From Awareness to Action: Increasing HPV Vaccination Rates

MERCK

Objectives

- Highlight prevalence of certain HPV-related cancers
- Discuss US HPV vaccination trends
- Highlight strategies for helping to improve HPV vaccination rates in adolescents

HPV, human papillomavirus.

In 2021, genital HPV was the most common STI in the United States.[1]

For most people, HPV clears on its own. But for those who don't clear the virus, it could cause certain cancers later in life.[1–4]

There is no way to know who will develop cancer or other health problems from HPV.[2]

HPV, human papillomavirus; STI, sexually transmitted infection.

References

REFERENCES

Close

1. Meites E, Gee J, Unger E, Markowitz L. Human papillomavirus. Centers for Disease Control and Prevention (CDC). Updated August 2021. Accessed February 27, 2023. https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hpv.pdf
2. Cancers caused by HPV. Centers for Disease Control and Prevention. Last reviewed February 28, 2022. Accessed June 20, 2023. https://www.cdc.gov/hpv/parents/cancer.html
3. HPV and oropharyngeal cancer. Centers for Disease Control and Prevention. Last reviewed September 12, 2023. Accessed September 14, 2023. https://www.cdc.gov/cancer/hpv/basic_info/hpv _oropharyngeal.htm
4. Sexually transmitted infections treatment guidelines, 2021 – human papillomavirus (HPV) infection. Centers for Disease Control and Prevention. Last reviewed July 22, 2021. Accessed June 1, 2023. https://www.cdc.gov/std/treatment-guidelines/hpv.htm

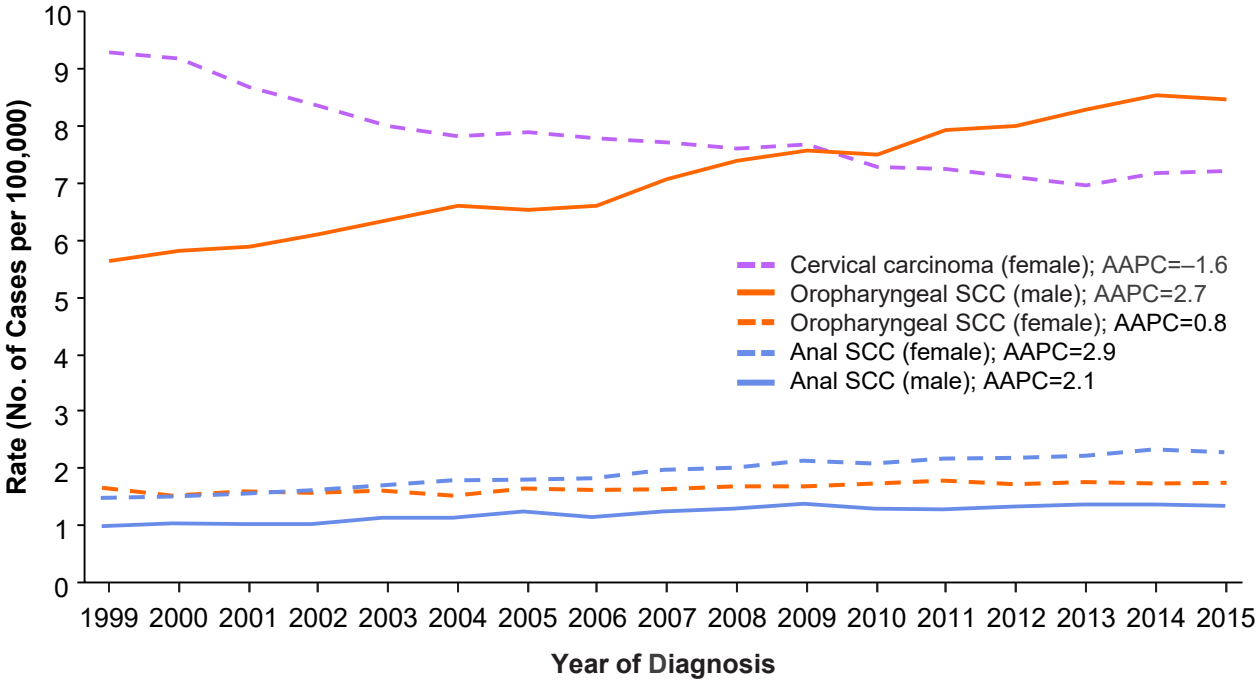
certain cancers later in life.[1-4]

HPV, human papillomavirus; STI, sexually transmitted infection.

References

From 1999 to 2015, Oropharyngeal Cancer Rates in Males Surpassed Cervical Cancer Rates, and Oropharyngeal Cancer and Anal Cancer Rates Increased[1]

Trends in Age-Adjusted HPV-associated Cancer Incidence By Cancer Type and Sex, 1999–2015[1]



For most people, HPV clears on its own. But for those who don't clear the virus, it could cause certain cancers and diseases later in life.[2–5]

- The CDC analyzed data from population-based cancer registries that participate in the CDC's National Program of Cancer Registries and the NCI's SEER program that met the criteria for high data quality for all years from 1999 to 2015.[1]
- These data cover approximately 97.8% of the US population.[1]
- HPV-associated cancers were defined as cancers at specific anatomic sites with specific cell types in which HPV DNA is frequently found.[1]
- Not all oropharyngeal, cervical, and anal cancers are caused by HPV.[1]

AAPC, average annual percentage change; CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus; NCI, National Cancer Institute; SCC, squamous cell carcinoma; SEER, Surveillance, Epidemiology, and End Results.

References

From 1999 to 2015, Oropharyngeal Cancer Rates in Males Surpassed Cervical Cancer Rates, and Oropharyngeal Cancer and Anal Cancer Rates Increased[1]

REFERENCES

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1. Van Dyne EA et al. *MMWR Morb Mortal Wkly Rep.* 2018;67(33): 918 924. doi: 10.15585/mmwr.mm6733a2.

