United States Government Accountability Office

Report to Congressional Requesters

September 2022

ROUTINE VACCINATIONS

Adult Rates Vary by Vaccine Type and Other Factors

GAO-22-105334

GAO Highlights

Highlights of GAO-22-105334, a report to congressional requesters.

September 2022

ROUTINE VACCINATIONS

Adult Rates Vary by Vaccine Type and Other Factors

Why GAO Did This Study

The U.S. has made significant progress against vaccine-preventable diseases. However, gaps in receipt of recommended vaccinations—especially among adults—has resulted in preventable disease, disability, and death. While children are guaranteed coverage of routine vaccines, certain adults have limited vaccine coverage, or may face out of pockets costs that contribute to lower vaccination rates. The COVID-19 pandemic has also contributed to a decline in the receipt of routine vaccines.

GAO was asked to review vaccination rates, as well as how the federal government and states address coverage of routine vaccines. This report describes estimated adult vaccination rates; factors that could affect such rates; state programs that provide free vaccines to adults; and HHS efforts to improve adult vaccination rates.

GAO (1) analyzed national survey data for 2019 and 2020—the most current available at the time—on the receipt of four routine vaccines at the ages recommended for all adults: 18 years and older for flu and tetanus, 50 years and older for shingles, and 65 years and older for pneumococcal; (2) interviewed 13 stakeholders representing a range of perspectives on vaccination, including providers and vaccine manufacturers; (3) collected information from all states on programs that offered free routine adult vaccines; and (4) reviewed HHS documents and interviewed HHS officials.

HHS provided technical comments on a draft of this report, which GAO incorporated as appropriate.

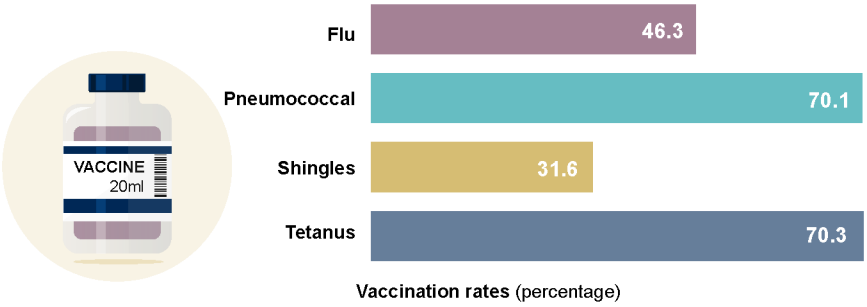
View GAO-22-105334. For more information, contact Carolyn L. Yocom at (202) 512-7114 or yocomc@gao.gov.

What GAO Found

Based on survey data it reviewed, GAO estimated that adults' receipt of four routine vaccines at the ages they are recommended for all adults—flu, pneumococcal, shingles, and tetanus—varied by type of vaccine, state, and other factors, such as race and ethnicity.

- **Vaccine type:** Estimated adult vaccination rates for tetanus and pneumococcal were nearly 40 percentage points higher than the rate for the shingles vaccine.
- **State:** Most states had estimated vaccination rates that fell within 5 percentage points of these national averages, with 16 states consistently above—and 9 states consistently below—the median vaccination rate.
- **Race and ethnicity:** Black or African American and Hispanic or Latino adults generally had estimated vaccination rates 13 or more percentage points below that of White adults for each of the four vaccines.

Estimated National Adult Vaccination Rates for Four Routine Vaccines



Source: GAO analysis of Behavioral Risk Factor Surveillance System data. | GAO-22-105334

Factors stakeholders identified as affecting routine adult vaccination rates included the extent to which providers screen adults for vaccines, adults' use of health care services, and the cost of vaccines for certain adults. For example, a full series of the shingles vaccine cost certain Medicare beneficiaries about $100 on average in 2021.

GAO found that the Department of Health and Human Services' (HHS) has a variety of efforts to improve adult vaccination rates. These efforts include raising public and provider awareness of the importance of vaccines and partnering with organizations, such as those representing health care providers, to encourage vaccination. GAO also found that 45 states had programs offering free routine vaccines to certain adults. These programs varied across a number of factors.

- **Number of vaccines offered:** Fifteen states offered the 12 routine adult vaccines that GAO examined, including the four vaccines above. The remaining states offered one to 11 of the 12 vaccines.
- **Eligible populations:** Most states offered vaccines to all uninsured adults and to adults who met each state's definition of underinsured. One state offered vaccines to all adults aged 19 through 64, and two states limited eligibility to adults at high-risk for certain diseases, such as hepatitis A or B.
- **Enrolled providers:** Thirty-two states limited the types of providers that could administer vaccines. For example, some states limited enrollment to public health departments. Thirteen states allowed any provider to enroll.

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Abbreviations

ACIP	Advisory Committee on Immunization Practices
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare & Medicaid Services
CHIP	State Children's Health Insurance Program
HHS	Department of Health and Human Services
HPV	human papillomavirus
PPACA	Patient Protection and Affordable Care Act
Td	tetanus and diphtheria vaccine
Tdap	tetanus, diphtheria, and acellular pertussis vaccine

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

September 15, 2022

Congressional Requesters

The United States has made significant progress against vaccine-preventable diseases, but gaps in the receipt of recommended vaccinations—particularly among adults—have resulted in preventable disease, disability, and death. For example, the Centers for Disease Control and Prevention (CDC), within the Department of Health and Human Services (HHS), estimated that from 2019 to 2020, influenza (flu) resulted in about 380,000 hospitalizations and over 20,000 deaths, which the agency reported were concentrated among individuals aged 18 and older, and could have been reduced through greater use of the flu vaccine.[1] Vaccine-preventable diseases also result in economic costs—such as from the need for health care services or lost income—and multiple studies have estimated that the economic costs resulting from these diseases among U.S. adults are in the billions of dollars annually.[2]

CDC data also indicate that adult vaccination rates lag behind those of children and adolescents for whom factors such as guaranteed coverage of recommended vaccines, as well as school vaccination requirements, have contributed to generally high vaccination rates. (See app. I for more information on child and adolescent vaccination rates.) In contrast, adults may have limited or no coverage of vaccines, or face out-of-pocket costs that pose barriers to vaccine access. While the Patient Protection and Affordable Care Act (PPACA) required most private health plans to cover without cost sharing adult vaccines that are recommended by the Advisory Committee on Immunization (ACIP) for routine use, states determine vaccine coverage for certain adults in the Medicaid program, and we and others have reported on barriers to vaccine access within

[1]According to CDC, flu vaccination reduces illness severity in people who are vaccinated but still get sick, and more people would be protected from adverse outcomes with higher vaccination rates. Flu hospitalizations and deaths vary by year; from 2010 to 2020, CDC data indicate that they ranged from 140,000 to 710,000 hospitalizations and from 12,000 to 52,000 deaths. For the purposes of this report, we define adults as those aged 18 and older unless otherwise specified.

[2]For example, see S. Ozawa et al., "Modeling the Economic Burden of Adult Vaccine-Preventable Diseases in the United States," *Health Affairs* vol. 35, no. 11 (2016).

Medicare.[3] Starting in 2023, the Inflation Reduction Act of 2022 will require coverage of ACIP-recommended vaccines without cost sharing for adults in both Medicaid and Medicare.[4] Uninsured adults do not have a federal guarantee of vaccine coverage, but may have access to free vaccines through state or local government programs, including those receiving federal funding.

HHS has recognized the importance of improving adult vaccination rates, including through setting national goals. For example, HHS's Healthy People initiative—which establishes 10-year national objectives to improve the health and well-being of people nationwide—has included objectives to improve vaccination rates among adults. However, the country has not met many adult vaccination targets established by HHS.[5]

Given the burden vaccine-preventable diseases pose on individuals and the country, and the decline in routine vaccinations that has occurred during the COVID-19 pandemic, you asked us to examine how federal and state governments address coverage of routine vaccines, as well as differences in vaccination rates.[6] In this report we describe

[3]Pub. L. No. 111-148, § 1001, 124 Stat. 119, 131 (2010) (codified, as amended, at 42 U.S.C. § 300gg-13). Cost sharing generally refers to costs incurred by an insured individual and can include deductibles, coinsurance, and copayments, but not costs associated with premiums, non-covered services, or services provided by out-of-network providers. ACIP is an advisory committee to CDC that is comprised of medical and public health experts who develop recommendations on how to use vaccines to control diseases in the United States. Medicaid is a jointly financed federal-state health care program for certain low-income and medically needy individuals.

For an example of a report on barriers to vaccine access in Medicare, see GAO, *Medicare: Many Factors, Including Administrative Challenges, Affect Access to Part D Vaccinations*, GAO-12-61 (Washington, D.C.: Dec. 15, 2011). Medicare is the federally financed health insurance program for persons aged 65 and over, certain individuals with disabilities, and individuals with end-stage renal disease.

[4]See Inflation Reduction Act of 2022, Pub. L. No. 117-169, §§ 11401, 11405, 136 Stat. 1818, 1896, 1900.

[5]For example, the Healthy People 2020 target vaccination rate for flu for adults aged 18 and older was 70 percent; the vaccination rate for this group during the 2019-2020 flu season was about 48 percent.

[6]We define routine vaccinations (also referred to as vaccines or vaccinations in this report) as those recommended for adults in the United States, depending on age and vaccine history, by CDC's ACIP and included in its Adult Immunization Schedule. COVID-19 vaccines were outside the scope of this report.

1. estimated adult vaccination rates across the United States;
2. factors that could affect adult vaccination rates;
3. state programs that provide free vaccines to adults; and
4. HHS efforts to improve adult vaccination rates.

To describe estimated adult vaccination rates across the United States, we analyzed data from CDC's Behavioral Risk Factor Surveillance System (BRFSS) for 2020, which was the most recent year available at the time we did our analyses.[7] BRFSS contains survey data on the receipt of four adult vaccines based on respondents' answers to questions about their vaccination history: flu and tetanus, which are recommended for all adults, and pneumococcal and zoster recombinant (shingles), which are recommended based on age or risk factors.[8] For each vaccine, we used the data to estimate national, regional, and state-level vaccination rates.[9] Because BRFSS reflects information provided by a sample of adults, CDC provided a data weighting strategy that we applied to produce estimates for the broader population at both the

For examples of the decline in routine vaccination rates during the COVID-19 pandemic, see Centers for Disease Control and Prevention, "Vaccination Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten — United States, 2020–21 School Year," *Morbidity and Mortality Weekly Report,* vol. 71, no. 16 (April 22, 2022); and Christine Liow et al., "Declines in Routine Adult and Teen Vaccinations Continued in 2021," *Avalere Health* (January 2022).

[7]BRFSS is a system of ongoing health-related telephone surveys designed to collect data on health-related risk behaviors, chronic health conditions, and use of preventive services from the noninstitutionalized adult population residing in the United States. BRFSS collects data in all 50 states, the District of Columbia, and U.S. territories. We excluded U.S. territories from our analysis. For the tetanus vaccine, the most recent available data were from 2019; California and New Jersey are not included in our tetanus estimates, because they did not provide data on the vaccine that year.

[8]BRFSS asked about respondents' vaccine receipt in the last 12 months for flu, the last 10 years for tetanus (tetanus and diphtheria or tetanus, diphtheria, and acellular pertussis), and whether they ever received the shingles vaccine or any type of pneumococcal vaccine.

[9]We defined vaccination rate as the percentage of BRFSS respondents who answered "yes" to receiving a vaccine out of all respondents who answered either "yes" or "no" in the age group for which CDC universally recommends it: 18 years and older for flu and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal. Our rate calculations did not include responses from individuals who answered "don't know/ not sure," "refused," or responses that were left blank. Non-response rates varied by vaccine type: 3 percent for the shingles vaccine; 6 percent for the flu vaccine, 8 percent for the pneumococcal vaccine, and 18 percent for the tetanus vaccine. Estimated vaccination rates among respondents who answered "yes" or "no" may not generalize to respondents who refused, answered "don't know/ not sure" or left the question blank.

national and state-level.[10] We also examined the extent to which adult vaccination rates varied by certain factors, such as health insurance status, race and ethnicity, and age. When comparing estimates, we conducted statistical tests at the 95 percent confidence level or above and only report differences we determined were statistically significant.

To assess the reliability of these data, we interviewed relevant officials, reviewed related documentation, and performed electronic testing to identify missing data and obvious errors. On the basis of these steps, we determined that the data were sufficiently reliable for the purposes of our reporting objectives. While the COVID-19 pandemic has led to declines in routine vaccination rates, we determined that the extent to which it affected our estimated vaccination rates was likely minimal. According to CDC officials, the BRFSS data we reviewed generally reflected respondents' experiences prior to when the pandemic started in 2020.

To describe factors that could affect adult vaccination rates, we interviewed 13 stakeholders that represent a range of perspectives on adult vaccination, including organizations that represent providers, consumers, and vaccine manufacturers; organizations that focus on health policy or vaccine-specific issues; and researchers.[11] We also reviewed studies and other documents these stakeholders provided, which we have cited as appropriate throughout this report.

To describe state programs that provide free vaccines to adults, we reviewed the websites of state immunization programs—which all receive grants authorized under section 317 of the Public Health Service Act (Section 317)—to determine the extent to which they provided free

[10]We also calculated standard errors and relative standard errors for all estimates. Standard error measures how much a survey estimate is likely to deviate from the actual population. Relative standard error is the standard error divided by the estimate itself. According to CDC, estimates with a sample size less than 50 or with a relative standard error of 30 percent or more do not have reliable precision, and we did not report estimates meeting these criteria.

[11]We interviewed the following 13 stakeholders: American Academy of Family Physicians; American Immunization Registry Association; American Pharmacists Association; AHIP; Association of Immunization Managers; Biotechnology Innovation Organization; Council of Medical Specialty Societies; Laura Hurley, MD; L.J Tan, MS, PhD; National Association of Community Health Centers; National Minority Quality Forum; The National Academy for State Health Policy; and Vaccinate Your Family.

vaccines to adults.[12] We subsequently contacted these states to confirm the accuracy of information collected, as well as to obtain any missing information. For states that had adult vaccine programs, we confirmed the number and types of ACIP-recommended adult vaccines their programs offered, eligible populations, and providers that could enroll to administer vaccines.

