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Human Papillomavirus and Oropharyngeal Cancer in Maine

Oral and Pharyngeal Cancer in Maine

In 2009, oral and pharyngeal cancer had the 10th highest incidence rate among all cancers in Maine. There were 200 new cases of oral and pharyngeal cancer diagnosed among Maine residents in that year. The Maine age-adjusted incidence rate of 11.9 per 100,000 was similar to the U.S. rate of 10.9 per 100,000. Incidence rates of oral and pharyngeal cancer are almost 3 times higher among Maine males than Maine females.[1]

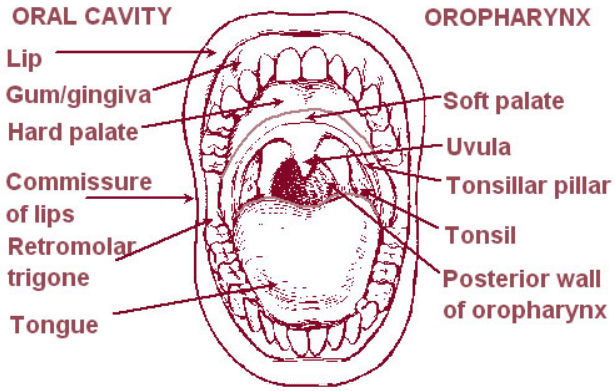
Oral cancer is often difficult to detect until later in its development, which is why historically the death rate associated with it is high; it is usually painless, and often is is detected only when it has metastasized, usually into the lymph nodes of the neck. Long term effects of oral and pharyngeal cancer, usually detected in a later stage and often after the cancer has metastasized, include facial disfiguration, difficulty swallowing and eating, and chronic mouth pain.

Terminology

Oral cancer and pharyngeal cancer includes cancer of the oral cavity and the pharynx (Figure 1). Oropharyngeal cancer is a subset of oral and pharyngeal cancer and refers to cancer of the oropharynx, which includes the palatine and lingual tonsils, the posterior one-third (base) of the tongue, the soft palate, and the posterior pharyngeal wall (Figure 1). The great majority of oral cancers are squamous cell carcinomas.[2,3,4]

Human papillomavirus (HPV)-associated cancer refers to cancers with specific anatomical locations within the oropharynx (Figure 1) that have been shown in prior literature to be strongly associated with HPV infection.[5]

Figure 1. Diagram of Oral Cavity



U. S. National Institutes of Health, National Cancer Institute. SEER Training Modules, Head and Neck Cancer. Accessed on 5th Oct. 2012 at http://training.seer.cancer.gov/head-neck/anatomy/mouth.html.

The Connection between Oropharyngeal Cancer and Human Papilloma Virus

Along with genetic and environmental factors, tobacco and alcohol have been regarded as the major risk factors for oral cancer.[6] Public health efforts at tobacco control and education in the U.S. have successfully reduced the prevalence of cigarette smoking, resulting in a lower incidence of oral and pharyngeal cancers. However, in recent years a leveling-off has been observed in the decrease of

oropharyngeal cancer incidence nationally.[7] It has been suggested that oncogenic or tumor-causing human papillomavirus (HPV), specifically type 16 (HPV-16) may be a factor in this phenomenon.

Oropharyngeal cancer is the second-most commonly occurring HPV-associated cancer after cervical cancer. Historically, oral cancer has been associated with males fifty and older who have a history of tobacco and alcohol use (with black males having the highest incidence). The incidence of HPV-associated oral cancer, in contrast, has been linked with young adults between the ages of 20 to 28 who have no history of smoking (white males at a slightly higher rate than white females). There appears to be an increased risk of this cancer for individuals with a history of multiple sexual partners, even when the number of partners is low. HPV vaccines (Gardasil and Cervarix) may protect against HPV-6, 11, 16 and 18, which are associated with 80%–90% of all HPV-related oropharyngeal cancers in the United States.[6]

Although typically HPV-positive oropharyngeal cancers may be detected and diagnosed at later stages, patients (who also tend to be somewhat younger) appear to have higher survival rates than those with non HPV-associated oropharyngeal cancers, respond better to treatment therapies, and are less likely to experience growth or metastases and reoccurrence of tumors.[8]

HPV-Associated Oropharyngeal Cancer Trends in Maine

This analysis uses Maine Cancer Registry data on all newly diagnosed oral and pharyngeal cancers among Maine residents occurring between 1995 and 2009. Based on anatomic site preference of HPV-associated oropharyngeal cancers, cancers were classified into two groups:[5,9]

1. HPV-associated oropharyngeal cancer: Defined as cancers detected in the base of the tongue, lingual and palatine tonsils, and certain sites within the oropharynx (n=1,030).