2. Meites E, Gee J, Unger E, Markowitz L. Human papillomavirus. Centers for Disease Control and Prevention (CDC). Updated August 2021. Accessed February 27, 2023. https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hpv.pdf

3. HPV and oropharyngeal cancer. Centers for Disease Control and Prevention. Last reviewed September 12, 2023. Accessed September 14, 2023. https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm

4. Sexually transmitted infections treatment guidelines, 2021 – human papillomavirus (HPV) infection. Centers for Disease Control and Prevention. Last reviewed July 22, 2021. Accessed June 1, 2023. https://www.cdc.gov/std/treatment-guidelines/hpv.htm

5. Cancers caused by HPV. Centers for Disease Control and Prevention. Last reviewed February 28, 2022. Accessed June 20, 2023. https://www.cdc.gov/hpv/parents/cancer.html

Rate (No. of Cases per 100,000)

Year of Diagnosis

- Not all oropharyngeal, cervical, and anal cancers are caused by HPV.[1]

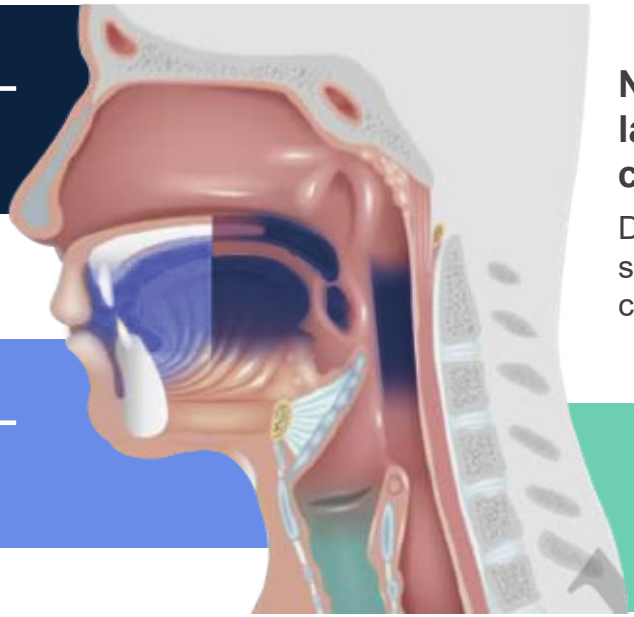
AAPC, average annual percentage change; CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus; NCI, National Cancer Institute; SCC, squamous cell carcinoma; SEER, Surveillance, Epidemiology, and End Results.

References

HPV DNA Detection By Anatomic Location of Certain Head and Neck Cancers (1993–2005)[1,2]

Oropharynx

~ 70% HPV positive



Oral Cavity

~ 32% HPV positive

Larynx

~ 21% HPV positive

Not all oropharyngeal, laryngeal, and oral cavity cancers are caused by HPV.[1]

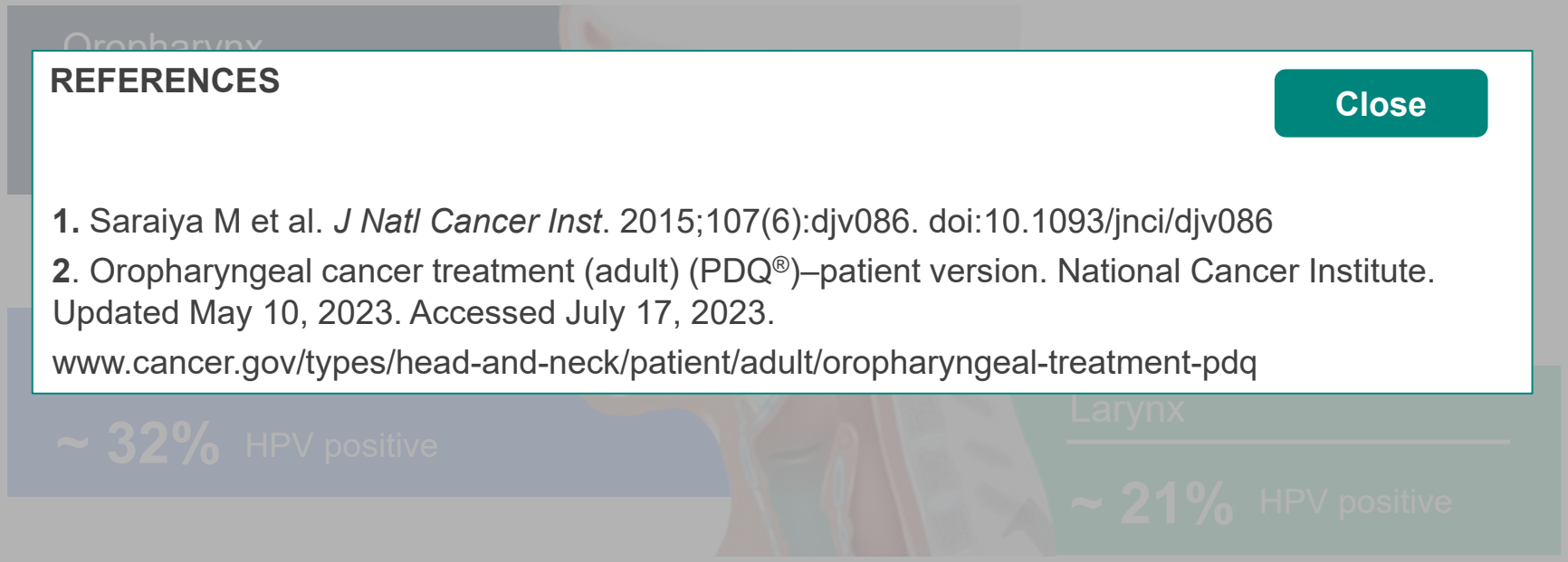
Detection of HPV DNA in an HPV study is insufficient to indicate a causal relation with the tumor.[1]

- The CDC partnered with 7 US population-based cancer registries to obtain archival tissue for cancers diagnosed from 1993 to 2005, before the introduction of HPV vaccination.[1]
- HPV testing was performed on 2670 case patients who were fairly representative of all participating cancer registry cases by age and sex.[1]
- HPV type–specific detection percentages were determined by anatomic site and demographic characteristics.[1]

CDC, Centers for Disease Control and Prevention; DNA, deoxyribonucleic acid; HPV, human papillomavirus.

