

HPV Associated Cancers – Data Brief

Vermont Cancer Registry

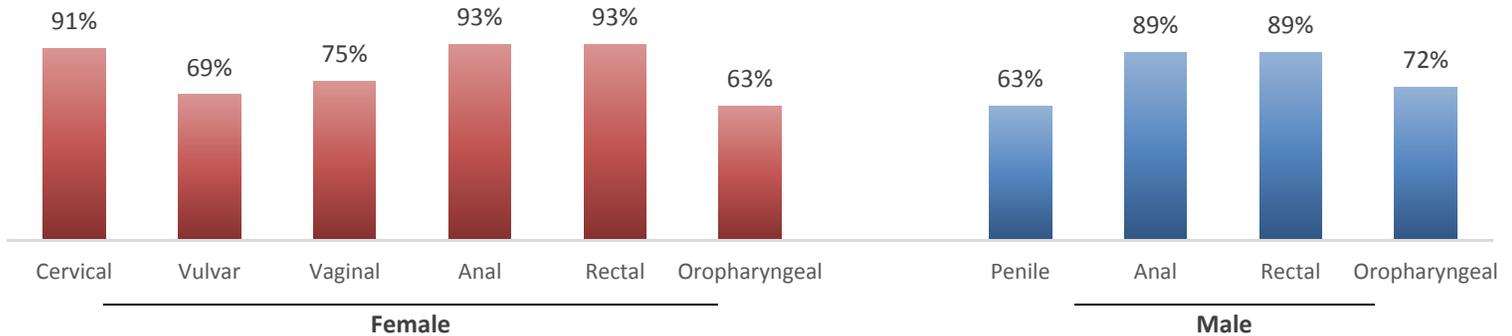
Background

Human Papillomavirus (HPV) causes nearly all cervical cancers and is associated with cancers of the vulva, vagina, penis, anus, mouth, and throat (oropharynx).

HPV infection is very common. Most individuals experience no symptoms, are never aware of an infection, and most infections clear spontaneously within one to two years. However, infection may persist and progress to pre-cancer or cancer.

HPV is a group of over 170 related viruses identified by a number which describes the HPV type. Some HPV viruses are low-risk types that can cause genital warts while high-risk types of HPV have been linked to developing cancer. The most common and carcinogenic high-risk HPV types include HPV 16 and 18, which are the most likely types to persist and progress to cancer. The association between HPV and cervical cancer is well established with more than 90 percent of cervical cancers attributed to HPV infection, 70 percent of oropharyngeal cancers, and over 90 percent of rectal cancers (MMRW, 2016).

Estimated annual percentage of cancers attributable to HPV* by site and sex – United States, 2008-2012[†]