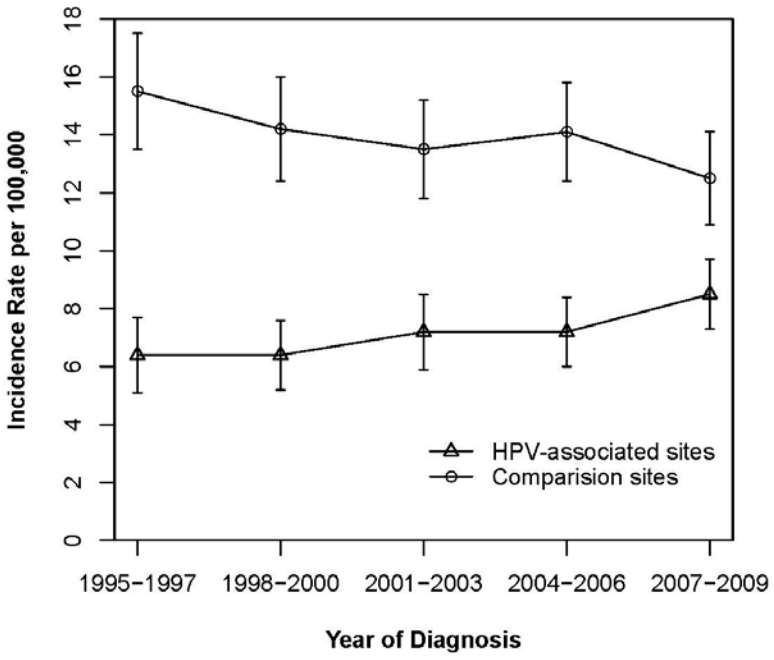
2. Comparison site cancer: Defined as cancers in the oral cavity and in the larynx that are anatomically near the oropharyngeal cancer sites but are sites not associated with HPV infection based on epidemiologic and pathologic studies (n=2,020 not located in HPV-associated sites).

The following key points emerged from the analysis:

- **Male Incidence:** The age-adjusted incidence rate for HPV-associated oropharyngeal cancer among Maine males has been rising steadily from 6.4 per 100,000 in 1995-97 to 8.5 per 100,000 in 2007-09, although this change is not statistically significant.

  During the same time period, however, there was a steady, but not statistically significant, decrease in the non-HPV-associated oropharyngeal cancer incidence rates among Maine males (from

Figure 2. Male Oral and Pharyngeal Cancer Incidence



15.5 per 100,000 in 1995-97 to 12.5 per 100,000 population in 2007-09; Figure2).

- **Female Incidence:** The incidence rates of both HPV and non-HPV-associated oropharyngeal cancer rates remained stable between 1995 and 2009 among Maine females (Figure 3).

- **Age at Diagnosis:** The difference in age at diagnosis between HPV-associated and non-HPV-associated cancers was also assessed.

Compared with cancers in the non-HPV-associated sites, HPV-associated oropharyngeal cancers were more likely to be diagnosed at a younger age, particularly among Maine males (Figure 4).