References

HPV DNA Detection By Anatomic Location of Certain Head and Neck Cancers (1993–2005)[1,2]



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CDC, Centers for Disease Control and Prevention; DNA, deoxyribonucleic acid; HPV, human papillomavirus.

References

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1. Saraiya M et al. *J Natl Cancer Inst*. 2015;107(6):djv086. doi:10.1093/jnci/djv086

2. Oropharyngeal cancer treatment (adult) (PDQ®)–patient version. National Cancer Institute. Updated May 10, 2023. Accessed July 17, 2023.
www.cancer.gov/types/head-and-neck/patient/adult/oropharyngeal-treatment-pdq

Indication for GARDASIL®9 (Human Papillomavirus 9-valent Vaccine, Recombinant)

9–45 years old FEMALES

INDICATED FOR THE PREVENTION OF:

- Cervical, vulvar, vaginal, anal, oropharyngeal and other head and neck cancers caused by HPV Types 16, 18, 31, 33, 45, 52, and 58
- Cervical, vulvar, vaginal, and anal precancerous or dysplastic lesions caused by HPV Types 6, 11, 16, 18, 31, 33, 45, 52, and 58
- Genital warts caused by HPV Types 6 and 11

9–45 years old MALES

INDICATED FOR THE PREVENTION OF:

- Anal, oropharyngeal and other head and neck cancers caused by HPV Types 16, 18, 31, 33, 45, 52, and 58
- Anal precancerous or dysplastic lesions caused by HPV Types 6, 11, 16, 18, 31, 33, 45, 52, and 58
- Genital warts caused by HPV Types 6 and 11

The oropharyngeal and head and neck cancer indication is approved under accelerated approval based on effectiveness in preventing HPV-related anogenital disease. Continued approval for this indication may be contingent upon verification and description of clinical benefit in a confirmatory trial.

Indication continues on page 10

GARDASIL®9 (Human Papillomavirus 9-valent Vaccine, Recombinant)

Indication *(continued)*—Limitations of Use

- GARDASIL 9 does not eliminate the necessity for vaccine recipients to undergo screening for cervical, vulvar, vaginal, anal, oropharyngeal and other head and neck cancers as recommended by a health care provider.
- GARDASIL 9 has not been demonstrated to provide protection against diseases caused by:
  - HPV types not covered by the vaccine
  - HPV types to which a person has previously been exposed through sexual activity
- Not all vulvar, vaginal, anal, oropharyngeal and other head and neck cancers are caused by HPV, and GARDASIL 9 protects only against those vulvar, vaginal, anal, oropharyngeal and other head and neck cancers caused by HPV Types 16, 18, 31, 33, 45, 52, and 58.
- GARDASIL 9 is not a treatment for external genital lesions; cervical, vulvar, vaginal, anal, oropharyngeal and other head and neck cancers; or cervical intraepithelial neoplasia (CIN), vulvar intraepithelial neoplasia (VIN), vaginal intraepithelial neoplasia (VaIN), or anal intraepithelial neoplasia (AIN).
- Vaccination with GARDASIL 9 may not result in protection in all vaccine recipients.

GARDASIL®9 (Human Papillomavirus 9-valent Vaccine, Recombinant)

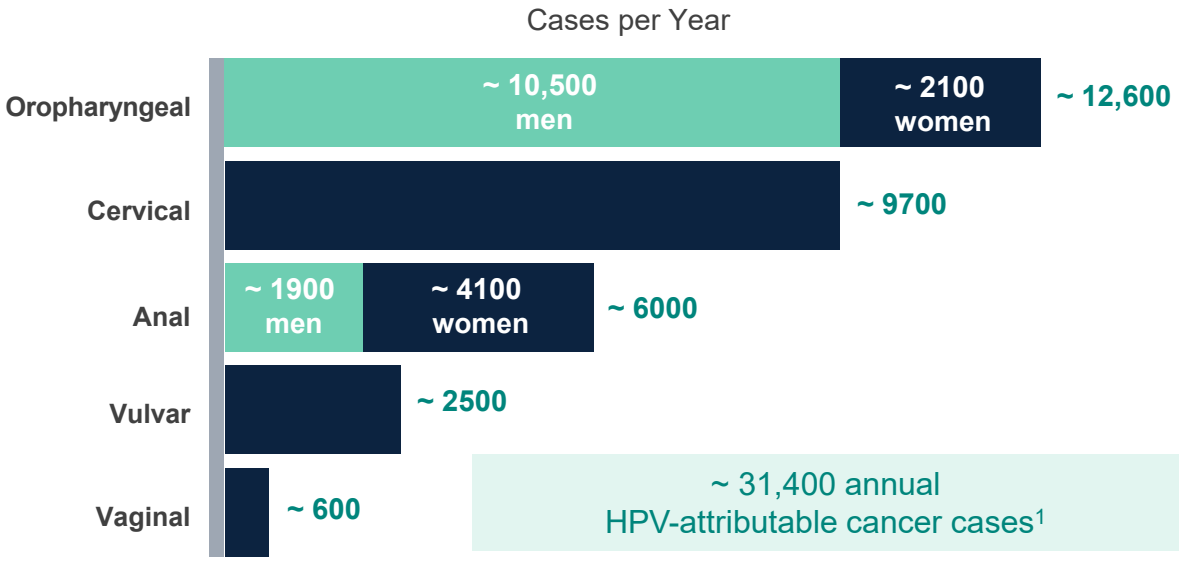
Select Safety Information

- GARDASIL 9 is contraindicated in individuals with hypersensitivity, including severe allergic reactions to yeast, or after a previous dose of GARDASIL 9 or GARDASIL® [Human Papillomavirus Quadrivalent (Types 6, 11, 16, and 18) Vaccine, Recombinant].

