National Center for Immunization & Respiratory Diseases

HPV Trends: Improving Vaccination Coverage

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HPV vaccine is cancer prevention.
Talk to the doctor about vaccinating your 11–12 year old sons and daughters against HPV.
#UCanStopHPV
Estimated numbers of HPV-associated cancers attributable to HPV 16/18 and 5 additional types in 9-valent vaccine, United States

Viens et al, http://www.cdc.gov/mmwr/volumes/65/wr/mm6526a1.htm

Number of HPV-Attributable Cancers Averted over 100 Years of 9-Valent HPV Vaccination Program

Viens et al, http://www.cdc.gov/mmwr/volumes/65/wr/mm6526a1.htm

Number of HPV-attributable cancers averted

HPV cancers averted total (excluding herd immunity)  
2014 HPV coverage (Females 39.7%, Males 21.6%)  1.27 million
80% HPV coverage  1.23 million

Total US population

HPV cancers averted total  
709,000  
1.56 million

Estimates calculated using published model (Chesson et al. Hum Vaccin Immunother 2016), with modified coverage assumptions. Coverage levels shown (39.7%, 21.6%, and 80%) refer to coverage among ages 13-17. For females, the annual probability of vaccination in the current coverage scenario was modeled as 20.9% for age 12, 8.9% for ages 13 to 18, and 0.89% for ages 19 to 26. For males, these values were 10.5%, 4.4%, and 0.44% (through age 21), respectively. In the 80% coverage scenario, the annual probability of vaccination was 73.8% for age 12, 8.9% for ages 13 to 18, and 0.89% for those 19 and older (through age 21 for men and age 26 for women).
Rate (cases per 100,000 persons) of HPV-associated cancers by state, 2010-2014

Cervical Cancer

- Cervical cancer is the most common HPV-associated cancer among women
  - 528,000 new cases and 266,000 deaths worldwide in 2012
  - 12,000 new cases and 4,000 deaths in the U.S. in 2013

- Half of cervical cancers occur in women <50 years
  - A quarter of cervical cancers occur in women 25-39 years

HPV-Associated Cervical Carcinoma Rates by State, United States, 2008–2012

Rate are per 100,000 persons and age-adjusted to the 2000 US standard population. Data are from population-based registries participating in CDC's National Program of Cancer Registries or NCI's Surveillance, Epidemiology, and End Results Program, meeting USCS publication criteria for all years 2008–2012, and cover about 99% of the US population. Rates were suppressed if the data did not meet USCS publication criteria or if there were fewer than 16 cases. HPV-associated cancers were defined as cancers at specific anatomic sites with specific cellular types in which HPV DNA frequently is found. All cancers were confirmed histologically. Cervical cancers (ICD-O-3 site codes C53.0–C53.9) were limited to carcinomas (ICD-O-3 histology codes 8010–8671, 8940–8941).


Vaccine type HPV seroprevalence, NHANES

Early vaccine era compared to pre-vaccine era

Markowitz et al. JID 2013;208:385-393
Vaccine type HPV seroprevalence, NHANES
Later vaccine era compared to pre-vaccine era

Recommended Immunizations for Adolescents

10 Years of HPV Vaccination

Estimated Vaccination Coverage with ≥1 Tdap, Adolescents Aged 13-17 Years, NIS-Teen, United States, 2016

US national estimate: ~88%. Texas: ~85%

Estimated Vaccination Coverage with ≥1 MenACWY, Adolescents Aged 13-17 Years, NIS-Teen, United States, 2016

US national estimate: ~82%. Texas: ~85%

*Source Walker, et al. MMWR; August 25, 2017 / 66(33);874-882

Estimated Vaccination Coverage with ≥1 HPV, Adolescents Aged 13-17 Years, NIS-Teen, United States, 2016

US national estimate: ~60%. Texas: ~49%. (El Paso ~80%)!

