Update on HPV Vaccination Coverage and Challenges in the US

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National Center for Immunization and Respiratory Diseases

National Vaccine Advisory Committee Meeting
February 5, 2013
Overview

- HPV vaccine recommendations for females and males
- HPV vaccination coverage among adolescents
- Challenges to HPV vaccination
- School located vaccination
**HPV-associated cancers  United States, 2004-2008**

<table>
<thead>
<tr>
<th>Anatomic Area</th>
<th>Average annual number of cases*</th>
<th>Estimated+</th>
<th>HPV attributable</th>
<th>HPV 16/18 attributable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cervix</strong></td>
<td>11,967</td>
<td>11,500</td>
<td>9,100</td>
<td></td>
</tr>
<tr>
<td><strong>Vagina</strong></td>
<td>729</td>
<td>500</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td><strong>Vulva</strong></td>
<td>3,136</td>
<td>1,600</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td><strong>Anus (F)</strong></td>
<td>3,089</td>
<td>2,900</td>
<td>2,700</td>
<td></td>
</tr>
<tr>
<td><strong>Oropharynx (F)</strong></td>
<td>2,370</td>
<td>1,500</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td><strong>Total (Females)</strong></td>
<td><strong>21,291</strong></td>
<td><strong>18,000</strong></td>
<td><strong>15,000</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Penis</strong></td>
<td>1,046</td>
<td>400</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td><strong>Anus (M)</strong></td>
<td>1,678</td>
<td>1,600</td>
<td>1,500</td>
<td></td>
</tr>
<tr>
<td><strong>Oropharynx (M)</strong></td>
<td>9,356</td>
<td>5,900</td>
<td>5,600</td>
<td></td>
</tr>
<tr>
<td><strong>Total (Males)</strong></td>
<td><strong>12,080</strong></td>
<td><strong>7,900</strong></td>
<td><strong>7,400</strong></td>
<td></td>
</tr>
</tbody>
</table>

# HPV vaccines

<table>
<thead>
<tr>
<th></th>
<th>Quadrivalent (Gardasil)</th>
<th>Bivalent (Cervarix)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Merck</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>VLP types</td>
<td>6, 11, 16, 18</td>
<td>16, 18</td>
</tr>
<tr>
<td>Schedule (IM)</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
</tbody>
</table>

Estimated to protect against:

<table>
<thead>
<tr>
<th></th>
<th>Genital warts</th>
<th>Cervical cancers*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated to protect</td>
<td>90%</td>
<td>70%</td>
</tr>
<tr>
<td>against</td>
<td></td>
<td>And majority of other HPV-associated cancers</td>
</tr>
</tbody>
</table>
Evolution of recommendations for HPV vaccination in the United States

- Quadrivalent vaccine (HPV 6,11,16,18): Routine, females 11 or 12 yrs* and 13-26 yrs not previously vaccinated
- Quadrivalent or Bivalent vaccine (HPV 16,18): Routine, females 11 or 12 yrs* and 13-26 yrs not previously vaccinated
- Quadrivalent vaccine (HPV 6,11,16,18): May be given, males 9-26 yrs*
- Quadrivalent vaccine (HPV 6,11,16,18): May be given, 22-26 yrs**

* Can be given starting at 9 years of age; ** For MSM and immunocompromised males, quadrivalent HPV vaccine through 26 years of age
US HPV Vaccination Program

- HPV is one of several vaccines recommended for the adolescent age group
- Majority of vaccines are administered in primary care provider offices and publicly funded clinics
- National survey of physicians found that 98% of pediatricians and 88% of family physicians stocked and administered HPV vaccine* 
- Vaccine covered by most private health insurance companies and government insurance programs
- In 2011, 39.4% of adolescents 13-17 years of age were eligible for VFC vaccine

National Estimated Vaccination Coverage Levels among Adolescents 13-17 Years, NIS-Teen 2006-2011

CDC. MMWR. 2012;61:671-677
Coverage of 1 or More Doses of HPV* Female Adolescents Aged 13-17 Years Old, 2011

Note 1: *Human Papillomavirus Vaccine, either quadrivalent or bivalent. Percentages reported among females only.
Note 2: Includes female adolescents born between January 1993 and February 1999
Source: National Immunization Survey - Teen (NIS - Teen)
Vaccination Estimates among Adolescent Girls Years by Poverty Status, NIS-Teen 2011

** statistically different (p<0.05)

CDC. MMWR. 2012;61:671-677
HPV Vaccination Estimates among Adolescent Girls 13-17 Years by Race/Ethnicity, NIS-Teen 2011

