHITE ONLY"
2 = "BLACK ONLY"
3 = "OTHER/MULT RACE"
;
run;
data sas_est4;
set &in_file;
format mean 3.
race_k race_kf.
incpov1 incpvr2f.
;
label
race_k = 'Race of Child'
incpov1 = 'Poverty Status'
;
filename odsout &out;
ods listing close;
```

```
/* SET THE GRAPHICS ENVIRONMENT */
goptions reset=global gunit=pct border
ftext=swissb htitle=4 htext=1.5
device=gif
;
ods html body='graph_4.html' path=odsout;
TITLE1 HEIGHT=3 "Percentage of Children Up-to-date with Vaccine Series
4:3:1:3";
TITLE2 HEIGHT=3 "by Race and Poverty Status, National Immunization Survey,
2009";
footnote j=r 'graph_4';
pattern1 value = solid color = blue;
pattern2 value = x3 color = green;
pattern3 value = l3 color = red;
pattern4 value = empty color = lib;
axis width = 3;
run;
proc gchart data=sas_est4;
vbar race_k
/frame
discrete
sumvar=mean
group=incpov1
gspace = 5
gaxis = axis
raxis = axis
name = 'graph_4'
patternid = midpoint
;
run;
quit;
ods html close;
ods listing;
```

Percentage of Children Up—to—date with Vaccine Series 4:3:1:3 by Race and Poverty Status, National Immunization Survey, 2009

graph_4
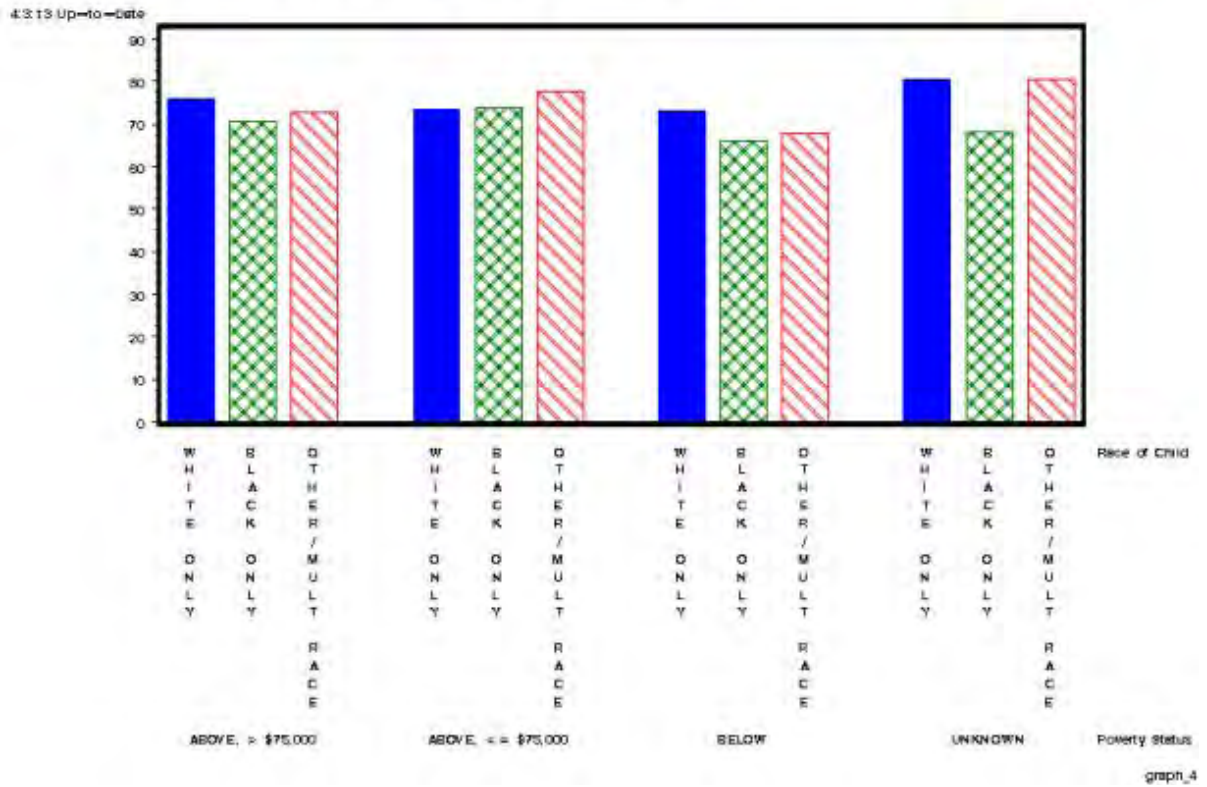
C. 'R'

```
######################
title <- "R_IAP.R"
######################################################################
#THIS PROGRAM WILL PRODUCE ESTIMATION AREA ESTIMATES AND STANDARD ERRORS
#FOR PUTD4313 USING R.
#
#R NOTES:
#1. R IS CASE SENSITIVE.
#2. A FILE PATH IS SEPERATED BY SLASH(/)
######################################################################
library(survey) #TO USE svydesign(), svymean(), and svyby()
library(Hmisc) #TO USE prn()


dd <- "c:/nispuf09" #"path-to-dataset"


#--- NAME OF R DATASET ---#
in.file <- paste(dd,"/NISPUF09.RData",sep="")
#---READ R DATASET---#
load(in.file)
#---FORMAT---#
UTD4313levels=c(0,1)
UTD4313labels=c("NOT 4:3:1:3 UTD", "4:3:1:3 UTD")
ESTIAPlevels=c(0, 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22,
25, 27, 28, 29, 30, 31, 34, 35, 36, 37, 38, 40, 41, 44, 46, 47, 49, 50, 51, 52, 53,
54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 69, 72, 73, 74, 75, 76, 77,
95, 96, 774)
ESTIAPlabels=c("US Total", "CT", "MA", "ME", "NH", "RI", "VT", "NJ", "NY-Rest of
State", "NY-City of New York", "DC", "DE", "MD-Rest of State", "MD-City of Baltimore",
"PA-Rest of State", "PA-Philadelphia County", "VA", "WV", "AL", "FL", "GA", "KY",
"MS", "NC", "SC", "TN", "IL-Rest of State", "IL-City of Chicago", "IN-Rest of State",
"IN-Marion County", "MI", "MN", "OH", "WI", "AR", "LA", "NM", "OK", "TX-Rest of
State", "TX-Dallas County", "TX-El Paso County", "TX-City of Houston", "TX-Bexar
County", "IA", "KS", "MO", "NE", "CO", "MT", "ND", "SD", "UT", "WY", "AZ", "CA-Rest of
State", "CA-Los Angeles County", "HI", "NV", "AK", "ID", "OR", "WA-Rest of State",
"U.S. Virgin Islands", "IN-Lake County", "WA-Eastern/Western WA")

#PROVWT WILL BE USED AS A WEIGHT, EXCLUDING US VIRGIN ISLANDS CASES
#TO INCLUDE USVI, USE PROVWTVI
R_FILE <- subset(NISPUF09, select=c(SEQNUMHH, SEQNUMC, PUTD4313, ESTIAP09,
PROVWT))
names(R_FILE) <- c("SEQNUMHH", "SEQNUMC", "PUTD4313", "ESTIAP", "WT")
R_FILE <- na.omit(R_FILE)
#---ASSIGN LABELS---#
R_FILE$PUTD4313 <- factor(R_FILE$PUTD4313, levels=UTD4313levels,
labels=UTD4313labels)
R_FILE$ESTIAP <- factor(R_FILE$ESTIAP, levels=ESTIAPlevels,
labels=ESTIAPlabels)

#---SPECIFY A SAMPLING DESIGN---#
svydsg <- svydesign(id=~SEQNUMHH, strata=~ESTIAP, weights=~WT,
data=R_FILE)

#---U.S. TOTAL ESTIMATES AND STANDARD ERRORS---#
r_nation <- svymean(~PUTD4313, svydsg)
PERCENT_UTD <- round(r_nation*100,2) #CONVERT INTO PERCENT ESTIMATES(MEAN)
SE_UTD <- round(SE(r_nation)*100,2) #CONVERT INTO PERCENT ESTIMATES(SE)
r_nation_est <- cbind(PERCENT_UTD, SE_UTD)
```

```
title <- "PERCENT 4:3:1:3 ESTIMATES AT A NATIONWIDE LEVEL"
prn(r_nation_est, title)

#---ESTIMATION AREA ESTIMATES AND STANDARD ERRORS---#
r_est <- svyby(~PUTD4313, ~ESTIAP, svydsg, svymean)
r_est[,-c(1)] <- round(r_est[,-c(1)]*100,2) #CONVERT INTO PERCENT ESTIMATES
r_est <- subset(r_est, select=c(1,3,5))


#SELECT ESTIMATES FOR UP-TO-DATE CASES
names(r_est) <- c("ESTIMATION AREA", "PERCENT 4:3:1:3 UTD", "STANDARD ERROR UTD")
title <- "PERCENT 4:3:1:3 ESTIMATES BY ESTIMATION AREA"
prn(r_est, title)

#####################
title <- "R_STATE.R"
######################################################################
#THIS PROGRAM WILL PRODUCE STATE ESTIMATES AND STANDARD ERRORS
#FOR PUTD4313 USING R.
#
#NOTE : THE STATE VARIABLE IS BASED ON FIPSTATE CODES ,THERE ARE
#NO STATES WITH FIPS CODES 3,7,14,43,52,57-77.
#
#R NOTES:
#1. R IS CASE SENSITIVE.
#2. A FILE PATH IS SEPERATED BY SLASH(/)
######################################################################
library(survey) #TO USE svydesign(), svymean(), and svyby()
library(Hmisc) #TO USE prn()


dd <- "c:/nispuf09" #"path-to-data"


#--- NAME OF R DATASET ---#
in.file <- paste(dd,"/NISPUF09.RData",sep="")
#---READ R DATASET---#
load(in.file)
#---FORMAT---#
UTD4313levels=c(0,1)
UTD4313labels=c("NOT 4:3:1:3 UTD", "4:3:1:3 UTD")
STATElevels=c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,
18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35,
36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53,
54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71,
72, 73, 74, 75, 76, 77, 78)
STATElabels=c(
"ALABAMA",
"ALASKA",
" ",
"ARIZONA",
"ARKANSAS",
"CALIFORNIA",
" ",
"COLORADO",
"CONNECTICUT",
"DELAWARE",
"DISTRICT OF COLUMBIA",
"FLORIDA",
"GEORGIA",
" ",
"HAWAII",
```

```
"IDAHO",
"ILLINOIS",
"INDIANA",
"IOWA",
"KANSAS",
"KENTUCKY",
"LOUISIANA",
"MAINE",
"MARYLAND",
"MASSACHUSETTS",
"MICHIGAN",
"MINNESOTA",
"MISSISSIPPI",
"MISSOURI",
"MONTANA",
"NEBRASKA",
"NEVADA",
"NEW HAMPSHIRE",
"NEW JERSEY",
"NEW MEXICO",
"NEW YORK",
"NORTH CAROLINA",
"NORTH DAKOTA",
"OHIO",
"OKLAHOMA",
"OREGON",
"PENNSYLVANIA",
" ",
"RHODE ISLAND",
"SOUTH CAROLINA",
"SOUTH DAKOTA",
"TENNESSEE",
"TEXAS",
"UTAH",
"VERMONT",
"VIRGINIA",
" ",
"WASHINGTON",
"WEST VIRGINIA",
"WISCONSIN",
"WYOMING",
" ",
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```

```
"U.S. Virgin Islands")
#PROVWT WILL BE USED AS A WEIGHT, EXCLUDING US VIRGIN ISLANDS CASES
#TO INCLUDE USVI, USE PROVWTVI
R_FILE <- subset(NISPUF09, select=c(SEQNUMHH, SEQNUMC, PUTD4313, ESTIAP09,
STATE, PROVWT))
names(R_FILE) <- c("SEQNUMHH", "SEQNUMC", "PUTD4313", "ESTIAP", "STATE",
"WT")
R_FILE <- na.omit(R_FILE)
#---ASSIGN LABELS---#
R_FILE$PUTD4313 <- factor(R_FILE$PUTD4313, levels=UTD4313levels,
labels=UTD4313labels)
R_FILE$STATE <- factor(R_FILE$STATE, levels=STATElevels,
labels=STATElabels)
#---SPECIFY A SAMPLING DESIGN---#
svydsg <- svydesign(id=~SEQNUMHH, strata=~ESTIAP, weights=~WT,
data=R_FILE)
#---STATE ESTIMATES AND STANDARD ERRORS---#
r_est2 <- svyby(~PUTD4313, ~STATE, svydsg, svymean)
r_est2[,-c(1)] <- round(r_est2[,-c(1)]*100,2) #CONVERT INTO PERCENT
ESTIMATES
r_est2 <- subset(r_est2, select=c(1,3,5)) #SELECT ESTIMATES FOR UP-TO-DATE
CASES
names(r_est2) <- c("STATE", "PERCENT 4:3:1;3 UTD", "STANDARD ERROR UTD")
prn(r_est2, '4:3:1:3 ESTIMATES BY STATE')


######################
title <- "R_PROG_3.R"
######################################################################
#THIS PROGRAM WILL PRODUCE A TABLE OF HAD_CPOX BY STATE FOR ALL RDD
#COMPLETES USING RDDWT. THE PROGRAM USES R.
#
#R NOTES:
#1. R IS CASE SENSITIVE.
#2. A FILE PATH IS SEPERATED BY SLASH(/)
######################################################################
library(survey) #TO USE svydesign(), svymean(), and svyby()
library(Hmisc) #TO USE prn()
library(prettyR) #TO USE freq()

#dd <- "c:/nispuf09" #"path-to-dataset"


#--- NAME OF R DATASET ---#
in.file <- paste(dd,"/NISPUF09.RData",sep="")
#---READ R DATASET---#
load(in.file)
#---FORMAT---#
HAD_CPOXlevels=c(1,2,77,99)
HAD_CPOXlabels=c("YES", "NO", "DON'T KNOW", "REFUSED")
STATElevels=c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17,
18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35,
36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53,
54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71,
72, 73, 74, 75, 76, 77, 78)
STATElabels=c(
"ALABAMA",
"ALASKA",
" ",
"ARIZONA",
"ARKANSAS",
"CALIFORNIA",
" ",
```

```
"COLORADO",
"CONNECTICUT",
"DELAWARE",
"DISTRICT OF COLUMBIA",
"FLORIDA",
"GEORGIA",
" ",
"HAWAII",
"IDAHO",
"ILLINOIS",
"INDIANA",
"IOWA",
"KANSAS",
"KENTUCKY",
"LOUISIANA",
"MAINE",
"MARYLAND",
"MASSACHUSETTS",
"MICHIGAN",
"MINNESOTA",
"MISSISSIPPI",
"MISSOURI",
"MONTANA",
"NEBRASKA",
"NEVADA",
"NEW HAMPSHIRE",
"NEW JERSEY",
"NEW MEXICO",
"NEW YORK",
"NORTH CAROLINA",
"NORTH DAKOTA",
"OHIO",
"OKLAHOMA",
"OREGON",
"PENNSYLVANIA",
" ",
"RHODE ISLAND",
"SOUTH CAROLINA",
"SOUTH DAKOTA",
"TENNESSEE",
"TEXAS",
"UTAH",
"VERMONT",
"VIRGINIA",
" ",
"WASHINGTON",
"WEST VIRGINIA",
"WISCONSIN",
"WYOMING",
" ",
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```

```
" ",
" ",
" ",
" ",
" ",
" ",
" ",
" ",
"U.S. Virgin Islands")

#RDDWT WILL BE USED AS A WEIGHT, EXCLUDING US VIRGIN ISLANDS CASES
#TO INCLUDE USVI, USE RDDWTVI
R_FILE <- subset(NISPUF09, select=c(SEQNUMHH, SEQNUMC, ESTIAP09, STATE,
HAD_CPOX, RDDWT))
names(R_FILE) <- c("SEQNUMHH", "SEQNUMC", "ESTIAP", "STATE", "HAD_CPOX",
"WT")

#---ASSIGN LABELS---#
R_FILE$HAD_CPOX <- factor(R_FILE$HAD_CPOX, levels=HAD_CPOXlevels,
labels=HAD_CPOXlabels)
R_FILE$STATE <- factor(R_FILE$STATE, levels=STATElevels,
labels=STATElabels)
R_FILE <- na.omit(R_FILE)
summary(R_FILE$HAD_CPOX)

#---SPECIFY A SAMPLING DESIGN---#
svydsg <- svydesign(id=~SEQNUMHH, strata=~ESTIAP, weights=~WT,
data=R_FILE)

#---U.S. TOTAL ESTIMATES AND STANDARD ERRORS---#
r_nation <- svymean(~HAD_CPOX, svydsg)
PERCENT_UTD <- round(r_nation*100,2) #CONVERT INTO PERCENT ESTIMATES(MEAN)
SE_UTD <- round(SE(r_nation)*100,2) #CONVERT INTO PERCENT ESTIMATES(SE)
r_nation_est3 <- cbind(PERCENT_UTD, SE_UTD)
prn(r_nation_est3, "PERCENT HAD_CPOX = YES ESTIMATES AT A NATIONWIDE
LEVEL\n")

