The Hidden HPV Vaccine

Reverse Disparity

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Disclosures

- I, Sherrie Flynt Wallington, PhD, am an Assistant Professor of Oncology at the Lombardi Comprehensive Cancer Center, Georgetown University Medical Center.
- I have no relevant financial relationships with commercial interests.
- I am a full-time faculty member at Georgetown University, which is an owner of the technology that became the marketed Gardasil vaccine.
Objectives

1. Discuss HPV-Associated Cancer Disease Disparities
2. Describe “Reverse Disparities”
3. Discuss Possible Causes of Variations
4. Summary
Numbers of U.S. Cancers and Genital Warts Attributed to HPV Infections

- Penis: 400
- Vagina: 500
- Juvenile-Onset RRP: 820
- Vulva: 1,600
- Anus: 1,600 (male), 2,900 (female)
- Oropharynx: 5,900 (male), 1,500 (female)
- Cervix: 11,500
- Genital Warts: 160,000 (male), 180,000 (female)

Disparities in HPV-Associated Cancer Disease

HPV Disparities can be seen by:

- Knowledge
- Race
- Ethnicity
- Geography
- Insurance
- Vaccine uptake and completion

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BACKGROUND: In the United States, the burden of human papillomavirus (HPV)-associated cancers vary by racial/ethnic group. HPV vaccination may provide opportunities for primary prevention of these cancers. Herein, we evaluated changes in HPV-associated cancer burden among racial/ethnic groups using several approaches, including race- and clinic-specific analyses, national and population-level data, and population-based modeling studies. METHODS: We conducted a population-based analysis of HPV-associated cancers among United States residents aged 18 years and older, using population-based data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program. RESULTS: In 2015, a total of 7,320 HPV-associated cancers were diagnosed in the United States, with the highest incidence rates among non-Hispanic black and Hispanic women. CONCLUSIONS: HPV vaccination can reduce the incidence of these cancers; however, achieving full coverage among all racial/ethnic groups remains a challenge. Further research is needed to identify barriers to HPV vaccination and to develop effective strategies to address these disparities.
Can disparities present in unexpected directions?
Reverse Racial and Ethnic Disparities

- Reverse racial and ethnic disparities refer to “a change in the direction of the racial ethnic disparity” (Powe, 2006).

- Reverse disparities have been documented in studies examining: mental health and depression (William et al., 2007), end stage renal disease (Powe, 2006), and urology referrals and prostate cancer biopsies (Gurmankin et al., 2004).

- Evidence of HPV vaccine reverse disparities exists with Hispanics and African Americans more likely than other population groups to get the first HPV vaccine dose (Cuff, 2016).


There was an increasing trend of national vaccination coverage with ≥1 dose, ≥2 doses, and ≥3 doses of HPV vaccine.

Regardless of doses of HPV vaccines and gender, White seems to have lower national HPV vaccination coverage than Black and Hispanic across time.

Figure 1: Estimated national vaccination coverage with ≥1 dose of HPV vaccine among females and males aged 13–17 years, by race (White, Black, and Hispanic), 2011-2014

Note: The US vaccination coverage table data via NIS-Teen (http://www.cdc.gov/vaccines/imz-managers/coverage/nis/teen/index.html) were utilized.
Estimated National HPV Vaccination Coverage by Race and Gender

Figure 2: Estimated national vaccination coverage with ≥2 doses of HPV vaccine among females and males aged 13–17 years, by race (White, Black, and Hispanic), 2011-2014

Figure 3: Estimated national vaccination coverage with ≥3 doses of HPV vaccine among females and males aged 13–17 years, by race (White, Black, and Hispanic), 2011-2014

Note: The US vaccination coverage table data via NIS-Teen (http://www.cdc.gov/vaccines/imz-managers/coverage/nis/teen/index.html) were utilized.
Estimated vaccination coverage with ≥1 dose of HPV vaccine among females and males aged 13-17 years during 2014.

