

**National Health Interview Survey/
National Immunization Provider Record
Check Study**

**User=s Guide for the
1997 Public-Use Data File**

Prepared for
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Health Statistics
and
National Immunization Program

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Glossary of Commonly Used Terms and Abbreviations

4:3:1	Child has received 4 or more DTP, 3 or more polio, and 1 or more MCV vaccinations.
4:3:1:3	Child has received 4 or more DTP, 3 or more polio, 1 or more MCV, and 3 or more Hib vaccinations.
4:3:1:3:3	Child has received 4 or more DTP, 3 or more polio, 1 or more MCV, 3 or more Hib, and 3 or more hepatitis B vaccinations.
CAPI	Computer-assisted personal interviewing
CDC	Centers for Disease Control and Prevention
DTaP	Diphtheria, tetanus, acellular pertussis
DTP	Diphtheria, tetanus, pertussis
Hep B	Hepatitis B
Hib	<i>Haemophilus influenzae</i> type b
IHQ	Immunization History Questionnaire
IPV	Inactivated poliovirus vaccine
MCV	Measles-containing vaccine
MMR	Measles, mumps, rubella
NCHS	National Center for Health Statistics
NHIS	National Health Interview Survey
NHIS/IM	National Health Interview Survey Immunization Supplement
NIP	National Immunization Program
NIPRCS	National Immunization Provider Record Check Study
NRFUS	Nonresponse Follow-Up Survey
OPV	Oral poliovirus vaccine

Chapter 1. Introduction

Since 1991, national estimates of vaccination coverage have been available through the National Health Interview Survey - Immunization Supplement (NHIS/IM), sponsored by the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC) and conducted by the Census Bureau. The NHIS questionnaire includes a core module that collects demographic information on all household members, a module of health questions about one sampled adult, and a module of health questions about one sampled child.¹ At the end of the core interview, the NHIS/IM is administered for the sampled child and all other children in the household between the ages of 12 and 35 months. (In the first half of 1997, immunization data were collected only for non-sample children aged 19-35 months. Children aged 12-18 months were added to the survey in the third quarter of data collection.) The NHIS/IM asks for a vaccination history of the child. Respondents can either report vaccination dates from a written shot record, if one is available for the child, or they can report the total number of doses for each vaccine from memory recall if no shot record is available.

Reliance on household reports of childhood immunizations has two potential inaccuracies that influence the estimation of vaccination coverage (Zell et al. 1996). First, a large proportion (63%) of respondents rely only on memory recall to report their child's immunization history, which is subject to the potential bias inherent in recall data. In 1997, only 37% of respondents used a shot card to report all or some of their child's vaccinations. Second, even when shot records are used, dates of vaccinations may be missing if the respondent did not have the shot record at the time of the immunization or the original shot record has been lost. Thus, the validity of the vaccination coverage estimates produced from the NHIS has been a major concern. Therefore, to determine the accuracy of the household responses in the NHIS, the NCHS and the National Immunization Program (NIP) of the CDC implemented the National Immunization Provider Record Check Study (NHIS/NIPRCS) in 1994. Its purpose is to evaluate the accuracy of household reports of children's immunization histories by comparing the household reports with the reports from the children's immunization providers, and to produce national estimates of vaccination coverage using both the household and provider reports (Ezzati-Rice et al. 1996; Peak and Cadell 1996). The estimates of vaccination coverage from the NHIS/NIPRCS are also used to adjust for non-telephone coverage bias in the National Immunization Survey (NIS), a telephone survey of households with children aged 19-35 months.

¹ For details on the NHIS sample design and data collection procedures, see the documentation on the NHIS Web site: <http://www.cdc.gov/nchs/nhis.htm>

The NHIS/NIPRCS produces estimates of coverage for nine vaccines and series of vaccines. Table 1.1 lists these vaccines and the number of doses required to be up-to-date for each vaccine and series.

DTP	4 or more doses of diphtheria-tetanus-pertussis vaccine
DTP3	3 or more doses of diphtheria-tetanus-pertussis vaccine
Polio	3 or more doses of polio vaccine
MCV	1 or more doses of measles-containing vaccine
Hib	3 or more doses of <i>Haemophilus influenzae</i> type b vaccine
Hep B	3 or more doses of hepatitis B vaccine
4:3:1	4 or more doses of DTP, 3 or more doses of polio, and 1 or more doses of measles-containing vaccine
4:3:1:3	4 or more doses of DTP, 3 or more doses of polio, 1 or more doses of measles-containing vaccine, and 3 or more doses of Hib vaccine
4:3:1:3:3	4 or more doses of DTP, 3 or more doses of polio, 1 or more doses of measles-containing vaccine, 3 or more doses of Hib, and 3 or more doses of hepatitis B vaccine

General Information about the 1997 NHIS/NIPRCS

The NHIS/NIPRCS begins with households that completed an NHIS/IM for a child or children aged 12-35 months (or 19-35 months in the first half of 1997). As part of completing the Immunization Supplement, the parent or legal guardian is asked to sign a permission form allowing the survey staff to contact the child's medical providers. Only households that signed permission forms are eligible for the NHIS/NIPRCS. The permission form has space for the names and addresses of up to three providers. It also contains identifying information and the signature of the parent or guardian. Permission forms are valid for one year from the date of the interview. The permission forms are sent to the NHIS/NIPRCS contractor for data collection, Abt Associates Inc.

All providers for whom households gave adequate locating information are mailed an Immunization History Questionnaire (IHQ). (See Appendix B for a copy of the 1997 IHQ.) A label on the IHQ gives the child's name, date of birth, and gender, so the provider can locate the child's records. The form includes a grid for the provider to record the date of each vaccination the child has received. The provider is asked to enter all known vaccinations, whether they were given at that practice or elsewhere. In addition to the child's immunization history, the form collects characteristics of the provider's practice, such as whether the practice is a public or private facility and the types of care provided.

The returned IHQs are reviewed for legibility and consistency, and edited as appropriate before being sent to a vendor for data entry. The data from the IHQ are entered in a database, with

100% double-keying, and the raw data file is returned to the contractor for cleaning and further editing.

The immunization information reported by the households and providers is compared for each child. If discrepancies are discovered, the case is eligible for reconciliation. That process contacts the providers, the household, or both to resolve the inconsistencies between the reports. The household is asked to verify some information and whether any additional providers should be contacted, and the providers are asked about specific vaccination dates or whether another provider could have immunization records for the child. If discrepancies remain in the data after these contacts, either the provider information or a combination of the household and provider information is considered to be the most accurate or the “best values” for immunization information.

The NHIS interviews were conducted between January and December of 1997. Due to an error in the computerized questionnaire, permission forms were not generated for some children eligible for the provider record check. An effort to recontact these households to obtain permission forms was conducted by the Census Bureau in 1998. Data collection for the 1997 NHIS/NIPRCS began in May 1999 and continued through April 2000. Original permission forms that were more than one year old were renewed in December 1999 and January 2000. Reconciliation was conducted between May and September of 2000.

The 1997 NHIS/NIPRCS public-use data file (PUF) includes data for 2,622 children with completed NHIS/IM interviews. The variables included in the file come from the 1997 NHIS and the 1997 NHIS/NIPRCS IHQ. The NHIS variables were selected from the following NHIS data files: Household, Family, Person, Sample Adult, Sample Child, and Immunization Supplement.

For further information on the NHIS data products, please contact the NCHS Data Dissemination Branch:

Phone: 301-458-4901

FAX: 301-458-4035

E-mail: nhislist@cdc.gov

Internet: <http://www.cdc.gov/nchs/nhis.htm>

Chapter 2. Sample and Data Collection

2.1 Summary of 1997 Sample

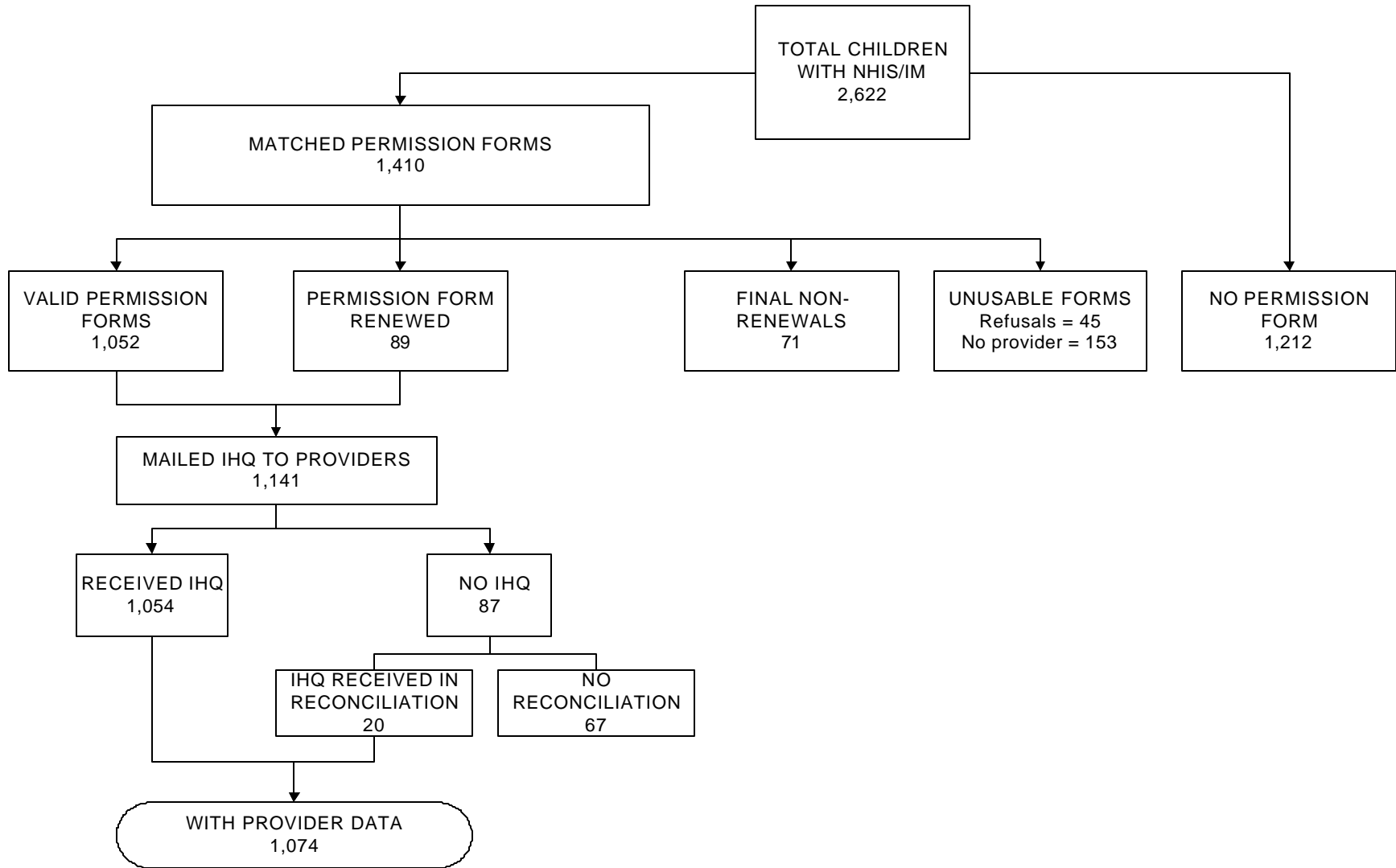
The 1997 NHIS/NIPRCS sample contains 2,622 children aged 12-35 months with a completed NHIS/IM. Of these children, 462 (17.6%) were aged 12-18 months at the time of the NHIS interview, and 2,160 (82.4%) were 19-35 months. IHQs were mailed to the providers for the 1,141 children (43%) who had valid original or renewed permission forms. Providers returned IHQs with vaccination data for 1,074 (94%) of the children. Approximately 41% of the children with a completed NHIS/IM had provider data. (See Figure 2.1.)