#---HAD_CPOX = YES ESTIMATES BY STATE---#
r_est3 <- svyby(~HAD_CPOX, ~STATE, svydsg, svymean)
r_est3[,-c(1)] <- round(r_est3[,-c(1)]*100,2) #CONVERT INTO PERCENT ESTIMATES
r_est3 <- subset(r_est3, select=c(1,2,6)) #SELECT ESTIMATES FOR HAD_CPOX=YES
names(r_est3) <- c("STATE", "PERCENT HAD_CPOX=YES", "STANDARD ERROR
HAD_CPOX=Y")
prn(r_est3, 'PERCENT HAD_CPOX ESTIMATES BY STATE')
```

```
#######################
title <- "PROG_4.R"
##############################################################################
#TABLE OF PUTD4313 BY INCPOV1 BY RACE_K. SAVE % UTD
#ESTIMATES (NOT S.E.'S) FOR USE IN THE PROGRAM GRAPH_4.
#
#THIS PROGRAM WILL PRODUCE ESTIMATES USING R.
#
#R NOTES:
#1. R IS CASE SENSITIVE.
#2. A FILE PATH IS SEPERATED BY SLASH(/)
##############################################################################
library(survey) #TO USE svydesign(), svymean(), and svyby()
library(Hmisc) #TO USE prn()


dd <- "c:/nispuf09" #"path-to-dataset"

out <-"c:/nispuf09" #"path-to-output"



#--- NAME OF R DATASET ---#
in.file <- paste(dd,"/NISPUF09.RData",sep="")
#---READ R DATASET---#
load(in.file)
#---FORMAT---#
UTD4313levels=c(0,1)
UTD4313labels=c("NOT 4:3:1:3 UTD", "4:3:1:3 UTD")
RACE_PUFlevels=c(1,2,3)
RACE_PUFlabels=c("WHITE ONLY", "BLACK ONLY", "OTHER + MULTIPLE RACE")
INCPOVlevels=c(1,2,3,4)
INCPOVlabels=c("ABOVE POVERTY, > $75K", "ABOVE POVERTY, <= $75K", "BELOW
POVERTY", "UNKNOWN")
#PROVWT WILL BE USED AS A WEIGHT, EXCLUDING US VIRGIN ISLANDS CASES
#TO INCLUDE USVI, USE PROVWTVI
R_FILE <- subset(NISPUF09, select=c(SEQNUMHH, SEQNUMC, PUTD4313, ESTIAP09, RACE_K,
INCPOV1, PROVWT))
names(R_FILE) <- c("SEQNUMHH", "SEQNUMC", "PUTD4313", "ESTIAP", "RACE_K", "INCPOV1",
"WT")
#---ASSIGN LABELS---#
R_FILE$PUTD4313 <- factor(R_FILE$PUTD4313, levels=UTD4313levels, labels=UTD4313labels,
exclude=NULL)
R_FILE$RACE_K <- factor(R_FILE$RACE_K, levels=RACE_PUFlevels, labels=RACE_PUFlabels,
exclude=NULL)
R_FILE$INCPOV1 <- factor(R_FILE$INCPOV1, levels=INCPOVlevels,labels=INCPOVlabels,
exclude=NULL)
#---UNWEIGHTED FREQUENCIES---#
unwt_freq <- function(UNWT.VAR){#FUNCTION TO PRINT UNWEIGHTED FREQUENCIES
unwt.tab <- wtd.table(UNWT.VAR, weights= NULL, type='table')
unwtd.freq <- data.frame(cbind(
unwt.tab, round(unwt.tab/sum(unwt.tab)*100,2),
cumsum(unwt.tab), cumsum(round(unwt.tab/sum(unwt.tab)*100,2))))
names(unwtd.freq) <- c("Frequency", "Percent", "Cumulative Frequency", "Cumulative
Percent")
unwtd.title <- paste('Table 4A. Q1/2009 - Q4/2009', 'UNWEIGHTED FREQUENCIES',
label(UNWT.VAR), sep="\n")
label(unwtd.freq) <- unwtd.title
print(unwtd.freq)
}
unwt_freq(R_FILE$PUTD4313)
```

```
unwt_freq(R_FILE$INCPOV1)
unwt_freq(R_FILE$RACE_K)
R_FILE <- na.omit(R_FILE)
#---SPECIFY A SAMPLING DESIGN---#
svydsg <- svydesign(id=~SEQNUMHH, strata=~ESTIAP, weights=~WT,
data=R_FILE)
#---PERCENT 4:3:1:3 UP-TO-DATE AND ESTIMATED STANDARD ERRORS---#
r_est4 <- svyby(~PUTD4313, ~RACE_K+INCPOV1, svydsg, svymean)
r_est4[,-c(1,2)] <- round(r_est4[,-c(1,2)]*100,2) #CONVERT INTO PERCENT
ESTIMATES
r_est4 <- subset(r_est4, select=c(1,2,4,6)) #SELECT ESTIMATES FOR UP-TODATE CASES
names(r_est4) <- c("RACE", "INCOME", "PERCENT_UTD", "STANDARD_ERROR_UTD")
title <- "Table 4B. Q1/2009 - Q4/2009, Percent 4:3:1:3 UTD and Estimated Standard
Errors"
prn(r_est4, title)
#---SAVE PERCENT UP-TO-DATE ESTIMATES FOR USE IN THE PROGRAM GRAPH_4---#
r_est4 <- subset(r_est4, select=c(RACE, INCOME, PERCENT_UTD))
save(r_est4, file=paste(out, "/r_est4_09", sep=""))




######################
title <- "GRAPH_4.R"
########################################################################
#THIS PROGRAM BUILDS OFF OF THE PROGRAM PROG_4. IT PRODUCES A CHART OF
#PUTD4313 BY INCPOV1 BY RACE_K. IT CREATES A BAR CHART IN R GRAPH FOR
#THE 4X3 = 12 CELLS.
#R NOTES:
#1. R IS CASE SENSITIVE.
#2. A FILE PATH IS SEPERATED BY SLASH(/)
########################################################################
library(survey) #TO USE svydesign(), svymean(), and svyby()
library(Hmisc) #TO USE prn()
library(GDD) # TO USE GDD()

#dd <- "path-to-dataset" #---SPECIFY PATH TO R DATASET THAT WAS THE OUTPUT OF
R_PROG_4---#

dd <- "c:/nifpuf09"

#out <- "path-to-dataset" #---SPECIFY THE PATH FOR WHERE YOU WANT THE CHART OUTPUT TO
GO---#

out <- "c:/nispuf09"

#---NAME OF R DATASET OUTPUT FROM R_PROG_4---#
in.file <- paste(dd,"/r_est4_09",sep="")
#---READ R DATASET---#
load(in.file)
#---BARCHART---#
#NOTE:R DOES NOT SUPPORT CREATING A HTML FILE CONTAINING A BARCHART#
#CREATE A DATA MATRIX FOR DRAWING A BARCHART#
utd4313 <- matrix(r_est4$PERCENT_UTD, nrow=3, ncol=4, byrow=F,
dimnames=list(levels(r_est4$RACE), levels(r_est4$INCOME)))
#CREATE GRAPH_4.GIF#
GDD(paste(out,"/graph_4_09R.gif",sep=""), type="gif", width=1200, height=700)
barplot(utd4313, beside=TRUE, space=c(0.2,1),
col = c("wheat", "lightpink2", "forestgreen"),
axis.lty = 1,
sub="(Graph 4 using 'R')", cex.sub=1, ylim=c(0,100),
xlab="Poverty Status",
ylab="4:3:1:3 Up-To-Date (%)", cex=1, cex.names=1, border=NA)
```