Select Safety Information continues on page 19

From 2012–2016, HPV-related Oropharyngeal Cancers Affected Men ~5x More Than Women[1]

CDC-estimated 2012–2016 US Incidence Model of Cancer Cases Attributed to 7 HPV types (16, 18, 31, 33, 45, 52, and 58)[1]



The oropharyngeal and head and neck cancer indication is approved under accelerated approval based on effectiveness in preventing HPV-related anogenital disease. Continued approval for this indication may be contingent upon verification and description of clinical benefit in a confirmatory trial.

CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus.

For most people, HPV clears on its own. But for those who don't clear the virus, it could cause certain cancers and diseases later in life.[2–5]

- CDC analyzed data from the US Cancer Statistics to assess the incidence of HPV-associated cancers and to estimate the annual number of cancers caused by HPV, overall and by state, during 2012–2016.[1]
- The estimated number of cancers attributable to HPV was calculated by multiplying the average number of HPV-associated cancers by the percentage of cancers diagnosed from 1993–2005 (pre-vaccine) that were attributable to HPV.[1,6]
- Not all cervical, vulvar, vaginal, anal, and oropharyngeal cancers are caused by HPV.[1]
- Detection of HPV DNA in an HPV study is insufficient to indicate a causal relation with the tumor.[6]

References

From 2012–2016, HPV-related Oropharyngeal Cancers Affected Men ~5x More Than Women[1]

REFERENCES

Close

1. Senkomago V et al. *MMWR Morb Mortal Wkly Rep.* 2019;68(33):724–728. doi: 10.11585/mmwr.mm6833a3

2. Meites E, Gee J, Unger E, Markowitz L. *Epidemiology and Prevention of Vaccine-Preventable Diseases* (Pink Book). 14th edition. Chapter 11: Human Papillomavirus. Centers for Disease Control and Prevention. Updated August 2021. Accessed February 27, 2023. https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hpv.pdf

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4. HPV and oropharyngeal cancer. Centers for Disease Control and Prevention. Last reviewed September 12, 2023. Accessed September 14, 2023. https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm

5. Cancers caused by HPV. Centers for Disease Control and Prevention. Last reviewed February 28, 2022. Accessed June 20, 2023. https://www.cdc.gov/hpv/parents/cancer.html

6. Saraiya M et al. *J Natl Cancer Inst.* 2015;107(6):1–12. doi: 10.1093/jnci/djv086

CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus.

References

CDC Recommendations for HPV Vaccination[1,2]

The CDC notes that HPV vaccination can be started at age 9 and recommends routine adolescent HPV vaccination at ages 11–12.[1]

HPV vaccination is recommended for persons through age 26 years.[2]

HPV vaccination is recommended for some adults aged 27– 45 based on shared clinical decision-making.[2]

CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus.

References

CDC Recommendations for HPV Vaccination[1,2]

REFERENCES

Close

1. Recommended child and adolescent immunization schedule for ages 18 years or younger, United States, 2023. Centers for Disease Control and Prevention. 2023. Last reviewed September 25, 2023. Accessed October 10, 2023. https://www.cdc.gov/vaccines/ schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

2. Recommended adult immunization schedule for ages 19 years or older, United States, 2023. Centers for Disease Control and Prevention. Last effective date September 22, 2023. Accessed October 11, 2023. https://www.cdc.gov/vaccines/schedules/downloads/ adult/adult-combined-schedule.pdf

CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus.

References

CDC Recommends Shared Clinical Decision-making When Considering HPV Vaccination in Adults Ages 27–45 Years[1]

Key Tenets of Shared Clinical Decision-making

Recommendations are made on an individual basis, based on:

- Patient characteristics/preferences
- HCP clinical discretion
- Vaccine characteristics

HCP–Patient Discussion Topics May Include:

- Age and other risk factors
- Potential benefits and risk of vaccination

CDC, Centers for Disease Control and Prevention; HCP, health care professional; HPV, human papillomavirus.

1. ACIP shared clinical decision-making recommendations. Centers for Disease Control and Prevention. Updated September 29, 2023. Accessed October 12, 2023. https://www.cdc.gov/vaccines/acip/acip-scdm-faqs.html

Dosage and Administration

9–14 YEARS OLD

2-dose Regimen[a]

DOSE #1	DOSE #2
NOW	6–12 MONTHS

15–45 YEARS OLD

3-dose Regimen[b]

DOSE #1	DOSE #2	DOSE #3
NOW	2 MONTHS	6 MONTHS

Observe patients for 15 minutes after administration.

[a]If the second dose is administered earlier than 5 months after the first dose, administer a third dose at least 4 months after the second dose.
[b]This schedule may also be used for those ages 9–14.

Administration ⊕

HPV, human papillomavirus.

Dosage and Administration

ADMINISTRATION

Close

GARDASIL® 9 (Human Papillomavirus 9-valent Vaccine, Recombinant) should be administered intramuscularly in the deltoid or anterolateral area of the thigh.

The number of recommended doses is based on age at the administration of the first dose.[1]

Immunologic response to GARDASIL 9 may be diminished in immunocompromised individuals.

Safety and effectiveness of GARDASIL 9 have not been established in pregnant women.

1. Recommended child and adolescent immunization schedule for ages 18 years or younger, United States, 2023. Centers for Disease Control and Prevention. 2023. Last reviewed September 25, 2023. Accessed October 10, 2023. https://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

HPV, human papillomavirus.