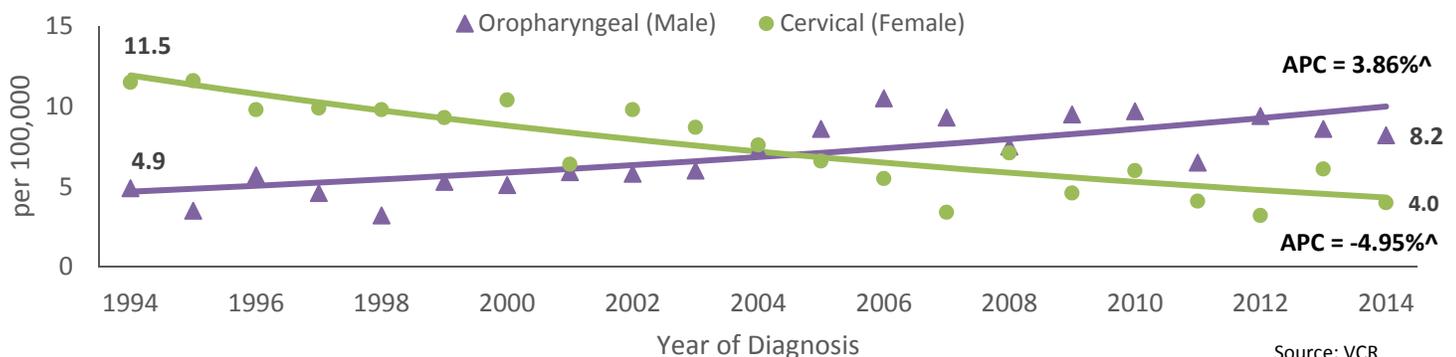


Source: MMWR

Incidence

In Vermont there are approximately 104 new cases of HPV associated cancers* diagnosed each year, which account for approximately three percent of all new cancers diagnosed (VCR, 2010-2014). Between 1994 and 2014, the incidence of cervical cancer, which has been the focus of efforts since the vaccine was licensed in 2006, has decreased by five percent while the incidence of oropharyngeal cancers among males has increased by nearly four percent. HPV oropharyngeal infection and related cancers among men are expected to continue outpacing cervical cancers among women[‡].

Age-adjusted incidence rates of HPV associated* oropharyngeal (male) and cervical (female) cancers – Vermont, 1994-2014

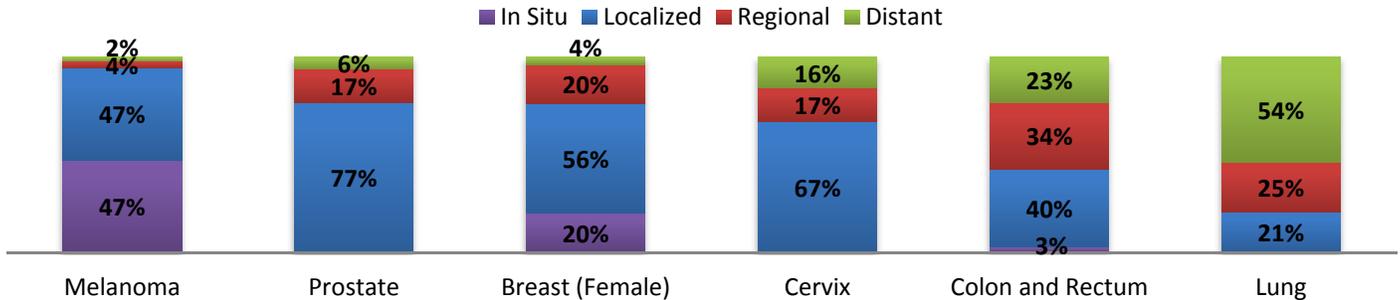


Source: VCR

Stage at Diagnosis

Approximately 67 percent of Vermont women are diagnosed with cervical cancer at an early (localized) stage, which has good prognosis (VCR, 2010-2014). Nationally, 92 percent of women whose cervical cancer is diagnosed at a localized stage survive their cancer for at least five years, compared to 17 percent of those diagnosed at a distant stage (SEER Cancer Statistics Review).

Cancer Stage at Diagnosis – % of total cases of cancer, by type, according to stage at diagnosis – Vermont, 2010-2014



Source: VCR

Prevention and Screening

HPV is a common virus for which there is no treatment. Most men and women will acquire HPV at some point during their lifetime; however, most cases resolve and go away. Having HPV does not mean that someone will develop cancer, and many HPV infections that lead to cancer could be prevented with vaccines.

The HPV vaccine was first recommended for girls in 2006 and for boys in 2011. Since the first HPV vaccine was licensed in 2006, the [Food and Drug Administration \(FDA\)](#) has approved [three vaccines](#) for use. *Gardasil 9* offers protection against more HPV types and is the only HPV vaccine currently used in the U.S.

Recommendations for use of vaccines in children, adolescents and adults are developed by the [Advisory Committee on Immunization Practices \(ACIP\)](#). In 2016, the ACIP *HPV Vaccines Work Group* approved updated recommendations⁵:

