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# Preventing Human Papilloma Virus through Community Education and Vaccination

*Celeste Mulry Baldwin and Lisa Rinke*

## Abstract

Human Papilloma Virus (HPV) affects many members of the community. To better educate the community in a participatory manner, engaging those outside of the health care arena is necessary. To prevent the spread of the disease in the United States, reaching the parents of children at the vulnerable age of 9–11 years of age is critical. The barriers to education of parents and children around the spread of a sexually transmitted disease are vast and difficult to overcome. However, the use of proven vaccinations give healthcare providers and community advocates the main tool for prevention of the spread of the disease. It is often taboo to discuss anything related to sexual promiscuity or sexual activity in the United States in the public schools. The biggest myth includes the fear parents and grandparents have is that if HPV is talked about, then the child may become sexually active sooner. This myth needs to be challenged with science and reality including taking on the those vehemently opposed to vaccines, known as “Anti-Vaxers” that obstruct vaccine education. The strategies utilized in public health outreach to the community should be reviewed and uniquely developed for each diverse community to overcome the challenges in the prevention of HPV.

**Keywords:** Human Papilloma Virus, HPV Vaccines, Preventable Cancers, Vaccine Hesitancy, Community Education, HPV Vaccine Rates in the United States

## 1. Introduction

Human Papilloma Virus (HPV) is a sexually transmitted disease that is found in multiple organs in both male and female patients. The role of the provider in this case is extremely vital in reducing the spread of the disease and encouraging vaccines for prevention of cancers. HPV is the one virus that has over 200 variants, which has an effective vaccine regimen available and provides coverage to eliminate the risk for fatal cancers [1]. Thus, it would seem to be an obvious step for children ages 9–11 years of age and those 11–45 years of age to receive the vaccine, yet that is not the case [2]. Less than 30% of children actually receive the vaccine and often, the second dose is avoided.

This vaccine hesitancy is a global issue in that some children live in poverty and do not have access to this preventable cancer vaccine and in addition, those children with high socio-economic statuses refusing to be vaccinated at the advice of their parents. With regard to those 11–45 years of age, often this age group has not been

fully educated about the concern over HPV infection and have concerns that they may get the disease.

Lastly, parental and grandparent vaccine hesitancy is due in part to lack of knowledge and concerns that the child may become promiscuous when vaccinated. Dispelling all of the myths surrounding HPV and the vaccine makes it difficult at best for providers to do due diligence in educating and preventing HPV. Which is quite distressing when over 13,00 cases of cervical cancers are diagnosed yearly in the United States (U.S.) and thousands of fatal cancers could be prevented [3].

This chapter outlines and provides the background including the incidence, prevalence, etiology, pathology, and health promotion measures of HPV. To appreciate HPV an understanding of regular screening and clinical practice guidelines are presented. The importance of health promotion and prevention is outlined. The goal of this chapter is to review the management and care to prevent HPV and subsequent complications, as well as present HPV vaccine rates, HPV vaccine hesitancy, and strategies to provide prevention at the community level.

### **1.1 Prevalence and incidence of HPV**

As the fourth most common cancer, cervical cancer (CC) is a global health issue [4]. It is estimated that 75% of women will contract a HPV infection during their lifetime [5]. The annual incidence rate in the United States is 14 million [6]. A notable variability in the incidence rates of HPV exist worldwide. So, to are the disparities in detection and death of HPV. Tanzania reports 10,000 cases with 7000 death per year [4]. In Korean women, CC ranks as the seventh most common cancer [7]. As a result, the pathological manifestations of HPV may occur in the genital region and oral cavity [5]. Uterine cervical cancer incidence is approximately 600,000 cases per year. In oral pathogenesis, HPV 16 is likely to the primary cause accounting for 90% of malignant neoplasms [5].

According to the Centers for Disease Control (CDC), 40 out of the over 200 types of HPV can infect the genital region [8]. Despite being self-limited, asymptomatic, or unrecognized, sexual activity persons are likely to have become infected at least once. The most common types of oncogenic HPV, specifically 16 and 18, are responsible for the development of cervical, vulvar, vaginal, penile, anal, and oral pharyngeal cancer. Lower risk HPV type 6 and 11 are associated with respiratory papillomatosis and genital warts [8].