GARDASIL®9 (Human Papillomavirus 9-valent Vaccine, Recombinant)

Select Safety Information (*continued*)

- Because vaccinees may develop syncope, sometimes resulting in falling with injury, observation for 15 minutes after administration is recommended. Syncope, sometimes associated with tonic-clonic movements and other seizure-like activity, has been reported following HPV vaccination. When syncope is associated with tonic-clonic movements, the activity is usually transient and typically responds to restoring cerebral perfusion.
- Safety and effectiveness of GARDASIL 9 have not been established in pregnant women.

Select Safety Information continues on page 30

National Adolescent Up-to-Date HPV Vaccination Rates Among Adolescents 13–17 Years (NIS-Teen 2022)[1]

Study Design:

Objective

- Estimate vaccination coverage for adolescents 13–17 years of age from the 2022 NIS-Teen survey

Population/Data Source

- NIS-Teen was a nationally representative, random-digit–dial telephone survey of adolescents 13–17 years conducted by the CDC.
- Adolescents (N=16,043) in the NIS-Teen survey were born January 2004–January 2010. **The response rate was 23.0%, and 38.8% of adolescents with completed interviews had adequate provider data.**
- Of these adolescents, 3198 were aged 13 and 3019 were aged 17 at the time of the interview.

Methodology

- Vaccination coverage estimates were based on provider-reported vaccination histories and included any vaccines administered before the 2022 NIS-Teen interview date.
- Recent trends in vaccination coverage were assessed by comparing vaccination coverage by age among the 2008 and 2009 birth cohorts (ie, those who reached their 12th and 11th birthdays, respectively, in 2020) to vaccination coverage in earlier birth cohorts (ie, adolescents born in 2006 and 2007) whose routine vaccinations were not affected by the pandemic.
- HPV vaccination included 9vHPV, 4vHPV, or 2vHPV vaccines. HPV up-to-date included those with ≥3 doses and those with 2 doses when the first HPV vaccine dose was initiated prior to age 15 years and there were ≥5 months minus 4 days between the first and second dose. This update to the HPV vaccination recommendation occurred in December 2016.

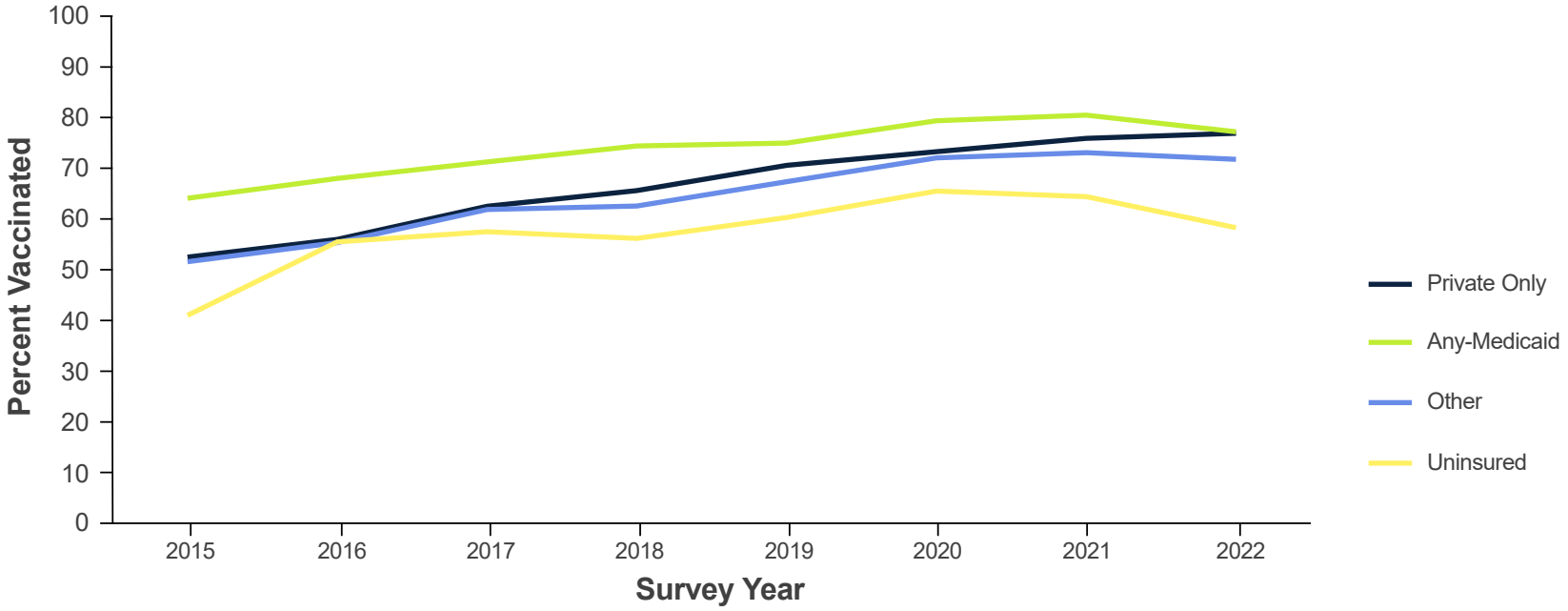
Limitations:

- The household response rate was 23.0%; 38.8% of completed interviews included adequate provider data; bias from low response rates might have occurred if survey participants differed from nonparticipants.
- Although estimates were adjusted for nonresponse and households without a telephone, bias in the estimates might have remained.
- Recent total survey error assessments indicated that NIS-Teen estimates might underestimate actual coverage.

2vHPV, bivalent human papillomavirus; 4vHPV, quadrivalent human papillomavirus; 9vHPV, 9-valent human papillomavirus; CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus; NIS, National Immunization Survey.

1. Pingali C et al. *MMWR Morb Mortal Wkly Rep*. 2023;72(34):912–919. doi:10.15585/mmwr.mm7234a3

Estimated Vaccination Coverage With ≥1 HPV Vaccination Among Adolescents 13–17 Years By Health Insurance Status (NIS-Teen, 2015–2022)[1,a]



Study Design and Limitations

In 2022, compared to 2021, coverage with ≥1 HPV vaccine dose declined among uninsured adolescents and adolescents with Medicaid, while coverage with ≥1 HPV vaccine dose among those with private insurance remained stable. Vaccination rates varied widely by jurisdiction.

