

Learning Objectives

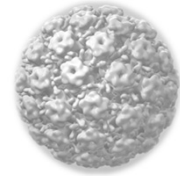
At the completion of this activity, participants will be better able to :

1. Assess the potential effect of HPV infection
2. Identify HPV serotypes associated with particular cancers and genital warts
3. Apply preventive strategies to reduce the prevalence of HPV-related disease

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HPV-Related Cancers and Diseases

- Worldwide, HPV causes ~5% of all new cancers occurring in males and females annually
- Globally, HPVs are responsible for:
 - Virtually 100% of cervical cancers
 - 75% of vaginal cancers
 - 69% of vulvar cancers
 - Almost all cases of genital warts and RRP
 - 91% of anal cancers
 - 63% of penile cancers
 - 70% of oropharyngeal cancers



HPV=human papillomavirus; RRP=recurrent respiratory papillomatosis.

1. Forman D et al. *Vaccine*. 2012;30 suppl 5:F12-F23; 2. Lacey CJ et al. *Vaccine*. 2006;24 suppl 3:S3/S3-S3/41; 3. Bailey HH et al. *J Clin Oncol*. 2016;34(15):1803-1812. <http://jco.ascopubs.org/content/early/2016/04/07/JCO.2016.67.2014.full>. Accessed June 17, 2016; 4. American Cancer Society. *Cancer Facts & Figures 2015*. Atlanta: American Cancer Society; 2015.

Approximately 80% of all people are infected by ≥ 1 type of HPV at some point in their lifetime

1. Syrjänen K, Syrjänen S. *Scand J Infect Dis Suppl*. 1990;69:17-17; 2. Dunne EF et al. *JAMA*. 2007;297(8):813-819; 3. Human Papillomavirus. In: Atkinson W et al, eds. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. 12th ed. Washington DC: Public Health Foundation/Centers for Disease Control and Prevention; 2011:175-196. <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hpv.pdf>. Accessed September 29, 2016.

Median Age at Cancer Diagnosis

- Breast Cancer 62 years
- Colon Cancer 68 years (men)
72 years (women)
- Prostate Cancer 67 years
- Lung Cancer 72 years

National Cancer Institute. Surveillance, Epidemiology, and End Results Program. <http://seer.cancer.gov/>. Accessed January 22, 2016.

HPV-Associated Cancers Affect Younger Adults Median Age at Diagnosis of HPV-Associated Cancers

- Cervical Cancer 47 years
 - More than 14% before age 35
- Oropharyngeal Cancer 62 years
 - 30% before age 50 years
 - HPV-related cancers typically <50 years
- Anal Cancer 60 years
 - More than 30% before age 55

1. National Cancer Institute. Surveillance, Epidemiology, and End Results Program. <http://seer.cancer.gov/>. Accessed January 22, 2016; 2. Marur S et al. *Lancet Oncol*. 2010;11(8):781-789; 3. Chaturvedi AK et al. *J Clin Oncol*. 2008;26(4):612-619.

Vaccine Composition

- Pseudovirion-based vaccines
 - Based on L1 (capsid) protein
 - Highly immunogenic
- Bivalent vaccine
 - HPV 16, HPV 18 pseudovirions
 - ASO₄ adjuvant
 - Combination of aluminum hydroxide and monophosphoryl lipid A
- Quadrivalent vaccine
 - HPV 6, HPV 11, HPV 16, HPV18 pseudovirions
 - Amorphous aluminum hydroxyphosphate sulfate adjuvant
- 9-valent vaccine
 - HPV 6, 11, 16, 18, 31, 33, 35, 45, 52, 58 pseudovirions
 - Amorphous aluminum hydroxyphosphate sulfate adjuvant

ASO₄=Adjuvant System 04.

qHPV Vaccine Efficacy (vaccine serotypes, PPE)

- In females
 - 98% for prevention of genital warts and for prevention of CIN2/3 and AIS
- In males
 - 90% for prevention of external genital lesions
 - 75% for prevention of AIN2/3

AIN=anal intraepithelial neoplasia; AIS=adenocarcinoma in situ; CIN=cervical intraepithelial neoplasia; PPE=parapneumonic pneumococcal empyema; qHPV=quadrivalent human papillomavirus.

