

Incidence of Human papillomavirus (HPV)-related cancer before and after HPV vaccine introduction among males and females 15-44 years old in the US

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Background

- Human papillomavirus (HPV) vaccines were introduced in the US since 2006 to prevent HPV-related cancers.
- HPV-related cancers, including oropharyngeal squamous cell carcinoma, anal and rectal squamous cell carcinoma, vulvar squamous cell carcinoma, vaginal squamous cell carcinoma, penile squamous cell carcinoma, and cervical carcinoma.

Methods

- Data used in this study were from United States Cancer Statistics (USCS) 2001–2018 database among US males and females 15–44 years old.
- We included primary cancer cases of HPV-related cancers, including oropharyngeal squamous cell carcinoma, anal and rectal squamous cell carcinoma, vulvar squamous cell carcinoma, vaginal squamous cell carcinoma, penile squamous cell carcinoma, and cervical carcinoma.
- We compared the 4-year average annual incidence of HPV-related cancers in 4 years before HPV vaccine introduction (2003–2006) and the latest 4 years in the vaccine era (2015–2018).
- Annual incidence rates were calculated as the number of cases per 1,000,000 persons and were age-adjusted to the 2000 US standard population. The Tiwari method was used to determine the confidence intervals (CI).

Table 1. Age-adjusted incidence of HPV-related cancer among adults 15-44 years old during 2003-2006 and 2015-2018.

	Incidence (per 1,000,000 person-years)		Rate ratio vs. 2003-2006
	2003-2006	2015-2018	
Among males			
Age group			
15-19 years			
20-24 years	0.4(0.2-0.7)	0.5(0.4-0.8)	1.30(0.68-2.54)
25-29 years	2(1.6-2.5)	2.2(1.8-2.7)	1.10(0.81-1.49)
30-34 years	7.3(6.5-8.2)	6.4(5.7-7.2)	0.88(0.74-1.04)
35-39 years	22.5(21.1-24)	17.8(16.6-19.1)	0.79(0.72-0.87)
40-44 years	61.5(59.2-63.8)	50.7(48.5-53)	0.82(0.78-0.87)
Among females			
Age group			
15-19 years	1.3(1-1.7)	0.4(0.2-0.7)	0.31(0.17-0.54)
20-24 years	14.5(13.4-15.7)	7.1(6.4-8)	0.49(0.43-0.57)
25-29 years	58(55.6-60.4)	50.2(48.2-52.3)	0.87(0.82-0.92)
30-34 years	122.6(119.2-126.1)	116.2(113-119.4)	0.95(0.91-0.99)
35-39 years	160.8(157-164.7)	156.3(152.6-160.2)	0.97(0.94-1.01)
40-44 years	195.5(191.4-199.5)	190.9(186.6-195.3)	0.98(0.95-1.01)

