

Harmonization of HPV vaccination age recommendations for females and males

Background and Considerations

Lauri Markowitz, MD
Division of Viral Diseases

Advisory Committee on Immunization Practices
February 21, 2018

Overview

- Current recommendations for HPV vaccination
- History of ACIP policy for HPV vaccination of males
- ACIP Workgroup considerations for harmonization of age recommendations for males and females (through age 26 years)

Current age recommendations for HPV vaccination in the United States

- **Routine (for females and males)**
 - Age 11 or 12 years
 - Series can be started beginning at age 9 years
- **Persons not previously vaccinated (catch-up)**
 - Females through **age 26 years**
 - Males through **age 21 years**
 - Males 22 through 26 years may be vaccinated
 - Males 22 through 26 years with immunocompromising conditions (including HIV), who are transgender, and who have sex with men*

2018 Adult Immunization Schedule

Figure 1

<https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf>

Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	19–21 years	22–26 years	27–49 years	50–64 years	≥65 years
Influenza ¹	1 dose annually				
Tdap ² or Td ²	1 dose Tdap, then Td booster every 10 yrs				
MMR ³	1 or 2 doses depending on indication (if born in 1957 or later)				
VAR ⁴	2 doses				
RZV ⁵ (preferred) or ZVL ⁵				2 doses RZV (preferred) or 1 dose ZVL	
HPV–Female ⁶	2 or 3 doses depending on age at series initiation				
HPV–Male ⁶	2 or 3 doses depending on age at series initiation				
PCV13 ⁷	1 dose				
PPSV23 ⁷	1 or 2 doses depending on indication				1 dose
HepA ⁸	2 or 3 doses depending on vaccine				
HepB ⁹	3 doses				
MenACWY ¹⁰	1 or 2 doses depending on indication, then booster every 5 yrs if risk remains				
MenB ¹⁰	2 or 3 doses depending on vaccine				
Hib ¹¹	1 or 3 doses depending on indication				



Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection



Recommended for adults with other indications



No recommendation

2018 Adult Immunization Schedule

Figure 2

<https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf>

Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	Pregnancy ^{1,6}	Immuno-compromised (excluding HIV infection) ^{3,7,11}	HIV infection CD4+ count (cells/ μ L) ^{3,7,9,10}		Asplenia, complement deficiencies ^{7,10,11}	End-stage renal disease, on hemodialysis ^{7,9}	Heart or lung disease, alcoholism ⁷	Chronic liver disease ^{7,9}	Diabetes ^{7,9}	Health care personnel ^{3,4,9}	Men who have sex with men ^{3,4,9}
			<200	$\geq$ 200							
Influenza ¹	1 dose annually										
Tdap ² or Td ²	1 dose Tdap each pregnancy	1 dose Tdap, then Td booster every 10 yrs									
MMR ³	contraIndicated				1 or 2 doses depending on Indication						
VAR ⁴	contraIndicated				2 doses						
RZV ⁵ (preferred)					2 doses RZV at age $\geq$ 50 yrs (preferred)						
or					or						
ZVL ⁵	contraIndicated					1 dose ZVL at age $\geq$ 60 yrs					
HPV–Female ⁶		3 doses through age 26 yrs			2 or 3 doses through age 26 yrs						
HPV–Male ⁶		3 doses through age 26 yrs			2 or 3 doses through age 21 yrs						2 or 3 doses through age 26 yrs
PCV13 ⁷		1 dose									
PPSV23 ⁷		1, 2, or 3 doses depending on Indication									
HepA ⁸	2 or 3 doses depending on vaccine										
HepB ⁹						3 doses					
MenACWY ¹⁰	1 or 2 doses depending on Indication , then booster every 5 yrs If risk remains										
MenB ¹⁰		2 or 3 doses depending on vaccine									
Hib ¹¹		3 doses HSCT recipients only			1 dose						



Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection



Recommended for adults with other indications

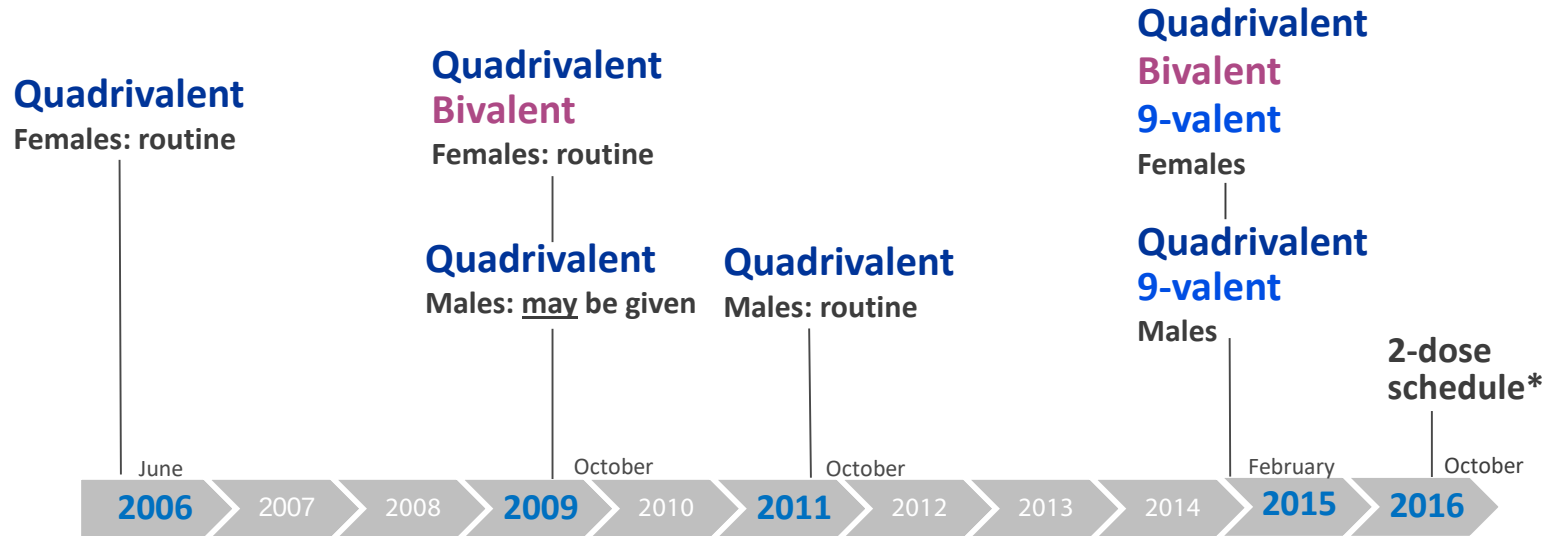


Contraindicated



No recommendation

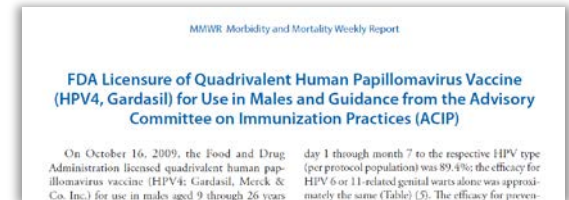
Evolution of ACIP recommendations for HPV vaccination in the United States



*For persons starting vaccination at age 9 through 14 years

ACIP considerations for HPV vaccination of males, 2009

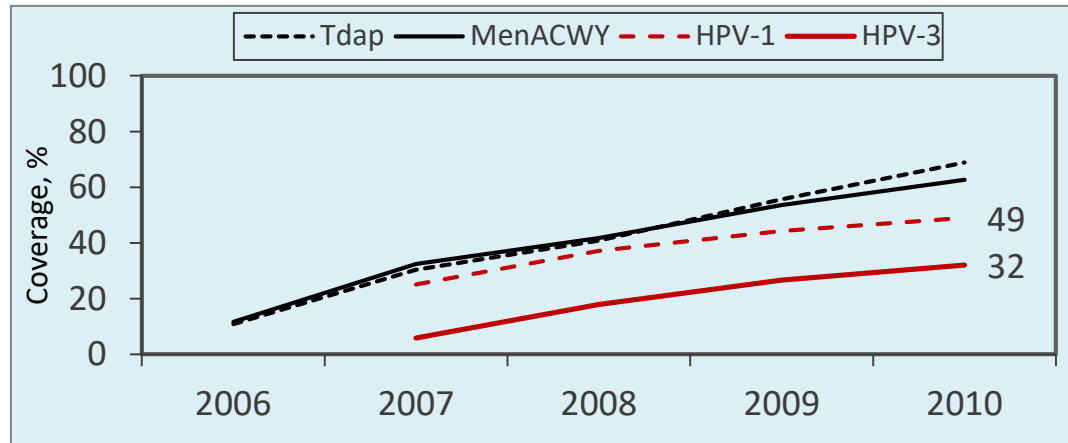
- **FDA licensed quadrivalent HPV vaccine for use in males aged 9 through 26 years for prevention of anogenital warts in 2009**
 - Based on data from clinical trial in males; endpoint was anogenital warts
 - Clinical trial was ongoing to evaluate efficacy against anal precancers in males
- **ACIP reviewed data and considered recommendations**
 - Wanted to wait for efficacy data against anal precancers in males
 - Uncertainty about impact and cost effectiveness
 - Guidance: quadrivalent vaccine may be given to males aged 9 through 26 years



