Human Papillomavirus (HPV) Vaccines: Addressing Safety & Efficacy – Promoting Adolescent Immunization

James H. Conway, MD FAAP
Professor of Pediatrics
Division of Pediatric Infectious Disease
University of Wisconsin – School of Medicine & Public Health
Wisconsin Chapter – American Academy of Pediatrics
Disclosure Statement

I disclose the following relationships with commercial interests:

– Research/Grant Support: Sanofi-Pasteur Pediatric Vaccines, Centers for Disease Control, American Academy of Pediatrics
– Consultant/Advisory Board: Merck Vaccines

• I do not intend to reference unlabeled or unapproved uses of drugs or products in my presentation.
Objectives

• Review the adolescent vaccine platform
• Review currently available vaccines
• Explore the efficacy of these vaccines
  – HOW DOES IT WORK?
  – DOES IT WORK?
• Transmission in USA
  – DOES MY PATIENT/KID NEED IT?
• Addressing Safety Concerns
  – IS IT SAFE?
• Conclusions
Top 5 reasons for not vaccinating daughter, among parents with no intention to vaccinate in the next 12 months, NIS-Teen 2012

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not needed or necessary</td>
<td>19.1%</td>
</tr>
<tr>
<td>Not recommended by provider</td>
<td>14.2%</td>
</tr>
<tr>
<td>Safety concern/side effects</td>
<td>13.3%</td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>12.6%</td>
</tr>
<tr>
<td>Not sexually active</td>
<td>10.1%</td>
</tr>
</tbody>
</table>

Response categories are not mutually exclusive
A Brief History of Adolescent Immunizations

• 1996 ACIP, AAP, AAFP & AMA first recommended a health-care visit at 11-12 years

• Before 2005 immunizations for adolescents only administered for ‘catch up’ or ‘special circumstances’

• 2006 NIS first collected immunization information for adolescents 13-17 years old

• 2006-2007 Creating the Adolescent Platform
Few Adolescents Would Visit Physicians’ Offices for *Preventive* Care

Only 8% of all reported physician visits by 11- to 18-year-old patients were coded as “preventive”

Clinical Snapshot: How Many Adolescents Visited Physicians’ Offices in 2003?

Of **32.8 million** adolescents ages 11–18 years, approximately 26.6 million visited a physician in 2003.

1. US Census Bureau, accessed August 2005
Opportunities to Immunize Adolescents Are Missed

When Physicians Check Immunization Status…

The Healthy People 2010 objective is 90% vaccination coverage among adolescents 13 to 15 years. Any new universally recommended vaccine for adolescents should be at a 90% coverage level within 5 years of the recommendation. Recommendations were published for MCV4 in 2005, for Tdap in 2006, and for HPV in 2007.


Recommendations for HPV vaccination in the United States

- **Quadrivalent**
  - Routine, females 11 or 12 yrs* and 13-26 yrs not previously vaccinated
  - May be given, males 9-26 yrs*

- **Quadrivalent or Bivalent**
  - Routine, females 11 or 12 yrs* and 13-26 yrs not previously vaccinated
  - Routine, males 11 or 12 yrs* and 13-21 yrs not previously vaccinated
  - May be given, 22-26 yrs**

*June 2006, 2007
October 2011, 2012

Quadrivalent (HPV 6,11,16,18) vaccine; Bivalent (HPV 16,18) vaccine
HPV Infection

- Almost all females and males will be infected with at least one type of HPV at some point in their lives
  - Estimated 79 million Americans currently infected
  - 14 million new infections/year in the US
  - HPV infection is most common in people in their teens and early 20s
- Most people will never know that they have been infected
HPV vaccines and vaccine immunogenicity
HOW DOES IT WORK?
Human Papillomavirus (HPV)

- >100 types identified\(^2\)
- 30–40 anogenital\(^2,3\)
  - 15–20 oncogenic\(^4\)
    - *HPV 16 (54%) and HPV 18 (13%)* account for the majority of worldwide cervical cancers.\(^5\)
  - Nononcogenic\(\dagger\) types include: 6, 11, 40, 42, 43, 44, 54\(^4\)
    - *HPV 6 and 11* are most often associated with external anogenital warts.\(^3\)