With the exception of the pneumococcal vaccines, we grouped vaccines that could be used to treat the same disease together (i.e., tetanus, diphtheria (Td) vaccine with tetanus, diphtheria, and acellular pertussis (Tdap) vaccine; flu vaccines; and the hepatitis A and B combination vaccine with individual hepatitis vaccines) and did not ask states to specify which vaccines they offered.[13] We also focused on ACIP-recommended adult vaccines for which CDC has negotiated a contract price.[14] These decisions resulted in a total of 12 vaccines for this analysis:(1) hepatitis A; (2) hepatitis B; (3) human papillomavirus (HPV); (4) flu; (5) measles, mumps, rubella; (6) meningococcal A,C,W,Y; (7) meningococcal B; (8) pneumococcal conjugate; (9) pneumococcal polysaccharide; (10) Td/ Tdap; (11) varicella; and (12) shingles.

We also interviewed officials from a non-generalizable sample of six states with adult vaccine programs—Florida, Michigan, New York, South Carolina, Vermont, and Washington—to obtain additional information about their programs to provide free vaccines to adults. We selected these states to obtain variation in program scope, adult vaccination and uninsured rates, Medicaid coverage of adult vaccines, and geographic location.

[12]Section 317 of the Public Health Service Act authorizes HHS to provide grants to states, localities, and nonprofit private entities to establish and maintain preventive health service programs, including to support immunization–related activities. See 42 U.S.C. § 247b. For this report, we focus on state grantees, and we collectively refer to the 50 states and the District of Columbia as states.

[13]We asked states to differentiate pneumococcal conjugate vaccines from the pneumococcal polysaccharide vaccine, because ACIP recommends that one type of pneumococcal conjugate—pneumococcal 15-valent conjugate—be followed by pneumococcal polysaccharide.

[14]CDC has contracts to purchase most ACIP-recommended adult vaccines; states that receive Section 317 funding can purchase adult vaccines at the CDC-negotiated rate. We excluded one recommended vaccine—haemophilus influenzae type b—because CDC does not have a contract to purchase this vaccine for adults and officials said the adult population recommended to receive it is small. However, 12 states reported offering it in their adult vaccine programs.

To describe HHS efforts to improve adult vaccination rates, we reviewed the websites of HHS agencies, including CDC, the Centers for Medicare & Medicaid Services (CMS), and the Office of the Assistant Secretary for Health; and obtained relevant agency documentation. We also interviewed HHS officials, as well as our 13 stakeholders about HHS efforts to improve adult vaccination rates.

We conducted this performance audit from July 2021 to September 2022 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

With primary responsibility to protect the nation's public health, HHS funds the research and development of vaccines, and is responsible for coordinating vaccine and immunization activities among federal agencies. Within HHS, several agencies contribute to these efforts. For example, CDC makes recommendations on who should be vaccinated, tracks vaccination rates, provides technical assistance and support regarding vaccination to jurisdictions and partner organizations, and disseminates public health messages encouraging vaccination. The Office of the Assistant Secretary for Health oversees many of the department's key public health offices and programs, including the National Vaccine Advisory Committee.[15] Additionally, CMS conducts a variety of vaccine-related activities in its administration and oversight of Medicare and Medicaid, and, in partnership with the Department of Labor and the Department of the Treasury, provides coverage-related guidance on vaccines that most private health plans must cover under PPACA.

HHS also partners with a variety of stakeholders on vaccine-related efforts, including state and local governments. Notably, under Section 317, CDC provides grants to 64 states, cities, and U.S. territories to support immunization program operations, such as the development of

[15]The National Vaccine Advisory Committee provides recommendations to HHS's Assistant Secretary for Health on ways to achieve optimal prevention of human infectious diseases through vaccine development and provides direction to prevent adverse reactions to vaccines.

immunization information systems.[16] Immunization information systems are secure databases administered by state and local immunization programs that record patient vaccination records submitted by participating health care providers. Section 317 also authorizes the federal purchase of vaccines for certain populations. Based on CDC guidance, Section 317-funded vaccines can be used to vaccinate (1) uninsured or underinsured adults, (2) fully insured individuals seeking vaccines during public health response activities (e.g. response to disease outbreaks), (3) individuals in correctional facilities and jails, and (4) certain infants receiving the hepatitis B vaccine. With regard to Section 317-funded vaccines, CDC defines the term "underinsured" as a person who has health insurance, but the coverage does not include vaccines, or a person whose insurance covers only selected vaccines. Funding provided to Section 317 awardees is limited to a set amount each year.

Recommended Vaccines for Adults

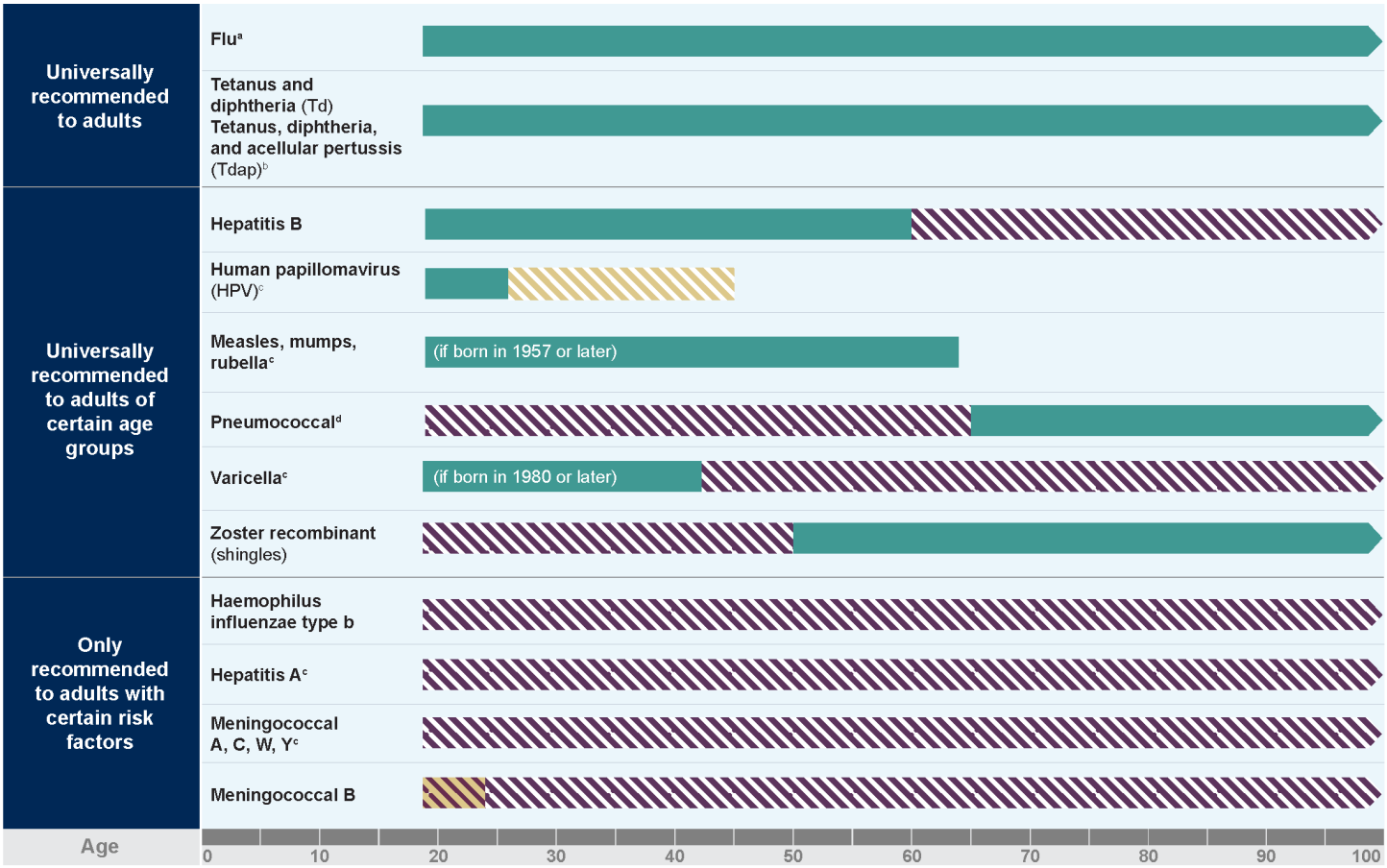
CDC's Advisory Committee on Immunization Practices recommends different vaccines or groups of vaccines for adults aged 19 and older to prevent a range of diseases.[17] These vaccines are generally included in CDC's Adult Immunization Schedule and are either universally recommended (e.g., the flu vaccine), recommended for certain age groups (e.g., the shingles vaccine), or targeted to individuals with specific risk factors (e.g., the hepatitis A vaccine).[18] CDC's adult schedule also includes vaccinations for those who never initiated or did not complete a vaccine series during childhood or adolescence, such as the measles, mumps, and rubella vaccine. (See fig. 1.)

[16]The 64 Section 317 grantees include all 51 states; five cities (Chicago, Houston, New York, Philadelphia, and San Antonio); and eight territories (American Samoa, Guam, Marshall Islands, Micronesia, Commonwealth of Northern Mariana Islands, Republic of Palau, Puerto Rico, and the U.S. Virgin Islands).

[17]ACIP includes vaccine recommendations for adults aged 18 years in its Child and Adolescent Immunization Schedule, and thus they are not included in the Adult Immunization Schedule. However, ACIP recommends they receive many of the same vaccines recommended for adults, such as the flu and tetanus vaccines.

[18]While ACIP recommends COVID-19 vaccines for everyone aged 6 months and older, as of August 2022, COVID-19 vaccines were not included in CDC's Adult Immunization Schedule; rather, they were recommended within the scope of the Emergency Use Authorization or Biologics License Application for the particular vaccine.

Figure 1: ACIP-Recommended Vaccines, Adults Aged 19 Years and Older



Source: The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) Recommended Adult Immunization Schedule by Age Group, 2022 | GAO-22-105334

Notes: For more information on vaccines in this table, including the number and frequency of doses recommended, see Centers for Disease Control and Prevention, "Adult Immunization Schedule: Recommendations for Ages 19 and Older, United States, 2022" (Feb. 17, 2022), accessed July 6, 2022, https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html. ACIP includes vaccine recommendations for adults aged 18 years in CDC's Child and Adolescent Immunization Schedule.

[a]Influenza (flu) vaccines include influenza inactivated or influenza recombinant, which ACIP recommends for all adults, and influenza live attenuated, which ACIP recommends for adults aged 19 through 49.

[b]One dose of Tdap is recommended each time a person becomes pregnant. One dose of Td or Tdap is recommended for wound management.

[c]ACIP recommends that this vaccine series be completed in childhood or adolescence.

[d]Pneumococcal vaccines include pneumococcal conjugate vaccines (15-valent and 20-valent) and the pneumococcal 23-valent polysaccharide vaccine.

[e]Risk factors can vary by vaccine type. For example, a risk factor for the hepatitis A vaccine is chronic liver disease; sickle cell disease is a risk factor for the meningococcal B vaccine.

[f]Shared clinical decision-making for vaccines is a process between a health care provider and a patient that considers factors such as the best available evidence of who may benefit from vaccination, vaccine characteristics, and an individual's values and preferences.

ACIP also makes vaccine recommendations for specific populations. For instance, ACIP recommends that pregnant women receive the flu vaccine and the Tdap vaccine to address a greater risk of morbidity and mortality from associated diseases. However, according to a 2021 CDC study, less than one-third of pregnant women received both of these vaccines. [19]

ACIP recommendations for adult vaccines have changed over time. In 2022, for example, ACIP recommended that all adults aged 19 through 59 receive the hepatitis B vaccine. Previously, ACIP had only recommended this vaccine for adults with certain risk factors.

Public and Private Coverage for Vaccines

Vaccinations begin in infancy and continue throughout an individual's lifespan. Insurance coverage for vaccines, however, varies by age and coverage type. Children and adolescents, regardless of insurance status, are generally guaranteed coverage of all ACIP-recommended vaccines without cost sharing. This is due, in part, to the Vaccines for Children program, which provides vaccines at no cost to certain individuals under 19 years of age, including those who might not otherwise be vaccinated due to inability to pay.[20] In contrast, coverage of vaccines for adults varies depending on an individual's insurance status. (See table 1.) For example, Medicaid may not provide coverage of vaccines to certain categories of eligible adults, including those eligible on the basis of disability or because they are pregnant or are parents or caretaker relatives. Instead, states determine coverage levels, including allowable

[19]See Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, National Center for Chronic Disease Prevention and Health Promotion, *Flu and Tdap Vaccination Coverage Among Pregnant Women – United States*, (April 2021).

[20]The Vaccines for Children program is a federally funded program administered by CDC. An individual is eligible if he or she is younger than 19 years of age and is either Medicaid-eligible, uninsured, underinsured (when served at a federally qualified health center or rural health clinic), or Indian as defined in section 4 of the Indian Health Care Improvement Act. See 42 U.S.C. § 1396s(b); 42 C.F.R. § 441.605(a) (2022). See also 25 U.S.C. § 1603(13). While providers participating in this program may charge a vaccine administration fee, they cannot refuse service to an eligible individual who cannot afford it.

cost sharing amounts for these adults.[21] Additionally, Medicare beneficiaries face cost sharing for certain vaccines. However, beginning in 2023, the Inflation Reduction Act of 2022 expands coverage and eliminates cost sharing, including deductible costs, for ACIP-recommended vaccines for adults in Medicaid, adults age 19 and older in the State Children's Health Insurance Program (CHIP), and Medicare Part D enrollees.[22] Uninsured adults, as well as those with private plans exempt from PPACA's coverage requirements, may still face gaps in vaccine coverage, as well as out of pocket costs.

Table 1: Federal Requirements for Coverage of ACIP-Recommended Vaccines by Health Insurance Type

Population	Program information	Federally required coverage	Cost sharing allowed
Children and adolescents			
Medicaid and CHIP[a]	For children and adolescents, Medicaid and CHIP cover all ACIP-recommended vaccines without cost sharing. Children and adolescents under age 19 who are eligible for Medicaid are eligible for vaccines under the Vaccines for Children program.[b]	●	○
Private insurance	Private group health plans and individual health insurance coverage must cover ACIP-recommended vaccines without cost sharing. Certain private insurance plans, including short-term, limited-duration plans and grandfathered plans, are exempt from this requirement. If a child or adolescent under age 19 has a plan that does not cover vaccines, they are eligible for vaccines at no cost under the Vaccines for Children program.[b]	●	○

[21]States may opt to expand their Medicaid programs to cover non-elderly, non-pregnant adults who are not eligible for Medicare and whose incomes are at or below 138 percent of the federal poverty level. As of June 2022, 39 states had elected to expand their Medicaid programs and must cover ACIP-recommended vaccinations without cost sharing for this adult group. CDC researchers examined Medicaid coverage of vaccines for other adults in Medicaid and found that coverage varied. See Charleigh J Granade et al. "State Policies on Access to Vaccination Services for Low-Income Adults," *JAMA Network Open,* vol. 3, no. 4 (2020). For additional information on adult access to vaccines within the Medicaid program, see Medicaid and CHIP Payment and Access Commission, Report to Congress on Medicaid and CHIP, *Chapter 2: Vaccine Access for Adults Enrolled in Medicaid* (Washington, D.C.: March 2022).