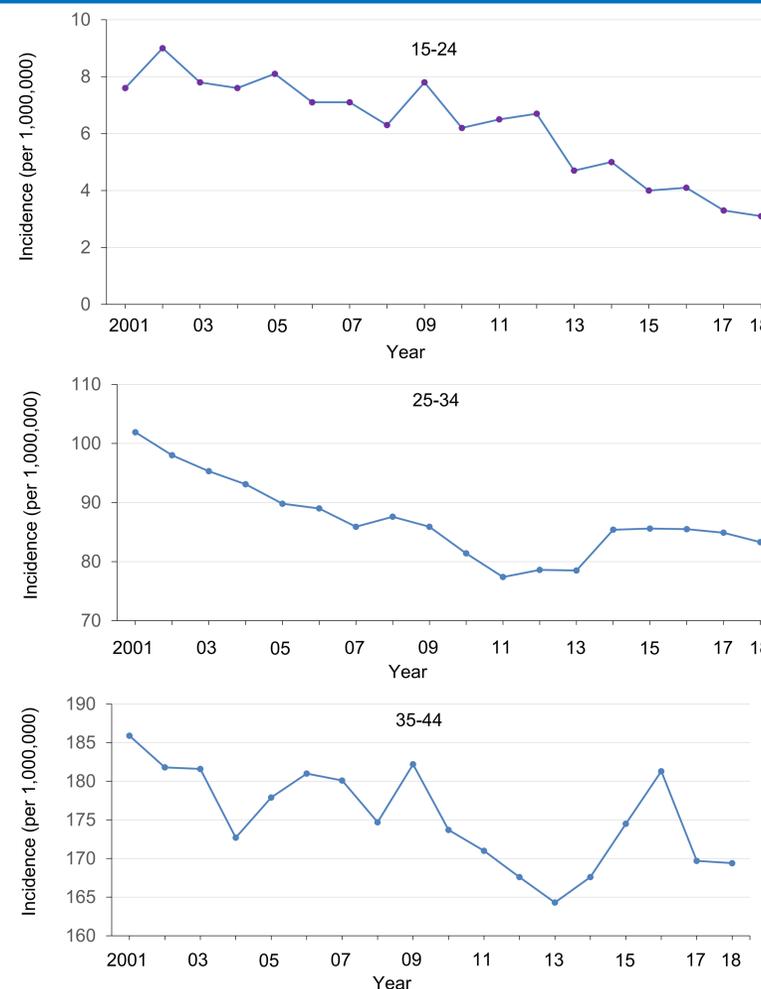
Objectives

To assess how HPV vaccine introduction affects the incidence of HPV-related cancers among young women.

Results

- The 4-year average annual incidence rates for HPV-related cancers decreased in 2015–2018 compared to 2003–2006 among females 15–19 years old (0.4 vs. 1.3 per 1,000,000, rate ratio 0.31, 95% CI 0.17–0.54), 20–24 years old (7.1 vs. 14.5 per 1,000,000, rate ratio 0.49, 95% CI 0.43–0.57), 25–29 years old (50.2 vs. 58.0 per 1,000,000, rate ratio 0.87, 95% CI 0.82–0.92) and 30–34 years old (116.2 vs. 122.6 per 1,000,000, rate ratio 0.95, 95% CI 0.91–0.99).
- On the other hand, the incidence decreased in 2015–2018 compared to 2003–2006 among males 35–39 years old (17.8 vs. 22.5 per 1,000,000, rate ratio 0.79, 95% CI 0.72–0.87) and 40–44 years old (50.7 vs. 61.5 per 1,000,000, rate ratio 0.82, 95% CI 0.78–0.87).

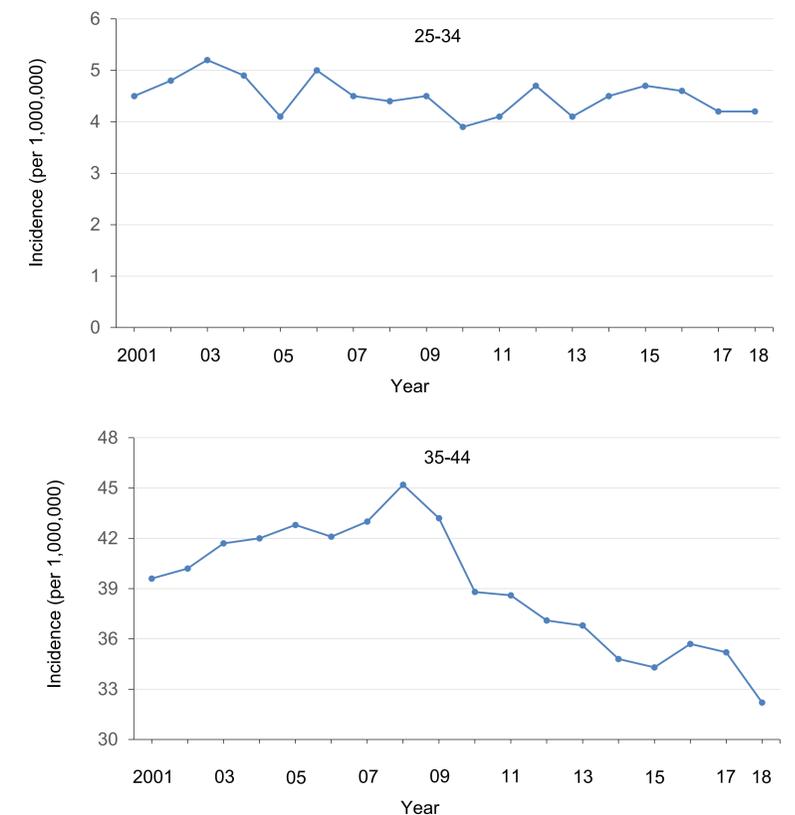
Figure 1. Age-adjusted incidence of HPV-related cancer from 2001 to 2018 among females 15-44 years old.



Conclusions

- Incidence rates for HPV-related cancers decreased in the vaccine era compared to the pre-vaccine era among both males and females in certain age groups.
- This suggests the potential early effects of the introduction of HPV vaccination in the US.

Figure 2. Age-adjusted incidence of HPV-related cancer from 2001 to 2018 among males 25-44 years old.



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