Introduction

• Incidence
  ▫ U.S. = 36,540 new cases of oral cavity and pharyngeal cancer (OPC) in 2010
  ▫ U.S. = 12,720 new cases of laryngeal cancer in 2010
  ▫ Higher in individuals over the age of 50, males, and African-Americans
  ▫ Age-adjusted incidence rates have declined for OPC since 1975 for men and since 1980 for women

• Mortality
  ▫ U.S. = 7,880 deaths from OPC in 2010
  ▫ U.S. = 3,600 deaths from laryngeal cancer in 2010

• Survival
  ▫ Five-year relative survival rate for OPC is 61% and is 62% for larynx
  ▫ African-Americans have lower survival rates than Whites

Risk Factors

• Alcohol and Tobacco Exposure
  ▫ Risk related to intensity and duration of exposure
  ▫ Over 80% of head and neck cancer (HNC) cases are attributable to alcohol and tobacco exposure

• Human Papillomavirus (HPV) Prevalence
  ▫ Approximately 25% of all HNCs are positive for HPV-DNA
  ▫ Varies by anatomic sub-site
    • HPV prevalence is significantly higher in the oropharynx and tonsil than the oral cavity and larynx

Study Objectives

• To describe the incidence of HNC in the U.S., 1995 - 2005

• To describe the distribution and trends in HNC incidence for specific anatomical sub-sites by race and sex
  ▫ To compare HPV-associated sites and non HPV-associated sites

• To investigate whether the incidence of HNC is increasing for the sub-sites associated with HPV infection compared to the sub-sites not associated with HPV
Methods

• Case Identification
  ▫ Cases were identified through the North American Association of Central Cancer Registries (NAACCR) Cancer in North America (CINA) Deluxe Analytic Data for 1995-2005
  ▫ To be included in CINA Deluxe:
    ▫ Data must meet NAACCR high quality standards (either gold or silver status) on data quality indicators
    ▫ Registries included represent approximately 82% of the U.S. population
  ▫ Excluded overlapping metropolitan areas to avoid double counting of cases
## Methods

### Case Classification

- Includes all cancers with anatomic sites under the heading of “lip, oral cavity and pharynx” and “larynx” according to the International Classification of Diseases for Oncology (ICD-O)

<table>
<thead>
<tr>
<th>ANATOMICAL SITES</th>
<th>ICD-O-3 CODES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lip</td>
<td>C00.0 – C00.9</td>
</tr>
<tr>
<td>Tongue</td>
<td>C01.9 – C02.9</td>
</tr>
<tr>
<td>Gum</td>
<td>C03.0 – C03.9</td>
</tr>
<tr>
<td>Floor of Mouth</td>
<td>C04.0 – C04.9</td>
</tr>
<tr>
<td>Palate</td>
<td>C05.0 – C05.9</td>
</tr>
<tr>
<td>Other and unspecified parts of mouth</td>
<td>C06.0 – C06.9</td>
</tr>
<tr>
<td>Salivary Gland</td>
<td>C07.9 – C08.9</td>
</tr>
<tr>
<td>Tonsil</td>
<td>C09.0 – C09.9</td>
</tr>
<tr>
<td>Oropharynx</td>
<td>C10.0 – C10.9</td>
</tr>
<tr>
<td>Nasopharynx</td>
<td>C11.0 – C11.9</td>
</tr>
<tr>
<td>Hypopharynx</td>
<td>C12.9, C13.0 – C13.9</td>
</tr>
<tr>
<td>Other oral cavity and pharynx</td>
<td>C14.0 – C14.8</td>
</tr>
<tr>
<td>Larynx</td>
<td>C32.0 – C32.9</td>
</tr>
</tbody>
</table>

Did not include these sites in the analysis due to etiologic and histological differences from the other sub-sites.
Methods

- Classified all HNC cases into two groups:

<table>
<thead>
<tr>
<th>HPV-Associated Sites</th>
<th>Non HPV-Associated Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tonsil, including the Waldeyer ring</strong></td>
<td><strong>All other remaining HNC sites</strong></td>
</tr>
<tr>
<td>C09.0-C09.9</td>
<td>C02.0-C02.3</td>
</tr>
<tr>
<td>C14.2</td>
<td>C02.8-C06.9</td>
</tr>
<tr>
<td><strong>Base of tongue and lingual tonsil</strong></td>
<td>C10.0-C10.1</td>
</tr>
<tr>
<td>C01.9</td>
<td>C12.9-C14.0</td>
</tr>
<tr>
<td>C02.4</td>
<td>C14.8</td>
</tr>
<tr>
<td><strong>Oropharynx</strong></td>
<td>C32.0-C32.9</td>
</tr>
<tr>
<td>C10.2</td>
<td></td>
</tr>
<tr>
<td>C10.9</td>
<td></td>
</tr>
</tbody>
</table>
Statistical Analysis

- Frequency and percent distribution
- Age-adjusted incidence rates (2000 U.S. Standard)
  - By sex, race/ethnicity, and HNC sub-site
- HPV-associated sites and Non HPV-associated sites
  - Compared age-adjusted incidence rates
  - By sex, age, and race/ethnicity
- Annual percent change (APC)
  - Only used data from registries that contributed data for the entire 1995-2005 time period
  - Examined whether trends differ between HPV-associated sites and non HPV-associated sites
  - By race/ethnicity groupings
- Data analyses conducted using SEER*Stat, version 6.2.4
Results

- 215,419 HNC cases were identified in the U.S., 1995 - 2005
  - Highest frequency of cases were male (73.2%)
  - Highest frequency of cases were Non-Hispanic White (78.5%)

- Larynx: 4.1
- Tongue: 2.5
- Tonsil: 1.4
- Floor of Mouth: 0.8
- Hypopharynx: 0.8
- Other and Unspecified Parts of Mouth: 0.5
- Oropharynx: 0.4
- Palate: 0.4
- Gum: 0.3
- Other Oral Cavity and Pharynx: 0.3

Rates per 100,000
Age-Adjusted Incidence Rates (2000 U.S. Standard) for HPV-Associated Sites by Age in the United States, 1995 to 2005

*Races are NHIA derived
Age-Adjusted Incidence Rates (2000 U.S. Standard) for HPV-Associated Sites and Non HPV-Associated Sites in the United States, 1995 to 2005
Age-Adjusted Incidence Rates (2000 U.S. Standard) for HPV-Associated Sites in the U.S., 1995 to 2005

*Races are NHIA derived

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- APCs are significantly different from zero (p < 0.05)
- APCs were calculated using the weighted least squares method
In Summary

- HNC age-adjusted incidence rates are higher in males and in Non-Hispanic Blacks
- When HNC age-adjusted incidence rates are broken down by sub-site, different trends are seen
  - Age-adjusted incidence rates for HPV-associated sites are increasing, while decreasing for non HPV-associated sites
  - When broken down by race, HNC age-adjusted incidence rates for Non-Hispanic Blacks are decreasing across HPV-associated sites as well as non HPV-associated sites
Discussion and Implications

- Decrease in incidence for NH Blacks across all sub-sites
  - Possible that those cancer sub-sites are not mediated by HPV infection
  - Decline in incidence could be more related to the decline in alcohol and tobacco use than HPV infection
- Increase in incidence for tonsil and base of tongue (HPV-associated sites)
  - Sites are composed of lymphoid associated tissue suggesting interesting biologic mechanisms involved
- No HPV-typing data included in registry data
Discussion and Implications

• HPV Vaccine
  ▫ With the introduction of the HPV vaccine for young women, will the HPV associated HNC cancers decline in the next decade?
  ▫ Recently, the HPV vaccine has been approved for young men – how will this effect the HNC incidence rates of men?

• Treatment implications
  ▫ With these findings, treatment options for HNC could be improved upon by using:
    • Possible vaccine-mediated therapy
    • Biological modifiers for tongue cancer for organ sparing
Acknowledgments

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Thank you!

Questions??

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