[a]Adolescents' health insurance status was reported by parent or guardian. "Other insurance" includes the Children's Health Insurance Program, military insurance, Indian Health Service, and any other type of health insurance not mentioned elsewhere.

HPV, human papillomavirus; NIS, National Immunization Survey.

1. Pingali C et al. *MMWR Morb Mortal Wkly Rep*. 2023;72(34):912–919. doi:10.15585/mmwr.mm7234a3

National Adolescent Up-to-Date HPV Vaccination Rates Among Adolescents 13–17 Years (NIS-Teen 2022)[1]

Estimated Percentage of Adolescents (by Age) Who Were Up-to-Date[a] With Either the 2- or 3-dose Series

Estimated National Rate by Age 13

50.0%

(n=3198)

Estimated National Rate by Age 17

68.3%

(n=3019)

Estimated Average National Rate by Ages 13–17

62.6%

(n=16,043)

- Adolescents in the NIS-Teen survey were born January 2004–January 2010.
- **The response rate was 23.0%, and 38.8% of adolescents with completed interviews had adequate provider data.**

← Study Design and Limitations

[a]HPV UTD includes those who received ≥3 doses and those who received 2 doses when the first HPV vaccine dose was initiated prior to age 15 years and there were at least 5 months minus 4 days between the first and second dose. This update to the HPV vaccination recommendation occurred in December 2016.

HPV, human papillomavirus; NIS, National Immunization Survey; UTD, up-to-date.

1. Pingali C et al. *MMWR Morb Mortal Wkly Rep*. 2023;72(34):912–919. doi:10.15585/mmwr.mm7234a3

Why Initiate HPV Vaccination at Age 9?

START AT AGE 9

SUPPORTED BY PROFESSIONAL GUIDELINES

The CDC notes that HPV vaccination may begin at age 9, and recommends routine adolescent HPV vaccination at ages 11–12.[1]

The ACS recommends routine HPV vaccination between ages 9 and 12 years.[2] HCPs are encouraged to start offering the HPV vaccination series beginning at age 9 or 10 years.[3]

COULD MEAN FEWER SHOTS

Starting HPV vaccination at age 9 could mean fewer concomitant shots per visit based on the CDC's recommended dosing schedule for adolescents.[1]

ACS, American Cancer Society; CDC, Centers for Disease Control and Prevention; HCPs, health care professionals; HPV, human papillomavirus.

References

Why Initiate HPV Vaccination at Age 9?

SUPPORTED BY PROFESSIONAL GUIDELINES

for adolescents.[1]

REFERENCES

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1. Recommended child and adolescent immunization schedule for ages 18 years or younger, United States, 2023. Centers for Disease Control and Prevention. 2023. Last reviewed September 25, 2023. Accessed October 10, 2023. https://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf
2. ACS updates HPV vaccination recommendations to start at age 9. American Cancer Society. July 8, 2020. Accessed February 22, 2023. https://www.cancer.org/latest-news/acs-updates-hpv-vaccination-recommendations-to-start-at-age-9.html
3. Saslow D et al. *CA Cancer J Clin.* 2020;70(4):274–280. doi: 10.3322/caac.21616.

ACS, American Cancer Society; CDC, Centers for Disease Control and Prevention; HCPs, health care professionals; HPV, human papillomavirus.

References

Initiation Age of HPV Vaccination and Completion Rates By Age 13 (2014–2020)[1]

Study Design:

Objective

- The objective was to assess whether initiating HPV vaccination at ages 9–10 years (proactive initiators), compared with ages 11–12 years (routine initiators), was associated with a higher rate of series completion by age 13 years and to identify factors associated with series completion by age 13 years.

Population/Data Source

- This was an observational, retrospective cohort study of individuals in the United States ages 9–12 years at their first dose of the 9vHPV vaccine.
- Information was obtained from databases that included information on inpatient and outpatient medical services use, prescription drug claims, and health care expenditures.

	Privately Insured	Publicly Insured
Claims database	IBM MarketScan Commercial Claims and Encounters Database	IBM MarketScan Multi-State Medicaid Database
Number of enrollees	100,117 98.03% (n=98,141) routine initiators/1.97% (n=1976) proactive initiators	115,863 93.45% (n=108,277) routine initiators/6.55% (n=7586) proactive initiators
Study period[a,b]	December 1, 2014, to March 1, 2020 12/1/2014 — Patient selection window 1/1/2016–2/1/2019 — 3/1/2020 Baseline period (13 months prior to index date) / Follow-up period	December 1, 2014, to December 31, 2019 12/1/2014 — Patient selection window 1/1/2016–12/1/2018 — 12/31/2019 Baseline period (13 months prior to index date) / Follow-up period

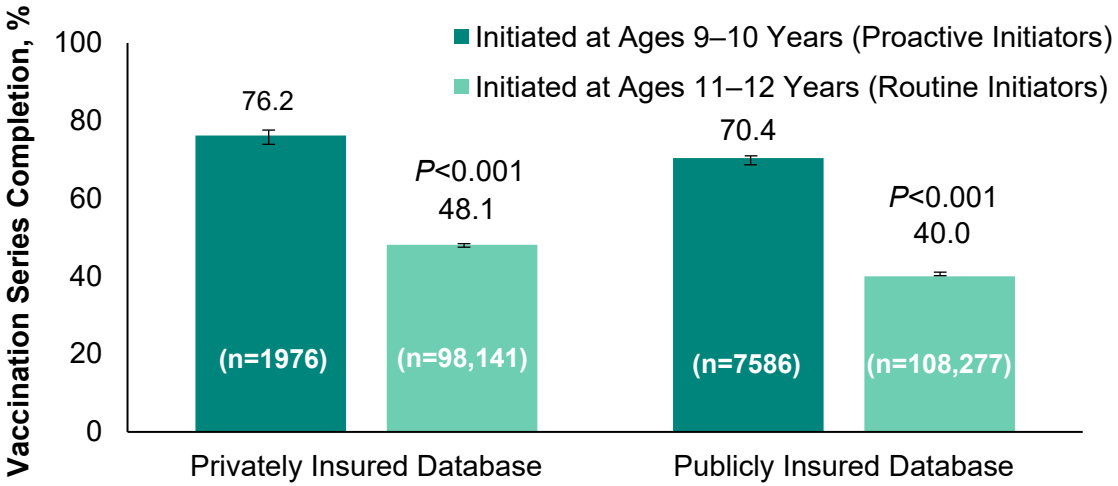
[a]The study and index periods were chosen to use the latest available data while limiting any effect of the COVID-19 pandemic on the analysis.