Of the 2,622 children, best values for vaccination dates could be determined for 1,197 (45.7%). The number of children with best values for vaccination dates is greater than the number of children with provider vaccination data. Some children without provider vaccination data have best vaccination values because they are 4:3:1:3 up-to-date from a household shot card. For the children without best values, up-to-date status was imputed. (The imputation procedures are described in Section 3.6.) Table 2.1 shows the results of the provider data collection and best value construction for the two age groups. See Appendices F and G for tables summarizing the distribution of the sample by various demographic characteristics.

Table 2.1: Distribution of Children with Provider and Best Value Data by Age Group, 1997 NHIS/NIPRCS			
	Children aged 12-18 months	Children aged 19-35 months	Total
Total number of children	462	2,160	2,622
Number of children with requests mailed to providers	n/a	n/a	1,141
Number of children with provider data	173	901	1,074*
Number of children with best values	177	1,020	1,197
Number of children with imputed best values	285	1,140	1,425

*After reconciliation, the number of cases with provider data went down from 1082 to 1074. See Footnote 2 for Table 2.2 for an explanation of these procedures.

FIGURE 2.1: 1997 NHIS/ NIPRCS SAMPLE



2.2 NHIS Immunization Supplement

The U.S. Bureau of the Census collects data for the NHIS under a contract with the NCHS. Census Bureau interviewers conduct personal, in-home interviews with individuals in sampled households. For the Family Core component of the NHIS Basic Module, all members of an eligible household who are at home at the time of the interview and 17 years of age and over are asked to participate and to respond for themselves. For children and those adults not at home during the interview, information is provided by a knowledgeable adult family member (18 years of age or over) residing in the household. For the Sample Adult questionnaire, one adult per family is randomly selected; this individual responds for him/herself to the questions in this interview. Information for the Sample Child questionnaire is obtained from a knowledgeable adult in the household.

The 1997 NHIS interview was conducted using a computer-assisted personal interviewing (CAPI) version of the NHIS questionnaire. Interviewers administered the instrument using laptop computers, entering responses directly into the computer during the household interview. This computerized mode of administration offers distinct advantages in timeliness of the data and improved data quality.

The data for the NHIS/IM are collected for children selected for the Sample Child questionnaire, and all other children in the household between the ages of 12 and 35 months. (In the first two quarters of 1997, NHIS/IM data were collected only for children between the ages of 19 and 35 months. Children between the ages of 12 and 18 months were added in the third quarter of data collection.)

2.3 National Immunization Provider Record Check Study

The data in the provider record check study are collected in two phases: original data collection and reconciliation. In the original data collection, immunization records are collected from the providers. In reconciliation, the data collected from the providers are compared and reconciled with the data collected from the household. During reconciliation, some new IHQs are received for children for whom provider data were not obtained in the original data collection.

2.3.1 Original Data Collection

Once the NHIS/IM is completed, the names and addresses of immunization providers identified by household respondents are written on permission forms. The NHIS CAPI questionnaire captures whether a permission form was completed (or **Agenerated@**), and whether the permission form was signed by the child's parent or legal guardian. An electronic file of eligible household ID numbers with child and household data is forwarded to the NHIS/NIPRCS contractor, Abt Associates, where it is entered into a case management and tracking system. The Regional Offices of the Census Bureau send the signed permission forms to the contractor.

The first step in data collection matches the permission forms with the file of eligible households. The file is loaded into a case management system. After the forms have been

matched, provider names, addresses and telephone numbers are entered from the hard-copy permission forms. After data entry and editing are completed, a scannable label with an ISBN bar code is printed for each case ID and attached to the appropriate permission form in order to facilitate tracking and reporting.

Once the provider address information has been entered, the next step is to check its completeness. (Complete addresses are necessary to mail questionnaires to immunization providers.) When the household did not supply a complete address for a provider, locating clerks use multiple methods to find additional information, including searching a database of providers from the NIS and calling Directory Assistance.

Once the provider addresses have been reviewed and updated, the initial requests are mailed. The initial mailing packet includes the following documents:

- \$ A cover letter from the Director of the NCHS describing the purpose of the NHIS/NIPRCS, the importance of provider participation, and how the parent's consent was obtained. Separate letters are used for cases with a parent's signature and cases with an interviewer's signature verifying a parent's verbal consent during a telephone contact.
- \$ An excerpt from the permission form signed by the parent or guardian, or signed by the interviewer for cases with verbal consent.
- \$ An Immunization History Questionnaire labeled with sufficient information to identify the child whose immunization records are requested.
- \$ An excerpt from an article in the *Morbidity and Mortality Weekly Report (MMWR)* containing information on national vaccination rates.
- \$ A pre-addressed, postage-paid return envelope.

Providers are asked to complete the IHQ, or to attach a copy of the child's immunization records. Providers are also given the option to return the forms by mail, or to a toll-free fax number. Reminder/thank you postcards are mailed two weeks after the initial mailing. The postcards contain the CDC logo to identify study sponsorship, a "thank-you" to those who have already returned the original IHQ, and a brief message about the need for and importance of collecting these data to measure vaccination coverage among children in the U.S.

Reminder packets containing a second copy of the IHQ are mailed three weeks after the postcard mailing (five weeks from the initial mailing) to providers who have not yet returned the IHQ from the first mailing. A one-page letter reiterates the importance of provider participation and requests return of the completed questionnaire. Seven weeks after the initial mailing, provider offices that still have not responded to the initial request or subsequent mailed reminders receive a telephone prompt from an experienced interviewer trained to elicit cooperation and record medical information. The prompting call is a final attempt to obtain the provider questionnaires.

Generally, these prompting calls serve to remind providers to return the completed questionnaires, and they provide an opportunity to mail or fax new materials to those providers who request them. In some cases, the questionnaire is completed with the interviewer over the telephone.

The IHQ is then manually edited. If a provider returned a copy of the child's medical records, the information is transcribed onto a new IHQ. Every IHQ is reviewed by a quality control clerk. The cases are then sent to a vendor for data entry. The forms are keyed twice for verification. The data from the IHQs are then merged with the NHIS data to create the initial dataset.

2.3.2 Matching and Reconciliation

In matching and reconciliation, every case with provider data is reviewed and compared with the corresponding data from the NHIS/IM interview. For cases in which the household and provider data are discrepant, or where provider data are missing, either the household, the provider, or both are recontacted by telephone or mail to clarify the discrepant data.

The first step in the matching process is to classify the cases into ten adjudication groups. First, the cases are separated by whether a shot card was used in the initial household interview. Cases with shot cards are further divided into five groups, depending on whether there is a discrepancy between the dates and/or doses of the household and provider reports. Cases in which the household reported only the number of doses of each vaccine from recall are divided into four groups. Finally, cases in which multiple providers responded for a child but the provider reports disagreed form the tenth adjudication group. Table 2.2 defines the adjudication groups and gives the number of children in each in 1997.

A matching sheet is printed for every case. The matching sheet displays key data items for the child, and all of the household and provider-reported vaccination data. The matching sheets from each adjudication group are reviewed for discrepancies. Cases that need reconciliation because of differences between household and provider reports of the number or dates of specific vaccinations are assigned problem codes that describe the type of discrepancy. These cases are sent to a specially trained team of telephone interviewers and supervisors for reconciliation. Additionally, sample children for whom no providers responded in the original data collection are sent to reconciliation. (See Figure 2.2 for an illustration of the reconciliation process.)

In reconciliation, the providers are called, and interviewers attempt to resolve the discrepancy. The providers are asked to check their medical records to verify the information returned on the IHQ or reported by the household. Providers are also asked whether they know of any other vaccination providers for the child.

Table 2.2: Distribution of Cases with Provider Data by Adjudication Group before Reconciliation, 1997 NHIS/NIPRCS¹			
Adjudication Group	Description	Total Number of Cases	Cases Requiring Reconciliation
Household reports from shot record			
R1	All dates and numbers of doses matched provider reports	95	0
R2	All numbers of doses matched provider reports, but at least one date was discrepant	70	4
R3	At least one discrepancy in number of doses; all discrepancies involved a household over-report	93	92
R4	At least one discrepancy in number of doses; all discrepancies involved a household under-report	156	17
R5	At least two discrepancies in number of doses; at least one over-report and one under-report	56	53
Household reports from memory (recall)			
H1	No discrepancies in number of doses (including cases where the household responded "Don't Know")	98	10
H2	At least one discrepancy in number of doses; all discrepancies involved a household over-report	140	108
H3	At least one discrepancy in number of doses; all discrepancies involved a household under-report	194	13
H4	At least two discrepancies in number of doses; at least one over-report and one under-report	89	68
Multiple providers			
M	Non-identical reports from two or more providers	91	24
Total number of children with provider data		1,082²	389

¹The distribution of adjudication groups in this table is different than the values of the variable ADJ_GRP in the final data file. This table shows the number of cases in each group before reconciliation. A case may have a different adjudication group after reconciliation is completed. For example, the final data file contains 103 cases with ADJ_GRP = H1, as some cases had their discrepancies resolved.

²The number of children with provider data in reconciliation is higher than the number of children with provider data in the data file. After reconciliation is completed, the data are reviewed again, and it may be determined that the provider data received for some children are not valid. Those provider data are then excluded from the file.

