National Immunization Survey-Teen

A User's Guide for the 2024 Public-Use Data File

Centers for Disease Control and Prevention

National Center for Immunization and Respiratory Diseases

Presented by:

NORC at the University of Chicago

February 2026

Acknowledgments

The development and production of the NIS-Teen public-use data files is a team effort that has included contributions from many individuals (listed in alphabetical order) in two organizations:

National Center for Immunization and Respiratory Diseases, CDC – Laurie D. Elam-Evans, Cassandra Pingali, and James A. Singleton.

NORC at the University of Chicago – Rachel Francis, Benjamin Skalland, and Maggie Yarbrough.

Table of Contents

Appendices

List of Tables and Figures

Convention for Bolding Text

The Data User's Guide uses **bold** font to highlight substantive changes in the methodology or study design from the previous year's Guide.

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 childhood vaccines; 3) enhance awareness, partnerships, and community participation; 4) improve vaccinations and their use; and 5) monitor vaccination coverage and occurrences of disease. The Healthy People 2020 objectives later established a target for adolescents aged 13–15 years of 80% coverage with ≥1 Tdap, ≥1 MenACWY, and the recommended number of HPV doses (≥2 or ≥3), and 90% coverage for ≥2 varicella vaccine doses. To fulfill the CII mandate of monitoring vaccination coverage and marking progress toward achieving those objectives, the National Immunization Survey (NIS) Family of Surveys with an adolescent component called the NIS-Teen was 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) in 2006 (https://www.cdc.gov/nis/about/index.html).

The target population for the NIS-Teen is non-institutionalized adolescents aged 13–17 years living in United States households at the time of the interview. The official coverage estimates reported from the 2024 NIS-Teen are proportions of adolescents up-to-date with respect to the recommended numbers of doses of all routinely recommended vaccines for adolescents and selected catch-up vaccines (Wodi et al., 2024). These vaccines and their recommended numbers of doses are:

- Tetanus, diphtheria, and acellular pertussis vaccine (Tdap) – 1 dose;
- Quadrivalent meningococcal vaccine (MenACWY) – 2 doses;
- Human papillomavirus vaccine (HPV) – 2 or 3 doses, depending on age at first dose;
- Measles, mumps, and rubella vaccine (MMR) – 2 doses;
- Hepatitis B vaccine (Hep B) – 3 doses;
- Varicella zoster (chicken pox) vaccine – 2 doses among adolescents with no varicella disease history;

- Hepatitis A vaccine (Hep A) – 2 doses;
- COVID-19 – 1 or more doses with updated (2024-25) formula; and
- Seasonal influenza vaccine – 1 dose annually.

The NIS-Teen is conducted as an add-on to the National Immunization Survey - Child (NIS-Child)[1], which seeks to estimate vaccination coverage rates among children aged 19–35 months. The NIS-Child uses a random digit dialing (RDD) telephone survey[2] to identify households containing children aged 19–35 months and interviews the adult who is most knowledgeable about the child's vaccinations. If an eligible household is identified and the NIS-Child interview is completed, the household is then screened for the presence of 13–17 year-old adolescents. Households that do not contain a 19–35 month old child are not administered the NIS-Child interview but are immediately screened for the presence of a 13–17 year-old adolescent. If a household containing one or more adolescents aged 13–17 years is identified, a 13–17 year-old adolescent is randomly chosen, and the adult who is most knowledgeable about the teen's vaccinations is interviewed. With consent of the teen's parent or guardian, the NIS-Teen also contacts (by mail) the teen's vaccination provider(s) to request information on vaccinations from the teen's medical records. NIS-Teen sampling, data collection, and weighting operations are conducted by NORC at the University of Chicago.

Samples of telephone numbers are drawn independently, for each calendar quarter, within selected geographical areas. For the 2024 NIS-Teen, there are 58 geographic strata for which vaccination coverage levels can be estimated, including 5 local areas; the remaining 54 are either an entire state, the District of Columbia, a U.S. territory (Guam or Puerto Rico), or a "rest of state" area. This design makes it possible to produce annual estimates of vaccination coverage levels within each of the 58 estimation areas with a specified degree of precision (a coefficient of variation of approximately 6.5%). Further, by using the

[1] More information about the NIS-Child is available at https://www.cdc.gov/nis/php/datasets-child/index.html.
[2] The NIS-Child used a landline-only sampling frame during 1995–2010, a dual-frame design in 2011–2017 which included both landline and cell-phone sampling frames, and a single-frame cell-phone sample since 2018.

same data collection methodology and survey instruments in all estimation areas and across years, the NIS-Teen produces comparable vaccination coverage levels among estimation areas and over time.

When the NIS-Teen was first conducted in Quarter 4 of 2006 and Quarter 4 of 2007, the survey was designed to produce estimates at the national level only. Starting in 2008, the NIS-Teen was expanded to produce estimates in 56 areas, including the 50 states, District of Columbia, and 5 local areas that receive federal Section 317 immunization grants (Bexar County, TX; City of Chicago, IL; City of Houston, TX; New York City, NY; Philadelphia County, PA). These areas are called *estimation areas*. **In 2024, the NIS-Teen included Guam and Puerto Rico as additional estimation areas.** As noted throughout this report, some procedures differed for territories when compared to the rest of the United States, including the creation of separate survey weight variables for analyses that are to include territories.

Data for Guam are not included in the 2024 public-use data file to protect respondent confidentiality, as the sampling fraction was large in this small-population area. Interested researchers can access data for Guam by submitting a proposal and working through the Research Data Center. The link and guidelines for developing a proposal are located at https://www.cdc.gov/rdc.

For the 2024 NIS-Teen, household interviews began on January 2, 2024 and ended on January 13, 2025. Provider data collection extended from January 2024 through April 2025. A total sample, including the territory samples, of approximately 16.3 million telephone numbers yielded household interviews for 39,347 teens, 16,665 of whom had adequate provider data (provider-reported vaccination data adequate to determine whether the teen was up-to-date with respect to the recommended vaccination schedule). The 2024 NIS-Teen public-use data file (which includes data for Puerto Rico but does not include data for Guam) contains data for 39,003 teens with completed household interviews, and more extensive data (e.g., provider-reported vaccination histories and facility data) for 16,559 teens with adequate provider data (including 109 unvaccinated teens). Data

were collected in Guam in 2024, although teens in these areas are not included on the public-use data file in order to protect their confidentiality.

NIS-Teen vaccination coverage estimates are based on provider-reported vaccination histories from adolescents with adequate provider data (APD). In 2014, the household questionnaire was shortened to reduce the length of the household interview, decrease respondent burden, and potentially improve survey response rates. Questions that were previously used to define APD were no longer available, thus necessitating a modification to the APD definition used by the NIS-Teen beginning in 2014 (for more details, see CDC 2015a; CDC 2015b). NIS-Teen estimates for 2024 will be directly comparable to NIS-Teen estimates published since 2014, but not to estimates published prior to 2014.

The weights included in this public-use data file allow data analysts to conduct several different types of analysis, depending on interests and aims. One can choose to analyze all teens with completed household interviews or only the subset of teens for whom the provider-reported data are adequate. CDC publishes estimates of vaccination coverage based on provider-reported vaccination histories using the subset of teens for whom the provider-reported data are adequate. Parental reported vaccination status is subject to recall error (Dorell et al., 2011; Ojha et al., 2013). Also, one can choose to include or exclude teens who reside in territories in the analysis. Previous NIS-Teen public-use files have provided analysts with these capabilities as well. Section 6 of this user's guide provides information about the creation of the weight variables included in the 2024 NIS-Teen public-use data file, and Section 8 provides guidance for their use.

Vaccination coverage estimates for 2024 are available on the *TeenVaxView* website, https://www.cdc.gov/teenvaxview/index.html.

The accompanying codebook (NCIRD, 2026) documents the contents of the 2024 NIS-Teen public-use data file, and Section 7 of this user's guide describes these contents in detail. For reference, the accompanying "Alphabetical Listing of Variables in the NIS-Teen Public-Use Data Files" CSV file provides a full list of variables in the 2024 and previous public-use data files. NIS-Teen data and

documentation for 2015 to the present are available at: https://www.cdc.gov/nis/php/datasets-teen/index.html.

Additional information on the NIS-Teen is available at: https://www.cdc.gov/nis/about/index.html.

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

Information Dissemination Staff, NCIRD

1600 Clifton Road

Atlanta, GA 30333

E-mail: cdcinfo@cdc.gov

Website: https://www.cdc.gov/nis/about/index.html

2. Sample Design

The NIS-Teen uses two phases of data collection to obtain vaccination information for a large national probability sample of teens: (1) a RDD telephone survey designed to identify households with adolescents aged 13–17 years, followed by (2) the Provider Record Check, a mailed survey to teens' vaccination providers. This section summarizes these two phases of data collection. Descriptions of the history and general design of the NIS family of surveys are given by Ezzati Rice et al. (1995), Zell et al. (2000), Smith et al. (2001a, 2005), Jain et al. (2009), and Wolter et al. (2017a).

2.1. The NIS-Teen RDD Telephone Survey

The NIS-Teen RDD telephone survey phase uses independent, quarterly samples of telephone numbers. Samples were provided by Marketing Systems Group (MSG). Cellular phone numbers were sampled within estimation areas in each quarter of 2024. Table C.1 (in Appendix C) lists the estimation areas for the 2024 NIS-Teen by state or territory and shows the estimated number of teens living in each state or territory and estimation area in 2024.

Because the NIS-Teen is an add-on survey to the NIS-Child, the NIS-Teen uses the same sampling frame and sampling methodology as the NIS-Child. In 2024, this was a single-frame cellular phone sampling design, with telephone numbers sampled only from a sampling frame of cellular phone numbers. Prior to 2011, the NIS-Teen was based on a landline telephone sample. A cellular phone sample was added to the survey in 2011 to address the rapid rise of cellular phone-only households. As cellular phone penetration has increased, fewer and fewer households, especially households with children, have relied only on a landline telephone. Because the proportion of households with children that are reachable only by landline telephone is now very small – only 0.2% in 2024 (Blumberg and Luke, 2025) – the landline sample was dropped beginning in 2018, and the NIS-Teen now uses only a cellular phone sample. A discussion of this change and its impact is given by Nguyen et al. (2019).

The target sample size of completed household interviews in each estimation area is designed to achieve an approximately equal coefficient of variation of 6.5% for an estimator of vaccination coverage derived from provider-reported vaccination histories, given a true coverage parameter of 50%. Cellular phone sample sizes were chosen to meet the target coefficient of variation of 6.5%.

Since 2019, the NIS sample design has included a modification to increase the efficiency of data collection. Immunization information systems (IIS) are state or local confidential, computerized, population-based data systems that collect and consolidate vaccination doses administered by participating vaccination providers to persons residing in a given geopolitical area. In participating geographic estimation areas, a two-phase RDD sample of cellular phone numbers is selected, with the second-phase sample stratified by the status of the telephone number in the corresponding IIS:

- Stratum 1: Phone number associated with a 19-35 month old child in the IIS
- Stratum 2: Phone number associated with a 13-17 year old adolescent in the IIS (but not with a 19-35 month old child in the IIS)
- Stratum 3: Phone number associated with a 6-18 month or 3-12 year old child in the IIS (but not with a 19-35 month old child or 13-17 year old adolescent in the IIS)
- Stratum 4: Phone number not associated with a 6 month to 17 year old child in the IIS

In the second phase of sampling, phone numbers falling into Strata 1, 2, and 3 were oversampled. The method was designed to maximize the effective sample sizes for the NIS family of surveys, given a fixed cost for data collection, within each of the participating geographic estimation areas. **For the 2024**

sample, 33 areas participated in this two-phase sampling process to increase the efficiency of data collection.[3]

In 2024, including the U.S. territory samples, 42.4% of teens with a completed household interview were determined to have adequate provider data. Excluding territories, this proportion was 42.8%. The percentage of teens with adequate provider data in 2024 varies among the non-territory estimation areas (from 29.5% in TX-City of Houston to 57.9% in Vermont); among the U.S. territories, the percentages were 30.8% in Guam and 27.1% in Puerto Rico (see Appendix C). The phrase "adequate provider data" means that sufficient vaccination history information was obtained from the provider(s) to determine whether the teen is up-to-date with respect to the recommended vaccination schedule. Unvaccinated teens are also considered to have adequate provider data. These are teens for whom either (1) the respondent reported during the household interview that the teen had received no vaccinations and has no providers, or (2) the respondent reported during the household interview that the adolescent had received no vaccinations but has one or more providers, and those providers all reported administering no vaccinations. The number of unvaccinated teens in the sample is small (**110 in 2024**, including the U.S. territory samples; **108 in 2024** when U.S. territory samples are excluded).

In 2014, the definition of adequate provider data was expanded to include all adolescents with provider-reported vaccination data (plus unvaccinated teens) (CDC, 2015a; CDC, 2015b). In 2021, the NIS-Teen began collecting data on COVID-19 vaccination, and the definition of adequate provider data was further revised to exclude adolescents for whom only COVID-19 vaccinations were reported; this change was

[3] The participating geographic areas in 2024 were Alaska, Arkansas, Arizona, Connecticut, Florida, Georgia, Idaho, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Mississippi, Missouri, Nebraska, Nevada, New Mexico, New York – City of New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania – Philadelphia County, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Washington, Wisconsin, Wyoming, and Puerto Rico. Not all of these areas utilized the IIS-NIS integration design in every quarter of 2023; Philadelphia County and Wisconsin used the integration design only in quarters 3 and 4.

made to maintain consistency in the definition between 2021 and prior years and has remained in place since 2021.

The design and implementation of the NIS-Teen cellular phone sample involve three procedures. First, statistical models predict the number of sample cellular phone numbers needed in each estimation area to meet the target precision requirements, and, from among the entire NIS-Child sample of telephone numbers, this number of telephone numbers are "flagged" to be part of the NIS-Teen sample. 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 numbers on the NIS do-not-call list from the sample before the interviewers dial them.

In 2014 and 2015, an automated process was implemented to remove cellular phone numbers flagged as having no recent activity and that were therefore very likely to be non-working cellular phone numbers. In 2016, a different automated process found to be more efficient in removing non-working cellular phone numbers was used. Following a July 2016 Federal Communications Commission (FCC) declaratory ruling (FCC 16-72, CG Docket No. 02-278) stating that the federal government and contractors working on behalf of the federal government are not subject to the restrictions on cellular phone dialing in the Telephone Consumer Protection Act of 1991 (TCPA, 47 U.S.C. 227), the NIS transitioned from manual dialing of cellular phones to auto-dialing cellular phones in November 2016. After this transition, the automated process to remove non-working cellular phone numbers was no longer cost effective, and beginning in 2017 this process was no longer used in the cellular phone sample.

Beginning in 2024, a small proportion of interviews are completed via a self-administered web questionnaire rather than through an interviewer-administered telephone interview. If a respondent calls back after receiving an NIS dial but an interviewer is not available to answer the call, the respondent is directed to an Interactive Voice Response (IVR) system that asks the

respondent questions to screen for eligibility for the NIS surveys. If the respondent is found to be eligible for one or more NIS surveys, the respondent is given the option of completing the survey online. If this option is chosen, a text message is sent to the respondent containing a link to an online version of the NIS questionnaire for self-completion. Beginning in Quarter 3, 2024, for a random subset of respondents who have not yet answered the phone, when a voicemail message is left it includes the option of receiving a text message containing a link to an online version of the NIS questionnaire for self-completion. In 2024, 0.4% of NIS-Teen interviews were completed online.

2.2. The NIS-Teen Provider Record Check

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

The instructions ask vaccination providers to mail or fax the IHQ back upon completion. Two 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. Providers also have the option to send a medical record or registry printout containing the child's vaccination history, which is then transcribed onto the IHQ form. The data from the questionnaires are edited, entered, cleaned, and merged with the information from the household survey to produce a teen-level record.

2.3. Summary of Data Collection

Table 1 presents selected operational results of NIS-Teen data collection for calendar year 2024 for the NIS-Teen sample. To facilitate comparisons with prior NIS-Teen surveys, the numbers that are presented in Table 1 and discussed in this section exclude the U.S. territory samples. **Adolescents aged 13–17 years during 2024 data collection were born between January 2006 and December 2011.**

The total cellular phone RDD sample (in replicates that were released for use in the U.S. excluding territories) consisted of 15,433,554 telephone numbers. Of these, 35,473 were eliminated before release to the telephone centers as numbers on the NIS do-not-call list, and the remaining 15,398,081 were sent to the telephone centers to be dialed. A total of 967,598 active personal cellular phone numbers (APCNs) were identified as shown in Row F. Among the identified APCNs, 750,602 (77.6%) were successfully screened. Of these, 57,262 (7.6%) were deemed eligible for the NIS-Teen interview. Respondents were eligible if the cellular phone belonged to an adult living in a household with at least one age-eligible teen. Among the identified eligible households, 38,132 (66.6%) completed the household interview.

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 the American Association for Public Opinion Research (AAPOR) Standard Definitions (AAPOR, 2023). **In 2024, the CASRO response rate (Row J) was 21.0%. The NIS-Teen CASRO response rate equals the product of the resolution rate (40.7%, Row E), the screening completion rate (77.6%, Row G), and the interview completion rate among eligible households (66.6%, Row I).** 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 teens. The interview completion rate is the percentage of households with one or more age-eligible teens that complete the household interview.

Row K of Table 1 shows that household interviews were completed for 38,140 age-eligible teens.[4] Rows L through O give results for the Provider Record Check phase. Specifically, Row L gives the

[4] This number may differ from that in Row I because some completed interviews were removed when edits to the teen's date of birth rendered the teen ineligible. In addition, this number also reflects the removal of teens who were not initially sampled in a U.S. territory but reported living in a U.S. territory, and the addition of teens initially sampled in a U.S. territory who reported living in the non-territory United States.

rate of obtaining oral consent from household respondents to contact their teen's vaccination providers – 55.0% in 2024. The number of immunization history questionnaires mailed to vaccination providers exceeds the number of completed interviews for teens with consent because some teens have more than one vaccination provider. **Of the questionnaires mailed to providers of teens, 28,843 (89.4%, Row N) were returned. Among the teens with completed household interviews, 16,325 (42.8%, Row O) had adequate vaccination histories based on provider reporting (16,217) or were determined to be unvaccinated (108). The other 57.2% of teens lacked adequate provider data for a variety of reasons, such as the parent or guardian did not give consent to contact the teen's provider(s), the provider(s) did not respond, or the provider(s) responded but did not report any vaccinations for the teen despite the parent or guardian indicating that the teen has received vaccinations.**

In 2024, data from the Health Insurance Module (HIM) were collected (see Section 3.1). **Among the 38,140 teens with completed household interviews, 21,591 (56.6%, Row P) completed the HIM.**

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

Table 1: Selected Operational Results (Excluding U.S. Territories), National Immunization Survey – Teen, 2024

Row	Key Indicator	Cellular Phone Sample		Formula
		Number	Percent	
	Household Phase			
A	Total Selected Telephone Numbers in Released Replicates	15,433,554	--	--
B	Phone Numbers Resolved before Computer-Assisted Telephone Interviewing	35,473	0.2%	B/A
C	Total Phone Numbers Released to Telephone Centers	15,398,081	--	A-B
D	Advance Letters Mailed	0	0.0%	D/C
E	Resolved Phone Numbers[1] – *Resolution Rate*	6,277,378	40.7%	E/A
F	Households Identified – *APCN Rate*[2]	967,598	15.4%	F/E
G	Households Successfully Screened[3] – *Screener Completion Rate*	750,602	77.6%	G/F
H	Eligible Households – *Eligibility Rate*[4]	57,262	7.6%	H/G
I	Households with Completed Household Interviews – *Interview Completion Rate*	38,132	66.6%	I/H
J	CASRO[5] Response Rate[6]	--	21.0%	--
K	Age-Eligible Teens with Completed Household Interviews[7]	38,140	--	--
	Provider Phase			
L	Teens with Consent to Contact Vaccination Providers	20,962	55.0%	L/K
M	Immunization History Questionnaires Mailed to Providers	32,276	--	--
N	Immunization History Questionnaires Returned from Providers	28,843	89.4%	N/M
O	Teens with Adequate Provider Data	16,325 (includes 108 unvaccinated teens)	42.8%	O/K
	Modules			
P	Age-Eligible Teens with Completed Household Interview and Completed Health Insurance Module	21,591	56.6%	P/K

[1] A phone number is resolved if it was determined to be either a non-working number or a working residential number. This row includes phone numbers resolved before computer-assisted telephone interviewing (CATI) (Row B). The numbers resolved before CATI interviewing are those on the NIS do-not-call list.
[2] Active personal cellular phone number (APCN) rate.
[3] The household screener screens for non-minor-only cellular phone households with age-eligible children.
[4] Of the screened households, the proportion that were non-minor-only cellular phone households with age-eligible children.
[5] CASRO, Council of American Survey Research Organizations.
[6] The response rate is the number of households with a completed household interview divided by the estimated number of eligible households in the sample. The number of eligible households was estimated using the CASRO assumptions; these assumptions are that the rate of households among the unresolved telephone numbers is the same as the observed rate of households among the resolved telephone numbers, and the rate of eligible households among unscreened households is the same as the observed rate of eligible households among screened households. Under these assumptions, the CASRO response rate is equal to the product of the resolution rate, the screener completion rate, and the interview completion rate.
[7] Rows K-P reflect the removal of teens with an ineligible best date of birth, the removal of teens who were not sampled but reported living in a U.S. territory, and the addition of teens sampled in a U.S. territory who reported living in the non-territory United States.

2.4. Informed Consent, Security, and Confidentiality of Information

The 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 teen's vaccination history (generally the parent or guardian of the teen). Informed consent to contact the teen's vaccination provider(s) is obtained at the end of the interview.

Information in the NIS-Teen is collected and processed under high security. To ensure privacy of the respondents and confidentiality of sensitive information, standards have been established for release of data from this survey. All CDC staff and contractor staff involved with the NIS-Teen sign confidentiality agreements and follow instructions to prevent disclosure.

All information in the NIS-Teen 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)]. Prior to public release, the contents of the public-use data file go through extensive review by the NCIRD Disclosure Review Board to protect participant privacy as well as data confidentiality.

3. Content of NIS-Teen Questionnaires

This section describes the questionnaires used in the 2024 NIS-Teen household interview and in the NIS-Teen Provider Record Check.

3.1. Content of the Household Questionnaire

The computer-assisted telephone interview (CATI) and computer-assisted web interview (CAWI) questionnaire used in the RDD phase of NIS-Teen data collection consists of two parts: a screener to identify households with adolescents aged 13-17 years and an interview portion. The questionnaire is modeled on the Immunization Supplement to the National Health Interview Survey (NHIS) (NCHS, 1999). The NIS-Teen household questionnaire has been translated into Spanish, and LanguageLine Solutions® (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-Teen household interview. The questionnaire is available at https://www.cdc.gov/nis/php/datasets-teen/index.html.

In the first section, the household is initially screened to ensure that the cellular phone is used by an adult (i.e., to ensure it is not a minor-only cellular phone) and then screened for the presence of children age 19-35 months. If the household contains such a child, the NIS-Child interview is conducted before the household is screened for the NIS-Teen survey; if the household does not contain such a child, the household immediately proceeds to the NIS-Teen screener.

In the next section with the NIS-Teen screener, the purpose of the survey is explained to the respondent, and the ages of all the children in the household are obtained. If the household contains one or more adolescents aged 13-17 years, a 13-17 year-old adolescent is randomly chosen to be the subject of the interview, this teen's date of birth is collected, and the respondent is asked whether he/she is the most knowledgeable person for this teen'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 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 – Teen, 2024

Questionnaire Section	Content of Section
Section S	Screening questions to determine NIS-Child eligibility
NIS-Teen Screener	Screening questions to roster children and to determine NIS-Teen eligibility
Section B	Ever vaccinated and flu, Td/Tdap, meningococcal, and HPV vaccination questions
Section C	Teen and household health questions, demographic and socioeconomic questions
Section D	Provider information and request for consent to contact the teen's vaccination provider(s)
Section E	Health Insurance Module (HIM)

The standard NIS-Teen questionnaire formerly included Section A following the NIS-Teen Screener, which asked about vaccinations recorded on a paper "shot card" sometimes given to families to track vaccination dates and dosages. After asking whether the respondent has a shot card of the teen's vaccination history, he/she was asked whether the shot card was easily accessible. If so, the interview proceeded with Section A (which asked respondents with shot cards about the shots on the card), followed by Section C; if not, it proceeded with Section B followed by Section C. Beginning in Q1/2014, Section A was eliminated from the regular household questionnaire and all respondents were administered Section B. Section B was also shortened. The remaining Section B questions are a limited set of questions regarding flu, COVID-19, Td/Tdap, meningococcal, and HPV vaccinations; questions about measles, varicella, hepatitis A, and hepatitis B vaccines were removed. In 2015 and 2016, Section A was reinstated for Guam respondents but was discontinued for all respondents beginning in 2017.

Section C collects information about the health of the selected teen, including recent doctor visits and history of chicken pox disease, asthma, and other health conditions. Section C also obtains information that includes the relationship of respondent to the teen, race and Hispanic origin of the teen, household

income, educational attainment of the mother, and other information on the socioeconomic characteristics of the household and the teen.

In the Provider Section (Section D) of the NIS-Teen household interview, identifying information (such as name, address, and telephone number) for the teen's vaccination provider(s) is requested, as well as the full names of the teen and the respondent, so that NIS-Teen personnel can contact the provider(s) and identify the teen whose vaccination information the NIS-Teen is requesting. After this information is obtained, consent to contact the teen's vaccination provider(s) is requested. When oral consent and sufficient identifying information are obtained, the immunization history questionnaire is mailed to the teen's vaccination provider(s).

A Health Insurance Module (HIM) (Section E) is administered upon completion of the Provider Section to collect data regarding the types of medical insurance coverage the teen has had since age 11 years. If a respondent provided consent to contact medical providers and completed the Provider Section, he/she flowed directly into the HIM. If, however, consent or any other critical provider question was refused, the call was terminated and the respondent was called back later to attempt to complete the Provider Section and obtain consent. Only upon callback on which consent was granted or a second refusal given within the Provider Section was the respondent asked the HIM.

3.2. Content of the Immunization History Questionnaire (IHQ)

The IHQ mailed 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 vaccination data from the providers of respondents to the Immunization Supplement to the National Health Interview Survey (Bartlett et al., 2001). The IHQ consists of two double-sided pages. Page 1 includes space for the label that gives the teen's name, date of birth, and sex. 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-Teen and the National Center for Immunization and Respiratory Diseases. The IHQ is available at https://www.cdc.gov/nis/php/datasets-teen/index.html.

4. Data Preparation and Processing Procedures

The household and provider data collection in the NIS-Teen incorporate extensive data preparation and processing procedures. During the household interview, the data collection system supports reconciliation of critical errors as interviewers enter the data. After completion of interviewing for a quarter, further 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 teen are consolidated into a single vaccination history, the editing continues. A quality assurance check is performed based on the name, sex, and date of birth of the teen to ensure that the provider completed the questionnaire for the correct teen and to confirm age-eligibility (age 13-17 years 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-Teen data involve several steps. First, the data collection system enables interviewers to reconcile potential errors while the respondent is on the telephone. Further cleaning and editing take place in a post-data collection clean-up stage, involving an extensive review of data values, cross tabulations, and the coding of verbatim responses for race and ethnicity. 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 Data Collection System

The data collection 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 data collection system, out-of-range and inconsistent responses produce a warning screen, allowing the interviewer to correct errors in real time. This allows the interviewer to reconcile errors while the respondent is on the telephone. Warning screens focus on items critical to the survey, such as those that determine a teen's eligibility (e.g., date of birth).

A data collection system cannot simultaneously incorporate every possible type of error check and maximize system performance. To reconcile this trade-off, post-data collection 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-data collection 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-Data Collection Edits and File Creation

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

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 teens, 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 centers. Checks also ensure that no duplicate households exist in the sample file and no duplicate teens 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 teen. 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% 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.,

Recombivax counts as Hep B). These translations come from a file that contains all such verbatim responses ever encountered in the NIS-Teen. Also, the provider data file is checked for duplicate records, and exact duplicates are removed. If the provider data contain a date of birth, sex, or name for the teen that differs from the household interview for that teen, the questionnaire is re-examined to determine whether it may have been filled out for the incorrect teen. Provider data that appear to have been filled out for the wrong teen are removed from the provider database. When a teen has data from multiple providers, decision rules are applied to produce the most complete picture of the teen's vaccination history.

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

4.2. Limitations of Data Editing Procedures

Although data editing procedures were used for the NIS-Teen, the data user should be aware that some inconsistent data might remain in the public-use data file. The variables that indicate whether a teen is up-to-date on each vaccine or series (on which the estimates of vaccination coverage are based) are derived from provider-reported data, and the NIS-Teen 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, the provider-reported data are manually reviewed and edited to correct specific

reporting errors. Some adolescents considered to have 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) providers respond with vaccination data but fail to list all the vaccinations in the teen's medical record. Even with these limitations, the NIS-Teen overall is a rich source of data for assessment of up-to-date status and age-appropriate vaccination. Also, NIS-Teen is the only source to provide comparable provider-reported vaccination data across states and local areas in the United States.

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 (NCIRD, 2026). 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 (NCIRD, 2026). For household variables, the missing value codes usually are 77 for DON'T KNOW, 98 for SKIPPED when completing on the web, and 99 for REFUSED when completing on the phone. 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-Teen 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 teens with a completed household interview – i.e., all teens appearing on the public-use data file. Missing values of health insurance variables are also imputed for teens with adequate provider data. 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 the 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 variable labels in the codebook (NCIRD, 2026) identify variables that contain imputed values. These variables include the sex, Hispanic origin, race, and health insurance status of the teen; the education level, age group, marital status, and mobility status of the mother; and the income-to-poverty ratio of the household. Codebooks from 2015 to present are available at: https://www.cdc.gov/nis/php/datasets-teen/index.html.

4.6. Vaccine-Specific Recoding of Verbatim Responses

On the IHQ, providers can list vaccinations in the "other" section of the IHQ shot grid. After data collection, these vaccinations are reclassified into the listed categories, if possible, using a vaccination recoding table. This table is reviewed by NCIRD personnel to ensure the vaccinations are recoded into the appropriate category or categories (for combination vaccinations).

4.7. Subsets of the NIS-Teen Data

The NIS-Teen public-use data file contains data for all adolescents aged 13–17 years 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 teen with a completed household interview is assigned a weight (**RDDWT_C** for the United States, excluding territories; **RDDWT_C_TERR** for the United States, including territories) for use in estimation.

The NIS-Teen 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 teens with adequate provider data. For these teens, one or more providers returned the immunization history questionnaire that included vaccination data. Unvaccinated teens are also considered to have adequate provider data. As discussed in Section 7

below, the **PDAT2** variable identifies the teens with adequate provider data (**PDAT2**=1). These teens have a separate weight (**PROVWT_C** for the United States, excluding territories; **PROVWT_C_TERR** for the United States, including territories)**,** which should be used to form estimates of vaccination coverage (see Section 6).