In Medicaid, states have flexibility to determine cost sharing amounts within federal limits. See 42 C.F.R. §§ 447.50-57 (2021). For example, pregnancy-related services are exempt from all cost sharing.

[22]See Pub. L. No. 117-169, §§ 11401, 11405, 136 Stat. 1818, 1896, 1900. Medicare consists of four parts: A, B, C, and D. Medicare Part D is Medicare's outpatient prescription drug benefit, and covers all commercially available vaccines needed to prevent illness not covered under Medicare Part B. While cost sharing is currently allowed for vaccines under Part D, it is not allowed under Part B.

Population	Program information	Federally required coverage	Cost sharing allowed
Uninsured	Uninsured children and adolescents under age 19 are guaranteed coverage of ACIP-recommended vaccines with no cost for the vaccine under the Vaccines for Children program.[b]	●	○
Adults			
Medicare Part B[c]	Medicare Part B—which covers physician, outpatient, and some preventive services—does not impose cost-sharing for covered vaccines, specifically vaccines that prevent pneumococcal disease and influenza (flu); hepatitis B for adults at increased risk of the disease; and vaccines directly related to the treatment of an injury or direct exposure to a disease or condition.	◐	○
Medicare Part C	Medicare Part C—also known as the Medicare Advantage program—is an alternative to the original Medicare fee-for-service program, whereby care is delivered through private health plans. These plans must cover all Medicare Part A and Part B benefits, including vaccines. If a Part C plan includes coverage of prescription drugs, it must also cover all Part D vaccines, and can impose cost sharing for these vaccines.	◐	●
Medicare Part D	Medicare Part D—Medicare's outpatient prescription drug benefit—covers all commercially available vaccines needed to prevent illness not covered under Part B. Under Part D, cost sharing is allowed and can vary by plan.[d]	◐	●
Medicaid expansion population	States may opt to expand their Medicaid programs to cover non-elderly (19 through 64 years of age), non-pregnant adults who are not eligible for Medicare and whose income does not exceed 138 percent of the federal poverty level, and requires states to cover ACIP-recommended vaccinations without cost-sharing for this group.	●	○
Medicaid non-expansion population	For other adults eligible for Medicaid—such as disabled adults, adults aged 65 and older, pregnant women, and parents and caretaker relatives—each state's Medicaid program determines coverage for vaccines, including cost sharing amounts within federal limits.[e]	○	◐
Private insurance	Private group health plans and individual health insurance coverage must cover ACIP-recommended vaccines without cost sharing. Certain private insurance plans, including short-term, limited-duration plans and grandfathered plans, are exempt from this requirement	◐	◐
Uninsured	Uninsured adults, as well as those whose insurance does not cover vaccines, do not have a federal guarantee of coverage of vaccines, though may have access to free vaccines through state or local government programs—including those funded under section 317 of the Public Health Service Act—or through Federally Qualified Health Centers.	○	●

● Yes ○ No ◐ Yes, for certain vaccines or groups

Source: GAO analysis of federal coverage and cost sharing requirements for vaccines as of June 2022. | GAO-22-105334

Notes: Individuals may obtain health benefits through other federal entities, including the Department of Defense, the Veterans Health Administration, and the Indian Health Service. Each of these entities covers all Advisory Committee on Immunization Practices (ACIP) recommended vaccines without cost sharing. Recent legislation expands coverage and eliminates cost sharing for ACIP-recommended vaccines for certain adults in Medicare, Medicaid, and CHIP, effective in 2023. For more information on these forthcoming changes, see Inflation Reduction Act of 2022, Pub. L. No. 117-169, §§ 11401, 11405, 136 Stat. 1818, 1896, 1900.

[a]Medicaid is a jointly financed federal-state health care program for certain low-income and medically needy individuals. The State Children's Health Insurance Program (CHIP) finances health insurance for children and adolescents in families whose household income exceeds Medicaid eligibility limits.

[b]The Vaccines for Children program provides vaccines at no cost to certain individuals, including those who might not otherwise be vaccinated due to inability to pay. An individual is eligible if he or she is younger than 19 years of age and is either Medicaid-eligible, uninsured, underinsured (when served at a federally qualified health center or rural health clinic), or Indian as defined in section 4 of the Indian Health Care Improvement Act. See 42 U.S.C. § 1396s(b); 42 C.F.R. § 441.605(a) (2021). See also 25 U.S.C. § 1603(13). While providers participating in this program may charge a vaccine administration fee, they cannot refuse service to an eligible individual who cannot afford it.

[c]Medicare is the federally financed health insurance program for persons aged 65 and over, certain individuals with disabilities, and individuals with end-stage renal disease. Medicare consists of four parts (Parts A, B, C, and D); all but Part A—which covers hospital inpatient services and post-hospital care—provide some coverage of vaccines. While enrollment in Part A is generally automatic, beneficiaries must opt to enroll in other parts.

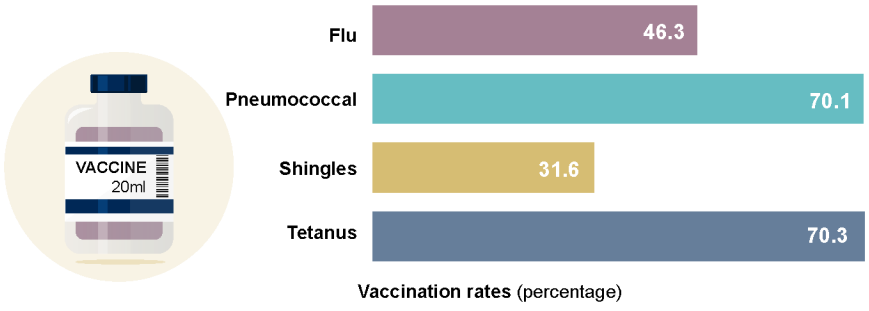
[d]Medicare beneficiaries can select a Part D plan from competing plan sponsors that contract with CMS. Plan sponsors are responsible for paying retail pharmacies for drugs dispensed to Medicare Part D beneficiaries, and beneficiaries are responsible for applicable cost sharing. However, Part D offers a low-income subsidy for eligible beneficiaries that helps pay for premiums and deductibles and results in no or nominal cost sharing.

[e]Individuals aged 19 and 20 who are enrolled in Medicaid are eligible for Early and Periodic Screening, Diagnostic, and Treatment benefits, which include coverage of vaccines.

CDC Data Indicate Variation in Adult Vaccination Rates across Vaccine Types, States, and Other Factors

Our analysis of CDC's national BRFSS survey data identified variation in adult vaccination rates by vaccine type, state, and other factors. With respect to vaccine type, we examined adults' reported receipt of four vaccines at the ages they are universally recommended by CDC—flu, pneumococcal, shingles, and tetanus—and identified significant differences in the rates at which adults reported receiving these vaccines. Specifically, we estimated that, nationally, over two-thirds of adults received the tetanus and pneumococcal vaccines, while less than half of adults received the flu vaccine, and less than one-third of adults received the shingles vaccine. (See fig. 2.)

Figure 2: Estimated National Adult Vaccination Rates for Four Vaccines, 2020



Source: GAO analysis of Behavioral Risk Factor Surveillance System (BRFSS) data. | GAO-22-105334

Notes: BRFSS data are survey data collected by the Centers for Disease Control and Prevention (CDC).We defined vaccination rates as the percentage of adults who reported receiving a vaccine out of the adult population for which CDC universally recommends it: 18 years and older for influenza (flu) and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal. BRFSS asked about receipt of the vaccine in the last 12 months for flu, the last 10 years for tetanus, and whether it was ever received for shingles and pneumococcal. Tetanus data are from 2019.

Estimated rates in this figure all had a relative standard error of less than 1 percent. Relative standard error is the standard error divided by the estimate itself. According to CDC, estimates with a relative standard error of 30 percent or more do not have reliable precision.

We also identified variation in the estimated adult vaccination rates for the four vaccines across states. The difference between the states with the highest and lowest estimated vaccination rates ranged from 14 percentage points for the pneumococcal vaccine to 28 percentage points for the tetanus vaccine, though most states had estimated vaccination rates that fell within 5 percentage points of the national average for all four vaccines.[23] (See table 2.) In addition, we identified states that were consistently among those with the highest or lowest estimated rates: 16 states were consistently above the median vaccination rate, and nine states were consistently below the median rate, across vaccines. (See app. II for additional information on states' estimated vaccination rates.)

Table 2: Comparison of Estimated National and State Adult Vaccination Rates for Four Vaccines, 2020

	Flu	Pneumococcal	Shingles	Tetanus
National average	46.3	70.1	31.6	70.3
State max	56.5	76.3	45.7	82.6
State median	47.0	71.8	33.1	72.6
State minimum	38.1	61.9	20.1	54.6
State range	18.3	14.4	25.7	28.0
Number of states within 5 percentage points of national average	39	44	39	32

Source: GAO analysis of Behavioral Risk Factor Surveillance System (BRFSS) data. | GAO-22-105334

Notes: BRFSS data are survey data collected by the Centers for Disease Control and Prevention (CDC). We defined vaccination rates as the percentage of adults who reported receiving a vaccine out of the adult population for which CDC universally recommends it: 18 years and older for influenza (flu) and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal. BRFSS asked about receipt of the vaccine in the last 12 months for flu, the last 10 years for tetanus, and whether it was ever received for shingles and pneumococcal. Tetanus data are from 2019.

Estimated national rates in this figure all had a relative standard error of less than 1 percent; relative standard errors for state estimates were all 6 percent or less. Relative standard error is the standard error divided by the estimate itself. According to CDC, estimates with a relative standard error of 30 percent or more do not have reliable precision.

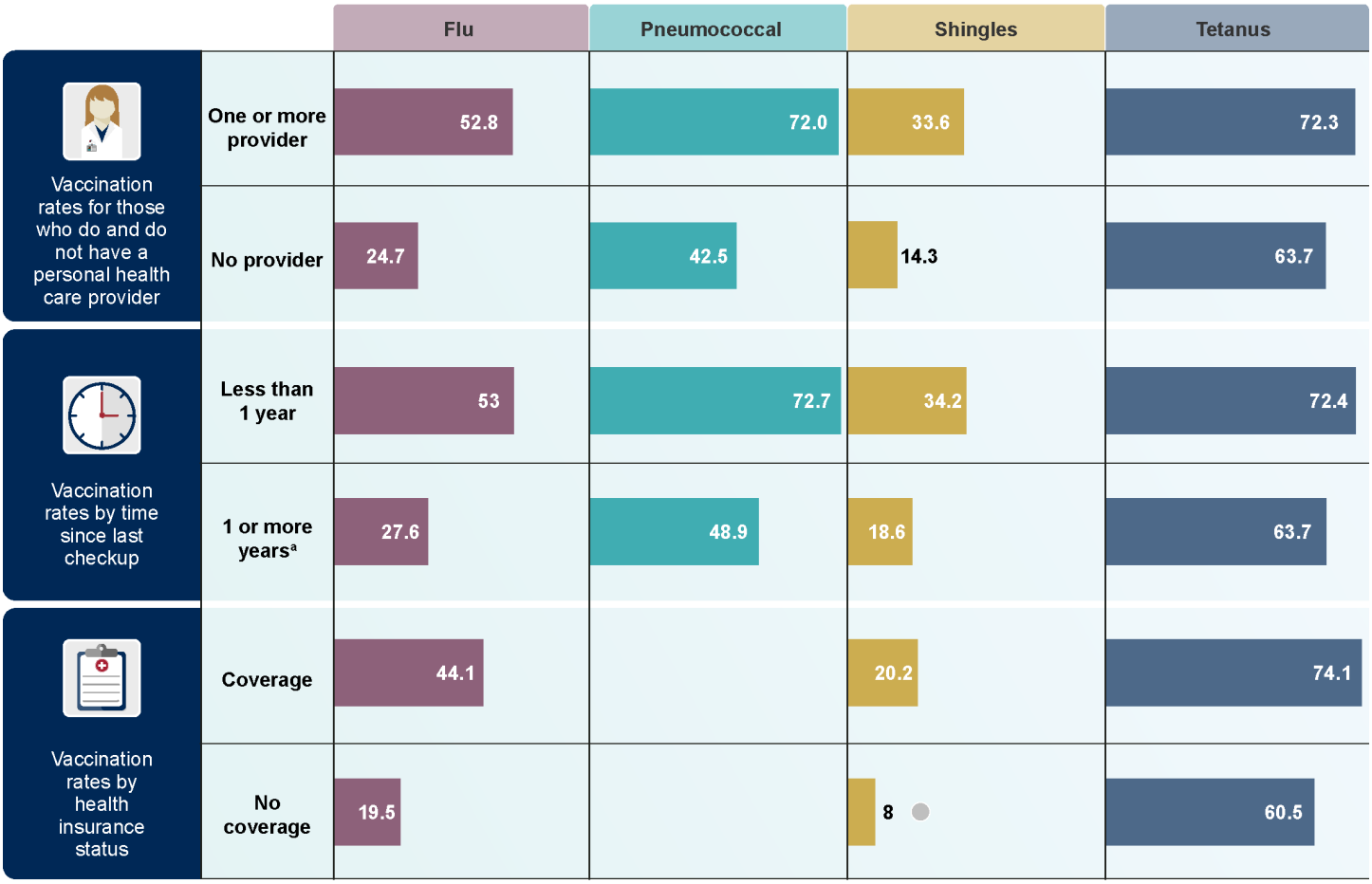
[23]Ranges in estimated vaccination rates across regions were smaller, with the largest difference being a 6 percentage point higher rate in the Midwest for the tetanus vaccine compared with the rate for the vaccine in the South.