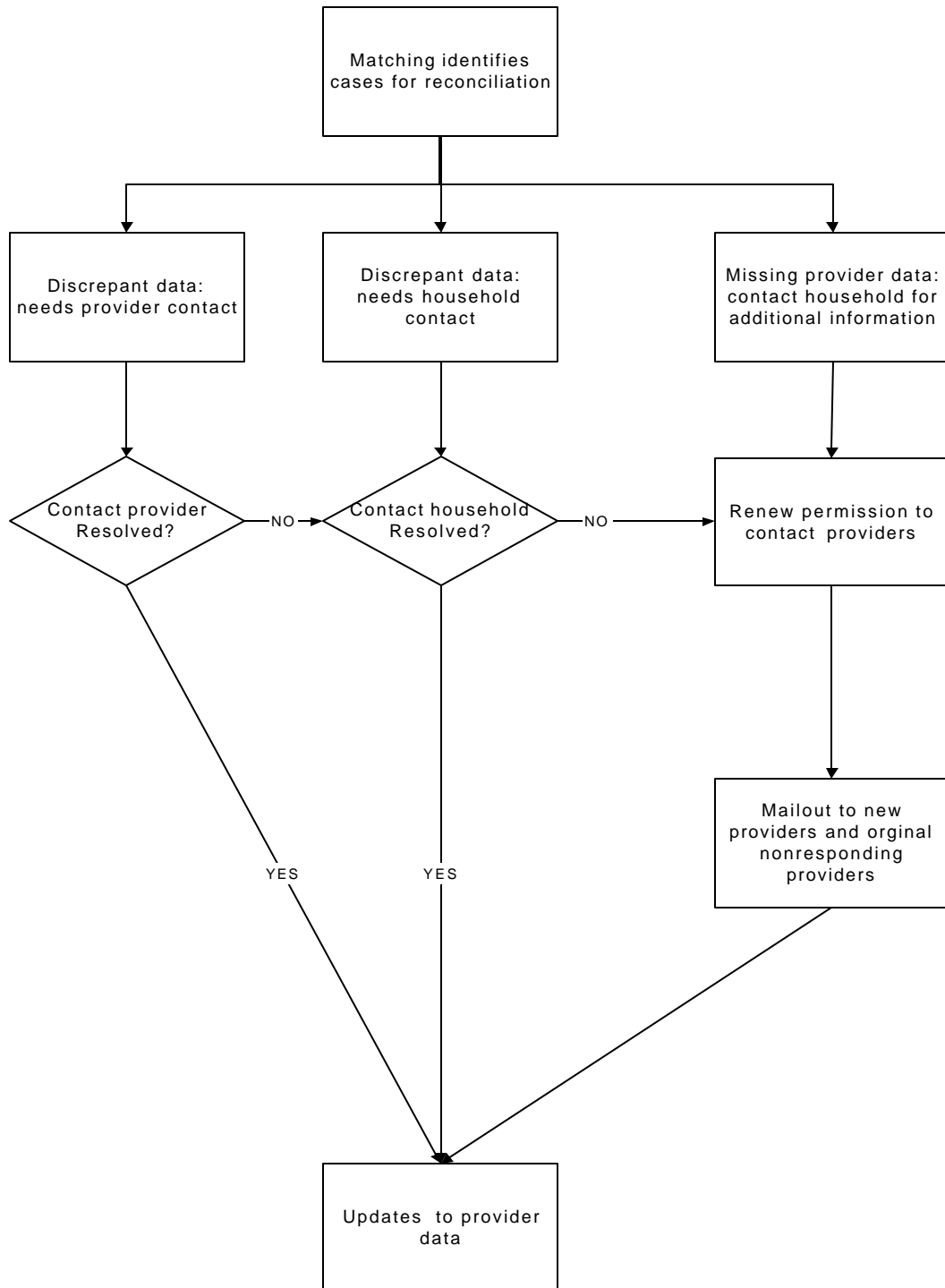
If the provider is unable to reconcile the discrepancy or cannot be reached, or if the problem appears to be in the household data, telephone interviewers attempt to contact the household to resolve the discrepancy. When contacted, the original household respondent or another knowledgeable adult is asked whether a shot card is available for the child. If the household has a shot card, specific dates are verified. If no shot card is available, the household respondent is asked to verify that the child had received vaccinations.

For those cases in which none of the providers for a child responded with vaccination data, a telephone interviewer contacts the household, verifies the names and addresses of providers previously reported, and asks for any other providers who may have immunization information for the child. This group includes cases in which:

- \$ The provider reported never treating the child.
- \$ The provider reported treating the child but not having immunization records, or indicated that the immunization records had been forwarded to another provider.
- \$ No provider responded for the child.
- \$ The provider contact information originally reported by the household was inadequate.
- \$ An original provider responded with some vaccination information, but it appeared that the child may have had another vaccination provider.

These households are mailed an advance letter that includes a provider information form and a consent form that the respondent can return by mail. Ten days after the advance letter is mailed, telephone interviewers attempt to contact the household by phone. The interviewer confirms the provider information originally reported by the respondent, and probes the respondent for additional providers. The interviewer obtains verbal consent to recontact the original providers and to contact any additional providers. In 1997, 24 cases in which the original provider never responded were eligible for reconciliation.

Figure 2.2: Flow Diagram of 1997 NHIS/NIPRCS Reconciliation Process



Of the 413 total cases eligible for reconciliation, the provider gave new information to reconcile a discrepancy in 60 cases. In 3 cases, the household reconciled a discrepancy, and in 37 cases both the household and provider were contacted and the discrepancies were resolved. Additionally, providers returned data for 20 children for whom provider data were not returned in the original data collection. These additional data were added to the original provider data for estimation. Table 2.3 summarizes the impact reconciliation had on the numbers of vaccinations reported.

Total number of children in reconciliation	413
Number of children with changes to provider-reported number of doses	
DTP	48
Polio	46
MCV	44
Hib	45
Hep B	59
Varicella	19
Number of children aged 19-35 months who were not 4:3:1:3 up-to-date	
Before reconciliation	241
After reconciliation	217
Change in 4:3:1:3 up-to-date status	-24
Number of children with changes to shot dates	
Changes to household-reported shot dates	29
Changes to provider-reported shot dates	68

2.4 Data Processing

After reconciliation is completed, the new data are combined with the original data for the estimation of vaccination coverage rates. The combined data are reviewed for certain kinds of discrepancies that may remain, including vaccination dates before the date of birth, consecutive vaccination dates within 28 days, measles-containing vaccines for children less than 9 months of age, and vaccination dates that are out of sequence. If the discrepancy can be resolved by reviewing the dates of other vaccinations the child had received (e.g., it may be evident that part of the date was transposed or incorrectly written), the data are then edited.

Once all the data have been edited, a disposition code (DISPCODE) that indicates the completeness and validity of the immunization data is assigned to every case with provider data. Cases with DISPCODE equal to 7 have provider data, but the completeness of the provider data is unknown. Therefore, cases with DISPCODE = 7 are not used in calculating the estimates of vaccination coverage. All other cases with a nonmissing DISPCODE are considered to have usable provider data.

2.5 Informed Consent, Security, and Confidentiality of Information

The data collection procedures of the NHIS assure the respondent of the confidentiality of his/her responses and the voluntary nature of the survey. Informed consent is obtained from the respondent (generally the parent or guardian of the child) to participate in the household interview and also (at the end of the interview) to contact the child's vaccination providers.

Information in the NHIS/NIPRCS 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 NHIS/NIPRCS sign the NCHS confidentiality agreement and follow procedures to prevent disclosure.

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

Chapter 3. Estimation of Vaccination Coverage

3.1 NHIS Weighting Information

The NHIS uses a multistage sample design to represent the civilian noninstitutionalized population of the U.S.; each person interviewed has a known probability of selection. The resulting sampling weights (initially equal to the reciprocal of the selection probability) are adjusted for unit nonresponse and poststratified to population control totals from the Census by sex, age, and race/ethnicity. Thus, each respondent has a sample weight that can be used to produce national estimates.

The foundation for the 1997 NHIS/NIPRCS sampling weight is a child-level weight that comes from the NHIS Immunization Supplement file. This Final Annual Weight (WTFA_IM) is included in the public-use data file. It includes design, nonresponse, and poststratification adjustments for sample children under 18 years of age, and additional children aged 12-18 months (quarters 3 and 4) and 19-35 months (quarters 1 to 4) in sampled households.

When including the children between 12 and 18 months in an analysis, this NHIS/IM sampling weight should be doubled to account for the fact that data were collected in that age group for only half of the year. (See Section 3.6.)

3.2 Provider-Adjusted Estimates

The provider-adjusted method of estimation produces estimates of percentages of children who are up-to-date for various vaccines and combinations of vaccines. The provider-adjusted estimates are calculated by first dividing the children into a set of weighting classes for each vaccine. Within each weighting class, the proportion of children with usable provider data who are up-to-date is calculated, and then applied to the total number of children within the weighting class. These totals are then summed to produce an overall coverage estimate for that vaccine. These estimates are comparable to the estimates produced in the National Immunization Survey (Stokley et al. 2000; Bartlett et al. 2001). Section 4.1 gives detailed instructions for calculating provider-adjusted estimates.

3.3 Adjustment for Effect of Nonresponse Follow-Up Survey

The 1995 NHIS/NIPRCS and 1996 NHIS/NIPRCS included a nonresponse follow-up survey (NRFUS) of households with children aged 12-35 months who had completed the NHIS/IM interview but who:

- had not given permission to contact the immunization providers,
- had not supplied adequate information to contact the providers, or
- had reported that their child had never been vaccinated.

The NRFUS recontacted these households and asked them again for permission to contact the immunization providers. If the household gave permission, the immunization data were collected from the providers using the same procedures as the original data collection. These new data were combined with the original provider data to calculate estimates of vaccination coverage. (Westat, Inc. 1999).

The 1997 NHIS/NIPRCS did not conduct a NRFUS. In order to make the estimates comparable to previous years, adjustment factors were calculated from the results of the 1996 NRFUS. The adjustment factor for each vaccine or series was determined by dividing the provider-adjusted estimate of coverage including the NRFUS data by the provider-adjusted estimate calculated from only the original data collection. For every vaccine and series except Hib, the addition of the NRFUS data produced a lower estimate of the number of children that were up-to-date. Therefore, the adjustment factors (shown in Table 3.1) are less than 1 for all vaccines except Hib.

Table 3.1: Adjustment Factors Based on 1996 NRFUS Data	
Vaccine or Series	Adjustment Ratio
DTP	0.9903
DTP3	0.9782
Polio	0.9892
MCV	0.9848
Hib	1.0143
Hep B	0.9926
4:3:1	0.9852
4:3:1:3	0.9799
4:3:1:3:3	0.9776

3.4 Best Values

The best values combine the household and provider data to produce a vaccination report judged to be the most accurate for each child. Because the best value vaccination dates include data from both sources, more children have best values for vaccination dates than have provider data. The inclusion of more children reduces the potential bias in estimates calculated using the best values for vaccination dates.

For the 1997 NHIS/NIPRCS, best values for vaccination dates were developed for two main groups of children: children with no provider data who were 4:3:1:3 up-to-date according to the household report from a shot card; and all children who had usable provider-reported vaccination information.

For the children who were 4:3:1:3 up-to-date from a shot card, the household-reported vaccination dates were evaluated to see whether they were consistent with the date of birth and the vaccination schedule. The record was also checked for the degree of agreement between vaccination dates. If the record met these criteria, then the shot card dates were inserted as best values for vaccination dates, along with any edits to the dates that seemed warranted, such as transposed dates or reports with the same month and day but in which the year was inconsistent.

For the children with usable provider data, the household and provider reports were compared. If the household used a shot card and there was no agreement between the two sources, the household-reported vaccination dates were considered unusable, and the provider vaccination dates were used as the best values. (Provider reports that appeared to be inadequate or for the wrong child were previously excluded. See Section 2.4 for the definition of usable provider data.) If there was some agreement between the provider-reported and household-reported vaccination dates, the household information was deemed usable, and these shot card vaccination dates were used to supplement the provider vaccination dates to create a composite vaccination record. If the household reported from recall, the provider-reported dates were used as the best values. Children with best value vaccination dates were assigned a flag (BESTVAL=1) so that they can easily be identified in the data file.

3.5 Best Value Weights

The sample weights of children with best values for vaccination dates were adjusted to account for children without best values. The method used to adjust the weights was similar to the method used in the 1996 NHIS/NIPRCS, in order to maintain comparability among the years. A total of 11 weighting classes were formed using the following variables: the vaccination status according to the household report (up-to-date, not up-to-date, missing), shot card use (shot card used, no shot card), and education of the respondent (high school or less, college or higher, missing). These three variables resulted in 18 cells; some cells were collapsed when they contained too few cases. Table 3.2 shows the 11 cells used in the weighting.