```
legend("top", rownames(utd4313), col=c("wheat", "lightpink2",
"forestgreen"), title="Race of Child", pch=15, cex=1)
title1 <- "Percentage of Children Up-to-date with Vaccine Series 4:3:1:3 \n"
title2 <- "by Race and Poverty Status, National Immunization Survey, 2009\n"
mtext(paste(title1,title2), cex=1.3)
dev.off()
```
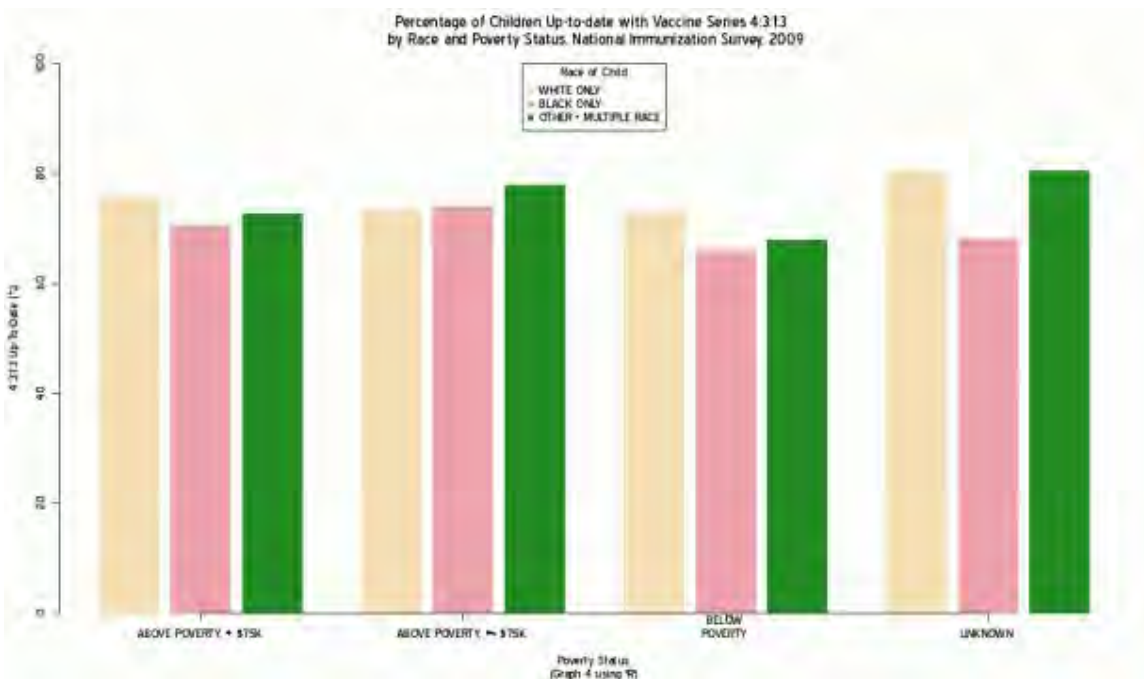
Appendix F

Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
AGECPOXR	AGE IN MONTHS AT CHICKEN POX DISEASE (RECODE)		Y	Y	Y	Y	Y	Replaces IAGECPXR starting 2005. This version is not imputed.
AGEGRP	AGE CATEGORY OF CHILD (19-23, 24-29, 30-35 MO) (RECODE)	Y	Y	Y	Y	Y	Y	
ALL4SHOT	HH REPORT OF 4:3:1:3 UP-TO-DATE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
BF_ENDR	DURATION OF BREAST FEEDING IN DAYS (TOPCODE)	Y	Y					Dropped starting in 2006 because of question wording change. Replaced by BF_ENDR06.
BF_ENDR06	DURATION OF BREAST FEEDING IN DAYS (RECODE)			Y	Y	Y	Y	Replaces BF_ENDR starting 2006.
BF_EXCLR	DURATION OF EXCLUSIVE BREAST FEEDING IN DAYS (TOPCODE)	Y	Y					Dropped starting in 2006 because of question wording change. Replaced by BF_EXCLR06.
BF_EXCLR06	DURATION OF EXCLUSIVE BREAST/FORMULA FEEDING IN DAYS (RECODE)			Y	Y	Y	Y	Replaces BF_EXCLR starting 2006.
BF_FORMR06	AGE IN DAYS WHEN CHILD FIRST FED FORMULA (TOPCODE)			Y	Y			Question CBF_03_X added starting 2006. Replaced by BF_FORMR06 starting 2008.
BF_FORMR08	AGE IN DAYS WHEN CHILD FIRST FED FORMULA (RECODE)					Y	Y	Replaces BF_FORMR06 to add a "never fed formula" code.
BFENDFL	DURATION OF BREAST FEEDING EXCEEDS CHILD AGE IN DAYS, WITH BUFFER	Y	Y					Dropped starting in 2006 because of question wording change. Replaced by BFENDFL06.
BFENDFL06	DURATION OF BREAST FEEDING EXCEEDS CHILD AGE IN DAYS, WITH BUFFER			Y	Y	Y	Y	Replaces BFENDFL starting 2006.
BFEXCLFL	DURATION OF EXCLUSIVE BREAST FEEDING EXCEEDS TOTAL BREASTFEEDING, WITH BUFFER	Y	Y					Dropped starting in 2006 because question wording change do not allow it to be derived.
BFFORMFL06	AGE IN DAYS WHEN CHILD FIRST FED FORMULA EXCEEDS CHILD AGE IN DAYS, WITH BUFFER			Y	Y	Y	Y	Question CBF_03_X added starting 2006.
C_431	HH REPORT OF 4:3:1 UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_4313	HH REPORT OF 4:3:1:3 UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_DTP	HH REPORT OF 4+ DT-CONTAINING UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_HEP	HH REPORT OF 3+ HEPATITIS B-CONTAINING UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_HIB	HH REPORT OF 3+ HIB-CONTAINING UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_MMR	HH REPORT OF 1+ MEASLES-CONTAINING UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_POL	HH REPORT OF 3+ POLIO-CONTAINING UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C_VRC	HH REPORT OF 1+ VARICELLA-CONTAINING UP-TO-DATE BY SHOT CARD USE	Y	Y					Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
C1R	NUMBER OF PEOPLE IN HOUSEHOLD (RECODE)	Y	Y	Y	Y	Y	Y	

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
C5R	RELATIONSHIP OF RESPONDENT TO CHILD (RECODE)	Y	Y	Y	Y	Y	Y	
CBF_01	WAS CHILD EVER BREAST FED OR FED BREAST MILK?	Y	Y	Y	Y	Y	Y	
CEN_REG	CENSUS REGION BASED ON TRUE STATE OF RESIDENCE	Y	Y	Y	Y	Y	Y	
CHILDNM	NUMBER OF CHILDREN LESS THAN 18 YEARS IN HH (RECODE)	Y	Y	Y	Y	Y	Y	
CWIC_01	CHILD EVER RECEIVED WIC BENEFITS?	Y	Y	Y	Y	Y	Y	
CWIC_02	CHILD CURRENTLY RECEIVING WIC BENEFITS?	Y	Y	Y	Y	Y	Y	
D6R	NUMBER OF VACCINATION PROVIDERS IDENTIFIED BY RESPONDENT (RECODE)	Y	Y	Y	Y	Y	Y	
D7	CONSENT TO OBTAIN CHILD'S IMMUNIZATION RECORDS FROM PROVIDERS	Y	Y	Y	Y	Y	Y	
DDTP1	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DDTP2	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DDTP3	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DDTP4	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DDTP5	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DDTP6	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DDTP7	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DDTP8	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DDTP9	AGE IN DAYS OF PROV-REPTD DT-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DFLU1	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #1	Y	Y	Y	Y	Y	Y	
DFLU2	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #2	Y	Y	Y	Y	Y	Y	
DFLU3	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #3	Y	Y	Y	Y	Y	Y	
DFLU4	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #4	Y	Y	Y	Y	Y	Y	
DFLU5	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #5	Y	Y	Y	Y	Y	Y	
DFLU6	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #6	Y	Y	Y	Y	Y	Y	
DFLU7	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #7	Y	Y	Y	Y	Y	Y	
DFLU8	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #8	Y	Y	Y	Y	Y	Y	
DFLU9	AGE IN DAYS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

| Variable Name | Variable Label[2] | Year of Data Collection | | | | | | Notes[3] |
		2004	2005	2006	2007	2008	2009	
DHEPA1	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DHEPA2	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DHEPA3	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DHEPA4	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DHEPA5	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DHEPA6	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DHEPA7	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DHEPA8	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DHEPA9	AGE IN DAYS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DHEPB1	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DHEPB2	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DHEPB3	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DHEPB4	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DHEPB5	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DHEPB6	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DHEPB7	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DHEPB8	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DHEPB9	AGE IN DAYS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DHIB1	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DHIB2	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DHIB3	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DHIB4	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DHIB5	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DHIB6	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DHIB7	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DHIB8	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
DHIB9	AGE IN DAYS OF PROV-REPTD HIB-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DISPCODE	NIS PROVIDER RECORD-CHECK DISPOSITION CODE	Y	Y	Y	Y	Y	Y	
DMMR1	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DMMR2	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DMMR3	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DMMR4	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DMMR5	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMMR6	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMMR7	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMMR8	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMMR9	AGE IN DAYS OF PROV-REPTD MEASLES-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMP1	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #1	Y	Y	Y	Y	Y	Y	
DMP2	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #2	Y	Y	Y	Y	Y	Y	
DMP3	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #3	Y	Y	Y	Y	Y	Y	
DMP4	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #4	Y	Y	Y	Y	Y	Y	
DMP5	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMP6	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMP7	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMP8	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMP9	AGE IN DAYS OF PROV-REPTD MUMPS-ONLY SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMPRB1	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #1	Y	Y	Y	Y	Y	Y	
DMPRB2	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #2	Y	Y	Y	Y	Y	Y	
DMPRB3	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #3	Y	Y	Y	Y	Y	Y	
DMPRB4	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #4	Y	Y	Y	Y	Y	Y	
DMPRB5	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMPRB6	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	Year of Data Collection						Notes[3]
		2004	2005	2006	2007	2008	2009	
DMPRB7	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMPRB8	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DMPRB9	AGE IN DAYS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DPCV1	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DPCV2	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DPCV3	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DPCV4	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DPCV5	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DPCV6	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DPCV7	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DPCV8	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DPCV9	AGE IN DAYS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DPOLIO1	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DPOLIO2	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DPOLIO3	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DPOLIO4	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DPOLIO5	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DPOLIO6	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DPOLIO7	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DPOLIO8	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DPOLIO9	AGE IN DAYS OF PROV-REPTD POLIO-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DRB1	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #1	Y	Y	Y	Y	Y	Y	
DRB2	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #2	Y	Y	Y	Y	Y	Y	
DRB3	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #3	Y	Y	Y	Y	Y	Y	
DRB4	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #4	Y	Y	Y	Y	Y	Y	
DRB5	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #5	Y	Y	Y	Y	Y	Y	

Table F.1   Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]

Variable Name	Variable Label[2]	Year of Data Collection						Notes[3]
		2004	2005	2006	2007	2008	2009	
DRB6	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #6	Y	Y	Y	Y	Y	Y	
DRB7	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #7	Y	Y	Y	Y	Y	Y	
DRB8	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #8	Y	Y	Y	Y	Y	Y	
DRB9	AGE IN DAYS OF PROV-REPTD RUBELLA-ONLY SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DROT1	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DROT2	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DROT3	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DROT4	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DROT5	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DROT6	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DROT7	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DROT8	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DROT9	AGE IN DAYS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DTP_SOUR	SHOT CARD USED FOR DTP REPORTING	Y						Dropped starting in 2005 because this variable is redundant with variable SHOTCARD.
DTP1_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DTP2_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DTP3_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
DTP4_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DTP5_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
DTP6_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
DTP7_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
DTP8_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
DTP9_AGE	AGE IN MONTHS OF PROV-REPTD DT-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DVRC1	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
DVRC2	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
DVRC3	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
DVRC4	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
DVRC5	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DVRC6	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DVRC7	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DVRC8	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
DVRC9	AGE IN DAYS OF PROV-REPTD VARICELLA-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
EDUC1	EDUCATION OF MOTHER CATEGORIES (RECODE)	Y	Y	Y	Y	Y	Y	
ENTRY2	CHILD LIVES IN STATE WITH HEPATITIS B STATE ENTRY LAW FOR DAY CARE/HEAD START (2001-2002 SCHOOL YEAR)	Y						Dropped starting in 2005.
ESTIAP	ESTIMATION IAP AREA OF RESIDENCE		Y					New estimation area variable starting in 2005. Replaced ITRUEIAP.
ESTIAP06	ESTIMATION IAP AREA OF RESIDENCE			Y				New starting 2006 because estimation areas were modified.
ESTIAP07	ESTIMATION AREA OF RESIDENCE				Y			New starting 2007 because estimation areas were modified.
ESTIAP08	**ESTIMATION AREA OF RESIDENCE**					**Y**		**New starting 2008 because estimation areas were modified.**
ESTIAP09	**ESTIMATION AREA OF RESIDENCE**						**Y**	**New starting 2009 because estimation areas were modified.**
FLU1_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #1	Y	Y	Y	Y	Y	Y	
FLU2_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #2	Y	Y	Y	Y	Y	Y	
FLU3_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #3	Y	Y	Y	Y	Y	Y	
FLU4_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #4	Y	Y	Y	Y	Y	Y	
FLU5_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #5	Y	Y	Y	Y	Y	Y	
FLU6_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #6	Y	Y	Y	Y	Y	Y	
FLU7_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #7	Y	Y	Y	Y	Y	Y	
FLU8_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #8	Y	Y	Y	Y	Y	Y	
FLU9_AGE	AGE IN MONTHS OF PROV-REPTD SEASONAL FLU-CONTAINING VACCINATION #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