MMWR 2010;59

ACIP considerations for HPV vaccination of males, 2011

- **FDA added prevention of anal cancer in males and females as an indication**
 - December 2010 - after review of results from clinical trial in males*
- **HPV vaccination coverage in adolescent females continued to be low**



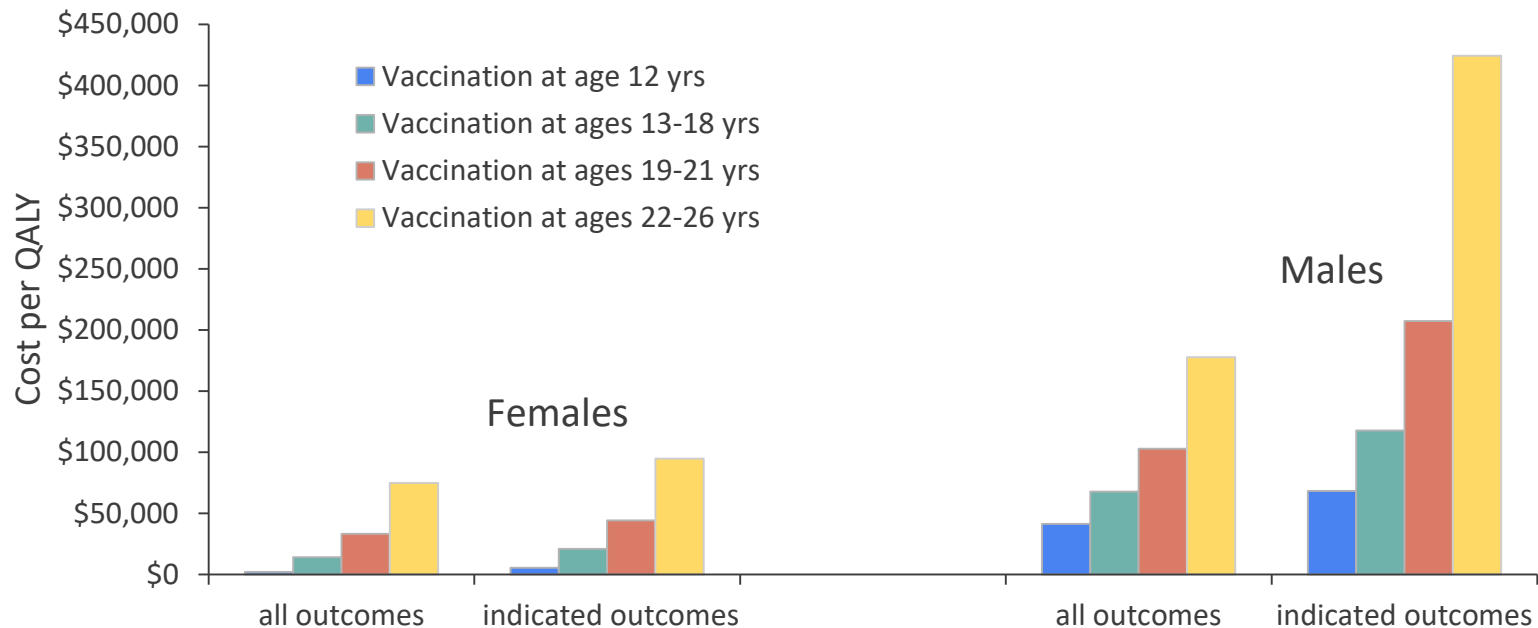
Vaccination coverage
among adolescents and
HPV vaccine among
females, 13–17 years