New ACIP Recommendations for Use of the 9-Valent HPV vaccine (parallel to recommendations for quadrivalent vaccine)

- The 9-valent HPV vaccine is recommended for routine vaccination of 11- and 12-year-old males and females
- As with the quadrivalent vaccine, immunization may be initiated as young as age 9 years
- The ACIP also recommended catch-up immunization with the 9-valent vaccine for females aged 13-26 years and for males aged 13-21 years
- Immunization is also recommended for males aged 22-26 years if immunocompromised or MSM

MSM=men who have sex with men.

Petrosky E et al. Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep.* 2015;64(11):300-304.

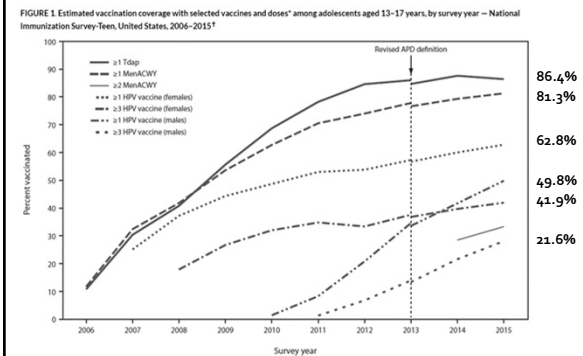
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What to do with people who have started, but have not yet completed, the 3-dose series?

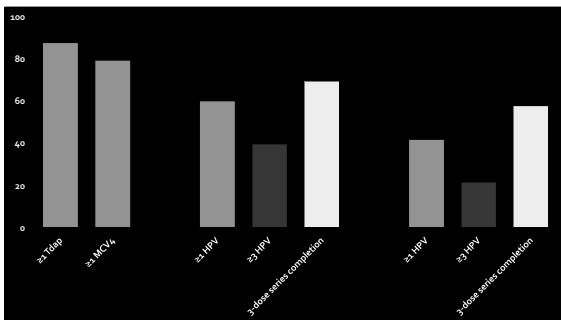
- For females, the ACIP does not make a preference among the 2-valent, 4-valent, or 9-valent vaccines
- For females, a 3-dose series with any of the vaccines is recommended
- For males, a 3-dose series with either the 4-valent or 9-valent is recommended

Petrosky E et al. Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep.* 2015;64(11):300-304. Supplemental guidance can be found at http://www.cdc.gov/hpv/downloads/9vHPV_guidance.pdf. Accessed September 30, 2016.

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Estimated Vaccination Coverage Among Adolescents Aged 13 to 17 Years, United States, National Immunization Survey-Teen, 2014



Reagan-Steiner S et al. *MMWR Morb Mortal Wkly Rep.* 2015;64(29):784-792.

Do we undervalue HPV immunization?

- National sample of 776 US physicians (53% pediatricians, 47% family medicine physicians)
- Assessed physicians' perceptions and communication practices related to recommending adolescent vaccines for 11- and 12-year-old patients

Gilkey MB et al. *Prev Med.* 2015 ;77:181-185.

Do we undervalue HPV immunization?

- For patients aged 11 to 12 years:
 - 95% of physicians reported recommending tetanus, diphtheria, and acellular pertussis (Tdap) as highly important
 - 87% of physicians reported recommending meningococcal conjugate vaccine (MCV4) as highly important
 - 73% of physicians reported recommending HPV vaccine as highly important

Gilkey MB et al. *Prev Med*. 2015 ;77:181-185.

Do we undervalue HPV immunization?

- 13% of physicians perceived HPV vaccine as being highly important to parents (74% for Tdap, 62% for meningococcal vaccine)
- Among physicians with a preferred order for discussing adolescent vaccines, 70% discussed HPV vaccine last

Gilkey MB et al. *Prev Med*. 2015 ;77:181-185.