Table 3.2: Weighting Classes for Adjusting the Weights of Children with Best Values, 1997 NHIS/NIPRCS

4:3:1:3 status according to household	Shot card		No Shot card		
	High school or less, or missing	College or higher	High school or less	Education missing	College or higher
Up-to-date	1	2	3	5	4
Not up-to-date			8		9
Missing	6	7	10		11

The sample weight for the children with best values was adjusted by multiplying the NHIS/IM weight for the child (WTFA_IM) by the ratio of the sum of the weights for all children in the weighting class to the sum of the weights for children with best values. In addition to this adjustment, the weights were adjusted through raking (Lohr 1999; Izrael et al. 2000) so that the sum of the weights agreed with the population control totals for poverty status, race/ethnicity, and telephone status in the U.S. (This adjustment was not done in 1996.) The result of the raking is the best value weight (WT_BV2).

Some of the best value weights, specifically those of children 12-18 months, are high. This occurred because not all children between 12 and 18 months in the NHIS/IM were in the NHIS/NIPRCS sample, and some children with best values were in weighting classes that had a large number of children without best values. In other words, these children had characteristics more associated with children without best values. (See Appendix H for summary statistics of the NHIS/IM weights and the best value weights.)

3.6 Imputed Best Values

For children without best values, imputation was used to calculate a total number of doses for each antigen and the up-to-date status of the child. The variables considered for forming imputation classes were the same as those used to form the weighting classes for children with best values: whether a child was up-to-date on the 4:3:1:3 series according to the household report, whether a shot card was used, and the education of the respondent. Some of the 18 cells in the cross-classification of the three variables were collapsed after looking at the distribution of children in the sample. Cells that contained few donors relative to the recipients were collapsed, resulting in a total of seven imputation classes.

Table 3.3: Imputation Classes for Imputing Missing Best Values, 1997 NHIS/NIPRCS				
4:3:1:3 status according to household	Shot card		No shot card	
	High school or less, or missing	College or higher	High school or less, or missing	College or higher
Up-to-date	1	2	3	
Not up-to-date	4	5	6	
Missing			7	

Within each imputation class, a hot-deck imputation procedure was used to impute the number of doses of each vaccine and series using data from children with non-missing best values. Cases in which best values were imputed are marked by the variable IMP_FLAG.

3.7 Children Aged 12-18 Months

The 1997 NHIS/IM collected data for children between 12 and 18 months only for the last two quarters of the year. To estimate the total number of children receiving various numbers of doses of specific vaccines during an entire year, the NHIS sampling weights for children 12 to 18 months were doubled prior to any other adjustments for missing data. A total of 462 children were sampled in this age group.

In the absence of a standard definition of Up-to-date for children between 12 and 18 months of age for either a specific vaccine or a series of vaccines, the best values were used to calculate weighted percentages of children receiving one or more doses of each vaccine. (See Appendix C for a table with these estimates.)

Chapter 4. Calculating Estimates of Vaccination Coverage and Standard Errors

As mentioned in the previous chapter, the NHIS/NIPRCS uses several methods for producing estimates of vaccination coverage. This chapter provides the user of the data set with instructions for replicating these methods.

4.1 Provider-Adjusted Estimates of Vaccination Coverage

As described in Section 3.2, the provider-adjusted estimates use the children with usable provider data to estimate the proportion of children who are up-to-date in the sample as a whole. The steps required to obtain the estimates are given below:

Step 1: Use the sample weight WTFA_IM in the following steps.

Step 2: All children between the ages of 19 and 35 months for whom the NHIS/IM was completed are divided into weighting classes specific to each vaccine. The weighting classes form two main groups according to whether the household used a shot card. All children belonging to households that used shot cards to report the number and dates of vaccinations are in the first group, and children from households that reported from memory recall belong to the second group. Within each main group, children are divided into subgroups by the number of doses reported by the household. Table 4.1 shows the weighting classes for calculating the provider-adjusted estimate of DTP coverage.

The weighting classes for the other vaccines appear in Appendix D in the column “Number of Doses Reported by Household.”

Step 3: Sum the weights (WTFA_IM) of children with usable provider data in each weighting class. This gives the estimated number of children with provider data. Call this Sum 1. (See Column 1 in Table 4.2.)

Next, sum the sample weights of all children with usable provider data who are up-to-date on the specific vaccine. This gives the estimated number of children who are up-to-date among children with provider data. Call this Sum 2. (See Column 2 in Table 4.2.)

Compute the ratio [Sum 2/Sum 1]. This gives the proportion of children with usable provider data who are up-to-date in this weighting class. (See Column 3 in Table 4.2.)

Table 4.1: Weighting Classes for DTP, 1997 NHIS/NIPRCS	
Use of Shot Card	Number of Doses of DTP
Shot Card Used	4+
	3
	2
	1
	0
No Shot Card	4+
	3
	2
	1
	0
	All*
	Don't know/Missing

*The household respondent was not able to give the total number of shots received, but indicated that the child was up-to-date on this vaccine.

Step 4: Apply this proportion to the total weighted number of children in the weighting class. The total weighted number of children is obtained by simply aggregating the sample weights of all children. (See Column 4 in Table 4.2) This product gives the estimated number of children who are up-to-date in that weighting class. (See Column 5 in Table 4.2)

Step 5: Aggregate the estimated numbers of children who are up-to-date on the specific vaccine over all weighting classes. (See the Total entry in Column 5 in Table 4.2.)

Step 6: Divide the number obtained in Step 5 by the total estimated number of children over all the weighting classes. This is simply the sum of the weights of all children who completed the NHIS/IM. (See the Total entry in Column 4 in Table 4.2.)

Step 7: The number obtained in Step 6 (when multiplied by 100) gives the percentage of children who are up-to-date on the specific vaccine. This is the provider-adjusted estimate of coverage for that vaccine.

Table 4.2: Calculation of Provider-Adjusted Estimate for DTP, 1997 NHIS/NIPRCS					
Weighting Class	(1) Sum of the weights of all children with usable provider data	(2) Sum of the weights of children who are up-to-date among children in (1)	(3)=(2)/(1) Proportion of children who are up-to-date	(4) Sum of the weights of all children with and without provider data	(5)=(4)x(3) Estimated number of children who are up-to-date
Shot Card 4+	794,766	742,740	0.935	1,389,989	1,298,999
3	222,992	130,059	0.583	397,572	231,882
2	34,599	25,797	0.746	71,939	53,638
1	11,364	8,122	0.715	32,925	23,532
0	916	916	1.000	9,282	9,282
No Shot Card 4+	103,181	80,636	0.782	215,768	168,623
3	83,782	65,107	0.777	190,017	147,662
2	38,331	30,126	0.786	85,568	67,252
1	9,816	4,285	0.437	37,422	16,336
0	11,580	11,580	1.000	108,912	108,912
All*	814,820	704,768	0.865	2,323,786	2,009,929
Don't Know/ Missing	199,179	155,248	0.779	747,598	582,707
Total	2,325,326	1,959,384		5,610,778	4,718,754
Percentage of children who are up-to-date for DTP = [4,718,754/5,610,774] x 100 =					84.1%

*The household respondent was not able to give the total number of shots received, but reported that the child was up-to-date on this vaccine.

See Appendix A for the provider-adjusted estimates of coverage for other vaccines and series. The provider data in the data file include the results from reconciliation, so estimates calculated using the provider-adjusted method will correspond to the column labeled “Initial + Reconciliation” in the table in the appendix.

4.2 Including the Nonresponse Follow-Up Survey Adjustment in Coverage Estimates

Both provider-adjusted estimates and best value estimates (discussed below) for individual vaccine coverage should be multiplied by the NRFUS adjustment factor in Table 3.1. For example, the provider-adjusted estimate of DTP coverage calculated in Table 4.2 (84.1%)

should be multiplied by the adjustment factor (0.9903) to obtain a final NRFUS-adjusted coverage estimate of 83.3%. (See Appendix A for the estimates of vaccination coverage that include the NRFUS adjustment.)

When calculating coverage estimates for the entire sample or any subgroup, these NRFUS adjustment factors should be applied.

4.3 Best Value Estimates and Using Imputed Best Values

Best value estimates should be calculated using the best value weight (WT_BV2), which incorporates an adjustment for children without best values. The results should then be multiplied by the NRFUS adjustment to derive the Final Best Value estimates.

When using the imputed best values, the NHIS/IM sampling weight (WTFA_IM) should be used. Cases for which best values were imputed are flagged in the data set (IMP_FLAG = 1).

See Appendix A for the coverage estimates for each vaccine and series using the best value and imputed best value data.

4.4 Calculating Standard Errors

4.4.1 Standard Errors of NHIS Estimates

Data users should refer to the report *Design and Estimation for the 1995-2004 National Health Interview Survey* (Series 2, No. 130), available on the NCHS Web site <http://www.cdc.gov/nchs/nhis.htm>, for detailed instructions on how to calculate standard errors (using SUDAAN) for the 1997 NHIS estimates.

4.4.2 Standard Errors of Best Value Estimates

Vaccination coverage rates are ratio estimates, and the Taylor linearization method can be used to compute the standard errors of these estimates (Nixon et al. 1996). For computing the standard errors of best value estimates of vaccination coverage rates, the “pseudostrata” created for the NHIS with two PSUs per stratum were first considered. Because only a subset of the sample of children had best values, many of the strata were empty, in the sense that the two PSUs in the stratum did not have children with best values. Therefore, the 337 NHIS strata were collapsed to 185 strata such that each stratum had two PSUs containing children with best values. The standard errors of the best value estimates were computed using SUDAAN software (Shah et al. 1997). Appendix E gives an example of a SAS program that calls SUDAAN program that was used to calculate standard errors, including the specifications for collapsing the 1997 NHIS strata. Other software such as STATA (Stata Corporation 2001) or SAS (SAS Institute Inc. 1999) can also be used to estimate the standard errors by the Taylor linearization method.

The standard errors of the best value estimates for all vaccines and series can be found in Appendix A.

4.4.3 Standard Errors of Estimates Based on Imputed Best Values

Treating the imputed best values as if they were responses and then computing the variance estimates, using a standard method like Taylor linearization, generally results in underestimation of the variance. Alternative methods of variance estimation take into account the presence of imputed values and adjust for this underestimation. A jackknife variance estimation method suggested by Rao and Shao (1992) was used to compute the variance of the estimates based on imputed values. (For details of this procedure, see the internal methodology report. Abt Associates Inc. 2002.) The Table in Appendix A includes these standard errors.

Chapter 5. Public-Use Data File

This chapter contains details about the 1997 NHIS/NIPRCS data file and information for users and analysts of these data. The data file is in ASCII format. A code book and a program for reading the data into SAS are available with this data file.

5.1 File Description

Data in the PUF come from two sources: the 1997 NHIS/IM and the 1997 NHIS/NIPRCS. The source of each variable is noted in the code book. Data are provided at the child level; that is, each child has one record, which includes the household and provider information. The data file contains 2,622 records for children aged 12-35 months. If more than one child was interviewed in a household, the household variables, including the ID number, are included in each child's record.

5.2 Data Cleaning

Data from the Immunization History Questionnaire (IHQ) were checked for internal consistency, including skip-pattern logic and out-of-range or otherwise invalid values. The provider data file was checked for duplicate records from the same provider. When a child had data from more than one IHQ, decision rules were applied to produce the most complete record of the child's immunization history. The analyst should refer to the documentation provided by the NCHS for data collected in the NHIS or the NHIS/IM.

As described in Sections 2.3.2 and 2.4, some provider data may have been edited as a result of the reconciliation and file preparation processes.

