

HUMAN PAPILLOMAVIRUS INFECTIONS IN OREGON, 2018

Each year, almost 40,000 people in the U.S. are diagnosed with a human papillomavirus (HPV) associated cancer.¹ In Oregon, this equates to 540 people diagnosed with an HPV-associated cancer each year. Most of these cancers are preventable through vaccination. While we have made progress in Oregon, there is still room for improvement. This *CD Summary* reviews background on HPV and its disease burden; presents data on HPV immunization rates in Oregon; and provides resources for clinicians to overcome barriers to HPV vaccination in their clinics.

THE VIRUS

Human papillomaviruses are a group of related DNA viruses,² of which approximately 120 have been characterized. Forty types can be spread sexually, through contact with mucous membranes of infected partners; an additional 80 types cause cutaneous infection, most commonly warts on the hands and feet.

CDC estimates that 80%–90% of people have been infected with sexually transmitted HPV at some point in their lives, usually in their teens and early 20's. This corresponds to 80 million Americans currently infected. Each year, 14 million new infections occur in U.S., making HPV the most common sexually transmitted infection.

Sexually transmitted HPVs can be categorized into high- and low-risk types. The high-risk (oncogenic) types — primarily 16 and 18 — are capable of causing cancers, most commonly cervical cancer, anogenital, oropharyngeal carcinomas, as well as cancer precursors. The low risk (non- oncogenic) types — primarily types 6 and 11 — can cause genital warts, laryngeal papillomas, and low-grade cervical dysplasia.

About half of HPV infections are with a high-risk type. In many people, the infection is asymptomatic and resolves in a year or two. For those in whom the infection persists, HPV can cause cellular changes that may progress to cancer.

HPV DISEASE BURDEN IN U.S. AND OREGON

HPV infection is associated with several different cancers; however, these cancers have other risk factors as well. For example, oropharyngeal cancer is associated with smoking and alcohol consumption, in addition to HPV. Saraiya and colleagues recently identified the prevalence of HPV DNA in cancers of various sites,³ enabling calculation of HPV-attributable* cancers. Table 1 shows the average annual numbers of HPV-attributable cancers diagnosed in the U.S. from 2010–2014.⁴ Almost all cervical, anal and rectal cancers are HPV-attributable, whereas approximately two-thirds of oropharyngeal, vulvar, penile cancers are HPV-attributable.

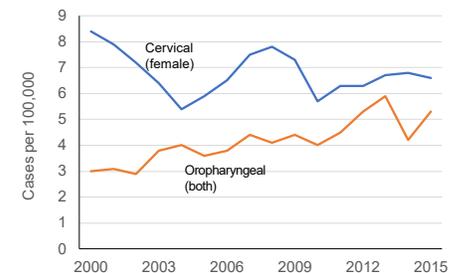
* In other words, those cancers that are likely caused by HPV.

Table 1. Average annual numbers of HPV-attributable cancers diagnosed in the U.S.

Cancer Site	Total number	% caused by HPV	HPV-attributable Female cases	HPV-attributable Male cases
Cervix	11,693	91%	10,600	0
Vagina	819	75%	600	0
Vulva	3,671	69%	2,500	0
Penis	1,181	63%	0	700
Anus	5,229	91%	3,200	1,600
Rectum	772	91%	500	200
Oropharynx	16,479	70%	2,000	9,600
Total	42,671	79%	20,260	13,477

See CDC. HPV and Cancer. www.cdc.cancer/hpv/statistics/cases.htm

Figure 1. Cervical and oropharyngeal cancer incidence; Oregon 2000–2015



Both in the U.S. and in Oregon, the incidence of cervical cancer has been gradually declining, while the incidence of oropharyngeal cancer has been increasing (Figure 1). In Oregon, the number of cases of oropharyngeal cancer has now surpassed cases of cervical cancer.

HPV-ASSOCIATED CONDITIONS

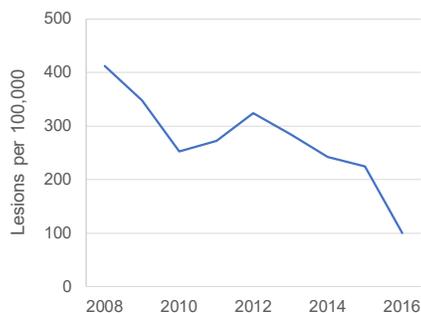
Cancer is the most serious outcome of HPV infection, and it often takes years, if not decades, to develop. HPV infections that don't resolve spontaneously can also produce shorter-term adverse outcomes, such as cervical dysplasia, that significantly affect people's health. In the U.S. each year, 1.4 million women are diagnosed with low-grade, and

330,000 with high-grade cervical dysplasia.

In Oregon each year, 3,500 cases of high-grade cervical dysplasia are diagnosed in women 21–29 years of age. Evaluation and treatment of these cervical pre-cancers cost the U.S. health care system an estimated \$1.2 billion annually.

As part of the effort to evaluate the impact of HPV vaccination, the Oregon Public Health Division monitors precancerous conditions such as cervical carcinoma *in situ* (CIN 2+). The trend is remarkable: from 2008 to 2016, the population rate of CIN 2+ women ages 18–24 years dropped 75%, from 400 per 100,000 women to 100 (Figure 2). The decline can be attributed in large part to the success of HPV vaccination.

Figure 2. Incidence of CIN 2+ lesions in Oregon women ages 18–24 years, 2008–2016



HPV VACCINE

The first HPV vaccine, Gardasil®, was licensed in 2006 for use in young women. Gardasil® protected against four strains: HPV-16 and -18, which caused 70% of cervical cancers, and HPV-6 and -11, which caused 90% of genital warts. Since then, two more vaccines that protect against additional strains have been developed. Only the 9-valent HPV vaccine is currently used in the U.S. This vaccine could prevent an estimated 90% of HPV cancers.