Each year in the United States...

- Pertussis kills approximately 20 people per year, mostly young infants
- Meningococcal infections kill approximately 100 people each year.
- By vaccinating adolescents with Tdap and MCV4 vaccines, we are working to prevent approximately 120 fatalities per year

1. Centers for Disease Control and Prevention. 2014 Final Pertussis Surveillance Report. <http://www.cdc.gov/pertussis/downloads/pertuss-surv-report-2014.pdf>. Accessed September 30, 2016; 2. Centers for Disease Control and Prevention. Active Bacterial Core Surveillance (ABCS). <http://www.cdc.gov/abcs/reports-findings/surv-reports.html>. Accessed September 30, 2016.

And yet, each year in the United States...

- Approximately 4000 women die of cervical cancer, another 1900 die of vaginal and vulvar cancer, 1000 men and women die of anal cancers, and at least 1700 die of HPV-associated oropharyngeal cancers
- Taken together, timely HPV vaccination could prevent as many as 8000 to 10,000 HPV-associated cancer deaths

American Cancer Society. *Cancer Facts & Figures 2015*. Atlanta: American Cancer Society; 2015. <http://www.cancer.org/acs/groups/content/@editorial/documents/document/acspc-044552.pdf>. Accessed September 30, 2016.

Who are the best physicians to immunize adolescents against HPV?

**Pediatric/Family Medicine providers
or
Obstetrician/Gynecologists?**

Why Pediatricians and Family Medicine?

Why can't the Obstetrician/Gynecologists do this (especially for HPV)?

Why Pediatricians and Family Medicine?

- Adolescents need medical homes with providers who understand adolescent issues
- The vaccine works best when given at a younger age
 - Obstetrician/Gynecologists do not care for early teens
- Obstetrician/Gynecologists do not see males
- Obstetrician/Gynecologists are poor immunizers
- Pediatric providers are vaccine enthusiasts
- Caring for teens is good business

**Parents make decisions,
not on the basis of facts,
but on the basis of experience**

**When we speak provider-to-provider,
we use the language of epidemiology**

...We talk about risk

...We use statistics

...Proven facts matter

The prospective, double-blinded, placebo-controlled trial is the standard we demand

**How we talk about HPV immunization
with our patients and in the community
must differ from
how we speak with one another**

**To best serve our patients,
we must be translators.**

**When we talk to patients
and in the community,
we must be less scientific
and more emotional**

We must tell compelling stories.

**Each year in the United States,
because of our low HPV
immunization rates,
non-immunizing providers condemn
approximately 2200 women
to die of vaccine-preventable
cervical cancer**

Two Approaches...

- HPV stands for human papillomavirus
- HPV causes genital warts and cervical cancer
- HPVs are transmitted sexually
- Many adolescents become sexually active by age 13 years
- Do you want this vaccine for your 11-year-old?

Two Approaches...

- Has anyone that you care about had cancer?
 - What was it like for him or her?
 - What was it like for you?
- We can reduce the chances of your son or daughter having a cancer experience
- Do you want to reduce your child's risk for cancer?

HPVTdapmeningococcalflu

When talking with parents about immunization, parents want to know 3 things:

1. Does it work?
2. Is it safe?
3. What is your recommendation?

Talking With Parents About Immunization

1) Does it work?

Yes!

Vaccine efficacy is high for prevention of cervical disease, genital warts, and anal malignancies.

The vaccine may also protect against some head and neck cancers.

Talking With Parents About Immunization

2) Is it safe?

Yes!

Large clinical trials and extensive postmarketing surveillance have identified sore arms, and the occasional headache and fever, as the only vaccine-associated side effects.

Talking With Parents About Immunization

3) What is your recommendation?

Use Every Opportunity to Immunize

**Nothing you do for children
is ever wasted.**

Garrison Keillor