National Immunization
Survey-Teen, 2006–2010

Cost-effectiveness considerations for HPV vaccination of males, 2009-2011

- **Male vaccination less cost-effective than female vaccination**
 - Depends on health outcomes included in models
 - Depends on female vaccination coverage assumptions
- **Vaccination of men who have sex with men cost-effective through age 26 years**

Cost-effectiveness of routine and catch-up HPV vaccination, considerations in 2011



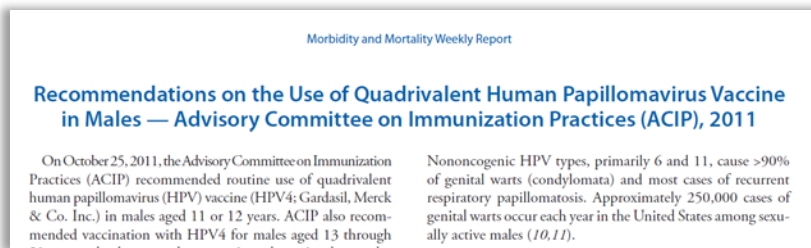
- Lower coverage scenario: 3-dose coverage 30% at age 12, 50% by age 26 years
- Vaccination of older age groups is incremental to vaccination of younger age groups. Results for male vaccination show incremental cost-effectiveness of expanding male vaccination to include additional age groups, in the context of an existing vaccine program for females aged 12-26 years.
- “Indicated” outcomes include cervical outcomes, vaginal, vulvar, and anal cancers, genital warts. All outcomes include indicated outcomes plus oropharyngeal cancer, penile cancer, and recurrent respiratory papillomatosis.

ACIP deliberations and conclusions: HPV vaccination of males, October 2011

- Quadrivalent HPV vaccine is safe/effective in males
- Burden of disease in males justifies routine vaccination; likely benefit against all HPV vaccine type-attributable disease
- Males as well as females should be protected against HPV: equity
- Vaccination of adolescent males is cost effective at current coverage levels
- In addition to protecting heterosexual males and their female sex partners, routine vaccination is the best way to reach MSM, and men with this sexual orientation, at an age when they could most benefit
- Higher cost per QALY for vaccination of 22–26 year-old males was a consideration for age recommendations for males

ACIP recommendations for HPV vaccination of males, 2011

- **Quadrivalent HPV vaccination of males was considered using GRADE**
 - Recommendation category A; evidence type 2
- **Recommendations for vaccination of males**
 - Routine at age 11 or 12 years; series can be started at age 9 years
 - Through 21 years if not vaccinated previously; 22–26 year-olds may be vaccinated
 - Through 26 years for high risk groups
- **United States was the first country to include routine vaccination of males in national immunization program**



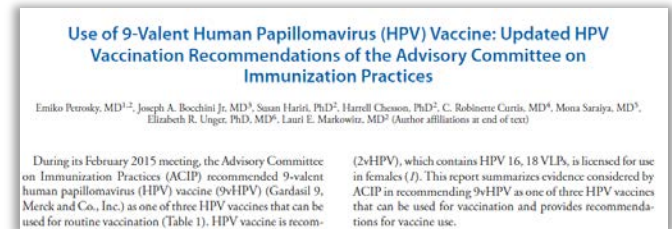
ACIP Recommendations for 9-valent HPV vaccine, 2015

- **FDA licensed 9-valent vaccine in 2014 for females and males**
 - Efficacy trial in females; immunobridging studies in females and males
- **ACIP considered 9-valent HPV vaccine using GRADE***
 - Vaccinating females and males with 9-valent vaccine estimated to be cost saving compared with 4-valent vaccine[†]
 - Modeling considered current policy for females and males
 - Did not reconsider age recommendations
 - Recommendation category A; evidence type 2 (females) and type 3 (males)