4.8. Confidentiality and Disclosure Avoidance

To prevent identification of participants in the NIS-Teen 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 collapsed or recoded. These decisions are reviewed by the NCIRD Disclosure Review Board to ensure the public-use data files meet acceptable levels of disclosure risk.

5. Quality Control and Quality Assurance Procedures

A major contributor to NIS-Teen data quality is its sample management system, which in 2024 managed over 230 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 household survey component of the NIS-Teen included on-line interviewer monitoring; on-line provider look-ups in a database system integrated with the data collection 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) address 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 were 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% verification. The keying error rate is estimated, by way of a second verification process, to be less than 1%.

6. Sampling Weights

The two phases (RDD-phase and provider-phase) of data collection result in a separate sampling weight for each teen that has data at that phase. The RDD-phase sampling weights permit analyses of data from teens with completed household interviews. Each teen with adequate provider data (the subset of teens with completed household interviews on which official estimates of vaccination coverage are based) has a provider-phase sampling weight. In 2024, the RDD-phase sampling weight variable for producing estimates for teens with completed household interviews in the United States excluding territories is called **RDDWT_C**, and the RDD-phase weight variable for producing estimates for the United States including territories is called **RDDWT_C_TERR**. The provider-phase sampling weight variable for producing estimates for teens with adequate provider data in the United States excluding territories is called **PROVWT_C**, and the provider-phase weight variable for producing estimates for the United States including territories is called **PROVWT_C_TERR**. See Section 8 of this user's guide for more information about the weights included in the data file and the proper way to use them.

A sampling weight may be interpreted as the approximate number of teens in the target population that a teen in the sample represents. Thus, for example, the sum of the sampling weights of teens that are up-to-date (on a particular vaccine or series of vaccines) yields an estimate of the total number of teens in the target population who are up-to-date. Dividing this sum by the total of the sampling weights for all teens 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 telephone number'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, subsampling of one eligible teen in the household, non-response to the household interview, number of telephone lines in the

household, raking for differential coverage rates, non-response by providers, and a final raking adjustment.

6.1. Base Sampling Weight

In each quarterly NIS-Teen sample, each teen with a completed household interview receives a base sampling weight. The base sampling weight is equal to the inverse of the probability the phone number was sampled from the sampling frame for the quarter and estimation area.

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

Non-response occurs in population-based surveys when respondents cannot be reached during the survey period, are not available at the time of the interview, or refuse to participate. Thus, the sum of the base sampling weights of teens 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 can accurately reflect the number of teens in the target population that each sampled teen with a completed household interview represents.

Some sampled households with age-eligible teens fail to complete the household interview because of unit non-response: for some telephone numbers, it is never determined whether or not the number is a working residential number despite multiple call attempts; for some households it is never determined whether or not the household contains age-eligible teens; and some households with age-eligible teens do not complete the household interview. To compensate for these types of unit non-response, the sampling weights of teens with a completed household interview are adjusted to account for the estimated number of age-eligible teens in households whose telephone numbers are never resolved; the estimated number of age-eligible teens in households that fail to complete the screening interview; and the estimated number of age-eligible teens in households that fail to complete the household interview because of unit non-

response. Each of these adjustments is carried out within each estimation area by forming weighting cells based on the Metropolitan Statistical Area (MSA) status of the wire center associated with the cellular phone number (MSA/non-MSA). Each of the non-response adjustments for territories was done at the estimation area level. That is, no weighting cells were formed for territories. Each cell in each stage of adjustment is ensured to have sufficient resolved/responding cases (usually 20) at that stage of adjustment. The cells with a deficient number of responding cases are collapsed into neighboring cells, i.e., both MSA categories are collapsed together if either of the cells have a deficient number of responding cases. 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 Subsampling of One Teen per Household

In households with more than one teen, only one teen is selected randomly per household for the NIS-Teen interview. The non-response adjusted age screener weight is adjusted to account for the teens that are not selected. Each household's age screener weight is adjusted by multiplying it by the total number of eligible teens reported in the household (up to a maximum of 3).

6.4. Adjustment for Interview Non-Response

Some households that are determined to be eligible fail to complete the household interview for the selected teen. To compensate for this third type of unit non-response, the sampling weights of teens with a completed household interview are adjusted to account for teens who live in households that failed to complete the household interview. Similar to the first two types of unit non-response, the adjustment is carried out within estimation areas by forming weighting cells based on MSA status. For territories, the interview non-response adjustment was done at the estimation area level, i.e., no weighting cells were formed for the territory interview non-response adjustment. Each weighting cell for the interview non-response adjustment must have sufficient responding cases (usually 15); cells with a deficient number of

responding cases are collapsed with neighboring cells, i.e., both MSA categories are collapsed together if either of the cells have a deficient number of responding cases. Once the adjustment cells are formed, the weights of the non-responding records from the previous adjustment step are distributed to the weights of the responding records within each cell.

6.5. Adjustment for Multiple Cellular Phones and Deriving Annual Weights

Once the non-response-adjusted interview weights for teens are computed, these weights are adjusted for additional cellular phones in the household. Because households with multiple cellular phones have a greater chance of being sampled, each teen's household interview weight is adjusted by dividing it by the total number of cellular phones used by parents or guardians (up to a maximum of 3).

Up to the previous step, the sampling weights are adjusted separately for each quarter, and the weights in each quarter pertain to the 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 and estimation area.

6.6. Post-Stratification

Survey weights must be adjusted to provide weights for the full target population of teens aged 13-17 years. Weights are first adjusted to population control totals by telephone status. Teens in dual landline and cellular phone households are adjusted to the population estimate of teens living in dual user households within each estimation area, and teens in cellular phone-only households within each estimation area are weighted to represent teens in cellular phone-only households. Teens in landline-only and phoneless households, which are excluded from the sample, are accounted for in the raking step described below.

The control totals used for the 2024 NIS-Teen are derived from a combination of 2023 census population estimates and the combined 2021, 2022, and 2023 one-year American Community Survey (ACS) data for the United States and Puerto Rico, with adjustments for mortality, foreign immigration, and migration between states to produce population totals as of July 1, 2024. For Guam, the control totals are derived from the 2020 Census data. The proportion of teens by detailed telephone status (landline-only, landline and cellular phone dual-user, cellular phone-only, phoneless) within each estimation area in the United States were derived using a similar small area modeling approach as described in Blumberg et al. (2011). These modeled telephone status estimates are applied to the control total for the total number of teens age 13-17 years in the estimation area to estimate the number of teens age 13-17 years by telephone status within the estimation area.

To reduce sampling variability and improve the precision of estimation, extreme weights are trimmed within an estimation area. RDD sampling weight values exceeding the median weight plus three times the interquartile range of the weights within an estimation area are truncated to that threshold. This weight trimming prevents teens with unusually large weights from having an unusually large impact on vaccination coverage estimates.

The final step in adjusting the RDD sampling weights is a raking adjustment (Deming, 1943) of the trimmed, telephone status adjusted weights. **To reduce the impact of weights that are substantially larger than those for other teens in the same estimation area, the raking adjustment is preceded by a weight trimming step applied within each estimation area using the method of Ganesh et al. (2015).** The weights are then raked to estimation area-level control totals for maternal education, teen's race/ethnicity, age group of the teen, sex of the teen, and telephone status. (The categories of some raking dimensions in some estimation areas are collapsed before raking to ensure at least 20 teens in each cell.) Briefly, raking takes each variable in turn and applies a proportional adjustment to the current weights of the teens 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.

The sampling weights after all the foregoing adjustments constitute the "RDD sampling weights" (**RDDWT_C** for the United States excluding territories; **RDDWT_C_TERR** for the United States including territories).

6.7. Adjustment for Provider Non-Response

Among the 38,140 teens with a completed household interview (excluding territories), 16,325 (42.8%) had adequate provider data. To maintain consistency with the adequate provider data definition used in previous years prior to the introduction of COVID-19 vaccines, adolescents were not considered to have adequate provider data if the only vaccinations reported were COVID-19 vaccinations. The definition of teens with adequate provider data includes unvaccinated teens. These are teens for whom the respondent reported during the household interview that the teen had received no vaccinations and has no providers, or for whom one or more providers were reported but those providers reported administering no vaccinations. **Among the 16,325 teens with adequate provider data (excluding territories), 108 were unvaccinated teens. Failure to obtain adequate provider data for the remaining 21,815 teens (57.2%) was attributable to:**

- **parent or guardian not giving consent to contact the teen's vaccination provider(s) (44.9%);**
- **consent to contact vaccination providers obtained but no providers returned the immunization history questionnaire (6.9%); and**
- **one or more providers returned the immunization history questionnaire, but no providers reported any non-COVID-19 vaccination data, despite the parent or guardian indicating that the teen has received vaccinations (4.9%).**

The 21,815 teens 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-Teen as a whole.

Empirical results for the NIS-Child 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 principal city of an MSA. Also, a child with missing provider data is less likely to live in the state where the mother lived when the child was born. These factors indicate a potential lack of continuity of health care, and are associated with lower vaccination rates (Coronado et al., 2000). An adjustment is made to the RDD sampling weights of the NIS-Child to account for these differences; otherwise, estimated vaccination coverage rates may be biased. A similar adjustment is also made to the RDD sampling weights of the NIS-Teen.

To reduce potential bias in estimators of vaccination coverage attributable to partial non-response, a weighting-class adjustment is used in each estimation area (Brick and Kalton, 1996). This adjustment involves three steps. In the first step, teens 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). Teens that 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, teens in each class are comparable. Because of this comparability, any sub-sample of teens in a class may represent all teens in the class. Therefore, the weighting-class adjustment uses the teens with adequate provider data to represent all teens 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 teens with missing provider data to the weights of the teens that have adequate provider data. These adjusted sampling weights of teens with adequate provider data are initial non-response-adjusted provider-phase weights.

Within an estimation area, the sums of non-response adjusted weights of teens 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. **As was done prior to the raking to create the RDD sampling weights, the raking here is preceded by a weight trimming step applied within each estimation area using the method of Ganesh et al. (2015).** Control totals for the raking variables were estimated using the weighted totals from the sample of teens with completed household interviews. Smith et al. (2001b, 2005) describe the development of this approach in more detail. These raked weights of teens with adequate provider data are called "final provider-phase weights" (**PROVWT_C** for the United States excluding territories and **PROVWT_C_TERR** for the United States including territories). Because of the comparability of teens within each weighting class, any estimate that uses data only from the teens with adequate provider data, along with their provider-phase sampling weights, will have less bias attributable to differences between teens with adequate provider data and teens with missing provider data.

Appendix B summarizes the distribution of the sampling weights in each estimation area.

7. Contents of the Public-Use Data File

The NIS-Teen public-use data file contains a record for each eligible teen for whom Section C of the household interview was completed, along with household-reported vaccination information and demographic information about the teen and the teen's mother. For teens with immunization history questionnaires containing vaccination data returned by one or more providers, the file also contains provider characteristic variables, as well as variables based on the teen's synthesized provider-reported vaccination history: the age of the teen at each vaccination, the number of each type of vaccination received, and indicators of whether the teen 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 (NCIRD, 2026). The codebook is divided into the ten sections described below and contains variable names, labels, and response frequencies (for categorical variables). The codebook also indicates the questionnaire item or items that serve as the ultimate source for each variable and, for selected variables, gives additional information about the variable in the "Notes" field. Codebooks, Household Interview Questionnaires, and IHQs from 2015 to present are located at: https://www.cdc.gov/nis/php/datasets-teen/index.html.

Before describing the sections of the public-use data file, we first summarize the differences between the 2023 and 2024 NIS-Teen public-use data files:

- **A new 2024 estimation area variable (ESTIAPT24) has been added and the 2023 estimation area variable (ESTIAPT23) has been dropped (see Table 5). Although data were collected for Guam in 2024, teens in Guam are not included on the public-use data file in order to protect confidentiality.**
- **A new MenACWY-MenB combination vaccine subtype, MenACWY-TT/MenB-FHbp (Penbraya) was added to the 2024 NIS-Teen IHQ in both the MEN and MENB shot**

categories. This new shot type is represented by the code "83" in the relevant MEN and MENB shot type and up-to-date indicators (see Table 3), and four new shot counter variables have been added to the 2024 NIS-Teen PUF for this vaccine subtype (P_N13MEN_83, P_NUMMEN_83, P_N13MENB_83, and P_NUMMENB_83).

- **CDC's official estimates for Meningococcal vaccination coverage among adolescents in 2024 (Pingali et al., 2025) used measures similar to the NIS-Teen variables P_UTDACWY (for Meningococcal ACWY coverage) and P_UTDMENB_S (for Meningococcal B coverage) but excluded the new MenACWY-MenB combination vaccine. Accordingly, alternate versions of the Meningococcal up-to-date indicators have been added to the 2024 NIS-Teen PUF which exclude doses of the MenACWY-MenB combination vaccine to allow data users to easily replicate CDC's estimates. The new variables are called P_UTDACWY_O, P_UTDMENB_O_S, and P_UTDMENB_O_L, and are identical to the original versions except for excluding the new MenACWY-MenB combination shot type.**
- **Due to changes in COVID-19 vaccination recommendations, the following legacy COVID-19 up-to-date indicators have been dropped from the 2024 NIS-Teen PUF: P_UTDCOV1, P_UTDCOV_FULL, and P_UTDCOV_BOOST.**

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

SEQNUMT is the unique teen identifier. (Because only one teen is selected per household, **SEQNUMT** is also a unique household identifier.) **PDAT2** indicates which teens are considered to have adequate provider data. As described in Section 6 of this report, **RDDWT_C/RDDWT_C_TERR** and **PROVWT_C/PROVWT_C_TERR** are the final household- and provider-phase weights, respectively. **PROVWT_C/PROVWT_C_TERR** 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.

7.2. Section 2: Household-Reported Vaccination and Health Information

As of 2017, all respondents are administered Section B of the household questionnaire, where they are asked whether they recall the teen getting flu, Td/Tdap, meningococcal, and HPV vaccinations, and for the number of meningococcal and HPV vaccinations.

Respondents are then administered Section C of the household interview, wherein information about the health of the selected teen and the teen's family, as well as demographic information about the teen and the teen's mother, is collected.

Section 2 of the public-use data file contains vaccination information collected in Section B, and the health information collected in Section C of the household questionnaire. **IMM_ANY** indicates whether the respondent reported that the teen has had a vaccination of any type. For each type of vaccine asked about in Section B (excluding seasonal influenza), a set of variables stores the information collected about that vaccine type; additional variables store the responses to the health questions in Section C.

The household-reported vaccination and health variables are described in more detail below. Household Interview Questionnaires from 2015 to present are located at: https://www.cdc.gov/nis/php/datasets-teen/index.html.

7.2.1. Household-Reported Tetanus Vaccine Variables

Section B respondents who said the teen has received a vaccination of any type (IMM_ANY=1) are asked whether they recall the teen getting any Tetanus booster vaccinations. Variable **TET_ANY** indicates whether any Tetanus booster vaccinations were reported for the teen. All respondents reporting that the teen has not received any Tetanus booster vaccinations are then asked the reason the teen didn't receive Tetanus booster vaccinations. Variables **TET_REAS_1-TET_REAS_5, TET_REAS_7**, and **TET_REAS_10-TET_REAS_28** store the answers to this choose-all-that-apply question and reflect the coding of open-ended responses into the reason categories existing on the questionnaire as well as into newly-created reason categories.

7.2.2. Household-Reported Meningococcal Vaccine Variables

Section B respondents who said the teen has received a vaccination of any type (IMM_ANY=1) are asked whether they recall the teen getting any meningococcal vaccinations, and if so, they are asked for the number of meningococcal vaccinations they recall. Variable **MEN_ANY** indicates whether any meningococcal vaccinations were reported for the teen. Variable **MEN_NUM_TOT** stores the total number of meningococcal vaccinations reported by the respondent. All respondents reporting that the teen has not received any meningococcal vaccinations, are then asked the reason the teen didn't receive meningococcal vaccinations. Variables **MEN_REAS_1-MEN_REAS_7** and **MEN_REAS_10-MEN_REAS_27** store the answers to this choose-all-that-apply question and reflect the coding of open-ended responses into the reason categories existing on the questionnaire as well as into newly-created reason categories.

7.2.3. Household-Reported Human Papillomavirus (HPV) Vaccine Variables

Section B respondents that said the teen has received a vaccination of any type (IMM_ANY=1) are asked whether they recall the teen getting any HPV vaccinations, and if so, they are asked for the number of HPV vaccinations they recall. Variable **HPVI_ANY** indicates whether any HPV vaccinations were reported for the teen. Variable **HPVI_NUM_TOT** stores the total number of HPV vaccinations reported by the respondent.

All respondents reporting that the teen has received a vaccination of any type (IMM_ANY=1), regardless of whether they reported the teen has received an HPV vaccination, are asked whether a doctor or other health care professional has ever recommended that the teen receive HPV vaccinations (**HPVI_RECOM**), and if so, the respondent is asked at what age the doctor recommended the teen should start receiving HPV shots (variable not included on the public-use file).

All respondents reporting that the teen received fewer than the recommended number of HPV vaccinations (two if the teen is under 15 years of age, three if the teen is 15 years or older) are asked how likely it is that the teen will receive HPV vaccinations in the next twelve months (**HPVI_INTENTR**).

Those responding "Not too likely", "Not likely at all", or “Not Sure/Don’t Know” are asked the reason the teen won't receive HPV vaccinations in the next twelve months. Variables **HPVI_REAS_1-HPVI_REAS_3, HPVI_REAS_5-HPVI_REAS_6**, and **HPVI_REAS_9-HPVI_REAS_33** store the answers to this choose-all-that-apply question and reflect the coding of open-ended responses into the reason categories existing on the questionnaire as well as into newly-created reason categories.

7.2.4. Household-Reported Health Variables

All respondents are asked whether the selected teen has ever had the chicken pox (**CPOX_HAD**) and, if so, they are asked the age of the teen in years at the time when the teen had the chicken pox (**CPOX_AGE**). Those unable to give an exact age are asked to report an age range (**CPOX_AGER**).

All respondents are then asked the age of the teen at the time of his or her last check-up (**CKUP_AGE**). If the teen's age at the last check-up was 13 years or more, the respondent is asked whether the teen had an 11-12 year old well-child exam (**CKUP_11_12**); if the respondent is unable or unwilling to answer this question he or she is asked whether or not the teen's last check-up was more than, exactly, or less than [age of teen - 12] years ago (**CKUP_LAST**).

All respondents are asked the number of times the teen has seen a health care professional in the last 12 months (**VISITS**); whether the teen has been told by a health professional that he or she has asthma (**ASTHMA**); whether the teen has ever been told by a health professional that he or she has a lung condition other than asthma, a heart condition, diabetes, a kidney condition, sickle cell anemia or other anemia, or a weakened immune system caused by a chronic illness or by medicines taken for a chronic illness (**RISK_EVER**); whether the teen currently has any of these conditions (**RISK_NOW**); and whether any other members of the teen's household currently have any of these conditions (**RISK_HH**). Finally, the respondent is asked the number of times in the past 12 months the teen has missed school due to illness or injury (**NOSCHOOLR**).

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

Section 3 of the NIS-Teen public-use data file consists of information collected during the household screening interview and the demographic information collected in 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 been collapsed or recoded. Codebooks and Household Interview Questionnaires from 2015 to present are located at: https://www.cdc.gov/nis/php/datasets-teen/index.html.

AGE is the age of the selected teen in years based on the teen's best date of birth and the screener completion date, and **SEX** gives the sex of the selected teen, with missing values imputed. The language in which the interview was conducted is stored in variable **LANGUAGE**, and **C5R** gives the relationship of the respondent to the selected teen.

C1R and **CHILDNM** give the number of people and children, respectively, in the household.

The teen'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. **EDUC_TR** gives the teen's grade in school at the time of the interview.

The age, education level, and marital status of the mother of the selected teen are stored in variables **AGEGRP_M_I**, **EDUC1**, and **MARITAL2** (married vs. not married), with missing values imputed.

The categorized total combined income for the teen'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. **INCPORAR_I** gives the same ratio after missing values of family income have been imputed. Household tenure is given by **RENT_OWN**.

The number of landline telephone numbers in the household, the number of working cellular phones household members have available for personal use, and the number of these cellular 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 teen's birth.

7.4. Section 4: Geographic Variables

Variables **ESTIAPT24** and **STATE** give the 2024 estimation area and state of residence, respectively, for each teen. **EST_GRANT** indicates which of the 50 states, District of Columbia, and 5 local areas that receive federal Section 317 immunization grants (Bexar County, TX; City of Chicago, IL; City of Houston, TX; New York City, NY; Philadelphia County, PA) the teen resides in.

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

Variable **D7** indicates whether the respondent gave consent to contact the teen'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 respondents sometimes report erroneous provider counts and sometimes report the same provider more than one time, and **D6R** does not reflect the cleaning or de-duplication of the initially reported provider count. Variable **NUM_PROVR** gives the number of providers identified for teens with consent to contact the providers and reflects the cleaning and de-duplication of the initially reported provider count. For teens without consent, **NUM_PROVR** is set to 0.

7.6. Section 6: Number of Responding Providers Variables

Variable **N_PRVR** indicates the number of providers returning IHQs with vaccination information for the teen. That is, **N_PRVR** is the number of IHQs that were returned for the teen that contain information on the IHQ shot grid.

7.7. Section 7: Characteristics of Providers Variables

This section summarizes the information collected in IHQ questions 4, 5b, 6, and 7 across the teen's providers who returned IHQs.

WELLCHILD indicates whether the teen had an 11-12 year old well child exam or check-up based on responses to IHQ question 4. If any of the teen's providers that returned IHQs reported that the teen had a well child exam, then **WELLCHILD**=1. If all of the teen's providers that returned IHQs reported that the teen did not have a well child exam, then **WELLCHILD**=2. If none of the teen's providers that returned IHQs reported that the teen had a well child exam, but at least one provider left the question blank or selected “Don’t Know”, or if no IHQs were returned for the teen, then **WELLCHILD**=3 (unknown).

FACILITY indicates the facility type of the teen's vaccination providers based on responses to IHQ question 5b. If all of the teen's providers who returned IHQs containing vaccination (i.e. shot grid) data (see Section 6 variable **N_PRVR**) reported their facility type to be:

- a public health department-operated clinic, community health center, rural health clinic, migrant health center, Indian Health Service-operated center, tribal health facility, or urban Indian health care facility, then **FACILITY**=1 (all public facilities);
- a hospital-based clinic, then **FACILITY**=2 (all hospital facilities);
- a private practice, then **FACILITY**=3 (all private facilities);
- a military health care facility, WIC clinic, school-based health center, pharmacy, or other type of facility, then **FACILITY**=4 (all military/WIC/school/pharmacy or other facilities).

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

The Vaccines For Children (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 (http://www.cdc.gov/vaccines/programs/vfc/index.html). CDC buys vaccines at a discount and distributes them to awardees—i.e., state health departments and certain local and territorial public health agencies—which in turn distribute them at no charge to those private physicians' offices and public health clinics registered as VFC providers. **VFC_ORDER**, based on responses to IHQ question 6, indicates whether the teen's vaccination providers order vaccines from a state or local health department to administer to children. If all of the teen'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 teen'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 teen'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 teen'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 teen's providers returned an IHQ containing shot grid data, **VFC_ORDER**=4 (unknown). If none of the teen's providers returned an IHQ containing shot grid data, **VFC_ORDER** is set to missing. Note that having a provider that orders VFC vaccine does not imply that the child is VFC-entitled; providers enrolled in the VFC program could also vaccinate children who are not VFC-entitled.

REGISTRY is based on responses to IHQ question 7 and indicates whether the teen's vaccination providers reported the teen's vaccinations to a community or state immunization registry (also known as an Immunization Information System, or IIS). If all of the teen'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 teen's providers that returned an IHQ containing shot grid data indicated that the practice reported to a registry and the teen'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 teen'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 teen's providers returned an IHQ containing shot grid data, **REGISTRY**=4 (unknown). If none of the teen'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 teen'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-Teen, 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. Table 3 shows the vaccine categories and types for the 2024 NIS-Teen public-use data file.

For each vaccine category (except for COVID-19, see below), Section 8 of the public-use data file contains a variable named **P_NUM*YYY*** – where "YYY" is the vaccine category abbreviation given in Table 3 – that stores the number of vaccinations in that vaccine category in the teen's synthesized

provider-reported vaccination history. For each vaccine category and type combination, Section 8 also contains a variable named **P_NUM*YYY_TT*** – where "YYY" is the vaccine category abbreviation and "TT" is the vaccine type code given in Table 3 – that stores the number of vaccinations in that vaccine category of that vaccine type in the teen's synthesized provider-reported vaccination history.

For each **P_NUM*YYY*** and **P_NUM*YYY_TT*** variable described above, there are corresponding variables of the form **P_N13*YYY*** and **P_N13*YYY_TT*** that count only vaccinations that the teen received prior to age 13 years.

This section of the public-use data file also contains up-to-date (UTD) indicators for a variety of recommended vaccines and vaccine series. These variables' names begin with "**P_UTD**"; 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 3) being included when determining whether the teen is up-to-date. For each "P_UTD" variable there is a corresponding variable whose name begins with "**P_U13**" that indicates whether the teen was up-to-date for the particular vaccine or vaccine series by age 13 years.

Note that it is possible that the administration of the NIS-Teen interview itself prompts some respondents to vaccinate their teens following the interview; to ensure that the vaccination rate estimates aren't artificially boosted because of this, the "**P_NUM**", "**P_N13**", "**P_UTD**", and "**P_U13**" variables in this section of the public-use data file count only vaccinations received before the date the household interview was completed.

In 2021, the NIS-Teen began collecting provider-reported COVID-19 vaccination data. However, detailed information about the number, types, and age-at-vaccination of COVID-19 doses are not included on the NIS-Teen public-use data file to protect respondent confidentiality.

This section also contains some additional UTD variables specific to human papillomavirus (HPV) vaccines. **P_UTDHPV11**, **P_UTDHPV12**, and **P_UTDHPV13** are conditional up-to-date indicators

showing whether a teen has received exactly 1, exactly 2, or 3 or more HPV vaccinations, given that the teen has received at least one. Teens that have received no HPV vaccinations will have missing values for these variables. **P_UTDHPV3C** is the conditional HPV vaccination series completion indicator for the 3-dose series. It indicates, among teens that have received at least one HPV vaccination, whether the teen completed the series of three doses. This variable is limited to teens with at least one HPV vaccination where the interview completion date follows the date of the first HPV vaccination by at least 6 months, as 6 months is the minimum amount of time required to complete the 3-dose HPV vaccine series. **P_UTDHPV_15** indicates teens that either have received 3 or more HPV doses or have received 2 or more HPV doses with the 1st dose before age 15 years. **P_UTDHPV_15INT** indicates teens that either have received 3 or more HPV doses or have received 2 or more HPV doses with the 1st dose before age 15 years and at least 5 months minus 4 days between the 1st and 2nd doses. **P_U13HPV_15INT** identifies teens who met these criteria by age 13. **P_UTDHPV3C_15INT** is the conditional HPV vaccination series completion indicator for either the 3-dose or 2-dose series. This variable uses the same criteria as P_UTDHPV_15INT but is limited to teens with at least one HPV vaccination and 6 months between the first HPV dose date and the household interview date.

Finally, this section includes two UTD variables specific to Meningococcal Serogroup B (MenB), both of which identify teens who have received at least 2 doses of MenB at age 10 or later with the appropriate interval between doses dependent on brand (4 weeks apart for Bexeros, or 6 months apart for Trumenba or Penbraya). The two variables differ in the treatment of Meningococcal doses of unknown type: **P_UTDMENB_S** uses a strict definition of UTD status which excludes all doses of unknown type, while **P_UTDMENB_L** uses a lenient definition of UTD status in which doses of unknown type are assumed to be the type most likely to result in the teen meeting the UTD criteria.

Table 3: Vaccine Categories and Vaccine Types, National Immunization Survey - Teen, 2024

Vaccine Category Abbreviation[1]	Vaccine Category Description	Vaccine Type Code	Vaccine Type Description
TDP	Td/Tdap-containing, given after age 6 years	11	Td
TDP	Td/Tdap-containing, given after age 6 years	14	Tdap
TDP	Td/Tdap-containing, given after age 6 years	15	Td/Tdap-containing, unknown type
HEPB	Hepatitis B-containing	61	0.5 ml Recombivax
HEPB	Hepatitis B-containing	62	1.0 ml Recombivax
HEPB	Hepatitis B-containing	63	Engerix
HEPB	Hepatitis B-containing	64	Hepatitis B-only, unknown type
HEPB	Hepatitis B-containing	43	HepB-Hib
HEPB	Hepatitis B-containing	HB	Hepatitis B-containing, unknown type
FLU	Seasonal influenza-containing	FZ	Fluzone
FLU	Seasonal influenza-containing	FV	Fluvirin
FLU	Seasonal influenza-containing	FN	Injected influenza, other/unknown type
FLU	Seasonal influenza-containing	FM	Flumist
FLU	Seasonal influenza-containing	FL	Influenza-containing, unknown type
MCV	Measles-containing	30	MMR-only
MCV	Measles-containing	31	Measles-only
MCV	Measles-containing	32	Measles-Mumps (through backcoding)
MCV	Measles-containing	33	Measles-Rubella (through backcoding)
MCV	Measles-containing	VM	MMR-Varicella
MCV	Measles-containing	MM	Measles-containing, unknown type
VAR	Varicella-containing	VO	Varicella-only
VAR	Varicella-containing	VM	MMR-Varicella
VAR	Varicella-containing	VA	Varicella-containing, unknown type
HEPA	Hepatitis A-containing	HO	HepA-only (Havrix or Vaqta)
HEPA	Hepatitis A-containing	HA	HepA-containing, unknown type
MEN	Meningococcal serogroup ACWY	80	MenACWY (Menactra or Menveo)
MEN	Meningococcal serogroup ACWY	81	MPSV4 (Menomune)
MEN	Meningococcal serogroup ACWY	82	Meningococcal serogroup ACWY, unknown type
MEN	**Meningococcal serogroup ACWY**	**83**	**MenACWY-TT/MenB-FHbp (Penbraya)**
MENB	Meningococcal serogroup B	BT	MenB-FHbp
MENB	Meningococcal serogroup B	BB	MenB-4C
MENB	Meningococcal serogroup B	83	MenACWY-TT/MenB-FHbp (Penbraya)
MENB	Meningococcal serogroup B	BU	Meningococcal serogroup B, unknown type
MENU	Meningococcal, unknown serogroup	-	-
HPV	Human Papillomavirus	CV	Cervarix (2vHPV)
HPV	Human Papillomavirus	4V	Gardasil 4 (4vHPV)
HPV	Human Papillomavirus	9V	Gardasil 9 (9vHPV)
HPV	Human Papillomavirus	UV	Gardasil, unknown valency
HPV	Human Papillomavirus	HP	HPV, unknown type

Vaccine Category Abbreviation[1]	Vaccine Category Description	Vaccine Type Code	Vaccine Type Description
COV	COVID-19	CP	Pfizer-BioNTech
COV	COVID-19	CM	Moderna
COV	COVID-19	CJ	Johnson & Johnson/Janssen
COV	COVID-19	CN	Novavax
COV	COVID-19	CX	COVID-19, unknown type

[1] If another vaccine type is reported that is not on this list, it is either coded with the appropriate shot category with "unknown type" code (if it belongs in one of the existing NIS-Teen shot categories), or in an "Other" shot category (if it does not belong to an existing NIS-Teen shot category). Shots in the "Other" shot category are not included in the synthesized vaccination history variables, while shots coded to the shot category-specific "unknown type" codes are included except where variables are restricted to specific subtypes (as described in the variable labels/notes).