** Statistically different (P<0.05) from White-NH.
CDC. MMWR. 2012;61:671-677
Completion of the HPV series

- Completion: among the females that started the series, the proportion that received all 3 doses
  - Nationally, 70% of girls that start the HPV series, complete the series

** Statistically different (P<0.05) from White-NH.

CDC. MMWR. 2012;61:671-677
HPV Vaccination Uptake among Adolescent Boys

- Available data represents vaccination activities prior to implementation of routine recommendation
- 8.3% of boys 13-17 years of age have initiated the series*
- Initial uptake follows the same pattern as observed for girls
  - Higher coverage among boys living below the poverty level
  - Higher coverage among black and Hispanic boys

*CDC. MMWR. 2012;61:671-677
Factors Influencing HPV Vaccination

- **Parental factors**
  - Knowledge
  - Attitudes

- **Provider factors**
  - Weak recommendations
  - Missed opportunities
Knowledge of Vaccine Recommendations among Parents of Adolescents 11-18 years, 2007 HealthStyles Survey

HPV Vaccine Intentions (in the Next 12 Months) Among Parents of Adolescent Girls 13-17 Years, NIS-Teen

- 2008: 9% Unsure/unknown, 26% Not likely, 28% Somewhat/very likely, 37% Vaccinated
- 2009: 8% Unsure/unknown, 27% Not likely, 21% Somewhat/very likely, 44% Vaccinated
- 2010: 7% Unsure/unknown, 28% Not likely, 17% Somewhat/very likely, 49% Vaccinated
- 2011: 5% Unsure/unknown, 25% Not likely, 17% Somewhat/very likely, 53% Vaccinated
<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not needed or necessary</td>
<td>23.2%</td>
</tr>
<tr>
<td>Not sexually active</td>
<td>19.5%</td>
</tr>
<tr>
<td>Safety concern/side effects</td>
<td>19.3%</td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>15.2%</td>
</tr>
<tr>
<td>Not recommended by provider</td>
<td>9.6%</td>
</tr>
</tbody>
</table>

*Response categories are not mutually exclusive.*
HPV Vaccination and Sexual Behavior

- **Analysis of 2010 National Survey of Family Growth**¹
  - HPV vaccination was not associated with being sexually active or number of sex partners

- **Evaluation of girls 11-12 years enrolled in a large managed care organization**²
  - HPV vaccination was not associated with increased sexual activity-related outcomes

HPV Vaccine Communications During the Healthcare Encounter

- Qualitative review of 184 healthcare encounters where HPV vaccination was discussed\(^1\)
  - HPV vaccine is presented as ‘optional’ whereas other indicated vaccines are recommended
  - Some expressed mixed/negative opinions about the vaccine: ‘new vaccine’; concerns over safety/efficacy

- Qualitative interviews with pediatricians\(^2\)
  - When parents expressed reluctance, providers were hesitant to engage in discussion
  - Some perceived the vaccine as less important than other vaccines
  - Some providers shared parent’s views that teen was not at risk and could delay vaccination until older

\(^1\)Goff et al. Vaccine. 2011;29:7343-7349.
Current Strength of Recommendation in Females, Pediatricians and Family Physicians (N=609)*

11-12 y.o. females
- Strongly recommend: 51%
- Recommend, but not strongly: 36%
- Make no recommendation: 8%
- Recommend against: 2%

13-15 y.o. females
- Strongly recommend: 79%
- Recommend, but not strongly: 15%
- Make no recommendation: 2%
- Recommend against: 1%

16-18 y.o. females
- Strongly recommend: 85%
- Recommend, but not strongly: 10%
- Make no recommendation: 2%
- Recommend against: 2%

Actual and potentially achievable vaccination coverage if missed opportunities were eliminated: NIS-Teen, 2011

- **Td/Tdap**
  - Actual: 85.3%
  - Potentially Achievable: 91.5%

- **MenACWY Vaccine**
  - Actual: 70.5%
  - Potentially Achievable: 90.9%

- **HPV-1 (girls)**
  - Actual: 53%
  - Potentially Achievable: 89.5%

Among girls unvaccinated for HPV, 78% had a missed opportunity.