In addition, we examined BRFSS data by other factors and found that an adult's engagement with the health care system, as well as his or her race and ethnicity and age were the factors associated with the most variation in estimated vaccination rates.[24]

- **Engagement with the health care system:** Adults who reported in CDC's survey that they had a personal health care provider, a health checkup less than 1 year prior, or health insurance coverage had higher estimated national vaccination rates compared with adults who did not have them. For each of these factors, the differences were at least 24 percentage points for the flu and pneumococcal vaccines, and ranged from about 9 to 19 percentage points for the shingles and tetanus vaccines. (See fig. 3.)

[24]We also examined whether someone lived in an urban or rural area or identified as male or female, but these factors generally resulted in differences in estimated vaccination rates that were less than 4 percentage points. The exceptions were the differences between males and females for the flu and pneumococcal vaccines, where the differences were 8 and 6 percentage points, respectively.

Figure 3: Estimated National Adult Vaccination Rates, by Vaccine Type and Factors Related to Health Care System Engagement, 2020



The difference between this rate and the rate for those who had coverage was not statistically significant for the shingles vaccine.

Source: GAO analysis of Behavioral Risk Factor Surveillance System (BRFSS) data. | GAO-22-105334

Notes: BRFSS data are survey data collected by the Centers for Disease Control and Prevention (CDC). We defined vaccination rates as the percentage of adults who reported receiving a vaccine out of the adult population for which CDC universally recommends it: 18 years and older for influenza (flu) and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal. BRFSS asked about receipt of the vaccine in the last 12 months for flu, the last 10 years for tetanus, and whether it was ever received for shingles and pneumococcal. The health insurance status variable only included data for adults aged 18 through 64 years; as a result, we did not report on this variable for pneumococcal. Tetanus data are from 2019.

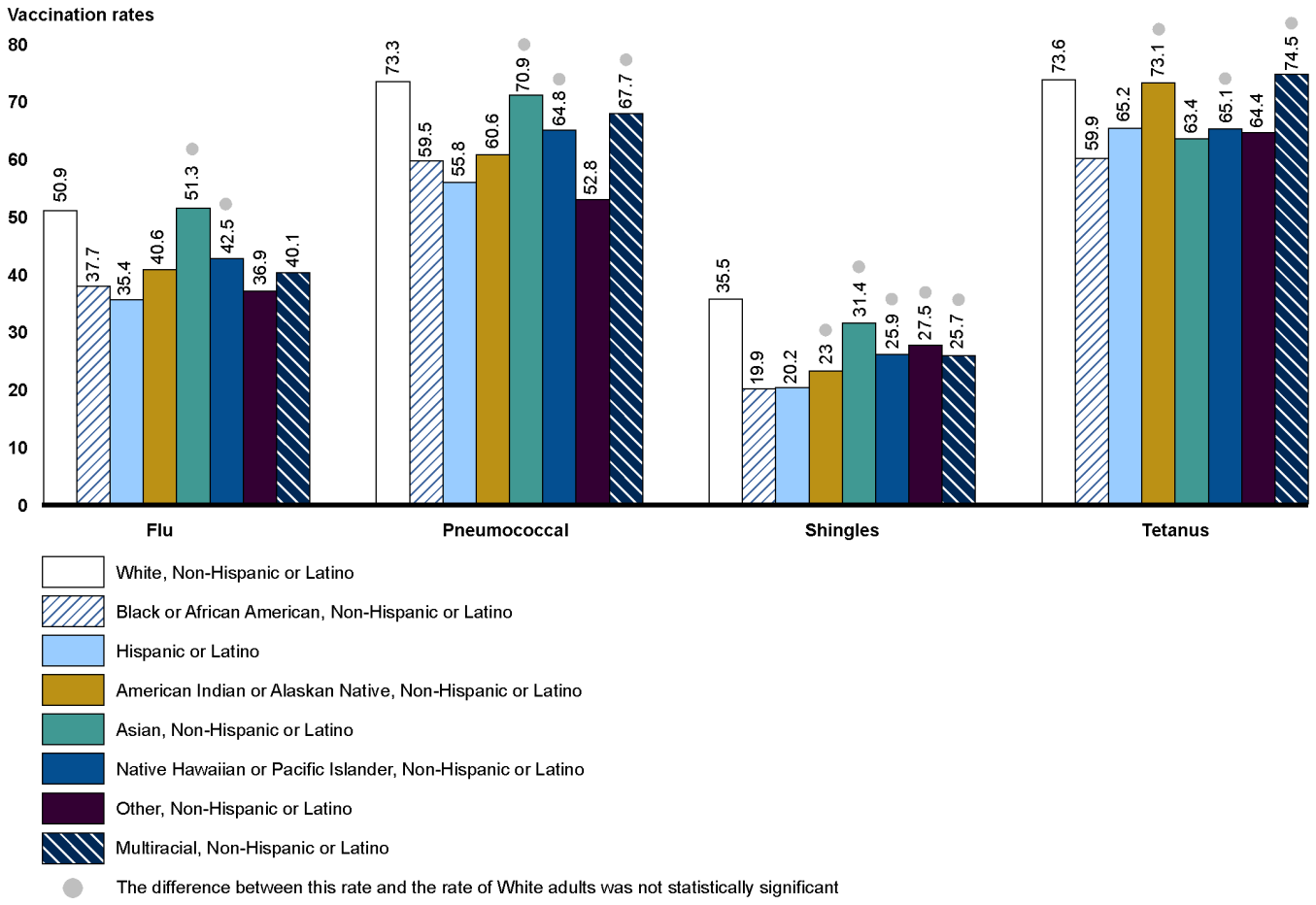
Estimated rates in this figure all had a relative standard error of 4 percent or less except the no coverage rate for the shingles vaccine, which had a relative standard error of 9 percent. Relative standard error is the standard error divided by the estimate itself. According to CDC, estimates with a relative standard error of 30 percent or more do not have reliable precision.

[a]A small number of individuals (less than 1 percent of the survey sample) had never had a checkup and are included in this category.

- **Race and ethnicity:** When compared with White adults, adults in other racial and ethnic groups generally had lower estimated vaccination rates across the four vaccines. However, estimated vaccination rates for Asian and White adults were closely aligned, with the exception of the tetanus vaccine, where the estimated vaccination rate for Asian adults was 10 percentage points lower than that for White adults. Black or African American and Hispanic or Latino adults most frequently had the lowest estimated vaccination rates—generally 13 or more percentage points below that of White adults for a given vaccine.[25] For example, for the flu vaccine, the estimated vaccination rate for White adults was 51 percent versus 35 percent for Hispanic or Latino adults; for the shingles vaccine, estimated vaccination rates were 36 percent for White adults versus 20 percent for Black or African American adults. (See fig. 4.)

[25]The only exception was an 8 percentage point difference in the vaccination rate between White and Hispanic or Latino adults for the tetanus vaccine.

Figure 4: Estimated National Adult Vaccination Rates for Four Vaccines by Certain Racial and Ethnic Groups, 2020



Source: GAO analysis of Behavioral Risk Factor Surveillance System (BRFSS) data. | GAO-22-105334

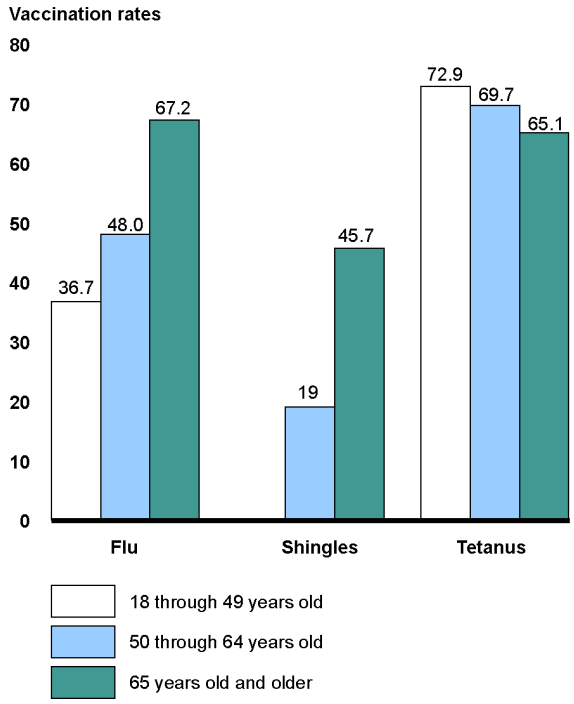
Notes: BRFSS data are survey data collected by the Centers for Disease Control and Prevention (CDC). We defined vaccination rates as the percentage of adults who reported receiving a vaccine out of the adult population for which CDC universally recommends it: 18 years and older for influenza (flu) and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal. BRFSS asked about receipt of the vaccine in the last 12 months for flu, the last 10 years for tetanus, and whether it was ever received for shingles and pneumococcal. Tetanus data are from 2019.

Estimated rates in this figure all had a relative standard error of 8 percent or less except the pneumococcal and shingles rates for Native Hawaiian or other Pacific Islanders, which had relative standard errors of 11 and 20 percent, respectively. Relative standard error is the standard error divided by the estimate itself. According to CDC, estimates with a relative standard error of 30 percent or more do not have reliable precision.

- **Age:** We grouped respondents into three age groups (ages 18 through 49, ages 50 through 64, and ages 65 and older) and found that estimated vaccination rates increased with age for the flu and

shingles vaccines, and decreased with age for the tetanus vaccine.[26] While differences in estimated vaccination rates among the three age groups were under 8 percentage points for the tetanus vaccine, they were notably higher for the flu and shingles vaccines. The largest difference we identified was 30 percentage points: an estimated 37 percent of respondents aged 18 through 49 reported receiving the flu vaccine versus an estimated 67 percent of respondents aged 65 and older who reported doing so.[27] (See fig. 5.)

Figure 5: Estimated National Adult Vaccination Rates for Three Vaccines by Certain Age Groups, 2020



Source: GAO analysis of Behavioral Risk Factor Surveillance System (BRFSS) data. | GAO-22-105334

Notes: BRFSS data are survey data collected by the Centers for Disease Control and Prevention (CDC). We defined vaccination rates as the percentage of adults who reported receiving a vaccine out of the adult population for which CDC universally recommends it: 18 years and older for influenza (flu) and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal. As a result, we did not analyze shingles data for 18 to 49 year olds, and excluded pneumococcal as it only

[26]We did not calculate estimated vaccination rates for the age variable for 18 to 49 year olds for the shingles vaccine, and for all age groups for the pneumococcal vaccine, because these vaccines are recommended beginning at age 50 and 65, respectively.

[27]Similarly, for the shingles vaccine, the difference in estimated vaccination rates between the 50 through 64 age group and the 65 and older age group was 27 percentage points—the largest difference between these age groups across the three vaccines.

applied to one age category. BRFSS asked about receipt of the vaccine in the last 12 months for flu, the last 10 years for tetanus, and whether it was ever received for shingles. Tetanus data are from 2019.

The estimated rates in this figure all had a relative standard error of less than 2 percent. Relative standard error is the standard error divided by the estimate itself. According to CDC, estimates with a relative standard error of 30 percent or more do not have reliable precision.

For most factors we examined, the differences we identified in estimated vaccination rates at the national level were generally reflected at the state-level.[28] However, for certain factors, the data were insufficient to assess differences at the state-level, particularly among racial and ethnic groups.[29]

Vaccine Cost and Screening among the Factors Stakeholders Cited as Affecting Adult Vaccination Rates

The 13 stakeholders we interviewed identified a range of factors that specifically affect adult vaccination rates.[30] These factors included the cost of vaccines for certain adults, adults' use of health care services, the extent to which providers screen adults for vaccines, and the completeness of states' adult immunization information system data. (See table 3.)

[28]For some factors, state-level sample sizes were not sufficient to calculate reliable estimates across all vaccines. In such cases, we pooled BRFSS data from additional years in an effort to attain a sufficient sample size. Years pooled were based on data availability and reliability, and estimates represent the average vaccination rate. For the race and ethnicity variable, we pooled data from 2016, 2017, 2019, and 2020 for the flu vaccine; 2016 to 2020 for the pneumococcal vaccine; 2016 and 2019 for the tetanus vaccine; and 2017 and 2020 for the shingles vaccine. We also pooled state-level data as specified for the health insurance status variable for the flu vaccine, and for the personal health care provider and time since last check-up variables for the pneumococcal and shingles vaccines.

[29]For example, using CDC's definition of reliable estimates, even after pooling data, we found that many states had unreliable estimates for one or more categories of race and ethnicity variables across the four vaccines, and that the majority of state estimates were unreliable for the shingles vaccine for individuals who did not have health insurance.

[30]The 13 stakeholders represented a range of perspectives on adult vaccination, including organizations that represent providers, consumers, and vaccine manufacturers; organizations that focus on health policy or vaccine-specific issues; and researchers.

Table 3: Select Factors Cited by Stakeholders as Affecting Adult Vaccination Rates

Factor	Stakeholder description	Stakeholder examples of potential effects on adult vaccination rates
Vaccine costs for certain adults	Uninsured adults and some insured adults may need to pay the cost of vaccines in full or in part.	Individuals who do not have access to free vaccines or who face cost sharing may decide not to get vaccinated if they cannot afford the cost. For example, according to the Centers for Medicare & Medicaid Services, a full series of the shingles vaccine cost Medicare Part D beneficiaries just over $100, on average, in 2021 and 2022.
Providers screening for and recommending adult vaccines	Vaccination is not always integrated into adult health care, and providers vary in the extent to which they screen adults to determine if a vaccine is recommended, as well as refer them elsewhere if the vaccine cannot be administered on site.	Multiple studies have demonstrated the importance of provider recommendations in predicting vaccine receipt. However, the adult vaccine recommendations are complex and providers may be unaware of or unclear about some vaccine recommendations. Certain practices, such as automatic reminders in electronic health records, help improve the likelihood that providers will screen for and recommend vaccines.
Providers stocking and administering adult vaccines	Providers may not stock some or all adult vaccines for a variety of reasons including low volume of vaccines administered, high storage and handling costs, and insufficient or complex reimbursement.	If providers recommend a vaccine, but are not able to administer it, individuals may not follow up to get vaccinated elsewhere. This can be a particular issue for certain vaccines, such as the shingles vaccine, which many physicians do not stock. A further complication is that some state Medicaid programs and private insurance plans may not cover the cost of vaccines provided by pharmacies, where adults also access vaccines. In such situations, adults may decline vaccines recommended by pharmacists.
Adults' use of health care services	Adults' use of health care services is often dispersed across different types of providers, including subspecialists, such as cardiologists or endocrinologists.	Primary care providers are more likely to screen for vaccines compared with other specialists and subspecialists. However, adults may not always see primary care providers for care.
Capture of adult data in state immunization information systems	States' immunization information systems vary widely in the extent to which they capture adult vaccination data. This is due to variation in system requirements, such as whether providers must report adult data and whether the state shares immunization data with other states.	Without complete immunization information system data, providers may not be able to access vaccination histories for new or current patients, which could lead to both under and over vaccination. Additionally, states may have more difficulty targeting funding to areas where vaccination gaps exist.