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

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

For each vaccine category, variables ***YYY*_AGE1** - ***YYY*_AGE9** store the age in years of the teen when the vaccination was administered for up to nine vaccinations in the teen's synthesized provider-reported vaccination history, where "**YYY**" is the vaccine category abbreviation given in Table 3. Variables ***YYY*_MAGE1 - *YYY*_MAGE9** store the age in months of the teen when each vaccination was administered. Variables ***YYY*_DAGE1 - *YYY*_DAGE9** store the age in days of the teen when each vaccination was administered. For vaccine categories that contain multiple vaccine types, variables **X*YYY*TY1 - X*YYY*TY9** give the corresponding vaccine type code (see Table 3).

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.

Users of the NIS-Teen public-use data file should be aware that the age-at-vaccination variables included in Section 9 may contain a small number of vaccination ages that are implausible according to the recommended immunization schedules (https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html). Such ages may arise if a medical provider inadvertently records an erroneous vaccination date or if a vaccination date is incorrectly transcribed onto an IHQ. The quality control procedures of the NIS-Teen address implausible ages to every extent possible. Suspicious dates are manually reviewed and corrected if there is evidence either from the household interview or from another provider that the date is incorrect. In rare cases, however, when there is no further information with which to correct the reported vaccination date, the vaccination is treated as having actually occurred and the implausible age at vaccination persists on the data file. The data user should consider these issues in deciding how to analyze the NIS-Teen data.

7.10. Section 10: Health Insurance Module Variables

The Health Insurance Module (HIM) (Section E) gathers information on the health insurance coverage of the selected teen. Prior to 2016, seven variables containing HIM data were included in the NIS-Teen public-use data file:

- TIS_INS_1: “Is the teen covered by health insurance provided through employer or union?”;
- TIS_INS_2: “Is the teen covered by any MEDICAID plan?”;
- TIS_INS_3: “Is the teen covered by CHIP?”;
- TIS_INS_3A: “Is the teen covered by any MEDICAID plan or CHIP?”;
- TIS_INS_4_5: “Is the teen covered by Indian Health Service, Military Health Care, TRICARE, CHAMPUS, or CHAMP-VA?”;
- TIS_INS_6: “Is the teen covered by any other health insurance or health care plan?”; and
- TIS_INS_11: “Since age 11, was there any time when the teen was not covered by health insurance?”

In 2016, these variables were replaced by two health insurance variables, INS_STAT_I and INS_BREAK_I, which summarize the teen's health insurance status and history across all of the insurance questions listed above, while also incorporating the imputation of missing values and coding of open-ended responses. In 2017, INS_STAT_I was replaced with INS_STAT2_I, which provides a different categorization of teens with both private and non-private, non-Medicaid insurance.

INS_STAT2_I identifies the teen's current health insurance coverage status. If the teen has a form of private health insurance and is not covered by any other type of health insurance, he/she is classified as (1) Private only. If the teen is on any form of Medicaid, alone or in addition to other forms of insurance, he/she is classified as (2) Any Medicaid. If the teen is not covered by Medicaid but is covered by some other type of health insurance (including, but not limited to, CHIP, Indian Health Service, Military Health Care, TRICARE, CHAMPUS, or CHAMP-VA), either alone or in combination with private insurance, he/she is classified as (3) Other. If the teen is not covered by any kind of health insurance, he/she is classified as (4) Uninsured.

INS_BREAK_I describes the teen's health insurance coverage history since age 11 and indicates whether there have been any breaks in health insurance coverage during this period. A teen may be (1) currently insured but uninsured at some point since age 11, (2) currently insured and never uninsured since age 11, (3) currently uninsured but insured at some point since age 11, or (4) currently uninsured and never insured since age 11.

Both variables are available only for teens with adequate provider data. Beginning in 2022, these variables are available for teens from all estimation areas, whereas prior to 2022, they were not available from teens residing in U.S. territories.

8. Analytic and Reporting Guidelines

Data from the NIS-Teen public-use data file can be used to produce national, state, and estimation-area estimates of vaccination coverage rates using the **PROVWT_C** weight (**PROVWT_C_TERR** if territories are 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-Teen. The file includes estimation area and state identifiers (**ESTIAPT24** and **STATE**) as well as a stratum identifier, **STRATUM**. The sample is stratified by the 58 geographic estimation areas.

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 CDC standard for precision of sub-group estimates is that relative standard error (the ratio of the standard error to the estimate) should be less than 0.3, and each analytic cell should contain at least 30 respondents.

8.1. Use of NIS Sampling Weights

The 2024 NIS-Teen public-use data file contains two teen-level sets of weights. The **RDDWT_C** variable gives the household-phase weight for all teens in the United States excluding territories (**RDDWT_C_TERR** if territories are to be included). These weights should be used to form estimates from teens with completed household interviews. The weights reflect the stratified sample design and also have been adjusted for unit non-response, for the selection of one teen per household, for the number of telephone lines in the household, for calibration to population control totals, and for the exclusion of non-telephone and landline-only teens. The weight variables **PROVWT_C**/**PROVWT_C_TERR** apply to teens with adequate provider data. These weights should be used to form estimates of vaccination coverage using variables from Sections 7, 8, and 9 of the public-use data file (see Section 7 of this user's

guide). Table 4 presents a summary of the appropriate weights and stratum variables to use for various types of analyses.

Table 4: Summary of Weights and Stratum Variables, National Immunization Survey - Teen, 2024

Weight Variable	Population*	Sample Frame	Strata	Stratum Variable
RDDWT_C	United States excluding territories	Single Frame Cellular Phone	Estimation Area	STRATUM
RDDWT_C_TERR	United States including territories	Single Frame Cellular Phone	Estimation Area	STRATUM
PROVWT_C	United States excluding territories, teens with adequate provider data	Single Frame Cellular Phone	Estimation Area	STRATUM
PROVWT_C_TERR	United States including territories, teens with adequate provider data	Single Frame Cellular Phone	Estimation Area	STRATUM

* Each weight will contain a missing value for all records that are not included in the population covered by the weight.

The NIS-Teen public-use data file does not contain any provider-level weights. The NIS-Teen does not sample providers directly; rather, they are included in the survey through the teens they vaccinate. A user of the file should not attempt provider-level analyses (e.g., estimate the percentage of providers in the United States that are private providers), because the NIS-Teen 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 teens with adequate provider data (**PDAT2** = 1), along with their final provider sampling weights (**PROVWT_C**/**PROVWT_C_TERR**). To summarize the statistical methodology by which vaccination coverage rates and their standard errors are obtained from these data, let Y_{hi} be an indicator, for the *i*th teen with adequate provider data in the *h*th stratum of the NIS-Teen sampling design, equal to 1 if the teen is up-to-date according to the provider data and 0

otherwise. Also, let W_{hi} denote the value of **PROVWT_C**/**PROVWT_C_TERR** for this teen. Then, letting $\hat{Y}_h = \sum_{i=1}^{n_h} W_{hi} Y_{hi}$ and $\hat{T}_h = \sum_{i=1}^{n_h} W_{hi}$, 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, and n_h denotes the number of sampled teens with adequate provider data in the hth stratum.

Letting L instead denote the number of strata 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 stratum).

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 $Z_{hi} = \frac{W_{hi}(Y_{hi} - \hat{\theta})}{\sum_{h=1}^{L} \hat{T}_h}$ and $\bar{Z}_h = \frac{\sum_{i=1}^{n_h} Z_{hi}}{n_h}$ 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-Teen can be implemented in specialized statistical software such as SUDAAN (RTI International, 2008), SAS (SAS Institute Inc., 2025), R (R Core Team, 2025), and Stata (StataCorp, 2025). Several examples of the use of SAS, R, and SUDAAN to estimate vaccination coverage rates and their standard errors for estimation areas and states can be found in the accompanying

example SUDAAN, SAS, and R analysis programs (available for download at https://www.cdc.gov/nis/php/datasets-teen/index.html). 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. For all estimates, the variable **STRATUM** is used as the stratum variable and the household/teen identifier (**SEQNUMT**) is used as the primary sampling unit identifier. The data file should be sorted first on **STRATUM** and then on **SEQNUMT** within **STRATUM** before running the programs for SUDAAN and SAS.

8.3. Combining Multiple Years of NIS-Teen Data

8.3.1. Estimation of Multi-Year Means

With release of the 2024 NIS-Teen public-use data file, seventeen years of public-use NIS-Teen data are now available. The precision of estimates of vaccination coverage for sub-domains (e.g., by race/ethnicity of teen) within estimation areas or states can be improved by combining multiple years of NIS-Teen data. Data users should, however, be aware that estimates from combined years of NIS-Teen data represent an average over multiple years. Although combining multiple years of NIS-Teen 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-Teen, it is also possible that a teen could appear in more than one public-use data file. Finally, given the change to the definition of adequate provider data in 2014 and its effect on NIS-Teen vaccination coverage rate estimates as described in the introduction, users should exercise caution when interpreting results from a combination of years prior to 2014 with years 2014 and later.

To estimate a multi-year mean for a given NIS-Teen variable, the weights in each participating file (RDD-phase weights **RDDWT** in 2008-2011, **RDDWT_D** in 2012-2017, and **RDDWT_C** in 2018-2024;

and provider-phase weights **PROVWT** in 2008-2011, **PROVWT_D** in 2012-2017, and **PROVWT_C** in 2018-2024) should be divided by the number of years being combined. For example, if data for 2023-2024 for teens with adequate provider data are to be combined, then the weights in the two files – **PROVWT_C** in both 2023 and 2024 – 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 teens aged 13-17 years. Furthermore, the teen ID numbers (**SEQNUMT**) 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:

YRSEQT = 1 ***** (**YEAR** || **SEQNUMT**);

YEAR is the 4-digit year variable for the NIS-Teen data year (e.g., 2024).

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, SUDAAN, R, or Stata.

There is an important complication for variance estimation when combining multiple years, because some estimation areas are removed and other new areas are added each year (see Section 2 above for more information about rotating estimation areas). The variance strata are defined by the variables **ESTIAPT08-ESTIAPT10** (for 2008-2010), **STRATUM_D** (for 2011), and **STRATUM** (for 2012-2024), with **STRATUM_D** and **STRATUM** being a combination of the estimation area variable for that year and the sampling frame (landline or cellular phone). The estimation area variables **ESTIAPT08-ESTIAPT24** define mutually exclusive and exhaustive geographic areas. However, they are not exactly the same areas. For example, **Dallas County, TX, was a separate estimation area in 2009-2011, 2016-2017, and 2019 but not in 2012-2015, 2018, and 2020-2024. Tarrant County, TX, was a separate**

estimation area in 2018, but not in 2008-2017 and 2019-2024. Other areas, such as New York City, NY and Rest of New York, are estimation areas in all years.

To make inferences concerning multi-year means, the user must take two actions. First, the user must define and save a new stratum variable with a common name for all years included in the analysis. Second, the user 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 = **ESTIAPT08-ESTIAPT10**, for teens in the 2008-2010 public-use data files

   = **STRATUM_D**, for teens in the 2011 public-use data file

   = **STRATUM**, for teens in the 2012-2024 public-use data files

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 teen identification numbers, **YRSEQT**, 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 CDIAP (Common Denominator Estimation Area) variable set forth in Table 5 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 **YRSEQT**.

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 YRSEQT / PSULEV = 3;

the specification of weights by

WEIGHT NEWWT;

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

CLASS YEAR CDIAP STATE;
TABLES CDIAP;

or

CLASS YEAR CDIAP 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-Teen years. For example, a typical contrast of interest would be the difference between the vaccination coverage parameters in 2023 and in 2024. As when combining multiple years of NIS-Teen data to estimate multi-year means, users should exercise caution when combining multiple years of data to estimate multi-year contrasts. The composition of the population in a geographic area may change over time, and it is possible that a teen could appear in more than one public-use data file. Furthermore, given the change in the definition of adequate provider data in 2014, users should be aware that NIS-Teen vaccination coverage estimates from 2014 and later, which use the revised definition, are not directly comparable to those from NIS-Teen 2013 and prior, which used the previous adequate provider data definition.

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 teen is in the 2008-2011 public-use data file

= **PROVWT_D**, if the teen is in the 2012-2017 public-use data files

= **PROVWT_C**, if the teen is in the 2018-2024 public-use data files.

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 Td/Tdap-containing vaccine up-to-date estimate from 2023 to the 2024 estimate, SUDAAN users can use the following WEIGHT, VAR, and CONTRAST statements:

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

Table 5: Cross-Walk Between Annual Estimation Areas, ESTIAPT08-ESTIAPT24, and Common Denominator Estimation Area (CDIAP), National Immunization Survey - Teen, 2008-2024*

CDIAP	Area Name	ESTIAPT08 (2008)	ESTIAPT09 (2009)	ESTIAPT10 (2010)	ESTIAPT11 (2011)	ESTIAPT12 (2012)	ESTIAPT13 (2013)	ESTIAPT14 (2014)	ESTIAPT15 (2015)
20	Alabama	20	20	20	20	20	20	20	20
74	Alaska	74	74	74	74	74	74	74	74
66	Arizona	66	66	66	66	66	66	66	66
46	Arkansas	46	46	46	46	46	46	46	46
	California								
68	CA-Los Angeles County	68	69	68	68	68	68	68	68
68	CA-Rest of State	68	68	68	68	68	68	68	68
60	Colorado	60	60	60	60	60	60	60	60
1	Connecticut	1	1	1	1	1	1	1	1
13	Delaware	13	13	13	13	13	13	13	13
12	District of Columbia	12	12	12	12	12	12	12	12
22	Florida	22	22	22	22	22	22	22	22
25	Georgia	25	25	25	25	25	25	25	25
72	Hawaii	72	72	72	72	72	72	72	72
75	Idaho	75	75	75	75	75	75	75	75
	Illinois								
35	IL-City of Chicago	35	35	35	35	35	35	35	35
34	IL-Rest of State	34	34	34	34	34	34	34	34
	Indiana								
36	IN-Lake County	36	96	36	36	36	36	36	36
36	IN-Marion County	36	37	36	36	36	36	36	36
36	IN-Rest of State	36	36	36	36	36	36	36	36
56	Iowa	56	56	56	56	56	56	56	56
57	Kansas	57	57	57	57	57	57	57	57
27	Kentucky	27	27	27	27	27	27	27	27
47	Louisiana	47	47	47	47	47	47	47	47
4	Maine	4	4	4	4	4	4	4	4
14	Maryland	14	14	14	14	14	14	14	14
2	Massachusetts	2	2	2	2	2	2	2	2
38	Michigan	38	38	38	38	38	38	38	38
40	Minnesota	40	40	40	40	40	40	40	40
28	Mississippi	28	28	28	28	28	28	28	28
58	Missouri	58	58	58	58	58	58	58	58
61	Montana	61	61	61	61	61	61	61	61
59	Nebraska	59	59	59	59	59	59	59	59
73	Nevada	73	73	73	73	73	73	73	73
5	New Hampshire	5	5	5	5	5	5	5	5
8	New Jersey	8	8	8	8	8	8	8	8

CDIAP	Area Name	ESTIAPT08 (2008)	ESTIAPT09 (2009)	ESTIAPT10 (2010)	ESTIAPT11 (2011)	ESTIAPT12 (2012)	ESTIAPT13 (2013)	ESTIAPT14 (2014)	ESTIAPT15 (2015)
49	New Mexico	49	49	49	49	49	49	49	49
	New York								
11	NY-City of New York	11	11	11	11	11	11	11	11
10	NY-Rest of State	10	10	10	10	10	10	10	10
29	North Carolina	29	29	29	29	29	29	29	29
62	North Dakota	62	62	62	62	62	62	62	62
41	Ohio	41	41	41	41	41	41	41	41
50	Oklahoma	50	50	50	50	50	50	50	50
76	Oregon	76	76	76	76	76	76	76	76
	Pennsylvania								
17	PA-Philadelphia County	17	17	17	17	17	17	17	17
16	PA-Rest of State	16	16	16	16	16	16	16	16
6	Rhode Island	6	6	6	6	6	6	6	6
30	South Carolina	30	30	30	30	30	30	30	30
63	South Dakota	63	63	63	63	63	63	63	63
31	Tennessee	31	31	31	31	31	31	31	31
	Texas								
55	TX-Bexar County	55	55	55	55	55	55	55	55
54	TX-City of Houston	54	54	54	54	54	54	54	54
51	TX-Dallas County	51	52	52	52	51	51	51	51
51	TX-El Paso County	51	53	53	53	51	51	53	53
51	TX-Hidalgo County	51	51	51	51	51	51	51	107
51	TX-Travis County	51	51	51	51	51	51	51	51
51	TX-Tarrant County	51	51	51	51	51	51	51	51
51	TX-Rest of State	51	51	51	51	51	51	51	51
64	Utah	64	64	64	64	64	64	64	64
7	Vermont	7	7	7	7	7	7	7	7
18	Virginia	18	18	18	18	18	18	18	18
77	Washington	77	77	77	77	77	77	77	77
19	West Virginia	19	19	19	19	19	19	19	19
44	Wisconsin	44	44	44	44	44	44	44	44
65	Wyoming	65	65	65	65	65	65	65	65
-	Puerto Rico	-	-	-	-	-	-	106	106

Table 5 (continued): Cross-Walk Between ESTIAPT08-ESTIAPT24 and Common Denominator Estimation Area (CDIAP), National Immunization Survey - Teen, 2008-2024

CDIAP	Area Name	ESTIAPT16 (2016)	ESTIAPT17 (2017)	ESTIAPT18 (2018)	ESTIAPT19 (2019)	ESTIAPT20 – ESTIAPT24 (2020-2024)
20	Alabama	20	20	20	20	20
74	Alaska	74	74	74	74	74
66	Arizona	66	66	66	66	66
46	Arkansas	46	46	46	46	46
	California					
68	CA-Los Angeles County	68	68	68	68	68
68	CA-Rest of State	68	68	68	68	68
60	Colorado	60	60	60	60	60
1	Connecticut	1	1	1	1	1
13	Delaware	13	13	13	13	13
12	District of Columbia	12	12	12	12	12
22	Florida	22	22	22	22	22
25	Georgia	25	25	25	25	25
72	Hawaii	72	72	72	72	72
75	Idaho	75	75	75	75	75
	Illinois					
35	IL-City of Chicago	35	35	35	35	35
34	IL-Rest of State	34	34	34	34	34
	Indiana					
36	IN-Lake County	36	36	36	36	36
36	IN-Marion County	36	36	36	36	36
36	IN-Rest of State	36	36	36	36	36
56	Iowa	56	56	56	56	56
57	Kansas	57	57	57	57	57
27	Kentucky	27	27	27	27	27
47	Louisiana	47	47	47	47	47
4	Maine	4	4	4	4	4
14	Maryland	14	14	14	14	14
2	Massachusetts	2	2	2	2	2
38	Michigan	38	38	38	38	38
40	Minnesota	40	40	40	40	40
28	Mississippi	28	28	28	28	28
58	Missouri	58	58	58	58	58
61	Montana	61	61	61	61	61
59	Nebraska	59	59	59	59	59
73	Nevada	73	73	73	73	73
5	New Hampshire	5	5	5	5	5
8	New Jersey	8	8	8	8	8

CDIAP	Area Name	ESTIAPT16 (2016)	ESTIAPT17 (2017)	ESTIAPT18 (2018)	ESTIAPT19 (2019)	ESTIAPT20 – ESTIAPT24 (2020-2024)
49	New Mexico	49	49	49	49	59
	New York					
11	NY-City of New York	11	11	11	11	11
10	NY-Rest of State	10	10	10	10	10
29	North Carolina	29	29	29	29	39
62	North Dakota	62	62	62	62	62
41	Ohio	41	41	41	41	41
50	Oklahoma	50	50	50	50	50
76	Oregon	76	76	76	76	76
	Pennsylvania					
17	PA-Philadelphia County	17	17	17	17	17
16	PA-Rest of State	16	16	16	16	16
6	Rhode Island	6	6	6	6	6
30	South Carolina	30	30	30	30	30
63	South Dakota	63	63	63	63	63
31	Tennessee	31	31	31	31	31
	Texas					
55	TX-Bexar County	55	55	55	55	55
54	TX-City of Houston	54	54	54	54	54
51	TX-Dallas County	52	52	51	52	51
51	TX-El Paso County	53	53	51	53	51
51	TX-Hidalgo County	51	51	107	51	51
51	TX-Travis County	51	108	51	51	51
51	TX-Tarrant County	51	51	109	51	51
51	TX-Rest of State	51	51	51	51	51
64	Utah	64	64	64	64	64
7	Vermont	7	7	7	7	7
18	Virginia	18	18	18	18	18
77	Washington	77	77	77	77	77
19	West Virginia	19	19	19	19	19
44	Wisconsin	44	44	44	44	44
65	Wyoming	65	65	65	65	65
-	Puerto Rico	106	-	-	106	106

*This table can be used to derive a Common Denominator Estimation Area (CDIAP) variable for use in multi-year NIS-Teen analyses. This is necessary because certain areas may be included as separate estimation areas in one year but subsumed within other estimation areas in another year. The CDIAP variable can be derived for each year by mapping the codes in the year-specific estimation area variable column (e.g., ESTIAP08 for the 2008 NIS-Teen) to the corresponding codes in the CDIAP column.

9. Summary Tables

Appendix C contains seven tables. Appendix Table C.1 lists the 58 estimation areas for the 2024 NIS-Teen by state. At the national level and for each state and estimation area, it provides the estimated population total of teens aged 13-17 years in 2024, the number of teens with completed household interviews, and the number of teens with adequate provider data.

Appendix Tables C.2 through C.5 summarize pairs of variables: age of teen by maternal education (Appendix Table C.2), age of teen by family poverty status (Appendix Table C.3), race/ethnicity of teen by family poverty status (Appendix Table C.4), age of teen by race/ethnicity of teen (Appendix Table C.5), and age of teen by sex of teen (Appendix Table C.6). Each of these tables gives the unweighted and weighted counts of teens for whom the household interview was completed and the unweighted and weighted counts of teens with adequate provider data.

Appendix Table C.7 presents estimates of vaccination coverage and 95% confidence intervals obtained from SAS. The data user should obtain the same estimates from the 2024 NIS-Teen public-use data file.

Appendix D shows the vaccine type codes used in the 2024 NIS-Teen public-use data file.

Appendix E contains four tables and time-series charts**.** Table E.1 and Figure E.1 show key components of the NIS-Teen landline sample response rates and the landline sample CASRO response rates by year of the survey. Table E.2 and Figure E.2 show key components of the NIS-Teen cellular phone sample response rates and the cellular phone sample CASRO response rates. Table E.3 and Figure E.3 show the CASRO response rates for the combined landline and cellular phone samples. Table E.4 and Figure E.4 show vaccination coverage rate estimates since 2006.

Appendix F presents key response rate components and the CASRO response rate by estimation area in the 2024 NIS-Teen.

10. Assessment of Total Survey Error in the NIS-Teen

Assessing the validity of the NIS-Teen estimates of vaccination coverage is a critical and ongoing aspect of the NIS surveillance program. CDC frequently conducts evaluation studies and controlled experiments to understand the causes and impacts of sampling and nonsampling errors on the estimates and enable formulation of methodological refinements that have the demonstrated capacity to improve data quality. As landline phone use decreased and cellular phone use increased dramatically over the past decade, and the NIS-Teen transitioned first from a single-frame landline RDD sampling design to a dual-frame landline and cellular phone RDD design and then to a single-frame cellular phone RDD design, CDC has monitored the NIS-Teen estimates utilizing a Total Survey Error (TSE) approach.

TSE is the sum of the errors that arise at every step of a survey, including both sampling error and nonsampling errors such as sampling-frame coverage, nonresponse, and measurement errors (Mulry and Spencer, 1991). Pooling information from multiple evaluations of their precision and accuracy, we have conducted TSE analyses for the 2009-2013 NIS-Child and NIS-Teen data (Molinari et al., 2011; NORC, 2011; Pineau et al., 2012; Pineau et al., 2013; Skalland et al., 2016; Wolter et al., 2017b) and for the 2018-2023 NIS-Child and NIS-Teen data (see the Data User's Guides for the 2018-2023 NIS-Child and NIS-Teen public use data files). Data User's Guides from 2015 to present are located at: https://www.cdc.gov/nis/php/datasets-teen/index.html.

An assessment based on 2024 NIS-Teen data was conducted in 2025, with results summarized in this report. The full report is available at:

https://www.cdc.gov/teenvaxview/media/pdfs/2025/11/Error-Profile-for-the-2024-NIS-Teen_508.pdf

10.1 Comparisons of NIS-Teen Data to External Sources

Comparison of Demographic Distributions. Demographic distributions (age, sex, race/ethnicity, mother's education, and mother's age) among adolescents with adequate provider data were compared to benchmark values for adolescents aged 13-17 years derived from the U.S. Census Bureau's Population

Estimates Program (PEP) and American Community Survey (ACS) data. ACS data are located at: https://www.census.gov/programs-surveys/acs. **When using design weights that have not been calibrated to external population totals, demographic distributions as estimated by the survey are generally close to the benchmark distributions. Before calibration, the NIS-Teen somewhat over-represented non-Hispanic White-only adolescents, under-represented non-Hispanic Black adolescents, and over-represented adolescents whose mothers are college graduates. When using final weights that have been calibrated to external population totals, the differences between survey estimates and population values narrowed, but the 2024 NIS-Teen still over-represented adolescents whose mothers are college graduates (45.8% in survey, 38.3% in population) and under-represented adolescents whose mothers have some college but not a four-year degree (21.9% in survey, 29.7% in population).**

Comparison to IISAR Vaccination Coverage Rates. Next, NIS-Teen vaccination coverage rate estimates were compared to vaccination coverage rates reported in the Immunization Information Systems Annual Report (IISAR). Sponsored and conducted by NCIRD, the IISAR is an annual assessment of immunization information systems (IIS)[5] activity among the 64 immunization program awardees, which include the 50 states, 6 cities (Chicago, District of Columbia, Houston, New York City, Philadelphia, and San Antonio), and 8 U.S. territories. To evaluate each awardee's performance, the immunization program manager in the awardee area is asked to complete a self-administered, web-based questionnaire asking for demographic and immunization information, public and private provider site participation levels, and information about achievement of IIS functional standards. NCIRD provides competitive supplemental funds to awardees that met high data timeliness and participation (child and adolescent) in the IIS. During the period 2013-2017, six awardees were recognized as IIS *sentinel sites*, including Michigan, Minnesota, North Dakota, New York City, Oregon, and Wisconsin. Because of increased timeliness and higher child

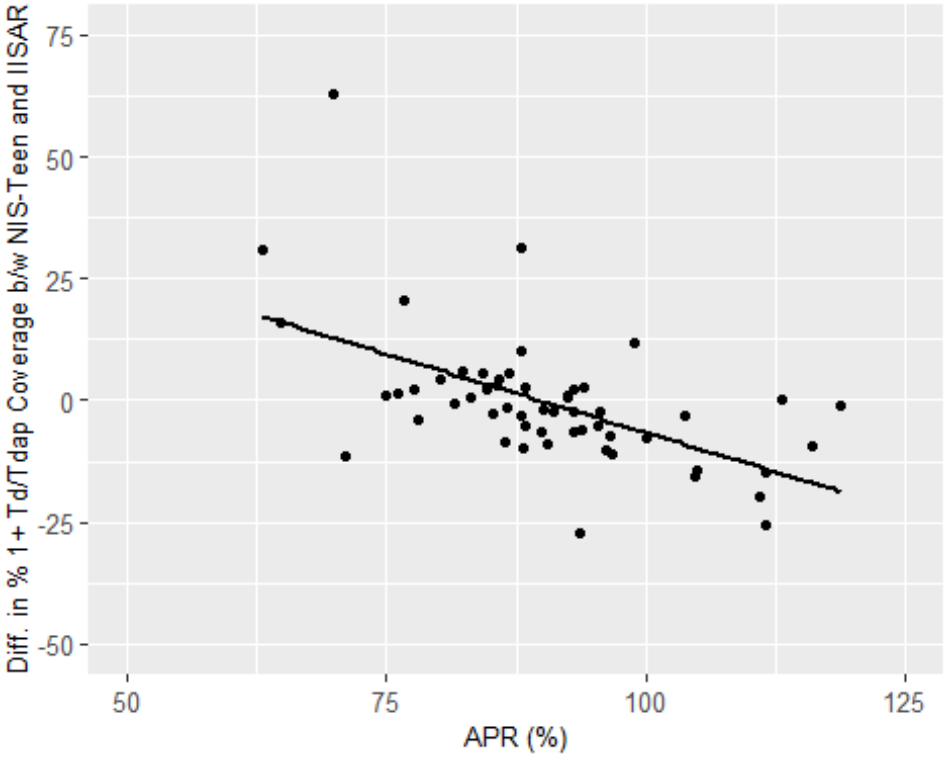
[5] State IIS are computer databases that aspire to contain information about all of the doses of all vaccines administered to all children resident within the state. State IIS vary in their completeness of both children included and the vaccinations they received.

and adolescent saturation levels in the IIS, vaccination coverage rates reported in IISAR by sentinel sites are thought to be relatively more accurate than vaccination rates reported by non-sentinel sites. Information about the IISAR can be found at: https://www.cdc.gov/iis/annual-report-iisar/index.html.

Vaccination coverage rate estimates from the 2023 NIS-Teen were compared to those from the 2023 IISAR. The 2023 IISAR was the most recent available, and so the 2023 comparison served as the most current information available about the relative accuracy of the 2024 NIS-Teen. There was variation in the level of agreement between NIS-Teen vaccination coverage rate estimates and IISAR vaccination coverage rates, including some areas where the NIS-Teen estimate was greater and some where the IISAR estimate was greater. However, the adolescent participation rate – the proportion of adolescents in the IIS jurisdiction with two or more vaccine doses in the IIS database[6] – was determined to be a reasonable indicator of the quality of the corresponding IIS database, as the IIS vaccination coverage rate was found to increase as the adolescent participation rate increased, and it was observed (Figure 1) that the difference between NIS-Teen and IISAR vaccination coverage rates declines as the adolescent participation rate increases (i.e., as the quality of the IIS increases). These findings are consistent with the view that IIS vaccination coverage rates converge towards NIS-Teen vaccination coverage rates as the quality of the IIS increases. When we focus just on IISs in states with mandatory reporting of vaccinations to the IIS by vaccination providers and with adolescent participation rate values that are less than 100 percent, there is a greater level of agreement between NIS-Teen and IISAR vaccination coverage estimates than found across all areas, with 12 out of 13 estimates within 10 percentage points.