Figure 3. Female Oral and Pharyngeal Cancer Incidence

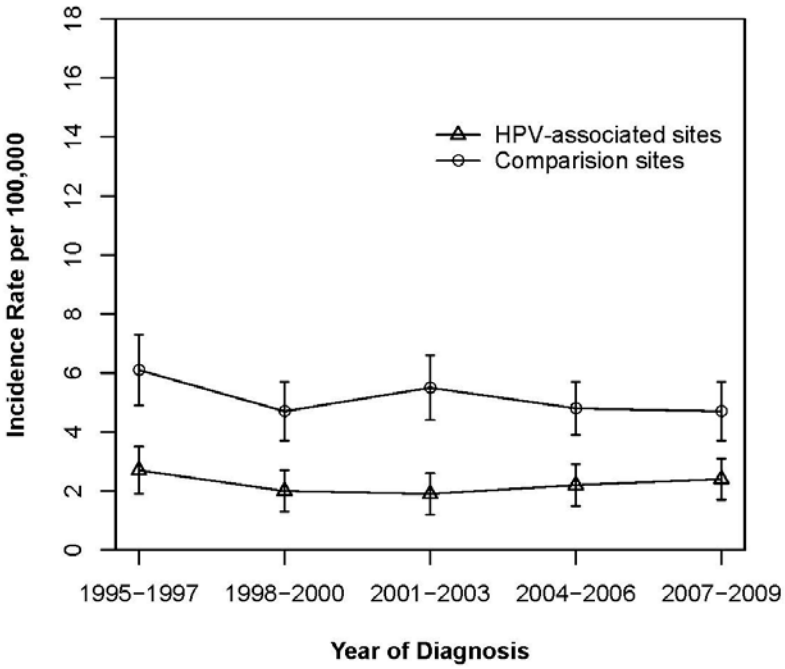
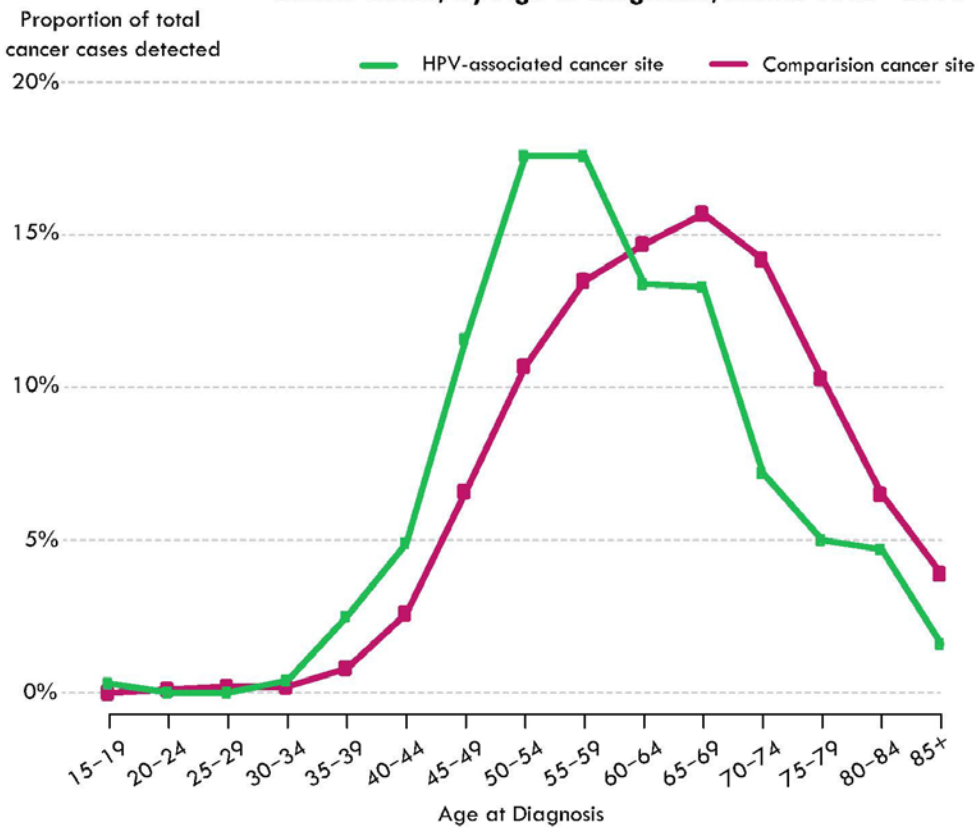


