



KEYNOTES AND RESOURCES

Episode #7 – HPV and Oral Cancer

July 24, 2020

Global Burden of Cancer Attributable to Human Papillomavirus (HPV)

HPV-related cancers remain a leading cause of cancer in both women and men. Globally, HPV infection causes up to 4.5% (640,000 cases) of all new cancer cases worldwide (8.6% females; 0.9% males), representing 29.5% of all infection-related cancers. Three cancer sites in the head and neck have been associated with HPV: oropharynx and, to a lesser extent, the oral cavity and larynx. Countries in which the age-standardized incidence rates of HPV-attributable head and neck cancer is relatively high (over 1.25 per 100,000) are located in Northern America and Europe. Between 70% to 90% of all HPV-related cancer cases may be prevented by universal high-coverage HPV vaccination¹ [1] [2].

Prevalence of HPV Associated Cancers in Canada

Approximately two-thirds of HPV-related cancers occur in areas other than the cervix. Most of these cancers are related to high-risk HPV types 16 and 18.

For example, HPV infection is related to:

- 80% to 90% of anal cancers
- 40% of vaginal and vulvar cancers
- 40% to 50% of penile cancers
- 25% to 35% of mouth and throat cancers [3]

Key risk factors for intra-oral cancers are tobacco and alcohol use. HPV is also a main risk factor for oropharyngeal cancer, but not the other types of intra-oral cavity cancers. While the decrease in intra-oral cancers from 1981 to 2003 was likely a result of a decrease in tobacco use, the increase since 2003 appears to be due to rising rates of HPV infection. Oropharyngeal cancer incidence increased at a greater rate than other intra-oral cancers between 2003 and 2013. The rise in HPV infection has been linked to changing patterns in sexual behaviours, particularly an increased number of sexual partners and oral sex [4]. Research has demonstrated that it usually takes

¹ HPV vaccination information:

Human papillomavirus (HPV) prevention and HPV vaccines: Questions and answers, Public Health Agency of Canada, October 4, 2017

<https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/hpv-prevention-vaccines-questions-answers.html>

Ontario's Routine Immunization Schedule, Ontario Ministry of Health

http://www.health.gov.on.ca/en/public/programs/immunization/static/immunization_tool.html

approximately 20 years after being infected with HPV for oropharyngeal cancer to develop, which help to explain the delay in the uptick of HPV related cancers [5].

HPV Classification and Type

HPV is formed by a non-enveloped icosahedral capsid with circular double-stranded DNA. More than 150 types of HPV are currently known, and approximately 120 types are fully sequenced. HPV is also classified according to cutaneous or mucosal tropism characteristics.

Cutaneous types are associated with skin lesions:

- HPV 1, 2, and 4 are most prevalent in plantar warts
- HPV 5, 8, 9, 12, 14, 15, 17, 19-25, 36, 46, and 47 are frequently found in epidermodysplasia verruciforme
- HPV 5 and 8 are also related to skin carcinomas

Mucosal types infect the anogenital tract and upper aerodigestive tract and include head and neck squamous cell carcinoma (HNSCC), oropharyngeal squamous cell carcinoma (OPSCC), and oral cancer. Mucosal types can be subdivided into low-risk and high-risk types based on oncogenic potential.

- The most relevant low-risk types are HPV 6 and 11, and HPV 40, 42, 43, 44, 54, 61, 70, and 72 can be observed in benign genital mucosal lesions.
- HPV 31, 33, 35, 52, 58, and 67 are known to be moderate to high-risk
- Among the high-risk types, HPV 16 and 18 are most common, and type 16 can be found in various cancers such as cervical cancer, oropharyngeal squamous cell carcinoma (OPSCC), and penile carcinoma [6].

HPV Types Related to Oral Cancer

In the oral cavity, 24 types of HPV have been associated with benign lesions (1, 2, 3, 4, 6, 7, 10, 11, 13, 16, 18, 30, 31, 32, 33, 35, 45, 52, 55, 57, 59, 69, 72, and 73). Twelve types have been associated with malignant lesions (2, 3, 6, 11, 13, 16, 18, 31, 33, 35, 52, and 57). A total of 99% of HPV infections in HNSCC are related to high-risk types 16, 18, 31, or 33, with HPV 16 as the most common subtype and HPV 33 accounting for up to 10% of cases [6].

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Additional Resources

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