[6] When setting the denominator for the participation rate calculation, some IIS use an external estimate of the number of adolescents living in the jurisdiction rather than a count of adolescents in the IIS itself; this results in some IIS reporting a participation rate of over 100 percent.

Figure 1: Scatter Plot of Percentage Point Difference between 2023 NIS-Teen and Immunization Information Systems Annual Report (IISAR) Vaccination Coverage Rates for One or More Doses of Tdap vs. Immunization Information Systems (IIS) Adolescent Participation Rate (APR) with Regression Line: 56 Estimation Areas



Note for Figure 1: A positive difference indicates the NIS-Teen vaccination coverage rate estimate was higher than the corresponding IISAR estimate, and a negative difference indicates the NIS-Teen vaccination coverage rate estimate was lower than the corresponding IISAR estimate.

Comparison of Health Insurance Distributions. NIS-Teen health insurance distributions were compared to similar distributions produced by the Current Population Survey (CPS)[7], the National Health Interview Survey (NHIS)[8], and the American Community Survey (ACS)[9]. All of these surveys use somewhat different definitions of insurance status and report for different age ranges of adolescents. **Nevertheless, we found the NIS-Teen distributions to be broadly similar to those from the CPS, NHIS, and ACS, but with some differences. NIS-Teen estimates of percent of adolescents with any public insurance (43.6% in 2023, 43.1% in 2024) were higher than most of the corresponding benchmark estimates**

[7] https://www.census.gov/programs-surveys/cps.html
[8] https://www.cdc.gov/nchs/nhis/index.htm
[9] https://www.census.gov/programs-surveys/acs

(40.4% (NHIS), 35.8% (CPS), and 39.3% (ACS) in 2023; 34.8% (CPS) in 2024), and the NIS-Teen estimates of uninsured adolescents 3.8% in 2023, 5.2% in 2024) were lower than the estimates from the benchmark surveys (4.4% (NHIS), 6.0% (CPS), and 5.8% (ACS) in 2023; 6.6% (CPS) in 2024).

10.2 Assessment of Total Survey Error for NIS-Teen Vaccination Coverage Estimates

Next, an assessment of all sources of error in the 2024 NIS-Teen was conducted, including sample-frame coverage error, nonresponse error, and measurement error; the component errors were then combined to assess total survey error. The change in total survey error between the 2023 NIS-Teen and 2024 NIS-Teen was also estimated.

Coverage Error. The NIS-Teen cellular phone RDD sampling frame fails to cover the landline-only and phoneless households; vaccination coverage rates in the former were estimated using data collected in the 2017 NIS-Teen and vaccination coverage rates in the latter were estimated using data collected in the 2012 NHIS Provider Record Check**.** The vaccination coverage rates in the landline-only population tended to be less than the vaccination coverage rates in the population covered by the cellular phone sampling-frame, and the results were somewhat mixed with regard to the phoneless households. **Because the sampling-frame uncovered population is so small relative to the covered population, however, mean sampling-frame coverage error was estimated to be 0.1 percentage points or less for 1+ Tdap, 1+ MenACWY, and UTD HPV.**

Nonresponse Error. **Nonresponse error in the 2024 NIS-Teen was assessed through comparison of the 2024 NIS-Teen to the cellular phone domain within the 2023 NHIS.** NHIS does not offer direct estimates of vaccination coverage rates. Instead, a model-based technique was used to impute NHIS vaccination status, and then the resulting NHIS vaccination coverage rates (treated as vaccination coverage rates void of nonresponse error) were compared to NIS-Teen vaccination coverage rates, with the difference treated as nonresponse error in the NIS-Teen. **Despite nonresponse in the 2024 NIS-Teen,**

including household nonresponse, non-consent to contact vaccination providers, and provider nonresponse, mean nonresponse error in vaccination rates was estimated to be modest and not statistically significant at the 0.05 level when using either design weights or final weights that account for the survey's nonresponse adjustment.

Measurement Error. A form of measurement error called "provider under-reporting" was assessed. Sometimes called "under-ascertainment," provider under-reporting error arises when an adolescent with adequate provider data is truly vaccinated but is reported as unvaccinated for one or more recommended doses in the adolescent's provider-reported vaccination history. Under-reporting error can occur if the household respondent fails to nominate all of the adolescent's vaccination providers, if one or more of the adolescent's nominated vaccination providers fails to report a vaccination history for the adolescent, or if one or more of the adolescent's nominated providers reports a vaccination history but fails to report all of the vaccinations the adolescent has received. **Underreporting error was estimated using data from projects sponsored by CDC in which the 2017 NIS-Teen sample of adolescents in 20 jurisdictions and the 2019 NIS-Teen sample of adolescents in 8 jurisdictions were matched to the state or local IIS for the jurisdiction.** In this work, the standard of truth for a given adolescent is taken to be the synthesis of the NIS-Teen and IIS vaccination histories. In prior studies conducted in 2012, 2013, 2018, 2019, 2020, 2021, 2022, and 2023 using similar methods, measurement error was found to be the largest component of error in the NIS-Teen vaccination coverage rate estimates for most vaccines. **Similar conclusions were reached for the 2024 NIS-Teen, where it was estimated that measurement error decreased observed vaccination coverage rates by about 2 to 5 percentage points due to provider underreporting of vaccinations.**

Total Survey Error. Finally, all of the component errors were combined to assess the distribution of total error in the NIS-Teen vaccination coverage rates, using a Monte Carlo technique. The mean of the distribution is an estimate of the total error, and the 2.5 and 97.5 percentiles of the distribution form a 95% credible interval for the total error. The estimated component errors and total survey errors are

presented in Table 6. **For the ≥1 Tdap vaccination coverage rate, the mean of the TSE distribution was found to be -3.7 percentage points with a 95% credible interval of (-5.5, -1.1) percentage points. That is, the NIS-Teen ≥1 Tdap vaccination coverage rate was on average about 3.7 percentage points too low. For the ≥1 MenACWY vaccination coverage rate, the mean of the TSE distribution was found to be -3.7 percentage points with a 95% credible interval of (-5.4, -1.4) percentage points. For UTD HPV, the mean of the TSE distribution was found to be -5.4 (-8.4, -2.4) percentage points overall, -5.4 (-9.7, -0.8) percentage points for females, and -5.3 (-9.2, -1.2) percentage points for males. Under-ascertainment of the provider-reported vaccination history is the largest source of error for all vaccines.**

Change in Total Survey Error. **Change in TSE between the 2023 and 2024 NIS-Teen was measured using the bridging cohort method introduced by NCIRD (Yankey, Hill, Elam-Evans, et al. 2015).** Each survey year includes adolescents born within 24 quarterly birth cohorts. Every pair of adjacent survey years spans 28 quarterly birth cohorts, of which 20 are in common and 8 are not in common. **The set of quarterly birth cohorts in common comprise the *bridging cohort*, and for 2023 and 2024, the bridging cohort extends from adolescents born in January 2006 through adolescents born in December 2010.**

Consider a vaccination coverage rate estimated from the bridging cohort as of a given adolescent age, such as 13 years. Two estimates are possible, one using the sample of adolescents in the bridging cohort within the 2023 NIS-Teen sample and the second using the corresponding sample of adolescents within the 2024 NIS-Teen sample. Ideally, the two estimators should exhibit the same statistical expectation (i.e., average value in hypothetical repeated sampling). A large difference between the two estimates may signal a change in the statistical expectation from one survey year to the next, which could result from a change in the distribution of sampling-frame coverage error, nonresponse error, or measurement error. Differences may also result simply from the effects of random sampling error.

Table 6: Mean and 95% Credible Interval for the Estimated Total Survey Error (TSE) Distribution and Component Error Distributions for National Vaccination Coverage Rate Estimates, National Immunization Survey - Teen, 2024

Vaccine or Series	Component	Mean TSE (percentage points)	95% Credible Interval (percentage points)
1+ Tdap	TSE (final weighted)	-3.7	(-5.5, -1.1)*
	TSE (design weighted)	-3.2	(-5.0, -0.6)*
	Noncoverage error	0.0	(0.0, 0.2)
	Nonresponse error	1.5	(-0.7, 4.1)
	Measurement error	-4.7	(-5.6, -3.6)*
	Sampling error	0.1	(-1.1, 1.3)
1+ MenACWY	TSE (final weighted)	-3.7	(-5.4, -1.4)*
	TSE (design weighted)	-3.2	(-5.0, -1.0)*
	Noncoverage error	0.0	(0.0, 0.2)
	Nonresponse error	0.8	(-1.3, 3.2)
	Measurement error	-4.1	(-5.0, -3.0)*
	Sampling error	0.0	(-1.1, 1.3)
UTD HPV*	TSE (final weighted)	-5.4	(-8.4, -2.4)*
	TSE (design weighted)	-4.1	(-7.1, -1.1)*
	Noncoverage error	0.1	(0.0, 0.2)
	Nonresponse error	-1.7	(-5.0, 1.6)
	Measurement error	-2.5	(-3.8, -1.0)*
	Sampling error	0.0	(-1.4, 1.5)
UTD HPV* among females	TSE (final weighted)	-5.4	(-9.7, -0.8)*
	TSE (design weighted)	-4.3	(-8.6, 0.2)
	Noncoverage error	0.1	(-0.1, 0.2)
	Nonresponse error	-2.1	(-6.8, 2.8)
	Measurement error	-2.3	(-4.3, -0.2)*
	Sampling error	0.0	(-2.1, 2.1)
UTD HPV* among males	TSE (final weighted)	-5.3	(-9.2, -1.2)*
	TSE (design weighted)	-3.7	(-7.6, 0.3)
	Noncoverage error	0.1	(0.0, 0.3)
	Nonresponse error	-1.2	(-5.5, 3.2)
	Measurement error	-2.6	(-4.5, -0.7)*
	Sampling error	0.0	(-2.0, 2.0)

* ≥3 doses, or ≥2 doses if 1st dose before age 15 and at least 5 months – 4 days between 1st and 2nd doses.

** 95% credible interval excludes zero.

For 1+ Tdap by age 13 years, 1+ MenACWY by age 13 years, and UTD HPV by age 13 years, the differences between the 2023 and 2024 national-level vaccination coverage rate estimates for the bridging cohort were small, and no differences were found to be statistically significant at the 0.05 level. The difference between the 2024 estimate and the 2023 estimate for the bridging cohort was 1.0 percentage points for 1+ Tdap, 0.2 percentage points for 1+ MenACWY, 0.4 percentage points for UTD HPV overall, 1.0 percentage points for UTD HPV among females, and 0.2 percentage points for UTD HPV among males. Overall, the results suggest there is little statistical evidence of a change in total survey error between 2023 and 2024. The full assessment of change in total survey error is available at: https://www.cdc.gov/teenvaxview/media/pdfs/2025/11/Error-Profile-for-the-2024-NIS-Teen_508.pdf.

11. Limitations

The findings in this report are subject to at least four limitations. First, because NIS-Teen is a telephone survey, results are weighted to be representative of all adolescents aged 13-17 years. Although statistical adjustments were made to account for non-response and households without cellular phones, 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. Third, 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. Finally, analysis of trends across data years that span from 2010 and earlier to 2011-2017 and from 2011-2017 to 2018-2024 are subject to potential bias that may remain after weighting adjustments because of the switch from landline to dual landline and cellular phone frames in 2011, and from dual landline and cellular phone frames to a single cellular phone frame in 2018 (Nguyen et al., 2019). In addition, analysis of trends across data years that span from 2011 to 2017 are subject to potential bias that may remain after weighting adjustments because of the expansions and reductions of the share of the total sample that came from the cellular phone frame across these years and because of the change in the definition of adequate provider data in 2014.

12. Citations for NIS-Teen Data

In publications please acknowledge the original data source. The citation for the 2024 NIS-Teen public-use data file is:

U.S. Department of Health and Human Services (DHHS). National Center for Immunization and Respiratory Diseases. The 2024 National Immunization Survey - Teen, Atlanta, GA: Centers for Disease Control and Prevention, 2026.

Information about the NIS-Teen is located at https://www.cdc.gov/nis/about/index.html.

The NIS-Teen public-use data file is located at https://www.cdc.gov/nis/php/datasets-teen/index.html.

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

The following publications use past and current NIS-Teen data:

2024

Anandarajah, A., Shato, T., Humble, S., Barnette, A. R., Brandt, H. M., Klesges, L. M., ... & Silver, M. I. (2024). The association of caregiver attitudes, information sources, and trust with HPV vaccine initiation among adolescents. *Human Vaccines & Immunotherapeutics*, *20*(1), 2300879.

Buscemi-Kimmins, T., Teelin, K. L., Mozo, N. M., & Shaw, J. (2024). Routine vaccination coverage in an adolescent transgender population in a large tertiary care center in the United States. *Journal of Pediatric Health Care*. *38*(4), 480-485.

Colón-López, V., Muñoz-Torres, F. J., Escabí Wojna, E., Vega Jimenez, I., Díaz Miranda, O. L., Medina-Laabes, D. T., ... & Suárez, E. (2024). State and territory immunization program activities and their association with human papillomavirus vaccine initiation in the United States of America: A multilevel approach. *PLOS Global Public Health*, *4*(12), e0002852.

Ejezie, C. L., Cuccaro, P., Savas, L. S., & Shegog, R. (2024). Regional differences in provider recommendation of HPV vaccines among 13-to-17 year old adolescents from 2019 to 2021. *Vaccine*. *42*(20) 125974.

Ejezie, C. L., Shegog, R., Durand, C., Cuccaro, P., & Savas, L. S. (2024). A multivariate probit regression of the uptake of adolescent vaccines among racial/ethnic minority adolescents before and during the COVID-19 pandemic. *Journal of Adolescent Health*, *74*(1), 28-35.

Hirth, J., Ostovar-Kermani, T., Gutierrez, J. A., Thompson, E. L., Barnett, T. E., & Zoorob, R. (2024). Effect of age at initiation of the human papillomavirus vaccine on the association between race/ethnicity and completion of the vaccine series. *Vaccine*, *42*(11), 2827-2836.

Marcondes, F. O., Price, M., McDowell, A., Newhouse, J. P., Hsu, J., & Fung, V. (2024). The impact of the Medicaid reimbursement bump on influenza vaccination rates among US teens: Evidence from the National Immunization Survey–Teen 2011–2020. *The Journal of the American Board of Family Medicine*, *37*(1), 137-146.

Nair, M., Domgue, J. F., Joseph, C. L., Alleman, E. R., Williams, A. M., Abouelella, D. K., ... & Boakye, E. A. (2024). Disparities in HPV vaccination among adolescents by health care facility type. *JAMA Pediatrics*, *178*(9), 932-939.

Nyika, P., Yankey, D., Elam-Evans, L. D., Meyer, S., Pingali, C., Stokley, S., & Singleton, J. A. (2025). Human papillomavirus vaccination coverage among adolescent boys and girls in the United States: A birth year cohort analysis of the National Immunization Survey-Teen, 2016–2022. *Vaccine*, *44*, 126560.

Olusanya, O. A., Masters, N. B., Zhang, F., Sugerman, D. E., Carter, R. J., Weiss, D., & Singleton, J. A. (2024). Sociodemographic trends and correlation between parental hesitancy towards pediatric COVID-19 vaccines and routine childhood immunizations in the United States: 2021–2022 National Immunization Survey—Child COVID Module. *Vaccines*, *12*(5), 495.

Qian, Z. J., Peñaranda, D., Valdez, T. A., Balakrishnan, K., & Brigger, M. T. (2024). Recurrent respiratory papillomatosis in the post–human papillomavirus vaccination era. *JAMA pediatrics*, *178*(12), 1372-1373.

Savas, L. S., Shegog, R., Frost, E. L., Healy, C. M., Mantey, D. S., Coan, S. P., ... & Vernon, S. W. (2024). Effect of an HPV vaccination multi-level, multi-component program on HPV vaccination initiation and completion in a pediatric clinic network. *Vaccines*, *12*(5), 510.

Saxena, K., Patterson-Lomba, O., Gomez-Lievano, A., Zion, A., Cunningham-Erves, J., & Kepka, D. (2024). Assessing the long-term implications of age 9 initiation of HPV vaccination on series completion by age 13–15 in the US: projections from an age-structured vaccination model. *Frontiers in Pediatrics*, *12*, 1393897.

Skyles, T. J., Stevens, H. P., Davis, S. C., Obray, A. M., Miner, D. S., East, M. J., ... & Poole, B. D. (2024). Comparison of predictive factors of flu vaccine uptake pre-and post-COVID-19 using the NIS-Teen survey. *Vaccines*, *12*(10), 1164.

Sonawane, K., Zhu, Y., Damgacioglu, H., Garg, A., Graboyes, E. M., Montealegre, J. R., ... & Deshmukh, A. A. (2024). Factors associated with parental human papillomavirus vaccination intentions among adolescents from socioeconomically advantaged versus deprived households: a nationwide, cross-sectional survey. *The Lancet Regional Health–Americas*, *19*(31), 100694.

White, M. C., Osazuwa-Peters, O. L., Abouelella, D. K., Barnes, J. M., Cannon, T. Y., Watts, T. L., ... & Osazuwa-Peters, N. (2024). Trends and factors associated with receipt of human papillomavirus (HPV) vaccine in private, public, and alternative settings in the United States. *Vaccine*. *42*(22), 126036.

White, J. L., Grabowski, M. K., Quinn, T. C., Tobian, A. A., & Patel, E. U. (2024). Trends in HPV vaccination before age 13 years in the US National Immunization Survey–Teen. *JAMA pediatrics*, *178*(2), 203-205.

2023

Adjei Boakye, E., Nair, M., Abouelella, D. K., Joseph, C. L., Gerend, M. A., Subramaniam, D. S., & Osazuwa-Peters, N. (2023). Trends in reasons for human papillomavirus vaccine hesitancy: 2010–2020. *Pediatrics*, *151*(6), e2022060410.

Anderson, E. M. (2023). Obscured inequity: How focusing on rates of disparities can conceal inequities in the reasons why adolescents are unvaccinated. *PLOS ONE*, *18*(11), e0293928.

Bednarczyk, R. A., & Brandt, H. M. (2023). Descriptive epidemiology of age at HPV vaccination: analysis using the 2020 NIS-Teen. *Human Vaccines & Immunotherapeutics*, *19*(1), 2204784.

Chandra, M., Osaghae, I., Talluri, R., & Shete, S. (2023). Barriers to human papillomavirus vaccine uptake: role of state religiosity and healthcare professionals' participation in a state vaccine program. *JNCI Cancer Spectrum*, *7*(5), pkad068.

Ejezie, C. L., Cuccaro, P., Durand, C., Savas, L. S., & Shegog, R. (2023). Parent-reported provider recommendation of HPV vaccination among minority adolescents before and during the COVID-19 pandemic: Findings from the National Immunization Survey-Teen, 2019–2021. *Preventive Medicine Reports*, *35*, 102286.

Ejezie, C. L., Savas, L. S., Durand, C., Shegog, R., & Cuccaro, P. (2023). The prevalence of human papillomavirus vaccination among racial and ethnic minority adolescents during the COVID-19 pandemic. *JNCI Cancer Spectrum*, *7*(5), pkad065.

Elenwo, C., Batioja, K., Davis, T., Greiner, B. H., Markey, C., & Hartwell, M. (2023). Associations of maternal age, education, and marital status with HPV vaccine uptake and hesitancy among United States youth: a cross-sectional analysis of the 2020 National Immunization Survey. *Journal of Pediatric and Adolescent Gynecology*, *36*(3), 273-279.

Goodman, E., Felsher, M., Wang, D., Yao, L., & Chen, Y. T. (2023). Early initiation of HPV vaccination and series completion in early and mid-adolescence. *Pediatrics*, *151*(3), e2022058794.

Hollis, N. D., Zhou, T., Rice, C. E., Yeargin-Allsopp, M., Cree, R. A., Singleton, J. A., ... & Ryerson, A. B. (2023). Inequities in COVID-19 vaccination coverage for adolescents with and without disability, national immunization Survey–Child COVID module, July 22, 2021–February 26, 2022. *Disability and Health Journal*, *16*(4), 101509.

Kajtezovic, S., Morgan, J. R., Fiascone, S., Brandt, H. M., & Perkins, R. B. (2023). Optimizing timing of adolescent vaccines: Impact of initiating HPV vaccination before Tdap or meningococcal vaccination on timely completion of the HPV vaccine series. *Human Vaccines & Immunotherapeutics*, *19*(1), 2175541.

Minihan, A. K., Bandi, P., Star, J., Fisher-Borne, M., Saslow, D., & Jemal, A. (2023). The association of initiating HPV vaccination at ages 9–10 years and up-to-date status among adolescents ages 13–17 years, 2016-2020. *Human Vaccines & Immunotherapeutics*, *19*(1), 2175555.

Osaghae, I., Chandra, M., Talluri, R., & Shete, S. (2023). Individual, systemic and state factors associated with provider recommendation of HPV vaccination: Findings from NIS-Teen, 2020. *Human Vaccines & Immunotherapeutics*, *19*(2), 2239678.

Pingali, C., Zhang, F., Santibanez, T. A., Elam-Evans, L. D., Hill, H. A., Valier, M. R., & Singleton, J. A. (2023). Associations Between Routine Adolescent Vaccination Status and Parental Intent to Get a COVID-19 Vaccine for Their Adolescent. *JAMA Pediatrics*, *177*(2), 208-210.

Saxena, K., Kathe, N., Sardana, P., Yao, L., Chen, Y. T., & Brewer, N. T. (2023). HPV vaccine initiation at 9 or 10 years of age and better series completion by age 13 among privately and publicly insured children in the US. *Human Vaccines & Immunotherapeutics*, *19*(1), 2161253.

Warren, B. R., Gillette-Walch, H., Adler, J., Arias, R., Klausner, J. D., Ashing, K. T., & Villa, A. (2023). Assessment of human papillomavirus vaccination rates of adolescents in California, 2018–2019. *Preventive Medicine Reports*, *32*, 102144.

White, J. L., Grabowski, M. K., Rositch, A. F., Gravitt, P. E., Quinn, T. C., Tobian, A. A., & Patel, E. U. (2023). Trends in adolescent human papillomavirus vaccination and parental hesitancy in the United States. *The Journal of Infectious Diseases*, *228*(5), 615-626.

Zhao, R., Prizment, A., & Kulasingam, S. (2023). Lower human papillomavirus vaccine initiation and completion among Asian American adolescents compared to their peers: National Health and Nutritional Examination Survey 2011–2018. *Cancer Causes & Control*, *34*(6), 543-552.

2022

Abouelella, D. K., Canick, J. E., Barnes, J. M., Rohde, R. L., Watts, T. L., Adjei Boakye, E., & Osazuwa-Peters, N. (2022). Human papillomavirus vaccine uptake among teens before and during the COVID-19 pandemic in the United States. *Human Vaccines & Immunotherapeutics*, *18(7)*, doi: 10.1080/21645515.2022.2148825

Agana-Norman, D. F., Berenson, A. B., & Chang, M. (2022). Impact assessment of a provider-targeted national vaccine messaging campaign on human papillomavirus vaccination rates among US adolescent males. *Preventive Medicine*, *164*, 107228.

Chido-Amajuoyi, O. G., Talluri, R., Jackson, I., Shete, S. S., Domgue, J. F., & Shete, S. (2022). The influence of parent–child gender on intentions to refuse HPV vaccination due to safety concerns/side effects, National Immunization Survey–Teen, 2010–2019. *Human Vaccines & Immunotherapeutics*, *18*(5), 2086762.

Chido-Amajuoyi, O., Talluri, R., Jackson, I., Shete, S., Domgue, J. F., & Shete, S. (2022). HPV non-vaccination due to safety concerns/side effects: Variations in vaccination intentions by Parent-Child Gender, National Immunization Survey-Teen, 2010-2019. *Cancer Research*, *82*(12_Supplement), 2209-2209.

Choi, Y., Bhatti, A., Liu, Z., Ruch, A., Skolnik, A., Carias, C., Goveia, M. G., & Simon, J. K. (2022). Association Between State Hepatitis A Vaccination Requirements and Hepatitis A Vaccination Rates. *Journal of the Pediatric Infectious Diseases Society*, *11*(6), 295-299.

Choi, S. S., & Choi, B. (2022). Comparison of Social Inequality in Human Papillomavirus (HPV) Vaccination among Teenagers with Parental Reports and Healthcare Providers' Records in the 2019 National Immunization Survey-Teen. *Vaccines*, *10*(2), 178.

Cortright, L., Buckman, C., Tumin, D., Syed, S., & Beeninga, F. T. (2022). Influence of measles-mumps-rubella vaccine series initiation and completion on influenza vaccination among adolescents. *International Journal of Pediatrics and Adolescent Medicine, 9*, 11-15.

Ejezie, C. L., Osaghae, I., Ayieko, S., & Cuccaro, P. (2022). Adherence to the recommended HPV vaccine dosing schedule among adolescents aged 13 to 17 years: findings from the national immunization survey-teen, 2019–2020. *Vaccines*, *10*(4), 577.

Elam-Evans, L. D., Valier, M. R., Fredua, B., Zell, E., Murthy, B. P., Sterrett, N., ... & Marin, M. (2022). Celebrating 25 years of varicella vaccination coverage for children and adolescents in the United States: a success story. *The Journal of Infectious Diseases*, *226*(Supplement_4), S416-S424.

Gambrell, A., Sundaram, M., & Bednarczyk, R. A. (2022). Estimating the number of US children susceptible to measles resulting from COVID-19-related vaccination coverage declines. *Vaccine*, *40*(32), 4574-4579.

Hartman, K. C., Ancha, S., & McLaughlin, M. J. (2022). Human papillomavirus vaccination rates in adolescents with cerebral palsy compared to the general population. *Journal of Pediatric Rehabilitation Medicine*, (Preprint), 1-8.

Lu, P. J., Yankey, D., Fredua, B., Hung, M. C., Sterrett, N., Markowitz, L. E., & Elam–Evans, L. D. (2022). Human papillomavirus vaccination trends among adolescents: 2015 to 2020. *Pediatrics*, *150*(1), e2022056597.

Luna, M., & Upadhyay, S. (2022, June). Trends in the Utilization of Human Papillomavirus Vaccines and the Incidence of Malignant Cervical Cancer in Women and Teenagers: A Secondary Analysis. *Healthcare*, *10(7)*, 1211.

Nasserie, T., & Bendavid, E. (2022). Systematic identification and replication of factors associated with human papillomavirus vaccine initiation among adolescents in the United States using an environment-wide association study approach. *Sexually Transmitted Infections*, *98*(3), 203-209.

Pruitt, S. L., Tiro, J. A., Kepka, D., & Henry, K. (2022). Missed Vaccination Opportunities Among US Adolescents by Area Characteristics. *American Journal of Preventive Medicine*, *62*(4), 538-547.

Rositch, A. F., Liu, T., Chao, C., Moran, M., & Beavis, A. L. (2022). Levels of parental human papillomavirus vaccine hesitancy and their reasons for not intending to vaccinate: insights from the 2019 National Immunization Survey-Teen. *Journal of Adolescent Health*, *71*(1), 39-46.

Sundaram, M. E., & Bednarczyk, R. A. (2022). Toward a Deeper Understanding of the Spectrum of Parental Human Papillomavirus Vaccine Hesitancy. *Journal of Adolescent Health*, *71*(1), 4-5.

Torres, A. R., Johnson, N. P., Ellingson, M. K., Hansen, C. E., Oliveira, C. R., Niccolai, L. M., & Sheth, S. S. (2022). State laws permitting adolescent consent to human papillomavirus vaccination and rates of immunization. *JAMA pediatrics*, *176*(2), 203-205.

Tran, N., Cortright, L., Buckman, C., Tumin, D., & Syed, S. (2022). Association between asthma and influenza vaccine uptake among US adolescents: a retrospective survey study. *Journal of Asthma*, *59*(6), 1256-1262.

2021

Caldwell, A. C., Madden, C. A., Thompson, D. M., Garbe, M. C., Roberts, J. R., Jacobson, R. M., & Darden, P. M. (2021). The impact of provider recommendation on human papillomavirus vaccine and other adolescent vaccines. *Human vaccines & immunotherapeutics*, *17*(4), 1059-1067.

Carrera, M., Lawler, E. C., & White, C. (2021). Population mortality and laws encouraging influenza vaccination for hospital workers. *Annals of Internal Medicine*, *174*(4), 444-452.

Chido-Amajuoyi OG, Talluri R, Shete SS, Shete S. Safety Concerns or Adverse Effects as the Main Reason for Human Papillomavirus Vaccine Refusal: National Immunization Survey–Teen, 2008 to 2019. *JAMA Pediatr.* 2021;175(10):1074–1076. doi:10.1001/jamapediatrics.2021.1585

Churchill, B. F. (2021). How important is the structure of school vaccine requirement opt-out provisions? Evidence from Washington, DC's HPV vaccine requirement. *Journal of Health Economics*, *78*, 102480.

Churchill, B. F. (2021). Insurance Coverage, Provider Contact, and Take-Up of the HPV Vaccine. *American Journal of Health Economics*, *7*(2), 222-247.

Daniels, V., Prabhu, V. S., Palmer, C., Samant, S., Kothari, S., Roberts, C., & Elbasha, E. (2021). Public health impact and cost-effectiveness of catch-up 9-valent HPV vaccination of individuals through age 45 years in the United States. *Human vaccines & immunotherapeutics*, *17*(7), 1943-1951.

Gogineni, V. (2021). Exposure to Health Care Economics and Policy in Medical School Curricula as an Avenue to Improve Patient Advocacy. *Academic Medicine*, *96*(1), 12-13.

Hansen, C. E., & Niccolai, L. M. (2021). Factors Associated With Receipt of Meningococcal B Vaccine Among United States Adolescents, National Immunization Survey-Teen, 2017–2018. *Journal of Adolescent Health*, *69*(5), 769-773.

Kong, W. Y., Bustamante, G., Pallotto, I. K., Margolis, M. A., Carlson, R., McRee, A. L., & Gilkey, M. B. (2021). Disparities in healthcare providers' recommendation of HPV vaccination for US adolescents: A systematic review. *Cancer Epidemiology and Prevention Biomarkers*, *30*(11), 1981-1992.

La, E. M., Garbinsky, D., Hunter, S., Poston, S., Novy, P., & Ghaswalla, P. (2021). Meningococcal B vaccination coverage among older adolescents in the United States. *Vaccine*, *39*(19), 2660-2667.

La, E. M., Garbinsky, D., Hunter, S., Poston, S., Novy, P., & Ghaswalla, P. (2021). National and State-Level Composite Completion of Recommended Vaccines Among Adolescents in the United States, 2015–2018. *Journal of Adolescent Health*, *69*(5), 762-768.

Lu, P. J., Yankey, D., Fredua, B., Hung, M. C., Walker, T. Y., Markowitz, L. E., & Elam-Evans, L. D. (2021). National and State-Specific Estimates of Settings of Receiving Human Papillomavirus Vaccination Among Adolescents in the United States. *Journal of Adolescent Health*, *69*(4), 597-603.

