The HPV-Related Oropharyngeal Cancer Epidemic: Why Our Boys Must Be Vaccinated

Oropharyngeal Cancer Symposium
American Dental Association – MD Anderson Cancer Center
Atlanta, Georgia
October 18, 2017

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Administrative Leader HPV-Related Cancers Moon Shot Program
Program Director MD Anderson Oropharynx Program

No conflicts, disclosures, or off-label
Oral Cavity (mouth)

Nasopharynx

Larynx (voicebox)

Hypopharynx

Oropharynx
- tonsil
- base of tongue or lingual tonsil

Nose/Paranasal Sinuses

Thyroid Cancer, Melanoma & Skin Cancer, Salivary Gland Cancer
Mucosal sites of infection: ~80 HPV Types

Cutaneous sites of infection: ~40 HPV Types

High risk (oncogenic): HPV 16, 18 most common

Low risk (non-oncogenic): HPV 6, 11 most common

Oropharyngeal Cancers
Cervical & Anogenital Cancers
Cancer Precursors

Laryngeal Papillomas
Genital Warts
Low Grade Cervical Disease
Cutaneous Warts

CDC HPV Slide Deck
cdc.gov/hpv/hcp/speaking
**HPV Genital Infection**
Most females & males will be infected
- in the US: 80 million currently infected (14M new/yr)
- most without symptoms
- most common in teens & early 20s

**HPV Throat Infection**
- 5% of women & 15% of men currently infected
- most without symptoms
- highest rates in 50s

Oral HPV prevalence by age
HPV Infection & Progression to Cancer Schematic

NORMAL MUCOSA

SQUAMOUS INTRAEPITHELIAL LESION

INVASIVE CANCER

- Normal nuclei
- Nuclei with episomal viral DNA
- Nuclei with integrated viral DNA
- Normal cytoplasm
- Expression of early and late genes
- Overexpression of E6 and E7

www.genticel.com
International Burden of HPV Cancer
(cervical cancer)

Top ranked cancers by absolute death for all ages in females, 2013

WHO, IARC
globocan.iarc.fr
Human Papillomavirus–Associated Cancers — United States, 2008–2012

Laura J. Viens, MD; S. Jane Henley, MSPH; Meg Watson, MPH; Lauri E. Markowitz, MD; Cheryl C. Thomas, MSPH; Trevor D. Thompson; Hilda Razzaghi, PhD; Mona Saraiya, MD

<table>
<thead>
<tr>
<th>Total (N=38,793)</th>
<th>Men (N=15,793)</th>
<th>Women (N=23,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>~60,000</td>
<td>~27,000</td>
</tr>
<tr>
<td>Oropharynx</td>
<td>802</td>
<td>1,987</td>
</tr>
<tr>
<td>Anus</td>
<td>3,554</td>
<td>3,100</td>
</tr>
<tr>
<td>Cervix</td>
<td>11,771</td>
<td>12,638</td>
</tr>
<tr>
<td>Vagina</td>
<td>5,760</td>
<td>15,738</td>
</tr>
<tr>
<td>Vulva</td>
<td>1,168</td>
<td>1,168</td>
</tr>
<tr>
<td>Penis</td>
<td>11,771</td>
<td>12,638</td>
</tr>
</tbody>
</table>

- Oropharynx 9.2%
- Anus 16.4%
- Cervix 51.2%
- Vagina 15.5%
- Vulva 3.5%
- Penis 2.1%

- Oropharynx 3.0%
- Anus 14.8%
- Cervix 40.6%
- Vagina 14.8%
- Vulva 30.3%
- Penis 12.6%

- Oropharynx 7.4%
- Anus 12.6%
- Cervix 80.0%
- Vagina 80.0%
- Vulva 3.0%
- Penis 12.6%

- Oropharynx 13.5%
- Anus 16.4%
- Cervix 51.2%
- Vagina 15.5%
- Vulva 3.5%
- Penis 2.1%
Crisis in America

Age-Adjusted SEER Incidence Rates
By Cancer Site
All Ages, White, Male
1975–2012 (SEER 9)

APC:
+5-10%

Oropharynx (tongue base)
+5-10%

Oropharynx (tonsil)
+3%

Anus
~0%

Penis
< 1/100,000

SEER.cancer.gov
6 types of cancer that HPV vaccine protects against:

- anal
- cervical
- penile
- throat/tonsil
- vaginal
- vulvar
FIGURE 2. Estimated vaccination coverage* of ≥1 dose of human papillomavirus vaccine† among female adolescents aged 13–17 years§,¶ — National Immunization Survey – Teen, United States, 2016

Abbreviation: DC = District of Columbia.
* National coverage = 65%.