*<https://www.cdc.gov/vaccines/acip/recs/grade/hpv-9v.html>

[†]Brisson M et al. JNCI 2015

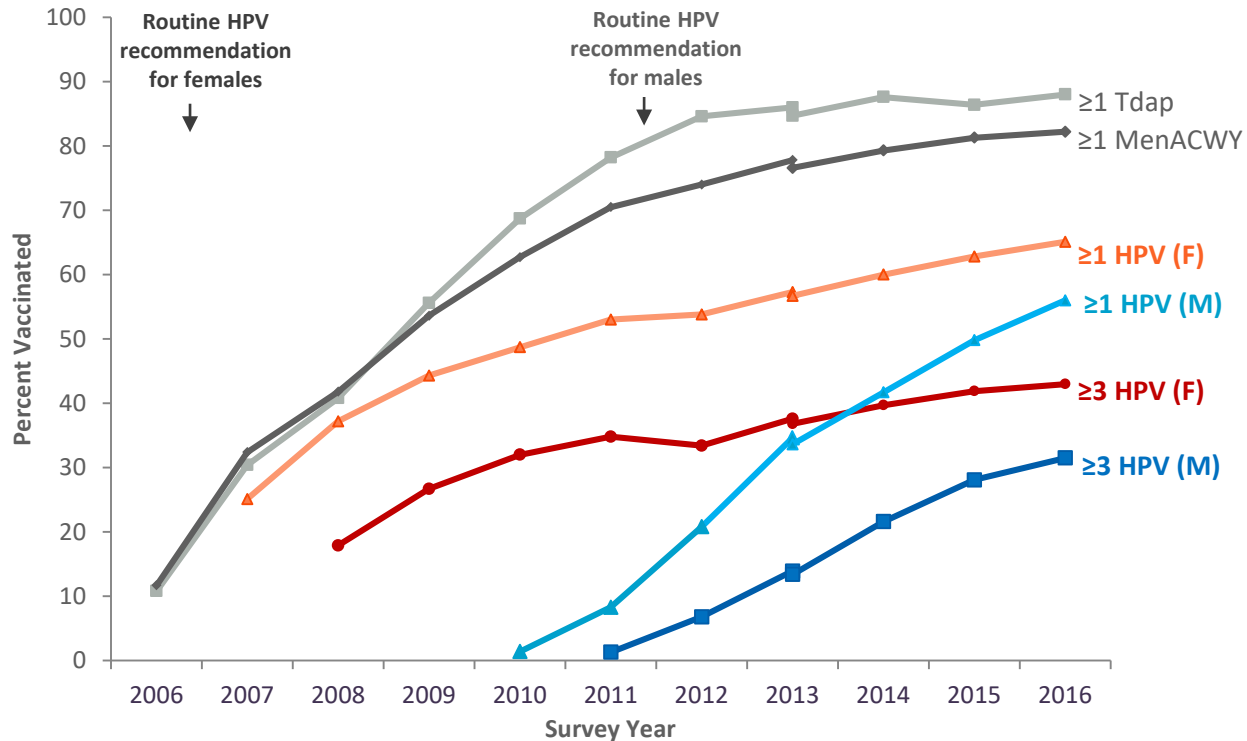
FDA, Food and Drug Administration



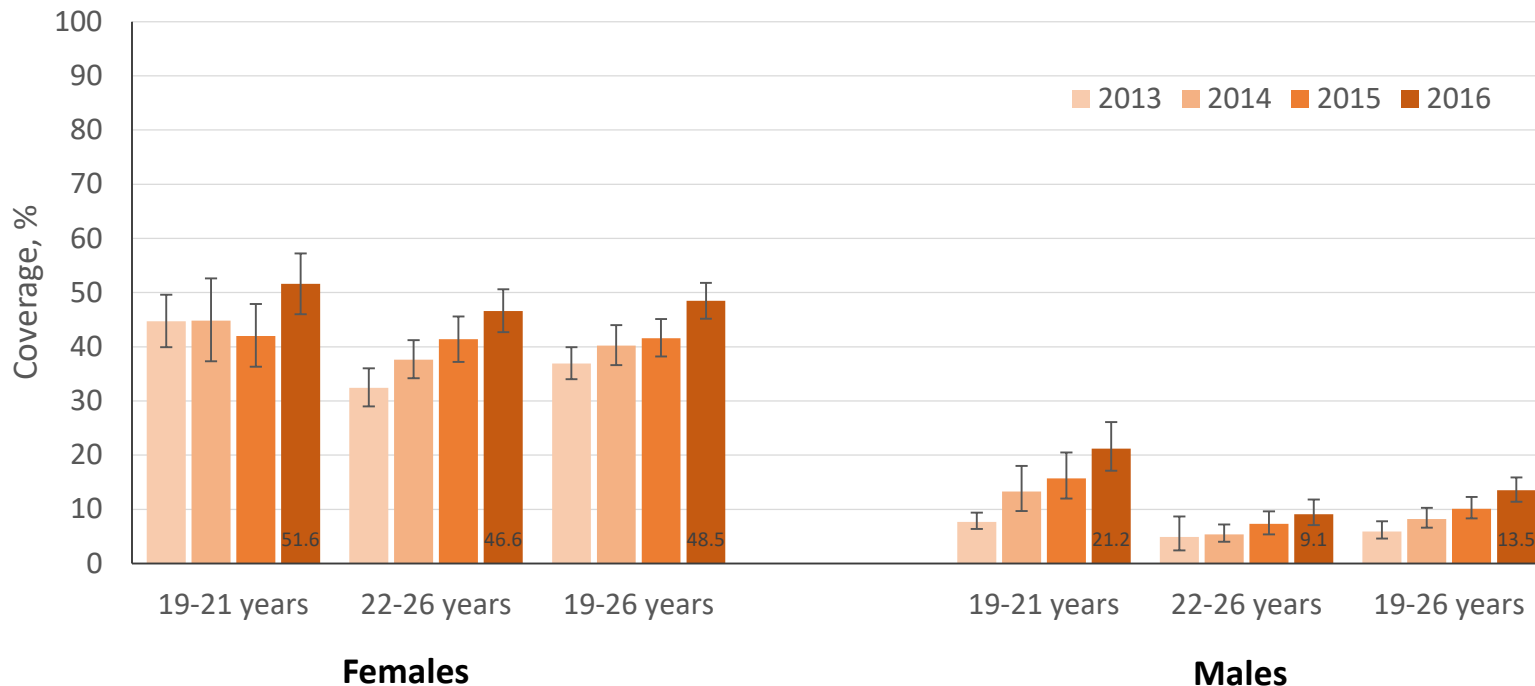
Considerations for harmonization of upper age recommendations for females and males

- Would simplify immunization schedule
- Might facilitate reaching males, including high risk males

Estimated vaccination coverage among adolescents aged 13–17 years, NIS-Teen, United States, 2006–2016