Nasserie, T., & Bendavid, E. (2021). Systematic identification and replication of factors associated with human papillomavirus vaccine initiation among adolescents in the United States using an environment-wide association study approach. *Sexually transmitted infections*

Nguyen, K. H., Santibanez, T. A., Stokley, S., Lindley, M. C., Fisher, A., Kim, D., ... & Singleton, J. (2021). Parental vaccine hesitancy and its association with adolescent HPV vaccination. *Vaccine*, *39*(17), 2416.

Pingali, C., Yankey, D., Elam-Evans, L. D., Markowitz, L. E., Williams, C. L., Fredua, B., McNamara, L. A., Stokley, S., & Singleton, J. A. (2021). National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years—United States, 2020. *Morbidity and Mortality Weekly Report*, *70*(35), 1183.

Oh, N. L., Biddell, C. B., Rhodes, B. E., & Brewer, N. T. (2021). Provider communication and HPV vaccine uptake: a meta-analysis and systematic review. *Preventive Medicine*, *148*, 106554.

Reiter, P. L., Pennell, M. L., Martinez, G. A., & Katz, M. L. (2021). Provider recommendation for HPV vaccination across Hispanic/Latinx subgroups in the United States. *Human Vaccines & Immunotherapeutics*, *17*(4), 1083-1088.

Sonawane, K., Zhu, Y., Lin, Y. Y., Damgacioglu, H., Lin, Y., Montealegre, J. R., & Deshmukh, A. A. (2021). HPV vaccine recommendations and parental intent. *Pediatrics*, *147*(3): e2020026286. 10.1542/peds.2020-026286

Sonawane, K., Lin, Y. Y., Damgacioglu, H., Zhu, Y., Fernandez, M. E., Montealegre, J. R., ... & Deshmukh, A. A. (2021). Trends in human papillomavirus vaccine safety concerns and adverse event reporting in the United States. *JAMA network open*, *4*(9), e2124502-e2124502.

Tran, N., Cortright, L., Buckman, C., Tumin, D., & Syed, S. (2021). Association between asthma and influenza vaccine uptake among US adolescents: a retrospective survey study. *Journal of Asthma*, 1-7.

Vasudevan, L., Ostermann, J., Wang, Y., Harrison, S. E., Yelverton, V., McDonald, J. A., ... & Walter, E. B. (2021). Predictors of HPV vaccination in the southern US: A survey of caregivers from 13 states. *Vaccine*, *39*(51), 7485-7493.

Wood, M. L., Hoke, A. M., Schaefer, E. W., & Sekhar, D. L. (2021). The association between state-based provisional attendance periods and adolescent middle school-entry vaccination coverage. *Preventive Medicine*, *153*, 106733.

Zhang, Y., Fakhry, C., & D'Souza, G. (2021). Projected association of human papillomavirus vaccination with oropharynx cancer incidence in the US, 2020-2045. *JAMA oncology*, *7*(10), e212907-e212907.

Weatherer, A. C., Pritzl, S. L., Kerch, S., Li, Z., & LoConte, N. K. (2021). Current Trends in HPV Vaccine Uptake: Wisconsin and United States, 2016-2019. *WMJ: official publication of the State Medical Society of Wisconsin*, *120*(1), 62-65.

2020

Beeninga FT, Cortright L, Buckman C, Tumin D, Syed S. Influence of measles-mumps-rubella vaccine series initiation and completion on influenza vaccination among adolescents. International Journal of Pediatrics and Adolescent Medicine. 2020. doi: https://doi.org/10.1016/j.ijpam.2020.12.001

Burger EA, Smith MA, Killen J, Sy S, Simms KT, Canfell K, Kim JJ. Projected time to elimination of cervical cancer in the USA: a comparative modelling study. The Lancet Public Health. 2020;5(4):e213-e222.

Caldwell AC, Madden CA, Thompson DM, Garbe MC, Roberts JR, Jacobson RM, Darden PM. The impact of provider recommendation on human papillomavirus vaccine and other adolescent vaccines. Human vaccines & immunotherapeutics. 2020;17:4:1059-1067.

Conrey R, Valencia V, Cioletti A, Williams-Brown MY. Regional variation in human papillomavirus vaccination uptake and completion among adolescents 13-17 in the state of Texas. Vaccine. 2020;38(25):4119-4124. doi:10.1016/j.vaccine.2020.03.059

Elam-Evans LD, Yankey D, Singleton JA, Sterrett N, Markowitz LE, Williams CL, Fredua B, McNamara L, Stokley S. National, Regional, State, and Selected Local Area Vaccination Coverage Among

Adolescents Aged 13–17 Years — United States, 2019. MMWR Morb Mortal Wkly Rep 2020;69(33):1109-1116.

Hoff BM, Livingston MD 3rd, Thompson EL. The association between state Medicaid expansion and human papillomavirus vaccination. Vaccine. 2020;38(38):5963-5965. doi:10.1016/j.vaccine.2020.07.024

Khan N, Tomar SL. The incidence of oropharyngeal cancer and rate of human papillomavirus vaccination coverage in Florida, 2011 through 2015. J Am Dent Assoc. 2020;151(1):51-58. doi:10.1016/j.adaj.2019.08.022

Ko JS, Goldbeck CS, Baughan EB, Klausner JD. Association Between Human Papillomavirus Vaccination School-Entry Requirements and Vaccination Initiation [published online ahead of print, 2020 Jun 29]. JAMA Pediatr. 2020;e201852. doi:10.1001/jamapediatrics.2020.1852

Newcomer SR, Caringi J, Jones B, Coyle E, Schehl T, Daley MF. A Mixed-Methods Analysis of Barriers to and Facilitators of Human Papillomavirus Vaccination Among Adolescents in Montana. Public Health Reports. 2020;135(6):842-850.

Reiter PL, Pennell ML, Martinez GA, Perkins RB, Katz ML. HPV vaccine coverage across Hispanic/Latinx subgroups in the United States. Cancer Causes Control. 2020;31(10):905-914. doi:10.1007/s10552-020-01331-y

Sonawane K, Zhu Y, Montealegre JR, et al. Parental intent to initiate and complete the human papillomavirus vaccine series in the USA: a nationwide, cross-sectional survey. Lancet Public Health. 2020;5(9):e484-e492. doi:10.1016/S2468-2667(20)30139-0

Thompson EL, Livingston MD 3rd, Daley EM, Saslow D, Zimet GD. Rhode Island Human Papillomavirus Vaccine School Entry Requirement Using Provider-Verified Report. Am J Prev Med. 2020;59(2):274-277. doi:10.1016/j.amepre.2020.02.022

Walker TY, Elam-Evans LD, Williams CL, Fredua B, Yankey D, Markowitz LE, Stokley S. Trends in human papillomavirus (HPV) vaccination initiation among adolescents aged 13–17 by metropolitan statistical area (MSA) status, National Immunization Survey–Teen, 2013–2017. Human vaccines & immunotherapeutics. 2020;16(3):554-561.

Yankey D, Elam-Evans LD, Bish CL, Stokley SK. Human Papillomavirus Vaccination Estimates Among Adolescents in the Mississippi Delta Region: National Immunization Survey-Teen, 2015-2017. Prev Chronic Dis. 2020;17:E31. Published 2020 Apr 16. doi:10.5888/pcd17.190234

Yoo W, Koskan A, Scotch M, Pottinger H, Huh WK, Helitzer D. Patterns and Disparities in Human Papillomavirus (HPV) Vaccine Uptake for Young Female Adolescents among U.S. States: NIS-Teen (2008-2016). Cancer Epidemiol Biomarkers Prev. 2020;29(7):1458-1467. doi:10.1158/1055-9965.EPI-19-1103

2019

Bednarczyk RA, Ellingson MK, Omer SB. Human Papillomavirus Vaccination Before 13 and 15 Years of Age: Analysis of National Immunization Survey Teen Data. JID 2019 Sept; 220:730–4.

Cheng WY, Chang R, Novy P, O'Connor C, Duh MS, Hogea CS. Determinants of Meningococcal ACWY vaccination in adolescents in the US: completion and compliance with the CDC recommendations. Hum Vaccin Immunother. 2020;16(1):176-188. doi:10.1080/21645515.2019.1632679

Franco M, Mazzucca S, Padek M, Brownson RC. Going beyond the individual: how state-level characteristics relate to HPV vaccine rates in the United States. BMC public health. 2019 Dec;19(1):246.

Hirth JM, Fuchs EL, Chang M, Fernandez ME, Berenson AB. Variations in reason for intention not to vaccinate across time, region, and by race/ethnicity, NIS-Teen (2008–2016). Vaccine. 2019 Jan 21;37(4):595-601.

Lu PJ, Yankey D, Fredua B, O'Halloran AS, Williams C, Markowitz LE, Elam-Evans LD. Association of Provider Recommendation and Human Papillomavirus Vaccination Initiation among Male Adolescents Aged 13-17 Years—United States. The Journal of pediatrics Volume 206, March 2019, Pages 33-41.e1.

Niccolai LM, Yakely AE, Hansen CE. Up-to-date coverage with meningococcal vaccine among adolescents age 17 years: Patterns and correlates in the United States, 2017. Vaccine. 2019;37(40):5934-5938. doi:10.1016/j.vaccine.2019.08.015

Sriram S, Ranganathan R. Why human papilloma virus vaccination coverage is low among adolescents in the US? A study of barriers for vaccination uptake. J Family Med Prim Care. 2019;8(3):866-870. doi:10.4103/jfmpc.jfmpc_107_19

Suryadevara M, Bonville CA, Cibula DA, Domachowske JB, Suryadevara AC. Associations between population based voting trends during the 2016 US presidential election and adolescent vaccination rates. Vaccine. 2019 Jan 26.

Swiecki-Sikora AL, Henry KA, Kepka D. HPV Vaccination Coverage Among US Teens Across the Rural-Urban Continuum. The Journal of Rural Health. 2019 Jan 31.

Walker TY; Elam-Evans LD; Yankey D; Markowitz LE; Williams CL; Fredua B; Singleton JA; Stokley S. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years — United States, 2018. MMWR Morb Mortal Wkly Rep 2019;68(33):718-723.

Walker TY, Elam-Evans LD, Williams CL, Fredua B, Yankey D, Markowitz LE, Stokley S. Trends in Human Papillomavirus (HPV) Vaccination Initiation among Adolescents Aged 13-17 by Metropolitan Statistical Area (MSA) Status, National Immunization Survey – Teen, 2013 – 2017. Hum Vaccin Immunother 2019;Epub ahead of publication DOI: 10.1080/21645515.2019.1671765

Williams CL, Walker TY, Elam-Evans LD, Yankey D, Fredua B, Saraiya M, Stokley S. Factors associated with not receiving HPV vaccine among adolescents by metropolitan statistical area status, United States, National Immunization Survey–Teen, 2016–2017Hum Vaccin Immunother 2019; Epub ahead of publication DOI:10.1080/21645515.2019.1670036

2018

Beavis A, Krakow M, Levinson K, Rositch AF. "Reasons for Lack of HPV Vaccine Initiation in NIS-Teen Over Time: Shifting the Focus From Gender and Sexuality to Necessity and Safety." Journal of Adolescent Health 63.5 (2018): 652-656.

Fedewa SA, Preiss AJ, Fisher-Borne M, Goding Sauer A, Jemal A, Saslow D. Reaching 80% human papillomavirus vaccination prevalence by 2026: How many adolescents need to be vaccinated and what are their characteristics?. Cancer. 2018 Dec 15;124(24):4720-30.

Hanson KE, Koch B, Bonner K, McRee AL, Basta NE. National trends in parental human papillomavirus vaccination intentions and reasons for hesitancy, 2010–2015. Clinical Infectious Diseases. 2018 Mar 27;67(7):1018-26.

Healy J, Rodriguez-Lainz A, Elam-Evans L, Hill HA, Reagan-Steiner S, Yankey D (2018). Vaccination coverage among foreign-born and U.S.-born adolescents in the United States: Successes and gaps – National Immunization Survey-Teen, 2012–2014. Vaccine 2018; 36(13):1743-1750.

Landis K, Bednarczyk RA, Gaydos LM. Correlates of HPV vaccine initiation and provider recommendation among male adolescents, 2014 NIS-Teen. Vaccine. 2018 Jun 7;36(24):3498-504.

Leung J, Reagan-Steiner S, Lopez A, Jeyarajah J, Marin M. Varicella Vaccination Among US Adolescents: Coverage and Missed Opportunities, 2007-2014. Journal of Public Health Management Practice 2018; [Epub ahead of print].

Lu PJ, Yankey D, Jeyarajah J, O'Halloran A, Fredua B, Elam-Evans LD, Reagan-Steiner S. Association of Health Insurance Status and Vaccination Coverage among Adolescents 13-17 Years of Age. Journal of Pediatrics 2018; 195:256-262.e1.

Nelson NP, Yankey D, Singleton JA, Elam-Evans LD. Hepatitis A vaccination coverage among adolescents (13-17 years) in the United States, 2008-2016.Vaccine 2018; 36(12):1650-1659.

Odoh C, Sanderson M, Williams EA, Hull PC. Operationalizing outcome measures of human papillomavirus vaccination among adolescents. Public Health 2018; 159:129-132.

Roberts MC, Murphy T, Moss JL, Wheldon CW, Psek W. A qualitative comparative analysis of combined state health policies related to human papillomavirus vaccine uptake in the United States. American Journal of Public Health 2018; 108(4):493-499.

Thompson EL, Livingston MD, Daley EM, Zimet GD. Human Papillomavirus Vaccine Initiation for Adolescents Following Rhode Island's School-Entry Requirement, 2010-2016. American Journal of Public Health 2018. e1-e3. doi: 10.2105/AJPH.2018.304552. [Epub ahead of print].

Walker TY, Elam-Evans LD., Singleton JA., Yankey, D, Markowitz LE, Fredua B, et al. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years — United States, 2017. MMWR 2018 Aug 24; 67:909-917.

Webb NS, Dowd-Arrow B, Taylor MG, Burdette AM. Racial/Ethnic Disparities in Influenza Vaccination Coverage Among US Adolescents, 2010-2016. Public Health Reports. 2018 Nov;133(6):667-76.

2017

Adjei BE, Tobo BB, Osazuwa PN, Mohammed KA, Geneus CJ, Schootman M. A Comparison of Parent- and Provider-Reported Human Papillomavirus Vaccination of Adolescents. American Journal of Preventive Medicine 2017; 52(6):742-752.

Bednarczyk RA, Orenstein WA, Omer SB. Impact of Gender-Specific Human Papillomavirus Vaccine Recommendations on Uptake of Other Adolescent Vaccines: Analysis of the NIS-Teen (2008-2012). J Public Health Manag Pract. 2017;23(2):122-125. doi:10.1097/PHH.0000000000000335

Bodson J, Ding Q, Warner EL, Hawkins AJ, Henry KA, Kepka D. Sub-Regional Assessment of HPV Vaccination Among Female Adolescents in the Intermountain West and Implications for Intervention Opportunities. Maternal and Child Health Journal 2017; 21(7):1500-1511.

Burdette AM, Webb NS, Hill TD, Jokinen-Gordon H. Race-specific trends in HPV vaccinations and provider recommendations: persistent disparities or social progress? Public Health 2017; 142:167-176.

Cheruvu VK, Bhatta MP, Drinkard LN. Factors associated with parental reasons for "no-intent" to vaccinate female adolescents with human papillomavirus vaccine: National Immunization Survey - Teen 2008-2012. BMC Pediatrics 2017; 17(1):52.

Henry KA, Swiecki-Sikoria AL, Stroup AM, Warner EL, Kepka D. Area-based socioeconomic factors and Human Papillomavirus (HPV) vaccination among teen boys in the United States. BMC Public Health 2017 Jul 14;18(1):19.

Johnson KL, Lin MY, Cabral H, Kazis LE, Katz IT. Variation in human papillomavirus vaccine uptake and acceptability between female and male adolescents and their caregivers. J Community Health 2017;42:522–532.

Klosky JL, Hudson MM, Chen Y, Connelly JA, Wasilewski-Masker K, Sun CL, et al. Human papillomavirus vaccination rates in young cancer survivors. Journal of Clinical Oncology 2017; 35(31): 3582-3590.

Krakow M, Beavis A, Cosides O, Rositch AF. Characteristics of adolescents lacking provider-recommended human papillomavirus vaccination. Journal of Adolescent Health 2017; 60:619-622.

Lu PJ, Yankey D, Jeyarajah J, O'Halloran A, Meyer SA, Elam-Evans LD, Reagan-Steiner S. Impact of Provider Recommendation on Tdap Vaccination of Adolescents Aged 13–17 Years. American Journal of Preventive Medicine 2017 Sept; 53(3):373-384.

Mohammed KA, Vivian E, Loux TM, Arnold LD. Factors associated with parents' intent to vaccinate adolescents for human papillomavirus: findings from the 2014 National Immunization Survey–Teen. Prev Chronic Dis 2017;14:160314. DOI: https://doi.org/10.5888/pcd14.160314.

Pierre-Victor D, Trepka MJ, Page TF, Li T, Stephens DP, Madhivanan P. Impact of Louisiana's HPV vaccine awareness policy on HPV vaccination among 13- to 17-year-old females. Health Education & Behavior 2017; 44(4): 548–558.

Pierre-Victor D, Page TF, Trepka MJ, Stephens DP, Li T, Madhivanan P. Impact of Virginia's school-entry vaccine mandate on human papillomavirus vaccination among 13–17-year-old Females. JOURNAL OF WOMEN'S HEALTH 2017; 26(3): 266-275.

Rahman M, Hirth JM, Berenson AB. Adherence to ACIP recommendation for human papillomavirus vaccine among US adolescent girls. J Community Health 2017;42:385–389.

Thompson EL, Rosen BL, Vamos CA, Kadono M, Daley EM. Human papillomavirus vaccination: what are the reasons for nonvaccination among US adolescents? Journal of Adolescent Health 2017;61:288-293.

Waldrop AR, Moss JL, Liu B, Zhu L. Ranking states on coverage of cancer-preventing vaccines among adolescents: The influence of imprecision. Public Health Reports 2017; 132(6):627-636.

Walker TY, Elam-Evans LD, Singleton JA, Yankey D, Markowitz LE, Fredua B, Williams CL, Meyer SA, Stokley S. National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 years – United States, 2016. MMWR. 2017 Aug 25;66(33):874-82. DOI: http://dx.doi.org/10.15585/mmwr.mm6633a2.

Warner EL, Ding Q, Pappas LM, Henry K, Kepka D. White, affluent, educated parents are least likely to choose HPV vaccination for their children: A cross-sectional study of the National Immunization Study – teen. BMC Pediatrics 2017; 17(1),200.

2016

Beachler DC, Gonzales FA, Kobrin SC, Kreimer AR. HPV vaccination initiation after the routine-recommended ages of 11-12 in the United States. Papillomavirus Res. 2016;2:11-16. doi:10.1016/j.pvr.2015.12.001

Bednarczyk RA, Orenstein WA, Omer SB. Estimating the Number of Measles-Susceptible Children and Adolescents in the United States Using Data From the National Immunization Survey-Teen (NIS-Teen). Am J Epidemiol. 2016;184(2):148-156. doi:10.1093/aje/kwv320

Cardemil CV, Cullen KA, Harris L, Greby SM, Santibanez TA. Factors Associated With Provider Reporting of Child and Adolescent Vaccination History to Immunization Information Systems: Results From the National Immunization Survey, 2006-2012. J Public Health Manag Pract. 2016;22(3):245-254. doi:10.1097/PHH.0000000000000278

Choi Y, Eworuke E, Segal R. What explains the different rates of human papillomavirus vaccination among adolescent males and females in the United States?. Papillomavirus Res. 2016;2:46-51. doi:10.1016/j.pvr.2016.02.001

Cloessner EA, Stokley S, Yankey D, Markowitz LE. Timing of HPV vaccine intervals among United States teens with consideration to the current ACIP schedule and the WHO 2-dose schedule. Hum Vaccin Immunother. 2016;12(6):1375-1380. doi:10.1080/21645515.2015.1110659

Gilkey MB, Reiter PL, Magnus BE, McRee AL, Dempsey AF, Brewer NT. Validation of the Vaccination Confidence Scale: A Brief Measure to Identify Parents at Risk for Refusing Adolescent Vaccines. Acad Pediatr. 2016;16(1):42-49. doi:10.1016/j.acap.2015.06.007

Henry KA, Stroup AM, Warner EL, Kepka D. Geographic Factors and Human Papillomavirus (HPV) Vaccination Initiation among Adolescent Girls in the United States. Cancer Epidemiol Biomarkers Prev. 2016;25(2):309-317. doi:10.1158/1055-9965.EPI-15-0658

Hirth J, Kuo YF, Laz TH, et al. Concordance of adolescent human papillomavirus vaccination parental report with provider report in the National Immunization Survey-Teen (2008-2013). Vaccine. 2016;34(37):4415-4421. doi:10.1016/j.vaccine.2016.07.014

Jeyarajah J, Elam-Evans LD, Stokley S, Smith PJ, Singleton JA. Human Papillomavirus Vaccination Coverage Among Girls Before 13 Years: A Birth Year Cohort Analysis of the National Immunization Survey-Teen, 2008-2013. Clin Pediatr (Phila). 2016;55(10):904-914. doi:10.1177/0009922815616245

Kepka D, Ding Q, Hawkins AJ, Warner EL, Boucher KM. Factors associated with early adoption of the HPV vaccine in US male adolescents include Hispanic ethnicity and receipt of other vaccines. Prev Med Rep. 2016;4:98-102. Published 2016 May 25. doi:10.1016/j.pmedr.2016.05.014

Lai D, Ding Q, Bodson J, Warner EL, Kepka D. Factors Associated with Increased HPV Vaccine Use in Rural-Frontier U.S. States. Public Health Nurs. 2016;33(4):283-294. doi:10.1111/phn.12223

Lindley MC, Jeyarajah J, Yankey D, Curtis CR, Markowitz LE, Stokley S. Comparing human papillomavirus vaccine knowledge and intentions among parents of boys and girls. Hum Vaccin Immunother. 2016;12(6):1519-1527. doi:10.1080/21645515.2016.1157673

Mohammed KA, Geneus CJ, Osazuwa-Peters N, Adjei Boakye E, Tobo BB, Burroughs TE. Disparities in Provider Recommendation of Human Papillomavirus Vaccination for U.S. Adolescents. J Adolesc Health. 2016;59(5):592-598. doi:10.1016/j.jadohealth.2016.06.005

Moss JL, Gilkey MB, Rimer BK, Brewer NT. Disparities in collaborative patient-provider communication about human papillomavirus (HPV) vaccination. Hum Vaccin Immunother. 2016;12(6):1476-1483. doi:10.1080/21645515.2015.1128601

Moss JL, Reiter PL, Brewer NT. Concomitant Adolescent Vaccination in the U.S., 2007-2012. Am J Prev Med. 2016;51(5):693-705. doi:10.1016/j.amepre.2016.05.013

Moss JL, Reiter PL, Rimer BK, Brewer NT. Collaborative patient-provider communication and uptake of adolescent vaccines. Soc Sci Med. 2016;159:100-107. doi:10.1016/j.socscimed.2016.04.030

Moss JL, Reiter PL, Rimer BK, Ribisl KM, Brewer NT. Summer Peaks in Uptake of Human Papillomavirus and Other Adolescent Vaccines in the United States. Cancer Epidemiol Biomarkers Prev. 2016;25(2):274-281. doi:10.1158/1055-9965.EPI-15-0574

Moss JL, Reiter PL, Truong YK, Rimer BK, Brewer NT. School Entry Requirements and Coverage of Nontargeted Adolescent Vaccines. Pediatrics. 2016;138(6):e20161414. doi:10.1542/peds.2016-1414

Perkins RB, Lin M, Wallington SF, Hanchate AD. Impact of school-entry and education mandates by states on HPV vaccination coverage: Analysis of the 2009-2013 National Immunization Survey-Teen. Hum Vaccin Immunother. 2016;12(6):1615-1622. doi:10.1080/21645515.2016.1150394

Reagan-Steiner S, Yankey D, Jeyarajah J, et al. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13-17 Years - United States, 2015. MMWR Morb Mortal Wkly Rep. 2016;65(33):850-858. Published 2016 Aug 26. doi:10.15585/mmwr.mm6533a4

Setse RW, Siberry GK, Moss WJ, et al. Meningococcal Conjugate and Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccination Among HIV-infected Youth. Pediatr Infect Dis J. 2016;35(5):e152-e157. doi:10.1097/INF.0000000000001078

Smith PJ, Stokley S, Bednarczyk RA, Orenstein WA, Omer SB. HPV vaccination coverage of teen girls: the influence of health care providers. Vaccine. 2016;34(13):1604-1610. doi:10.1016/j.vaccine.2016.01.061

Trogdon JG, Shafer PR, Shah PD, Calo WA. Are state laws granting pharmacists authority to vaccinate associated with HPV vaccination rates among adolescents?. Vaccine. 2016;34(38):4514-4519. doi:10.1016/j.vaccine.2016.07.056

2015

Jacobson RM, Rogacki B, Thompson DM, Roberts JR, Margolis B, Darden PM. Vaccination Rates among Adolescents in Minnesota as Compared with the United States: Not "Above Average". Minn Med. 2015;98(11-12):38-43.

Kepka D, Ding Q, Warner EL, Spigarelli MG, Mooney K. High school females and those with other vaccinations most likely to complete the Human Papillomavirus vaccine. Prev Med Rep. 2015;2:79-83. Published 2015 Jan 6. doi:10.1016/j.pmedr.2014.12.008

Lu PJ, Yankey D, Jeyarajah J, et al. Hepatitis B vaccination among adolescents 13-17 years, United States, 2006-2012. Vaccine. 2015;33(15):1855-1864. doi:10.1016/j.vaccine.2015.02.021

Lu PJ, Yankey D, Jeyarajah J, et al. HPV Vaccination Coverage of Male Adolescents in the United States. Pediatrics. 2015;136(5):839-849. doi:10.1542/peds.2015-1631

Perkins RB, Lin M, Silliman RA, Clark JA, Hanchate A. Why are U.S. girls getting meningococcal but not human papilloma virus vaccines? Comparison of factors associated with human papilloma virus and meningococcal vaccination among adolescent girls 2008 to 2012. Womens Health Issues. 2015;25(2):97-104. doi:10.1016/j.whi.2014.12.005

Rahman M, Laz TH, McGrath CJ, Berenson AB. Provider recommendation mediates the relationship between parental human papillomavirus (HPV) vaccine awareness and HPV vaccine initiation and completion among 13- to 17-year-old U.S. adolescent children. Clin Pediatr (Phila). 2015;54(4):371-375. doi:10.1177/0009922814551135

Rahman M, McGrath CJ, Hirth JM, Berenson AB. Age at HPV vaccine initiation and completion among US adolescent girls: trend from 2008 to 2012. Vaccine. 2015;33(5):585-587. doi:10.1016/j.vaccine.2014.12.021

Reagan-Steiner S, Yankey D, Jeyarajah J, et al. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13-17 Years--United States, 2014. MMWR Morb Mortal Wkly Rep. 2015;64(29):784-792. doi:10.15585/mmwr.mm6429a3

Roberts JR, Naifeh M, Jacobson RM, et al. Adolescent Vaccination Performance in South Carolina Compared to the United States. J S C Med Assoc. 2015;111(4):117-121.

Smith PJ, Marcuse EK, Seward JF, Zhao Z, Orenstein WA. Children and Adolescents Unvaccinated Against Measles: Geographic Clustering, Parents' Beliefs, and Missed Opportunities. Public Health Rep. 2015;130(5):485-504. doi:10.1177/003335491513000512

2014

Attanasio L, McAlpine D. Accuracy of parental reports of children's HPV vaccine status: implications for estimates of disparities, 2009-2010. Public Health Rep. 2014;129(3):237-244. doi:10.1177/003335491412900305

Bednarczyk RA, Curran EA, Orenstein WA, Omer SB. Health disparities in human papillomavirus vaccine coverage: trends analysis from the National Immunization Survey-Teen, 2008-2011. Clin Infect Dis. 2014;58(2):238-241. doi:10.1093/cid/cit707

Burdette AM, Gordon-Jokinen H, Hill TD. Social determinants of HPV vaccination delay rationales: Evidence from the 2011 National Immunization Survey-Teen. Prev Med Rep. 2014;1:21-26. Published 2014 Oct 2. doi:10.1016/j.pmedr.2014.09.003

Curtis CR, Dorell C, Yankey D, et al. National human papillomavirus vaccination coverage among adolescents aged 13-17 years-National Immunization Survey--teen, United States, 2011. MMWR Suppl. 2014;63(2):61-70.

Dorell C, Yankey D, Jeyarajah J, et al. Delay and refusal of human papillomavirus vaccine for girls, national immunization survey-teen, 2010. Clin Pediatr (Phila). 2014;53(3):261-269. doi:10.1177/0009922813520070

Elam-Evans LD, Yankey D, Jeyarajah J, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 years--United States, 2013. MMWR Morb Mortal Wkly Rep. 2014;63(29):625-633.

Gilkey MB, Magnus BE, Reiter PL, McRee AL, Dempsey AF, Brewer NT. The Vaccination Confidence Scale: a brief measure of parents' vaccination beliefs. Vaccine. 2014;32(47):6259-6265. doi:10.1016/j.vaccine.2014.09.007

Johnson NB, Hayes LD, Brown K, Hoo EC, Ethier KA; Centers for Disease Control and Prevention (CDC). CDC National Health Report: leading causes of morbidity and mortality and associated behavioral risk and protective factors--United States, 2005-2013. MMWR Suppl. 2014;63(4):3-27.

Myers J. Kentucky's improvement in administering Tdap for adolescents: The National Immunization Survey-Teen 2008-2012. Ky Nurse. 2014;62(4):8.

Naifeh MM, Roberts JR, Margolis B, et al. Adolescent vaccination in Oklahoma: a work in progress. J Okla State Med Assoc. 2014;107(9-10):510-516.

Rahman M, McGrath CJ, Berenson AB. Geographic variation in human papillomavirus vaccination uptake among 13-17 year old adolescent girls in the United States. Vaccine. 2014;32(21):2394-2398. doi:10.1016/j.vaccine.2014.02.097

Reiter PL, Brewer NT, Gilkey MB, Katz ML, Paskett ED, Smith JS. Early adoption of the human papillomavirus vaccine among Hispanic adolescent males in the United States. Cancer. 2014;120(20):3200-3207. doi:10.1002/cncr.28871

Reiter PL, Gupta K, Brewer NT, et al. Provider-verified HPV vaccine coverage among a national sample of Hispanic adolescent females. Cancer Epidemiol Biomarkers Prev. 2014;23(5):742-754. doi:10.1158/1055-9965.EPI-13-0979

Stokley S, Jeyarajah J, Yankey D, et al. Human papillomavirus vaccination coverage among adolescents, 2007-2013, and postlicensure vaccine safety monitoring, 2006-2014--United States. MMWR Morb Mortal Wkly Rep. 2014;63(29):620-624.

2013

Centers for Disease Control and Prevention (CDC). Human papillomavirus vaccination coverage among adolescent girls, 2007-2012, and postlicensure vaccine safety monitoring, 2006-2013 - United States. MMWR Morb Mortal Wkly Rep. 2013;62(29):591-595.