*Source Walker, et al. MMWR; August 25, 2017 / 66(33);874-882
Average Annual Increase in Coverage with ≥1 HPV, Adolescents Aged 13-17 Years, NIS-Teen, United States, 2013-2016

National Average Annual Increase = 5.0 percentage points

*Source: Reagan-Steiner, et al. MMWR; August 26, 2016 / 65(33);850-858; Walker, et al. MMWR; August 25, 2017 / 66(33);874-882 and


**Year**
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014

**Percent Vaccinated**
- 0
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90
- 100

- MMR (1+)
- DTP/Dtap (3+)*
- Polio (3+)*
- Hib (3+)*
- HepB (3+)
- Varicella (1+)
- PCV (4+)
- Rotavirus*
- HepA (2+)*

**Vaccine**
- 1+ Varicella
- 3+ HepB
- 4+ PCV
- 3+ Hib
- Rotavirus
- 2+ HepA

*Source: Reagan-Steiner, et al. MMWR; August 26, 2016 / 65(33);850-858; Walker, et al. MMWR; August 25, 2017 / 66(33);874-882 and
Components for successful infant immunization

Provider motivation and skill

Parental acceptance

Systems support

Challenges for HPV immunization

Lack of provider motivation and skill

Lack of parental acceptance

Lack of systems support
Why Is HPV Vaccine Coverage So Low?

Parents
- Parents are not offered vaccination
- Parents perceive vaccine as optional or unnecessary at that time
- Parents perceive that their providers discouraged vaccination
- Parents want information about vaccine safety
- Parents do not understand the reason to vaccinate at 11 to 12 years of age

Providers
- Providers are reluctant to give multiple shots at one visit
- Providers introduce HPV vaccination at age 11 years but do not recommend it strongly
- Providers recommend vaccination based on their estimation of sexual activity
- Providers have limited experience with HPV and underestimate risk
- Providers perceive HPV as more emotionally charged than other vaccines
- Delaying vaccination leads to nonvaccination

Both providers and parents know they are often unaware of the timing of sexual debut.

Perkins RB et al. Pediatrics 2014;134:e666-e674

Reasons for Not Vaccinating Adolescents with HPV Vaccine, Unvaccinated Adolescents* Aged 13-17 Years, NIS-Teen, United States, 2016

<table>
<thead>
<tr>
<th>Reason</th>
<th>Parents of Girls</th>
<th>Parents of Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
</tr>
<tr>
<td>Safety concern/side effects</td>
<td>21.3 (18.7-24.1)</td>
<td>13.1 (11.2-15.3)</td>
</tr>
<tr>
<td>Not needed or not necessary</td>
<td>19.3 (16.6-22.4)</td>
<td>21.0 (18.4-23.9)</td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>11.3 (8.5-15.0)</td>
<td>12.8 (10.9-15.0)</td>
</tr>
<tr>
<td>Not sexually active</td>
<td>9.7 (7.8-12.1)</td>
<td>8.7 (7.0-10.7)</td>
</tr>
<tr>
<td>Not recommended</td>
<td>9.5 (7.4-12.1)</td>
<td>15.6 (12.9-18.7)</td>
</tr>
</tbody>
</table>

* Analysis limited to adolescents with zero HPV vaccine doses, whose parents reported that they were not likely to seek HPV vaccination for their adolescent in the next 12 months
We only want the vaccines needed for school.

All three vaccines are strongly and equally recommended by the CDC. All three are also recommended by Pediatric, Adolescent, and Family Medicine doctors and groups. School-entry requirements don’t always reflect the current recommendations for your child’s health.
Physicians’ Perceptions of Adolescent Vaccine Endorsement for Patients Ages 11-12, 2014

Proportion endorsing highly (physicians) and physicians’ estimate of parents

What can we do about it?