FRSTBRN	FIRST BORN STATUS OF CHILD	Y	Y	Y	Y	Y	Y	
FUL2_MMR	HOUSEHOLD REPORT OF 1+ MMR AT ANY AGE	Y						Replaced by FULL_MMR starting in 2005.
FULL_CPO	HH REPORT OF 1+ VARICELLA-CONTAINING SHOT AT ANY AGE	Y	Y					Starting 2005, a code of 88 added for children with unknown UTD status. Dropped starting in 2006 because no longer possible to derive due to shortened Section B.

Variable Name	Variable Label[2]	Year of Data Collection						Notes[3]
		2004	2005	2006	2007	2008	2009	
FULL_DTP	HH REPORT OF 4+ DT-CONTAINING SHOT	Y	Y					Starting 2005, a code of 88 added for children with unknown UTD status. Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
FULL_HEP	HH REPORT OF 3+ HEPATITIS B-CONTAINING SHOTS	Y	Y					Starting 2005, a code of 88 added for children with unknown UTD status. Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
FULL_HIB	HH REPORT OF 3+ HIB-CONTAINING SHOTS	Y	Y					Starting 2005, a code of 88 added for children with unknown UTD status. Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
FULL_MMR	HH REPORT OF 1+ MEASLES-CONTAINING SHOT AT ANY AGE		Y					Replaced FUL2_MMR starting in 2005. A code of 88 added for children with unknown UTD status. Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
FULL_POL	HH REPORT OF 3+ POLIO-CONTAINING SHOTS	Y	Y					Starting 2005, a code of 88 added for children with unknown UTD status. Dropped starting in 2006 because no longer possible to derive due to shortened Section B.
HAD_CPOX	CHILD EVER HAD CHICKEN POX DISEASE?		Y	Y	Y	Y	Y	Replaces I_HADCPX starting in 2005. This version is not imputed.
HEA1_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
HEA2_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
HEA3_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
HEA4_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
HEA5_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
HEA6_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
HEA7_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
HEA8_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
HEA9_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS A-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
HEP_BRTH	HEPATITIS B-CONTAINING SHOT GIVEN AT BIRTH FLAG	Y	Y	Y	Y	Y	Y	
HEP_FLAG	HEPATITIS B BIRTH SHOT DATE IMPUTATION FLAG	Y	Y	Y	Y	Y	Y	
HEP1_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
HEP2_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
HEP3_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
HEP4_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
HEP5_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
HEP6_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
HEP7_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
HEP8_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
HEP9_AGE	AGE IN MONTHS OF PROV-REPTD HEPATITIS B-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
HH_DTP	HH REPORT OF NUMBER OF DT-CONTAINING SHOTS RECEIVED			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
HH_FLU	**HH REPORT OF NUMBER OF FLU VACCINATIONS RECEIVED**				**Y**	**Y**		**FLU questions added to the HH questionnaire starting in 2007. Dropped in 2009 due to mid-year questionnaire changes.**
HH_HEPB	HH REPORT OF NUMBER OF HEPATITIS B-CONTAINING SHOTS RECEIVED			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
HH_HIB	HH REPORT OF NUMBER OF HIB-CONTAINING SHOTS RECEIVED			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
HH_MCV	HH REPORT OF NUMBER OF MEASLES-CONTAINING SHOTS RECEIVED			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
HH_POL	HH REPORT OF NUMBER OF POLIO-CONTAINING SHOTS RECEIVED			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
HH_VRC	HH REPORT OF NUMBER OF VARICELLA-CONTAINING SHOTS RECEIVED			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
HIB1_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
HIB2_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
HIB3_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
HIB4_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
HIB5_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
HIB6_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
HIB7_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
HIB8_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
HIB9_AGE	AGE IN MONTHS OF PROV-REPTD HIB-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
HUTD4313	HOUSEHOLD REPORT OF 4:3:1:3 UTD (UP-TO-DATE)	Y						Dropped starting in 2005 because this variable is redundant with variable ALL4SHOT.
I_HADCPX	DID CHILD EVER HAVE CHICKEN POX?	Y						Replaced by HAD_CPOX starting in 2005.
I_HISP_K	HISPANIC ORIGIN OF CHILD	Y	Y	Y	Y	Y	Y	
IAGECPXR	AGE IN MONTHS WHEN CHILD HAD CHICKEN POX (RECODE)	Y						Replaced by AGECPOXR starting in 2005.
INCPORAR	INCOME TO POVERTY RATIO (RECODE)		Y	Y	Y	Y	Y	Replaces INCPORAT starting 2005. INCPORAT used categories whereas INCPORAR is continuous. INCPORAR has been top- and bottom-coded.
INCPORAT	INCOME TO POVERTY RATIO	Y						Replaced by INCPORAR starting in 2005.
INCPOV1	POVERTY STATUS		Y	Y	Y	Y	Y	Replaces INCPOV1R starting in 2005. INCPOV1R used two categores whereas INCPOV1 uses three.
INCPOV1R	POVERTY STATUS (RECODE)	Y						Replaced by INCPOV1 starting in 2005.

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
INCQ298A	FAMILY INCOME CATEGORIES (RECODE)		Y	Y	Y	Y	Y	Replaces INCQ298R starting in 2005. INCQ298A uses different categories than were used by INCQ298R.
INCQ298R	FAMILY INCOME CATEGORIES (RECODE)	Y						Replaced by INCQ298A starting in 2005.
INOPHONR	LENGTH OF INTERRUPTION IN TELEPHONE SERVICE IN DAYS (RECODE)	Y	Y	Y	Y	Y	Y	
INS_1	IS CHILD COVERED BY HEALTH INSURANCE PROVIDED THROUGH EMPLOYER OR UNION?				Y	Y	Y	
INS_11	ANY TIME WHEN CHILD WAS NOT COVERED BY ANY HEALTH INSURANCE?				Y	Y	Y	
INS_2	IS CHILD COVERED BY ANY MEDICAID PLAN?				Y	Y	Y	
INS_3	IS CHILD COVERED BY S-CHIP?				Y	Y	Y	
INS_3A	IS CHILD COVERED BY ANY MEDICAID PLAN OR S-CHIP?				Y	Y	Y	
INS_4	**IS CHILD COVERED BY INDIAN HEALTH SERVICE?**				**Y**	**Y**		**Replaced by INS_4_5 starting 2009.**
INS_4_5	**IS CHILD COVERED BY INDIAN HEALTH SERVICE, MILITARY HEALTH CARE, TRICARE, CHAMPUS, OR CHAMP-**						**Y**	**Replaces INS_4 and INS_5 starting 2009.**
INS_5	**IS CHILD COVERED BY MILITARY HEALTH CARE, TRICARE, CHAMPUS, OR CHAMP-VA?**				**Y**	**Y**		**Replaced by INS_4_5 starting 2009.**
INS_6	IS CHILD COVERED BY ANY OTHER HEALTH INSURANCE OR HEALTH CARE PLAN?				Y	Y	Y	
INTRP	PHONE INTERRUPTION OF 7 DAYS OR MORE IN PAST YEAR?	Y	Y	Y	Y	Y	Y	
ITRUEIAP	IAP AREA OF CURRENT RESIDENCE	Y						The new estimation area variable starting in 2005 is ESTIAP.
LANGUAGE	LANGUAGE IN WHICH INTERVIEW WAS CONDUCTED	Y	Y	Y	Y	Y	Y	
M_AGEGRP	AGE OF MOTHER CATEGORIES (RECODE)	Y	Y	Y	Y	Y	Y	
MARITAL	**MARITAL STATUS OF MOTHER CATEGORIES (RECODE)**	**Y**	**Y**	**Y**	**Y**	**Y**		**Replaced by MARITAL2 starting 2009.**
MARITAL2	**MARITAL STATUS OF MOTHER (RECODE)**						**Y**	**Replaces MARITAL starting 2009.**
MMR1_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
MMR2_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
MMR3_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
MMR4_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
MMR5_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MMR6_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MMR7_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MMR8_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
MMR9_AGE	AGE IN MONTHS OF PROV-REPTD MEASLES-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MOBIL	GEOGRAPHIC MOBILITY STATUS: STATE OF RESIDENCE OF CHILD AT BIRTH VERSUS CURRENT STATE	Y						Replaced by MOBIL_I starting in 2005.
MOBIL_I	GEOGRAPHIC MOBILITY STATUS: STATE OF RESIDENCE OF CHILD AT BIRTH VERSUS CURRENT STATE		Y	Y	Y	Y	Y	Replaces MOBIL starting in 2005. This version is imputed.
MP1_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #1	Y	Y	Y	Y	Y	Y	
MP2_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #2	Y	Y	Y	Y	Y	Y	
MP3_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #3	Y	Y	Y	Y	Y	Y	
MP4_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #4	Y	Y	Y	Y	Y	Y	
MP5_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MP6_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MP7_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MP8_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MP9_AGE	AGE IN MONTHS OF PROV-REPTD MUMPS-ONLY SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MPR1_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #1	Y	Y	Y	Y	Y	Y	
MPR2_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #2	Y	Y	Y	Y	Y	Y	
MPR3_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #3	Y	Y	Y	Y	Y	Y	
MPR4_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #4	Y	Y	Y	Y	Y	Y	
MPR5_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MPR6_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MPR7_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MPR8_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
MPR9_AGE	AGE IN MONTHS OF PROV-REPTD (MUMPS/RUBELLA)-ONLY SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
N_PRVR	NUMBER OF PROVIDERS RESPONDING WITH VACCINATION DATA FOR CHILD (RECODE)	Y	Y	Y	Y	Y	Y	
NUM_CELLS_HH	**NUMBER OF WORKING CELL PHONES HOUSEHOLD MEMBERS HAVE AVAILABLE FOR PERSONAL USE**						**Y**	
NUM_CELLS _PARENTS	**NUMBER OF WORKING CELL PHONES USUALLY USED BY PARENTS OR GUARDIANS**						**Y**	
NUM_PHONE	**NUMBER OF RESIDENTIAL TELEPHONE NUMBERS IN HOUSEHOLD (EXCLUDING CELL PHONES)**						**Y**	
P_NUHEPX	NUMBER OF HEPATITIS B-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

| Variable Name | Variable Label[2] | Year of Data Collection | | | | | | Notes[3] |
		2004	2005	2006	2007	2008	2009	
P_NUHIBX	NUMBER OF HIB-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.			Y	Y	Y	Y	
P_NUHPHB	NUMBER OF HEPATITIS B/HIB COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMDAH	NUMBER OF DTAP/HIB COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMDHB	**NUMBER OF DTP/HIB CONTAINING SHOTS DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.**	**Y**	**Y**	**Y**	**Y**	**Y**		**Dropped in 2009 due to change to IHQ shotgrid.**
P_NUMDHI	NUMBER OF DTAP/HEPB/IPV COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.			Y	Y	Y	Y	
P_NUMDIH	**NUMBER OF DTAP/IPV/HIB COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						**Y**	**Added in 2009 due to change to IHQ shotgrid.**
P_NUMDHM	**NUMBER OF DTP/HIB COMBO SHOTS DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.**	**Y**	**Y**	**Y**	**Y**	**Y**		**Dropped in 2009 due to change to IHQ shotgrid.**
P_NUMDTA	NUMBER OF DTAP-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMDTM	**NUMBER OF DT-ONLY SHOTS DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.**	**Y**	**Y**	**Y**	**Y**	**Y**		**Dropped in 2009 due to change to IHQ shotgrid.**
P_NUMDTP	NUMBER OF DT-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMFLU	NUMBER OF SEASONAL FLU-CONTAINING VACCINATIONS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW	Y	Y	Y	Y	Y	Y	
P_NUMFLUL	NUMBER OF SEASONAL FLU-CONTAINING VACCINATIONS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
P_NUMFLUM	NUMBER OF SEASONAL FLU SPRAY VACCINATIONS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
P_NUMFLUN	NUMBER OF INJECTED SEASONAL FLU VACCINATIONS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
P_NUMH2	**NUMBER OF HIB-SANOFI or HIB-GLAXOSMITHKLINE SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER**						**Y**	**Added in 2009 due to change to IHQ shotgrid.**
P_NUMHEA	NUMBER OF HEPATITIS A-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW	Y	Y	Y	Y	Y	Y	
P_NUMHEN	NUMBER OF HEPATITIS B-CONTAINING SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER			Y	Y	Y	Y	

| Variable Name | Variable Label[2] | Year of Data Collection | | | | | | Notes[3] |
		2004	2005	2006	2007	2008	2009	
P_NUMHEP	NUMBER OF HEPATITIS B-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMHIB	NUMBER OF HIB-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMHIN	NUMBER OF HIB-CONTAINING SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW			Y	Y	Y	Y	
P_NUMHION	**NUMBER OF HIB-ONLY SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE**						Y	**Added in 2009 due to change to IHQ shotgrid.**
P_NUMHM	**NUMBER OF HIB-MERCK SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW**						Y	**Added in 2009 due to change to IHQ shotgrid.**
P_NUMIPV	NUMBER OF IPV-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMCN	NUMBER OF MEASLES-CONTAINING SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH			Y	Y	Y	Y	
P_NUMMMR	NUMBER OF MEASLES-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMMRX	NUMBER OF MMR-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.			Y	Y	Y	Y	
P_NUMMMX	NUMBER OF MMR-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMP	NUMBER OF MUMPS-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMPR	NUMBER OF (MUMPS/RUBELLA)-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMRV	NUMBER OF MMR/VARICELLA COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.			Y	Y	Y	Y	
P_NUMMS	NUMBER OF MEASLES-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMSM	NUMBER OF MEASLES/MUMPS COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMMSR	NUMBER OF MEASLES/RUBELLA COMBO SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW	Y	Y	Y	Y	Y	Y	
P_NUMOLN	NUMBER OF POLIO SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW	Y	Y	Y	Y	Y	Y	

| Variable Name | Variable Label[2] | Year of Data Collection | | | | | | Notes[3] |
		2004	2005	2006	2007	2008	2009	
P_NUMOPV	NUMBER OF OPV-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMPCC	NUMBER OF PCV CONJUGATE SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMPCN	NUMBER OF PCV SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMPCP	NUMBER OF PCV POLYSACCHARIDE SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMPCV	NUMBER OF PNEUMOCOCCAL-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW	Y	Y	Y	Y	Y	Y	