Centers for Disease Control and Prevention (CDC). National and state vaccination coverage among adolescents aged 13-17 years--United States, 2012. MMWR Morb Mortal Wkly Rep. 2013;62(34):685-693.

Darden PM, Thompson DM, Roberts JR, et al. Reasons for not vaccinating adolescents: National Immunization Survey of Teens, 2008-2010. Pediatrics. 2013;131(4):645-651. doi:10.1542/peds.2012-2384

Dorell C, Yankey D, Kennedy A, Stokley S. Factors that influence parental vaccination decisions for adolescents, 13 to 17 years old: National Immunization Survey-Teen, 2010. Clin Pediatr (Phila). 2013;52(2):162-170. doi:10.1177/0009922812468208

Kawai K, O'Brien MA, Conway JH, Marshall GS, Kuter BJ. Factors associated with receipt of two doses of varicella vaccine among adolescents in the United States. Pediatr Infect Dis J. 2013;32(5):538-542. doi:10.1097/INF.0b013e31827f4c3c

Ojha RP, Tota JE, Offutt-Powell TN, Klosky JL, Ashokkumar R, Gurney JG. The accuracy of human papillomavirus vaccination status based on adult proxy recall or household immunization records for adolescent females in the United States: results from the National Immunization Survey-Teen. Ann Epidemiol. 2013;23(5):281-285. doi:10.1016/j.annepidem.2013.02.002

Polonijo AN, Carpiano RM. Social inequalities in adolescent human papillomavirus (HPV) vaccination: a test of fundamental cause theory. Soc Sci Med. 2013;82:115-125. doi:10.1016/j.socscimed.2012.12.020

Reiter PL, Gilkey MB, Brewer NT. HPV vaccination among adolescent males: results from the National Immunization Survey-Teen. Vaccine. 2013;31(26):2816-2821. doi:10.1016/j.vaccine.2013.04.010

Reiter PL, Katz ML, Paskett ED. Correlates of HPV vaccination among adolescent females from Appalachia and reasons why their parents do not intend to vaccinate. Vaccine. 2013;31(31):3121-3125. doi:10.1016/j.vaccine.2013.04.068

Ylitalo KR, Lee H, Mehta NK. Health care provider recommendation, human papillomavirus vaccination, and race/ethnicity in the US National Immunization Survey. Am J Public Health. 2013;103(1):164-169. doi:10.2105/AJPH.2011.300600

2012

Bugenske E, Stokley S, Kennedy A, Dorell C. Middle school vaccination requirements and adolescent vaccination coverage. Pediatrics. 2012;129(6):1056-1063. doi:10.1542/peds.2011-2641

Centers for Disease Control and Prevention (CDC). National and state vaccination coverage among adolescents aged 13-17 years--United States, 2011 [published correction appears in MMWR Morb Mortal Wkly Rep. 2012 Oct 19;61(41):844]. MMWR Morb Mortal Wkly Rep. 2012;61(34):671-677.

Dorell CG, Stokley S, Yankey D, Markowitz LE. Compliance with recommended dosing intervals for HPV vaccination among females, 13-17 years, National Immunization Survey-Teen, 2008-2009. Vaccine. 2012;30(3):503-505. doi:10.1016/j.vaccine.2011.11.042

Dorell CG, Yankey D, Byrd KK, Murphy TV. Hepatitis a vaccination coverage among adolescents in the United States. Pediatrics. 2012;129(2):213-221. doi:10.1542/peds.2011-2197

Gowda C, Dempsey AF. Medicaid reimbursement and the uptake of adolescent vaccines. Vaccine. 2012;30(9):1682-1689. doi:10.1016/j.vaccine.2011.12.097

Lu PJ, Dorell C, Yankey D, Santibanez TA, Singleton JA. A comparison of parent and provider reported influenza vaccination status of adolescents. Vaccine. 2012;30(22):3278-3285. doi:10.1016/j.vaccine.2012.03.015

Reiter PL, Katz ML, Paskett ED. HPV vaccination among adolescent females from Appalachia: implications for cervical cancer disparities. Cancer Epidemiol Biomarkers Prev. 2012;21(12):2220-2230. doi:10.1158/1055-9965.EPI-12-0850

2011

Centers for Disease Control and Prevention (CDC). National and state vaccination coverage among adolescents aged 13 through 17 years--United States, 2010. MMWR Morb Mortal Wkly Rep. 2011;60(33):1117-1123.

Dorell CG, Jain N, Yankey D. Validity of parent-reported vaccination status for adolescents aged 13-17 years: National Immunization Survey-Teen, 2008. Public Health Rep. 2011;126 Suppl 2(Suppl 2):60-69. doi:10.1177/00333549111260S208

Dorell CG, Yankey D, Santibanez TA, Markowitz LE. Human papillomavirus vaccination series initiation and completion, 2008-2009 [published correction appears in Pediatrics. 2012 Jul;130(1):166-8. Dosage error in article text]. Pediatrics. 2011;128(5):830-839. doi:10.1542/peds.2011-0950

Dorell C, Yankey D, Strasser S. Parent-reported reasons for nonreceipt of recommended adolescent vaccinations, national immunization survey: teen, 2009. Clin Pediatr (Phila). 2011;50(12):1116-1124. doi:10.1177/0009922811415104

Lindley MC, Smith PJ, Rodewald LE. Vaccination coverage among U.S. adolescents aged 13-17 years eligible for the Vaccines for Children program, 2009. Public Health Rep. 2011;126 Suppl 2(Suppl 2):124-134. doi:10.1177/00333549111260S214

Niccolai LM, Mehta NR, Hadler JL. Racial/Ethnic and poverty disparities in human papillomavirus vaccination completion. Am J Prev Med. 2011;41(4):428-433. doi:10.1016/j.amepre.2011.06.032

Stokley S, Cohn A, Dorell C, et al. Adolescent vaccination-coverage levels in the United States: 2006-2009. Pediatrics. 2011;128(6):1078-1086. doi:10.1542/peds.2011-1048

Stokley S, Cohn A, Jain N, McCauley MM. Compliance with recommendations and opportunities for vaccination at ages 11 to 12 years: evaluation of the 2009 national immunization survey-teen. Arch Pediatr Adolesc Med. 2011;165(9):813-818. doi:10.1001/archpediatrics.2011.138

2010

Centers for Disease Control and Prevention (CDC). National, state, and local area vaccination coverage among adolescents aged 13-17 years --- United States, 2009. MMWR Morb Mortal Wkly Rep. 2010;59(32):1018-1023.

Jain N, Stokley S, Cohn A. Receipt of tetanus-containing vaccinations among adolescents aged 13 to 17 years in the United States: National Immunization Survey-Teen 2007. Clin Ther. 2010;32(8):1468-1478. doi:10.1016/j.clinthera.2010.07.016

Lu PJ, Jain N, Cohn AC. Meningococcal conjugate vaccination among adolescents aged 13-17 years, United States, 2007. Vaccine. 2010;28(11):2350-2355. doi:10.1016/j.vaccine.2009.12.032

2009

Centers for Disease Control and Prevention (CDC). National, state, and local area vaccination coverage among adolescents aged 13-17 years--United States, 2008. MMWR Morb Mortal Wkly Rep. 2009;58(36):997-1001.

Jain N, Hennessey K. Hepatitis B vaccination coverage among U.S. adolescents, National Immunization Survey-Teen, 2006. J Adolesc Health. 2009;44(6):561-567. doi:10.1016/j.jadohealth.2008.10.143

Smith PJ, Lindley MC, Shefer A, Rodewald LE. Underinsurance and adolescent immunization delivery in the United States. Pediatrics. 2009;124 Suppl 5:S515-S521. doi:10.1542/peds.2009-1542K

2008

Centers for Disease Control and Prevention (CDC). Vaccination coverage among adolescents aged 13-17 years - United States, 2007 [published correction appears in MMWR Morb Mortal Wkly Rep. 2009 Jan 16;58(1):10]. MMWR Morb Mortal Wkly Rep. 2008;57(40):1100-1103.

2007

Centers for Disease Control and Prevention (CDC). National vaccination coverage among adolescents aged 13-17 years--United States, 2006. MMWR Morb Mortal Wkly Rep. 2007;56(34):885-888.

13. References

American Association for Public Opinion Research (2023). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 10th edition. https://aapor.org/wp-content/uploads/2024/03/Standards-Definitions-10th-edition.pdf

Bartlett, D. L., Ezzati-Rice, T. M., Stokley, S., & Zhao, Z. (2001). Comparison of NIS and NHIS/NIPRCS vaccination coverage estimates. National Immunization Survey. National Health Interview Survey/National Immunization Provider Record Check Study. *American Journal of Preventive Medicine, 20*(4 Suppl), 25–27. https://doi.org/10.1016/s0749-3797(01)00284-7

Blumberg, S. J. and Luke, J. V. (2025). Wireless substitution: Early release of estimates from the National Health Interview Survey, July-December 2024. National Center for Health Statistics. https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless202506.pdf

Blumberg, S. J., Luke, J. V., Ganesh, N., Davern, M. E., Boudreaux, M. H., and Soderberg, K. (2011). Wireless substitution: State-level estimates from the National Health Interview Survey, January 2007–June 2011. National Center for Health Statistics. http://www.cdc.gov/nchs/data/nhsr/nhsr039.pdf

Brick, J. M. and Kalton, G. (1996). Handling missing data in survey research. *Statistical Methods in Medical Research, 5*(3):215–238. https://doi.org/10.1177/096228029600500302

Centers for Disease Control and Prevention (CDC) (1994). Reported vaccine-preventable diseases - United States, 1993, and the childhood immunization initiative. *MMWR, 43*(4):57-60. https://www.cdc.gov/mmwr/preview/mmwrhtml/00023738.htm

Centers for Disease Control and Prevention (CDC) (2002). *National Immunization Survey: Guide to Quality Control Procedures.* http://www.cdc.gov/nchs/data/nis/qcman.pdf

Centers for Disease Control and Prevention (CDC) (2015a). *National Immunization Survey-Teen: A User's Guide for the 2014 Public-Use Data File.* https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NIS/NISTEENPUF14_DUG.pdf

Centers for Disease Control and Prevention (CDC) (2015b). *NIS-Teen: Revised Definition of Adequate Provider Data (APD).* https://www.cdc.gov/vaccines/imz-managers/coverage/nis/teen/downloads/APD-full-report.pdf

Centers for Disease Control and Prevention (CDC) (2025). Error profile for the 2024 NIS-Teen: National Immunization Survey. Atlanta, GA: US Department of Health and Human Services, CDC; 2023. https://www.cdc.gov/teenvaxview/media/pdfs/2025/11/Error-Profile-for-the-2024-NIS-Teen_508.pdf

Coronado, V. G., Maes, E. F., Rodewald, L. E., Chu, S., Battaglia, M. P., Hoaglin, D. C., Merced, N. L., Yusuf, H., Cordero, J. F., and Orenstein, W. A. (2000). Risk factors for underimmunization among 19-35 month-old children in the United States: National Immunization Survey, July 1996-June 1998. Unpublished manuscript, Centers for Disease Control and Prevention, Atlanta.

Council of American Survey Research Organizations (CASRO) (1982). On the Definition of Response Rates: A Special Report of the CASRO Task Force on Completion Rates. Council of American Survey Research Organizations.

Deming, W. E. (1943). *Statistical Adjustment of Data*. New York: Wiley.

Dorell, C., Jain, N., and Yankey, D. (2011). Validity of parent-reported vaccination status for adolescents aged 13-17 years: National Immunization Survey-Teen, 2008. *Public Health Reports, 126*(Suppl 2), 60-69. https://doi.org/10.1177/00333549111260S208

Ezzati-Rice, T. M., Zell, E. R., Battaglia, M. P., Ching, P. L. Y. H., and Wright, R. A. (1995). The design of the National Immunization Survey. *1995 Proceedings of the Section on Survey Research Methods,* Alexandria, VA: American Statistical Association, 668-672. https://www.cdc.gov/nchs/data/nis/sample_design/ezzati1995.pdf

Ford, B. L. (1983). An overview of hot-deck procedures, in: *Incomplete data in sample surveys*, Madow W. G., Olkin I., Rubin D. B. (Eds.), Academic Press, New York, pp. 185-207.

Ganesh, N., Pineau, V., Copeland, K. R., Zhao, Z., Smith, P., Khare, M., and Yankey, D. (2015). *An Alternative Raking Approach to Reduce Design Effects*. Presented at the Joint Statistical Meetings, American Statistical Association, Alexandria, VA.

Iowa Health and Human Services (HHS) (2023). Adolescent Immunizations Data. https://hhs.iowa.gov/public-health/data/health/immunization/adolescent-immunizations-data

Jain, N., Singleton, J., Montgomery, M., and Skalland, B. (2009). Determining accurate vaccination coverage rates for adolescents: The National Immunization Survey-Teen 2006. *Public Health Reports, 124*(5): 642-651. https://doi.org/10.1177/003335490912400506

Khare, M., Battaglia, M. P., Huggins, V. J., Stokley, S., Hoaglin, D. C., Wright, R. A., and Rodén, A. S. (2000). Accuracy of vaccination dates reported by immunization providers in the National Immunization Survey. *2000 Proceedings of the Section on Survey Research Methods*. Alexandria, VA: American Statistical Association, 665-670. https://www.cdc.gov/nchs/data/nis/data_collection/khare2000.pdf

Khare, M., Battaglia, M. P., Stokley, S., Wright, R. A., and Huggins, V. J. (2001). Quality of immunization histories reported in the National Immunization Survey. *Proceedings of the International Conference on Quality in Official Statistics* (CD-ROM). Stockholm: Statistics Sweden.

Meites, E., Kempe, A., and Markowitz, L. E. (2016). Use of a 2-dose schedule for human papillomavirus vaccination — Updated recommendations of the Advisory Committee on Immunization Practices. *MMWR,* 65(49), 1405-1408. https://doi.org/10.15585/mmwr.mm6549a5

Molinari, N., Wolter, K., Skalland, B., Montgomery, R., Khare, M., Smith, P., and Singleton, J. (2011). Quanitfying bias in a health survey: Modeling total survey error in the National Immunization Survey. *Statistics in Medicine, 30*, 505-515. https://doi.org/10.1002/sim.3911

Mulry, M. H. and Spencer, B. C. (1991). Total error in PES estimates of population. *Journal of the American Statistical Association, 86*(416), 839-863. https://doi.org/10.1080/01621459.1991.10475122

National Center for Health Statistics (NCHS) (1999). National Health Interview Survey: Research for the 1995-2004 redesign. *Vital and Health Statistics, Series 2, Data Evaluation and Methods Research* (126), 1-119. https://www.cdc.gov/nchs/data/series/sr_02/sr02_126.pdf

National Center for Immunization and Respiratory Diseases (NCIRD) (2024). *National Immunization Survey - Teen 2023 Public-Use Data File: Documentation, Codebook and Frequencies*. Atlanta, GA. Available at: https://www.cdc.gov/nis/php/datasets-teen/index.html

Nguyen, K. H., Singleton, J., Elam-Evans, L. D., Hill, H. A., Walker, T., Yankey, D., et al. (2019). Impact of a methodological change from a dual-frame landline and cell-phone sample design to a single-frame cell-phone sample design on vaccination coverage estimates among adolescents 13-17 years, National Immunization Survey-Teen, 2016-2017. Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/pubs-presentations/dual-to-single-frame-teen.html

NORC at the University of Chicago (NORC) (2011). *Modeling Total Survey Error in the 2009 and 2010 NIS: Young Children and Teens.* Report submitted to the Centers for Disease Control and Prevention. Chicago, IL: NORC.

Ojha, R. P., Tota, J. E., Offut-Powell, T. N., Kloskey, J. L., Ashokkumar, R., and Gurney, J. G. (2013). The accuracy of human papillomavirus vaccination status based on adult proxy recall or household immunization records for adolescent females in the United States: results from the National Immunization Survey-Teen. *Annals of Epidemiology, 23*(5), 281-285.

Oregon Immunization Program (2023). Adolescent Immunization Data. https://public.tableau.com/app/profile/oregon.immunization.program/viz/OregonAdolescentImmunizations/D-Landing

Pineau, V., Wolter, K., Skalland, B., Zeng, W., Zhao, Z., and Khare, M. (2012). *Modeling Total Survey Error in the 2010 National Immunization Survey (NIS): Pre-School Children and Teens.* Presented at the 2012 American Statistical Association (ASA) Joint Statistical Meetings, San Diego, CA.

Pineau, V., Wolter, K., Skalland, B., Zeng, W., Black, C., Dorell, C., Khare, M., and Yankey, D. (2013). *Modeling Total Surey Error in the 2011 National Immunization Survey (NIS): Pre-School Children and Teens.* Presented at the 2013 American Statistical Association (ASA) Joint Statistical Meetings, Montreal, Canada. https://www.cdc.gov/vaccines/imz-managers/coverage/downloads/total-survey-error.pdf

Pingali, C., Yankey, D., Elam-Evans, L. D., et al. (2025). Vaccination coverage among adolescents aged 13–17 years — National Immunization Survey-Teen, United States, 2024. MMWR, 74(30), 466–472. http://dx.doi.org/10.15585/mmwr.mm7430a1

R Core Team (2025). *R: A Language and Environment for Statistical Computing.* R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

RTI International (2008). *SUDAAN Language Manual, Release 10.0*. RTI International.

Rosenbaum, P.R. (1987). Model-based direct adjustment. *Journal of the American Statistical Association*, *82*, 387-394. https://doi.org/10.1080/01621459.1987.10478441

Rosenbaum, P.R. and Rubin, D.B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*(1), 41-55. https://doi.org/10.1093/biomet/70.1.41

Rosenbaum, P.R. and Rubin, D.B. (1984). Reducing bias in observational studies using subclassification on the propensity score. *Journal of the American Statistical Association*, *79*(387), 516-534. https://doi.org/10.1080/01621459.1984.10478078

SAS Institute Inc. (2025). *SAS/STAT User's Guide*. Cary, NC: SAS Institute Inc.

Skalland, B., Wolter, K., Ma, Q., Pineau, V., Singleton, J., Yankey, D., and Smith, P. (2016). A total survey error framework and assessment for the 2013 National Immunization Survey. Presented at the International Total Survey Error Workshop, Sydney, Australia, October, 2016.

Smith, P. J., Battaglia, M. P., Huggins, V. J., Hoaglin, D. C., Rodén, A. S., Khare, M., Ezzati-Rice, T. M., and Wright, R. A. (2001a). Overview of the sampling design and statistical methods used in the National Immunization Survey. *American Journal of Preventive Medicine, 20*(4 Suppl), 17-24. https://doi.org/10.1016/s0749-3797(01)00285-9

Smith, P. J., Rao, J. N. K., Battaglia, M. P., Ezzati-Rice, T. M., Daniels, D., and Khare, M. (2001b). Compensating for provider non-response using response propensities to form adjustment cells: The National Immunization Survey. *Vital and Health Statistics, Series 2, Data Evaluation and Methods Research,* 133, 1-17.

Smith, P. J., Hoaglin, D. C., Battaglia, M. P., Khare, M., and Barker, L. E. (2005). *Statistical Methodology of the National Immunization Survey: 1994-2002*. *Vital and Health Statistics, Series 2, Data Evaluation and Methods Research* (138), 1-64. https://www.cdc.gov/nchs/data/series/sr_02/sr02_138.pdf

StataCorp (2025). *Stata Statistical Software: Release 19*. College Station, TX: StataCorp LLC.

Walker, T. Y., Elam-Evans, L. D., Singleton, J. A., Yankey, D., Markowitz, L. E., Fredua, B., et al. (2018). National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years — United States, 2017. *MMWR, 67*(33), 909-917. https://doi.org/10.15585/mmwr.mm6733a1

Wall, T. P., Kochanek, K. M., Fitti, J. E., and Zell, E. R. (1995). The use of real time translation services in RDD telephone surveys. Presented at the 1995 Conference of the American Association for Public Opinion Research, Fort Lauderdale, FL.

Wodi, A. P., Murthy, N., McNally, V., Daley, M. F., and Cineas, S. (2024). Advisory committee on immunization practices recommended immunization schedule for children and adolescents aged 18 years or younger – United States, 2024. *MMWR*, 73(1):6-10. http://dx.doi.org/10.15585/mmwr.mm7301a2

Wolter, K., Smith, P., Khare, M., Welch, B., Copeland, K., Pineau, V., and Davis, N. (2017a). Statistical methodology of the National Immunization Survey, 2005-2014. *Vital Health Statistics, Series 1, Programs and Collection Procedures,* (61), 1-107.

Wolter, K., Pineau, V., Skalland, B., Zeng, W., Singleton, J., Khare, M., Zhao, Z., Yankey, D., and Smith, P. (2017b). Total survey error assessment for socio-demographic subgroups in the 2012 U.S. National Immunization Survey. In Biemer, P., De Leeuw, E., Edwards, B., Kreuter, F., Lyberg, L., Tucker, C., and West, B. (Eds.) *Total Survey Error in Practice*, John Wiley & Sons, Inc., Hoboken, NJ, USA.

Yankey D., Hill H. A., Elam-Evans L. D., et al. (2015). Estimating change in telephone survey bias in an era of declining response rates and transition to wireless telephones—evidence from the National Immunization Survey (NIS), 1995–2013. Presented at the 2015 American Association for Public Opinion Research (AAPOR) 70th Annual Conference, Hollywood, FL; May 14–17, 2015.

Zell, E. R., Ezzati-Rice, T. M., Battaglia, M. P., and Wright, R. A. (2000). National Immunization Survey: The methodology of a vaccination surveillance system. *Public Health Reports, 115*(1), 65-77. https://doi.org/10.1093/phr/115.1.65

Appendix A: Glossary of Abbreviations and Terms

1:3:2:1	The series of 1 or more Td/Tdap vaccinations, 3 or more Hep B vaccinations (or 2 or more Hep B 1.0 ml Recombivax vaccinations), 2 or more MMR vaccinations, and 1 or more VAR vaccinations (or a history of chicken pox disease)
1:3:2:1:2	The series of 1 or more Td/Tdap vaccinations, 3 or more Hep B vaccinations (or 2 or more Hep B 1.0 ml Recombivax vaccinations), 2 or more MMR vaccinations, 1 or more MEN vaccinations, and 2 or more VAR vaccinations (or a history of chicken pox disease)
1:1:3	The series of 1 or more Tdap vaccinations at or after age 10 years, 1 or more MenACWY vaccinations and 3 or more HPV vaccinations prior to age 13 years.
AAPOR	American Association for Public Opinion Research
ACS	American Community Survey
APCN	Active Personal Cellular Phone Number
CASRO	Council of American Survey Research Organizations
CATI	Computer-assisted telephone interviewing
CAWI	Computer-assisted web interviewing
CDC	Centers for Disease Control and Prevention
CII	Childhood Immunization Initiative
COV	COVID-19
CPS	Current Population Survey
DHHS	U.S. Department of Health and Human Services
DOB	Date of birth
FLU	Seasonal influenza vaccine
H1N1	Monovalent 2009 H1N1 Influenza Vaccine
Hep A	Hepatitis A vaccine
Hep B	Hepatitis B vaccine
HIM	Health insurance module
HPV	Human papillomavirus
IAP	Immunization Action Plan
IHQ	Immunization history questionnaire
MCV	Measles-containing vaccine

MenACWY	Quadrivalent meningococcal conjugate vaccine
MenB	Serogroup B meningococcal vaccine
MPSV4	Quadrivalent meningococcal polysaccharide vaccine
MEN	Meningococcal vaccine
MMR	Measles, mumps, and rubella vaccine
MSA	Metropolitan Statistical Area
NCHS	National Center for Health Statistics
NCIRD	National Center for Immunization and Respiratory Diseases
NIPRCS	National Immunization Provider Record Check Study
NIS	National Immunization Survey
NIS-Child	National Immunization Survey - Child
NIS-Teen	National Immunization Survey - Teen
NHIS	National Health Interview Survey
NIP	National Immunization Program
PRC	Provider Record Check
PUF	Public-use data file
PUMS	Public-Use Microdata Sample
RDD	Random digit dialing
SC	Shot card
Td	Tetanus and diphtheria toxoids adsorbed
Tdap	Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine, adsorbed
UTD	Up-to-date
WRN	Working Residential Number
VFC	Vaccines for Children program
VAR	Varicella vaccine

Appendix B: Summary Statistics for Sampling Weights by Estimation Area

Table B.1: Distribution of Sampling Weights* for Teens with Completed Household Interviews, National Immunization Survey - Teen, 2024

State/Estimation Area	n	Sum§	Minimum	Maximum	Mean	Coefficient of Variation
U.S. National†	38,140	21,650,071.56	5.98	15,087.34	567.65	130.87
Alabama	865	335,328.35	59.44	1,577.44	387.66	53.88
Alaska	462	50,570.94	22.27	306.38	109.46	47.87
Arizona	476	481,455.30	33.26	4,147.54	1,011.46	59.47
Arkansas	646	209,427.00	72.11	1,335.27	324.19	55.78
California	951	2,526,121.72	32.03	9,610.79	2,656.28	61.55
Colorado	699	364,143.49	36.17	1,383.58	520.95	45.22
Connecticut	350	220,525.99	74.94	1,861.74	630.07	53.26
Delaware	855	63,293.52	24.20	235.43	74.03	41.71
District of Columbia	901	31,114.17	5.98	279.23	34.53	101.32
Florida	656	1,306,654.42	49.22	15,087.34	1,991.85	84.83
Georgia	495	769,219.10	36.53	7,780.55	1,553.98	76.65
Hawaii	866	81,742.15	31.29	295.56	94.39	38.43
Idaho	405	145,895.47	29.92	931.44	360.24	48.14
Illinois	1,567	817,054.41	45.35	3,160.89	521.41	62.98
IL-City of Chicago	510	150,038.95	45.35	3,160.89	294.19	96.10
IL-Rest of State	1,057	667,015.46	49.40	1,803.31	631.05	46.04
Indiana	823	468,588.02	51.13	2,212.56	569.37	45.37
Iowa	405	216,243.49	53.95	1,555.62	533.93	44.37
Kansas	600	209,319.33	41.70	1,216.64	348.87	55.82
Kentucky	508	296,540.44	65.58	1,687.74	583.74	50.56
Louisiana	744	308,023.23	58.31	2,225.59	414.01	65.83
Maine	684	75,762.92	42.97	275.46	110.76	39.87
Maryland	983	401,548.89	33.67	2,877.63	408.49	92.63
Massachusetts	831	400,661.36	47.06	1,914.46	482.14	47.97
Michigan	423	628,288.98	36.42	5,250.11	1,485.32	52.84
Minnesota	794	383,520.17	81.06	1,910.44	483.02	44.57
Mississippi	563	206,287.04	43.12	2,018.07	366.41	63.40
Missouri	467	406,602.84	48.92	4,298.14	870.67	61.30
Montana	776	70,832.52	27.99	219.93	91.28	37.13
Nebraska	423	141,646.36	50.52	920.15	334.86	48.96
Nevada	541	206,729.91	39.47	2,302.99	382.13	65.53
New Hampshire	742	77,144.06	26.75	375.92	103.97	44.11
New Jersey	977	594,648.42	45.77	1,758.32	608.65	46.44
New Mexico	604	140,071.53	29.90	754.89	231.91	46.88
New York	1,316	1,130,866.53	41.58	4,807.66	859.32	63.36
NY-City of New York	442	448,221.72	54.13	4,807.66	1,014.08	71.83
NY-Rest of State	874	682,644.81	41.58	2,674.29	781.06	51.24
North Carolina	789	697,987.71	42.78	2,847.88	884.65	52.90
North Dakota	487	50,398.21	21.44	358.68	103.49	58.66
Ohio	673	757,639.29	59.00	5,637.87	1,125.76	58.06
Oklahoma	760	287,283.00	46.65	1,076.32	378.00	44.38
Oregon	792	250,965.55	43.51	769.33	316.88	38.72
Pennsylvania	1,375	781,487.07	34.18	2,880.66	568.35	82.13

State/Estimation Area	n	Sum[§]	Minimum	Maximum	Mean	Coefficient of Variation
PA-Philadelphia County	531	91,912.08	43.16	764.19	173.09	54.10
PA-Rest of State	844	689,574.99	34.18	2,880.66	817.03	53.25
Rhode Island	337	60,022.39	46.58	720.59	178.11	57.90
South Carolina	992	346,937.07	30.72	1,501.20	349.73	54.49
South Dakota	583	64,680.90	33.79	269.53	110.94	45.60
Tennessee	613	460,607.93	75.98	4,177.77	751.40	58.25
Texas	3,404	2,246,006.20	32.48	6,580.60	659.81	148.75
TX-Bexar County	812	150,690.05	36.21	603.92	185.58	48.94
TX-City of Houston	1,169	159,849.01	32.48	562.97	136.74	60.36
TX-Rest of State	1,423	1,935,467.13	45.10	6,580.60	1,360.13	88.55
Utah	446	284,592.68	32.87	1,942.42	638.10	56.70
Vermont	349	35,581.66	9.93	426.81	101.95	69.45
Virginia	832	552,073.90	28.59	3,909.78	663.55	80.81
Washington	474	482,085.60	51.00	3,326.39	1,017.06	55.18
West Virginia	715	106,313.98	31.56	422.70	148.69	41.48
Wisconsin	519	380,204.27	123.01	3,207.67	732.57	51.50
Wyoming	602	39,332.06	19.27	180.34	65.34	43.20
Puerto Rico	863	174,084.49	16.97	3,133.35	201.72	136.94
Guam	344	12,001.00	4.80	213.47	34.89	84.73

*Distribution of RDDWT_C_TERR.

† Excludes U.S. territories.

§ The sum of the weights is an estimate of the total number of adolescents age 13-17 in the population.