The prevalence of oral HPV in the United States between 2011 and 2014 was 7.3% in adults aged 18–69. During the same time frame, non-Hispanics saw a 2.9% rate and non-Hispanic black adults was 9.7% in comparison to 7.3% in non-Hispanic whites and 7% in Hispanic adults. Low prevalence rates occurred among non-Hispanic Asian women with no significance differences noted in non-Hispanic white, non-Hispanic black and Hispanic women. Overall, oral HPV was highest in men within each race and Hispanic group [9].

### **1.2 Most vulnerable populations that acquire HPV**

According to the World Health Organization, greater than 85% of the 300,000 reported deaths from CC occur in countries with low to middle income. These rates are largely due to vaccination programs and screening practice in countries with higher income earnings [10]. Efforts to reach vulnerable populations are now distempered by the ongoing global pandemic due to the novel coronavirus (COVID-19), delaying and disrupting routine immunizations impinging accessibility, furthering inequalities of health care potentiating healthcare consequences globally [11].

## **2. The historical perspective of HPV**

Nearly 528,000 women are diagnosed with cervical cancer each year with nearly half of them deceased [12]. The authors suggest that nearly 80% of the cases are found in third world countries are lacking the resources to battle this number of deaths. The evolution of (HPV) in the world is multifactorial leaving women in vulnerable populations more likely to contract one of the over 200 types most often through sexual transmission. The higher risk for women is due in part to the factors that lead to spread of HPV infection. Namely, early age at marriage, intercourse, pregnancy, and use of hormonal contraceptives [12]. Nearly 75% of adults that are sexually active have the disease without symptoms.

### **2.1 The evolution of HPV and types**

There are over 200 types of HPV with 14 strains considered to be associated with cervical cancer [13]. Nearly 80 million people in the United States have been infected with most clearing the infection without incident [14]. In addition, these authors suggest that there has been a surge in oropharyngeal cancers related to HPV infection with the more notorious strains as the culprit [14].

### **2.2 Sites of origin of HPV**

HPV is drawn to squamous epithelial cells and these are often found on mucosa such as skin and moist areas. HPV is most commonly found in the female cervix, however other sites of infection include those organs with similar tissue qualities such as the oropharynx, tonsillar tissue, soft palate, penis, and anus as examples. HPV tends to also live in the vagina, nose, nasopharynx, trachea, bronchi, and inner eyelid [15]. Frequently, HPV lives on the skin in the form of warts, however these growths can appear inside the organs described. Prevention of spread of anogenital warts is critical to decreasing the progression of cancer in males and females alike [16].

### **2.3 The diagnosis of HPV**

The diagnosis of HPV is completed by performing a Papanicolaou (Pap) screening to identify infected cervical tissue [17]. This screening method first utilized in 1950's remains a gold standard for diagnosis. Cervical cancer remains the 4th most common cause of cancer in women globally [18]. The American Cancer Society (ACS) recommends that cervical cancer screening should begin at age 25 for women with an HPV test every five years using the U.S. Food and Drug Administration (FDA) tests only [15]. Those with higher risks such as immunocompromise include patients with HIV infection, organ transplant, or long term use of steroids [15]. If the patient has had a total hysterectomy with cervix removal and are cancer free are exempt from this testing.

### **2.4 Risks for preventable cancers**

Cervical cancer evolves in four major steps, which include infection, persistence, progression, and invasion [18]. When the patient presents to clinic with oropharyngeal growths on the tongue or soft palate, a biopsy of the site should be performed and a follow up appointment should be scheduled once the diagnosis is confirmed. Most of the 230 genotypes of HPV cause no harm and resolve asymptotically without the patient noticing with 40 genotypes known to be high risk [19]. Genital

warts are tumors found caused by HPV, are the most common sexually transmitted disease, and generally are benign [19]. Risk factors for genital warts include: number of partners, barrier contraception use, young age at first encounter, circumcision, and male sexual behavior [19]. This high rate of transmission results in infection of multiple partners including females.