P_NUMPOL	NUMBER OF POLIO-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMRB	NUMBER OF RUBELLA-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMRG	**NUMBER OF ROTARIX-GSK SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW**						Y	**Starting in 2009, rotavirus type boxes were added to the IHQ shot grid.**
P_NUMRM	**NUMBER OF ROTATEQ-MERCK SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD**						Y	**Starting in 2009, rotavirus type boxes were added to the IHQ shot grid.**
P_NUMRO	**NUMBER OF ROTAVIRUS SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE**						Y	**Starting in 2009, rotavirus type boxes were added to the IHQ shot grid.**
P_NUMROT	NUMBER OF ROTAVIRUS-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMTPM	**NUMBER OF DTP-ONLY SHOTS DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.**	**Y**	**Y**	**Y**	**Y**	**Y**		**Dropped in 2009 due to change to IHQ shotgrid.**
P_NUMTPN	NUMBER OF DT-CONTAINING SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW	Y	Y	Y	Y	Y	Y	
P_NUMVRC	NUMBER OF VARICELLA-CONTAINING SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.	Y	Y	Y	Y	Y	Y	
P_NUMVRN	NUMBER OF VARICELLA-CONTAINING SHOTS OF UNKNOWN TYPE BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH			Y	Y	Y	Y	
P_NUMVRX	NUMBER OF VARICELLA-ONLY SHOTS BY 36 MONTHS OF AGE DETERMINED FROM PROVIDER INFO, EXCLUDING ANY VACCINATIONS AFTER THE HH INTERVIEW DATE.			Y	Y	Y	Y	
P_U12VRC	UTD (UP-TO-DATE) FLAG FOR PROVIDER 1+ VARICELLA-CONTAINING SHOT AT 12+ MONTHS, BY 36 MONTHS OF AGE	Y	Y	Y	Y	Y	Y	
P_UTD331	UTD (UP-TO-DATE) FLAG FOR PROVIDER 3:3:1 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS AFTER THE	Y	Y	Y	Y	Y	Y	

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
P_UTD431	UTD (UP-TO-DATE) FLAG FOR PROVIDER 4:3:1 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS AFTER THE	Y	Y	Y	Y	Y	Y	
P_UTD431H_ROUT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 4:3:1:3 BY 36 MONTHS OF AGE, USING THE ROUTINE, STRICT DEFINITION OF HIB UTD, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW**						Y	**Added in 2009 due to new Hib vaccination recommendations.**
P_UTD431H3_ROUT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 4:3:1:3:3 BY 36 MONTHS OF AGE, USING THE ROUTINE, STRICT DEFINITION OF HIB UTD, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	**Added in 2009 due to new Hib vaccination recommendations.**
P_UTD431H31_ROUT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 4:3:1:3:3:1 BY 36 MONTHS OF AGE (INCLUDES 1+ VARICELLA-CONTAINING AT AGE 12+ MTHS) USING THE ROUTINE, STRICT DEFINITION OF HIB UTD, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	**Added in 2009 due to new Hib vaccination recommendations.**
P_UTD431H313_ROUT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 4:3:1:3:3:1:3 BY 36 MONTHS OF AGE (INCLUDES 1+ VARICELLA-CONTAINING AT AGE 12+ MTHS) USING THE ROUTINE, STRICT DEFINITION OF HIB UTD, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	**Added in 2009 due to new Hib vaccination recommendations.**
P_UTD431H314_ROUT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 4:3:1:3:3:1:4 BY 36 MONTHS OF AGE (INCLUDES 1+ VARICELLA-CONTAINING AT AGE 12+ MTHS) USING THE ROUTINE, STRICT DEFINITION OF HIB UTD, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	**Added in 2009 due to new Hib vaccination recommendations.**
P_UTDFL1	UTD FLAG FOR PROVIDER SEASONAL INFLUENZA VARIABLE 1 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS	Y	Y	Y	Y	Y	Y	
P_UTDFL2	UTD FLAG FOR PROVIDER SEASONAL INFLUENZA VARIABLE 2 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS	Y	Y	Y	Y	Y	Y	
P_UTDFL3	UTD FLAG FOR PROVIDER SEASONAL INFLUENZA VARIABLE 3 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS				Y	Y	Y	
P_UTDHEP	UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ HEPATITIS B-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING	Y	Y	Y	Y	Y	Y	
P_UTDHIB	UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ HIB-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING	Y	Y	Y	Y	Y	Y	
P_UTDHIB_ROUT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ HIB DOSES BY 36 MONTHS OF AGE, BASED ON THE ROUTINE (NON-SHORTAGE) HIB RECOMMENDATIONS AND A STRICT TREATMENT OF HIB SHOTS OF UNKNOWN TYPE, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	**Added in 2009 due to new Hib vaccination recommendations.**
P_UTDHIB_SHORT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ HIB DOSES BY 36 MONTHS OF AGE, BASED ON THE HIB SHORTAGE RECOMMENDATIONS AND A STRICT TREATMENT OF HIB SHOTS OF UNKNOWN TYPE, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	**Added in 2009 due to new Hib vaccination recommendations.**

Variable Name	Variable Label[2]	Year of Data Collection						Notes[3]
		2004	2005	2006	2007	2008	2009	
P_UTDMCV	UTD (UP-TO-DATE) FLAG FOR PROVIDER 1+ MEASLES-CONTAINING SHOT BY 36 MONTHS OF AGE, EXCLUDING ANY	Y	Y	Y	Y	Y	Y	
P_UTDMMX	UTD FLAG FOR PROVIDER 1+ MMR COMBO SHOT BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS AFTER	Y	Y	Y	Y	Y	Y	
P_UTDPC3	UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ PNEUMOCOCCAL-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING	Y	Y	Y	Y	Y	Y	
P_UTDPCV	UTD (UP-TO-DATE) FLAG FOR PROVIDER 4+ PNEUMOCOCCAL-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING	Y	Y	Y	Y	Y	Y	
P_UTDPOL	UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ POLIO-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING	Y	Y	Y	Y	Y	Y	
P_UTDROT_S	**UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ ROTAVIRUS DOSES BY 36 MONTHS OF AGE, BASED ON A STRICT TREATMENT OF ROTAVIRUS VACCINATIONS OF UNKNOWN TYPE, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD INTERVIEW DATE.**						Y	
P_UTDTP3	UTD (UP-TO-DATE) FLAG FOR PROVIDER 3+ DT-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING ANY	Y	Y	Y	Y	Y	Y	
P_UTDTP4	UTD (UP-TO-DATE) FLAG FOR PROVIDER 4+ DT-CONTAINING SHOTS BY 36 MONTHS OF AGE, EXCLUDING ANY	Y	Y	Y	Y	Y	Y	
PCV1_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
PCV2_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
PCV3_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
PCV4_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
PCV5_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
PCV6_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
PCV7_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
PCV8_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
PCV9_AGE	AGE IN MONTHS OF PROV-REPTD PNEUMOCOCCAL-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
PDAT	CHILD HAS ADEQUATE PROVIDER DATA	Y	Y	Y	Y	Y	Y	
POL1_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
POL2_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
POL3_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
POL4_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
POL5_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
POL6_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	

Table F.1 **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
POL7_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
POL8_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
POL9_AGE	AGE IN MONTHS OF PROV-REPTD POLIO-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
PROV_FAC	PROVIDER FACILITY TYPES	Y	Y	Y	Y	Y	Y	
PROVWT	WEIGHT FOR CHILDREN WITH ADEQUATE PROVIDER DATA AND UNVACCINATED CHILDREN (EXCLUDING U.S. VIRGIN		Y	Y	Y	Y	Y	Replaces WGT starting in 2005.
PROVWTVI	**WEIGHT FOR CHILDREN WITH ADEQUATE PROVIDER DATA AND UNVACCINATED CHILDREN (INCLUDING U.S.**						**Y**	
PU431331	UTD FLAG FOR PROVIDER 4:3:1:3:3:1 (INCLUDES 1+ VARICELLA AT AGE 12+ MTHS) BY 36 MONTHS OF AGE, EXCLUDING ANY	Y	Y	Y	Y	Y	Y	
PU4313313	UTD FLAG FOR PROVIDER 4:3:1:3:3:1:3 (INCLUDES 1+ VARICELLA AT AGE 12+ MTHS) BY 36 MONTHS OF AGE,				Y	Y	Y	
PU4313314	UTD FLAG FOR PROVIDER 4:3:1:3:3:1:4 (INCLUDES 1+ VARICELLA AT AGE 12+ MTHS) BY 36 MONTHS OF AGE,				Y	Y	Y	
PUT43133	UTD FLAG FOR PROVIDER 4:3:1:3:3 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD	Y	Y	Y	Y	Y	Y	
PUTD4313	UTD FLAG FOR PROVIDER 4:3:1:3 BY 36 MONTHS OF AGE, EXCLUDING ANY VACCINATIONS AFTER THE HOUSEHOLD	Y	Y	Y	Y	Y	Y	
Q5WEB1	INTEREST IN IHQ ON WEBSITE PROVIDER #1	Y						Question was not asked starting in 2005.
Q5WEB2	INTEREST IN IHQ ON WEBSITE PROVIDER #2	Y						Question was not asked starting in 2005.
Q5WEB3	INTEREST IN IHQ ON WEBSITE PROVIDER #3	Y						Question was not asked starting in 2005.
Q5WEB4	INTEREST IN IHQ ON WEBSITE PROVIDER #4	Y						Question was not asked starting in 2005.
Q5WEB5	INTEREST IN IHQ ON WEBSITE PROVIDER #5	Y						Question was not asked starting in 2005.
RACE_K	RACE OF CHILD (RECODE)	Y	Y	Y	Y	Y	Y	
RACEETHK	RACE/ETHNICITY OF CHILD (RECODE)	Y	Y	Y	Y	Y	Y	
RB1_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #1	Y	Y	Y	Y	Y	Y	
RB2_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #2	Y	Y	Y	Y	Y	Y	
RB3_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #3	Y	Y	Y	Y	Y	Y	
RB4_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #4	Y	Y	Y	Y	Y	Y	
RB5_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #5	Y	Y	Y	Y	Y	Y	
RB6_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #6	Y	Y	Y	Y	Y	Y	
RB7_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #7	Y	Y	Y	Y	Y	Y	
RB8_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #8	Y	Y	Y	Y	Y	Y	

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files**[1]

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
RB9_AGE	AGE IN MONTHS OF PROV-REPTD RUBELLA-ONLY SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
RDDWT	HH-PHASE CHILD INTERVIEW WEIGHT (EXCLUDING U.S. VIRGIN ISLANDS)		Y	Y	Y	Y	Y	Replaces WGT_RDD starting in 2005.
RDDWTVI	**HH-PHASE CHILD INTERVIEW WEIGHT (INCLUDING U.S. VIRGIN ISLANDS)**						Y	
REGISTRY	CHILD'S PROVIDERS REPORTED CHILD'S VACCINATIONS TO IMMUNIZATION REGISTRY	Y	Y	Y	Y	Y	Y	
RENT_OWN	**IS HOME OWNED/BEING BOUGHT, RENTED, OR OCCUPIED BY SOME OTHER ARRANGEMENT?**						Y	
ROT1_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
ROT2_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
ROT3_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
ROT4_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
ROT5_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #5	Y	Y	Y	Y	Y	Y	
ROT6_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #6	Y	Y	Y	Y	Y	Y	
ROT7_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #7	Y	Y	Y	Y	Y	Y	
ROT8_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #8	Y	Y	Y	Y	Y	Y	
ROT9_AGE	AGE IN MONTHS OF PROV-REPTD ROTAVIRUS-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
SC_431	HH SHOT CARD REPORT OF 4:3:1 UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_4313	HH SHOT CARD REPORT OF 4:3:1:3 UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_43133	HH SHOT CARD REPORT OF 4:3:1:3:3 UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_DTP	HH SHOT CARD REPORT OF 4+ DT-CONTAINING UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_HEPB	HH SHOT CARD REPORT OF 3+ HEPATITIS B-CONTAINING UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_HIB	HH SHOT CARD REPORT OF 3+ HIB-CONTAINING UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_MCV	HH SHOT CARD REPORT OF 1+ MEASLES-CONTAINING UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_POL	HH SHOT CARD REPORT OF 3+ POLIO-CONTAINING UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SC_VRC	HH SHOT CARD REPORT OF 1+ VARICELLA-CONTAINING UP-TO-DATE			Y	Y	Y	Y	Added in 2006 as a partial replacement for the "FULL" and "C_" variables.
SEQNUMC	UNIQUE CHILD IDENTIFIER	Y	Y	Y	Y	Y	Y	
SEQNUMHH	UNIQUE HOUSEHOLD IDENTIFIER	Y	Y	Y	Y	Y	Y	
SEX	GENDER OF CHILD	Y	Y	Y	Y	Y	Y	

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
SHORT	Q1/2004 SHORT QUESTIONNAIRE EXPERIMENT FLAG	Y						There was no short questionnaire experiment in 2005.
SHOTCARD	SHOT CARD USE FLAG	Y	Y	Y	Y	Y	Y	
STATE	TRUE STATE OF RESIDENCE (STATE FIPS CODE)	Y	Y	Y	Y	Y	Y	
VFC_I	**DERIVED: IS TEEN VFC ELIGIBLE?**						Y	
VFC_ORDER	DO CHILD'S PROVIDERS ORDER VACCINES FROM STATE/LOCAL HEALTH DEPT?			Y	Y	Y	Y	
VFC_PRO	PARTICIPATION OF CHILD'S PROVIDERS IN VACCINES FOR CHILDREN PROGRAM	Y	Y					Question was not asked starting in 2006.
VRC1_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #1	Y	Y	Y	Y	Y	Y	
VRC2_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #2	Y	Y	Y	Y	Y	Y	
VRC3_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #3	Y	Y	Y	Y	Y	Y	
VRC4_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #4	Y	Y	Y	Y	Y	Y	
VRC5_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #5		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
VRC6_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #6		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
VRC7_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #7		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
VRC8_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #8		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
VRC9_AGE	AGE IN MONTHS OF PROV-REPTD VARICELLA-CONTAINING SHOT #9		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
WGT	NEW WEIGHT FOR CHILDREN WITH ADEQUATE PROVIDER DATA AND UNVACCINATED CHILDREN	Y						Replaced by PROVWT starting in 2005.
WGT_RDD	RDD CHILD INTERVIEW WEIGHT	Y						Replaced by RDDWT starting in 2005.
XDTPTY1	DT-CONTAINING VACCINATION #1 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY2	DT-CONTAINING VACCINATION #2 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY3	DT-CONTAINING VACCINATION #3 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY4	DT-CONTAINING VACCINATION #4 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY5	DT-CONTAINING VACCINATION #5 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY6	DT-CONTAINING VACCINATION #6 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY7	DT-CONTAINING VACCINATION #7 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY8	DT-CONTAINING VACCINATION #8 TYPE CODE	Y	Y	Y	Y	Y	Y	
