Surveillance of Cancers of the Oral Cavity & Pharynx and Role of Human Papillomavirus (HPV) in Cancers of the Oropharynx

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National Oral Health Conference
April 24, 2013

Objectives

- Provide Overview of Oral Cavity & Pharynx Cancers, 2013
- Review Anatomy of Sites for Cancers of Region
- Describe Tools/Websites for National and State Surveillance - Cancers Oral Cavity and Pharynx
- Examine Epidemiologic Trends in Oral Cavity & Pharynx and Oropharynx Cancers
- Describe the Role of Human Papillomavirus (HPV) in Cancers of the Oropharynx Region
- Describe Public Health Implications of Current Status of Oropharyngeal Cancers

Oral Cavity and Pharynx Cancers, 2013

- **Approx 264,000 persons living with these cancers**
- 41,380 **new cases** of Oral Cavity and Pharynx Cancers
  - 29,620 men (71%) 11,670 women
- 7,800 **deaths** from Oral Cavity and Pharynx Cancers
  - 5,500 men (70%) 2,390 women

Median age at diagnosis was 62 years of age

Mean age at death was 67 years

Relative **5-year Survival Rate** is 62% overall :

Local: 82%; Regional: 57%; Distant: 35%

http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-036845.pdf
http://seer.cancer.gov/statfacts/html/oralcav.html

How Are These Cancers Being Described?

- Cancers of the Head and Neck
- Squamous Cell Cancers of the Head & Neck
- Cancers of Oral Cavity and Pharynx (OCPC)
  - Lip,(included) salivary glands and nasopharynx (typically excluded)
- Cancers of the Oropharynx
  - A very small subset of Oral Cavity and Pharynx
  - HPV-**associated** or HPV-non-**associated**
  - HPV-**positive** or HPV-**negative**

HPV-associated vs HPV-positive

HPV-associated means that specific groups of anatomic sites (base of tongue and tonsils) histologically known to be associated with Human Papillomavirus are documented here – it does not reflect actual testing of every specimen from these sites as being positive or negative…

HPV non-associated means that specific groups of anatomic sites (oral cavity and pharynx other than tongue and tonsils) are histologically **not** known to associated with HPV though every specimen has **not** been tested.

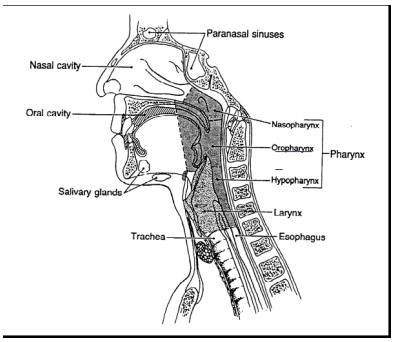
HPV-positive or HPV negative means that the specimen has been tested and found to either positive or negative for HPV

Approximately 65-75% % of all oropharyngeal cancers (base of tongue and tonsils) are **HPV-positive.** NOT 100%

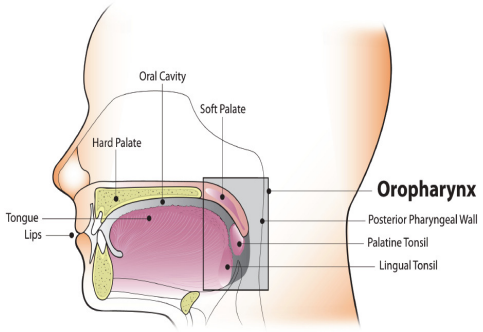
Objectives

- Provide an Overview of Oral Cancers, 2013
- **Review Anatomy of Sites for Oral Cancers**
- Describe the Tools/Website for National and State Surveillance of Oral Cancers
- Examine Trends in Oral Cancers' Epidemiology
- Describe the Role of Human Papillomavirus (HPV) in Cancers of the Oropharynx Region
- Describe Public Health Implications of Current Status of Oral Cancers

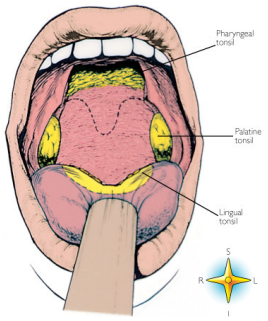
Anatomy of Head and Neck



Oral Cavity and Oropharynx



Tonsils



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- Provide an Overview of Oral Cancers, 2013
- Review Anatomy of Sites for Oral Cancers
- **Describe the Tools/Website for National and State Surveillance of Oral Cancers**
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- Describe the Role of Human Papillomavirus (HPV) in Cancers of the Oropharynx Region
- Describe Public Health Implications of Current Status of Oral Cancers