Gilkey MB et al, Preventive Medicine 2015;77:181-185
Systems Strategies to Improve HPV Vaccine Coverage

- Establish standing orders for HPV vaccination beginning at age 11-12 years in your practice
- Conduct reminder/recall beginning at 11-12 years of age
- Assess HPV vaccine coverage at every visit and prompt clinical staff to give HPV vaccine at that visit
- Schedule return visit for next dose before the patient leaves the office
- Document each dose in the child’s medical record and the state’s immunization information system

Immunization Rates for Adolescents
Denver Health, 2004-2014

[Graph showing immunization rates over time for different vaccines, including Tdap, MCV4, HPV vaccine recommended for male subjects, and HPV vaccine recommended for female subjects]

Farmer et al, Pediatrics 2016
Tactics for Successful HPV Vaccine Delivery, Denver Health

- Routine use of a robust immunization registry for multiple functions, including recording vaccine history and recommended needed vaccines at every visit
- Medical assistants check vaccine registry for recommended vaccines at every visit
- Standing order for routine immunizations
- Vaccines are given early in the visit when possible
- Education for providers to present Tdap, MCV, and HPV as a standard “bundle” of adolescent immunizations
- Provider-level “report cards” with adolescent vaccination coverage rates
- Vaccination drives at school-based health centers

Farmer et al, Pediatrics 2016

National, State, and Denver Health Immunization Rates, 2013

Farmer et al, Pediatrics 2016
What can you do to improve HPV vaccine coverage?

- Make sure everyone in your office is on board with HPV vaccine as cancer prevention
- Recommend HPV vaccination for your patients who are vaccine eligible
- Be prepared to answer parents’ questions
- Share information on HPV vaccine in your office or clinic
- Be an advocate
  - Tell other healthcare providers why preventing HPV cancers is important to you
  - Find your local- or state-level HPV vaccine coalition and support it

https://www.cdc.gov/hpv/hcp/answering-questions.html
https://www.cdc.gov/vaccines/parents/diseases/teen/hpv.html
The National HPV Vaccination Roundtable

The National HPV Vaccination Roundtable, established by the American Cancer Society (ACS) and the Centers for Disease Control and Prevention (CDC) in 2014, is a national coalition of public organizations, private organizations, voluntary organizations, and invited individuals dedicated to reducing the incidence of and mortality from HPV-associated cancer in the U.S., through coordinated leadership and strategic planning.

http://www.texascancer.info/hpv/

Thank you!

https://www.cdc.gov/hpv/index.html
https://www.cdc.gov/hpv/hcp/speaking-colleagues.html
https://www.cdc.gov/hpv/hcp/how-I-recommend.html

For more information, contact CDC
1-800-CDC-INFO (232-4636)

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.
Why don’t adolescents finish the HPV vaccine series?

Perkins RB et al. Human Vaccines and Immunotherapeutics, 2016

SUMMARY OF DOSING RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Number of doses</th>
<th>Dosing schedule</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0, 6–12 months</td>
<td>▪ Persons initiating vaccination at ages 9 through 14 years, except immunocompromised persons*</td>
</tr>
</tbody>
</table>
| 3               | 0, 1–2, 6 months| ▪ Persons initiating vaccination at ages 15 through 26 years  
▪ Immunocompromised persons* initiating vaccination at ages 9 through 26 years |

*Persons with primary or secondary immunocompromising conditions that might reduce cell-mediated or humoral immunity
WHAT CAN COMMUNITY- AND STATE-LEVEL ORGANIZATIONS DO?

- Convene and commit to implementing effective strategies
- Immunization programs: AFIX focused on adolescent immunization
- Provider organizations: help members develop the motivation and skills to make an effective recommendation for HPV vaccination
- Cancer programs: motivate immunization providers to prevent cancers caused by HPV in their patients
- Health care payers: use HPV vaccine coverage as a quality measure
- All organizations: increase public awareness and support for HPV vaccination as cancer prevention
- All organizations: promote or implement systems strategies to improve HPV vaccine coverage
Cumulative incidence of genital HPV infection among sexually active female college students

Winer et al. Am J Epidemiol 2003;157