XDTPTY9	DT-CONTAINING VACCINATION #9 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.

Table F.1   Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
XFLUTY1	SEASONAL FLU-CONTAINING VACCINATION #1 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY2	SEASONAL FLU-CONTAINING VACCINATION #2 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY3	SEASONAL FLU-CONTAINING VACCINATION #3 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY4	SEASONAL FLU-CONTAINING VACCINATION #4 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY5	SEASONAL FLU-CONTAINING VACCINATION #5 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY6	SEASONAL FLU-CONTAINING VACCINATION #6 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY7	SEASONAL FLU-CONTAINING VACCINATION #7 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY8	SEASONAL FLU-CONTAINING VACCINATION #8 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XFLUTY9	SEASONAL FLU-CONTAINING VACCINATION #9 TYPE CODE					Y	Y	Starting in 2008, influenza type boxes were added to the IHQ shot grid.
XHEPTY1	HEPATITIS B-CONTAINING VACCINATION #1 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY2	HEPATITIS B-CONTAINING VACCINATION #2 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY3	HEPATITIS B-CONTAINING VACCINATION #3 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY4	HEPATITIS B-CONTAINING VACCINATION #4 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY5	HEPATITIS B-CONTAINING VACCINATION #5 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY6	HEPATITIS B-CONTAINING VACCINATION #6 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY7	HEPATITIS B-CONTAINING VACCINATION #7 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY8	HEPATITIS B-CONTAINING VACCINATION #8 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHEPTY9	HEPATITIS B-CONTAINING VACCINATION #9 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XHIBTY1	HIB-CONTAINING VACCINATION #1 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY2	HIB-CONTAINING VACCINATION #2 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY3	HIB-CONTAINING VACCINATION #3 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY4	HIB-CONTAINING VACCINATION #4 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY5	HIB-CONTAINING VACCINATION #5 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY6	HIB-CONTAINING VACCINATION #6 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY7	HIB-CONTAINING VACCINATION #7 TYPE CODE	Y	Y	Y	Y	Y	Y	
XHIBTY8	HIB-CONTAINING VACCINATION #8 TYPE CODE	Y	Y	Y	Y	Y	Y	

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

Variable Name	Variable Label[2]	2004	2005	2006	2007	2008	2009	Notes[3]
XHIBTY9	HIB-CONTAINING VACCINATION #9 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XMMRTY1	MEASLES-CONTAINING VACCINATION #1 TYPE CODE	Y	Y	Y	Y	Y	Y	
XMMRTY2	MEASLES-CONTAINING VACCINATION #2 TYPE CODE	Y	Y	Y	Y	Y	Y	
XMMRTY3	MEASLES-CONTAINING VACCINATION #3 TYPE CODE	Y	Y	Y	Y	Y	Y	
XMMRTY4	MEASLES-CONTAINING VACCINATION #4 TYPE CODE	Y	Y	Y	Y	Y	Y	
XMMRTY5	MEASLES-CONTAINING VACCINATION #5 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XMMRTY6	MEASLES-CONTAINING VACCINATION #6 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XMMRTY7	MEASLES-CONTAINING VACCINATION #7 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XMMRTY8	MEASLES-CONTAINING VACCINATION #8 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XMMRTY9	MEASLES-CONTAINING VACCINATION #9 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XPCVTY1	PNEUMOCOCCAL-CONTAINING VACCINATION #1 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY2	PNEUMOCOCCAL-CONTAINING VACCINATION #2 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY3	PNEUMOCOCCAL-CONTAINING VACCINATION #3 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY4	PNEUMOCOCCAL-CONTAINING VACCINATION #4 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY5	PNEUMOCOCCAL-CONTAINING VACCINATION #5 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY6	PNEUMOCOCCAL-CONTAINING VACCINATION #6 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY7	PNEUMOCOCCAL-CONTAINING VACCINATION #7 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY8	PNEUMOCOCCAL-CONTAINING VACCINATION #8 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPCVTY9	PNEUMOCOCCAL-CONTAINING VACCINATION #9 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XPOLTY1	POLIO-CONTAINING VACCINATION #1 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY2	POLIO-CONTAINING VACCINATION #2 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY3	POLIO-CONTAINING VACCINATION #3 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY4	POLIO-CONTAINING VACCINATION #4 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY5	POLIO-CONTAINING VACCINATION #5 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY6	POLIO-CONTAINING VACCINATION #6 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY7	POLIO-CONTAINING VACCINATION #7 TYPE CODE	Y	Y	Y	Y	Y	Y	

Table F.1   **Alphabetical Listing of Variables that are in the 2004-2009 Public-Use Data Files[1]**

| Variable Name | Variable Label[2] | Year of Data Collection | | | | | | Notes[3] |
		2004	2005	2006	2007	2008	2009	
XPOLTY8	POLIO-CONTAINING VACCINATION #8 TYPE CODE	Y	Y	Y	Y	Y	Y	
XPOLTY9	POLIO-CONTAINING VACCINATION #9 TYPE CODE		Y	Y	Y	Y	Y	Starting in 2005, nine shot variables are included for each vaccine category.
XROTTY1	**ROTAVIRUS-CONTAINING VACCINATION #1 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY2	**ROTAVIRUS-CONTAINING VACCINATION #2 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY3	**ROTAVIRUS-CONTAINING VACCINATION #3 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY4	**ROTAVIRUS-CONTAINING VACCINATION #4 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY5	**ROTAVIRUS-CONTAINING VACCINATION #5 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY6	**ROTAVIRUS-CONTAINING VACCINATION #6 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY7	**ROTAVIRUS-CONTAINING VACCINATION #7 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY8	**ROTAVIRUS-CONTAINING VACCINATION #8 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XROTTY9	**ROTAVIRUS-CONTAINING VACCINATION #9 TYPE CODE**						Y	**Rotavirus vaccination types were added to the IHQ starting 2009.**
XVRCTY1	VARICELLA-CONTAINING VACCINATION #1 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY2	VARICELLA-CONTAINING VACCINATION #2 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY3	VARICELLA-CONTAINING VACCINATION #3 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY4	VARICELLA-CONTAINING VACCINATION #4 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY5	VARICELLA-CONTAINING VACCINATION #5 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY6	VARICELLA-CONTAINING VACCINATION #6 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY7	VARICELLA-CONTAINING VACCINATION #7 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY8	VARICELLA-CONTAINING VACCINATION #8 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
XVRCTY9	VARICELLA-CONTAINING VACCINATION #9 TYPE CODE			Y	Y	Y	Y	Varicella vaccination types were added to the IHQ starting 2006.
YEAR	YEAR OF INTERVIEW	Y	Y	Y	Y	Y	Y	

1 For a list of variables that appeared in one or more (but not all) public use files from 1995-2004, see "Alphabetical Listing of Variables that are Not Available in All Public-Use Data Files, National Immunization Survey, 1995-2004": http://www.cdc.gov/nis/pdfs/pufvariables1995to2004.pdf

2 If the variable appeared in the 2009 public use file, then the 2009 label is given; otherwise the label from the most recent public use file in which the variable appeared is given.

3 Starting in 2005, a code of 77 is used for "Don't Know" responses and a code of 99 is used for "Refused" responses.

Appendix G

Summary Tables

Table G.1: Estimated Population Totals and Sample Sizes of Children 19-35 Months of Age by State and Estimation Area, National Immunization Survey, 2009

State/Estimation Area	ESTIAP09	Estimated Population Total of Children	Number of Children with Complete Household Interviews	Number of Children with Adequate Provider Data	Percent of Children with Adequate Provider Data
Total U.S.[1]		6,297,797	24,809	17,053	68.7
Alabama	20	92,187	372	249	66.9
Alaska	74	15,712	295	192	65.1
Arizona	66	155,016	486	317	65.2
Arkansas	46	59,193	432	298	69.0
California					
CA-Los Angeles County	69	228,291	356	194	54.5
CA-Rest of State	68	610,712	309	192	62.1
Colorado	60	105,245	510	337	66.1
Connecticut	1	63,243	349	229	65.6
Delaware	13	17,292	390	251	64.4
District of Columbia	12	11,272	537	355	66.1
Florida	22	355,765	505	326	64.6
Georgia	25	222,822	425	297	69.9
Hawaii	72	27,068	352	221	62.8
Idaho	75	34,919	279	207	74.2
Illinois					
IL-City of Chicago	35	67,607	516	320	62.0
IL-Rest of State	34	196,940	448	311	69.4
Indiana					
IN-Rest of State	36	96,464	322	219	68.0
IN-Marion County	37	22,801	359	252	70.2
IN-Lake County	96	10,108	380	237	62.4
Iowa	56	57,903	371	266	71.7
Kansas	57	62,455	292	218	74.7
Kentucky	27	84,127	482	350	72.6
Louisiana	47	92,237	407	266	65.4
Maine	4	20,463	361	261	72.3
Maryland					
MD-City of Baltimore	15	14,645	382	276	72.3
MD-Rest of State	14	102,474	284	209	73.6
Massachusetts	2	115,448	390	275	70.5
Michigan	38	187,622	471	331	70.3
Mississippi	28	63,991	524	339	64.7
Missouri	58	118,686	467	326	69.8
Minnesota	40	107,992	360	274	76.1
Montana	61	18,121	350	262	74.9
Nebraska	59	38,422	346	247	71.4
Nevada	73	61,202	434	320	73.7
New Hampshire	5	21,602	339	236	69.6

Table G.1:   Estimated Population Totals and Sample Sizes of Children 19-35 Months of Age by State and Estimation Area, National Immunization Survey, 2009

State/Estimation Area	ESTIAP09	Estimated Population Total of Children	Number of Children with Complete Household Interviews	Number of Children with Adequate Provider Data	Percent of Children with Adequate Provider Data
New Jersey	8	172,980	536	353	65.9
New Mexico	49	42,442	466	342	73.4
New York					
NY-City of New York	11	179,452	365	219	60.0
NY-Rest of State	10	187,635	353	233	66.0
North Carolina	29	189,945	345	262	75.9
North Dakota	62	11,678	276	206	74.6
Ohio	41	220,643	394	280	71.1
Oklahoma	50	79,326	433	306	70.7
Oregon	76	72,095	429	316	73.7
Pennsylvania					
PA-Philadelphia County	17	33,837	437	261	59.7
PA-Rest of State	16	183,243	350	248	70.9
Rhode Island	6	19,629	429	307	71.6
South Carolina	30	90,912	367	257	70.0
South Dakota	63	16,786	335	230	68.7
Tennessee	31	124,975	499	339	67.9
Texas					
TX-Bexar County	55	38,488	385	242	62.9
TX-City of Houston	54	73,435	348	233	67.0
TX-Dallas County	52	66,676	336	235	69.9
TX-El Paso County	53	21,143	416	313	75.2
TX-Rest of State	51	389,671	373	243	65.1
Utah	64	74,688	389	289	74.3
Vermont	7	10,053	473	331	70.0
Virginia	18	160,571	409	278	68.0
Washington					
WA-Eastern/Western WA	774	38,990	386	274	71.0
WA-Rest of State	77	90,509	282	198	70.2
West Virginia	19	29,333	327	212	64.8
Wisconsin	44	107,650	420	317	75.5
Wyoming	65	10,961	369	269	72.9
U.S. Virgin Islands	95	2,864	432	260	60.2

[1]'Total U.S.' excludes the U.S. Virgin Islands.

Table G.2:   Estimated Population Totals and Sample Sizes for Age Group by Maternal Education, National Immunization Survey, 2009[1]

Age Group in Months	Maternal Education	Children with Completed Household Interviews		Children with Adequate Provider Data	
		Unweighted Completes	Weighted Completes	Unweighted Completes	Weighted Completes
19-23	<12 Years	801	362,556	558	365,417
19-23	12 Years	1,359	565,111	919	561,614
19-23	>12, Non College Graduate	1,943	388,548	1,336	387,577
19-23	College Grad	3,062	599,258	2,144	602,497
24-29	<12 Years	916	447,214	617	433,800
24-29	12 Years	1,593	650,301	1,082	660,566
24-29	>12, Non College Graduate	2,264	390,467	1,526	382,091
24-29	College Grad	4,026	637,979	2,810	647,983
30-35	<12 Years	909	433,310	622	435,179
30-35	12 Years	1,634	731,419	1,066	733,334
30-35	>12, Non College Graduate	2,334	424,014	1,596	421,672
30-35	College Grad	3,968	667,621	2,777	666,064
Total		24,809	6,297,797	17,053	6,297,794

[1] Excludes the U.S. Virgin Islands.

Table G.3: Estimated Population Totals and Sample Sizes for Age Group by Poverty Status, National Immunization Survey, 2009[1]

Age Group in Months	Poverty Status	Children with Completed Household Interviews		Children with Adequate Provider Data	
		Unweighted Completes	Weighted Completes	Unweighted Completes	Weighted Completes
19-23 Months	Above poverty, > $75K	2,442	525,171	1,733	522,857
19-23 Months	Above poverty, <= $75K	2,802	694,905	1,963	705,670
19-23 Months	Below poverty	1,548	593,250	1,086	591,476
19-23 Months	Unknown	373	102,146	175	97,102
24-29 Months	Above poverty, > $75K	3,237	556,449	2,313	594,880
24-29 Months	Above poverty, <= $75K	3,352	755,922	2,288	750,723
24-29 Months	Below poverty	1,776	679,441	1,231	661,667
24-29 Months	Unknown	434	134,149	203	117,171
30-35 Months	Above poverty, > $75K	3,190	588,782	2,244	582,403
30-35 Months	Above poverty, <= $75K	3,510	856,841	2,443	862,448
30-35 Months	Below poverty	1,720	687,884	1,191	709,099
30-35 Months	Unknown	425	122,856	183	102,299
Total		24,809	6,297,797	17,053	6,297,794

[1] Excludes the U.S. Virgin Islands.

Table G.4: **Estimated Population Totals and Sample Sizes for Race/Ethnicity by Poverty Status, National Immunization Survey, 2009[1]**

Race/Ethnicity*	Poverty Status	Children with Completed Household Interviews		Children with Adequate Provider Data	
		Unweighted Completes	Weighted Completes	Unweighted Completes	Weighted Completes