Source: GAO summary of stakeholder interviews. | GAO-22-105334

Note: The 13 stakeholders represented a range of perspectives on adult vaccination, including organizations that represent providers, consumers, and vaccine manufacturers; organizations that focus on health policy or vaccine-specific issues; and researchers.

Beyond the factors identified as specifically affecting adult vaccination rates, stakeholders sometimes cited other factors—such as public awareness of vaccine recommendations, confidence in the safety and efficacy of vaccines, and equitable access to vaccinations—that may affect vaccination rates for all age groups, including adults.

- **Public awareness of vaccine recommendations:** Stakeholders said that adults may not always be aware of vaccine recommendations for their age group, or information may not be conveyed effectively. In particular, they said vaccine messaging has not always been effectively targeted to different adult age groups—such as young adults versus seniors—and has not always been provided through different mediums to accommodate different communication styles (e.g., fact sheets compared with television advertisements).
- **Vaccine confidence:** Stakeholders said some adults may decide not to get a vaccine, because they do not have confidence in its safety or efficacy. They noted that while vaccine confidence can be increased through education, some individuals will still decide to forego vaccination. Stakeholders also noted mixed effects from the COVID-19 pandemic on vaccine confidence. For example, while the pandemic has led to an increased focus on the importance of vaccines, hesitancy around COVID-19 vaccines could spill over to other vaccines. A 2021 survey by the American Academy of Family Physicians found that most adults age 18 and older expressed either no change or an increase in vaccine confidence since the start of the pandemic; around 20 percent of respondents reported a decrease in confidence.[31]
- **Vaccine equity:** Stakeholders said that unequal access to vaccines can also affect vaccination rates, and that a number of factors can contribute to vaccine inequity. For example, social determinants of health—which can include circumstances such as income, job benefits, and proximity to health care services—can affect whether an individual of any age receives recommended vaccines. One stakeholder noted that adults may be less likely to travel long distances to get vaccines for themselves compared with their children. Another stakeholder said some adult populations, such as lower income seniors, may face particular challenges with issues such as transportation. Additionally, we have previously reported on the role racial and ethnic discrimination plays in access to health care, and stakeholders noted similar effects to vaccine receipt.[32] One stakeholder cited a recent study that found that among Medicare beneficiaries who had been vaccinated for flu, Hispanic or Latino,

[31]See American Academy of Family Physicians, “Surveying the Effect of the COVID-19 Pandemic on Public Confidence in Vaccines and Vaccine Messengers: Lessons Learned and Challenges Ahead” (2021).

[32]See, for example, GAO, *Health Care Capsule: Racial and Ethnic Health Disparities*, GAO-21-105354 (Washington, D.C.: Sept. 23, 2021).

Black or African American, and Asian beneficiaries were 26 to 32 percent less likely to receive the high dose flu vaccine compared with White beneficiaries, despite its demonstrated clinical benefit for seniors.[33] The stakeholder said this finding was particularly notable, because the analysis accounted for other factors that could affect vaccine receipt, such as region of the country, income, chronic conditions, and health care use.

Forty-Five States Offered Free Vaccines to Certain Adults; Scope of Programs Varied

Our review of information on states' immunization programs found that 45 states had programs offering free vaccines to certain adults, in part, by using Section 317 grant funds. While vaccines were offered for free, many states reported that providers could charge an administration fee for the vaccine—ranging from $10 up to $25, depending on the state—but generally specified that individuals could not be turned away due to an inability to pay. The remaining six states—Alabama, Connecticut, Hawaii, Idaho, Kansas, and Maryland—did not have adult vaccine programs, though these states reported providing free vaccines periodically, such as during outbreaks of vaccine-preventable diseases. Officials from most of the states said their states would consider implementing an adult vaccine program if they had adequate funding. Additionally, officials from one state, Kansas, indicated the state was in the process of developing an adult vaccine program.[34]

The scope of the 45 states' adult vaccine programs varied widely, from two states—Iowa and Nevada—which each offered two vaccines to high-risk adult groups, to Vermont, which offered all recommended vaccines to all adults aged 19 through 64. Specifically, we found the following variation across states:

- **Number of vaccines offered:** Fifteen of the 45 states offered all 12 recommended vaccines for adults included in our analysis. The number of vaccines offered by the remaining states ranged from one vaccine to 11 vaccines. Among the 45 states, the Td and Tdap

[33]Salaheddin M. Mahmud et al., "Effect of Race and Ethnicity on Influenza Vaccine Uptake among Older U.S. Medicare Beneficiaries: A Record-Linkage Cohort Study," *The Lancet Healthy Longevity,* vol. 2, issue 3 (March 2021): e143–53. In June 2022, ACIP voted to preferentially recommend high dose flu vaccines for adults aged 65 years or older based on evidence that they are potentially more effective than standard dose flu vaccines. Previously the choice of which type of vaccine to administer to this age group was made by the individual and their health-care provider.

[34]Kansas officials said the state was developing an adult vaccine program, but that it would initially focus on education and monitoring, with limited free vaccines.

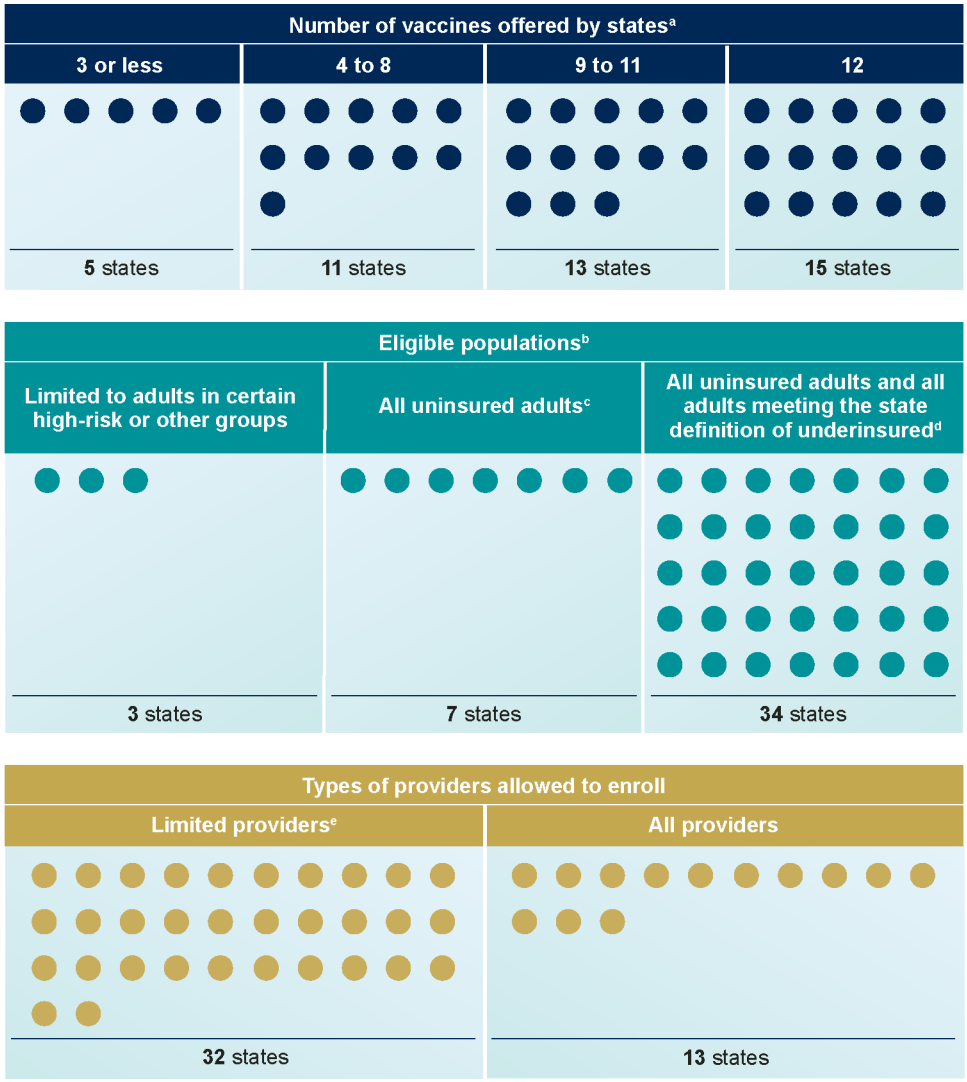
vaccines, and hepatitis A and B vaccines were most frequently offered. The shingles vaccine and meningococcal vaccines were most frequently not offered.

- **Eligible populations:** Forty-one states offered vaccines to all uninsured adults. Thirty-six of these 41 states also offered them to additional populations, primarily all adults who met the state's definition of underinsured.[35] Of the remaining four states, two limited eligibility to adults at high risk for vaccine-preventable diseases, such as those at high risk for hepatitis A and B, one offered vaccines to privately insured adults and uninsured adults whose providers opted-in to the program, and one did not provide eligibility information.
- **Providers enrolled:** Thirty-two of the 45 states limited the types of providers that could enroll in their adult vaccine programs. Some states limited provider enrollment to public health departments, while other states specified additional providers that could enroll, such as Federally Qualified Health Centers. The remaining 13 states did not limit the provider types that could enroll in their programs. (See fig. 6.) (See app. III for additional information on states' adult vaccine programs.)

[35]Most states defined an underinsured adult as a person who has health insurance, but whose coverage did not include vaccines or included only selected vaccines. Some states included additional populations in their definition of underinsured adults, such as adults whose insurance capped vaccine coverage at a certain dollar amount.

Outside of the underinsured, nine states offered vaccines to other populations, including all adults at risk for hepatitis A or B or all adults for certain vaccines. Two of the states offered vaccines to adults more broadly, such as all adults aged 19 through 64 for all vaccines offered.

Figure 6: Characteristics of 45 State Programs Offering Free Vaccines to Certain Adults



Source: GAO analysis of state adult vaccine program information collected from December 2021 through July 2022. | GAO-22-105334

[a]Our analysis of vaccines offered included Advisory Committee on Immunization Practices recommended vaccines for which the Centers for Disease Control and Prevention has a contracted price. Additionally, in counting the number of vaccines, we grouped vaccines that can be used to treat the same disease, and differentiated types of pneumococcal vaccines due to the recommended practices. This resulted in a total of 12 vaccines for our analysis: (1) hepatitis A; (2) hepatitis B; (3) human papillomavirus; (4) flu; (5) measles, mumps, rubella; (6) meningococcal A,C,W,Y; (7) meningococcal B; (8) pneumococcal conjugate; (9) pneumococcal polysaccharide; (10) tetanus and diphtheria/ tetanus, diphtheria, and acellular pertussis; (11) varicella; and (12) shingles. Ohio did not provide information on the number of vaccines offered, thus the number of states for this section totals 44 states.

[b]Ohio did not provide eligibility information, thus the number of states for this section totals 44 states.

[c]Two of these states also offered vaccines to additional populations.

[d]The definition of underinsured varied by state. Most states defined an underinsured adult as a person who has health insurance, but whose coverage did not include vaccines or included only selected vaccines. Some states included additional populations in their definitions of underinsured adults, such as adults whose insurance capped vaccine coverage at a certain dollar amount. Seven of these states also offered vaccines to additional populations.

[e]Some states limited provider enrollment to public health departments, while other states specified additional providers that could enroll, such as Federally Qualified Health Centers.

In the six states we selected for a more in-depth review, the scope of the adult vaccine programs also varied, due, in part, to how these states funded their programs. Three selected states—Florida, South Carolina, and Washington—relied exclusively on Section 317 funding to finance their vaccine programs. Outside of any funds needed to respond to disease outbreaks, officials in these three states reported using all remaining Section 317 funding for their adult vaccine program, but had to limit program scope to ensure they could meet demand. For example:

- South Carolina offered 10 ACIP-recommended adult vaccines, but limited eligible providers to public health departments. State officials said that additional funding could allow them to expand participation to other providers, such as Federally Qualified Heath Centers.[36]
- Washington allowed any provider to participate, but limited coverage to seven ACIP-recommended vaccines. State officials noted that despite limiting the types of vaccines, funding was not always sufficient to meet demand.[37] In such cases, the program had to adjust the number of vaccines providers received—such as providing 300 doses to a provider that requested 500 doses.

The remaining three selected states used multiple funding sources, including Section 317 funding, to finance their vaccine programs. In two of these states—Michigan and New York—state funds accounted for about 20 percent and 50 percent of total program spending, respectively. The third state, Vermont, imposes an assessment on certain entities, including health insurers, which accounted for 95 percent of the funding for

[36]Federally Qualified Health Centers are community-based health care providers that receive federal funds to provide primary care services in underserved areas.

[37]Washington officials explained that CDC offers opportunities to request additional Section 317 funding, and that while the state usually requests more funding to meet providers' demand for vaccines, it has not always received additional funds. They explained that CDC is able to provide states with additional funding, but it is dependent on other states' use of their allocated funding amounts.

purchasing vaccines through the program.[38] Officials from these states also cited program limitations. For example:

- Michigan officials said that additional funding for the program would allow them to offer more vaccines and enroll additional providers, such as private providers and rural health clinics, both of which are not currently eligible to participate in Michigan's program. They also said they would like to enroll pharmacies, because adults frequently use pharmacies to obtain vaccines, particularly in rural areas where they may be the only vaccine provider in close proximity.
- Vermont officials noted the health insurance assessment has provided funds, which has allowed them to offer free vaccines to all adults aged 19 through 64. However, the state has struggled to enroll providers, particularly pharmacies. The lack of provider participation has limited the reach of the state's program.