Table B.2: Distribution of Sampling Weights* for Teens with Adequate Provider Data, National Immunization Survey - Teen, 2024

State/Estimation Area	n	Sum§	Minimum	Maximum	Mean	Coefficient of Variation
U.S. National†	16,325	21,650,071.56	8.42	29,301.13	1,326.19	134.51
Alabama	373	335,328.35	226.98	3,501.29	899.00	56.15
Alaska	223	50,570.94	70.20	775.74	226.78	49.93
Arizona	206	481,455.30	231.76	12,737.58	2,337.16	63.68
Arkansas	311	209,427.00	184.82	2,843.32	673.40	63.79
California	328	2,526,121.72	484.81	28,628.18	7,701.59	55.97
Colorado	304	364,143.49	219.57	3,676.57	1,197.84	39.88
Connecticut	166	220,525.99	255.01	4,435.03	1,328.47	54.63
Delaware	346	63,293.52	44.99	571.52	182.93	43.50
District of Columbia	383	31,114.17	8.42	698.64	81.24	122.85
Florida	256	1,306,654.42	325.61	29,301.13	5,104.12	75.62
Georgia	201	769,219.10	430.39	15,351.11	3,826.96	72.46
Hawaii	347	81,742.15	65.93	806.79	235.57	40.80
Idaho	173	145,895.47	195.49	3,610.42	843.33	59.04
Illinois	669	817,054.41	102.40	5,630.44	1,221.31	63.52
IL-City of Chicago	212	150,038.95	102.40	5,630.44	707.73	91.36
IL-Rest of State	457	667,015.46	250.10	4,940.15	1,459.55	48.86
Indiana	349	468,588.02	257.28	4,181.95	1,342.66	46.46
Iowa	198	216,243.49	328.26	2,642.20	1,092.14	37.29
Kansas	276	209,319.33	195.58	3,443.49	758.40	50.47
Kentucky	211	296,540.44	279.81	3,421.04	1,405.40	44.56
Louisiana	295	308,023.23	217.60	5,183.97	1,044.15	70.83
Maine	332	75,762.92	60.45	596.53	228.20	38.64
Maryland	390	401,548.89	171.98	6,426.04	1,029.61	82.61
Massachusetts	404	400,661.36	187.61	6,787.55	991.74	54.05
Michigan	213	628,288.98	266.72	12,361.13	2,949.71	52.81
Minnesota	338	383,520.17	264.28	5,595.32	1,134.68	50.64
Mississippi	220	206,287.04	186.81	3,279.07	937.67	58.14
Missouri	213	406,602.84	154.12	6,445.38	1,908.93	57.04
Montana	345	70,832.52	56.45	524.97	205.31	38.61
Nebraska	208	141,646.36	125.60	1,809.06	680.99	47.25
Nevada	212	206,729.91	198.31	3,071.56	975.14	54.40
New Hampshire	330	77,144.06	73.07	795.28	233.77	41.51
New Jersey	400	594,648.42	186.03	5,108.56	1,486.62	52.49
New Mexico	301	140,071.53	100.33	1,256.52	465.35	42.57
New York	565	1,130,866.53	250.32	10,113.23	2,001.53	65.68
NY-City of New York	185	448,221.72	437.85	8,407.29	2,422.82	64.46
NY-Rest of State	380	682,644.81	250.32	10,113.23	1,796.43	62.45
North Carolina	331	697,987.71	214.47	8,128.74	2,108.72	56.48
North Dakota	197	50,398.21	51.91	776.99	255.83	53.23
Ohio	322	757,639.29	71.68	11,278.26	2,352.92	59.39
Oklahoma	318	287,283.00	214.11	2,634.61	903.41	40.44
Oregon	376	250,965.55	170.58	1,841.55	667.46	41.53
Pennsylvania	530	781,487.07	141.39	9,565.29	1,474.50	82.35
PA-Philadelphia County	195	91,912.08	141.39	1,238.90	471.34	51.29
PA-Rest of State	335	689,574.99	208.75	9,565.29	2,058.43	56.90
Rhode Island	140	60,022.39	138.55	1,902.22	428.73	64.49
South Carolina	417	346,937.07	178.92	4,244.64	831.98	62.64
South Dakota	294	64,680.90	63.18	588.13	220.00	44.19

State/Estimation Area	n	Sum[§]	Minimum	Maximum	Mean	Coefficient of Variation
Tennessee	279	460,607.93	291.15	11,992.64	1,650.92	64.88
Texas	1,188	2,246,006.20	101.99	13,737.79	1,890.58	124.86
TX-Bexar County	320	150,690.05	177.86	2,052.14	470.91	56.59
TX-City of Houston	345	159,849.01	101.99	2,319.98	463.33	64.97
TX-Rest of State	523	1,935,467.13	266.69	13,737.79	3,700.70	69.96
Utah	211	284,592.68	64.76	4,787.54	1,348.78	54.88
Vermont	202	35,581.66	37.71	744.98	176.15	64.00
Virginia	349	552,073.90	186.41	6,483.05	1,581.87	71.25
Washington	231	482,085.60	351.40	6,856.49	2,086.95	47.33
West Virginia	346	106,313.98	127.21	989.01	307.27	39.32
Wisconsin	251	380,204.27	411.87	4,934.55	1,514.76	46.92
Wyoming	257	39,332.06	42.52	344.87	153.04	40.45
Puerto Rico	234	174,084.49	99.82	7,534.49	743.95	131.18
Guam	106	12,001.00	15.69	644.70	113.22	95.11

* Distribution of PROVWT_C_TERR.

† Excludes U.S. territories.

§ The sum of the weights is an estimate of the total number of adolescents age 13-17 in the population.

Appendix C: Summary Tables

Table C.1: Estimated Population Totals and Sample Sizes of Teens Aged 13-17 Years by State and Estimation Area, National Immunization Survey - Teen, 2024

State/Estimation Area	Estimation Area Number (ESTIAPT24)	Estimated Population Total of Teens	Number of Teens with Complete Household Interviews	Number of Teens with Adequate Provider Data	Percent of Teens with Adequate Provider Data
U.S. National*		21,650,072	38,140	16,325	42.8
Alabama	20	335,328	865	373	43.1
Alaska	74	50,571	462	223	48.3
Arizona	66	481,455	476	206	43.3
Arkansas	46	209,427	646	311	48.1
California	68	2,526,122	951	328	34.5
Colorado	60	364,143	699	304	43.5
Connecticut	1	220,526	350	166	47.4
Delaware	13	63,294	855	346	40.5
District of Columbia	12	31,114	901	383	42.5
Florida	22	1,306,654	656	256	39.0
Georgia	25	769,219	495	201	40.6
Hawaii	72	81,742	866	347	40.1
Idaho	75	145,895	405	173	42.7
Illinois		817,054	1,567	669	42.7
IL-City of Chicago	35	150,039	510	212	41.6
IL-Rest of State	34	667,015	1,057	457	43.2
Indiana	36	468,588	823	349	42.4
Iowa	56	216,243	405	198	48.9
Kansas	57	209,319	600	276	46.0
Kentucky	27	296,540	508	211	41.5
Louisiana	47	308,023	744	295	39.7
Maine	4	75,763	684	332	48.5
Maryland	14	401,549	983	390	39.7
Massachusetts	2	400,661	831	404	48.6
Michigan	38	628,289	423	213	50.4
Minnesota	40	383,520	794	338	42.6
Mississippi	28	206,287	563	220	39.1
Missouri	58	406,603	467	213	45.6
Montana	61	70,833	776	345	44.5
Nebraska	59	141,646	423	208	49.2
Nevada	73	206,730	541	212	39.2
New Hampshire	5	77,144	742	330	44.5
New Jersey	8	594,648	977	400	40.9
New Mexico	49	140,072	604	301	49.8
New York		1,130,867	1,316	565	42.9
NY-City of New York	11	448,222	442	185	41.9
NY-Rest of State	10	682,645	874	380	43.5
North Carolina	29	697,988	789	331	42.0
North Dakota	62	50,398	487	197	40.5
Ohio	41	757,639	673	322	47.8
Oklahoma	50	287,283	760	318	41.8
Oregon	76	250,966	792	376	47.5
Pennsylvania		781,487	1,375	530	38.5
PA-Philadelphia County	17	91,912	531	195	36.7
PA-Rest of State	16	689,575	844	335	39.7

State/Estimation Area	Estimation Area Number (ESTIAPT24)	Estimated Population Total of Teens	Number of Teens with Complete Household Interviews	Number of Teens with Adequate Provider Data	Percent of Teens with Adequate Provider Data
Rhode Island	6	60,022	337	140	41.5
South Carolina	30	346,937	992	417	42.0
South Dakota	63	64,681	583	294	50.4
Tennessee	31	460,608	613	279	45.5
Texas		2,246,006	3,404	1,188	34.9
TX-Bexar County	55	150,690	812	320	39.4
TX-City of Houston	54	159,849	1,169	345	29.5
TX-Rest of State	51	1,935,467	1,423	523	36.8
Utah	64	284,593	446	211	47.3
Vermont	7	35,582	349	202	57.9
Virginia	18	552,074	832	349	41.9
Washington	77	482,086	474	231	48.7
West Virginia	19	106,314	715	346	48.4
Wisconsin	44	380,204	519	251	48.4
Wyoming	65	39,332	602	257	42.7
Puerto Rico	106	174,084	863	234	27.1

* Excludes U.S. territories.

Table C.2: Estimated Population Totals and Sample Sizes by Age of Teen by Maternal Education, National Immunization Survey - Teen, 2024

Age of Teen in Years	Maternal Education	Teens with Completed Household Interviews* Unweighted Completes	Teens with Completed Household Interviews* Weighted Completes†	Teens with Adequate Provider Data* Unweighted Completes	Teens with Adequate Provider Data* Weighted Completes§
13	<12 Years	629	523,820	284	528,355
13	12 Years	1,151	770,248	484	806,717
13	>12, Non College Graduate	1,607	866,615	703	867,899
13	College Grad	3,647	1,860,681	1,672	1,866,294
14	<12 Years	663	492,875	283	461,118
14	12 Years	1,280	864,876	545	896,891
14	>12, Non College Graduate	1,806	992,924	804	983,028
14	College Grad	3,870	2,014,549	1,723	1,976,286
15	<12 Years	702	510,081	311	533,591
15	12 Years	1,270	896,981	533	939,745
15	>12, Non College Graduate	1,886	956,554	760	944,697
15	College Grad	3,778	1,914,432	1,690	1,961,499
16	<12 Years	683	541,348	287	543,846
16	12 Years	1,482	968,673	581	986,149
16	>12, Non College Graduate	1,945	1,011,110	817	1,065,991
16	College Grad	3,935	2,028,428	1,709	2,108,616
17	<12 Years	630	463,754	254	457,858
17	12 Years	1,323	955,323	454	834,196
17	>12, Non College Graduate	1,893	961,160	787	884,114
17	College Grad	3,960	2,055,641	1,644	2,003,182
Total		38,140	21,650,072	16,325	21,650,072

***** Excludes U.S. territories.

† Weighted by single-frame cellular phone weight RDDWT_C.

§ Weighted by single-frame cellular phone weight PROVWT_C.

Table C.3: Estimated Population Totals and Sample Sizes by Age of Teen by Poverty Status, National Immunization Survey - Teen, 2024

Age of Teen in Years	Poverty Status	Teens with Completed Household Interviews* Unweighted Completes	Teens with Completed Household Interviews* Weighted Completes†	Teens with Adequate Provider Data* Unweighted Completes	Teens with Adequate Provider Data* Weighted Completes§
13	Above poverty, > $75K	4,002	2,048,144	1,850	2,138,244
13	Above poverty, <= $75K	1,514	941,301	688	941,590
13	Below poverty	1,080	737,779	519	764,603
13	Unknown	438	294,138	86	224,828
14	Above poverty, > $75K	4,221	2,187,478	1,906	2,216,442
14	Above poverty, <= $75K	1,704	1,025,333	780	1,016,080
14	Below poverty	1,209	833,799	576	798,999
14	Unknown	485	318,615	93	285,803
15	Above poverty, > $75K	4,283	2,162,359	1,894	2,209,660
15	Above poverty, <= $75K	1,702	987,770	755	1,071,876
15	Below poverty	1,190	813,384	543	858,208
15	Unknown	461	314,534	102	239,788
16	Above poverty, > $75K	4,464	2,345,821	1,951	2,483,003
16	Above poverty, <= $75K	1,890	1,149,125	824	1,246,248
16	Below poverty	1,156	743,965	508	723,831
16	Unknown	535	310,647	111	251,520
17	Above poverty, > $75K	4,484	2,354,296	1,874	2,277,250
17	Above poverty, <= $75K	1,775	1,051,984	732	1,004,208
17	Below poverty	993	721,594	429	675,837
17	Unknown	554	308,004	104	222,055
Total		38,140	21,650,072	16,325	21,650,072

* Excludes U.S. territories.

† Weighted by single-frame cellular phone weight RDDWT_C.

§ Weighted by single-frame cellular phone weight PROVWT_C.

Table C.4: Estimated Population Totals and Sample Sizes by Race/Ethnicity by Poverty Status, National Immunization Survey - Teen, 2024

Race/Ethnicity of Teen†	Poverty Status	Teens with Completed Household Interviews* Unweighted Completes	Teens with Completed Household Interviews* Weighted Completes†	Teens with Adequate Provider Data* Unweighted Completes	Teens with Adequate Provider Data* Weighted Completes§
Hispanic	Above poverty, > $75K	2,640	1,581,768	1,108	1,589,530
Hispanic	Above poverty, <= $75K	2,144	1,519,819	958	1,553,305
Hispanic	Below poverty	2,796	2,043,855	1,257	2,025,714
Hispanic	Unknown	778	563,004	194	534,015
Non-Hispanic White Only	Above poverty, > $75K	14,325	6,893,262	6,567	7,051,447
Non-Hispanic White Only	Above poverty, <= $75K	4,223	2,142,475	1,910	2,151,178
Non-Hispanic White Only	Below poverty	1,530	880,368	751	861,150
Non-Hispanic White Only	Unknown	1,132	581,151	197	368,615
Non-Hispanic Black Only	Above poverty, > $75K	1,585	1,188,536	561	1,118,020
Non-Hispanic Black Only	Above poverty, <= $75K	1,133	915,121	420	924,948
Non-Hispanic Black Only	Below poverty	704	626,282	308	659,974
Non-Hispanic Black Only	Unknown	247	222,333	44	182,346
Non-Hispanic Other & Multiple Race	Above poverty, > $75K	2,904	1,434,533	1,239	1,565,603
Non-Hispanic Other & Multiple Race	Above poverty, <= $75K	1,085	578,099	491	650,570
Non-Hispanic Other & Multiple Race	Below poverty	598	300,016	259	274,640
Non-Hispanic Other & Multiple Race	Unknown	316	179,451	61	139,016
Total		38,140	21,650,072	16,325	21,650,072

* Excludes U.S. territories.

† Race/ethnicity is respondent-reported and the categories presented here are mutually exclusive.

§ Weighted by single-frame cellular phone weight RDDWT_C.

¶ Weighted by single-frame cellular phone weight PROVWT_C.

Table C.5: Estimated Population Totals and Sample Sizes by Age of Teen by Race/Ethnicity, National Immunization Survey - Teen, 2024

Age of Teen in Years	Race/Ethnicity of Teen†	Teens with Completed Household Interviews* Unweighted Completes	Teens with Completed Household Interviews* Weighted Completes†	Teens with Adequate Provider Data* Unweighted Completes	Teens with Adequate Provider Data* Weighted Completes§
13	Hispanic	1,525	1,067,224	688	1,112,852
13	Non-Hispanic White Only	3,851	1,896,510	1,783	1,890,280
13	Non-Hispanic Black Only	680	578,440	255	532,893
13	Non-Hispanic Other & Multiple Races	978	479,188	417	533,240
14	Hispanic	1,739	1,155,204	740	1,107,064
14	Non-Hispanic White Only	4,156	2,106,212	1,932	2,155,345
14	Non-Hispanic Black Only	702	582,505	266	555,094
14	Non-Hispanic Other & Multiple Races	1,022	521,303	417	499,820
15	Hispanic	1,687	1,174,382	703	1,197,225
15	Non-Hispanic White Only	4,248	2,018,460	1,907	2,045,195
15	Non-Hispanic Black Only	762	602,666	264	629,261
15	Non-Hispanic Other & Multiple Races	939	482,539	420	507,852
16	Hispanic	1,777	1,199,239	734	1,198,290
16	Non-Hispanic White Only	4,465	2,211,591	1,961	2,313,407
16	Non-Hispanic Black Only	791	613,610	279	599,815
16	Non-Hispanic Other & Multiple Races	1,012	525,119	420	593,089
17	Hispanic	1,630	1,112,397	652	1,087,135
17	Non-Hispanic White Only	4,490	2,264,481	1,842	2,028,163
17	Non-Hispanic Black Only	734	575,051	269	568,225
17	Non-Hispanic Other & Multiple Races	952	483,950	376	495,828
Total		38,140	21,650,072	16,325	21,650,072

* Excludes U.S. territories.

† Race/ethnicity is respondent-reported and the categories presented here are mutually exclusive.

§ Weighted by single-frame cellular phone weight RDDWT_C.

¶ Weighted by single-frame cellular phone weight PROVWT_C.

Table C.6: Estimated Population Totals and Sample Sizes by Age and Sex of Teen, National Immunization Survey - Teen, 2024

Age of Teen in Years	Sex	Teens with Completed Household Interviews* Unweighted Completes	Teens with Completed Household Interviews* Weighted Completes†	Teens with Adequate Provider Data* Unweighted Completes	Teens with Adequate Provider Data* Weighted Completes§
13	Male	3,610	2,028,467	1,631	2,136,586
13	Female	3,424	1,992,896	1,512	1,932,678
14	Male	3,946	2,221,471	1,734	2,133,006
14	Female	3,673	2,143,754	1,621	2,184,317
15	Male	4,015	2,195,882	1,733	2,218,728
15	Female	3,621	2,082,166	1,561	2,160,805
16	Male	4,280	2,379,006	1,844	2,473,281
16	Female	3,765	2,170,552	1,550	2,231,320
17	Male	4,130	2,266,956	1,676	2,130,181
17	Female	3,676	2,168,921	1,463	2,049,169
Total		38,140	21,650,072	16,325	21,650,072

* Excludes U.S. territories.

† Weighted by single-frame cellular phone weight RDDWT_C.

§ Weighted by single-frame cellular phone weight PROVWT_C.

Table C.7: Estimated Vaccination Coverage*†, With Selected Vaccines Among Adolescents Aged 13-17 Years§, by State and Selected Area -- National Immunization Survey - Teen, United States, 2024

Area	BOTH SEXES ≥ 1 Tdap**	BOTH SEXES ≥ 1 MenACWY††	FEMALE ≥1 dose HPV§§	FEMALE ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***	MALE ≥1 dose HPV§§	MALE ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***	BOTH SEXES ≥1 dose HPV§§	BOTH SEXES ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
US National†††	91.3(±0.7)	90.1(±0.8)	79.1(±1.5)	64.3(±1.8)	77.4(±1.5)	61.6(±1.7)	78.2(±1.0)	62.9(±1.3)
Alabama	92.4(±2.8)	87.1(±3.8)	76.5(±6.8)	60.0(±8.6)	78.9(±6.2)	61.8(±7.4)	77.7(±4.6)	60.9(±5.7)
Alaska	81.4(±5.9)	77.8(±6.3)	72.0(±9.1)	47.6(±10.0)	67.6(±10.3)	55.6(±10.6)	69.7(±6.9)	51.8(±7.4)
Arizona	91.8(±4.3)	92.9(±4.1)	85.3(±8.6)	70.9(±11.3)	77.3(±8.8)	64.0(±10.1)	81.2(±6.2)	67.4(±7.6)
Arkansas	94.3(±2.6)	96.6(±1.8)	80.1(±7.1)	58.5(±9.8)	81.3(±6.0)	62.0(±8.2)	80.7(±4.6)	60.3(±6.4)
California	90.9(±3.4)	86.0(±4.2)	79.3(±7.2)	68.4(±8.3)	84.6(±6.0)	63.8(±8.3)	82.0(±4.7)	66.0(±5.9)
Colorado	89.4(±3.9)	86.6(±4.2)	79.2(±7.3)	65.1(±8.3)	82.0(±6.8)	63.5(±8.2)	80.6(±5.0)	64.3(±5.8)
Connecticut	92.5(±5.0)	91.8(±5.6)	81.1(±9.7)	70.7(±11.6)	76.2(±11.0)	63.3(±12.3)	78.6(±7.4)	67.0(±8.5)
Delaware	91.3(±3.2)	92.8(±3.0)	80.6(±6.3)	65.7(±7.7)	87.5(±5.3)	72.1(±7.4)	84.1(±4.1)	69.0(±5.3)
District of Columbia	80.1(±6.7)	87.0(±5.3)	87.8(±6.8)	74.6(±10.4)	90.8(±4.8)	77.1(±9.2)	89.3(±4.2)	75.8(±6.9)
Florida	96.4(±2.1)	89.2(±4.0)	85.5(±6.2)	54.0(±11.0)	82.9(±7.6)	63.7(±10.9)	84.2(±5.0)	59.0(±7.7)
Georgia	96.8(±2.0)	97.8(±1.5)	71.9(±11.3)	61.2(±12.2)	77.1(±9.4)	69.3(±10.4)	74.5(±7.4)	65.3(±8.0)
Hawaii	89.2(±3.4)	91.2(±3.1)	86.4(±5.8)	70.9(±7.5)	91.8(±4.0)	80.2(±5.8)	89.2(±3.5)	75.6(±4.8)
Idaho	85.1(±5.9)	87.5(±5.5)	69.0(±12.6)	55.0(±12.9)	72.3(±9.9)	56.8(±11.5)	70.7(±8.0)	55.9(±8.6)
Illinois	93.8(±2.2)	94.2(±2.1)	77.0(±5.7)	63.8(±6.3)	83.2(±4.6)	68.5(±5.9)	80.2(±3.6)	66.2(±4.3)
IL-City of Chicago	92.9(±4.0)	94.6(±3.5)	86.6(±8.4)	69.9(±11.7)	80.2(±9.5)	64.8(±11.9)	83.4(±6.3)	67.3(±8.3)
IL-Rest of State	94.0(±2.5)	94.1(±2.5)	74.8(±6.6)	62.5(±7.3)	83.8(±5.2)	69.3(±6.7)	79.4(±4.2)	66.0(±5.0)
Indiana	90.9(±3.6)	90.4(±3.6)	75.1(±7.5)	58.8(±8.4)	71.4(±7.4)	54.5(±8.0)	73.2(±5.3)	56.6(±5.8)
Iowa	93.0(±3.6)	96.3(±2.7)	74.9(±9.0)	62.7(±10.1)	68.4(±10.0)	57.0(±10.4)	71.6(±6.8)	59.8(±7.3)
Kansas	91.4(±3.5)	90.2(±3.7)	73.3(±8.8)	62.6(±9.2)	71.7(±8.4)	57.0(±9.2)	72.5(±6.1)	59.7(±6.5)
Kentucky	90.1(±4.5)	90.2(±4.4)	81.2(±8.1)	61.5(±10.3)	69.1(±9.4)	60.8(±9.9)	75.0(±6.3)	61.1(±7.2)
Louisiana	91.7(±4.4)	94.1(±2.9)	76.1(±8.1)	65.3(±9.3)	73.0(±8.3)	66.2(±8.8)	74.5(±5.8)	65.8(±6.4)
Maine	93.8(±2.7)	96.1(±2.2)	77.6(±6.9)	71.8(±7.3)	73.8(±7.1)	62.3(±7.8)	75.6(±5.0)	66.9(±5.4)
Maryland	89.7(±4.1)	89.4(±4.3)	88.4(±6.8)	77.0(±7.9)	80.9(±6.6)	61.8(±8.2)	84.5(±4.7)	69.2(±5.8)
Massachusetts	93.4(±2.9)	93.1(±2.9)	85.3(±5.6)	80.7(±6.2)	89.6(±4.7)	79.1(±6.1)	87.5(±3.7)	79.8(±4.4)
Michigan	94.5(±3.0)	94.6(±3.0)	80.9(±8.2)	67.5(±10.2)	80.6(±9.4)	63.8(±10.6)	80.8(±6.3)	65.6(±7.4)
Minnesota	89.0(±3.7)	89.8(±3.6)	79.9(±7.1)	66.5(±8.0)	86.6(±5.7)	68.7(±8.4)	83.3(±4.6)	67.7(±5.8)

Area	BOTH SEXES ≥ 1 Tdap**	BOTH SEXES ≥ 1 MenACWY††	FEMALE ≥1 dose HPV§§	FEMALE ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***	MALE ≥1 dose HPV§§	MALE ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***	BOTH SEXES ≥1 dose HPV§§	BOTH SEXES ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Mississippi	93.3(±3.3)	64.5(±7.1)	57.1(±11.0)	37.9(±11.1)	60.1(±9.9)	40.3(±10.3)	58.6(±7.4)	39.1(±7.6)
Missouri	90.3(±4.4)	89.4(±4.8)	64.8(±11.3)	48.7(±11.3)	73.7(±9.3)	56.5(±10.3)	69.4(±7.4)	52.7(±7.7)
Montana	90.4(±3.4)	81.2(±4.5)	75.7(±7.1)	60.8(±7.9)	75.0(±6.9)	58.9(±7.8)	75.4(±4.9)	59.8(±5.5)
Nebraska	90.9(±4.3)	90.2(±4.2)	82.0(±8.6)	65.5(±10.7)	78.3(±8.2)	62.8(±9.7)	80.1(±6.0)	64.1(±7.2)
Nevada	89.0(±5.1)	85.8(±5.7)	70.9(±9.8)	58.8(±10.5)	72.3(±10.1)	53.6(±11.0)	71.6(±7.0)	56.1(±7.6)
New Hampshire	95.1(±2.3)	94.3(±2.5)	84.9(±6.6)	74.3(±7.9)	82.8(±6.5)	70.3(±7.4)	83.8(±4.6)	72.2(±5.4)
New Jersey	91.9(±2.9)	94.6(±2.3)	75.5(±6.7)	62.6(±7.7)	70.8(±7.4)	54.9(±7.7)	73.1(±5.0)	58.6(±5.5)
New Mexico	90.7(±3.5)	92.7(±3.0)	85.7(±5.8)	72.2(±7.7)	78.4(±7.5)	61.4(±8.8)	82.0(±4.8)	66.7(±5.9)
New York	93.9(±2.1)	96.1(±1.6)	85.5(±5.0)	72.8(±6.3)	78.1(±6.0)	68.2(±6.6)	81.7(±3.9)	70.4(±4.6)
NY-City of New York	94.2(±3.3)	96.2(±2.6)	96.3(±3.3)	82.7(±9.1)	80.1(±10.9)	69.9(±11.8)	88.0(±6.1)	76.2(±7.6)
NY-Rest of State	93.7(±2.8)	96.1(±2.1)	78.4(±7.6)	66.3(±8.4)	76.7(±7.0)	67.0(±7.8)	77.5(±5.2)	66.7(±5.7)
North Carolina	90.6(±4.1)	92.8(±3.4)	80.9(±7.3)	68.7(±8.5)	79.2(±6.8)	65.0(±7.8)	80.0(±5.0)	66.8(±5.8)
North Dakota	91.2(±4.3)	94.0(±3.4)	82.2(±8.2)	70.0(±10.7)	83.7(±8.2)	70.7(±10.4)	82.9(±5.8)	70.4(±7.4)
Ohio	92.5(±3.3)	92.6(±3.0)	84.2(±7.2)	74.0(±8.6)	79.6(±6.3)	61.0(±8.2)	81.8(±4.7)	67.3(±5.9)
Oklahoma	87.4(±3.8)	77.6(±4.9)	71.1(±7.7)	50.8(±8.5)	65.0(±7.9)	48.6(±8.3)	68.0(±5.5)	49.7(±5.9)
Oregon	91.8(±3.2)	86.9(±3.7)	83.3(±5.8)	68.0(±7.5)	80.5(±6.0)	63.7(±7.3)	81.9(±4.2)	65.8(±5.2)
Pennsylvania	92.4(±2.8)	94.0(±2.4)	77.0(±6.9)	64.9(±7.6)	73.2(±7.4)	61.8(±7.8)	75.0(±5.1)	63.3(±5.4)
PA-Philadelphia County	89.3(±4.9)	90.9(±4.4)	87.9(±7.0)	78.8(±8.9)	88.4(±7.3)	76.3(±10.3)	88.2(±5.1)	77.6(±6.8)
PA-Rest of State	92.8(±3.1)	94.4(±2.6)	75.5(±7.8)	62.9(±8.6)	71.3(±8.2)	59.9(±8.7)	73.3(±5.7)	61.4(±6.1)
Rhode Island	94.6(±3.8)	95.1(±3.5)	91.4(±6.7)	78.3(±12.2)	91.2(±7.6)	74.0(±12.8)	91.3(±5.1)	76.1(±8.9)
South Carolina	91.3(±3.3)	85.2(±4.0)	76.3(±6.9)	62.0(±8.1)	72.9(±6.7)	57.2(±7.4)	74.6(±4.8)	59.5(±5.5)
South Dakota	93.2(±2.8)	93.5(±2.8)	80.7(±7.0)	70.3(±8.0)	84.3(±6.1)	69.8(±8.1)	82.5(±4.6)	70.0(±5.7)
Tennessee	90.8(±3.7)	84.0(±5.0)	77.1(±7.8)	57.4(±9.6)	69.0(±8.8)	51.3(±10.1)	73.0(±5.9)	54.3(±6.9)
Texas	84.5(±3.3)	87.0(±3.1)	74.5(±5.6)	56.7(±6.5)	65.5(±6.2)	47.9(±6.3)	69.9(±4.2)	52.2(±4.6)
TX-Bexar County	86.5(±4.0)	88.7(±3.8)	79.8(±7.2)	63.2(±8.8)	72.9(±7.3)	58.1(±8.2)	76.3(±5.2)	60.6(±6.1)
TX-City of Houston	83.9(±4.8)	84.2(±4.8)	77.6(±7.7)	62.9(±8.8)	77.5(±7.2)	68.2(±8.1)	77.6(±5.3)	65.6(±6.0)
TX-Rest of State	84.3(±3.8)	87.2(±3.5)	73.9(±6.5)	55.7(±7.5)	63.9(±7.1)	45.4(±7.2)	68.8(±4.9)	50.4(±5.2)
Utah	90.7(±4.3)	91.5(±4.3)	78.6(±9.0)	54.0(±11.4)	84.8(±6.8)	60.7(±10.0)	81.8(±5.6)	57.5(±7.6)
Vermont	95.6(±2.9)	93.4(±3.5)	87.4(±8.4)	80.9(±9.9)	83.1(±8.4)	63.0(±10.5)	85.2(±6.0)	71.7(±7.5)
Virginia	93.8(±2.8)	94.3(±2.6)	88.2(±5.5)	75.4(±7.8)	85.8(±5.8)	68.6(±7.6)	86.9(±4.0)	71.9(±5.5)

Area	BOTH SEXES ≥ 1 Tdap**	BOTH SEXES ≥ 1 MenACWY††	FEMALE ≥1 dose HPV§§	FEMALE ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***	MALE ≥1 dose HPV§§	MALE ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***	BOTH SEXES ≥1 dose HPV§§	BOTH SEXES ≥ 3 doses HPV, or ≥ 2 doses HPV with age and interval restriction***
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Washington	92.2(±4.2)	88.8(±4.5)	86.8(±6.3)	73.2(±8.5)	80.4(±8.5)	70.5(±9.4)	83.5(±5.4)	71.8(±6.4)
West Virginia	92.9(±2.7)	92.9(±3.1)	80.0(±6.4)	62.9(±7.9)	65.2(±7.4)	48.7(±7.7)	72.4(±5.0)	55.6(±5.6)
Wisconsin	86.9(±5.1)	88.7(±4.5)	74.9(±9.2)	64.3(±10.2)	80.4(±6.9)	69.9(±8.0)	77.7(±5.7)	67.2(±6.5)
Wyoming	87.7(±4.4)	75.0(±5.7)	72.2(±8.4)	54.4(±9.3)	66.4(±8.7)	40.1(±9.1)	69.2(±6.1)	47.1(±6.6)
Guam	65.4(±12.6)	65.1(±13.5)	67.9(±17.4)	37.9(±17.2)	77.7(±13.5)	48.1(±18.7)	72.9(±11.2)	43.1(±12.7)
Puerto Rico	88.2(±5.5)	92.6(±4.3)	96.0(±3.3)	76.7(±15.8)	87.7(±7.8)	77.2(±11.0)	91.8(±4.4)	77.0(±9.6)

* Estimate presented as point estimate (%) ± 95% confidence interval (CI). Estimate=NA (Not Available) if the unweighted sample size for the denominator was <30 or (95% CI half width)/Estimate > 0.6.