For shot date variables from the IHQ, if the day of the month was missing, it was imputed to "15" for the purpose of calculating the age in days at the time of vaccination. If this value created a vaccination date before the child's date of birth, the value would be changed to be equal to the date of birth.

5.3 Missing Value Codes

A standard coding scheme, based on the NHIS protocol designates **Arefused@** and **Adon't know@** responses on all variables. **ARefused@** responses are coded as **A7@** (with leading 9s filling the width of the field), and **Adon't know@** responses are coded as **A9@** (again, with leading 9s). A code of **A8@** indicates **Anot ascertained@** responses, which typically occur when an in-the-universe respondent had a blank field or the field contained an invalid code.

Because the appropriateness of some questions depended on the availability of shot records, not all questions were asked of all respondents. Cases that were not eligible to answer specific questions are coded as **A. <BLANK: NOT IN UNIVERSE>**." The notes in the code book describe the universe for each question.

5.4 Variable Naming Conventions

The provider data from the Immunization History Questionnaires are used to create numerous child-level composite variables, as described below. The names of the variables giving the number of doses received for each vaccine begin with **P_NUM**. For example, **P_NUMHEP** gives the number of doses of hepatitis B vaccine received by the child according to the provider data.

The provider data are also used to form variables for age in days and age in months at each vaccination. For age in days and age in months, either 4 or 8 variables are created, depending on the number of doses recommended for the vaccine. The variable names for age in months end with **AGn**, where **n** is the dose number. For example, **HEPAG1** to **HEPAG8** give age in months for 8 possible doses of hepatitis B vaccine. Similarly, for age in days at vaccination, the variable names start with **D** and end with **AGn**. **DHEPAG1** to **DHEPAG8** give age in days for 8 possible hepatitis B vaccination doses.

An up-to-date status indicator variable was created for each vaccine. These variables use the best values. Each of these variables begins with **B_UTD**. For example, the variable **B_UTDHEP** indicates whether the child received 3 or more doses of hepatitis B vaccine.

To accommodate the large number of types of vaccinations, a vaccination-type variable was created for each shot or dose. For example, the vaccination-type variable for DTP indicates whether the specific dose was a DTP, DTaP, DT, unknown (unmarked) type of DTP, DTP-Hib, DTaP-Hib, or an unknown (unmarked) type of DTP-Hib vaccination.

5.5 Explanatory Notes for Specific Variables

Variable name: ADJ_GRP

The adjudication groups are used for assessing agreement and consistency between the provider report(s) and the household report of vaccinations. See Section 2.3.2 for a more detailed explanation of the matching and reconciliation procedures.

Household reports from shot record

- R1 All dates and numbers of doses match provider reports
- R2 All numbers of doses match provider reports, but at least one date is discrepant
- R3 At least one discrepancy in number of doses; all discrepancies involve a household over-report
- R4 At least one discrepancy in number of doses; all discrepancies involve a household under-report
- R5 At least two discrepancies in number of doses; at least one over-report and one under-report

Household reports from memory recall

- H1 No discrepancies in number of doses (includes cases where the household responds **ADon't Know**)
- H2 At least one discrepancy in number of doses; all discrepancies involve a household over-report
- H3 At least one discrepancy in number of doses; all discrepancies involve a household under-report
- H4 At least two discrepancies in number of doses; at least one over-report and one under-report

Multiple provider reports

- M Non-identical reports from two or more providers

Variable name: DISPCODE

The DISPCODE refers to the completeness and validity of the immunization information from all the Immunization History Questionnaires returned for the child.

- 1 All identified providers responded, no problems indicated in cross-check between household and provider shot dates.
- 2 All identified providers responded, no shot card to cross-check.
- 3 All identified providers responded, poor immunization history matching results.
- 4 All identified providers responded, poor immunization history matching results, additional mismatch indicators present.
- 5 Some but not all identified providers responded, but provider information indicates 4:3:1:3:3 up-to-date.
- 6 Some but not all identified providers responded, but provider information

- matches shot card immunization history.
- 7 Some but not all identified providers responded, completeness of provider immunization history is unknown.
 - 8 Some but not all identified providers responded, but provider information indicates 4:3:1:3:3 up-to-date when immunizations after the interview date are included.
 - 9 Some but not all identified providers responded, but provider information indicates at least as many doses for each vaccine as the household respondent (or at least 1 dose for MCV).
 - 10 Some but not all identified providers responded, but the household reported an inexact number of vaccinations (~~A~~All,~~A~~Don't Know,~~A~~Refused or missing) for one or more vaccines, and any exact responses meet previous criteria (for DISPCODE 9).
 - 11 Some but not all identified providers responded, but 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).

When analyzing children with provider data, cases with DISPCODE = 7 should not be included.

Variable names: NUM_DTP, NUM_POLI, NUM_MMR, NUM_HIB, NUM_HEPB, NUM_CPOX

These variables were calculated by totaling the number of each type of vaccination reported by the household respondent in the NHIS/IM, either from a shot card or from recall.

Variable name: PSU

The variable identifies the primary sampling unit (PSU) and is used in variance estimation. Refer to the NHIS/IM documentation for more information.

Variable name: STRATUM

To calculate the standard errors of the best value estimates of vaccination coverage, the original NHIS strata need to be collapsed. See Appendix E for an example program.

Variable name: WTFA_IM

For children aged 12-18 months, this weight should be doubled for estimation.

5.6 Flags

The following flag variables are included in the data file:

BDOBFLAG A value of 1 indicates that no provider date of birth information was obtained and BEST_DOB is the date of birth reported by the household respondent.

BESTVAL A value of 1 indicates that best values for vaccination dates were determined. A value of 2 indicates that the child does not have best values.

BRDOBFLG A value of 1 indicates that BEST_DOB was assigned after recontacting the household and/or providers to reconcile differences.

IMP_FLAG A value of 1 indicates that best value vaccination status was imputed.

PRO_FLAG A value of 1 indicates that the child was 4:3:1:3 up-to-date according to the household's shot record. A value of 2 indicates the child was not 4:3:1:3 up-to-date. The value is missing for children in households that did not use shot cards.

5.7 Data Alerts

This section details known problems with the data.

Considerable time elapsed between the 1997 NHIS/IM data collection and the collection of vaccination data from providers, in some cases up to three years. The consent given by respondents was good for one year only, and in many cases it was necessary to renew the permission form before sending the Immunization History Questionnaire to providers. In total, 1,212 valid permission forms with complete provider information were collected by the Census Bureau. Of those, 160 cases expired before a questionnaire could be mailed to the provider. Eighty-nine of those cases had permission renewed. Between the number of valid forms collected, the forms that expired, and provider nonresponse a relatively low percentage of children ended up with provider vaccination data.

Although all provider-reported shot dates are reviewed and sent for reconciliation, some inconsistencies may remain in the data that could not be verified. These include shot dates that are too close together, and certain shots given before 38 days of age that are not recommended. Further, any variables derived from the provider reports (e.g., VISITS) may contain inaccuracies if those data could not be reconciled or verified.

5.8 Code Book

A complete listing of the variables included in the public-use data file is available in the *1997 National Health Interview Survey/National Immunization Provider Record Check Study Public-use Data File Code Book*. The code book contains a table of contents and an alphabetic list of variables. Then each variable is listed with either 1) the frequency of a given response, the response value, and the formatted response label; 2) a count of missing and non-missing values with summary statistics; or 3) a count of missing/non-missing values.

For categorical variables, the code book gives the frequency of each category. For continuous variables, the mean, median, minimum, and maximum values are displayed.

5.9 Guidelines for Citation of Data

Any published material derived from the data should acknowledge NCHS as the original source. The suggested citation to appear at the bottom of all tables is as follows:

Source: CDC, NIP and NCHS (2002), 1997 National Health Interview
Survey/National Immunization Provider Record Check Study

In a bibliography, the citation should read:

U.S. Department of Health and Human Services. 1997 National Health Interview
Survey/National Immunization Provider Record Check Study (machine readable data
file and documentation). National Center for Health Statistics, Centers for Disease
Control and Prevention, Hyattsville, MD, 2002.

The published material should also include a disclaimer that credits any analyses, interpretations, or conclusions reached to the author (recipient of the data file) and not to NCHS, which is responsible only for the initial data. Consumers who wish to publish a technical description of the data should make an effort to ensure that the description is not inconsistent with that published by the NCHS.

Please place the acronym NHIS/NIPRCS 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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APPENDICES

APPENDIX A
ESTIMATES OF VACCINATION COVERAGE RATES AMONG CHILDREN
AGED 19-35 MONTHS

Estimates of Vaccination Coverage among Children Aged 19-35 Months in the 1997 NHIS/NIPRCS

Vaccination or Series ¹	Provider-Adjusted Estimates			Best Value Estimates and Standard Errors				
	Initial Estimate ²	Initial + Reconciliation	Final Provider-Adjusted ³	Before NRFUS Adjustment ⁴	Final Best Values ⁵		Including Imputed Best Values ⁶	
					Estimate	S.E	Estimate	Rao-Shao S.E. ⁷
DTP	83.7	84.1	83.3	83.5	82.7	1.4	84.0	1.3
DTP3	95.4	95.4	93.3	95.5	93.4	0.9	95.3	0.8
POLIO	90.9	91.7	90.7	91.3	90.3	1.1	91.6	1.0
MCV	91.6	92.4	91.0	92.5	91.1	1.0	92.8	0.9
HIB	93.1	93.3	94.6	93.2	94.5	1.2	93.3	1.0
HEPB	84.2	86.0	85.4	85.9	85.3	1.2	86.5	1.4
4:3:1	80.5	82.1	80.9	82.2	81.0	1.3	82.8	1.3
4:3:1:3	79.5	81.2	79.6	81.3	79.7	1.4	81.9	1.3
4:3:1:3:3	72.3	75.4	73.7	74.9	73.2	1.4	75.8	1.4

1 4:3:1 means up-to-date with 4 or more doses of DTP, 3 or more doses of polio and 1 or more doses of MCV. 4:3:1:3 includes 3 or more doses of Hib. 4:3:1:3:3 includes 3 or more doses of Hep B.

2 Provider-adjusted estimates are calculated from provider-reported data. See Section 4.1 for a complete description of how provider-adjusted estimates are calculated. The initial estimate is calculated from unreconciled data and cannot be reproduced using the public-use file.

3 The provider-adjusted estimates, including reconciliation, are multiplied by a ratio calculated from the 1996 NRFUS. See Section 3.3 for a description of the NRFUS adjustment procedures.

4 Best value estimates are calculated for all children with best vaccination values. The weight used to calculate these estimates is WT_BV2. See Section 3.4 for a description of the best value procedures.

5 The Final Best Value estimates include the NRFUS adjustment. See Section 4.4 for a description of the standard errors.

6 The up-to-date status is imputed for children who do not have best value vaccination values. See Section 3.6 for a description of the imputation process.

7 See Section 4.4 for a description of variance estimation for imputed values.

APPENDIX B
1997 NHIS/NIPRCS IMMUNIZATION HISTORY QUESTIONNAIRE

**NATIONAL IMMUNIZATION PROVIDER RECORD CHECK STUDY
IMMUNIZATION HISTORY QUESTIONNAIRE**

INSTRUCTIONS: Please review your records and complete this questionnaire for the child identified below. Then mail it in the postage-paid envelope provided or fax it to: FAX: 1-800-293-5155

The Immunization History Questionnaire is voluntary. The National Center for Health Statistics, the Centers for Disease Control and Prevention, their contractors or grantees will use this information only for statistical purposes in health research, and no information which identifies the child, the child's family, doctors or medical care providers will ever be released or published. (Title 42, United States Code, Section 242k.)