Tools/Websites for National and State Surveillance of "Oral Cancers"

- NCI – **SEER**:

  Surveillance, Epidemiology, & End Results
- CDC – **NPCR**

  National Program of Cancer Registries
- NCI/CDC -- **State Cancer Profile**
- SHA – **State Cancer Registry**

Tools/Websites for National and State Surveillance of "Oral Cancers"

- NCI – **SEER**:

  Surveillance, Epidemiology, & End Results

  – http://seer.cancer.gov/

  18 Geographic U.S. Areas assessing:

  Incidence rates, Death rates,

  Trends in rates, (1975-2010)

  Survival and Stage of Diagnosis,

  Lifetime Risks, Prevalence

Tools/Websites for National and State Surveillance of "Oral Cancers"

- CDC – **NPCR**

  National Program of Cancer Registries
  www.cdc.gov/npcr/index.htm

  Aggregate & Individual State Cancer Data:

  Cancer Incidence & Mortality (1999-2009);

  Top 10 cancers (national & state ranking);

  State vs National comparisons,

  Selected state cancers by race-gender categ.

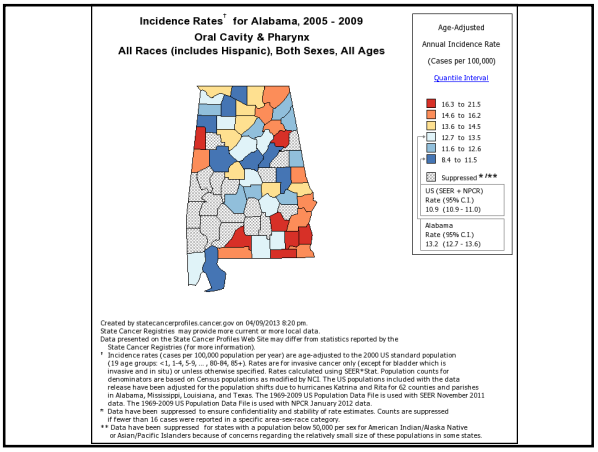
Tools/Websites for National and State Surveillance of "Oral Cancers"

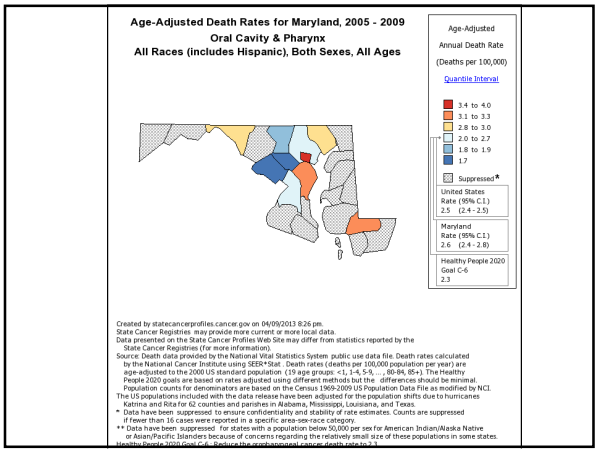
- NCI /CDC: **State Cancer Profiles**

  http://statecancerprofiles.cancer.gov/

  U.S., each State, and their Counties assessing:

  Death and incidence rates (2009) and trends (2005-2009) for cancers within states, and their counties, and state/county maps of incidence and death rates,





Tools/Websites for National and State Surveillance of "Oral Cancers"

- State Health Dept: **State Cancer Registry**

  Each State, and their Counties assessing:

  Death and incidence rates and trends for cancers within states, and their counties

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New Areas of Surveillance

- *Typical*: Oral Cavity & Pharynx Cancers
  - 75% of Head and Neck Cancers
  - Generally *tobacco/alcohol* risks –
  - HPV non-associated including other and unspecified parts of tongue (excluding base of tongue), gum, floor of mouth, palate, other parts of mouth).
- *New*: Oropharynx Cancers (a subset)
  - 2-4% of Head and Neck Cancers
  - 65%-75% are *HPV associated* (including base of tongue, lingual tonsil, palatine tonsil, and Waldeyer ring)

