

# Human Papillomavirus and Oropharyngeal Cancer

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## Abstract

*Viruses are microscopic organisms that require a host to live and multiply. The Human Papillomavirus is a sexually transmitted virus with strains that are connected with cervical cancer and genital warts. Due to the risk of cervical cancer, women have traditionally been “pre-treated” with various vaccinations as a means of prevention. More recently, there has been an increase in oropharyngeal cancer, especially in the younger male population. A strain of the Human Papillomavirus has been identified as a causative factor in these cancers.*

*Why is oropharyngeal cancer on the rise? With public information regarding smoking and excessive drinking, the associated risk factors for this disease, oropharyngeal cancer, was decreasing. We now know there is a correlation between oral sex and the Human Papillomavirus being transmitted to the oropharynx. Some of these strains of HPV are directly linked to these cancers of the head and neck.*

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**KEY WORDS:** *Human Papillomavirus, Oro-pharyngeal Cancer, Vaccinations*

## Introduction

The Human Papillomavirus is a sexually transmitted disease that has been associated with genital warts and cervical cancer. The mode of transmission for this sexually transmitted disease was thought to be primarily through vaginal intercourse. Research now shows that this virus can also be found in the head and neck region. Over the past decade, there has been an alarming increase in oropharyngeal cancer in a new demographic of the population who do not have the typical risk factors associated with oropharyngeal cancer. The typical factors that are commonly associated with oropharyngeal cancer are drinking and smoking/chewing tobacco (Spinelli, 2011).

The Human Papillomavirus possesses all the features of a typical virus. From the common cold to HIV, humans have been in a constant battle with viruses over the years! What are viruses? They are microscopic organisms with specific compositions. All viruses consist of genetic material, nucleic acid (RNA or DNA), are surrounded by a protein coat to protect the genetic information, and glycoprotein, or lipid. Viruses do not have organelles like cells, such as ribosomes, to make proteins, thus, they require a host to reproduce. The virus enters a host cell and inserts its genetic material into the host. The cell will now produce more viruses which will go on to infect other cells in a destructive cycle.

(<https://courses.lumenlearning.com/trident-boundless-microbiology/chapter/structure-of-viruses>)

Viruses can be categorised by their shape: Helical, icosahedral, envelope and other non-standard shapes that combine the other shapes. The Human Papillomavirus is a small, icosahedral DNA virus that is non-enveloped. These viruses exist without an envelope surrounding them for protection; this makes them more virulent and allows them to survive in harsh conditions. The HPV virus is surrounded by a protein-infused capsid that functions to surround and protect the genetic material. This capsid aids in binding the virus to the host cells thus aiding in ensuring the proliferation of more viruses.

(<https://courses.lumenlearning.com/trident-boundless-microbiology/chapter/structure-of-viruses>)

## Human Papillomavirus

The Human Papillomavirus (HPV) is the most prevalent sexually transmitted infection in the United States and worldwide (Stock, 2013, p.25). There are over 100 different strains of this virus with various presentations. Nearly all sexually active women and men will acquire this virus at some point in their lives. Most of these HPV infections are asymptomatic and self-limiting. Over 75% of these infections will be cleared by the body in approximately two years. HPV infections can sometimes persist in some individuals. These infections can be symptomatic and can manifest by presentation of genital warts (Stock, 2013).

Low risk strains (i.e. HPV6, HPV11) cause 90% of genital warts which can present clinically as lobulated bumps. This presentation may appear weeks, months, or even years after having sexual intercourse with an affected partner. These low risk strains of HPV are rarely associated with cancer. (<https://www.healthline.com/health/sexually-transmitted-diseases/hpv-types>)

There are 14 high-risk strains of HPV which are identified as cancer causing. Bosch and de Sanjosee's findings, as cited by Stock (2013) indicate that HPV-16 and HPV-18 have been recognised as causing approximately 70% of invasive cervical cancers. It must be noted that not all HPV-16 and HPV-18 infections progress to cancer; however, this percentage is a disturbing discovery. Medical research also reveals that oral Human Papilloma Virus infections can also cause oropharyngeal cancers. The Oral Cancer Foundation identified HPV-positive cases as the "fastest growing group of the oral cancers among Americans under 50 years of age" (Stock, 2013, p. 96).

There are many individuals with HPV who do not develop any symptoms, but these people can still infect others through sexual contact. HPV is spread through all forms of unprotected sex (vaginal, anal, and oral); however, more research must be completed in assessing HPV spread through nursing, labor and the blood/placental barrier.

([https://www.cdc.gov/cancer/hpv/basic\\_info/hpv\\_oropharyngeal.htm](https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm)).

In the past 7 years, HPV has been prevalent in the news as a major cause of cervical cancer; however, research shows that HPV is no longer just a health threat transmitted through vaginal intercourse. Transmission of the virus through vaginal sex allows the genitalia of the partners to contact one another. Safe sex campaigns and public education have lent to heightened awareness and discouragement of unprotected vaginal intercourse for the spread of the HPV. Condom usage may decrease the spread of this virus; however, this method of protection is not 100% fail proof.

In the United States, exposure to HPV during oral sex presents as the highest risk factor for oropharyngeal cancers, while the most common cause for oral cancer worldwide is from chewing and/or smoking tobacco. According to Spinelli (2011), "More than 60% of the cancers of the mouth and pharynx are caused by HPV" (p. 46). Additionally, Genden (as cited by Belluz, 2011) states that the increase in the rate of oral sex is directly proportional to the increase in tongue, oropharynx and tonsil cancer rate.