FIGURE 3. Estimated vaccination coverage* of ≥1 dose of human papillomavirus vaccine† among male adolescents aged 13–17 years§,¶ — National Immunization Survey – Teen, United States, 2016

Abbreviation: DC = District of Columbia.
* National coverage = 56%.
SEER.cancer.gov

Age-Adjusted Death Rates by State (2008 to 2012)
White Non-Hispanic, Oropharynx and Tonsil (Male)


HPV Vaccine Completion (UTD)
Females Males
National 49.5% 27.5%

Region VI
Arkansas
Louisiana
New Mexico
Oklahoma
Texas

41.3 (37.4-45.4)
35.5 (27.1-45.0)
50.8 (41.7-59.8)
49.0 (40.4-57.7)
43.6 (33.6-54.1)
39.7 (34.4-45.1)
28.9 (25.8-32.3)
33.6 (26.3-41.7)
33.2 (25.7-41.7)
37.0 (29.3-45.3)
35.0 (26.1-45.2)
26.5 (22.5-30.9)
### Age-Adjusted Death Rates by State (2008 to 2012)
White Non-Hispanic, Oropharynx and Tonsil (Male)

#### Region, state, local area

<table>
<thead>
<tr>
<th></th>
<th>Females (n = 9,661)</th>
<th>Males (n = 10,814)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>≥1 HPV††</td>
<td>HPV UTD§§</td>
</tr>
<tr>
<td><strong>Region VI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arkansas</td>
<td>53.3 (43.8–62.6)</td>
<td>35.5 (27.1–45.0)</td>
</tr>
<tr>
<td>Louisiana</td>
<td>69.9 (61.1–77.4)</td>
<td>50.8 (41.7–59.8)</td>
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<tr>
<td>New Mexico</td>
<td>63.1 (54.4–71.1)</td>
<td>49.0 (40.4–57.7)</td>
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<tr>
<td>Oklahoma</td>
<td>63.8 (53.0–73.4)</td>
<td>43.6 (33.6–54.1)</td>
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<tr>
<td>Texas</td>
<td>54.5 (49.0–59.8)</td>
<td>39.7 (34.4–45.1)</td>
</tr>
<tr>
<td>TX–Bexar County</td>
<td>58.3 (48.6–67.5)</td>
<td>45.2 (35.8–55.0)</td>
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<tr>
<td>TX–City of Houston</td>
<td>59.4 (45.7–71.8)</td>
<td>44.2 (31.8–57.3)</td>
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<tr>
<td>TX–Dallas County</td>
<td>48.8 (37.9–59.8)</td>
<td>24.3 (16.8–33.6)</td>
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<tr>
<td>TX–El Paso County</td>
<td>78.4 (68.4–85.9)</td>
<td>69.0 (58.9–77.6)</td>
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<tr>
<td>TX–Rest of state</td>
<td>53.3 (46.2–60.2)</td>
<td>39.2 (32.5–46.4)</td>
</tr>
</tbody>
</table>


SEER.cancer.gov

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# Reduced Prevalence of Oral Human Papillomavirus (HPV) 4 Years after Bivalent HPV Vaccination in a Randomized Clinical Trial in Costa Rica

Rolando Herrero¹, Wim Quint², Allan Hildesheim³, Paula Gonzalez⁴, Linda Struijk², Hormuzd A. Katki³, Carolina Porras⁴, Mark Schiffman³, Ana Cecilia Rodriguez⁴, Diane Solomon⁵, Silvia Jimenez⁴, John T. Schiller⁶, Douglas R. Lowy⁶, Leen-Jan van Doorn², Sholom Wacholder³, Aimée R. Kreimer³ for the CVT Vaccine Group⁴