Hispanic	Above poverty, > $75K	730	205,082	495	217,248
Hispanic	Above poverty, <= $75K	1,410	490,370	961	495,743
Hispanic	Below poverty	1,875	941,886	1,305	931,251
Hispanic	Unknown	267	123,895	144	121,724
Non-Hispanic White Only	Above poverty, > $75K	6,802	1,193,219	4,931	1,213,894
Non-Hispanic White Only	Above poverty, <= $75K	6,356	1,344,137	4,504	1,349,513
Non-Hispanic White Only	Below poverty	1,515	469,581	1,091	475,825
Non-Hispanic White Only	Unknown	657	163,975	269	128,289
Non-Hispanic Black Only	Above poverty, > $75K	449	99,656	257	84,581
Non-Hispanic Black Only	Above poverty, <= $75K	990	267,377	625	270,196
Non-Hispanic Black Only	Below poverty	1,137	392,468	740	394,295
Non-Hispanic Black Only	Unknown	182	46,868	92	48,255
Non-Hispanic Other & Multi-Racial	Above poverty, > $75K	888	172,445	607	184,418
Non-Hispanic Other & Multi-Racial	Above poverty, <= $75K	908	205,784	604	203,390
Non-Hispanic Other & Multi-Racial	Below poverty	517	156,640	372	160,871
Non-Hispanic Other & Multi-Racial	Unknown	126	24,413	56	18,304
Total		24,809	6,297,797	17,053	6,297,794

[1] Excludes the U.S. Virgin Islands.
*Race/Ethnicity is self-reported and mutually exclusive.

Table G.5: Estimated Population Totals and Sample Sizes for Age Group by Race/Ethnicity, National Immunization Survey, 2009[1]

Age Group in Months	Race/Ethnicity of Child*	Children with Completed Household Interviews		Children with Adequate Provider Data	
		Unweighted Completes	Weighted Completes	Unweighted Completes	Weighted Completes
19-23 Months	Hispanic	1,273	530,026	854	515,065
19-23 Months	Non-Hispanic White Only	4,415	988,568	3,158	991,423
19-23 Months	Non-Hispanic Black Only	824	235,313	509	241,141
19-23 Months	Non-Hispanic Other & Multi-Racial	653	161,566	436	169,476
24-29 Months	Hispanic	1,489	621,585	1,008	617,550
24-29 Months	Non-Hispanic White Only	5,445	1,040,419	3,822	1,052,936
24-29 Months	Non-Hispanic Black Only	972	270,311	607	261,049
24-29 Months	Non-Hispanic Other & Multi-Racial	893	193,646	598	192,906
30-35 Months	Hispanic	1,520	609,621	1,043	633,350
30-35 Months	Non-Hispanic White Only	5,470	1,141,925	3,815	1,123,162
30-35 Months	Non-Hispanic Black Only	962	300,746	598	295,136
30-35 Months	Non-Hispanic Other & Multi-Racial	893	204,071	605	204,600
Total		24,809	6,297,797	17,053	6,297,794

[1] Excludes the U.S. Virgin Islands.
*Race/Ethnicity is self-reported and mutually exclusive.

Table G.6:   Estimated Population Totals and Sample Sizes for Age Group by Gender, National Immunization Survey, 2009[1]

Age Group in Months	Gender	Children with Completed Household Interviews		Children with Adequate Provider Data	
		Unweighted Completes	Weighted Completes	Unweighted Completes	Weighted Completes
19-23 Months	Male	3,689	977,773	2,563	977,839
19-23 Months	Female	3,476	937,699	2,394	939,266
24-29 Months	Male	4,518	1,100,118	3,119	1,120,504
24-29 Months	Female	4,281	1,025,843	2,916	1,003,936
30-35 Months	Male	4,504	1,146,725	3,094	1,126,281
30-35 Months	Female	4,341	1,109,638	2,967	1,129,968
Total		24,809	6,297,797	17,053	6,297,794

[1] Excludes the U.S. Virgin Islands.

Table G.7: Sample Sizes for Shot Card Use by Presence of Adequate Provider Data, National Immunization Survey, 2009[1]

Shot Card Use	Presence of Adequate Provider Data	Unweighted RDD Completes	Percent	Weighted RDD Completes	Percent
Shot card	Adequate provider data	5,342	21.5	1,380,804	21.9
Shot card	Non-adequate provider data	1,518	6.1	438,008	7.0
Not shot card	Adequate provider data	11,711	47.2	2,860,307	45.4
Not shot card	Non-adequate provider data	6,238	25.1	1,618,678	25.7
Total		24,809	100.0	6,297,797	100.0

[1] Excludes the U.S. Virgin Islands.

Table G.8: Estimated Vaccination Coverage* with Individual Vaccines and Selected Vaccination Series Among Children 19-35 Months of Age by State and Local Area US, National Immunization Survey, Q1/2009-Q4/2009†

	4+DTaP‡	3+Polio§	1+MMR‖	3+Hib¶	3+Hib-S**	Hib by brand††	3+HepB‡‡	Hep B Birth dose§§	1+Var‖‖	3+PCV¶¶	4+PCV***	2+HepA†††	Rotavirus‡‡‡	4:3:1§§§	4:3:1:3:3:1‖‖‖	4:3:1:3:3:1-S¶¶¶	4:3:1:4:3:1€	4:3:1:3:3:1:4?	4:3:1:3:3:1:4-S€€	4:3:1:4:3:1:4??	4:3:1:0:3:1:4€€€	4:3:1:0:3:1:4-2008???
US National^v	83.9±1.0	92.8±0.7	90.0±0.8	83.6±1.0	92.1±0.8	54.8±1.4	92.4±0.7	60.8±1.3	89.6±0.8	92.6±0.7	80.4±1.1	46.6±1.4	43.9±1.4	81.5±1.1	69.9±1.2	75.7±1.2	48.3±1.4	63.6±1.3	69.0±1.3	44.3±1.4	70.5±1.2	70.6±1.2
Alabama	85.3±5.8	96.6±2.3	95.4±2.9	89.4±5.3	95.8±3.8	59.1±8.7	92.9±4.1	68.1±7.0	93.4±3.9	95.6±3.5	73.3±9.2	43.6±8.0	50.8±8.4	83.8±5.9	73.3±8.1	77.9±7.9	54.4±8.6	60.1±8.8	63.9±8.9	47.3±8.3	63.9±8.9	69.1±6.5
Alaska	74.4±6.8	91.6±4.4	85.2±5.8	84.0±5.7	93.0±3.5	80.3±6.1	92.2±4.1	65.4±7.6	76.0±7.1	92.2±4.2	73.2±7.3	45.9±8.2	32.3±7.4	71.1±7.1	63.8±7.8	64.6±7.8	61.7±7.8	55.2±8.3	55.9±8.3	53.3±8.3	56.6±8.3	64.1±7.1
Arizona	83.7±4.8	93.0±3.3	90.8±3.6	85.4±4.5	90.9±3.7	48.3±6.7	89.0±4.3	77.6±5.7	89.2±4.0	92.6±3.4	77.8±5.6	51.9±6.8	39.8±6.5	80.9±5.2	69.9±6.1	73.4±5.9	40.0±6.5	61.6±6.6	64.8±6.5	36.7±6.4	66.4±6.5	71.1±6.6
Arkansas	73.1±6.6	89.9±4.0	81.8±6.0	78.3±6.2	84.9±5.0	42.1±6.8	89.8±3.9	70.7±6.7	85.0±5.6	88.2±4.3	69.2±6.8	25.1±5.7	27.3±5.8	71.2±6.7	63.1±6.9	66.7±6.9	37.5±6.6	57.9±7.0	60.9±7.0	34.4±6.4	61.5±6.9	66.7±6.8
California	83.4±4.7	91.8±3.5	89.8±3.7	86.7±4.2	92.0±3.5	61.5±6.1	90.3±3.7	49.8±6.3	90.4±3.7	92.2±3.4	79.8±5.1	51.5±6.3	43.9±6.1	81.6±4.8	74.9±5.2	78.2±5.0	55.5±6.2	68.7±5.7	71.6±5.6	49.9±6.2	72.2±5.5	72.0±4.7
CA-Los Angeles County	85.9±5.8	90.2±5.3	88.9±5.4	90.0±4.8	93.8±4.2	61.0±7.9	91.6±4.8	51.5±8.1	91.8±4.6	91.5±4.8	79.4±6.7	51.7±8.0	51.5±8.1	82.5±6.5	78.1±6.7	80.8±6.5	54.8±8.0	71.4±7.3	73.5±7.2	50.6±8.0	73.5±7.2	69.4±5.8
CA-Rest of State	82.4±6.0	92.4±4.4	90.1±4.7	85.5±5.5	91.4±4.5	61.7±7.8	89.9±4.7	49.1±8.1	89.9±4.8	92.5±4.3	79.9±6.5	51.5±8.0	41.1±7.8	81.3±6.1	73.7±6.7	77.3±6.4	55.7±7.9	67.6±7.4	70.8±7.2	49.6±8.0	71.7±7.1	NA
Colorado	81.8±6.7	88.7±5.8	83.6±7.0	79.8±7.3	86.0±7.0	58.9±8.4	85.7±6.3	52.5±8.8	83.2±6.4	86.4±7.1	77.5±7.6	38.9±8.5	44.8±8.8	77.6±7.4	65.2±8.3	69.2±8.2	49.6±8.8	60.6±8.5	64.6±8.4	46.9±8.8	66.1±8.4	77.4±6.9
Connecticut	87.6±6.0	96.6±2.3	93.7±3.3	58.8±9.7	95.8±3.8	45.4±9.8	98.4±1.3	46.8±9.6	92.1±4.7	98.8±1.0	90.7±5.4	46.9±9.8	84.6±9.6	84.6±6.3	46.5±9.8	71.4±9.1	37.2±9.7	43.8±9.8	68.4±9.3	34.4±9.6	76.0±7.7	78.9±6.1
Delaware	86.8±5.2	92.9±3.8	90.2±4.2	79.5±5.9	89.1±4.7	51.4±7.3	89.4±4.8	62.8±7.4	91.0±4.0	94.9±2.9	81.6±5.9	52.3±7.3	56.4±7.4	84.6±5.4	65.3±7.1	73.5±6.6	42.8±7.2	60.0±7.3	67.7±6.9	38.9±7.1	69.2±6.8	68.5±6.9
District of Columbia	83.9±5.4	89.6±4.8	91.2±4.5	90.6±4.2	92.2±4.0	62.3±7.1	89.9±4.8	67.9±6.8	92.5±3.8	94.1±3.5	77.6±7.1	54.1±7.2	39.3±7.1	80.9±5.8	75.0±6.4	75.5±6.4	55.6±7.2	62.7±7.5	63.2±7.5	48.3±7.2	63.8±7.5	70.1±6.8
Florida	90.3±4.0	92.7±3.6	91.2±3.8	89.3±4.3	94.2±3.3	61.9±6.7	93.5±3.5	47.8±6.8	92.9±3.4	93.7±3.2	79.5±5.5	44.6±6.6	36.4±6.5	85.4±4.8	74.7±5.7	77.4±5.5	56.1±6.7	65.1±6.2	67.8±6.1	49.0±6.6	68.7±6.1	72.9±5.5
Georgia	82.8±5.5	94.3±3.2	91.3±4.2	78.6±5.8	91.8±3.6	56.0±7.3	94.1±3.3	71.2±6.6	91.5±4.4	94.7±3.1	79.4±5.9	58.1±7.1	48.5±7.1	82.2±5.6	69.3±6.6	76.7±6.1	51.1±7.4	62.9±7.0	70.3±6.7	45.8±7.4	73.1±6.5	70.2±7.0
Hawaii	80.0±6.1	89.6±4.6	86.7±5.3	79.5±6.0	87.7±5.1	51.4±7.6	87.9±5.0	65.4±7.3	90.5±4.3	90.1±4.5	80.7±5.9	47.1±7.7	39.4±7.5	78.2±6.3	66.9±7.1	73.2±6.7	47.3±7.6	63.8±7.2	70.1±6.9	46.7±7.6	71.0±6.9	76.2±6.8
Idaho	84.0±5.5	94.7±3.5	88.1±4.8	64.1±7.5	90.9±4.5	44.5±7.7	94.3±3.6	70.3±7.1	84.1±5.7	93.9±3.8	82.5±6.0	37.3±7.5	30.3±7.2	81.8±5.7	51.7±7.7	73.3±6.7	35.8±7.4	48.0±7.7	69.3±7.1	33.6±7.2	70.5±7.0	60.4±6.6
Illinois	84.0±4.4	91.8±3.2	88.2±3.9	87.8±3.8	90.9±3.7	63.8±5.8	93.9±2.6	58.6±5.7	88.8±3.7	92.3±3.4	82.9±4.6	38.0±5.5	37.9±5.4	81.0±4.7	69.9±6.1	73.4±5.9	56.1±5.8	61.6±6.6	64.8±6.5	53.7±5.8	72.8±5.2	66.2±5.1
IL-City of Chicago	81.2±6.4	88.9±5.7	90.4±4.0	89.5±4.3	95.6±2.6	67.9±7.0	92.3±3.5	69.8±7.1	90.8±5.4	93.1±3.5	84.7±5.0	47.2±7.5	39.9±7.1	78.2±6.6	72.0±6.9	74.2±6.8	57.8±7.6	69.2±7.0	71.4±6.9	55.8±7.6	71.4±6.9	72.3±6.5
IL-Rest of State	84.9±5.5	92.9±3.9	87.5±5.1	87.2±4.8	89.7±4.2	62.4±7.3	94.5±3.3	54.7±7.3	88.1±4.8	92.0±4.5	82.3±5.9	34.8±6.8	37.2±6.8	81.9±5.9	72.8±6.4	77.3±6.2	55.4±7.4	68.3±6.8	72.6±6.6	53.0±7.4	73.2±6.6	64.1±6.4
Indiana	79.8±5.7	91.3±3.9	86.6±4.6	82.8±5.7	89.7±4.8	53.3±6.5	91.6±3.4	74.8±5.4	85.7±4.8	91.0±4.0	78.6±5.6	46.1±6.5	50.8±6.5	76.8±5.9	65.9±6.5	69.9±6.3	45.7±6.4	61.9±6.5	65.8±6.4	43.4±6.4	67.3±6.3	72.2±6.5
IN-Lake County	80.7±6.6	92.2±3.9	82.7±6.4	87.7±5.0	91.6±4.4	55.2±7.7	90.6±5.1	69.9±7.6	81.8±6.6	91.3±4.4	75.5±7.3	22.6±6.8	33.4±7.4	74.0±7.1	65.1±7.7	68.3±7.5	47.3±7.8	58.2±8.0	60.6±8.0	43.9±7.9	61.5±8.0	NA
IN-Marion County	79.7±6.1	91.1±4.6	87.4±5.0	87.4±5.1	91.2±4.7	61.5±7.1	92.8±3.9	77.4±6.0	88.0±4.9	92.3±4.3	81.0±6.0	45.1±7.3	44.3±7.3	78.5±6.1	72.2±6.5	73.7±6.5	52.9±7.4	68.0±6.9	69.3±6.9	50.1±7.4	69.5±6.9	NA
IN-Rest of State	79.7±7.4	91.3±5.1	86.8±6.1	81.1±7.5	89.2±6.3	51.2±8.5	91.4±4.4	74.8±7.0	85.5±6.3	90.7±5.2	78.4±7.4	48.8±8.5	54.2±8.5	76.7±7.7	64.5±8.5	69.1±8.3	43.8±8.4	60.9±8.5	65.5±8.4	41.8±8.3	67.4±8.2	NA
Iowa	88.9±4.8	96.0±2.9	93.2±3.8	74.7±6.0	94.6±3.4	50.8±7.2	95.1±3.1	46.7±7.2	93.6±3.5	91.3±4.1	83.8±5.3	47.8±7.0	51.1±7.1	88.2±4.8	65.6±6.7	84.1±5.4	47.0±7.2	60.0±7.0	76.7±6.2	42.5±7.1	78.1±6.0	71.7±6.2
Kansas	87.2±5.9	93.8±4.4	92.5±4.6	86.7±6.3	90.8±5.3	56.4±8.6	91.6±4.6	72.6±7.7	92.0±4.6	91.5±4.9	78.6±7.4	43.8±8.5	39.7±8.1	86.2±6.0	77.0±7.4	80.5±6.8	52.6±8.6	65.8±8.5	69.3±8.2	46.0±8.7	71.7±8.0	71.0±6.4
Kentucky	84.7±4.5	96.1±2.3	88.9±3.8	79.7±4.6	92.7±3.0	57.3±6.1	95.1±2.4	76.6±5.0	91.3±3.3	90.3±3.8	75.2±5.4	37.9±5.7	45.3±5.8	82.1±4.7	65.6±5.8	76.8±5.1	51.0±6.1	56.0±6.0	66.7±5.7	43.4±6.0	67.5±5.7	71.4±6.3
Louisiana	84.1±5.7	98.1±1.5	94.4±3.0	88.2±4.8	96.6±2.2	64.7±7.2	90.0±2.4	63.0±6.9	95.3±2.8	94.7±3.5	81.6±5.9	52.2±7.4	50.9±7.4	82.8±5.8	76.9±6.3	80.7±5.9	56.9±7.4	70.1±6.8	73.8±6.6	53.7±7.4	74.9±6.5	73.7±5.7
Maine	87.2±4.9	92.3±3.9	91.4±3.9	65.0±6.8	84.7±5.2	46.9±7.1	90.6±3.9	68.6±6.2	90.4±3.8	92.0±3.8	82.5±5.2	19.3±5.2	28.5±6.3	83.9±5.3	52.5±6.9	69.5±6.4	39.1±6.9	49.6±6.9	65.8±6.5	37.6±6.9	72.3±6.1	73.1±5.9
Maryland	89.0±4.8	95.3±3.4	89.7±5.2	88.5±4.8	93.0±3.5	51.9±8.1	95.3±3.1	67.6±7.8	91.4±4.9	95.2±3.4	83.4±6.7	44.9±8.1	44.5±7.9	87.0±5.2	63.8±7.8	64.6±7.8	49.8±8.1	55.2±8.3	55.9±8.3	45.2±8.1	77.9±7.0	74.9±5.6
MD-City of Baltimore	80.5±6.2	92.8±3.9	91.0±4.4	76.4±6.5	83.9±5.7	48.0±7.3	93.1±3.7	67.8±7.0	90.1±4.3	93.7±3.6	80.1±6.5	46.1±7.3	37.5±6.7	79.5±6.3	62.8±7.2	68.7±7.0	40.6±7.2	58.9±7.4	64.2±7.3	39.8±7.2	70.4±7.0	71.5±6.2
MD-Rest of State	90.2±5.5	95.7±3.8	89.5±5.9	90.2±5.4	95.2±3.9	52.4±9.1	95.6±3.5	67.6±8.9	91.6±5.6	95.4±3.9	83.9±7.6	44.7±9.1	45.5±9.0	88.1±5.9	82.4±6.8	85.9±6.2	51.1±9.2	75.4±8.2	79.0±7.9	46.0±9.2	79.0±7.9	75.4±6.3
Massachusetts	88.9±4.5	95.8±2.5	93.7±3.2	94.7±3.4	94.7±3.4	41.9±6.9	95.0±2.7	62.5±6.8	90.2±4.2	94.8±3.4	86.0±5.3	47.1±7.1	45.2±7.0	87.7±4.6	81.1±5.7	81.1±5.7	36.9±6.8	75.7±6.3	75.7±6.3	32.7±6.5	76.0±6.3	76.5±6.2
Michigan	91.3±3.6	97.1±1.9	90.9±5.1	83.5±5.4	96.0±2.5	62.9±7.1	95.5±2.4	80.7±6.1	89.6±5.3	95.9±2.4	87.0±4.3	43.2±7.4	46.0±7.4	87.3±5.2	71.0±6.8	80.8±6.1	54.8±7.4	65.7±7.1	75.6±6.5	52.1±7.4	76.5±6.4	74.1±6.5
Minnesota	84.7±5.0	95.4±2.4	93.6±3.0	69.5±6.3	92.3±3.3	50.4±6.4	95.1±2.5	34.1±6.2	89.2±4.2	96.1±2.3	83.8±5.7	49.4±6.6	50.1±6.6	83.3±5.1	57.6±6.6	76.9±5.5	45.5±6.3	52.1±6.7	69.7±6.4	41.9±6.6	71.6±6.3	71.6±5.6
Mississippi	84.7±4.4	94.8±2.8	91.6±3.3	83.3±4.8	93.9±2.9	69.5±5.7	95.3±2.8	68.0±6.2	91.7±3.4	94.3±2.8	85.0±4.3	41.3±6.6	43.4±6.5	82.6±4.6	73.3±5.6	77.7±5.2	62.3±6.1	68.5±5.9	72.8±5.6	59.2±6.2	75.2±5.4	70.7±6.5
Missouri	78.4±6.2	87.5±5.5	88.8±5.0	79.9±6.2	88.6±5.3	47.3±6.9	89.4±5.0	59.9±6.7	87.8±4.3	86.1±5.9	67.5±6.9	33.6±6.5	46.9±7.1	74.2±6.5	60.5±7.0	64.6±6.9	37.9±6.7	50.1±6.9	54.1±7.0	31.5±6.4	56.2±7.0	63.1±6.7
Montana	76.0±6.5	89.6±4.3	87.2±5.0	68.6±7.0	83.4±5.6	52.4±7.6	88.9±4.4	65.2±7.2	77.5±6.6	88.7±4.6	74.6±6.7	31.1±7.0	30.7±6.8	75.0±6.5	55.2±7.5	65.9±7.2	42.5±7.7	49.4±7.7	59.1±7.5	38.7±7.6	61.7±7.5	59.5±6.8
Nebraska	81.8±5.4	94.4±2.9	93.6±3.1	74.0±6.2	93.3±3.4	53.2±7.4	94.5±3.0	45.4±7.4	89.0±4.8	93.1±4.1	79.2±6.5	52.7±7.3	50.9±7.2	80.8±5.4	59.9±7.2	74.3±6.3	42.7±7.5	50.7±7.5	64.0±7.4	38.1±7.2	65.4±7.3	68.8±6.1
Nevada	75.5±5.8	85.8±4.8	86.3±5.4	76.8±5.4	87.4±4.2	50.9±6.8	87.7±4.3	72.3±5.8	83.4±4.9	84.5±4.9	75.1±5.7	49.1±6.8	34.4±6.4	72.7±6.0	59.4±6.5	65.8±6.2	41.9±6.7	54.7±6.6	60.6±6.4	39.3±6.7	62.6±6.5	55.2±7.0
New Hampshire	87.5±4.6	93.8±3.4	92.0±3.8	97.1±2.3	97.1±2.3	46.4±7.0	94.8±2.9	63.7±7.1	89.0±4.8	94.2±3.2	85.8±5.2	49.7±7.4	54.8±7.5	83.8±5.1	78.7±5.9	78.7±5.9	39.9±7.1	73.3±6.5	73.3±6.5	39.1±7.1	73.3±6.5	75.0±5.9
New Jersey	82.1±5.9	93.5±3.5	86.9±4.3	87.3±5.4	92.8±3.8	57.9±6.7	90.9±4.2	39.0±6.1	88.2±4.3	90.7±4.2	79.6±6.0	34.5±6.0	42.4±6.3	77.7±6.1	67.2±6.5	70.2±6.4	46.7±6.5	63.1±6.5	66.1±6.5	44.7±6.4	67.2±6.4	60.5±6.5
New Mexico	80.6±5.8	90.9±3.9	89.1±4.1	80.1±5.4	86.9±5.6	55.8±6.6	90.1±3.8	51.2±6.8	89.8±3.8	92.0±3.5	79.9±5.4	40.8±6.5		78.2±6.0	68.2±6.6	74.3±6.2	48.6±6.7	63.2±6.4	68.4±6.5	45.8±6.6	70.2±6.4	74.6±6.3
New York	84.0±4.0	92.8±2.7	90.3±3.2	84.6±3.8	95.8±3.8	58.0±5.2	92.0±3.0	48.6±5.4	88.8±3.3	93.9±2.5	80.1±4.3	34.6±5.2	39.5±5.3	81.4±4.1	73.3±8.1	77.9±7.9	51.2±5.3	60.1±8.8	63.9±8.9	47.8±5.3	67.2±5.0	67.7±4.4
NY-City of New York	85.7±5.6	93.7±3.7	91.9±4.4	87.2±5.1	91.3±4.7	62.8±7.4	91.4±4.6	41.1±7.8	91.2±4.6	92.4±4.2	77.2±6.5	35.0±7.4	38.6±7.7	83.1±5.9	71.7±6.9	74.2±6.8	55.5±7.6	63.1±7.3	65.6±7.3	50.8±7.6	67.5±7.2	69.7±6.0
NY-Rest of State	82.4±5.7	91.9±3.9	88.7±4.5	82.2±5.6	93.6±3.4	53.3±7.4	92.5±3.7	55.8±7.4	86.5±4.8	95.3±2.7	82.9±5.5	34.2±7.3	40.4±7.3	79.9±5.8	66.6±6.8	72.0±6.5	47.1±7.4	61.4±7.1	66.2±6.9	44.9±7.4	67.0±6.8	65.7±6.4
North Carolina	85.9±5.5	92.9±4.0	92.6±4.0	62.6±7.3	90.1±4.4	47.7±7.8	93.9±3.5	76.6±6.7	91.9±4.1	91.7±4.2	84.0±5.8	47.5±7.7	41.1±7.4	83.3±5.9	55.8±7.4	78.3±6.2	43.2±7.5	52.6±7.5	73.9±6.7	40.2±7.5	76.7±6.5	69.9±6.5