Natural history of HPV infections: cervix

- Initial HPV infection
  - Within 1 year
  - Persistent infection
  - 1-5 years
  - CIN 1
  - Up to decades
  - CIN 2/3
  - Cervical cancer

CIN – cervical intraepithelial neoplasia

Cleared HPV infection

The Cervical Transformation Zone

• Area of immature metaplasia between the original and current squamocolumnar junction (SCJ)¹

• ~99% of HPV-related genital cancers arise within the transformation zone of the cervix.¹

HPV Prophylactic Vaccines

- Recombinant L1 capsid proteins that form “virus-like” particles (VLP)
- Non-infectious and non-oncogenic
- Produce higher levels of neutralizing antibody than natural infection
HPV vaccines
WHAT ARE THE OPTIONS?
### HPV vaccines licensed in the US

<table>
<thead>
<tr>
<th></th>
<th>Bivalent (2vHPV, Cervarix)</th>
<th>Quadrivalent (4vHPV, Gardasil)</th>
<th>9-valent (9vHPV, Gardasil 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L1 VLP types</strong></td>
<td>16, 18</td>
<td>6, 11, 16, 18</td>
<td>6, 11, 16, 18, 31, 33, 45, 52, 58</td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
<td>GlaxoSmithKline</td>
<td>Merck &amp; Co.</td>
<td>Merck &amp; Co.</td>
</tr>
<tr>
<td><strong>Adjuvant</strong></td>
<td>AS04: 500 μg aluminum hydroxide, 50 μg 3-O-desacyl-4’-monophosphoryl lipid A</td>
<td>AAHS: 225 μg amorphous aluminum hydroxyphosphate sulfate</td>
<td>AAHS: 500 μg amorphous aluminum hydroxyphosphate sulfate</td>
</tr>
<tr>
<td><strong>Schedule</strong></td>
<td>3-dose series</td>
<td>3-dose series</td>
<td>3-dose series</td>
</tr>
</tbody>
</table>

\~99% of HPV vaccine administered in US through 2014 was quadrivalent HPV vaccine.
## Licensed age groups for available HPV vaccines

<table>
<thead>
<tr>
<th></th>
<th>Bivalent (Cervarix)</th>
<th>Quadrivalent (Gardasil)</th>
<th>9-valent (Gardasil 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensure</td>
<td>Females 9-25 years</td>
<td>Females 9-26 years</td>
<td>Females 9-26 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Males 9-26 years</td>
<td>Males 9-15 years</td>
</tr>
</tbody>
</table>

- At the time of the first application to FDA, 9vHPV immunogenicity trials in males 16-26 years had not been completed.
- Immunogenicity data for males 16-26 years were presented to ACIP and submitted to FDA.
- In February 2015, ACIP recommended use of 9vHPV in the currently recommended age groups – through 21 years for males*
  - Use in males 16-26 years is off label at this time

*through age 26 for MSM and immunocompromised males and those with HIV infection
FDA Approves Expanded Age Indication for GARDASIL® 9 in Males

GARDASIL 9 Now Approved for Males 16 through 26 Years of Age for the Prevention of Anal Cancers and Genital Warts Caused by Nine HPV types

Dec 15, 2015
Estimated annual number of cancers attributable to HPV 16/18 and 5 additional HPV types in 9-valent vaccine, U.S.*

- **Females**
  - Cervix: 9000 (HPV 16/18), 1000 (5 additional types)
  - Vulva: 2000 (HPV 16/18), 100 (5 additional types)
  - Vagina: 1000 (HPV 16/18), 100 (5 additional types)
  - Anus: 1000 (HPV 16/18), 100 (5 additional types)
  - Oropharynx: 3000 (HPV 16/18), 200 (5 additional types)

- **Males**
  - Penis: 1000 (HPV 16/18), 100 (5 additional types)
  - Anus: 300 (HPV 16/18), 100 (5 additional types)
  - Oropharynx: 4500 (HPV 16/18), 300 (5 additional types)

*Based on years 2006-2010 [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6349a11.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6349a11.htm) and data from Saraiya et al. JNCI 2015;107*
HPV efficacy: DOES IT WORK?
HPV Vaccine
Duration of Immunity
• Studies suggest that vaccine protection is long-lasting; no evidence of waning immunity
  – Available evidence indicates protection for at least 8-10 years
  – Multiple cohort studies are in progress to monitor the duration of immunity