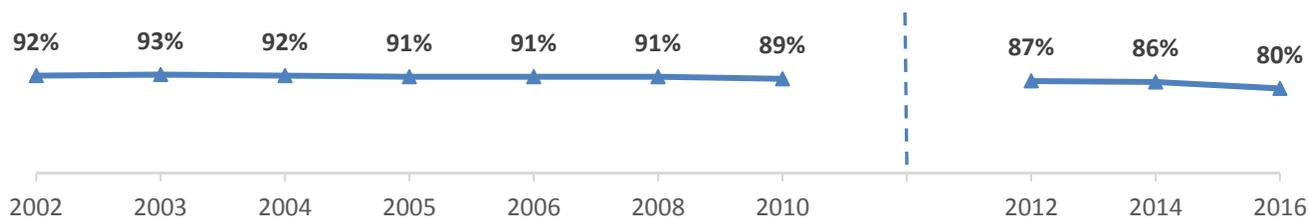
- Children and adolescents age 9-14 recommended schedule is *2 doses* of HPV vaccine. The second dose should be administered *6-12 months after the first dose* (0, 6-12 months).
- On or after age 15 the recommended schedule is *3 doses* of HPV vaccine. The second dose should be administered *1-2 months after the first does*, and the third dose should be administered *6 months after the first dose* (0, 1-2, 6 months).

Among Vermont adolescents, 51 percent of males and 60 percent of females age 13 to 17 have [completed](#) the full HPV vaccine series (Vermont Immunization Registry (IMR), 2016). Under the updated guidelines, coverage of adolescents receiving the recommended two doses has had a [positive impact](#) (IMR, 2017) however, almost half of eligible Vermont adolescents have not completed the series.

Widespread immunization with the HPV vaccine could greatly reduce cervical and oropharyngeal cancers. However, the vaccine does not protect against all HPV types that can cause cancer, and regular [screening](#) is recommended to detect changes before cancer develops. Screening for cervical cancer is very effective and has reduced cervical cancer deaths. Women who develop cervical cancer are more likely to be individuals who were not screened, were not screened recently, or did not follow-up after receiving an abnormal result[#]. Two tests are currently used to screen for cervical cancer. The Pap (Papanicolaou) test collects cells from the cervix to be examined microscopically to identify abnormal changes in cells that might be precancerous. The high-risk HPV test (hrHPV) looks for the types of HPV virus that cause cervical cancer.

Although the HPV vaccine is over 90% effective in preventing cervical cancer, women over 40 years of age will not have received this vaccine. The [United States Preventive Services Task Force \(USPSTF\)](#) recommends biennial screening for cervical cancer in women age 21 to 65 years with cytology (Pap smear) every 3 years or, for women age 30 to 65 years who want to lengthen the screening interval, screening with a combination of cytology and human papillomavirus (HPV) testing every 5 years. The USPSTF recommends against screening for cervical cancer in women younger than age 21 years or women older than age 65 years who have had adequate screening and women who had had a hysterectomy with removal of the cervix and who do not have a history of abnormal results (USPSTF, 2012).

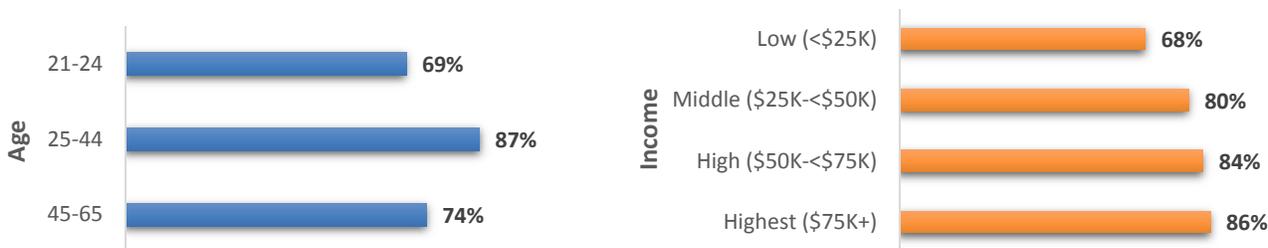
Meet Pap test screening recommendations – Vermont women, age 21-65, 2002-2016[¶]



Source: BRFSS

In 2016, eight in ten Vermont women ages 21 to 65 had received a Pap test in the last three years. Women age 25 to 44 are the most likely to have received cervical cancer screening in the last three years. The difference in screening in this age group is higher than among women in other age groups. Women with higher annual household incomes are more likely than those with less income to meet cervical cancer screening guidelines. Women in households making at least \$25,000 annually are more likely than those with less income to have received a Pap test in the last three years (BRFSS, 2016).