- Missed opportunity: encounter when some but not all indicated vaccines are given.
SCHOOL LOCATED VACCINATION
School Located Vaccination

- **Benefits**
  - Majority of adolescents attend school
  - Can vaccinate a large number of adolescents during a clinic
  - Reach many adolescents who may not have regular access to healthcare
Willingness to Consent for Vaccines Administered at School, Parents of incoming 6th Graders

- Jul – Sep 2009 survey of parents of incoming 6th graders at 3 schools in Aurora, CO
- Parental preference for vaccine location:
  - 64% doctor’s office
  - 17% school health clinic
  - 14% public health clinic
- 71% of parents would consent for 1 or more vaccines to be administered at school
  - 53% would consent for HPV

Adolescent School Located Vaccination Project, Denver Public Schools

- **Setting:** urban public school district
- **Time period:**
  - 1st year: January – May 2010
  - 2nd year: August 2010 – May 2011
- **Targeted schools:**
  - Seven schools serving \( \geq 100 \) 6th – 8th grade students
- **Offered 11 vaccines, including Tdap, MCV4, HPV, and Influenza**
- **Billed 3rd party payers for services provided**

Daley et al., Pediatric Academic Societies Annual Meeting, 2012
Adolescent School Located Vaccination Project Outcomes (2\textsuperscript{nd} year)

- **Consented students**
  - 17\% (520) of enrolled student returned consent forms, range per school: 8\% - 31\%

- **Vaccinated students**
  - 90\% (466) of consented students vaccinated with $\geq$ 1 vaccines
  - 1505 vaccines administered, range per school: 77 – 447

- **Estimated cost per dose, excluding the cost of vaccine:** $26.76

- 41\% of total costs were reimbursed by billing 3rd party payers

Daley et al., Pediatric Academic Societies Annual Meeting, 2012
Summary

- HPV vaccination coverage among U.S. adolescents is increasing, but slowly

- Addressing gaps in parental knowledge and attitudes towards HPV vaccination is needed
  - Awareness of recommended vaccines is low
  - Improve education: HPV vaccine is a tool to help prevent cancer; it is most effective if given before exposure to the HPV virus

- Primary care providers are key to help increase vaccination coverage
  - Provide strong recommendations
  - Do not delay vaccination
  - Implement evidence-based strategies to improve vaccine delivery
  - Prevent missed vaccination opportunities
School located vaccination is challenging

- Adolescent participation is low
- The cost to provide vaccination in schools can be quite high
- Billing health plans is challenging and may not be sufficient to recover program costs
Thank you
zma2@cdc.gov

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: http://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.
BACKUP SLIDES
State Level Policies

- State legislative policies related to HPV vaccine:
  - Insurance coverage (n=8)
  - Education of parents/general public (n=14)

- Presence of these policies are not associated with higher HPV vaccination coverage*

- Middle School Vaccination requirements: 2012-2013 SY
  - Td/Tdap: 41 states
  - MCV4: 13 states
  - HPV (vaccination): 2 states
  - HPV (education): 7 states

CDC unpublished data.
## Percentage of adolescents 13-17 years of age UTD with vaccination(s) by state requirement status*, NIS-Teen 2010

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Vaccination requirement</th>
<th>Education Requirement</th>
<th>No Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of States</td>
<td>(%)</td>
<td># of states</td>
</tr>
<tr>
<td>≥1 MCV4</td>
<td>3</td>
<td>(70.5)</td>
<td>10</td>
</tr>
<tr>
<td>≥1 Td/Tdap</td>
<td>32</td>
<td>(79.8)</td>
<td>--</td>
</tr>
<tr>
<td>≥1 HPV</td>
<td>--</td>
<td>--</td>
<td>6**</td>
</tr>
</tbody>
</table>

Red font indicates significantly lower (p<0.05) coverage compared to states with vaccine requirements.

*Status based on requirements for the 2008-2009 School Year

**Because of small sample size, one state with a vaccine requirement is included with the states with education only requirements.

System Level: Upcoming Policy Changes

- **Patient Affordable Care Act**
  - Insurance plans to provide first dollar coverage for all ACIP recommended vaccines

- **Time limited increase in Medicaid reimbursement for vaccine administration fee**
  - Time period: 2013-2014

- **New HEDIS measure**
  - Receipt of 3 doses of HPV vaccine by age 13 years (females only)
Factors that influence parental decisions to vaccinate their adolescents by HPV vaccination status, NIS-Teen 2010