Officials from selected states noted initiatives aimed at improving the reach of their adult vaccine programs, and vaccination rates among adults, generally. For example, officials from most of the selected states told us they offer various provider and patient education and resources, such as South Carolina, which has an immunization newsletter and a map to help patients locate enrolled providers. State officials also reported undertaking additional efforts:

- Florida recently added efforts to increase flu vaccination rates—including for adults—to its State Health Improvement Plan.[39] State officials said they plan to work with providers to improve related data in the state's immunization information system, because the state would like to use this system to track changes in flu vaccination rates.
- Michigan, Vermont, and Washington officials coordinate with their states' Medicaid programs to improve adult vaccination rates. For example, Michigan officials noted that they work with state Medicaid

[38]Under the Vermont Vaccine Purchasing Program, health insurers, among others, must pay a fee to the state based on the number of lives each insurer covers. State officials said that, because Medicare does not pay the assessment, adults age 65 and over are not included in the state's adult vaccine program.

[39]Florida's State Health Improvement Plan sets out goals for Florida's public health system. The flu vaccine objective aims to increase the percentage of state residents aged 6 months and older who receive an annual flu vaccine from 25.4 percent (2021) to 40 percent by the end of 2026. See Florida Department of Health, Health Improvement Planning Team, Division of Public Health Statistics and Performance Management, "Goals and Objectives: 2022-2026 Florida State Health Improvement Plan," accessed August 1, 2022, https://floridaship.org/meetings-and-reports/.

officials when ACIP recommends coverage of new vaccines in an effort to expedite Medicaid's coverage of them.

- New York officials said the state contracted with local health departments to conduct efforts related to adult vaccination, including meeting with providers who offer adult vaccines to encourage them to incorporate vaccinations into patients' office visits. Officials said these efforts were paused due to the strain of the pandemic on local health departments, but they hoped to resume them soon.
- Vermont officials said the state used COVID-19 funding to hire an additional staff person to develop a quality measurement program aimed at increasing the extent to which providers offer vaccines to adults and participate in their program. Other selected states, as well as some of the stakeholders we interviewed, noted that partnerships between immunization programs and providers were key to successful vaccine programs.

Our selected states faced challenges evaluating the effectiveness of their adult vaccine programs. For example, officials from Michigan, New York, and Washington tracked the number of vaccines administered through their program, but said that this effort did not help them identify the number of eligible adults they did not reach. Michigan and Washington officials said that they did not have the resources to conduct this type of evaluation, and New York officials said they would like to use their states' immunization information system data to do so, but that adult data are incomplete, which makes using it for program evaluations challenging.[40] South Carolina officials also noted data challenges and said that until recently, evaluations had been hindered by issues with the state's immunization information system, but that the state had just completed a system modernization, which could make evaluations easier. However, these officials, as well as officials from Florida, said their states had not yet evaluated the effectiveness of their programs.

[40]Florida, Michigan, New York, and Washington officials told us that their states do not require providers to report adult vaccinations to their respective immunization information systems. Florida and New York said that this limited completeness of such data, while Michigan and Washington officials said that their adult data were still relatively complete. Despite requiring providers to report adult data, Vermont officials said the state's immunization information system does not include a field for payment source, which means the state is unable to identify adult vaccinations provided through its program. However, these officials said they track adult vaccination rates generally and that they have gone up since the program's establishment.

HHS Efforts to Improve Adult Vaccination Rates

Our review of HHS documentation and interviews with HHS officials shows that the department's efforts aimed at improving adult vaccination rates included setting goals that support adult vaccination, increasing public and provider awareness about adult vaccines, and establishing partnerships with various organizations, among other initiatives.

- **Setting goals and recommendations:** HHS set goals that support adult vaccination and outlined activities to achieve those goals. For example, in 2021, HHS released the Vaccines National Strategic Plan, which builds on its previous strategic plans, and includes goals to increase confidence in recommended routine vaccines and to improve access to those vaccines.[41] The plan also includes strategies to achieve those goals, such as expanding the availability of free vaccines for uninsured adults and promoting the use of payment incentives by health plans and others for providers who meet adult vaccination quality measures.[42] HHS has also made recommendations to increase adult vaccination rates. For example, the department's National Vaccine Advisory Committee released Standards for Adult Immunization Practice, which recommends all providers take steps to help ensure their adult patients are fully vaccinated. One such step is assessing the vaccination status of all patients at each clinical encounter.[43]
- **Increasing public and provider awareness:** HHS provided educational information to the public and providers about adult vaccines through various platforms, such as its website, social media, and newsletters. For example, HHS posted the *Catch-Up to Get Ahead Toolkit* on its website, which provides social media content and

[41]See Department of Health and Human Services, Office of Infectious Disease and HIV/AIDS Policy, Office of the Assistant Secretary for Health, *Vaccines National Strategic Plan 2021–2025* (Washington, D.C.: Jan. 19, 2021). In contrast to HHS's previous strategic plans, the current plan covers vaccination for all ages, has a 5-year time frame instead of a 10-year time frame, and includes indicators to measure progress.

[42]HHS is in the process of developing an implementation plan, which outlines specific federal agency actions to achieve the goals and strategies included in the strategic plan. HHS anticipates publishing the final version of the implementation plan in late summer of 2022.

[43]See the National Vaccine Advisory Committee, "Update on the National Vaccine Advisory Committee Standards for Adult Immunization," (September 2013). For additional Committee recommendations, see Department of Health and Human Services, Office of Infectious Disease and HIV/AIDS Policy, "Reports & Recommendations" (August 23, 2021), accessed June 10, 2022, https://www.hhs.gov/vaccines/nvac/reports-and-recommendations/index.html.

suggested language that organizations can adopt, in an effort to ensure individuals remain up to date on routine vaccinations throughout the COVID-19 pandemic.[44] HHS has designated August as National Immunization Awareness Month, during which it shares resources with the public to highlight the importance of vaccination. HHS also has efforts targeted to specific vaccines, particularly the flu vaccine. According to HHS, on an annual basis, the Office of Infectious Disease and HIV/AIDS Policy, within the Office of the Assistant Secretary for Health, works with CDC and other partners to address gaps in flu communication and to coordinate communication efforts. In addition, CMS told us it performs flu vaccine outreach in the Medicare program, with a focus on underserved and vulnerable populations, and engaged in over 700 events from September 2020 to January 2021 in which promoting the flu vaccine was a key message. HHS has also launched campaigns for other vaccines, such as the *HPV VAX NOW* campaign, which aims to improve HPV vaccination rates among young adults.[45] (See fig. 7.)

- **Partnering with and providing funding to other organizations:** HHS partnered with a number of organizations to address issues related to adult vaccination. For example, CDC launched the Partnering for Vaccine Equity program in 2020. According to information included on its website, by October 2021, CDC had provided over $156 million in funding and support through this program to national, state, and community-level partners who prioritize equity in adult vaccination, including efforts to reduce racial and ethnic disparities. In another example, according to the Federal Register, in 2021, CDC awarded about $26 million to the Council of Medical Specialty Societies and the Society for Post-Acute and Long-Term Care Medicine to work on encouraging subspecialty providers to use the National Vaccine Advisory Committee's Standards for Adult

[44]See Department of Health and Human Services, Office of Infectious Disease and HIV/AIDS Policy, *Catch-Up to Get Ahead Toolkit* (Aug. 24, 2021), accessed June 10, 2022, https://www.hhs.gov/immunization/catch-up/index.html.

[45]HHS's *HPV VAX NOW* campaign is focused on increasing HPV vaccination rates among adults aged 18 through 26 living in Mississippi, South Carolina, and Texas. See Department of Health and Human Services, Office on Women's Health, *HPV VAX NOW* (July 9, 2021), accessed June 10, 2022, https://www.womenshealth.gov/about-us/what-we-do/programs-and-activities/hpv-vaxnow-campaign.

Immunization Practice.[46] HHS's Office of Infectious Disease and HIV/AIDS Policy also worked with the American Medical Group Association on its Rise to Immunize campaign, an initiative of medical groups and health systems to administer 25 million adult vaccines by 2025.

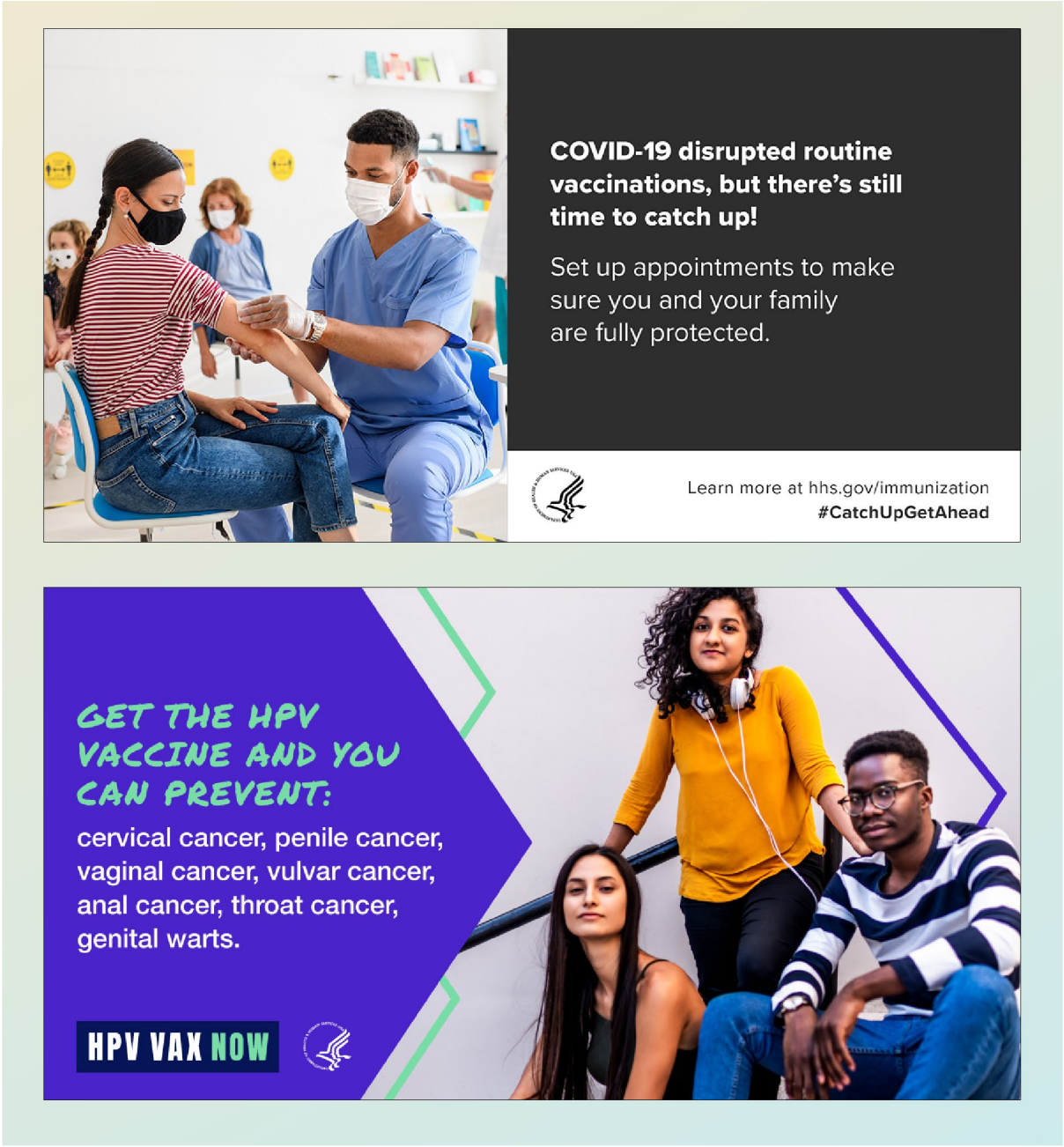
- **Program-specific efforts:** HHS has taken steps aimed at improving adult vaccination rates within the federal health insurance programs it administers. For example, CMS increased Medicare Part B payment rates for administering the hepatitis B, flu, and pneumococcal vaccines beginning in 2022 from $17 to $30 per dose.[47] CMS has also included some vaccine related quality measures in both Medicare and Medicaid. For example, CMS provides bonus payments to certain Medicare Part C plans based, in part, on the percentage of a plan's membership who received the flu vaccine. Regarding Medicaid, CMS included the quality measure Flu Vaccination for Adults ages 18 to 64 in the Medicaid Adult Core Set.[48]

[46]The Council of Medical Specialty Societies is an independent forum for medical specialists to discuss issues of national interest and mutual concern. The Society for Post-Acute and Long-Term Care Medicine represents over 50,000 medical directors, physicians, nurse practitioners, physician assistants, and other practitioners working in the various post-acute and long-term care settings.

[47]See 86 Fed. Reg. 64,996, 65,185 (Nov. 19, 2021).

[48]The Adult Core Set includes measures related to primary and preventive care, behavioral health care, and patients' experience of care. One goal of the core set is to facilitate states' reporting of a standardized set of quality measures, which states can in turn use to improve quality of care.

Figure 7: Examples of Information about Adult Vaccines on the Department of Health and Human Services' Website



Source: Department of Health and Human Services. | GAO-22-105334

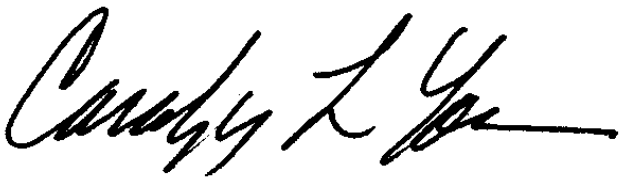
Stakeholders from one organization we interviewed said that it is too soon to know how HHS's more recent initiatives will affect adult vaccination rates. Other stakeholders told us that adult immunization funding has historically been insufficient, which HHS officials also noted. Most recently, in its fiscal year 2023 budget request, HHS asked Congress for funds to establish a Vaccines for Adults program, similar to the Vaccines for Children program, which would provide routine and COVID-19 vaccinations to uninsured adults free of charge. HHS officials said that this program would build on the investments made in response to the COVID-19 pandemic and fill an important gap in the public health infrastructure. Moving forward, several stakeholders also highlighted the effectiveness of strategies for improving adult vaccination rates used during the pandemic, such as mandatory reporting of adult vaccinations to immunization information systems, diversifying adult vaccine access points, and involving community members in solutions.