FOR OFFICE USE ONLY	For LABEL placement (printed from <i>NIPTRACK</i>)
TYPE Telephone Mail Fax	

1. Which of the following best describes your records of immunization for this child? (Check only one box.)
 - G a. Have immunization record for this child. (Go to item 2 below.)
 - G b. Have provided care to this child, but do not have his/her immunization record. (Go to question 3 on next page.)
 - G c. Have no record of providing care to this child. (Return questionnaire to CDC as instructed above.)
 - G d. Other: _____

2. Referring to all sources of immunization history, please specify below the month, day and year when each of the following immunizations was given, either by your office or by another provider (OP), as documented in your records. If you prefer, you may attach a copy of the complete immunization history and complete Questions 3 through 12.

Circle the "OP" for any immunization given by another provider, after the date for that immunization. Please see item 12.

	Dates of immunization (MM - DD - YYYY)				
	(1)	(2)	(3)	(4)	(5)
DT/DTP/DTaP (check one box per date)	<u> </u> - <u> </u> - <u> </u> OP 9 DT 9 DTP 9 DTaP	<u> </u> - <u> </u> - <u> </u> OP 9 DT 9 DTP 9 DTaP	<u> </u> - <u> </u> - <u> </u> OP 9 DT 9 DTP 9 DTaP	<u> </u> - <u> </u> - <u> </u> OP 9 DT 9 DTP 9 DTaP	<u> </u> - <u> </u> - <u> </u> OP 9 DT 9 DTP 9 DTaP
DTP-Hib (Tetramune or Acthib/DTP)	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP
Hib	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP
Hepatitis B (enter date or check box)	<u> </u> - <u> </u> - <u> </u> OP 9 Administered at birth	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP
Polio (OPV or IPV) (check one box per date)	<u> </u> - <u> </u> - <u> </u> OP 9 OPV 9 IPV	<u> </u> - <u> </u> - <u> </u> OP 9 OPV 9 IPV	<u> </u> - <u> </u> - <u> </u> OP 9 OPV 9 IPV	<u> </u> - <u> </u> - <u> </u> OP 9 OPV 9 IPV	<u> </u> - <u> </u> - <u> </u> OP 9 OPV 9 IPV
MMR	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP
Measles only	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP
Varicella	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP
Other Vaccines (Specify)	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP	<u> </u> - <u> </u> - <u> </u> OP

3. What was the date of this child's first visit for any reason to this place of practice?

____ - ____ - ____ or ⁸ G Don't Know
mm dd yyyy

4. What was the date of this child's most recent visit for any reason to this place of practice?

____ - ____ - ____ or ⁸ G Don't Know
mm dd yyyy

5. Which types of care does this facility routinely provide? (Check all that apply.)

- ¹ G a. Comprehensive well-child care (examination, anticipatory guidance, screening)
- ² G b. Acute illness care
- ³ G c. Follow-up visits
- ⁴ G d. After-hours telephone coverage
- ⁵ G e. WIC Program/services
- ⁶ G f. Other (Describe:)

6. Which of the following best describes this facility? (Check only one box, representing the most specific description.)

- ¹ G a. Private Practice
- ² G b. Public Health Department-operated clinic
- ³ G c. Hospital Outpatient Clinic
- ⁴ G d. Community/Migrant Health Center
- ⁵ G e. Military Health Care Facility
- ⁶ G f. Other Facility (Describe:)

7. Is this facility a Vaccines for Children provider?

- ¹ G a. Yes
- ² G b. No
- ³ G c. Unknown

8a. Was this facility ever this child's medical home for primary care? (**Medical home:** the place where care is delivered or directed by practitioners known to the child and family, who are able to manage or facilitate essentially all aspects of pediatric care.)

- ¹ G a. Yes (Go to question 8b.)
- ² G b. No (Go to item 9.)
- ³ G c. Unknown (Go to item 9.)

8b. If Yes, what specialty is (was) this child's primary care provider?

- ¹ G a. Pediatrician
- ² G b. Family Physician
- ³ G c. General practitioner
- ⁴ G d. Other (Describe) _____

9. Name of person completing questionnaire: (print) _____

Phone: () _____ Signature: _____

10. According to your records, what is this child's date of birth? ____ - ____ - ____ or ⁸ G Don't know
mm dd yyyy

11. According to your records, did this child ever use another last name (excluding names prior to adoption)?

- ¹ G Yes [Specify name(s):] _____
- ² G No

INSTRUCTIONS: If you know of other providers that may have immunization records for this child, please continue with item 12. Otherwise, return this questionnaire to CDC. Call 1-877-652-1244 (toll-free) with any questions. Thank you.

12. Please enter below the names, addresses and telephone numbers of other providers who may have an immunization record for this child, and the name and address for any provider of immunizations with OP circled in item 2.

(1) _____	(2) _____
_____	_____
_____	_____
() _____	() _____

APPENDIX C
ESTIMATES OF VACCINATION COVERAGE AMONG CHILDREN
AGED 12-18 MONTHS

Weighted Best Value Estimates of Vaccination Coverage Among Children Aged 12-18 Months (n=177) , 1997 NHIS/NIPRCS

Vaccine/ Series	Percent of children receiving number of doses of vaccines										
	None		1		2		3		4+		Total
	Est (%)	S.E.	Est (%)	S.E.	Est (%)	S.E.	Est (%)	S.E.	Est (%)	S.E.	
DTP	-	-	1.6	1.1	15.9	4.2	54.9	5.1	27.6	1.9	100.0
Polio	-	-	1.6	1.1	33.7	2.3	64.7	2.4	-	-	100.0
MCV	37.3	5.9	62.7	5.9	-	-	-	-	-	-	100.0
Hib	-	-	4.6	1.8	15.3	4.4	80.1	4.6	-	-	100.0
Hep B	1.2	0.9	2.0	1.1	14.8	3.3	82.0	3.8	-	-	100.0

Note: A dash in the cell means that the sample contained no children in this category.

APPENDIX D
WEIGHTING CLASSES AND CALCULATIONS FOR PROVIDER-ADJUSTED
ESTIMATES

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 DTP

	Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, 4+		595223	794766	742740	93.45	1389989	1298999	
3		174580	222992	130059	58.32	397572	231882	
2		37340	34599	25797	74.56	71939	53638	
0		8366	916	916	100.00	9282	9282	
No shot card, 4+		112587	103181	80636	78.15	215768	168623	
3		106235	83782	65107	77.71	190017	147662	
2		47237	38331	30126	78.59	85568	67252	
1		27606	9816	4285	43.65	37422	16336	
0		97332	11580	11580	100.00	108912	108912	
All		1508966	814820	704768	86.49	2323786	2009929	
DK/Missing		548419	199179	155248	77.94	747598	582707	
Total		3285452	2325326	1959384	84.26	5610778	4718754	84.10

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 DTP3

	Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, 3+		769803	1017758	987409	97.02	1787561	1734257	
2		37340	34599	26585	76.84	71939	55276	
1		21561	11364	8122	71.47	32925	23532	
0		8366	916	916	100.00	9282	9282	
No shot card, 3+		218822	186963	186963	100.00	405785	405785	
2		47237	38331	33241	86.72	85568	74205	
1		27606	9816	8335	84.91	37422	31776	
0		97332	11580	11580	100.00	108912	108912	
All		1508966	814820	777025	95.36	2323786	2215998	
DK/Missing		548419	199179	185422	93.09	747598	695963	
Total		3285452	2325326	2225598	95.71	5610778	5354986	95.44

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 POLIO

	Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, 3+		708689	973887	933540	95.86	1682576	1612869	
2		79071	76739	47912	62.44	155810	97280	
1		39158	8964	5722	63.83	48122	30718	
0		10152	5047	5047	100.00	15199	15199	
No shot card, 3+		203404	150845	132663	87.95	354249	311550	
2		78693	48021	39578	82.42	126714	104435	
1		28463	30723	25893	84.28	59186	49881	
0		100311	7331	7331	100.00	107642	107642	
All		1497121	822231	758007	92.19	2319352	2138189	
DK/Missing		540390	201538	184440	91.52	741928	678985	
Total		3285452	2325326	2140133	92.04	5610778	5146748	91.73

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 MCV

	Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, 1+		756567	937965	903909	96.37	1694532	1633006	
0		80503	126672	85908	67.82	207175	140505	
No shot card, 1+		298223	205388	190892	92.94	503611	468067	
0		207420	63410	49933	78.75	270830	213268	
All		1375270	759575	708806	93.32	2134845	1992155	
DK/Missing		567469	232316	214346	92.26	799785	737920	
Total		3285452	2325326	2153794	92.62	5610778	5184921	92.41

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 HIB

	Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, 3+		599554	839522	804598	95.84	1439076	1379211	
2		69421	72001	61164	84.95	141422	120136	
1		66192	77929	66498	85.33	144121	122981	
0		101903	75185	71011	94.45	177088	167257	
No shot card, 3+		139672	101132	101132	100.00	240804	240804	
2		57832	30795	28796	93.51	88627	82874	
1		45133	40650	36078	88.75	85783	76135	
0		240926	91018	82702	90.86	331944	301615	
All		1293864	728605	678698	93.15	2022469	1883937	
DK/Missing		670955	268489	245952	91.61	939444	860587	
Total		3285452	2325326	2176629	93.61	5610778	5235537	93.31

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 HEP B

	Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, 3+		631329	860070	816844	94.97	1491399	1416443	
2		103532	110323	76726	69.55	213855	148729	
1		34596	30353	21939	72.28	64949	46945	
0		67613	63891	34876	54.59	131504	71784	
No shot card, 3+		169823	142184	118111	83.07	312007	259181	
2		72614	32837	28873	87.93	105451	92721	
1		67040	35274	30541	86.58	102314	88586	
0		285476	127171	79847	62.79	412647	259089	
All		1209764	644909	580303	89.98	1854673	1668875	
DK/Missing		643665	278314	232901	83.68	921979	771538	
Total		3285452	2325326	2020961	86.91	5610778	4823891	85.98

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 4:3:1

Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final
							Provider adjusted up-to-date
Shot card Up-to-date, Number	549323	744269	689640	92.66	1293592	1198643	
not Up-to-date	287747	320368	197172	61.55	608115	374267	
No Shot card, Up-to-date ,All	1385374	773804	672259	86.88	2159178	1875833	
Up-to-date -Number	77900	71342	56717	79.50	149242	118648	
not Up-to-date	404413	195313	138586	70.96	599726	425541	
DK/Missing	580695	220230	168116	76.34	800925	611399	
Total	3285452	2325326	1922490	82.68	5610778	4604331	82.06

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 4:3:1:3

Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final
							Provider adjusted up-to-date
Shot card, Up-to-date-Number	438214	613252	575668	93.87	1051466	987025	
not Up-to-date	398856	451385	302301	66.97	850241	569422	
No shot card, Up-to-date-All	1193749	691737	587659	84.95	1885486	1601798	
Up-to-date -Number	63907	46765	35461	75.83	110672	83920	
not Up-to-date	538099	272886	207624	76.08	810985	617034	
DK/Missing	652627	249301	192778	77.33	901928	697438	
Total	3285452	2325326	1901491	81.77	5610778	4556637	81.21

Provider-adjusted estimates
 Children 19-35 months old
 Weighted (weight = WTFA_IM)
 4:3:1:3:3

Number of Doses Reported By household	Without Provider Data	Total With Provider Data	Up_to_ date	Percent	Total	Final Provider adjusted up-to-date	Final Provider adjusted up-to- date(%)
Shot card, Up-to-date -Number	381825	547116	516761	94.45	928941	877402	
not Up-to-date	455245	517521	310412	59.98	972766	583471	
No shot card, Up-to-date -All	1038852	584207	472680	80.91	1623059	1313212	
Up-to-date -Number	53167	36832	28527	77.45	89999	69706	
not Up-to-date	685482	360738	247736	68.67	1046220	718489	
DK/Missing	670881	278912	195969	70.26	949793	667343	
Total	3285452	2325326	1772085	76.21	5610778	4229623	75.38

APPENDIX E
EXAMPLE OF A SAS PROGRAM THAT CALLS SUDAAN FOR
CALCULATING STANDARD ERRORS

SE_NIPR97.SAS

THIS PROGRAM WILL PRODUCE ESTIMATES AND STANDARD ERRORS FOR BEST VALUE
UP-TO-DATE STATUS 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.