North Dakota	85.4±5.3	96.5±2.7	94.4±3.2	65.2±6.8	91.8±3.8	53.2±7.2	96.7±2.6	78.3±6.0	93.6±3.6	96.3±2.7	84.0±5.5	63.2±7.0	62.6±7.1	84.9±5.4	56.4±7.2	77.8±6.1	46.9±7.2	52.4±7.2	72.7±6.5	43.4±7.2	77.0±6.2	69.7±6.1
Ohio	83.3±5.0	92.6±3.2	89.4±4.2	87.8±4.7	91.1±4.2	54.3±7.3	91.5±3.6	63.6±7.5	87.1±4.5	93.0±3.2	82.1±5.3	46.7±7.4	48.9±7.4	80.8±5.3	73.8±6.2	74.8±6.1	47.5±7.3	68.8±6.6	69.8±6.6	44.7±7.3	72.4±6.2	71.7±6.8
Oklahoma	83.7±5.2	93.4±2.9	94.2±2.7	81.5±5.5	90.7±4.3	63.2±6.4	93.9±3.3	66.0±6.3	91.5±3.3	91.5±4.0	74.0±6.1	59.0±6.5	33.4±6.3	81.7±5.4	70.2±6.3	76.5±5.9	59.1±6.6	60.4±6.7	66.0±6.5	51.9±6.7	66.3±6.5	57.4±7.5
Oregon	82.1±5.5	91.7±3.8	88.1±4.3	79.6±5.4	89.4±4.5	53.6±6.6	88.8±4.2	59.4±6.7	86.4±4.6	89.5±4.3	81.9±5.3	49.5±6.6	31.6±6.0	78.5±5.7	64.8±6.3	73.0±6.1	45.5±6.5	60.8±6.4	68.8±6.3	44.3±6.5	69.9±6.2	70.0±7.4
Pennsylvania	80.9±5.2	88.5±4.5	89.3±4.4	84.9±4.5	94.0±3.0	51.1±6.2	92.4±3.4	69.1±5.8	87.7±4.5	90.6±4.0	82.6±4.7	52.0±6.1	59.0±6.1	78.7±5.5	69.0±5.9	74.4±5.8	41.4±6.1	63.9±6.0	69.2±5.9	38.8±6.0	69.4±5.9	73.4±5.4
PA-Philadelphia County	84.8±4.9	93.8±3.2	90.7±4.0	87.9±4.4	91.9±3.8	41.4±6.9	89.5±4.6	72.2±6.6	91.3±3.7	94.2±3.3	77.6±6.0	50.0±6.8	52.6±7.2	83.5±5.0	73.5±6.2	75.8±6.0	37.5±6.8	64.8±6.8	66.8±6.8	35.8±6.8	68.5±6.7	71.6±5.7
PA-Rest of State	80.1±6.1	87.5±5.3	89.1±5.1	84.3±5.3	94.4±3.5	52.9±7.2	92.9±4.0	68.5±6.7	87.0±5.3	89.9±4.7	83.6±5.5	52.4±7.1	60.2±7.1	77.9±6.4	68.2±6.9	74.1±6.7	42.1±7.1	63.7±7.0	69.6±6.9	39.3±7.0	69.6±6.9	73.7±6.3

	4+DTaP‡	3+Polio§	1+MMRǁ	3+Hib¶	3+Hib-S**	Hib by brand††	3+HepB‡‡	Hep B Birth dose§§	1+Varǁǁ	3+PCV¶¶	4+PCV***	2+HepA†††	Rotavirus‡‡	4:3:1§§§	4:3:1:3:3:1ǁǁ	4:3:1:3:3:1-S¶¶¶	4:3:1:4:3:1€	4:3:1:3:3:1:4?	4:3:1:3:3:1:4-S€€	4:3:1:4:3:1:4??	4:3:1:0:3:1:4€€€	4:3:1:0:3:1:4-2008???
Rhode Island	82.3±6.4	96.5±3.5	90.8±4.2	60.2±7.7	86.3±5.3	38.8±7.6	98.8±1.5	69.5±7.3	93.0±3.4	96.5±2.8	83.6±6.5	55.5±7.8	71.2±7.3	78.8±6.7	50.6±7.9	70.0±7.1	34.6±7.6	44.9±7.9	63.5±7.6	29.2±7.0	69.7±7.5	73.9±7.2
South Carolina	81.7±5.5	96.4±2.3	86.9±4.9	79.0±5.5	94.1±2.9	42.1±6.8	97.0±2.1	62.5±6.8	88.3±4.7	95.3±2.6	79.7±5.9	43.9±6.8	42.5±6.7	80.6±5.6	66.9±6.4	76.7±5.9	38.9±6.7	59.7±6.7	68.8±6.5	34.6±6.4	70.9±6.4	73.5±6.0
South Dakota	82.4±5.6	96.2±2.6	92.8±3.5	92.3±3.6	94.9±3.0	51.6±7.2	96.3±2.6	53.0±7.2	87.3±4.6	93.9±3.1	80.6±5.9	43.0±7.2	38.6±7.0	81.4±5.7	74.8±6.2	76.9±6.1	45.8±7.1	67.1±6.8	69.1±6.7	42.8±7.1	69.6±6.7	63.6±6.4
Tennessee	89.0±3.8	96.5±2.0	94.7±2.7	87.4±4.0	96.6±1.8	55.2±6.6	96.2±2.5	49.7±6.7	92.9±3.2	96.8±2.1	81.2±5.3	47.3±6.7	53.1±6.8	86.8±4.3	74.4±5.6	81.8±4.9	49.0±6.7	65.0±6.2	71.3±6.0	44.8±6.6	72.5±5.9	75.8±5.9
Texas	82.1±4.2	92.2±2.4	88.5±3.2	88.9±3.4	84.9±5.0	48.9±5.5	92.2±2.4	69.8±4.8	91.2±2.7	93.4±2.1	80.8±4.2	55.0±5.5	45.8±5.4	80.2±4.4	63.1±6.9	66.7±6.9	43.3±5.4	57.9±7.0	60.9±7.0	40.7±5.3	71.3±5.0	72.3±5.3
TX-Bexar County	80.1±6.3	89.8±5.1	87.6±5.6	89.7±5.2	91.5±4.9	56.9±7.9	91.0±4.8	58.3±7.5	89.1±5.2	90.2±5.2	76.3±7.4	51.2±8.0	49.9±8.0	76.9±6.7	70.6±7.0	71.4±7.0	46.0±7.5	63.3±7.9	64.0±7.8	40.1±7.6	65.4±7.8	71.8±6.8
TX-City of Houston	78.9±6.2	87.3±5.5	86.9±4.9	83.9±5.5	86.1±5.3	56.2±8.2	89.2±4.8	62.3±7.9	87.9±4.9	87.7±5.0	75.7±6.8	57.3±7.9	46.6±8.4	76.2±6.7	70.2±7.5	71.2±7.5	47.1±8.3	65.5±7.8	66.4±7.8	44.8±8.3	67.9±7.4	66.5±9.9
TX-Dallas County	78.9±7.4	90.1±5.3	84.9±6.1	90.0±5.2	92.1±4.0	49.3±8.2	89.0±4.7	70.5±7.0	87.7±5.5	88.8±5.6	78.0±7.1	46.4±8.2	47.4±8.1	78.7±7.4	73.5±7.6	73.6±7.6	42.3±7.8	69.6±7.8	69.7±7.8	39.1±7.7	69.7±7.8	69.0±6.5
TX-El Paso County	77.1±5.4	91.2±3.4	87.1±4.4	89.7±3.7	90.2±3.6	41.5±6.2	92.6±3.1	71.5±5.8	88.3±4.2	91.3±3.5	72.7±5.7	56.6±6.2	56.5±6.3	74.9±5.5	70.5±5.8	71.0±5.7	36.3±6.0	62.2±6.1	62.7±6.1	32.5±5.9	63.9±6.1	67.3±5.9
TX-Rest of State	83.7±6.1	93.8±3.4	89.5±4.6	89.5±5.0	92.7±4.5	47.1±8.0	93.4±3.3	72.1±7.0	92.7±3.9	95.6±2.8	83.1±6.0	56.5±8.1	44.5±7.9	81.9±6.3	75.1±7.1	76.8±7.0	42.9±7.8	68.3±7.7	70.0±7.6	40.7±7.8	73.3±7.2	74.3±7.8
Utah	85.5±5.1	90.1±4.6	91.3±4.1	83.4±5.2	90.9±4.4	55.2±6.5	91.3±4.2	77.8±6.1	85.7±5.7	90.8±4.5	79.2±5.9	51.3±7.2	43.6±7.6	83.9±5.4	70.3±6.7	75.8±6.5	45.5±7.3	63.2±7.1	68.7±6.9	41.2±7.2	69.6±6.9	66.4±8.2
Vermont	83.2±4.4	92.7±3.2	91.9±3.2	91.4±4.2	91.4±4.2	37.9±6.0	91.5±3.6	22.8±5.1	82.7±4.7	91.4±3.8	80.9±5.0	43.4±6.2	34.5±5.8	78.6±4.9	65.1±6.1	65.1±6.1	25.3±5.3	58.4±6.2	58.4±6.2	23.0±5.1	59.9±6.1	62.1±6.9
Virginia	79.2±7.5	89.2±4.9	85.8±6.8	81.1±7.4	90.3±4.9	47.2±8.0	92.5±4.2	60.8±7.9	86.7±7.0	90.6±4.7	76.4±7.9	37.8±7.5	53.1±8.1	77.6±7.5	69.6±7.8	75.0±7.5	43.8±8.0	63.2±8.1	68.3±8.0	40.0±7.7	68.6±8.0	68.3±8.6
Washington	82.2±4.3	92.9±2.7	90.8±3.0	92.7±2.8	93.6±2.5	47.9±5.9	88.6±3.6	70.1±5.4	85.4±4.2	92.6±3.0	82.2±4.1	52.3±5.9	20.9±4.7	79.7±4.5	70.3±5.4	70.3±5.4	38.1±5.7	64.8±5.7	64.8±5.7	35.6±5.7	64.9±5.7	67.7±6.2
WA-Eastern/ Western WA	75.0±5.8	89.7±4.2	87.8±4.4	89.5±4.1	90.5±3.9	47.2±6.5	88.3±4.3	88.2±4.3	81.7±5.2	87.8±4.5	72.9±6.0	41.1±6.4	25.5±5.5	73.1±5.9	66.9±6.6	66.9±6.2	38.1±6.3	60.9±6.5	60.9±6.5	34.2±6.2	61.4±6.5	NA
WA-Rest of State	85.4±5.6	94.3±3.5	92.1±3.8	94.0±3.6	94.9±3.2	48.2±8.0	88.8±4.8	68.8±7.3	87.1±5.5	94.7±3.8	86.2±5.2	57.1±7.8	18.9±6.3	82.5±5.9	71.8±7.3	71.8±7.3	38.1±7.7	66.4±7.6	66.4±7.6	36.2±7.6	66.4±7.6	NA
West Virginia	78.8±7.0	88.6±6.0	89.2±5.7	82.3±6.6	85.9±6.0	39.8±7.9	88.3±5.7	53.7±8.2	86.9±5.9	84.7±6.4	74.4±7.5	51.7±8.1	40.9±7.9	75.3±7.2	64.5±7.7	65.8±7.7	32.1±7.6	58.2±8.0	59.4±8.0	30.5±7.5	60.9±8.0	64.9±7.3
Wisconsin	88.8±4.2	95.7±2.5	94.4±2.7	68.9±6.3	94.6±2.6	50.0±6.9	95.2±2.7	63.1±6.6	90.0±3.9	93.7±3.5	86.9±4.7	52.5±6.6	46.7±6.8	87.8±4.3	59.1±6.5	80.0±5.3	43.4±6.8	53.3±6.6	74.0±6.1	39.2±6.7	75.9±6.0	76.4±7.0
Wyoming	81.3±5.4	95.2±2.6	91.3±3.6	77.8±5.9	90.9±3.8	55.0±6.9	95.1±3.1	61.2±6.8	87.0±4.5	92.2±3.4	82.3±5.1	32.2±6.3	34.7±6.3	80.6±5.5	62.0±6.9	72.5±6.3	46.3±6.9	57.3±6.9	67.4±6.6	43.6±6.8	69.6±6.5	58.9±6.6
Virgin Islands	60.7±7.2	77.2±6.1	71.2±6.4	75.4±5.9	81.0±5.4	57.1±7.0	81.6±5.7	81.8±5.5	68.6±6.5	74.7±5.9	46.5±7.1	15.9±5.5	5.6±7.1	57.4±7.2	50.9±7.2	51.5±7.2	41.6±7.0	36.4±6.8	37.0±6.8	30.9±6.6	37.0±6.8	NA

* Estimate=NA (Not Available) if the unweighted sample size for the denominator was <30 or (CI half width)/Estimate > 0.6, otherwise estimates are presented as point estimates (%) + 95% confidence intervals. NA for 2008 indicate areas that were not sampled in 2008 or not comparable to 2009.

† Children in the Q1/2009-Q4/2009 National Immunization Survey were born between January 2006 and July 2008.

¥ US National estimates include the 50 States plus DC, and exclude the Virgin Islands.

‡ 4 or more doses of any diphtheria and tetanus toxoids and pertussis vaccines including diphtheria and tetanus toxoids, and any acellular pertussis vaccine (DTaP/DTP/DT).

§ 3 or more doses of any poliovirus vaccine.

ǁ 1 or more doses of measles-mumps-rubella vaccine.

¶ 3 or more doses of Haemophilus influenzae type b (Hib) vaccine.

** >2 or >3 doses of Haemophilus influenzae type b (Hib) vaccinefor the primary series, depending on brand type.

†† >3 or >4 doses of Hib vaccine depending on product type received (includes primary series plus the booster dose).

‡ 3 or more doses of hepatitis B vaccine.

§§ 1 or more doses of hepatitis B vaccine administered between birth and age 3 days.

ǁǁ1 or more doses of varicella at or after child's first birthday, unadjusted for history of varicella illness.

¶¶3 or more doses of pneumococcal conjugate vaccine (PCV).

*** 4 or more doses of PCV.

††† 2 or more doses of Hepatitis A vaccine.

‡‡ >2 or >3 or more doses of Rotavirus vaccine, depending on product type received (>2 doses for Rotarix® [RVI] or >3 doses for RotaTeq® [RV5].

§§§ 4 or more doses of DTaP, 3 or more doses of poliovirus vaccine, and 1 or more doses of any MMR vaccine.

ǁǁǁǁ4:3:1 plus 3 or more doses of Hib vaccine of any type, 3 or more doses of HepB vaccine, and 1 or more doses of varicella vaccine.

¶¶¶ 4:3:1 plus >2 or >3 doses of Hib vaccine depending on brand type (primary series only), 3 or more doses of HepB, and 1 or more doses of varicella vaccine.

€ 4:3:1 plus >3 or >4 doses of Hib vaccine, depending on brand type (primary plus booster dose), 3 or more doses of HepB vaccine, 1 or more doses of varicella vaccine.

? 4:3:1 plus >3 doses of Hib vaccine of any type, 3 or more doses of HepB, 1 or more doses of varicella vaccine, and 4 or more doses of PCV.

€€ 4:3:1 plus >2 or >3 doses of Hib vaccine depending on brand type (primary series only), 3+ doses of HepB vaccine, 1+ doses of varicella vaccine, and 4+ doses of PCV.

?? 4:3:1 plus >3 or >4 doses of Hib vaccine depending on brand type (primary plus booster dose), 3 or more doses of HepB, 1 or more doses of varicella vaccine, and 4 or more doses of PCV.

€€€ 4:3:1 plus 3 or more doses of HepB vaccine, 1 or more doses of varicella vaccine, and 4 or more doses of PCV. Hib vaccine is excluded.

??? 2008 estimates for 4:3:1 plus 3 or more doses of HepB vaccine, 1 or more doses of varicella vaccine, and 4 or more doses of PCV. Hib vaccine is excluded.

Appendix H

Trends in the NIS Response Rates and Vaccination Coverage Rates, 1995-2009

Table H.1: **Key Indicators* from Household and Provider Data Collection by Survey Year, National Immunization Survey, 1995-2009[1]**

Survey Year	Resolution Rate (%)	Screener Completion Rate (%)	Interview Completion Rate (%)	CASRO Response Rate (%)	Children with Adequate Provider Data (%)
1995	96.5	96.4	93.5	87.1	50.6
1996	94.3	96.8	94.0	85.8	63.4
1997	92.1	97.9	93.8	84.6	69.7
1998	90.4	97.8	93.6	82.7	67.1
1999	88.6	97.0	93.4	80.2	65.4
2000	88.1	96.0	93.1	78.7	67.4
2001	86.8	96.2	91.1	76.1	70.4
2002	84.8	96.6	90.6	74.2	67.6
2003	83.6	94.0	88.7	69.8	68.9
2004	83.8	94.8	92.0	73.1	71.0
2005	83.3	92.8	84.2	65.1	63.6
2006	83.3	90.5	85.6	64.5	70.4
2007	82.9	90.2	86.8	64.9	68.6
2008	82.3	90.3	85.1	63.2	71
2009	82.9	92.4	83.2	63.8	68.7

[1] Excludes the U.S. Virgin Islands.

*For the definition of the key indicators see Table 1 of NIS Data User's Guides for the survey year of interest.

Figure H.1: Trends in Key Indicators from Household and Provider Data Collection by Survey Year, National Immunization Survey, 1995-2009[1]

Legend:
- Resolution Rate (%)
- Screener Completion Rate (%)
- Interview Completion Rate (%)
- CASRO Response Rate (%)
- Children with Adequate Provider Data (%)
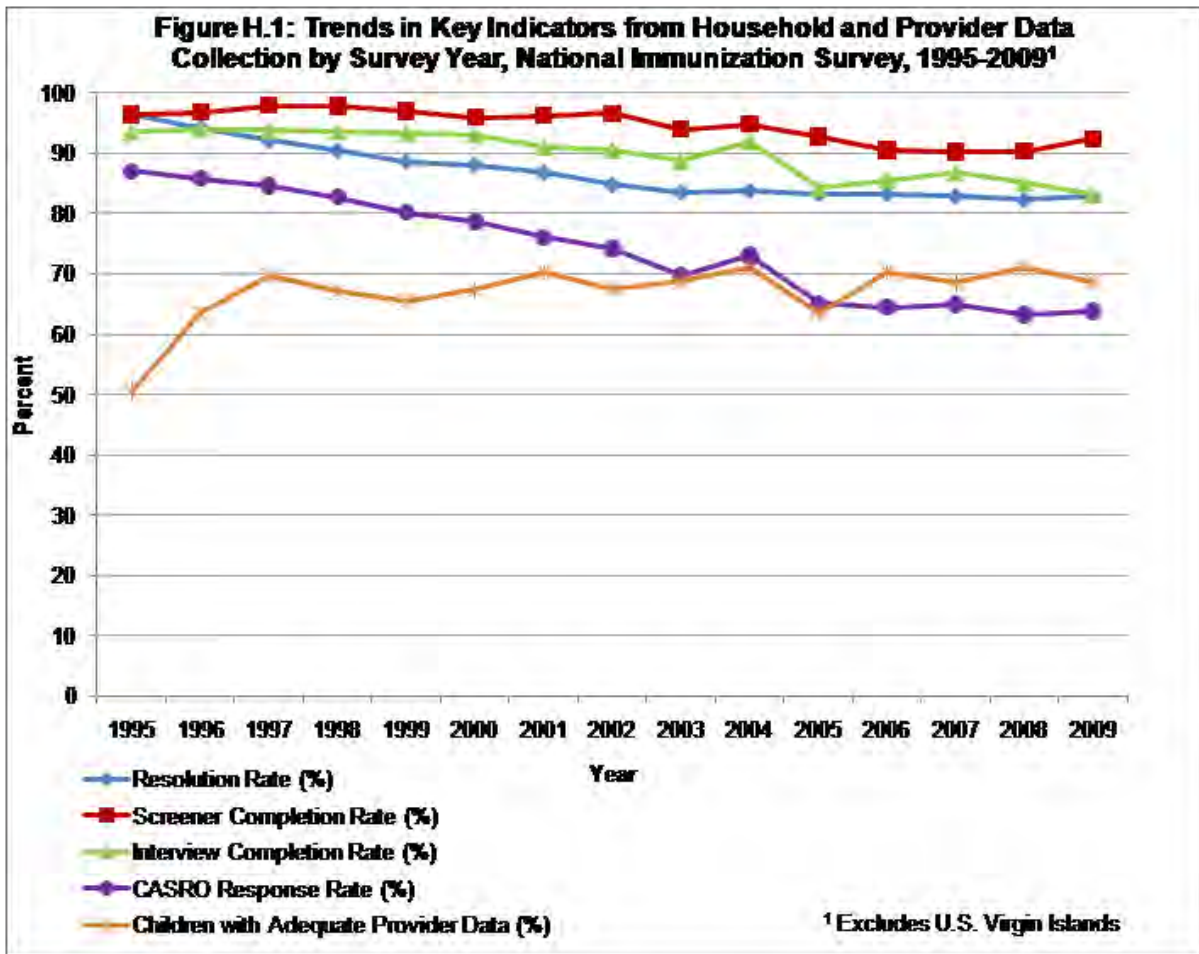
[1] Excludes U.S. Virgin Islands

Figure H.1 provides a graphical representation of the data contained in table H.1. It shows how selected key indicators from the household and provider data collection performed throughout the years, from 1995 to present. We observe that the trend in the data collection rates is going downward, with the exception of the collection rate for children with adequate provider data, which has been essentially flat since 1997.

Table H.2: Vaccine-Specific Coverage Levels Among Children Age 19-35 months in the United States by Survey Year, National Immunization Survey, 1995-2009[1]

Survey Year	4+ DTaP	3+ Polio	1+ MCV	3+ Hib^	3+ Hep B	1+ Varicella*	4+ PCV	4:3:1†	4:3:1:3‡
1995	78.4	87.8	89.8	91.2	67.9	N.A.	N.A.	76	73.7
1996	81.1	91	90.6	91.4	81.8	12	N.A.	78.4	76.4
1997	81.5	90.7	90.4	92.5	83.6	25.8	N.A.	77.9	76.2
1998	83.9	90.8	92	93.4	87	43.2	N.A.	80.6	79.2
1999	83.3	89.6	91.5	93.5	88.1	57.5	N.A.	79.9	78.4
2000	81.7	89.5	90.5	93.4	90.3	67.8	N.A.	77.6	76.2
2001	82.1	89.4	91.4	93	88.9	76.3	N.A.	78.6	77.2
2002	81.6	90.2	91.6	93.1	89.9	80.6	N.A.	78.5	77.5
2003	84.8	91.6	93	93.9	92.4	84.8	N.A.	82.2	81.3
2004	85.5	91.6	93	93.5	92.4	87.5	N.A.	83.5	82.5
2005	85.7	91.7	91.5	93.9	92.9	87.9	53.7	83.1	82.4
2006	85.2	92.8	92.3	93.4	93.3	89.2	68.4	83.1	82.2
2007	84.5	92.6	93.2	92.6	92.7	90	75.3	82.8	80.1
2008	84.6	93.6	92.1	90.9	93.5	90.7	80.1	82.5	79.6
2009	83.9	92.8	90.0	83.6	92.4	89.6	80.4	81.5	73.4

[1] Excludes the U.S. Virgin Islands.

^ Beginning in 2009, the number of doses required to be up-to-date on Hib depends on the manufacturer of the vaccine. However, the figures shown here refer to 3 or more doses of Hib vaccine regardless of manufacturer.

* Varicella was added to the NIS in 1996.

† Four or more doses of DTaP, three or more doses of poliovirus vaccine, and one or more doses of any MCV.

‡ Four or more doses of DTaP, three or more does of poliovirus vaccine, and one or more doses of any MCV, and three or more doses of Hib.

Source: http://www.cdc.gov/nip/coverage

Figure H.2: Trends in Vaccine-Specific Coverage Levels among Children 19-35 Months of Age in the United States by Survey Year, National Immunization Survey, 1995-2009[1]
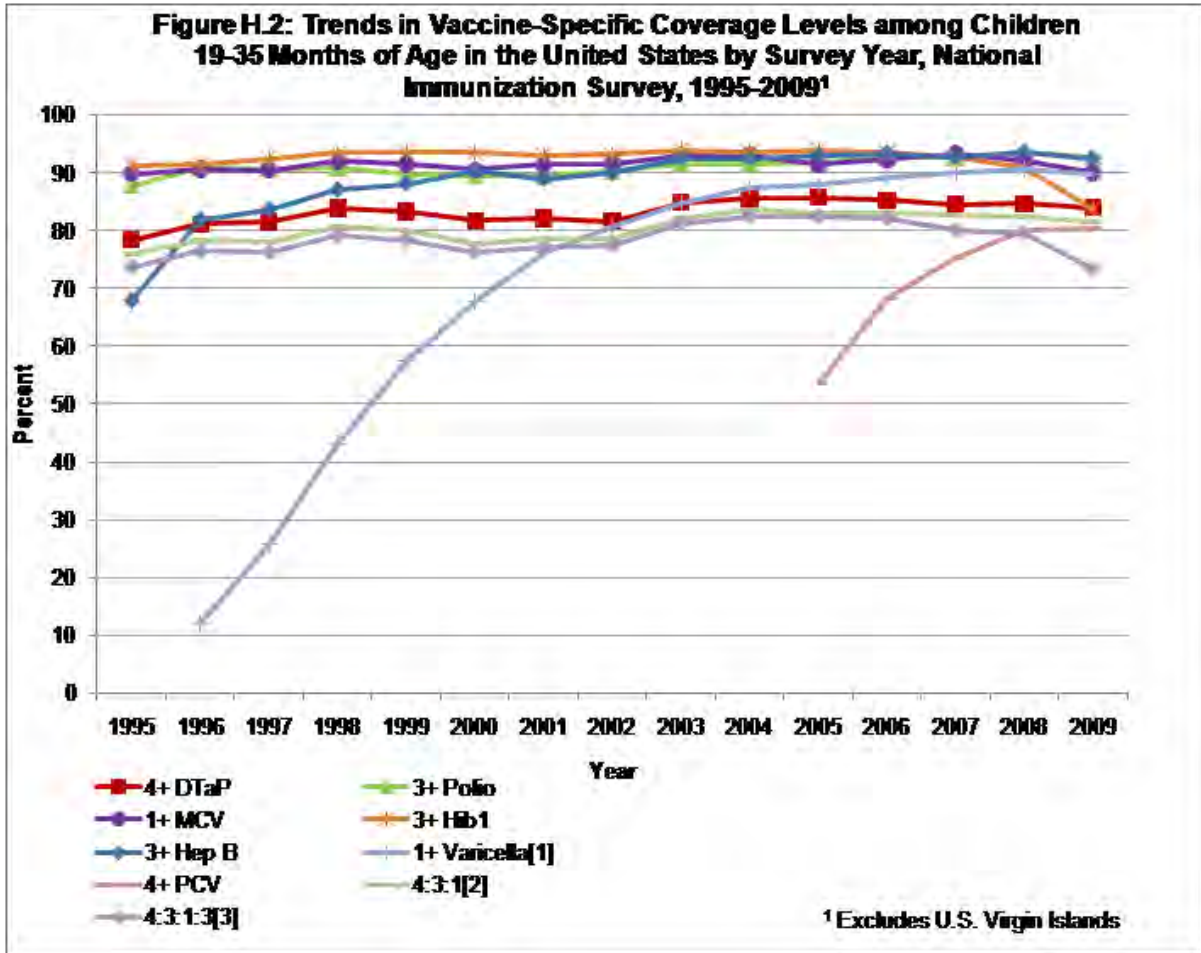
Figure H.2 provides a graphical representation of the data contained in Figure H.2. It displays the trend in vaccine-specific coverage levels among children age 19-35 months from 1995 to 2009. We observe that the trend in the data collection rates is slightly upward for the longer established vaccines, while the early trends for new vaccines show strong upward trends.

Appendix I

Vaccine Type Codes

Table I.1: 2009 NIS Vaccine Type Codes

Vaccine Code	Description
03	DTaP/DTP-containing, unknown type
04	DTaP
07	DTaP-Hib
08	DTaP-HepB-IPV
20	OPV
21	IPV
22	Polio-containing, unknown type
30	Measles-mumps-rubella
31	Measles only
32	Measles-mumps
33	Measles-rubella
43	HepB-Hib
44	Hib-only, unknown type
60	HepB-only
70	Pneumococcal conjugate
71	Pneumococcal polysaccharide
72	Pneumococcal-containing, unknown type
D3	DTaP-IPV-Hib
FL	Seasonal influenza, unknown type
FM	Seasonal influenza spray
FN	Injected seasonal influenza
HB	HepB-containing, unknown type
HI	Hib-containing, unknown type
HM	Hib-only (Merck)
H2	Hib-only (Sanofi or GSK)
MM	Measles-containing, unknown type
RG	Rotarix (GSK)
RM	Rotateq (Merck)
RO	Rotavirus-containing, unknown type
VA	Varicella-containing, unknown type

Vaccine Code	Description
VM	MMR-varicella
VO	Varicella-only