Variation in Dosing Regimen for GARDASIL

Summary of Geometric Mean Titers (GMTs)

Variability in Dose 2*

Variability in Dose 3†

*Dose 2 (Postdose 1): Early = 36–50 days Postdose 1; On Time = 51–70 days; Late = 71–84 days.
†Dose 3 (Postdose 2): Early = 80–105 days Postdose 2; On Time = 106–137 days; Late = 138–160 days.
Anti-HPV Neutralizing Antibodies By Age [at month 7]

*Inclusive of 5 study protocols; all GMTs measured using cLIA.
Neutralizing Antibody Titers to HPV16 by age (non-inferiority)

Per-protocol immunogenicity population (9–26 year old females and males): Month 7 anti-HPV cLIA Geometric Mean Titers (GMTs)

- **Females**
  - 9–15 years: 4919 (95% CI: 4557, 5309; n=915)
  - 16–26 years: 2409 (95% CI: 2309, 2514; n=3249)

- **Males**
  - 9–15 years: 6057 (95% CI: 5601, 6549; n=882)
  - 16–26 years: 2403 (95% CI: 2243, 2575; n=1136)

Population consisted of individuals who received all 3 vaccinations within pre-defined day ranges, did not have major deviations from the study protocol, met predefined criteria for the interval between the Month 6 and Month 7 visit, and were naïve (PCR negative and seronegative) to HPV 16 prior to dose 1 and through 1 month Postdose 3 (Month 7) cLIA=competitive Luminex immunoassay; mMU=milli-Merck Units; CI=confidence interval.
Better antibody response is observed among preteens compared to older teens

- Results of immunogenicity studies during VE trials
- 18 months post HPV4 series completion, anti-HPV antibodies in females aged 9-15 years were two- to three-fold higher than those observed in females aged 16-26 years
HPV vaccine immunogenicity (continued)

• Duration of immunity
  – For both vaccines, subset of participants followed for >60 months with no evidence of waning immunity
  – Anti-HPV antibody titers decline over time after the third dose but plateau by 24 months
  – Vaccinated women given a challenge dose (revaccinated) 5 years after enrollment demonstrated increase in antibody titer consistent with immune memory
  – This available evidence suggests protection for at least 8-10 years
  – Multiple cohort studies in progress to monitor duration of immunity
HPV vaccination:
Measures of program impact

Monitoring impact of HPV vaccine programs: HPV-associated outcomes

Early Outcomes (Years)
- HPV Prevalence
- Genital warts

Mid Outcomes (Years-Decades)
- CIN/Precancers

Late Outcomes (Decades)
- HPV-associated cancers
Genital Warts

- ~1 in 10 people will develop genital warts over a lifetime.¹
- ~1 in 100 sexually active adults has clinically visible genital warts.²
- ~2 in 3 people develop warts when exposed by a sexual partner.³

Because cases of genital warts are likely to be underreported, incidence data likely underestimate the true occurrence.⁴

Proportion of Australian-born women and heterosexual men diagnosed with genital warts at first visit, by age group, 2004-2011

Females (%)

Heterosexual males (%)

Anogenital wart prevalence among females with private health insurance, by age, U.S., 2003-2010


Markowitz L E et al. J Infect Dis. 2013;infdis.jit192

Published by Oxford University Press on behalf of the Infectious Diseases Society of America 2013.
Prevalence of HPV 6, 11, 16, 18* in Cervicovaginal Swabs, by Age Group
NHANES, 2003-2006 and 2007-2010

HPV Vaccine Impact

Australia: 80% of school-age girls are fully vaccinated

- High-grade cervical lesions have declined in women less than 18 years of age
- For 15-24 year old females, the proportion of genital warts cases declined by 85%
- Genital warts have declined by 71% among males of the same age, indicating herd immunity

US: 33% of teens are fully vaccinated

- 56% decline in HPV 6/11/16/18 in girls age 14-19
- 20% decrease in all CIN2/3 among 21-24 year olds
- Substantial decrease in genital warts among female military under age 26 between 2007 to 2010