HPV-associated vs HPV-positive

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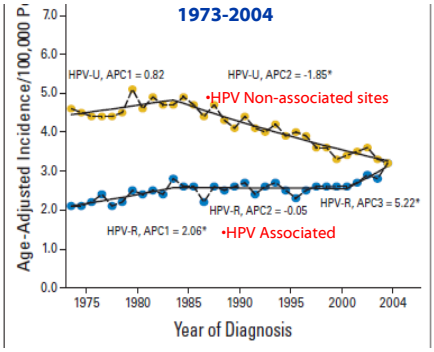
HPV-positive or HPV negative means that the specimen has been tested and found to either positive or negative for HPV

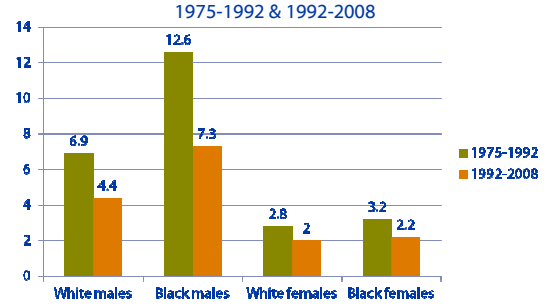
Almost 65-75% % of all oropharyngeal cancers (base of tongue and tonsils) are **HPV-positive.**

Incidence Rates by Calendar Year for HPV-associated and non-associated Sites 1973-2004



•Charturvedi AK et al. *J Clin Oncology* 2/1/2008

Oral Cavity & Pharynx Cancer Trends by race-gender per 100,000 population for HPV Non-associated Cancers 1975-1992 & 1992-2008



Oral Cavity and Pharynx Cancer incidence Trends by Subsite in US: Changing Gender Patterns. J of Oncology, (12) 2012. http://dx.doi.org/10.1155/2012/649498

New Areas of Surveillance of "Oral Cancers"

- *Typical*: Oral Cavity & Pharynx Cancers
  - 75% of Head and Neck Cancers
  - Generally tobacco/alcohol risks –
  - HPV non-associated
- *New*: Oropharynx Cancers (a subset)
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  - 65%-75% are HPV associated

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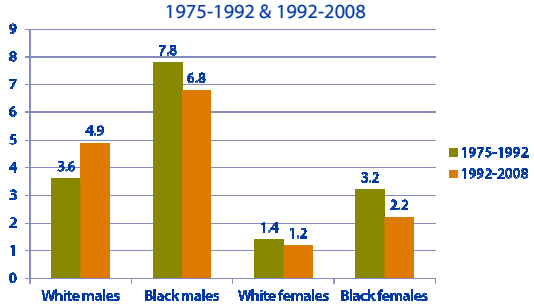

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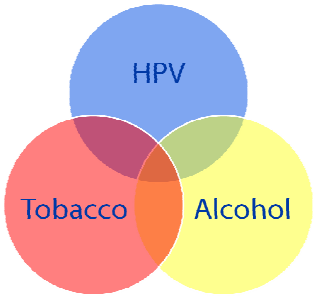
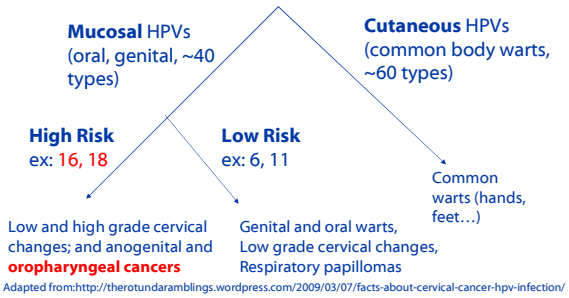
Established Risk Factors for Head and Neck Cancers



HPV Classification

Over 100 different types of HPV

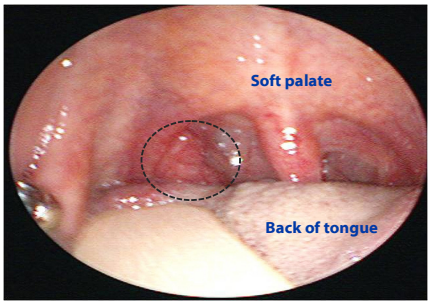


Adapted from:http://therotundaramblings.wordpress.com/2009/03/07/facts-about-cervical-cancer-hpv-infection/

Natural History of HPV Infection

- ~80-85% of people acquire any HPV infection at some point in their lives
- ~90% infections clear in 1-2 years in healthy individuals
- Almost all cervical cancers are caused by HPV infections that persist more than 2 years.