† Estimates with 95% CI half-widths >10 may not be reliable.

§ Adolescents in the 2024 NIS-Teen were born between January 2006 and January 2012. Vaccination coverage estimates include only adolescents who had adequate provider-reported immunization records.

** ≥1 dose of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) at or after age ten years.

†† ≥1 dose of quadrivalent meningococcal conjugate vaccine or meningococcal-unknown type vaccine.

§§ ≥1 dose of human papillomavirus vaccine, either 9-valent (9vHPV), quadrivalent (4vHPV), or bivalent (2vHPV).

*** ≥3 doses of human papillomavirus vaccine, or ≥ 2 doses with the first dose before age 15 and at least 5 months minus 4 days between the first and second dose.

††† Excludes U.S. territories.

Appendix D: Vaccine Type Codes

Table D.1: Vaccine Type Codes, National Immunization Survey - Teen, 2024

Vaccine Code	Description
11	Td
14	Tdap
15	Td/Tdap-containing, unknown subtype
30	MMR-only
31	Measles-only
32	Measles-Mumps
33	Measles-Rubella
43	HepB-Hib
4V	Human Papillomavirus, Gardasil (quadrivalent)
61	0.5 ml Recombivax
62	1.0 ml Recombivax
63	Engerix
64	Hepatitis B-only, unknown subtype checked
80	MenACWY (Menactra, Menveo)
81	MPSV4 (Menomune)
82	Meningococcal serogroup ACWY, unknown subtype
83	**MenACWY-TT/MenB-FHbp (Penbraya)**
9V	Human Papillomavirus, Gardasil (9-valent)
BB	MenB-4C
BT	MenB-FHbp
BU	Meningococcal serogroup B, unknown subtype
CJ	COVID-19, Johnson & Johnson/Janssen
CM	COVID-19, Moderna
CN	COVID-19, Novavax
CP	COVID-19, Pfizer-BioNTech
CX	COVID-19, unknown subtype
CV	Human Papillomavirus, Cervarix (bivalent)
FL	Seasonal Flu-containing, unknown subtype
FM	Seasonal Flumist
FN	Injected Seasonal Flu, other/unknown subtype
FV	Seasonal Fluvirin
FZ	Seasonal Fluzone
HA	Hepatitis A-containing, unknown subtype
HB	Hepatitis B-containing, unknown subtype

Vaccine Code	Description
HO	Hepatitis A-only (Havrix or Vaqta)
HP	Human Papillomavirus, unknown subtype
MM	Measles-containing, unknown subtype
VA	Varicella-containing, unknown subtype
VM	MMR-Varicella
VO	Varicella-only
UV	Human Papillomavirus, Gardasil (unknown valency)

Appendix E: Trends in the NIS-Teen Response Rates and Vaccination Coverage Rates, 2006-2024

Table E.1: Key Indicators* from Landline Sample Household and Provider Data Collection by Survey Year, National Immunization Survey - Teen, 2006-2017†

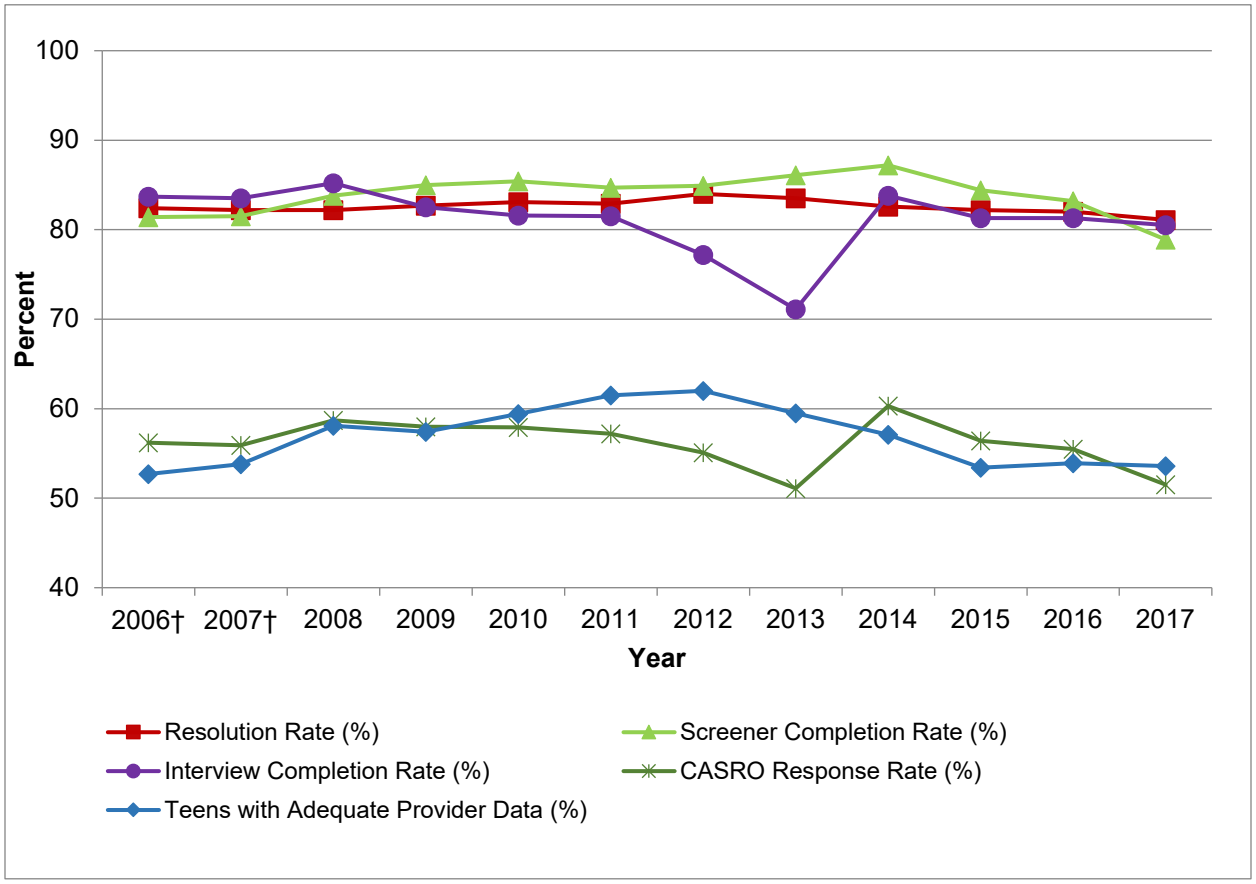
Survey Year	Resolution Rate (%)	Screener Completion Rate (%)	Interview Completion Rate (%)	CASRO Response Rate (%)	Teens with Adequate Provider Data (%)
2006§	82.4	81.4	83.7	56.2	52.7
2007§	82.2	81.5	83.5	55.9	53.8
2008	82.2	83.8	85.2	58.7	58.1
2009	82.7	85.0	82.5	58.0	57.4
2010	83.1	85.4	81.6	57.9	59.4
2011	82.9	84.7	81.5	57.2	61.5
2012	84.0	84.9	77.2	55.1	62.0
2013	83.5	86.1	71.1	51.1	59.5
2014	82.6	87.2	83.8	60.3	57.1
2015	82.2	84.4	81.3	56.4	53.4
2016	82.0	83.2	81.3	55.5	53.9
2017	81.1	78.9	80.5	51.5	53.6

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

† Excludes U.S. territories. The landline sample was removed from the NIS sample design beginning in 2018.

§ In 2006 and 2007, NIS-Teen was conducted only in Quarter 4.

Figure E.1: Trends in Landline Sample Key Indicators from Household and Provider Data Collection by Survey Year, National Immunization Survey - Teen, 2006-2017*



* Excludes U.S. territories. The landline sample was removed from the NIS sample design beginning in 2018.

† In 2006 and 2007, NIS-Teen was conducted only in Quarter 4.

Figure E.1 presents a graphical representation of the data contained in Table E.1. It shows how selected key indicators from landline sample household and provider data collection performed throughout the years, from 2006 to 2017. Note that these data apply to the landline sample only, which was removed from the NIS sample design beginning in 2018.

Table E.2: Key Indicators* from Cellular Phone Sample Household and Provider Data Collection by Survey Year, National Immunization Survey - Teen, 2011-2024†

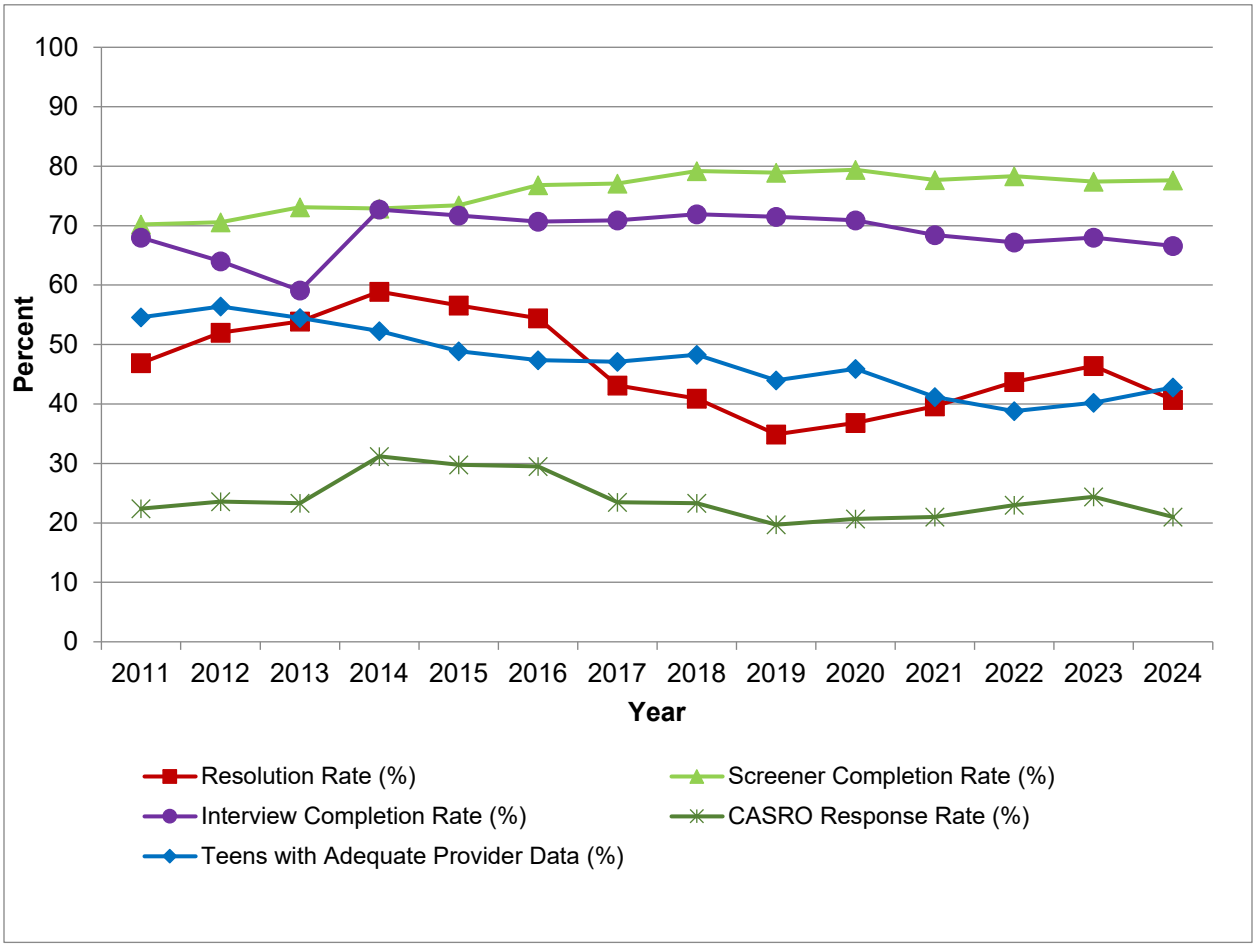
Survey Year§	Resolution Rate (%)	Screener Completion Rate (%)	Interview Completion Rate (%)	CASRO Response Rate (%)	Teens with Adequate Provider Data (%)
2011	46.9	70.2	68.0	22.4	54.6
2012	52.0	70.6	64.0	23.6	56.4
2013	53.9	73.1	59.1	23.3	54.5
2014	58.9	72.9	72.7	31.2	52.3
2015	56.6	73.4	71.7	29.8	48.9
2016	54.4	76.8	70.7	29.5	47.4
2017	43.1	77.1	70.9	23.5	47.1
2018	40.9	79.2	71.9	23.3	48.3
2019	34.9	78.9	71.5	19.7	44.0
2020	36.8	79.4	70.9	20.7	45.9
2021	39.6	77.7	68.4	21.0	41.2
2022	43.7	78.3	67.2	23.0	38.8
2023	46.4	77.4	68.0	24.4	40.2
2024	40.7	77.6	66.6	21.0	42.8

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

† Excludes U.S. territories.

§ Cellular phone sample was added to the NIS-Teen in 2011.

Figure E.2: Trends in Cellular Phone Sample Key Indicators from Household and Provider Data Collection by Survey Year, National Immunization Survey - Teen, 2011-2024*



* Excludes U.S. territories.

Figure E.2 presents a graphical representation of the data contained in Table E.2. It shows how selected key indicators from cellular phone sample household and provider data collection performed from 2011 to present. Note that these data apply to the cellular phone sample only. Cellular phone sample was added to the NIS in 2011.

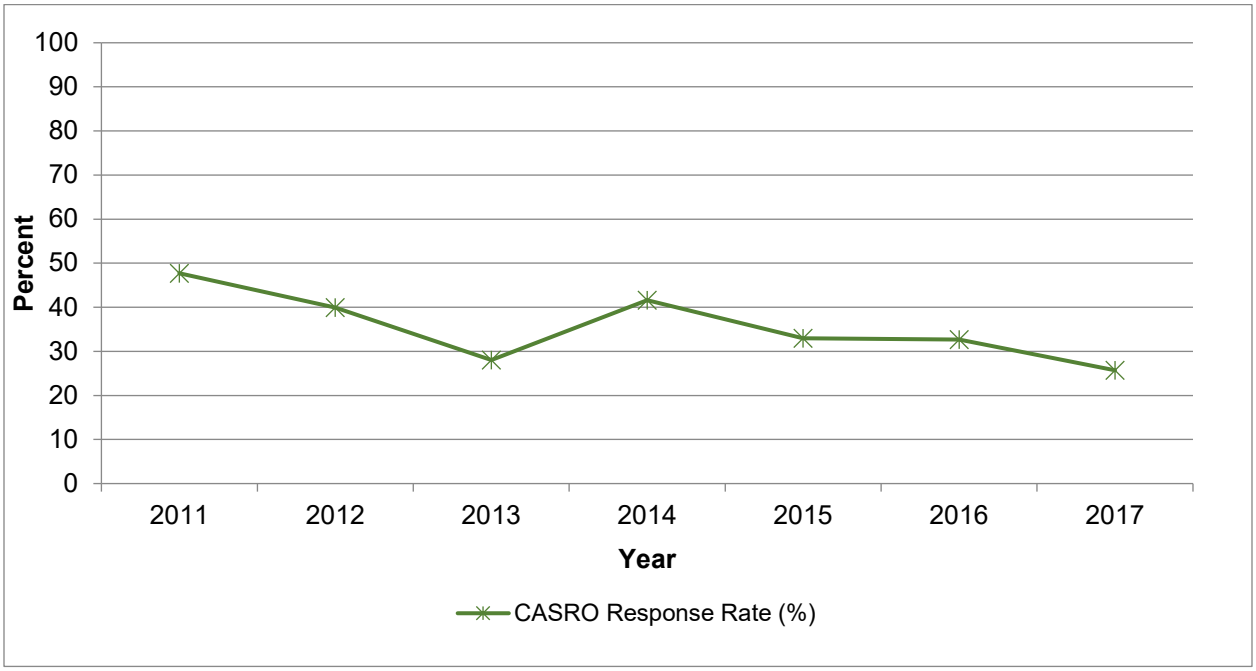
Table E.3: CASRO Response Rate for the Combined Landline and Cellular Phone Samples by Survey Year, National Immunization Survey - Teen, 2011-2017*

Survey Year†	CASRO Response Rate (%)
2011	47.7
2012	40.0
2013	28.0
2014	41.6
2015	32.9
2016	32.7
2017	25.7

* Excludes U.S. territories.

† Cellular phone sample was added to the NIS-Teen in 2011. The NIS-Teen transitioned from a dual-frame landline and cellular phone RDD sample design to a single-frame cellular phone RDD sample design beginning in 2018.

Figure E.3: Trend in CASRO Response Rate for the Combined Landline and Cellular Phone Samples by Survey Year, National Immunization Survey - Teen, 2011-2017*



* Excludes U.S. territories. The landline sample was removed from the NIS sample design beginning in 2018.

The response rate is the number of households with a completed household interview divided by the estimated number of eligible households in the sample. Within each sample type (landline or cellular phone), the number of eligible households was estimated using the CASRO assumptions; these assumptions are that the rate of households among the unresolved telephone numbers is the same as the observed rate of households among the resolved telephone numbers, and the rate of eligible households among unscreened households is the same as the observed rate of eligible households among screened

households. Under these assumptions, within each sample type the CASRO response rate is equal to the product of the resolution rate, the screener completion rate, and the interview completion rate. For the combined samples, we have defined the CASRO response rate as the total number of households with a completed interview divided by the estimated total number of eligible households across both sample types, where the estimated total number of eligible households is equal to the sum of the estimated number of eligible households in the landline sample (using CASRO assumptions) and the estimated number of eligible households in the cellular phone sample (using CASRO assumptions). Table E.3 presents the CASRO response rate calculated in this way for the combined landline and cellular phone samples, by survey year, and Figure E.3 presents a graphical representation. Because the CASRO response rate is lower for the cellular phone sample than for the landline sample, the CASRO response rate for the combined landline and cellular phone samples was lower in years with a larger cellular phone sample and higher in years with a smaller cellular phone sample.

Table E.4: Vaccine-Specific Coverage Levels among Teens Age 13-17 Years in the United States by Survey Year, National Immunization Survey - Teen, 2006-2024*

Survey Year	≥ 1 Td or Tdap[†]	≥ 1 Tdap Since Age 10[§]	≥ 1 MenACWY[¶]	FEMALE HPV UTD**	MALE HPV UTD**	≥2 MMR[§§]	≥ 3 HepB[¶¶]	VARICELLA History of Varicella Disease***	VARICELLA ≥ 2 Doses Varicella Vaccine if Had No History of Varicella Disease
2006[†††]	60.1	10.8	11.7	-	-	86.9	81.3	69.9	-
2007[†††]	72.3	30.4	32.4	-	-	88.9	87.6	65.8	18.8
2008	72.2	40.8	41.8	17.9	-	89.3	87.9	59.8	34.1
2009	76.2	55.6	53.6	26.7	-	89.1	89.9	52.7	48.6
2010	81.2	68.7	62.6	31.9	-	90.4	91.6	44.7	58.1
2011[§§§]	85.3	78.2	70.5	34.8	1.3	91.1	92.3	36.6	68.3
2012	88.5	84.6	74.0	33.4	6.8	91.4	92.8	30.6	74.9
2013	89.1	86.0	77.8	37.6	13.9	91.8	93.2	25.4	78.5
2014[¶¶¶]	89.8	87.6	79.3	39.7	21.6	90.7	91.4	21.0	81.0
2015	89.6	86.4	81.3	41.9	28.1	90.7	91.1	17.8	86.1
2016	90.6	88.0	82.2	43.0	31.5	90.9	91.4	15.2	85.6
2017	90.7	88.7	85.1	53.1	44.3	92.1	91.9	13.2	88.6
2018[****]	91.2	88.9	86.6	53.7	48.7	-	-	-	-
2019	91.9	90.2	88.9	56.8	51.8	91.9	91.6	9.1	90.6
2020	92.0	90.1	89.3	61.4	56.0	92.4	92.6	8.4	91.9
2021	92.2	89.6	89.0	63.8	59.8	92.2	92.3	7.3	91.5
2022	91.7	89.9	88.6	64.6	60.6	91.2	91.2	7.0	90.8
2023	90.5	89.0	88.4	64.0	59.0	91.3	90.9	7.3	90.8
2024	92.2	91.3	90.1	64.3	61.6	92.6	92.2	7.5	91.9

* Excludes U.S. territories.

[†] ≥1 dose of tetanus toxoid-diphtheria vaccine (Td) or tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) at or after age ten years.

[§] ≥1 tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) since at or after age ten years.

[¶] ≥1 quadrivalent meningococcal conjugate vaccine or meningococcal -unknown type vaccine.

** Prior to 2017, ≥3 doses were required to be considered UTD. Beginning in 2017, adolescents are considered UTD if they have ≥3 doses, or 2 doses when the first HPV vaccine dose was initiated at age <15 years and there was at least 5 months minus 4 days between the first and second dose. This update to the HPV recommendation occurred in December 2016. Doses may be 9-valent (9vHPV), quadrivalent (4vHPV) or bivalent (2vHPV).

[§§] ≥ 2 doses of measles-mumps-rubella vaccine.

[¶¶] ≥3 doses of hepatitis B vaccine.

*** By parent/guardian report or provider records.

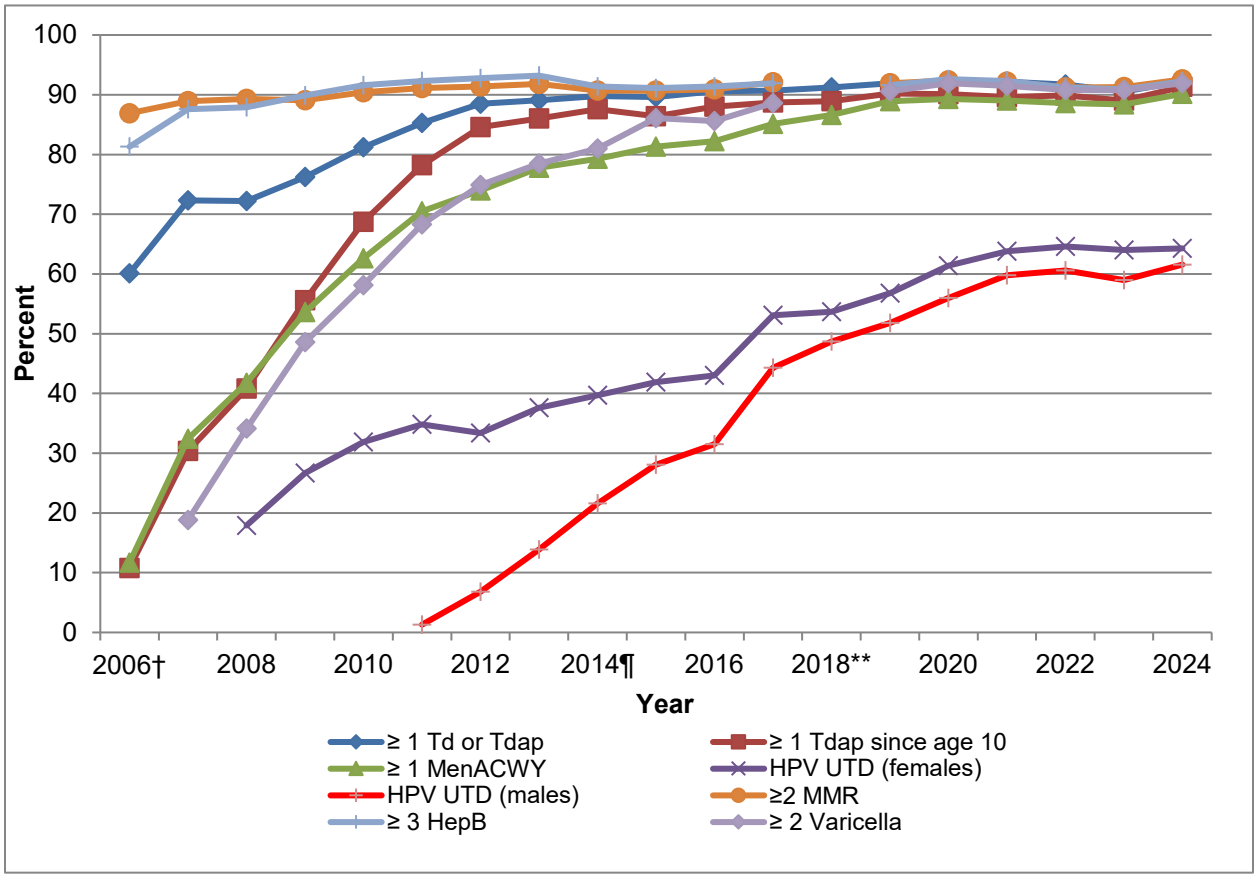
[†††] In 2006 and 2007, NIS-Teen was conducted only in Quarter 4.

[§§§] Prior to 2011, estimates are single-frame, landline-sample estimates. From 2011-2017, estimates are dual-frame (landline plus cellular phone) estimates. From 2018 onward, estimates are single-frame, cellular phone estimates.

[¶¶¶] Revised definition of adequate provider data (APD) implemented.

**** MMR, Hep B, and Varicella estimates are not available for 2018 due to a provider reporting error.

Figure E.4: Trends in Vaccine-Specific Coverage Levels among Teens Aged 13-17 Years in the United States by Survey Year, National Immunization Survey - Teen, 2006-2024*



* Excludes U.S. territories.

† In 2006 and 2007, NIS-Teen was conducted only in Quarter 4.

§ Prior to 2011, estimates are single-frame, landline-sample estimates. From 2011-2017, estimates are dual-frame (landline plus cellular phone) estimates, and from 2018 onward estimates are single-frame, cellular phone sample estimates.

¶ Revised definition of adequate provider data (APD) implemented in 2014.

** MMR, Hep B, and Varicella estimates are not available for 2018 due to a provider reporting error.

Figure E.4 presents a graphical representation of selected data contained in Table E.4. It displays the trend in selected vaccine-specific coverage levels among teens aged 13-17 years from 2006 to 2024. Note that these data apply to the landline sample only from 2006-2010, to the dual-frame sample from 2011-2017, and to the cellular phone sample only from 2018 forward.

Appendix F: Key NIS-Teen Response Rates by Area

Table F.1: Key Indicators* for the Cellular Phone Sample by Estimation Area, National Immunization Survey - Teen, 2024

Area	Resolution Rate (%)	Screener Completion Rate (%)	Interview Completion Rate (%)	CASRO Response Rate (%)	Adolescents with Adequate Provider Data (%)
U.S. National†	40.7	77.6	66.6	21.0	42.8
Alabama	44.6	78.2	67.0	23.3	43.1
Alaska	54.7	75.1	70.1	28.8	48.3
Arizona	32.7	78.0	64.7	16.5	43.3
Arkansas	50.3	75.7	66.9	25.5	48.1
California	35.4	79.6	61.0	17.2	34.5
Colorado	34.1	82.5	68.6	19.3	43.5
Connecticut	35.8	73.4	70.5	18.5	47.4
Delaware	35.9	75.9	66.4	18.1	40.5
District of Columbia	38.5	76.7	67.8	20.0	42.5
Florida	35.6	73.6	65.2	17.1	39.0
Georgia	42.2	75.0	65.2	20.6	40.6
Hawaii	34.5	77.1	60.8	16.2	40.1
Idaho	34.7	78.9	69.3	19.0	42.7
Illinois	45.5	78.6	63.8	22.8	42.7
IL-City of Chicago	44.7	76.9	60.4	20.8	41.6
IL-Rest of State	46.0	79.7	66.1	24.2	43.2
Indiana	42.7	79.1	68.2	23.0	42.4
Iowa	46.8	80.7	71.2	26.9	48.9
Kansas	49.5	77.6	69.0	26.5	46.0
Kentucky	44.2	75.6	67.7	22.6	41.5
Louisiana	46.2	75.6	63.5	22.2	39.7
Maine	36.1	80.5	70.9	20.6	48.5
Maryland	38.2	76.0	74.5	21.6	39.7
Massachusetts	42.6	80.4	65.4	22.4	48.6
Michigan	48.1	78.4	66.9	25.3	50.4
Minnesota	38.2	81.9	70.2	22.0	42.6
Mississippi	48.2	73.9	65.8	23.4	39.1
Missouri	47.0	76.6	67.6	24.4	45.6
Montana	41.3	80.0	71.1	23.5	44.5
Nebraska	46.0	80.3	70.0	25.8	49.2
Nevada	32.5	76.0	61.0	15.1	39.2
New Hampshire	36.4	79.4	67.3	19.5	44.5
New Jersey	36.3	78.0	61.9	17.5	40.9
New Mexico	35.5	78.4	69.6	19.4	49.8
New York	38.3	77.4	63.8	18.9	42.9

Area	Resolution Rate (%)	Screener Completion Rate (%)	Interview Completion Rate (%)	CASRO Response Rate (%)	Adolescents with Adequate Provider Data (%)
NY-City of New York	32.5	70.8	63.8	14.7	41.9
NY-Rest of State	39.9	79.9	63.7	20.3	43.5
North Carolina	39.7	78.9	68.3	21.4	42.0
North Dakota	43.5	78.5	67.5	23.1	40.5
Ohio	42.1	73.1	75.3	23.2	47.8
Oklahoma	46.6	77.5	63.8	23.0	41.8
Oregon	37.2	83.3	71.7	22.2	47.5
Pennsylvania	39.5	77.3	63.3	19.3	38.5
PA-Philadelphia County	38.0	72.8	64.4	17.8	36.7
PA-Rest of State	40.7	81.2	62.4	20.6	39.7
Rhode Island	34.9	75.5	71.2	18.8	41.5
South Carolina	39.6	79.1	65.6	20.6	42.0
South Dakota	44.9	77.4	70.0	24.3	50.4
Tennessee	40.7	75.8	71.0	21.9	45.5
Texas	38.0	75.8	62.2	17.9	34.9
TX-Bexar County	35.4	76.2	64.7	17.5	39.4
TX-City of Houston	37.8	74.9	60.0	17.0	29.5
TX-Rest of State	41.3	77.5	64.2	20.5	36.8
Utah	35.2	74.8	75.9	20.0	47.3
Vermont	34.8	77.6	74.4	20.1	57.9
Virginia	40.3	80.7	66.7	21.7	41.9
Washington	33.2	78.0	68.2	17.6	48.7
West Virginia	48.5	75.8	70.8	26.0	48.4
Wisconsin	41.4	79.5	68.4	22.5	48.4
Wyoming	46.8	71.4	68.8	23.0	42.7
Puerto Rico	46.0	82.2	60.8	23.0	27.1
Guam	34.8	64.3	48.4	10.8	30.8

* For the definition of the key indicators see Table 1.

† Excludes U.S. territories.