*****;

title 'SUD_NIPR.SAS';

options nofmterr ls=80;

libname data 'c:\nprpuf97'; **** SPECIFY PATH TO SAS DATA SET;

proc format ;
value utdf 1='UP-TO-DATE'
2='NOT UP-TO-DATE';

run;

data analyt;
set data.nprpuf97 /** SPECIFY NAME OF THE SAS DATA SET **/
(where=(19<=icagemr<=35 and bestval=1)); ** AGE 19-35 MO **
** AND HAVE BEST VALUE **;

/****

COLLAPSE STRATUM TO HAVE 2 PSU PER STRATUM

*****/

if stratum in (1,2) then cstratum=400;
if stratum in (4,3,5) then cstratum=401;
if stratum in (8,9,10) then cstratum=402;
if stratum in (17,18) then cstratum=403;
if stratum in (23,24) then cstratum=404;
if stratum in (25,26) then cstratum=405;
if stratum in (32,33) then cstratum=406;
if stratum in (35,36,37,38,39,40,41) then cstratum=407;
if stratum in (42,43) then cstratum=408;
if stratum in (48,49) then cstratum=409;
if stratum in (50,51,52) then cstratum=410;
if stratum in (53,54) then cstratum=411;
if stratum in (55,56) then cstratum=412;
if stratum in (58,59) then cstratum=413;
if stratum in (64,65) then cstratum=414;
if stratum in (71,72) then cstratum=415;
if stratum in (74,75) then cstratum=416;
if stratum in (77,78) then cstratum=417;
if stratum in (81,82) then cstratum=418;
if stratum in (85,86) then cstratum=419;
if stratum in (88,89,90) then cstratum=420;
if stratum in (93,94) then cstratum=421;
if stratum in (98,99,100) then cstratum=422;
if stratum in (101,102,103,104) then cstratum=423;
if stratum in (107,108,109,110) then cstratum=424;
if stratum in (111,112) then cstratum=425;
if stratum in (114,115,116) then cstratum=426;
if stratum in (122,123) then cstratum=427;
if stratum in (125,126,127,129,130) then cstratum=428;
if stratum in (132,133) then cstratum=429;
if stratum in (135,136) then cstratum=430;
if stratum in (142,143) then cstratum=431;

```
if stratum in (145,146,147,148) then cstratum=432;
if stratum in (151,152) then cstratum=433;
if stratum in (153,154) then cstratum=434;
if stratum in (156,157,158) then cstratum=435;
if stratum in (160,161) then cstratum=436;
if stratum in (164,165) then cstratum=437;
if stratum in (167,168) then cstratum=438;
if stratum in (169,170,171,172) then cstratum=439;
if stratum in (176,177,180) then cstratum=440;
if stratum in (181,182) then cstratum=441;
if stratum in (186,187) then cstratum=442;
if stratum in (189,190) then cstratum=443;
if stratum in (194,196) then cstratum=444;
if stratum in (197,199) then cstratum=445;
if stratum in (202,203) then cstratum=446;
if stratum in (205,206) then cstratum=447;
if stratum in (207,208) then cstratum=448;
if stratum in (211,212) then cstratum=449;
if stratum in (214,215) then cstratum=450;
if stratum in (216,217) then cstratum=451;
if stratum in (218,219) then cstratum=452;
if stratum in (222,223,224,225) then cstratum=453;
if stratum in (230,232) then cstratum=454;
if stratum in (234,236,237) then cstratum=455;
if stratum in (238,239) then cstratum=456;
if stratum in (241,242) then cstratum=457;
if stratum in (244,245,246) then cstratum=458;
if stratum in (249,250) then cstratum=459;
if stratum in (252,253) then cstratum=460;
if stratum in (256,257) then cstratum=461;
if stratum in (258,259) then cstratum=462;
if stratum in (263,264) then cstratum=463;
if stratum in (265,266) then cstratum=464;
if stratum in (268,269,270) then cstratum=465;
if stratum in (271,272,273) then cstratum=466;
if stratum in (278,279,280,283,284,285) then cstratum=466;
if stratum in (289,290,291,292) then cstratum=467;
if stratum in (296,297) then cstratum=468;
if stratum in (299,300) then cstratum=469;
if stratum in (307,308,309) then cstratum=470;
if stratum in (311,312,313) then cstratum=471;
if stratum in (321,322) then cstratum=472;
if stratum in (314,315) then cstratum=473;
if stratum in (324,325) then cstratum=474;
if stratum in (328,329,330) then cstratum=475;
if stratum in (333,334) then cstratum=476;
if stratum in (335,336,337,338,339) then cstratum=477;
```

```
/**/ DEFINE UP-TO-DATE STATUS FOR EACH VACCINE AND SERIES */
```

```
if b_numdtp>=4 then b_utddtp=1;
else b_utddtp=2;
```

```
if b_numdtp>=3 then b_utddt3=1;
else b_utddt3=2;
```

```
if b_numpol>=3 then b_utdpol=1;
else b_utdpol=2;
```

```
if b_nummmr>=1 then b_utdmmr=1;
else b_utdmmr=2;
```

```
if b_numhib>=3 then b_utdhib=1;
else b_utdhib=2;
```

```
if b_numhiep>=3 then b_utdhep=1;
else b_utdhep=2;
```

```
if b_utddtp=1 and b_utdpol=1 and b_utdmmr=1 then b_utd431=1;
else b_utd431=2;
if b_utddtp=1 and b_utdpol=1 and b_utdmmr=1 and b_utdhib=1 then butd4313=1;
else butd4313=2;
```

```
if b_utddtp=1 and b_utdpol=1 and b_utdmmr=1 and b_utdhib=1 and b_utdhep=1
then but43133=1;
else but43133=2;
format b_ut: but: utdf.;
run;
```

```
proc sort; /* SORT BY NEST VARIABLES */
by cstratum psu;
run;
```

```
proc crosstab data=analyt filetype=sas design=wr; /* SUDAAN PROCEDURE */
weight wt_bv2;
nest cstratum psu/missunit;
subgroup b_utddtp b_utddt3 b_utdpol b_utdmmr b_utdhib b_utdhib b_utdhep
b_utd431 butd4313 but43133;
levels 2 2 2 2 2 2 2 2 2;
tables b_utddtp b_utddt3 b_utdpol b_utdmmr b_utdhib b_utdhib b_utdhep
b_utd431 butd4313 but43133 ;
output / filename=se tablecell=default replace;
run;
```

APPENDIX F
UNWEIGHTED DISTRIBUTION OF CHILDREN AGED 12-35 MONTHS IN THE
1997 NHIS/NIPRCS BY SELECTED DEMOGRAPHIC CHARACTERISTICS

UNWEIGHTED DISTRIBUTION OF CHILDREN AGED 12- 35 MONTHS IN THE 1997 NHIS/NIPRCS
 BY SELECTED DEMOGRAPHIC CHARACTERISTICS

Demographic Characteristic	Immunization Supplement		Shot Card Users		No Shot Card		With Provider Data		No Provider Data	
	(n	%)	(n	%)	(n	%)	(n	%)	(n	%)
Total	2622		940		1682		1074		1548	
Age of Child										
1. 12-18	462	17.6	186	19.8	276	16.4	173	16.1	289	18.7
2. 19-24	786	30.0	316	33.6	470	27.9	347	32.3	439	28.4
3. 25-29	568	21.7	186	19.8	382	22.7	239	22.3	329	21.3
4. 30-35	806	30.7	252	26.8	554	32.9	315	29.3	491	31.7
Gender of Child										
1. Male	1378	52.6	483	51.4	895	53.2	557	51.9	821	53.0
2. Female	1244	47.4	457	48.6	787	46.8	517	48.1	727	47.0
Race/Ethnicity of Child										
1. Hispanic	795	30.3	328	34.9	467	27.8	281	26.2	514	33.2
2. Black, nonHispanic	408	15.6	105	11.2	303	18.0	143	13.3	265	17.1
3. White, nonHispanic	1308	49.9	472	50.2	836	49.7	610	56.8	698	45.1
4. Other, nonHispanic	111	4.2	35	3.7	76	4.5	40	3.7	71	4.6
Poverty Status										
1. Below	592	22.6	234	24.9	358	21.3	238	22.2	354	22.9
2. At or above	1610	61.4	609	64.8	1001	59.5	734	68.3	876	56.6
3. Unknown	420	16.0	97	10.3	323	19.2	102	9.5	318	20.5
Income										
1. \$20,000 and above	1644	62.7	588	62.6	1056	62.8	717	66.8	927	59.9
2. Less than \$20,000	855	32.6	326	34.7	529	31.5	332	30.9	523	33.8
3. Unknown	123	4.7	26	2.8	97	5.8	25	2.3	98	6.3
Education of Mother										
1. Less than High School	655	25.8	258	28.0	397	24.6	243	23.2	412	27.6
2. High School	647	25.5	207	22.5	440	27.2	246	23.5	401	26.9
3. Some College	741	29.2	256	27.8	485	30.0	328	31.4	413	27.7
4. College Graduate	466	18.4	197	21.4	269	16.6	228	21.8	238	16.0
5. Unknown	28	1.1	2	0.2	26	1.6	1	0.1	27	1.8