However, the clinician should be aware that correlating lymph node enlargement may require further biopsy to assure that squamous cell carcinoma is not in the tissue or lymph nodes. While most head and neck cancers are caused by squamous cell carcinoma and found historically in smoker, drinker, males >50 years of age, more recently it has been found in women in the oropharynx. This is occurring more often in the last decade as teens and young women engage in oral sex as a means to prevent pregnancy. In addition, males having sex with males are in a high risk category for this type of cancer due to multiple partners, as well as high risk for genital warts and anogenital cancer [19]. Recently, an anal Pap smear was created to help diagnose HPV in males having sex with multiple male partners. Recently, HPV is a culprit linked to urothelial bladder cancer as well [20].

### **3. Current treatments for HPV**

A quadrivalent vaccine for HPV was first recommended by a sub-committee of the (CDC) in the United States known as the Advisory Committee on Immunization Practices (ACIP) in 2006 [21]. In 2009, a bivalent was available and in 2015, non-valent HPV vaccine was created and is the mainstay in HPV vaccination today. To date, the vaccine rates among girls ages 13–17 years of age remains quite low at nearly 42%, while boys in the same age group are worse at a rate of 28% [21]. Pediatricians and mid-level providers spend an inordinate amount of time working to educate families regarding this cancer prevention vaccine, yet compliance continues to be dismal. Adults should be vaccinated up until 45 years of age.

#### **3.1 The target age group**

The WHO Director in 2018, committed to eliminating cervical cancer with a significant goal of a 90% immunization rate in girls 15 years of age by 2030 [10]. Additionally, the Healthy People 2025 national goals in the U.S. continue to advocate for improved vaccine completion numbers. Approximately 70% of the global target population includes adolescent girls, ages 9–14, living in geographic regions without an immunization program for HPV prevention [21]. Adults less than 45 years of age are encouraged to take the vaccine.

#### **3.2 Vaccine hesitancy**

According to the WHO, if 70% vaccination coverage is achieved in low and middle income countries, approximate 4 million deaths could be prevented [10]. However, despite national recommendations, vaccine hesitancy often ensues [21]. In 2010 an estimated 14% of teenage girls in the USA completed and received all 3 doses, noting parental hesitancy as the primary reason for lack of follow through. One concern being the public policy mandate resulting in suspicion on the part of the parents. Parental opposition stems primarily from compulsory vaccination of their children citing trust and safety for the reluctance to pursue or complete the protocol. Several states in the U.S. require the HPV series to attend school, however, religious exemptions abound and this has not significantly increased the vaccination rate [22].

Knowledge served as a basis for hesitancy to vaccinate. However, parents with the higher levels of education tend to research the topic and decided against vaccination. Those with lower education levels tended to base decisions to vaccinate due to provide recommendation or encouragement opposed pursuing knowledge or information regarding disease prevention with vaccination adherence [22]. Patient navigators to increase the vaccination rates and found that white patients are less likely to initiate the HPV vaccine than other ethnicities, however once initiated they were more likely to finish the series [22]. Rural parents were much less likely to encourage HPV vaccines as compared to their urban counterparts [13]. Women in the U.S. in general are basically poorly informed about HPV overall and found therefore, that provider education should target Non-Hispanic Blacks, lower level educated women, and those younger than 65 years of age. Beliefs about the efficacy of the vaccine to prevent cervical cancer remain a barrier to increased vaccine rates overall [22].

Parental attitudes toward vaccination of an STI factors into the decision-making process regarding vaccination prior to FDA approval. Several studies conducted demonstrated favorable attitudes in the USA and UK and accepting vaccination of their children. Specifically noting a mother's sexual values were secondary compared to overall vaccination attitude. In addition, social aversion to vaccination was not seen across various religions groups [23].

#### **4. Community outreach**

Cancer screening efforts are an ongoing effort to take the screening tools out to the community [3]. Educational outreach to vulnerable communities is an incredibly important method of reaching underserved groups. Often, vulnerable and underserved people are fearful of government institutions such as schools, social security, hospitals, and the police. The marginalized people in society have frequently been unsuccessful in navigating the system to obtain access to critical resources. In the case of Immigrants, the concern surrounds deportation or criminal charges. To overcome these barriers to educating and serving the public, healthcare providers are placed in the position of being more creative in how outreach is managed.