Agency Comments

We provided a draft of this report to the Department of Health and Human Services for comment. The department provided technical comments, which we incorporated as appropriate.

As agreed with your offices, unless you publically announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the Secretary of the Department of Health and Human Services and other interested parties. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-7114 or yocomc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.



Carolyn L. Yocom
Director, Health Care

List of Requesters

The Honorable Rosa L. DeLauro
Chair
Subcommittee on Labor, Health and Human Services, Education, and Related Agencies
Committee on Appropriations
House of Representatives

The Honorable Alma S. Adams, Ph.D.
House of Representatives

The Honorable André Carson
House of Representatives

The Honorable David N. Cicilline
House of Representatives

The Honorable Steve Cohen
House of Representatives

The Honorable Jim Cooper
House of Representatives

The Honorable Mark DeSaulnier
House of Representatives

The Honorable Ruben Gallego
House of Representatives

The Honorable Jahana Hayes
House of Representatives

The Honorable Eddie Bernice Johnson
House of Representatives

The Honorable Henry C. “Hank” Johnson, Jr.
House of Representatives

The Honorable Ro Khanna
House of Representatives

The Honorable Ann McLane Kuster
House of Representatives

The Honorable Al Lawson
House of Representatives

The Honorable Sheila Jackson Lee
House of Representatives

The Honorable Betty McCollum
House of Representatives

The Honorable Eleanor Holmes Norton
House of Representatives

The Honorable Katie Porter
House of Representatives

The Honorable Jamie Raskin
House of Representatives

The Honorable Lisa Blunt Rochester
House of Representatives

The Honorable Lucille Roybal-Allard
House of Representatives

The Honorable John P. Sarbanes
House of Representatives

The Honorable Mary Gay Scanlon
House of Representatives

The Honorable Jan Schakowsky
House of Representatives

The Honorable Kim Schrier, M.D.
House of Representatives

The Honorable Terri A. Sewell
House of Representatives

The Honorable Eleanor Thomas R. Suozzi
House of Representatives

The Honorable Mark Takano
House of Representatives

The Honorable David Trone
House of Representatives

The Honorable Lauren Underwood
House of Representatives

The Honorable Nydia M. Velázquez
House of Representatives

Appendix I: Information on Child and Adolescent Vaccination Rates

The child and adolescent vaccination rates presented in this appendix are from three Centers for Disease Control and Prevention (CDC) reports based on data from 2018 to 2020.[1] When needed, we supplemented these data with CDC Child, School, and Flu VaxView data, which provides vaccination data for individuals 17 years and younger, and are publicly available on CDC's website.[2] Details of our methodology are at the end of this appendix.

CDC's estimated national average vaccination rates for children were generally high—around 90 percent for having started a vaccine series—and were similarly high for two of five adolescent vaccines.[3] Estimated rates for being up to date on vaccines that can require multiple doses by 24 months or during adolescence were often lower; kindergarteners generally received all recommended doses required by their state for kindergarten enrollment. Across vaccines and age groups, many states had an estimated vaccination rate that fell within 5 points of the estimated national average.

Children at Age 24 Months

CDC's estimated national average vaccination rates for children at 24 months of age were around 90 percent for having started a vaccine series, with the exception of the hepatitis B birth dose vaccine and

[1]Vaccination estimates for children at age 24 months, and for teens 13 to17 years of age are based on CDC's National Immunization Surveys. See Centers for Disease Control and Prevention, "Vaccination Coverage by Age 24 Months Among Children Born in 2017 and 2018, United States, 2018-2020," *Morbidity and Mortality Weekly Report,* vol. 70, no. 41 (Oct. 15, 2021); and Centers for Disease Control and Prevention, "National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years, United States, 2020," *Morbidity and Mortality Weekly Report,* vol. 70, no. 35 (Sept. 3, 2021). Estimates for children enrolled in kindergarten are based on data CDC compiles from state reports. See Centers for Disease Control and Prevention, "Vaccination Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten, United States, 2019–20 School Year," *Morbidity and Mortality Weekly Report,* vol. 70, no. 3 (Jan. 22, 2021). These reports were the most recent available at the time we conducted our work.

[2]For more information on CDC VaxView, see Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, VaxView (October 6, 2016), accessed June 8, 2022, https://www.cdc.gov/vaccines/vaxview/index.html. While CDC's Advisory Committee on Immunization Practice (ACIP) recommends COVID-19 vaccines for everyone aged 6 months and older, as of August 2022, COVID-19 vaccines were not included in CDC's Child and Adolescent Immunization Schedule; rather, they were recommended within the scope of the Emergency Use Authorization or Biologics License Application for the particular vaccine.

[3]To be considered fully vaccinated, some vaccines require multiple doses. For our purposes, having started a vaccine series refers to having had at least the first dose of a series, but not being up to date on the series.

rotavirus vaccine, which had estimated rates of 78 percent and 76 percent, respectively. The estimated rate for the influenza (flu) vaccine was the lowest at 61 percent. For any given vaccine, most states had an estimated vaccination rate that fell within 5 percentage points of the estimated national average vaccination rate, with the exception of the flu vaccine. For that vaccine, 19 states fell within 5 percentage points of the national average. Additionally, the difference between the state with the highest and lowest estimated vaccination rate for the flu vaccine was about 43 percentage points, at least 15 percentage points more than the difference for any other vaccine. (See table 4.)

Table 4. Estimated National Average and State Range in Vaccination Rates for Children at 24 Months of Age, 2018 to 2020

	National average	State minimum	State maximum	Number of states within 5 percentage points of national average[a]
Diphtheria, tetanus, and acellular pertussis				
≥ 3 doses	93.7	89.6	97.1	51
≥ 4 doses (up to date)	81.6	71.8	89.1	41
Haemophilus influenzae type b				
≥ 2 doses	92.9	88.6	97.0	51
≥ 3 doses (up to date)	80.2	75.0	90.5	43
Hepatitis A				
≥ 1 dose	87.0	72.5	93.2	43
≥ 2 doses (up to date) (by 35 months)	77.7	60.8	88.7	34[b]
Hepatitis B				
Birth dose	78.4	62.2	88.5	41
≥ 3 doses (up to date)	91.9	88.0	96.8	51
Influenza (flu) ≥ 2 doses (up to date)	60.6	37.7	80.2	19
Measles, mumps, and rubella ≥ 1 dose (up to date)	91.6	85.6	96.4	50
Pneumococcal				
≥ 3 doses	92.4	85.8	96.9	50
≥ 4 doses (up to date)	82.3	74.7	92.6	45
Poliovirus ≥3 doses (up to date)	92.7	88.3	96.8	51
Rotavirus ≥ 2 doses (up to date) (by 8 months)	75.6	62.5	87.7	41
Varicella ≥ 1 dose (up to date)	90.9	82.7	95.2	50

Source: GAO analysis of Centers for Disease Control and Prevention (CDC), Vaccination Coverage by Age 24 Months Among Children Born in 2017 and 2018 – National Immunization Survey-Child, United States, 2018 to 2020, *Morbidity and Mortality Weekly Report*, vol. 70, no. 41 (Oct. 15, 2021); and CDC's Child VaxView. | GAO-22-105334

Note: Vaccination rates are presented as a percent estimate.

[a]For purposes of this table, we consider the District of Columbia to be a state.

[b]Estimated vaccination rates were not available for two states.

Kindergarteners

By kindergarten, nearly all children received the recommended doses of vaccine series required by their state for kindergarten enrollment, where data were available.[4] Across vaccines, estimated national average vaccination rates were around 95 percent, and most states had estimated rates that were concentrated around CDC's estimated national average. (See table 5.)

Table 5. Estimated National Average and State Range in Vaccination Rates for Select Vaccines for Kindergarteners, 2019 to 2020 School Year

	National average	State minimum	State maximum	Number of states within 5 percentage points of national average[a]
Diphtheria, tetanus, and acellular pertussis ≥ 5 doses (up to date)	94.9	84.0	99.1[d]	47[b]
Hepatitis B	96.1	91.3	99.7	45[c]
Measles, mumps, and rubella ≥ 2 doses (up to date)	95.2	86.6[d]	99.1[d]	48[b]
Polio ≥ 4 doses (up to date)	95.0	86.6	99.1	46[b]
Varicella ≥ 2 doses (up to date)	94.8	85.6	99.1[d]	47[b]

Source: GAO analysis of Centers for Disease Control and Prevention (CDC), "Vaccination Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten — United States, 2019–20 School Year," *Morbidity and Mortality Weekly Report*, vol. 70, no. 3 (Jan. 22, 2021); and CDC's School VaxView. | GAO-22-105334

Notes: CDC's Advisory Committee on Immunization Practice (ACIP) recommends that the hepatitis B vaccine series is complete prior to kindergarten. Data on other vaccines ACIP recommends are complete prior to kindergarten, as well as the influenza (flu) vaccine, which ACIP recommends for children annually, were not available. Vaccination rates are presented as a percent estimate.

[a]For the purposes of this table, we consider the District of Columbia to be a state.

[b]Estimated vaccination rates were not available for three states.

[c]Estimated vaccination rates were not available for six states.

[d]State did not assess coverage for individual vaccines, but instead considered kindergartners up to date only if they had received all doses of all vaccines required for school entry.

Adolescents

The estimated national average vaccination rates for adolescents were around 90 percent for having at least one dose of the meningococcal or tetanus, diphtheria, and acellular pertussis (Tdap) vaccine, and 75 percent for the human papillomavirus (HPV) vaccine. Estimated rates for the annual flu and meningococcal B vaccine—which is only recommended for certain adolescents—were lower, at 53 percent and 28

[4]Six states did not report vaccination rates for hepatitis B, and three states did not report vaccination rates for any of the other vaccines.

percent, respectively.[5] For most vaccines, about half of the states had an estimated vaccination rate that fell within 5 percentage points of the estimated national average rate, and the difference between the states with the highest and lowest estimated vaccination rates were at least 32 percentage points. The exception was Tdap for which nearly all states were within 5 percentage points of the national average and the difference between the state with the highest and lowest estimated vaccination rate was 12 percentage points. (See table 6.)

Table 6. Estimated National Average and State Range in Vaccination Rates for Adolescents, 13 through 17 Years of Age, 2020

	National average	State minimum	State maximum	Number of states within 5 percentage points of national average[a]
Human papillomavirus (HPV)[b]				
≥ 1 dose	75.1	55.2	93.0	31
≥ 3 doses (up to date)	58.6	31.9	83.0	21
Flu (annual)[c]	53.3	39.9	72.1	25
Meningococcal[d]				
≥ 1 dose	89.3	63.5	96.4	33
≥ 2 doses (up to date)	54.4	—	—	—
Meningococcal B ≥ 1 dose[e]	28.4	—	—	—
Tetanus, diphtheria, and acellular pertussis (Tdap) ≥ 1 dose (up to date)[f]	90.1	83.7	95.2	47

Source: GAO analysis of Centers for Disease Control and Prevention (CDC), "National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years — United States, 2020," *Morbidity and Mortality Weekly Report*, vol. 70, no. 35 (Sept. 3, 2021); and CDC's Flu VaxView. | GAO-22-105334

Notes: We summarized vaccinations rates for vaccines that CDC's Advisory Committee on Immunization Practice (ACIP) recommends starting in adolescence, and influenza (flu), which ACIP recommends annually. We did not include information on vaccines that ACIP recommends be complete prior to adolescence. Vaccination rates are presented as a percent estimate.

[a]For the purposes of this table, we consider the District of Columbia to be a state.

[b]ACIP recommends the first dose at 11 to 12 years of age. Individuals vaccinated with two doses when the first HPV vaccine dose was initiated before 15 years of age and there was at least 5 months between the first and second dose are considered up-to-date on the series.

[c]We obtained flu vaccination data from CDC's Flu VaxView, 2019-2020 end of season (May).

[d]ACIP recommends the first dose at 11 to 12 years of age; because the second dose is recommended at 16 years of age, this percentage is calculated among 17 year olds.

[5]ACIP does not recommend the serogroup B meningococcal vaccine for all adolescents. ACIP recommends that adolescents aged 10 years and older at increased risk receive a vaccine. Adolescents aged 16 through 18 years old who are not at increased risk may receive a serogroup B meningococcal vaccine.

[e]ACIP does not recommend the serogroup B meningococcal vaccine for all adolescents. ACIP recommends that adolescents aged 10 years and older at increased risk receive a vaccine.

[f]ACIP recommends a dose at 11 to 12 years of age.

We also reviewed information on vaccination rates for children at age 24 months and adolescents ages 13 to 17 and identified variation in these rates for certain factors.[6] For example:

- Children at age 24 months and adolescents with private health insurance generally had higher vaccination rates compared with those who had Medicaid or who were uninsured, with the largest differences being for those who were uninsured. One exception was that adolescents with Medicaid had higher vaccination rates for the HPV vaccine compared with adolescents with private insurance.
- White children at age 24 months and adolescents generally had higher vaccination rates compared with other racial and ethnic groups. Two exceptions were (1) Asian children, who generally had higher vaccination rates overall compared with White children; and (2) White adolescents, who generally had lower vaccination rates compared with all other groups for the HPV vaccine. Differences in vaccination rates—when statistically significant—were generally less than 10 percentage points. However, there were a few exceptions with the largest being for the flu vaccine, where the vaccination rate for White children was more than 20 percentage points higher than for Black or African American children.
- Children at age 24 months and adolescents living in a metropolitan statistical area had higher vaccination rates compared with their respective counterparts living outside of these areas.[7] These differences were most pronounced for the flu vaccine at age 24 months, and for the HPV vaccine for adolescents.

[6]CDC did not analyze kindergarten data by these or other factors, thus it is not included here. For additional information on variation in estimated vaccination rates for children and adolescents included in the reports we reviewed, see Centers for Disease Control and Prevention, “Vaccination Coverage by Age 24 Months Among Children Born in 2017 and 2018, United States, 2018-2020”; and Centers for Disease Control and Prevention, “Adolescents: National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years, United States, 2020.”

[7]A metropolitan statistical area is a group of counties that contain at least one urbanized area of 50,000 or more inhabitants. For more information, see Centers for Disease Control and Prevention, *SMART: BRFSS Frequently Asked Questions (FAQs)* (Feb. 11, 2019), accessed July 1, 2022, https://www.cdc.gov/brfss/smart/smart_faq.htm.