Demographic Characteristic		Immunization Supplement		Shot Card Users		No Shot Card		With Provider Data		No Provider Data	
		(n	%)	(n	%)	(n	%)	(n	%)	(n	%)
Census Region											
1.	Northeast	495	18.9	164	17.4	331	19.7	206	19.2	289	18.7
2.	Midwest	561	21.4	224	23.8	337	20.0	267	24.9	294	19.0
3.	South	880	33.6	271	28.8	609	36.2	343	31.9	537	34.7
4.	West	686	26.2	281	29.9	405	24.1	258	24.0	428	27.6
MSA											
1.	5,000,000 or more	375	14.3	123	13.1	252	15.0	114	10.6	261	16.9
2.	2,500,000 - 4,999,999	323	12.3	124	13.2	199	11.8	128	11.9	195	12.6
3.	1,000,000 - 2,499,999	668	25.5	234	24.9	434	25.8	242	22.5	426	27.5
4.	500,000 - 999,999	292	11.1	108	11.5	184	10.9	137	12.8	155	10.0
5.	250,000 - 499,999	318	12.1	116	12.3	202	12.0	129	12.0	189	12.2
6.	Under 250,000	216	8.2	83	8.8	133	7.9	93	8.7	123	7.9
7.	Non-MSA	430	16.4	152	16.2	278	16.5	231	21.5	199	12.9
RACE											
1.	White	1897	72.3	713	75.9	1184	70.4	810	75.4	1087	70.2
2.	Black	400	15.3	98	10.4	302	18.0	134	12.5	266	17.2
3.	Asian	24	0.9	12	1.3	12	0.7	13	1.2	11	0.7
4.	API	84	3.2	28	3.0	56	3.3	31	2.9	53	3.4
5.	Other	115	4.4	53	5.6	62	3.7	45	4.2	70	4.5
6.	Multiple race	79	3.0	23	2.4	56	3.3	33	3.1	46	3.0
7.	Unknown	23	0.9	13	1.4	10	0.6	8	0.7	15	1.0
HISPAN_P											
0.	Multiple Hispanic	21	0.8	7	0.7	14	0.8	10	0.9	11	0.7
1.	Puerto Rican	68	2.6	19	2.0	49	2.9	18	1.7	50	3.2
3.	Mexican-Mexicano	153	5.8	65	6.9	88	5.2	54	5.0	99	6.4
4.	Mexican-American	338	12.9	152	16.2	186	11.1	123	11.5	215	13.9
5.	Cuban/Cuban-American	20	0.8	5	0.5	15	0.9	2	0.2	18	1.2
6.	Other Latin American	64	2.4	25	2.7	39	2.3	17	1.6	47	3.0
7.	Other Spanish	6	0.2			6	0.4	1	0.1	5	0.3
8.	Hispanic/Spanish, non-spec	120	4.6	53	5.6	67	4.0	56	5.2	64	4.1
9-11.	Hispanic/Spanish, unk	5	0.2	2	0.2	3	0.2			5	0.3
12.	Non Hispanic/Spanish Orig	1827	69.7	612	65.1	1215	72.2	793	73.8	1034	66.8

APPENDIX G
WEIGHTED DISTRIBUTION OF CHILDREN AGED 12-35 MONTHS IN THE 1997
NHIS/NIPRCS BY SELECTED DEMOGRAPHIC CHARACTERISTICS

WEIGHTED DISTRIBUTION OF CHILDREN AGED 12-35 MONTHS IN THE 1997 NHIS/NIPRCS
 BY SELECTED DEMOGRAPHIC CHARACTERISTICS (WEIGHT = WTFA_IM)

Demographic Characteristic	Immunization Supplement		Shot Card Users		No Shot Card		With Provider Data		No Provider Data	
	(n	%)	(n	%)	(n	%)	(n	%)	(n	%)
Total	7884812		2822991		5061821		3319169		4565643	
Age of Child										
1. 12-18	2274034	28.8	921284	32.6	1352750	26.7	885190	26.7	1388844	30.4
2. 19-24	1991588	25.3	778678	27.6	1212910	24.0	887410	26.7	1104178	24.2
3. 25-29	1506468	19.1	482553	17.1	1023915	20.2	661281	19.9	845187	18.5
4. 30-35	2112722	26.8	640476	22.7	1472246	29.1	885288	26.7	1227434	26.9
Gender of Child										
1. Male	4117525	52.2	1497279	53.0	2620246	51.8	1728346	52.1	2389179	52.3
2. Female	3767287	47.8	1325712	47.0	2441575	48.2	1590823	47.9	2176464	47.7
Race/Ethnicity of Child										
1. Hispanic	1402341	17.8	554638	19.6	847703	16.7	479516	14.4	922825	20.2
2. Black, nonHispanic	1126972	14.3	282706	10.0	844266	16.7	402446	12.1	724526	15.9
3. White, nonHispanic	4974409	63.1	1856338	65.8	3118071	61.6	2304301	69.4	2670108	58.5
4. Other, nonHispanic	381090	4.8	129309	4.6	251781	5.0	132906	4.0	248184	5.4
Poverty Status										
1. Below	1515890	19.2	592482	21.0	923408	18.2	624202	18.8	891688	19.5
2. At or above	5192248	65.9	2001513	70.9	3190735	63.0	2423018	73.0	2769230	60.7
3. Unknown	1176674	14.9	228996	8.1	947678	18.7	271949	8.2	904725	19.8
Income										
1. \$20,000 and above	5365480	68.0	1970927	69.8	3394553	67.1	2401706	72.4	2963774	64.9
2. Less than \$20,000	2197866	27.9	805494	28.5	1392372	27.5	855295	25.8	1342571	29.4
3. Unknown	321466	4.1	46570	1.6	274896	5.4	62168	1.9	259298	5.7
Education of Mother										
1. Less than High School	1589486	20.7	565257	20.5	1024229	20.9	587791	18.1	1001695	22.7
2. High School	1962648	25.6	652164	23.6	1310484	26.8	799691	24.6	1162957	26.3
3. Some College	2302426	30.1	787185	28.5	1515241	30.9	1017144	31.3	1285282	29.1
4. College Graduate	1710591	22.3	750451	27.2	960140	19.6	837181	25.8	873410	19.8
5. Unknown	95522	1.2	8044	0.3	87478	1.8	3298	0.1	92224	2.1

NOTE: Weight WTFA_IM. For ages 12-18 months weight is multiplied by 2

Demographic Characteristic	Immunization Supplement		Shot Card Users		No Shot Card		With Provider Data		No Provider Data	
	(n	%)	(n	%)	(n	%)	(n	%)	(n	%)
Census Region										
1. Northeast	1608838	20.4	560561	19.9	1048277	20.7	686158	20.7	922680	20.2
2. Midwest	1921906	24.4	807085	28.6	1114821	22.0	927913	28.0	993993	21.8
3. South	2709826	34.4	789072	28.0	1920754	37.9	1074242	32.4	1635584	35.8
4. West	1644242	20.9	666273	23.6	977969	19.3	630856	19.0	1013386	22.2
MSA										
1. 5,000,000 or more	928226	11.8	280235	9.9	647991	12.8	275447	8.3	652779	14.3
2. 2,500,000 - 4,999,999	999603	12.7	409151	14.5	590452	11.7	428737	12.9	570866	12.5
3. 1,000,000 - 2,499,999	2031642	25.8	704887	25.0	1326755	26.2	746732	22.5	1284910	28.1
4. 500,000 - 999,999	898760	11.4	320458	11.4	578302	11.4	436007	13.1	462753	10.1
5. 250,000 - 499,999	959500	12.2	359071	12.7	600429	11.9	400508	12.1	558992	12.2
6. Under 250,000	682163	8.7	263064	9.3	419099	8.3	285136	8.6	397027	8.7
7. Non-MSA	1384918	17.6	486125	17.2	898793	17.8	746602	22.5	638316	14.0
RACE										
1. White	6003928	76.1	2263317	80.2	3740611	73.9	2630742	79.3	3373186	73.9
2. Black	1085473	13.8	259768	9.2	825705	16.3	376123	11.3	709350	15.5
3. Asian	71669	0.9	33924	1.2	37745	0.7	40420	1.2	31249	0.7
4. API	286375	3.6	102959	3.6	183416	3.6	100727	3.0	185648	4.1
5. Other	182994	2.3	80075	2.8	102919	2.0	69067	2.1	113927	2.5
6. Multiple race	218275	2.8	65887	2.3	152388	3.0	90597	2.7	127678	2.8
7. Unknown	36098	0.5	17061	0.6	19037	0.4	11493	0.3	24605	0.5
HISPAN_P										
0. Multiple Hispanic	45330	0.6	10965	0.4	34365	0.7	20610	0.6	24720	0.5
1. Puerto Rican	135940	1.7	43123	1.5	92817	1.8	33216	1.0	102724	2.2
3. Mexican-Mexicano	247590	3.1	99754	3.5	147836	2.9	79620	2.4	167970	3.7
4. Mexican-American	579758	7.4	252146	8.9	327612	6.5	210186	6.3	369572	8.1
5. Cuban/Cuban-American	36291	0.5	10398	0.4	25893	0.5	5514	0.2	30777	0.7
6. Other Latin American	128275	1.6	45029	1.6	83246	1.6	31348	0.9	96927	2.1
7. Other Spanish	11952	0.2			11952	0.2	1402	0.0	10550	0.2
8. Hispanic/Spanish, non-spec	200634	2.5	86037	3.0	114597	2.3	97620	2.9	103014	2.3
9-11. Hispanic/Spanish, unk	16571	0.2	7186	0.3	9385	0.2			16571	0.4
12. Non Hispanic/Spanish Orig	6482471	82.2	2268353	80.4	4214118	83.3	2839653	85.6	3642818	79.8

Note: Weight WIFA_IM. For ages 12-18 months weight is multiplied by 2

APPENDIX H
DESCRIPTIVE STATISTICS FOR TWO SAMPLING WEIGHT VARIABLES
INCLUDED IN THE 1997 NHIS/NIPRCS DATA FILE

DESCRIPTIVE STATISTICS FOR TWO SAMPLING WEIGHT VARIABLES INCLUDED IN 1997 NHIS/NIPRCS DATA FILE

ALL CHILDREN Aged 12-35 MONTHS IN IMMUNIZATION SUPPLEMENT

WEIGHT = WTFA_IM

	NUMBER CHILDREN	SUM OF WEIGHTS	MINIMUM VALUE	MAXIMUM VALUE	MEAN	COEFFICIENT OF VARIATION
Total	2622	7884812	744	19088	3007.17	54.0920
Age of Child						
1. 12-18	462	2274034	1574	19088	4922.15	46.2068
2. 19-35	2160	5610778	744	10795	2597.58	41.3751
Gender						
1. Male	1378	4117525	788	16930	2988.04	55.3610
2. Female	1244	3767287	744	19088	3028.37	52.6998
Race/Ethnicity						
1. Hispanic	795	1402341	744	7716	1763.95	51.1847
2. Black, nonHispanic	408	1126972	920	16930	2762.19	53.6576
3. White, nonHispanic	1308	4974409	916	19088	3803.06	40.3750
4. Other, nonHispanic	111	381090	1458	8023	3433.24	40.2722

CHILDREN AGED 12-35 MONTHS WITH BEST VALUES FOR DATES
 WEIGHT = WT_BV2

	NUMBER CHILDREN	SUM OF WEIGHTS	MINIMUM VALUE	MAXIMUM VALUE	MEAN	COEFFICIENT OF VARIATION
Total	1197	7884812.00	816.749	57591.54	6587.14	82.9717
Age of Child						
1. 12-18	177	2274034.00	2049.90	57591.54	12847.65	65.8868
2. 19-35	1020	5610778.00	816.75	25918.34	5500.76	69.6875
Gender						
1. Male	621	4133918.68	816.749	57591.54	6656.87	85.1606
2. Female	576	3750893.32	924.174	32547.94	6511.97	80.4830
Race/Ethnicity						
1. Hispanic	331	1402341.00	816.75	26595.16	4236.68	91.0726
2. Black, nonHispanic	153	1126972.00	1340.79	45378.06	7365.83	83.6359
3. White, nonHispanic	671	5078440.16	1223.11	57591.54	7568.47	75.2167
4. Other, nonHispanic	42	277058.84	1420.74	18296.70	6596.64	65.4372

Note: Children aged 12-18 months were included in the 1997 NHIS Immunization Supplement only during quarters 3 and 4.