HPV-Positive Squamous Cell Carcinoma of the Palatine Tonsil

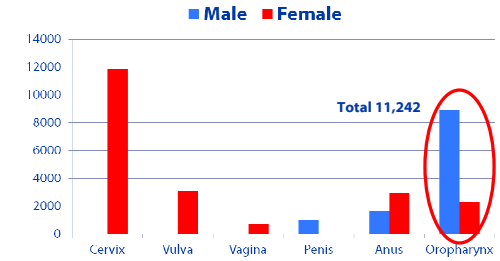


Screening for Oropharyngeal Cancers

(*base of tongue, lingual tonsil, palatine tonsil, Waldeyer ring*)

- Difficult to detect these at early stage
- No standardized screening tests
  - No oral "PAP" smear to detect cellular changes
  - No FDA approved test for oral HPV infection
- No evidence that detection of oral HPV could be used to predict development of these cancers.

Yearly Incidence Counts, 2004-2007 All HPV-associated Cancers, US



Defined by histology and anatomic site; Watson M et al. Cancer 2008.
Data source: National Program of Cancer Registries (CDC) and SEER (NCI), covering 99% of US population.

Risk Factors for HPV-Positive Cancers

- Associated with lifetime number of vaginal or oral sex partners and open-mouthed kissing
- Compared with HPV-negative cancers, occur more often:
  - Among white men
  - In a population younger by about 4 years (median age 52-56 years)
  - In people who may or may not use tobacco or alcohol

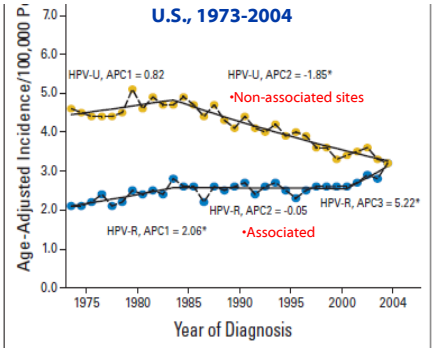
Prevalence of HPV in Oropharyngeal Cancers

- Almost 65%--75% of all oropharyngeal cancers are HPV-positive; 85-95% of these are high risk HPV-16.
- Estimates vary widely depending on:
  - Geographic region.
  - Site
  - Detection method
  - Tissue preservation method
  - Sample size

HPV Positives in Oropharyngeal Cancers, National, Alabama, Maryland

	7 US Cancer Registries	Alabama, 2010	Maryland, 2010
HPV Status			
Total cases -known	573 (100%)	59 (100%)	71 (100%)
HPV Negative	167 (29%)	17 (29%)	21 (30%)
HPV Positive	406 (71%)	42 (71%)	50 (70%)
HPV 16/18	349/406 (86%)	25/42(59%)	29/50 (58%)
HPV Other	57/406 (14%)	17/42 (41%)	21/50 (42%)
Overall HPV 16/18	349/573 (61%)	25 /59 (42%)	29/71 (41%)
Cases unknown		81	43

Incidence Rates per 100,000 population for HPV-associated and non-associated Sites U.S., 1973-2004



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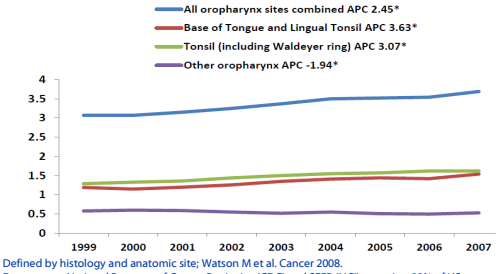
Incidence of HPV-associated Cancers of the Oropharynx in the U.S., 2004-2007

Counts and Rates of Oropharyngeal Cancer by Site

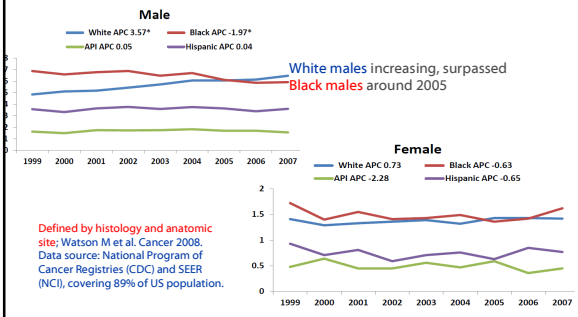
Site	Avg Annual Count	Total Count	Rate/ 100,000
Tonsils	5,077	20,310	1.6
Base of Tongue	4,536	18,144	1.4
Other OP	1,628	6,512	0.5
Total	11,241	44,966	3.6

Annual Percentage Change Oropharyngeal Cancers, by Site, 1999-2007



Defined by histology and anatomic site; Watson M et al. Cancer 2008.
Data source: National Program of Cancer Registries (CDC) and SEER (NCI), covering 89% of US population.