- **Among females:**
  - ≤ 49%: Kansas, Missouri, Tennessee, Alabama, Alaska
  - ≥ 70%: Washington DC, North Carolina, New Hampshire, Rhode Island

- **Among males:**
  - ≤ 29%: Wyoming, Utah, Missouri, Indiana, Kentucky, Mississippi, Alabama, South Carolina

## Relationship Between Demographic Factors and Having a Missed Opportunity for the HPV Vaccine Among Females Ages 11–18 Years

<table>
<thead>
<tr>
<th>Racial/ethnic group</th>
<th>OR</th>
<th>95% CI</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Ref.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>0.72</td>
<td>0.48–1.06</td>
<td>0.10</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>1.23</td>
<td>0.95–1.60</td>
<td>0.12</td>
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<tr>
<td>Black or African American</td>
<td>0.89</td>
<td>0.62–1.30</td>
<td>0.56</td>
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<tr>
<td>Hispanic</td>
<td>0.59</td>
<td>0.53–0.66</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rurality of Patient's Residence</th>
<th>OR</th>
<th>95% CI</th>
<th>p-Value</th>
</tr>
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<tbody>
<tr>
<td>Urban</td>
<td>Ref.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Rural</td>
<td>1.61</td>
<td>1.19–2.18</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Small Rural</td>
<td>1.83</td>
<td>1.49–2.24</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Isolated</td>
<td>1.08</td>
<td>0.79–1.48</td>
<td>0.62</td>
</tr>
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<table>
<thead>
<tr>
<th>Age</th>
<th>OR</th>
<th>95% CI</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preteen</td>
<td>2.44</td>
<td>2.22–2.68</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Teen</td>
<td>Ref.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data source: Vaccination and demographic data from the Utah Statewide Immunization Information System

Identifying HPV Vaccination Disparities in an Academic Pediatrics Clinic:
Study Goal:

- Examine the distribution of HPV vaccination among adolescents using medical records in an academic pediatric clinic.

Methodology

- MedStar Centricity EMR Database
  - Adolescents 13 to 17 years of age
  - January 1st, 2012 through December 31st, 2015
  - Sample Size: N=2406 patients (Females: 1293 (53.7%); Males: 1113 (43.6%))

- Measures
  - Time to complete the 3-dose series (HPV1, HPV2, HPV3)
  - Tetanus-Diphtheria-Pertussis (Tdap)
  - Demographics (gender, race/ethnicity, primary language, state of residence, insurance type)
Primary Findings

- Adolescent boys (71.2%) initiated the HPV vaccine more often than adolescent girls (59.6%).
- Adolescent girls (53.3%) completed the HPV vaccine more often than adolescent boys (49.6%).
- Prevalence difference is statistically (p<0.001) significant for initiation of the HPV vaccine (HPV1).

Figure #1
Percent of adolescent patients received the first (HPV1), second (HPV2), and third (HPV3) doses of HPV vaccine By Gender
Years: 2010-2015
Primary Findings

- Vaccination rates are highest among African American adolescents, regardless of the series.
- This difference is statistically significant for all series.
- DC proper experienced the greatest initiation and completion rates compared to Maryland and Virginia.
- Prevalence differences are statistically (p<0.001) significant for all doses of the HPV vaccine (HPV1).

![Figure #2](image)
Percent of adolescent patients received the first (HPV1), second (HPV2), and third (HPV3) doses of HPV vaccine
*By Race*
Years: 2010-2015

![Figure #4](image)
Percent of adolescent patients received the first (HPV1), second (HPV2), and third (HPV3) doses of HPV vaccine
*By State of Residence*
Years: 2010-2015
Some minority patients/parents list a provider from their community as trusted source.

Patterns of HPV vaccination are changing over time, with greater increases in vaccine initiation among Hispanics and African-Americans compared to whites.

Changing patterns reflect changes in provider and patient familiarity with the HPV vaccine.

Federal vaccine programs offering vaccine assistance and outreach to children over time.

Potential Causes for Variation


HPV Vaccination is Cancer Prevention