The Early Benefits of Human Papillomavirus Vaccination on Cervical Dysplasia and Anogenital Warts

Leah M. Smith, MSc, Erin C. Strumpf, PhD, Jay S. Kaufman, PhD, Aisha Lofters, MD, PhD, Michael Schwandt, MD, MPH, Linda E. Lévesque, BScPhm, PhD

Ontario, Canada – 260,493 girls
Population based cohort comparing before/after HPV program
- HPV vaccines in Grades 8-9 (88% completed series)
- Outcomes in Grades 10-12
- Reduced incidence of dysplasia by 5.7 per 1000 girls
- Relative reduction of 44%
HPV Vaccine Safety
# CDC Immunization Safety Office post-licensure vaccine safety monitoring infrastructure

<table>
<thead>
<tr>
<th>System</th>
<th>Collaboration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine Adverse Event Reporting System</td>
<td>CDC and FDA</td>
<td>US frontline spontaneous reporting system to detect potential vaccine safety problems</td>
</tr>
<tr>
<td>(VAERS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Vaccine Safety Datalink (VSD)                | CDC and 9 Managed Healthcare Plans | Large linked database system used for active surveillance and research  
|                                              |                                | ~9.2 million members (~3% of US pop.)  
|                                              |                                | -Conducts monitoring & evaluation  
|                                              |                                | -Rates & risk estimates can be calculated |
| Clinical Immunization Safety Assessment (CISA) Project | CDC and 7 Academic Centers | Expert collaboration that conducts individual clinical vaccine safety assessments and clinical research |
HPV vaccines: safety

• More than **60 million doses** of HPV vaccine distributed in the U.S. since 2006 and more than **200 million doses** worldwide.
  
  – Most common adverse events reported are local reactions at the site of injection (20-90%) and fever (10-13%).
  
  – **No new safety concerns identified** during post-licensure vaccine safety surveillance among vaccine recipients.
  
  – Among 7.9% of reports coded as “serious,” most frequently cited include: headache, nausea, vomiting, fatigue, dizziness, syncope, and generalized weakness.

• **Syncope** continues to be a frequently reported adverse event among adolescents in general.


Trends in total and serious female HPV4 vaccine reports to VAERS

(N=21,194)

Year Report Received

Number of Reports

<table>
<thead>
<tr>
<th>Year</th>
<th>Female Serious HPV4 reports</th>
<th>Female Total HPV4 Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>0</td>
<td>474</td>
</tr>
<tr>
<td>2007</td>
<td>563</td>
<td>6114</td>
</tr>
<tr>
<td>2008</td>
<td>6270</td>
<td>6532</td>
</tr>
<tr>
<td>2009</td>
<td>3457</td>
<td>4183</td>
</tr>
<tr>
<td>2010</td>
<td>2364</td>
<td>2708</td>
</tr>
<tr>
<td>2011</td>
<td>1671</td>
<td>2102</td>
</tr>
<tr>
<td>2012</td>
<td>1134</td>
<td>1380</td>
</tr>
<tr>
<td>2013</td>
<td>615</td>
<td>711</td>
</tr>
</tbody>
</table>

CDC, unpublished data
Markowitz L. HPV Vaccination Program and Impact Monitoring:
## Tolerability Profile in Females

### Injection-Site Adverse Reactions

<table>
<thead>
<tr>
<th></th>
<th>qHPV vaccine (n = 5,088)</th>
<th>AAHS control (n = 3,470)</th>
<th>Saline placebo (n = 320)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>84%</td>
<td>75%</td>
<td>49%</td>
</tr>
<tr>
<td>Swelling</td>
<td>25%</td>
<td>16%</td>
<td>7%</td>
</tr>
<tr>
<td>Erythema</td>
<td>25%</td>
<td>18%</td>
<td>12%</td>
</tr>
<tr>
<td>Pruritus</td>
<td>3%</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td>Bruising</td>
<td>3%</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Systemic Adverse Reactions

<table>
<thead>
<tr>
<th></th>
<th>qHPV vaccine (n = 5,088)</th>
<th>Placebo&lt;sup&gt;a&lt;/sup&gt; (n = 3,790)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyrexia</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>Nausea</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Dizziness</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>

AAHS = amorphous aluminum hydroxyphosphate sulfate; qHPV = quadrivalent human papillomavirus.