Meet Pap test screening recommendations – Vermont women, age 21-65, 2016[¶]



Source: BRFSS

While the benefits of cervical cancer screening are well established, there is no routine screening test for oral cavity and oropharyngeal cancers. The [USPSTF](#) has concluded that current [evidence is insufficient](#) to determine the potential benefits and harms of screening for oral cancer in a primary care setting. However, many cancers and pre-cancers are found during routine exams by a dentist, dental hygienist, or self-exam.

Technical Notes

These data were collected by the Vermont Cancer Registry participating in the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC). Incidence rates are *per 100,000* and are age adjusted to the 2000 U.S. standard population and exclude basal cell and squamous cell skin cancers. Incidence rates exclude in situ carcinomas unless otherwise specified. Incidence was coded using the International Classification of Disease (ICD) for Oncology (ICD-O). Vermont cases include Vermont residents only. A reporting delay by Department of Veterans Affairs (VA) has resulted in incomplete reporting of Vermont VA incident cases in 2011, 2012, 2013, and 2014. Vermont HPV vaccination includes adolescents born January 1998 through February 2004 and excludes adolescents with no reported immunizations in at least 10 years.

Sources: Vermont Cancer Registry (VCR), Vermont Department of Health (1994-2013). National Program of Cancer Registries (NPCR) and Surveillance, Epidemiology, and End Results (SEER) Program - Incidence State Restricted Access Data File (1999-2013). [SEER Cancer Statistics Review, 1975-2014](#), National Cancer Institute, April 2017. [United States](#) and [Vermont](#) Behavioral Risk Factor Surveillance System (BRFSS), 2002-2016. Vermont Immunization Registry (IMR), 2016.

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* HPV-associated cancers were coded using the International Classification of Diseases for Oncology, 3rd Edition [ICD-O-3]. Cervix (ICD-O-3 site codes C53.0–C53.9) and were limited to carcinomas (ICD-O-3 histology codes 8010–8671, 8940–8941), Vagina (ICD-O-3 site code C52.9), vulva (ICD-O-3 site codes C51.0–C51.9), penis (ICD-O-3 site codes C60.0–60.9), anus (ICD-O-3 site code C21.0–C21.9, C20.9), and oropharyngeal (ICD-O-3 site codes C01.9, C02.4, C02.8, C05.1–C05.2, C09.0–C09.1, C09.8–C09.9, C10.0–C10.9, C14.0, C14.2 and C14.8). Cancer sites were limited to squamous cell carcinomas (ICD-O-3 histology codes 8050–8084, 8120–8131).

† Viens LJ, Henley SJ, Watson M, et al. [Human Papillomavirus–Associated Cancers — United States, 2008–2012](#). *MMWR Morb Mortal Wkly Rep* 2016;65:661–666. DOI: <http://dx.doi.org/10.15585/mmwr.mm6526a1>.

‡ Gravitt PE. [Unraveling the Epidemiology of Oral Human Papillomavirus Infection](#). *Ann Intern Med*. 2017;167:748–749. doi: 10.7326/M17-2628

^ Annual Percent Change (APC) is used to measure trends in cancer rates over time where cancer rates are assumed to change at a constant percentage of the rate of the previous year. In this document, the APC is reported when it is significantly different from zero ($\alpha = 0.05$).

§ [Use of a 2-Dose Schedule for Human Papillomavirus Vaccination — Updated Recommendations of the Advisory Committee on Immunization Practices](#). Meites et al. *MMWR*, December 16, 2016, Vol. 65, No. 49. U.S. Department of Health and Human Services/Centers for Disease Control and Prevention.

Draft Evidence Review: Cervical Cancer: Screening. U.S. Preventive Services Task Force. October 2017.

<https://www.uspreventiveservicestaskforce.org/Page/Document/draft-evidence-review/cervical-cancer-screening2>.

¶ Usually women who have had a hysterectomy are excluded from cervical cancer screening calculations. In 2016, women 45–65 were not asked whether they've had a hysterectomy, and as such the proportion meeting Pap test screening recommendations is underestimated. The Behavioral Risk Factor Surveillance System (BRFSS) survey methodology changed in 2011. As a result, caution must be used when comparing data from 2011 and later to prior years. Due to a difference in how the cervical cancer questions were asked in 2016, comparisons over time cannot be made.