[b]Index period was defined as the patient selection window where the patient received the first dose of 9vHPV.

9vHPV, 9-valent HPV; HPV, human papillomavirus.

1. Saxena K et al. *Hum Vaccin Immunother.* 2023;19(1):2161253. doi:10.1080/21645515.2022.2161253

Early Initiation at Ages 9–10 Years Increased HPV Vaccination Completion Rates by Age 13 Years (2014–2020)[1]



Additional Demographic and Clinical Characteristics ⊕ ⟵ Study Design

Patients who proactively initiated HPV vaccination at age 9 or 10 years displayed higher completion rates by age 13 years. This analysis included both ***privately insured*** and ***publicly insured*** individuals, with similar trends observed among both groups.

Study Limitations

- The number of proactive vaccinators in this study was very small compared with the number of routine vaccinators.
- The commercial database used had an overrepresentation of individuals from the South; additionally, the Medicaid database comprised data reported anonymously by multiple states, which might introduce unquantifiable biases due to regional variation in demographic and clinical variables.
- Race, ethnicity, geographic region, and urbanicity were only available for one of the databases.
- The potential differences in population demographics and health care plan coverage make it unknown whether this study can be generalized to the overall US population.
- Conclusions cannot be drawn for all adolescents as these data only included those who initiated HPV vaccination.
- The potential opportunity for vaccination before age 13 was not equal between proactive (2–3 years) and routine (1–2 years) initiators.

HPV, human papillomavirus.

1. Saxena K et al. *Hum Vaccin Immunother.* 2023;19(1):2161253. doi:10.1080/21645515.2022.2161253

Demographic and Clinical Characteristics Associated With HPV Vaccination Series Completion By 13 Years of Age[1,a]

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Characteristic	Value	Privately Insured Database	Publicly Insured Database
Age at initiation (years; Referent: 11-12)	9-10	3.51 (3.15, 3.90)	3.50 (3.32, 3.68)
Sex (Referent: Male)	Female	1.13 (1.10, 1.16)	1.07 (1.05, 1.10)
Provider type (Referent: Pediatrician)[b]	Family medicine	1.08 (1.04, 1.13)	0.92 (0.86, 0.98)
	Physician (unspecified or rare specialty)	1.12 (1.06, 1.18)	1.08 (1.04, 1.12)
	Internal medicine	1.04 (0.94, 1.15)	0.85 (0.70, 1.02)
	Nurse practitioner	0.96 (0.89, 1.04)	1.03 (0.98, 1.08)
	Other	0.94 (0.89, 1.00)	1.05 (1.02, 1.09)
Race/ethnicity (Referent: Non-Hispanic White)	Non-Hispanic black	—	0.80 (0.78, 0.82)
	Hispanic	—	1.11 (1.07, 1.16)
	Other	—	1.04 (0.997, 1.09)
Region (Referent: South)	Northeast	1.05 (1.00, 1.09)	—
	Northcentral	1.09 (1.05, 1.13)	—
	West	1.15 (1.11, 1.19)	—
	Unknown	0.59 (0.49, 0.71)	—
Urbanicity (Referent: Urban)	Rural	1.06 (1.02, 1.12)	—
Plan type (Referent: HMO)	PPO	0.81 (0.78, 0.85)	—
	CDHP or HDHP	0.82 (0.78, 0.85)	—
	Comprehensive	—	0.97 (0.94, 1.01)
	Others	0.91 (0.87, 0.96)	1.20 (0.91, 1.57)
Vaccine financing policy (Referent: VFC only)	VFC and underinsured	1.00 (0.96, 1.03)	—
	VFC and underinsured select	0.87 (0.81, 0.93)	—
	Universal	0.90 (0.83, 0.97)	—
	Universal select	0.73 (0.69, 0.77)	—
	Other	1.08 (1.04, 1.12)	—
Immunocompromised status (Referent: No)	Yes	0.09 (0.07, 0.14)	0.09 (0.06, 0.14)
Prior vaccinations (Referent: No)	Yes	1.39 (1.35, 1.43)	1.45 (1.41, 1.49)
Wellness check visits (Referent: No)	Yes	1.33 (1.30, 1.37)	1.38 (1.34, 1.41)
Index year (Referent: 2016)	2017	0.82 (0.79, 0.85)	0.86 (0.84, 0.89)
	2018	0.73 (0.70, 0.75)	0.84 (0.82, 0.87)
	2019	0.68 (0.59, 0.79)	—

[a]Analysis performed via logistic regression. Results presented as odds ratio (95% confidence interval). [b]The category Physician (unspecified or rare medical specialty) in both databases includes Physician, Surgery, Neonatal-Perinatal Medicine, Obstetrics & Gynecology, Medical doctor, where Physician includes Multi-Specialty Physician Group and Physician Assistant and Surgery includes Surgeon (NEC), Colon & Rectal Surgery, Neurological Surgery, Orthopedic Surgery, Abdominal Surgery, Cardiovascular Surgery, Dermatologic Surgery, General Vascular Surgery, Head and Neck Surgery, Pediatric Surgery, Transplant Surgery, Traumatic Surgery, Cardiothoracic Surgery and Thoracic Surgery. Individuals with pharmacist or missing data for provider type were included in the "Other" category.