Annual Percentage Change in Oropharyngeal cancers, by Sex and Race/Ethnicity, 1999-2007



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HPV and Rising Oropharyngeal Incidence in the U.S., 1988-2004

- 271 oropharyngeal cancers collected by 3 cancer registries in 1988-2004.
- Incidence of HPV-positives increased by 225% during 1988-2004 -- incidence of HPV-negative cancers declined by 50%.
- Should recent trends continue, the annual number of HPV-positives among men will surpass that of cervical cancers among women by the year 2020.

Source: Chaturvedi A et al., ASCO Annual Meeting, May 2011

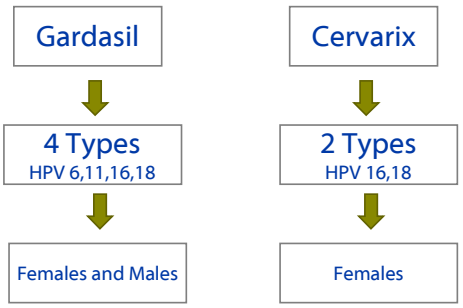
Prognosis

- HPV-positive oropharyngeal cancers have improved prognosis/outcomes relative to HPV-negative OPCs.
- HPV-positive tumors have higher survival rates, respond better to radiation and chemotherapy treatment, and are less likely to recur than HPV-negative ones.
- HPV +/— tumor status may drive treatment decisions.

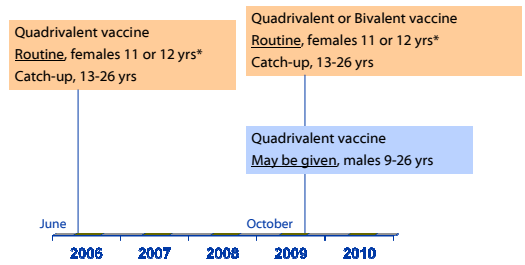
Differences in HPV-Positive Oropharyngeal Cancers by Race/Ethnicity

- HPV-positive oropharyngeal cancers occur more often in whites and are associated with improved outcomes
- Settle, 2009
  - Median overall survival: 70.6 months for whites vs. 20.9 months for blacks
  - HPV positivity in oropharyngeal cancer patients nearly 9-fold higher in whites than blacks

Vaccines – FDA Approval



ACIP Recommendations for HPV Vaccine in the United States



Quadrivalent (HPV 6,11,16,18) vaccine; Bivalent (HPV 16,18) vaccine; ACIP: Advisory Committee on Immunization Practices
* Can be given starting at 9 years of age

Potential for HPV Vaccines to Prevent Oral HPV Infection

- Effectiveness to prevent oral HPV infection is unknown.
- High prevalence of HPV-16 in oropharyngeal cancers suggests HPV vaccination may have a major impact on incidence of OPCs.
- Periodic surveillance in HPV-associated oropharyngeal cancers will be important to monitor the impact of HPV vaccines.

Clinical Implications – Tobacco Cessation

- Most Oral Cavity and Pharynx cancers (75%) caused by tobacco and alcohol use
- Expand efforts for tobacco cessation, particularly among black males and females
- Dentists should be aware that younger patients with no tobacco or alcohol use may develop HPV-associated Oral Cavity and Pharynx cancers

Conclusions

- Rates of HPV-positive oropharyngeal cancers are increasing in young, white males.
- HPV-positive oropharyngeal cancers are diagnosed later but have better prognosis than HPV-negative cancers.
- Potential for number of HPV-positive orophnaryngeal cancers among men to surpass that of cervical cancers among women by the year 2020.
- HPV vaccines may greatly affect the US public health by preventing non-cervical cancers, such as oropharyngeal cancers.

References

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Oral Cavity and Pharynx Cancer incidence Rates by Subsite in U.S. Changing Gender Patterns. J of oncology, (12) 2012. http://dx.doi.org/10.1155/2012/649498

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