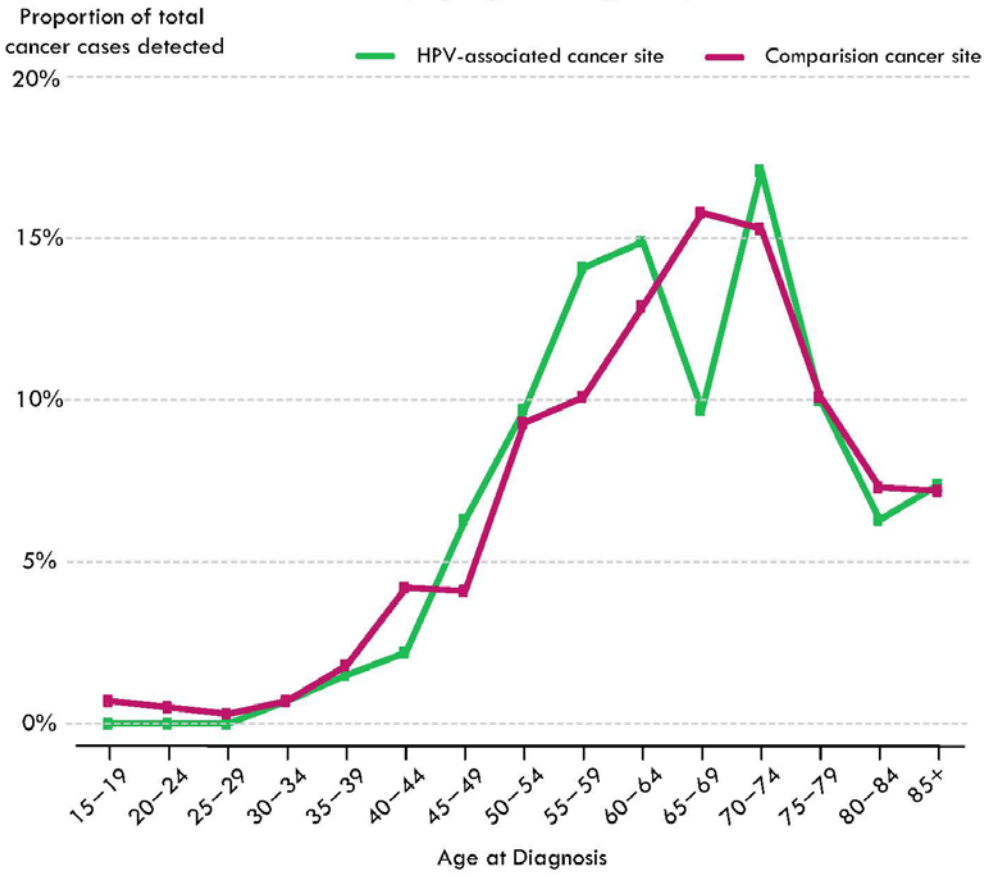
Figure 4. Distribution of Male Oral and Pharyngeal Cancer Cases, by Age of Diagnosis, Maine 1995–2009



Source: Maine Cancer Registry

In contrast to the pattern among males, the age at diagnosis for HPV-associated oropharyngeal cancer was more similar to that for non-HPV-associated oropharyngeal cancer among females. However, a slight shift to a younger age of diagnosis for HPV-associated oropharyngeal cancers was still seen. Compared to non-HPV-associated oropharyngeal cancers, a greater percentage of HPV-associated oropharyngeal cancers among females were diagnosed in the 55-59 and 60-64 year age groups and a smaller percentage were diagnosed in the 65-69 year age group.

Figure 5. Distribution of Female Oral and Pharyngeal Cancer Cases, by Age at Diagnosis, Maine 1995–2009



Source: Maine Cancer Registry

Conclusion:

This analysis reveals a slow rise in HPV-associated oropharyngeal cancer among Maine males beginning in 1995; this trend is accompanied by a decrease over time in the non-HPV comparison sites. Although neither of these trends is statistically significant, there is a possible clinical significance, which could be accompanied by an improvement in survival. HPV vaccines have shown considerable protection against HPV-associated cancers, but the effectiveness of these vaccines specifically relative to oropharyngeal cancer remains unknown.[10]

Years of public health efforts to promote tobacco abstinence and cessation, combat overuse of alcohol, and increase tobacco and alcohol treatment opportunities have helped reduce the incidence of oropharyngeal cancers associated with these traditional causes. There is currently insufficient evidence to conclude that efforts to increase HPV vaccination (among males as well as females) can decrease the incidence of HPV-associated oropharyngeal cancer. However, it seems reasonable to suggest that in the future, vaccine use along with enhanced awareness of HPV-associated cancer should be increased to help reduce HPV-associated oropharyngeal cancers among Mainers.

About the Data Source:

The Maine CDC Cancer Registry (MCR) is a statewide population-based cancer surveillance system housed in the Maine Center for Disease Control and Prevention. The MCR collects information about all newly diagnosed and treated cancers occurring among Maine residents (except in situ cervical cancer and basal and squamous cell carcinoma of the skin). This information is used to monitor and evaluate cancer incidence patterns in Maine. This information is also used to better understand cancer, identify areas in need of public health interventions, and improve cancer prevention, treatment and control.

For more information visit:

- Maine CDC Cancer Registry: http://www.maine.gov/dhhs/mecdc/population-health/mcr/.
- National Program of Cancer Registries (NPCR): http://www.cdc.gov/cancer/npcr/.

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