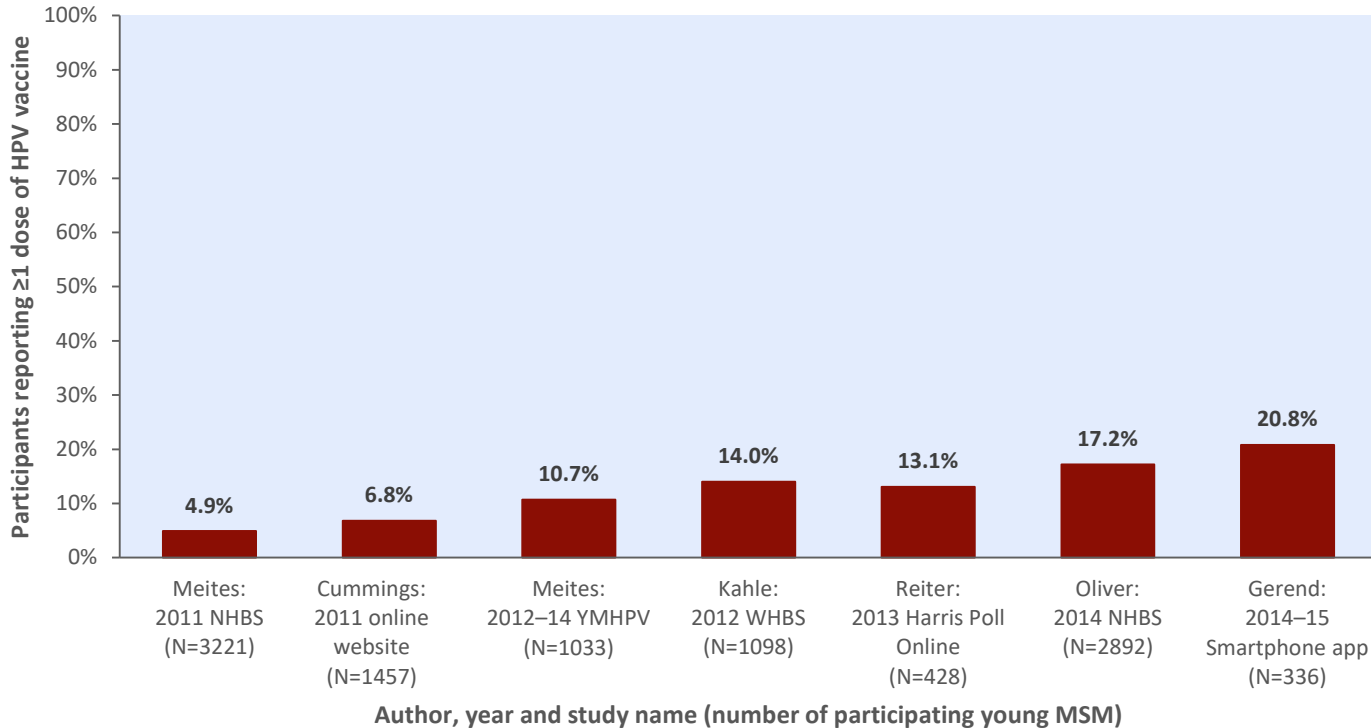
Estimated ≥ 1 dose HPV vaccination coverage among 19–26 year-olds, 2013–2016



Self-reported vaccination history from NHIS, National Health Interview Survey

Williams W, et al. MMWR 2017; Hung MC, et al. <https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/NHIS-2016.html>

HPV vaccination coverage among men who have sex with men (MSM), ages 18–26 years, 2011–2015



Meites E and Markowitz LE, slide presented at IPV Conference, 2017

NHBS, National HIV Behavior Surveillance; WHBS, Web-based HIV Behavioral Survey among Men Who Have Sex with Men

Next steps for consideration of harmonization of age recommendations for females and males

- Review burden of disease and HPV epidemiology in males (today)
- Summarize vaccine efficacy data in males
- Values and acceptability surveys regarding the age harmonization policy
 - Primary care providers
 - Association of Immunization Managers
- Updated cost effectiveness analysis
 - Extending 9vHPV for males from age 21 to 26 years in context of a 9-valent HPV vaccination program, under current vaccination coverage and costs
- Synthesize using Evidence to Recommendations Framework
- Potential vote in 2018

Presentations today

- **Trends in HPV-associated cancers**
 - Dr. Elizabeth Van Dyne (CDC/NCCDPPH)
- **Epidemiology of HPV in males**
 - Dr. Anil Chaturvedi (NIH/NCI)

ACIP HPV Vaccines Work Group

ACIP Members

Peter Szilagyi (Chair)
Cynthia Pellegrini
Jose Romero

Ex Officio Members

Jeff Roberts (FDA)
Joohee Lee (FDA)

CDC Lead

Lauri Markowitz

Liaison Representatives

Shelley Deeks (NACCI)
Linda Eckert (ACOG)
Sandra Fryhofer (ACP)
Amy Middleman (SAHM)
Chris Nyquist (AAP)
Sean O'Leary (PIDS)
Robin O'Meara (AAFP)
Patricia Whitley-Williams (NMA)
Jane Zucker (AIM)

Consultants

Joseph Bocchini
Tamera Coyne-Beasley
John Douglas
Sam Katz
Allison Kempe
Aimee Kreimer (NCI)
Debbie Saslow (ACS)
Rodney Willoughby

CDC Contributors

Jorge Arana
Harrell Chesson
Robin Curtis
Julianne Gee
Elissa Meites
Jeanne Santoli
Mona Saraiya
Shannon Stokley
Lakshmi Sukumaran
Elizabeth Unger

Thank You

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