1. Saxena K et al. *Hum Vaccin Immunother.* 2023;19(1):2161253. doi:10.1080/21645515.2022.2161253

Estimated HPV Vaccination (≥1 Dose) Rates Among Adults Ages 19–26 Years in the United States (NHIS, 2018)[1]

Study Design:

Objective

- Assess vaccination coverage among adults aged ≥19 years for selected vaccines and demographic factors associated with vaccination

Population/Data Source

- HPV vaccination data were from the NHIS, a cross-sectional survey conducted in-person through a household interview that is nationally representative of the US civilian, noninstitutionalized population.
- The 2018 NHIS survey included 25,417 participants aged ≥19 years (response rate=53.1%).
  - The analyses included the sample of individuals aged 19–26 (n=5930) from the total adult sample (persons aged ≥19 years) for all vaccine types (n=25,207).

Methodology

- As part of the survey, HPV vaccination status was determined on the basis of a person's response to whether they had ever received the HPV shot. Adults aged 19–26 years receipt of ≥1 dose of HPV vaccination was assessed.

Limitations:

- The data set did not include behavioral variables, including the use of preventive health services, vaccine safety concerns, state laws and immunization intervention programs, and cultural and religious factors.
- NHIS data, such as vaccination status and demographic and other characteristics (eg, insurance status, usual source and frequency of health care), were self-reported and are subject to recall biases; vaccination status and demographic and other reported characteristics were not validated through medical records.
- The response rate was 53.1%; nonresponse bias may have resulted if respondents and nonrespondents differed in their vaccination rates.
- The NHIS sample excluded persons in the military and those residing in institutions, which might have resulted in underestimation or overestimation of overall US vaccination coverage levels.

HPV, human papillomavirus; NHIS, National Health Interview Survey.

1. Lu PJ et al. *MMWR Surveill Summ.* 2021;70(3):1–26. doi: 10.15585/mmwr.ss7003a1

Estimated HPV Vaccination (≥1 Dose) Rates Among Adults Ages 19–26 Years (NHIS, 2018)[1]

Among 19- to 26-year-olds (n=5930)

~53% of females

(n=1069/2025)

~26% of males

(n=1027/3905)

RECEIVED ≥1 DOSE OF HPV VACCINE

Selected Study Limitations:

- NHIS data were self-reported and were subject to recall biases; vaccination status was not validated through medical records.
- Nonresponse bias may result if respondents and nonrespondents differed in their vaccination rates.

← Study Design and Limitations

HPV, human papillomavirus; NHIS, National Health Interview Survey.

1. Lu PJ et al. *MMWR Surveill Summ.* 2021;70(3):1–26. doi: 10.15585/mmwr.ss7003a1

GARDASIL®9 (Human Papillomavirus 9-valent Vaccine, Recombinant)

Select Safety Information (*continued*)

- The most common (≥10%) local and systemic adverse reactions in females were injection-site pain, swelling, erythema, and headache. The most common (≥10%) local and systemic reactions in males were injection-site pain, swelling, and erythema.
- The duration of immunity of a 2-dose schedule of GARDASIL 9 has not been established.

Many Factors Can Influence Vaccine Uptake[1]

The 5As Represent 5 Commonly Identified Dimensions of Factors That Could Influence Vaccine Uptake

Access	The ability of individuals to be reached by, or to reach, recommended vaccines
Affordability	The ability of individuals to afford vaccination, both in terms of financial and nonfinancial costs (eg, time)
Awareness	The degree to which individuals have knowledge of the need for, and availability of, recommended vaccines and their objective benefits and risks, and the recommended vaccination schedule
Acceptance	The degree to which individuals accept, question, or refuse vaccination (because of personal beliefs about vaccines and the diseases they help prevent and/or social context)
Activation	The degree to which individuals are recommended and reminded of their vaccination needs by an HCP

HCP, health care professional.

1. Thomson A et al. *Vaccine*. 2016;34(8):1018–1024. doi:10.1016/j.vaccine.2015.11.065

Certain Strategies May Help Improve HPV Vaccination[1]

RECOMMEND

- Recommend the HPV vaccine for adolescent patients the same day and the same way you recommend all other vaccines.
- Deliver regularly occurring vaccine reminders.

KNOW YOUR RATES

- Know your practice's actual vaccination rates.
- Learn more about why some patients are behind on their vaccines.
- Facilitate solutions with staff on how to bring these patients in and get or keep immunization rates up.

IMPLEMENT SYSTEMS

Don't miss opportunities to vaccinate:

- Have staff indicate if a patient is due for immunization.
- Incorporate standing orders into clinic procedures.

HPV, human papillomavirus.

1. Top 10 tips for HPV vaccination success: attain and maintain high HPV vaccination rates. Centers for Disease Control and Prevention. Last updated May 2018. Accessed October 25, 2022. https://www.cdc.gov/hpv/hcp/2-dose/top-10-vaxsuccess.html

Summary

- As of 2021, genital HPV was the most common STI in the United States.[1]

  For most people, HPV clears on its own. But for those who don't clear the virus, it could cause certain cancers and diseases later in life.[1–4]

- The CDC notes that HPV vaccination can be started at age 9 and recommends routine adolescent HPV vaccination at ages 11–12.[5]

- HPV vaccination is recommended for persons through age 26 years.[6]

- HPV vaccination is recommended for some adults aged 27–45 based on shared decision-making.[6]

CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus.

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Close

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2. HPV and oropharyngeal cancer. Centers for Disease Control and Prevention. Last reviewed September 12, 2023. Accessed September 14, 2023. https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm
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CDC, Centers for Disease Control and Prevention; HPV, human papillomavirus.

References

Before administering GARDASIL®9 (Human Papillomavirus 9-valent Vaccine, Recombinant), please read the accompanying Prescribing Information. The Patient Information also is available.

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