With the introduction of HIV in the 1980s, there has been increased awareness of sexually transmitted diseases. Consequently, preventative measures such as more consistent condom usage and selective partners for sexual encounters has increased with many individuals. The practice of oral sex has increased as the younger population tend to discount oral sex as a sexual act that can transmit disease. The younger generation may also want to 'preserve their virginity' and may feel this is a safer means of intimacy. This sexual act, however, is a viable mode of transmission for HPV.

If an individual performs oral sex on an infected partner, the virus can be transmitted to the new uninfected host. Unlike other viruses such as hepatitis B and HIV, HPV is not spread through blood and bodily fluids, but rather by direct skin-to-skin contact. According to the Centres for Disease Control and Prevention, the virus embeds in the

oropharynx, which include the posterior pharyngeal wall, the palatine and lingual tonsils, the soft palate, and the posterior one-third base of the tongue. When the virus attaches to these oral structures, it may lay dormant for many years. Researchers are still trying to ascertain if there are other factors that may activate this virus from its dormant state.

([https://www.cdc.gov/cancer/hpv/basic\\_info/hpv\\_oropharyngeal.htm](https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm))

## Discussion

A 2013 study was performed at Ohio State University to assess oropharyngeal cancer in three distinct decades. Dr. Maura Gillison, a medical oncologist and epidemiologist at Ohio State University first noticed an odd shift in patient profiles. She noticed younger men with virtually no history of heavy drinking or smoking being diagnosed with this cancer (Spinelli, 2011). 1984 to 1989, 16% of oropharyngeal cancers tested positive for Human Papillomavirus. In 2005, 73% of oropharyngeal cancers tested positive for Human Papillomavirus. It is estimated that by 2020, oropharyngeal cancer diagnoses will exceed those for cervical cancer in the United States. Some researchers have gone so far as to classify this growing trend as an epidemic (Pratt, 2018).

Several symptoms of HPV-caused oropharyngeal cancer are like other common illnesses such as the flu; however, they are usually more persistent in nature. Some such symptoms are ear pain, trouble moving the tongue, or fully opening the mouth, sore throat, voice changes, and enlarged lymph nodes may be present. The clinician should assess the patient for external asymmetry or swelling in the neck or jaw, but the most effective method to diagnosis this cancer is to have a tissue biopsy performed (Giacobbe, 2010). Belluz (2011) states that the body will fight the infection as it does a flu prior to it becoming a cancer. This lends to reason that the healthier the host when infected with HPV as with the flu virus, the more effective will be the initiation of and defensive response by the body to HPV.

Education of the public by the medical community is the most effective method for change. People are generally not fully aware of the pre-cancerous nature of the Human Papillomavirus other than on the cervix. If more awareness were made on the subject, there would be an increase in both abstinence from multiple sexual behaviors with multiple partners and implementation of the HPV vaccine on more individuals at an earlier age.

There are currently two vaccinations against HPV: Gardasil and Cervarix. Gardasil was first licensed by the Food and Drug Administration (FDA) in 2006 (Pratt, 2018). This initial quadrivalent vaccine prevents growth of strains of HPV 6, 11, 16, and 18. This vaccine is also effective against various pre-cancerous conditions caused by HPV31, 33, 45, 52 and 58. Gardasil vaccine was primarily promoted to prevent cervical cancers in females during sexual intercourse; however, since the mode of transmission is skin to skin contact, the transmission of the virus is still possible through oral and anal sex with a non-vaccinated partner (Pratt, 2018). Pratt also states that the initial research and evaluation of the vaccine efficacy against HPV was focused on females. Due to this focus, there has been an unintended adverse consequence of delaying an HPV vaccine recommendation for males until 2011 (2018).

The vaccine ideally should be administered to individuals between the ages of 9–26, thereby targeting people prior to exposure to HPV. It was not until 2011 that the recommendation for male vaccination was fully backed. This delay in vaccination of males caused an ‘epidemic’ of HPV associated head and neck cancers in men under the age of 35 (Wallis, 2018). Dr. Maura Gillison indicated that the burden of cancer caused by HPV is going to shift from women to men in this decade due to the lag in HPV vaccinations in males (The International BusinessTimes, 2013). Dr. Nathan Fletcher (as cited by AmeriHealth Caritas, 2019) states that females get pap smears more regularly to diagnose their HPV status, but currently, there are no screening tests for men. This is one of the reasons that the death rate associated with oral and oropharyngeal cancers for men remains quite high: these cancers are often discovered too late.

The good news is the oropharyngeal cancers associated with HPV have a better survival rate in comparison to oropharyngeal cancers in individuals with additional risk factors such as heavy drinking and smoking. This is due partly to the better immune system of the younger patient with a healthier lifestyle.

Dr. Larry Paul (AmriHealth Caritas, 2019) emphasised that early detection is imperative for a positive outcome. Regular dental visits with oral cancer screening exams are one of the first line of detection of head and neck changes. Other practical ways to reduce risk of oral cancer are avoiding HPV infections by vaccination and reduction of multiple sexual partners, limit smoking and drinking, and eating a healthy diet.

## Conclusion

This vaccination against HPV is a controversial subject as many parents feel conflicted to vaccinate their young children. There is oftentimes a negative stigma associated with the contraction of this disease; thus, many parents turn a blind eye to habits in which their children may indulge.

Unfortunately, this is how the HPV virus continues to live and thrive: lack of proactive measures due to misconceptions and miseducation. With proper education as to the modes of transmission of this virus, the pre-cancerous component of contraction with various strains, and the vaccination available to proactively counteract this growing increase of new cases, there could be a decrease in oropharyngeal cancers. It is the role of the medical community to make patients aware of this common, yet potentially dangerous virus, and provide advice on how to prevent the spread of and contraction of this sexually transmitted disease.

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