The table shows the common systemic and injection-site adverse experiences that were observed among recipients of qHPV vaccine at a frequency of at least 1.0% and also at a greater frequency than that observed among placebo recipients (females aged 9 to 26 years).

<sup>a</sup>Placebo = AAHS control (n=3,470) and saline placebo (n=320).
# Tolerability Profile in Males

## Injection-Site Adverse Reactions

<table>
<thead>
<tr>
<th></th>
<th>qHPV vaccine (n = 3,093)</th>
<th>AAHS control (n = 2,029)</th>
<th>Saline placebo (n = 274)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>61%</td>
<td>51%</td>
<td>42%</td>
</tr>
<tr>
<td>Erythema</td>
<td>17%</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>Swelling</td>
<td>14%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Hematoma</td>
<td>1%</td>
<td>0.3%</td>
<td>3%</td>
</tr>
</tbody>
</table>

## Systemic Adverse Reactions

<table>
<thead>
<tr>
<th></th>
<th>qHPV vaccine (n = 3,093)</th>
<th>Placebo(^a) (n = 2,303)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>Pyrexia</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>Oropharyngeal pain</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>

AAHS = amorphous aluminum hydroxyphosphate sulfate; qHPV = quadrivalent human papillomavirus.

The table shows the common systemic and injection-site adverse experiences that were observed among recipients of qHPV vaccine at a frequency of at least 1.0% and also at a greater frequency than that observed among placebo recipients (males aged 9 to 26 years).

\(^a\)Placebo = AAHS control (n=2029) and saline placebo (n=274).
DOES EVERY KID NEED IT?
Nonsense! Our little purity princess will NEVER have sex!
Estimated Prevalence of HPV infection

High risk/oncogenic HPV
Low risk/non-oncogenic HPV

Females¹,²

Males²,³

Most HPV infections clear on their own³

Estimates include all HPV types, not just HPV types 6, 11, 16 & 18.

¹ Prevalence of HPV DNA was determined from 4,150 study participants (aged 14-59) who provided self-collected cervicovaginal swab samples. ¹
² Prevalence of genital HPV infection among men age 18–44 years in Tucson, Arizona (N = 290). ²
Rapid acquisition of HPV following sexual debut

- **partridge et al.** Male university students aged 18-23 years (N=240)
- **winer et al.** Female university students aged 18-20 years (N=603)

---

The Most Effective Time to Vaccinate Is Before Exposure

These data suggest minimal risk of exposure to HPV in 9- to 11-year-olds.

In an analysis of 1,552 adolescents and young adults, the subset (n=1,014) featured in this chart reported having engaged in sexual intercourse.

WI Youth Risk Behavior

- 2,843 students in 53 public schools
- Response rate 68%
- 77% white
- Grades: 25% each from grades 9-12
- Sexual debut less than age 13 = 3%
  - (was 7% 1993)
- Sex ever = 35%
  - (was 47% 1993)
### Sexual intercourse by race/ethnicity.

<table>
<thead>
<tr>
<th></th>
<th>Asian</th>
<th>Black</th>
<th>Hisp</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever had sexual intercourse</td>
<td>14%</td>
<td>62%</td>
<td>41%</td>
<td>32%</td>
</tr>
<tr>
<td>Sexual intercourse before age 13</td>
<td>1%</td>
<td>11%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>4 or more partners</td>
<td>3%</td>
<td>22%</td>
<td>11%</td>
<td>8%</td>
</tr>
<tr>
<td>Sexual intercourse past 3 months</td>
<td>8%</td>
<td>39%</td>
<td>32%</td>
<td>24%</td>
</tr>
</tbody>
</table>

### Behaviors among sexually active students. *

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had sexual intercourse in past 3 months</td>
<td>24%</td>
<td>28%</td>
</tr>
<tr>
<td>Used alcohol or drugs before last sexual intercourse*</td>
<td>30%</td>
<td>16%</td>
</tr>
<tr>
<td>Used condom during last sexual intercourse*</td>
<td>68%</td>
<td>58%</td>
</tr>
<tr>
<td>Used birth control pills before last sexual intercourse*</td>
<td>21%</td>
<td>26%</td>
</tr>
</tbody>
</table>

*Among students who had sexual intercourse in the last 3 months*

*Age-adjusted to the 2000 U.S. standard population.