<table>
<thead>
<tr>
<th>Arm</th>
<th>Number of women</th>
<th>Number of women with infection⁷</th>
<th>Prevalence</th>
<th>95%CI</th>
<th>Vaccine efficacy 95%CI</th>
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<tbody>
<tr>
<td><strong>Oral Infections</strong></td>
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<tr>
<td>HPV16/18</td>
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<tr>
<td>HPV</td>
<td>2910</td>
<td>1</td>
<td>0.0</td>
<td>0.0:0.2</td>
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<tr>
<td>Control</td>
<td>2924</td>
<td>15</td>
<td>0.5</td>
<td>0.3:0.8</td>
<td>93.3% 62.5% to 99.7%</td>
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<tr>
<td>HPV16</td>
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<td></td>
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<td></td>
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<tr>
<td>HPV</td>
<td>2910</td>
<td>1</td>
<td>0.0</td>
<td>0.0:0.2</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2924</td>
<td>12</td>
<td>0.4</td>
<td>0.2:0.7</td>
<td>91.6% 51.7% to 99.6%</td>
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<tr>
<td>HPV18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV</td>
<td>2910</td>
<td>0</td>
<td>0.0</td>
<td>0.0:0.1</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>2924</td>
<td>4</td>
<td>0.1</td>
<td>0.0:0.3</td>
<td>100% -12.0% to 100%</td>
</tr>
<tr>
<td><strong>Cervical Infections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV16/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV</td>
<td>2910</td>
<td>61</td>
<td>2.1</td>
<td>1.6:2.7</td>
<td>72.0% 63.0% to 79.1%</td>
</tr>
<tr>
<td>Control</td>
<td>2924</td>
<td>219</td>
<td>7.5</td>
<td>6.6:8.5</td>
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</tr>
</tbody>
</table>
Oropharyngeal Cancer
“Typical” Presentation

Middle-aged White Male
Nonsmoker or Former Smoker
Middle to High Socioeconomic
No Throat Symptoms
Neck Mass (ie Stage IV)

Trends in Cancer Incidence & Number
Oropharynx vs. Cervix

Chaturvedi AK, et al.
JCO 2011.
Anatomic differences in cervical and tonsillar mucosa affect the ability of the cytobrush to collect premalignant or malignant epithelial cells.

Median Age at Presentation:

~45yo  ~55yo

Lingen MW. Cancer Prev Res 2011;4:1350-1352
Prevention of OPC through Screening

- No precursor lesion
- No screening test
- 5% increase in incidence each year
- Beneficial effects of vaccination will take decades
• Low incidence disease
• Do we screen everyone?
• Limit to high-risk population?

What characteristics could we include:
✓ Men only
✓ Age 50-59yo
  ○ Partners of patients with HPV-related cancers
  ○ Behavioral – high number of partners
✓ Oral HR HPV16 infection
✓ Other?
Are you at risk for throat cancer?

HPV*-related throat cancer is on the rise in men.

MD Anderson Cancer Center, the nation’s leader in cancer care, is seeking men to help us develop a screening test to detect this cancer early, when it’s easiest to treat.

Males ages 55-59 residing in the U.S. are invited to participate in this unique study and will have access to tests not available to the general public. Together, we’re Making Cancer History®.

You will be asked to:

- Come to an appointment in the Texas Medical Center (parking costs covered)
- Sign an informed consent document
- Complete a questionnaire
- Provide a blood and saliva sample

*human papillomavirus

To learn how you or a loved one can get involved, call 713-745-3511 or email houstonhpvtrial@mdanderson.org. mdanderson.org/houstonhpvtrial
The University of Texas
MD Anderson Cancer Center
HPV-Related Cancers
MOON SHOT
Immunize.
Prevent What's Preventable
Conclusions

- HPV cancer epidemic in men:
  Oropharyngeal and Anal

- HPV vaccination is imperative:
  Further Delay = Exponential Costs & Suffering

- Without novel screening/treatment of pre-malignancy:
  30 years of increasing incidence