Methodology

To describe child and adolescent vaccination rates, we summarized three CDC reports based on data from 2018 to 2020 that provide estimated vaccination rates for (1) all recommended vaccines for children at age 24 months; (2) vaccines required by states for children enrolled in kindergarten; and (3) all vaccines recommended starting in adolescence for 13 to 17 year olds, as well as the flu vaccine.[8] When needed, we supplemented these data with CDC Child, School, and Flu VaxView data, which provides vaccination data for individuals 17 years and younger, and are publicly available on CDC's website.[9] Using CDC's estimates, we calculated ranges in vaccination rates across states and the number of states that fell within 5 percentage points of the national average rate. We also calculated the size of vaccination rate differences among certain groups of children, where CDC identified the differences as statistically significant.

To assess the reliability of the data we used, we interviewed relevant CDC officials and reviewed related documentation. On the basis of these steps, we determined that the data were sufficiently reliable for the purposes of our reporting objectives. While more recent data have shown

[8]Vaccination estimates for children at age 24 months, and for teens 13 to17 years of age are based on CDC's National Immunization Surveys. See Centers for Disease Control and Prevention, "Vaccination Coverage by Age 24 Months Among Children Born in 2017 and 2018, United States, 2018-2020"; and Centers for Disease Control and Prevention, "Adolescents: National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years, United States, 2020." Estimates for children enrolled in kindergarten are based on data CDC compiles from state reports. See Centers for Disease Control and Prevention, "Vaccination Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten, United States, 2019–20 School Year." These reports were the most recent available at the time we conducted our work.

ACIP recommends specified vaccines for children age 0 through 24 months and generally reports these vaccination rates at 24 months. However, for three of these vaccines, CDC estimated vaccination rates at different points in time. Specifically, CDC estimated hepatitis A at 35 months, rotavirus at 8 months, and a birth dose for hepatitis B.

Kindergarten vaccination data were limited to five vaccines generally required by states for kindergarten enrollment.

ACIP recommends the following vaccines to adolescents, starting at age 11 or 12 years: HPV; meningococcal; and Tdap. Additionally, CDC recommends the meningococcal B vaccine for certain adolescents starting at age 10 and the flu vaccine for all adolescents annually. However, CDC reports adolescent vaccination data for those aged 13 through 17 years.

[9]For more information on CDC VaxView, see Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, *VaxView* (October 6, 2016), accessed June 8, 2022, https://www.cdc.gov/vaccines/vaxview/index.html.

declines in child and adolescent vaccination rates following the start of the COVID-19 pandemic, the CDC reports we used noted that the data generally represented vaccination opportunities prior to when the pandemic started in 2020.[10]

[10]For example, subsequent to the completion of our analyses, CDC released a new report on kindergarten vaccination rates for the 2020-21 school year that identified a 1 percentage point rate decrease nationally from the prior year. Additionally, for some states, decreases were larger. For example, Maryland had a 10 percentage point decrease from the prior year for the measles, mumps, and rubella and varicella vaccines, and an 8 percentage point decrease for the diphtheria, tetanus, and pertussis vaccine. See Centers for Disease Control and Prevention, "Vaccination Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten — United States, 2020–21 School Year," *Morbidity and Mortality Weekly Report,* vol. 71, no. 16 (April 22, 2022).

Appendix II: National and State-Level Adult Vaccination Rates

Table 7: National and State-Level Vaccination Rates for Four Adult Vaccines, Listed High to Low

Flu (2020)		Pneumococcal (2020)		Shingles (2020)		Tetanus (2019)[a]	
National average	**46.3**	**National average**	**70.1**	**National average**	**31.6**	**National average**	**70.3**
State	**Rate**	**State**	**Rate**	**State**	**Rate**	**State**	**Rate**
Massachusetts	56.5	South Dakota	76.3	South Dakota	45.7	Minnesota	82.6
District of Columbia (D.C.)	55.7	Colorado	75.9	North Dakota	43.1	Vermont	82.4
Rhode Island	55.1	Wisconsin	75.3	Minnesota	40.3	New Hampshire	80.8
South Dakota	54.6	Nebraska	75.2	Washington	39.7	Iowa	80.6
Connecticut	54.0	Oklahoma	75.0	Vermont	39.4	Maine	80.2
Maine	53.6	Massachusetts	74.8	Iowa	39.3	Wisconsin	80.1
Vermont	53.4	Iowa	74.7	Utah	38.4	North Dakota	79.8
Nebraska	53.2	Washington	74.7	Hawaii	37.8	Colorado	78.2
New Hampshire	52.9	Maryland	74.6	Maine	37.7	South Dakota	78.2
Minnesota	51.4	New Hampshire	74.5	Nebraska	37.0	Washington	78.1
Iowa	51.2	West Virginia	74.5	Montana	37.0	Massachusetts	77.6
North Dakota	50.7	Utah	74.3	New Hampshire	36.8	Oregon	76.7
Virginia	50.7	Virginia	74.0	Wisconsin	36.3	Kansas	76.5
Washington	50.6	Tennessee	73.8	Colorado	36.1	Montana	75.5
Maryland	50.2	Rhode Island	73.6	Oregon	36.1	Nebraska	75.4
Pennsylvania	50.1	Kansas	73.5	Virginia	35.1	Missouri	75.4
North Carolina	49.8	North Carolina	73.4	Massachusetts	35.0	Virginia	75.2
Colorado	49.5	Indiana	73.1	D.C.	34.9	North Carolina	74.2
Illinois	49.4	Kentucky	72.7	Kansas	34.5	Utah	73.8
Wisconsin	48.9	Missouri	72.7	New Mexico	34.3	Michigan	73.1
Delaware	48.7	Maine	72.6	North Carolina	33.9	Wyoming	73.1
Utah	47.9	Vermont	72.3	Maryland	33.6	Rhode Island	73.0
Arkansas	47.8	South Carolina	72.3	California	33.5	Pennsylvania	72.9
Kansas	47.2	New Mexico	72.3	Arizona	33.5	Maryland	72.8
New York	47.2	Minnesota	72.1	Pennsylvania	33.4	Idaho	72.6
Oklahoma	47.0	Arizona	71.8	Alaska	33.1	Oklahoma	71.6
Hawaii	46.8	Michigan	71.7	Michigan	33.0	West Virginia	71.6
Missouri	46.7	Ohio	71.7	Idaho	32.4	New Mexico	71.5
Michigan	46.7	Pennsylvania	71.6	Connecticut	32.3	Kentucky	70.9
West Virginia	46.6	Delaware	71.4	Rhode Island	32.1	Alaska	70.7
Kentucky	46.5	Arkansas	71.4	Ohio	32.0	Ohio	70.4
California	46.3	Georgia	71.2	Texas	31.8	Delaware	70.3

Flu (2020)		Pneumococcal (2020)		Shingles (2020)		Tetanus (2019)[a]	
Oregon	46.2	Idaho	71.2	Wyoming	31.5	D.C.	70.2
New Mexico	46.2	Oregon	70.9	Missouri	31.3	Connecticut	69.7
Montana	46.1	Texas	70.8	West Virginia	31.3	South Carolina	69.4
Indiana	46.0	North Dakota	70.8	Kentucky	30.9	Indiana	68.7
New Jersey	45.8	Connecticut	70.8	South Carolina	29.7	Illinois	68.2
Ohio	45.2	Nevada	70.5	Indiana	29.2	Hawaii	66.8
South Carolina	43.8	Montana	70.4	Nevada	29.1	Arizona	66.8
Texas	43.4	D.C.	70.3	Georgia	28.8	Tennessee	66.6
Idaho	42.7	Louisiana	69.8	Delaware	28.6	Georgia	66.5
Tennessee	42.3	California	68.7	Oklahoma	28.2	Louisiana	66.1
Arizona	42.2	Wyoming	68.7	Arkansas	28.0	Texas	65.5
Alabama	42.2	Mississippi	66.4	Louisiana	27.8	Alabama	65.2
Louisiana	41.4	Alabama	66.2	Tennessee	27.7	New York	65.1
Wyoming	41.3	Alaska	64.6	Florida	27.3	Arkansas	64.5
Georgia	41.3	Florida	64.2	New York	26.9	Florida	62.6
Mississippi	41.3	Illinois	64.0	Illinois	26.7	Nevada	60.8
Alaska	39.6	New York	63.8	New Jersey	24.9	Mississippi	54.6
Nevada	38.1	New Jersey	62.1	Alabama	23.2		
Florida	38.1	Hawaii	61.9	Mississippi	20.1		

Source: GAO analysis of CDC Behavioral Risk Factor Surveillance System (BRFSS) data. | GAO-22-105334

Notes: We analyzed data for influenza (flu), pneumococcal, shingles, and tetanus vaccines, because those are the vaccines included in BRFSS. BRFSS asked about receipt of the vaccine in the last 12 months for flu, the last 10 years for tetanus, and whether it was ever received for shingles and pneumococcal. We defined vaccination rates as the percentage of adults who reported receiving a vaccine out of the adult population for which the vaccine is recommended: 18 years and older for flu and tetanus; 50 years and older for shingles; and 65 years and older for pneumococcal.

Estimated rates in this table all had a relative standard error of 6 percent or less. Relative standard error is the standard error divided by the estimate itself. According to the Centers for Disease Control and Prevention (CDC), estimates with a relative standard error of 30 percent or more do not have reliable precision.

[a]California and New Jersey are not included in our tetanus estimates, because they did not provide data on the vaccine for 2019.

Appendix III: Information on State Adult Vaccine Programs

Table 8 below includes information on programs in 45 states that provided free vaccines to certain adults. Six states (Alabama, Connecticut, Hawaii, Idaho, Kansas, and Maryland) did not have such programs.[1]

Table 8: Information on 45 State Programs Offering Free Vaccines to Certain Adults

	Eligible adult populations				
State	**All uninsured**	**All under-insured (state defined)[a]**	**Other populations**	**Number of vaccines offered[b]**	**All or limited providers can enroll[c]**
Alaska	×	×	Privately insured adults and uninsured adults whose providers opt-in	12	All
Arizona	√	√		12	Limited
Arkansas	√	√	All adults for the flu vaccine regardless of insurance status	1	Limited
California	√	√		10	Limited
Colorado	√	√		11	Limited
Delaware	√	×		11	Limited
District of Columbia	√	×		12	All
Florida	√	√		11	Limited
Georgia	√	√		12	Limited
Illinois	√	√		12	Limited
Indiana	√	√	High-risk adults for the hepatitis A and B vaccines regardless of insurance status	11	Limited
Iowa	×	×	High-risk adults for the hepatitis A and B vaccines regardless of insurance status	2	Limited
Kentucky	√	√		12	Limited
Louisiana	√	√		12	Limited
Maine	√	√		4	All
Massachusetts	√	×	Adults aged 19 or older for the tetanus and diphtheria (Td) vaccine regardless of insurance status	7	Limited
Michigan	√	√		8	Limited
Minnesota	√	√		12	All
Mississippi	√	√		9	Limited

[1]Kansas officials said that the state was developing an adult vaccine program, but that it would initially focus on education and monitoring, with limited free vaccines.

For the purposes of this report, we consider the District of Columbia a state.

State	Eligible adult populations: All uninsured	Eligible adult populations: All under-insured (state defined)[a]	Eligible adult populations: Other populations	Number of vaccines offered[b]	All or limited providers can enroll[c]
Missouri	√	√	High-risk adults for the hepatitis A vaccine regardless of insurance status	9	Limited
Montana	√	√		7	Limited
Nebraska	√	√		12	Limited
Nevada	×	×	Pregnant women and family members of newborns for the tetanus, diphtheria, and acellular pertussis (Tdap) and influenza (flu) vaccines regardless of insurance status	2	Limited
New Hampshire	√	√		12	Limited
New Jersey	√	√		12	All
New Mexico	√	√	High-risk adults for the hepatitis B vaccine regardless of insurance status	9	All
New York	√	√		8	Limited
North Carolina	√	×		6	Limited
North Dakota	√	√		9	All
Ohio	—-[d]	—-[d]		—-d	Limited
Oklahoma	√	√		12	All
Oregon	√	√		7	Limited
Pennsylvania	√	√		12	All
Rhode Island	√	√		11	Limited
South Carolina	√	√		10	Limited
South Dakota	√	√		1	All
Tennessee	√	√		7	Limited
Texas	√	×		11	Limited
Utah	√	×	High-risk adults for the hepatitis B vaccine regardless of insurance status	5	Limited
Vermont	√	√	All adults ages 19 through 64 regardless of insurance status	12	All
Virginia	√	√		12	Limited
Washington	√	√		7	All
West Virginia	√	×		5	Limited
Wisconsin	√	√	High-risk adults for the hepatitis B vaccine and all adults for the flu vaccine regardless of insurance status	10	Limited
Wyoming	√	√	All adults for the hepatitis A and B vaccines regardless of insurance status	2	Limited

Source: GAO summary of state information collected between December 2021 and July 2022. | GAO-22-105334

Notes: Six states (Alabama, Connecticut, Hawaii, Idaho, Kansas, and Maryland) did not have programs that offered free vaccines to adults. For the purposes of this table, we consider the District of Columbia a state.

[a]The definition of underinsured varied by state. Most states defined an underinsured adult as a person who has health insurance, but whose coverage did not include vaccines or included only selected vaccines. Some states included additional populations in their definition of underinsured adults, such as adults whose insurance capped vaccine coverage at a certain dollar amount.

[b]Our analysis of vaccines offered included Advisory Committee on Immunization Practices recommended routine vaccines for which the Centers for Disease Control and Prevention has a contracted price. Additionally, in counting the number of vaccines, we grouped vaccines that can be used to treat the same disease, and differentiated types of pneumococcal vaccines due to the recommended practices. This resulted in a total of 12 vaccines for our analysis.

[c]Some states limited enrollment to public health departments, while other states specified additional providers that could enroll, such as Federally Qualified Health Centers.

[d]Ohio did not provide information on adults eligible for its program or the number of vaccines offered.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO contact

Carolyn L. Yocom at (202) 512-7114 or yocomc@gao.gov.

Staff Acknowledgments

In addition to the contact name above, key contributors to this report were Susan Anthony (Assistant Director), Rachel Svoboda (Analyst in Charge), Todd Anderson, Lily Besel, and Caylin Rathburn-Smith. Other contributors to this report were Cindy Korir-Morrison, Courtney LaFountain, Drew Long, Diona Martyn, Zina Merritt, Jennifer Rudisill, and Roxanna Sun.

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