Data from population-based cancer registries participating in the CDC-supported National Program of Cancer Registries and/or the National Cancer Institute-supported Surveillance, Epidemiology and End Results Program, meeting criteria for high data quality, and covering 100% of the population. Published in: Watson et al. Human papillomavirus-associated cancers—United States, 2004–2008. MMWR 2012;61:258–261.
Relative risks for CIN and invasive cancer increase with decreasing age of first sexual intercourse

Age at First Intercourse (Years)

- ≥23 or Never
- 18–22
- ≤17

Relative risks for CIN and invasive cancer increase with decreasing age of first sexual intercourse.

- CIN
  - (n=206)

- Invasive Cervical Cancer
  - (n=327)

*Mantle-Haenszel estimates adjusted for age only

DOES IT CHANGE SEXUAL BEHAVIOR?
Critics claim HPV vaccination will lead to promiscuity.

I am so turned on right now.
Receipt of HPV vaccine does not increase sexual activity or decrease age of sexual debut

Kaiser Permanente Center for Health Research

1,398 girls who were 11 or 12 in 2006, 30% of whom were vaccinated, followed through 2010

No difference in markers of sexual activity, including

- Pregnancies
- Counseling on contraceptives
- Testing for, or diagnoses of, sexually transmitted infections
Top 5 reasons for not vaccinating daughter, among parents with no intention to vaccinate in the next 12 months, NIS-Teen 2012

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not needed or necessary</td>
<td>19.1%</td>
</tr>
<tr>
<td>Not recommended by provider</td>
<td>14.2%</td>
</tr>
<tr>
<td>Safety concern/side effects</td>
<td>13.3%</td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>12.6%</td>
</tr>
<tr>
<td>Not sexually active</td>
<td>10.1%</td>
</tr>
</tbody>
</table>

Response categories are not mutually exclusive

MMWR 2013; 62:591-5
Parent opinions on the importance of vaccines and provider estimates of parental responses

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Parent</th>
<th>Provider's estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningitis</td>
<td>9.4</td>
<td>9.2</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>9.5</td>
<td>9.2</td>
</tr>
<tr>
<td>Pertussis</td>
<td>9.5</td>
<td>9.3</td>
</tr>
<tr>
<td>Influenza</td>
<td>9.3</td>
<td>7.0</td>
</tr>
<tr>
<td>HPV</td>
<td>9.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Adolescent vaccines</td>
<td>9.2</td>
<td>7.8</td>
</tr>
</tbody>
</table>

Prevent HPV-related cancers, cancer precursor lesions and genital warts

• Emphasize HPV vaccination as a standard and routine part of adolescent health care.

• Eliminate missed opportunities to vaccinate.
  – Take advantage of the adolescent immunization visit and every other potential visit.

• Do not delay vaccination.
  – Start the conversation regarding HPV vaccination during the first adolescent visit.

• Share a personal story and welcome questions from parents, especially about HPV vaccine safety.
Giving a Strong Recommendation

- Parents trust their health provider’s opinion more than anyone else's when it comes to immunizations.
- If we were to give HPV vaccine when other adolescent vaccines are given, our rates would be close to 90% and 4,400 cases of cervical cancer would be prevented.

YOU ARE THE KEY TO CANCER PREVENTION
Summary

Tell parents that **almost everyone gets HPV** and HPV can cause a variety of cancers in women and men.

Remind parents that **HPV vaccine is for cancer prevention**.

Provide a **strong recommendation for HPV vaccine** when patients are 11 or 12 years old.

Listen carefully to and **welcome patient and parent questions** especially about safety.
HPV YOU ARE THE KEY TO CANCER PREVENTION

Join the Campaign
Thank you

You’re not opening the door to sex.

You’re closing the door to cancer.

HPV vaccine is cancer prevention.
Talk to your child’s doctor about vaccinating your 11-12 year old against HPV.
www.cdc.gov/vaccines/teens