Cervical cancer
- Approximately 2/3 of cervical cancers are caused by HPV 16 and 18
- Cervical cancer in Minnesota is being prevented with routine screening tests which look for changes in cervical cells caused by HPV infection
- HPV tests look for the infections by finding genes (DNA) from HPV in cells

Vulvar cancer
- 50% of vulvar cancers & almost all vulvar pre-cancers are linked to infection with high-risk HPV types
- No standard screening available, other than routine physical exams
- More rarely occurring, often undetected cancer than cervical cancer

Vaginal cancer
- Up to 90% vaginal cancers and pre-cancers contain HPV
- Vaginal pre-cancers may be present for years before becoming invasive
- Vaginal cancer can sometimes be found with Pap test for cervical cancer/pre-cancer

Penile cancer
- HPV infection is found in 50% of penile cancers
- More common in men with HIV & among men who have sex with men (MSM)
- No approved screening test to detect early signs of penile cancer
- Nearly all penile cancers start under foreskin; often detected early in progression

Anal cancer
- HPV causes cancer of the anus in men & women
- Among men, most common among those with HIV and MSM
- Anal cancer screening is not recommended, though some experts recommend anal cytology testing (Anal Pap) for at risk populations, such as MSM, women who’ve had cervical or vulvar cancer, HIV+, organ transplant

Oropharyngeal cancer (including tonsil)
- HPV is now found in approximately 2/3 of oropharyngeal cancers in men & women
- No approved test to screen for oropharyngeal cancer
- Routine exams by a dentist, doctor, dental hygienist, or by self-exam are methods for early detection of oropharyngeal cancer is recommended

Citations

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Methods
The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute (NCI) works to provide information on cancer statistics to reduce the burden of cancer in the U.S. Cancer registries routinely collect data on patient demographics, tumor site, tumor morphology & stage at diagnosis, 1st course of treatment, & follow-up for vital status. SEER is the only comprehensive source of population-based information in the U.S. that includes stage of cancer at the time of diagnosis & patient survival data. SEER®Stat software version 8.1.5 was utilized to examine trends in HPV-related cancer trends over time among males & females from 1988-2009; results are presented here.

Introduction
- Minnesota’s smoking rate significantly declined from 1999 - 2010 from 22.1 + 1.7% to 16.1 + 1.2 %, a 6.0% change (CDC, State Highlights, Tobacco Data, 2010).
- Even while smoking rates are decreasing, oropharyngeal cancer incidence is increasing (1).
- Human papillomavirus (HPV) causes an epidemiologically & clinically distinct form or oropharyngeal squamous cell carcinoma (2).

- According to the Mayo clinic, > 90% of oral & oropharyngeal cancers are squamous cell carcinoma, meaning they begin in the flat, squamous cells in lining of the mouth & throat (3).
- Incidence rates, and trends over time, of other forms of non-cervical, HPV-related cancers in Minnesota, including relatively rare forms of cancers of the anus, penis, vulva, and vagina were analyzed using SEER®Stat software.

Objectives of MCSS
- Monitor occurrence of cancer & describe risks of developing cancer
- Inform health professionals & educate public regarding specific cancer risks
- Answer questions & concerns about cancer
- Promote cancer research
- Guide decisions about how to target cancer control resources

Conclusions & Recommendations
- Since the majority of the HPV-positive tumors contained HPV type 16 DNA, quadra-valent vaccination against this type prior to exposure should be widely implemented (4)
- Adolescent males & females, prior to sexual debut, should be vaccinated
- Current American Association of Pediatric (AAP) guidelines recommend that multi-dose vaccinations beginning in adolescence can be beneficial to both sexes (5)

Further information about Minnesota cancer trends can be obtained from the Cancer in Minnesota, 1988-2009 report which is accessible on and downloadable from the following website:
http://www.health.state.mn.us/dhs/ndph/docs/mcss/mcssformation