CDC currently recommends that both female and male adolescents be vaccinated against HPV at age 11 or 12 years; vaccination can be started as early as age 9 years. In addition, for those who did not complete vaccination when they were younger, vaccination is also recommended for: males 13–21 years; females 13–26 years; gay, bisexual, and other men who have sex with men; transgender people; and persons 22–26 years with certain immunocompromising conditions. Although it is preferable to be vaccinated before exposure to HPV, those who have been infected with one HPV type

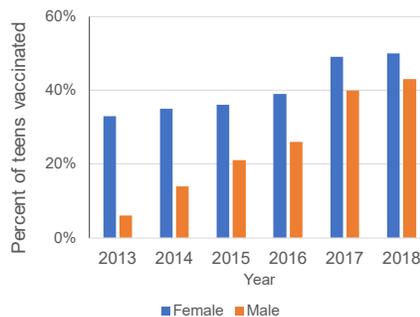
can still get protection against other types covered by the vaccine.

The recommended HPV vaccination schedule is two doses: one before the person's 15th birthday, and a second dose 6 to 12 months after the first (0, 6–12-month schedule). However, if the first dose is given after the 15th birthday, a three-dose schedule is recommended, with the second dose 1–2 months after the first dose, and the third at 6 months after the first dose (0, 1–2, 6-month schedule).

HPV IMMUNIZATION RATES

Since HPV vaccine was licensed, Oregon has been making steady progress in HPV vaccination rates. With the caveat that complete vaccination now requires only two doses rather than three, up-to-date rates among females increased from 33% in 2013 to 50% in 2018, and rates among males from 6% in 2013 to 43% in 2018 (Figure 3). These rates vary significantly around the state, with the highest rates in the metro region, Willamette Valley and Central Oregon, and lowest rates in Southern and more rural parts of the state. Up-to-date rates are higher among youth on Medicaid (females, 59%; males, 52%), than non-Medicaid insurance (females, 43%; males, 37%). Nonetheless, the overall HPV vaccination rate (43%) is considerably lower than that for Tdap (93%) or meningococcal vaccine (77%).

Figure 3. Up-to-date HPV vaccinations in teen females and males, Oregon, 2013–2018



ADDRESSING BARRIERS

So why does HPV vaccination lag behind that of other routine immunizations? Parents of unvaccinated girls reported lack of knowledge about the vaccine; deeming the vaccine “unnecessary”; concern about vaccine safety; lack of recommendation by their health care provider; and that their daughter was not sexually active.⁶

In June 2018, the American Cancer Society launched an HPV vaccination campaign “HPV cancer-free” with a message that shifts the focus from HPV as a sexually transmitted infection to HPV as a cause of vaccine-preventable cancer.⁷

Several clinic-level strategies work to increase HPV vaccination initiation and completeness:

1. Vaccinate teens against HPV when other family members get vaccinated
2. Provide same-day vaccination when teens are seen for an acute care visit
3. Align office and clinic policies
 - Immunize at every opportunity
 - Implement standing orders
 - Reminder and recall
4. Align talking points by all staff in the clinic: “HPV vaccine is aimed at cancer prevention”
5. Know HPV vaccine coverage rates for the clinic AND for each clinician

Recommend HPV vaccine in the same way, and on the same day as other adolescent vaccines. Taking advantage of the Tdap immunization opportunity is critical, and knowing how to communicate a strong recommendation is one of the most important things that a provider can do.

RESOURCES:

- Centers for Disease Control and Prevention (CDC) tools to help clinicians talk to patients about HPV vaccine: www.cdc.gov/hpv/index.html
- Public Health Division, Oregon Health Authority. HPV information. www.oregon.gov/oha/PH/DISEASES/CONDITIONS/DISEASESAZ/Pages/hpv.aspx

REFERENCES

1. CDC. Human Papilloma Virus (HPV): For clinicians. www.cdc.gov/hpv/hcp/hpv-important.html Accessed: 25 Jul 2018
2. National Cancer Institute. About Cancer: HPV and cancer. www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-fact-sheet#q1 Accessed 25 Jul 2018
3. Saraiya M, Unger ER, Thompson, TD, et al. U.S. assessment of HPV types in cancers: Implications for current and 9-valent HPV vaccines. *J Natl Cancer Inst.* 2015; 107. doi:10.1093/jnci/djv086.
4. CDC. HPV and Cancer: Number of HPV-associated and HPV-attributable cancer cases per year. www.cdc.gov/cancer/hpv/statistics/cases.htm. Accessed 16 Aug 2018.
5. Chesson HW, Ekweeme DU, Saraiya M, Watson M, Lowy DR, Markowitz LE. Estimates of the annual direct medical costs of the prevention and treatment of disease associated with human papillomavirus in the United States. *Vaccine* 2012;42:6016–9.
6. Stokley S, Jeyarajah J, Yankey D, Cano M, Gee J, et al. Human PapillomaVirus vaccination coverage among adolescents, 2007–2013, and post-licensure vaccine safety monitoring, 2006–2014 — United States. *MMWR* 2014;63:620–4.
7. American Cancer Society. Prevent Cancer with the HPV vaccine. www.cancer.org/healthy/hpv-vaccine.html. Accessed 25 Jul 2018.



Providence Portland Medical Center designates this enduring material for a maximum of .5 *AMA PRA Category 1 credit™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity. Portland Providence Medical Center is accredited by the Oregon Medical Association to sponsor continuing medical education of physicians.

You can get this document in other languages, large print, braille or a format you prefer. Contact the Public Health Division at 971-673-1222. We accept all relay calls or you can dial 711. for TTY.