<table>
<thead>
<tr>
<th>Factor</th>
<th>Vaccinated (%)</th>
<th>Not Vaccinated (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At visit made for [TEEN], did you talk to the doctor?</td>
<td>93.3</td>
<td>89.9*</td>
</tr>
<tr>
<td>At visits made for [TEEN]'s vaccinations, did his/her healthcare provider:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talk to you about the vaccine</td>
<td>89.6</td>
<td>68.4*</td>
</tr>
<tr>
<td>Recommend the vaccine</td>
<td>87.8</td>
<td>54.4*</td>
</tr>
<tr>
<td>How did [TEEN]'s healthcare provider play a role in your decision about getting him/her vaccinated with the vaccine?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made you more likely to get [TEEN] vaccinated</td>
<td>72.4</td>
<td>23.9*</td>
</tr>
<tr>
<td>Made you less likely to get [TEEN] vaccinated</td>
<td>0.9</td>
<td>8.2*</td>
</tr>
<tr>
<td>Did not affect your decision</td>
<td>26.7</td>
<td>67.8*</td>
</tr>
</tbody>
</table>

*Significantly different (p<0.05)
Evidenced based strategies to improve vaccination coverage*

- **Reminder/recall system**
  - Provider level (e.g., EMR prompts)
  - Parent/patient level (e.g., postcards, telephone calls, text messaging)

- **Standing orders**

- **Provider assessment and feedback**
  - Assessment of vaccination coverage levels within the practice and discussion of strategies to improve vaccine delivery

- **Utilizing immunization information systems**

*http://www.thecommunityguide.org/vaccines/universally/index.html*
Impact of a Reminder/Recall Intervention among Adolescents 11-18 years*


Percentages of adolescents 11-18 years of age who received any vaccination at 4, 12, and 24 weeks: Text4Health-Adolescents, New York City, 2009*

THE ROLE OF THE ADOLESCENT
Knowledge of vaccine recommendations among adolescents of 11-18 year olds, 2007 YouthStyles Survey

- Tdap: 61%
- MCV4: 33%
- HPV: 40%
- Correctly identify all 3: 11%

# Vaccine Attitudes among Adolescents 11-18 Years, 2007 YouthStyles Survey

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Really/Sort of Agree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting vaccines is one way I can protect my health</td>
<td>91</td>
</tr>
<tr>
<td>I have concerns about the safety of recommended vaccines</td>
<td>43</td>
</tr>
<tr>
<td>I will get a vaccine if my parent says I should</td>
<td>87</td>
</tr>
<tr>
<td>I will get a vaccine if my healthcare provider says I should</td>
<td>84</td>
</tr>
<tr>
<td>I will get a vaccine if my friends are getting it too</td>
<td>17</td>
</tr>
</tbody>
</table>

Adolescent Participation in HPV Vaccine Decision Making During the Healthcare Encounter

- Qualitative interviews with clinician/parent/adolescent triad*
  - Teens considered themselves passive participants in decision making, even when parents and clinicians reported including them in the process
  - All teens sampled reported that they were satisfied with their role in the decision making, and parents were also satisfied with the level of teen involvement.
  - The main way that adolescents reported taking part in the vaccine discussion was to express concern about anticipated pain from shots

## Factors that influence parental decisions to vaccinate their adolescents by HPV vaccination status, NIS-Teen 2010, Parental Concerns Module*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Vaccinated (%)</th>
<th>Not Vaccinated (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did [TEEN] play a role in your decision to get him/her vaccinated or not?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made you more likely to get [TEEN] vaccinated</td>
<td>32.0</td>
<td>11.3*</td>
</tr>
<tr>
<td>Made you less likely to get [TEEN] vaccinated</td>
<td>2.3</td>
<td>9.1*</td>
</tr>
<tr>
<td>Did not affect your decision</td>
<td>65.7</td>
<td>79.6*</td>
</tr>
</tbody>
</table>

*Significantly different (p<0.05)

Ability to Consent for Vaccination

- It is not uncommon for adolescents (especially older adolescents) to visit their healthcare provider without the parent.

- With some exceptions, parental consent is required to vaccinate adolescents <18 years:
  - CA: recently lowered age of consent for HPV to 12 yrs
  - OR: age of consent for healthcare services is 15 yrs
  - DC and NC: minors can consent for ‘prevention’ of an STD
Adolescent and Parental Attitudes about Consent for Vaccination, 2007 HealthStyles and YouthStyles Surveys

- My child should be able to consent without my knowledge to receive a vaccine recommended by their healthcare provider
  - Strongly disagree/disagree: 70%
  - Neutral: 25%
  - Strongly agree/agree: 14%

- I should be allowed to get vaccines without permission from my parent
  - Really/sort of disagree: 72%
  - Really/sort of agree: 28%