##### **4.1 American Cancer Society (ACS) efforts**

The American Cancer Society (ACS) has for decades provided funding, outreach, and resources to all patients in the U.S., as well as their regions and individual chapters. In the last decade, ACS has worked specifically to increase the knowledge base of parents, grandparents, and youth regarding the importance of cancer prevention, specifically for HPV. U.S. national immunization coalitions have devoted large amounts of time, effort, and funding to provide outreach for the public in an effort to prevent HPV. In 2014, a documentary about HPV and cervical cancer was produced in Hollywood called "Someone You Love: The HPV Epidemic." This documentary was shared at a conference in 2016 in Indianapolis, Indiana in the U.S. for a national meeting of all U.S. immunization coalitions. Soon, it spread throughout the U.S. as a tool for HPV prevention for youth and parents. It's real life powerful true stories of women that suffered and some died from cervical cancer caused by HPV. Other efforts in Maui, Hawai'i include having young cancer survivors assist in Relay for Life and ACS outreach events to speak candidly to youth about what HPV is and how disenchanting cancer treatment is along with the burden of fearing that the cancer may return.

Once the youth are aware of what the road for a cancer patient is like, they may not realize that there is one cancer that is preventable, and that is by vaccination against HPV.

## **5. Conclusion**

Human Papilloma Virus (HPV) is the most common sexually transmitted disease that is found in both male and female patients. The role of the provider in this case is extremely vital in reducing the spread of the disease and encouraging vaccines for prevention of cancers. HPV is the one virus that has over 200 variants, which has an effective vaccine regimen available and provides coverage to eliminate the risk for fatal cancers [1]. Thus, it would seem to be an obvious step for children ages 9–11 years of age and those 11–45 years of age to receive the vaccine, yet that is not the case [2]. Less than 30% of children actually receive the vaccine and often, the second dose is avoided.

Strategic elements to assist in global vaccination efforts include financial investment on a global level, enhancement of supply, single dose schedules, and effective social marketing [24]. Use of social media platforms to increase awareness of the notion that a vaccine preventable cancer such as cervical cancer may be the wave of the future. Without global concerted efforts to increase the vaccination rate to achieve herd immunity, the fight against HPV infection and the subsequent needless suffering and death will continue to occur.

## **Conflict of interest**

The authors declare no conflict of interest.


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## References

- [1] Senkomago V, Henley SJ, Thomas CC, Mix JM, Markowitz LE, Saraiya M. Human Papillomavirus–Attributable Cancers — United States, 2012–2016. *MMWR Morb Mortal Wkly Rep* 2019;68:724–728. DOI: <http://dx.doi.org/10.15585/mmwr.mm6833a3external icon>.
- [2] Meites E, Szilagyi PG, Chesson HW, Unger ER, Romero JR, Markowitz LE. Human Papillomavirus Vaccination for Adults: Updated Recommendations of the Advisory Committee on Immunization Practices. *MMWR Morb Mortal Wkly Rep*. 2019 Aug 16;68(32):698–702. doi: 10.15585/mmwr.mm6832a3. PMID: 31415491; PMCID: PMC6818701.
- [3] Zhang, B.S. & Batur, P. (2019). Human papilloma virus in 2019: An update on cervical cancer and prevention and screening guidelines. *Cleveland Clinic Journal of Medicine* Volume 86, 3). MARCH 2019.
- [4] Cooper EC, Maher JA, Naaseh A, et al. Implementation of human papillomavirus videoeducation for women participating in mass cervical cancer screening in Tanzania. *Am J Obstet Gynecol*. 2021;224:105.e1-9.
- [5] Fiorillo L, Cervino G, Surace G, De Stefano R, Laino L, D'Amico C, Fiorillo MT, Meto A, Herford AS, Arzukanyan AV, Spagnuolo G, Ciccì M. Human Papilloma Virus: Current Knowledge and Focus on Oral Health. *Biomed Res Int*. 2021 Feb 1;2021:6631757. doi: 10.1155/2021/6631757. PMID: 33623784; PMCID: PMC7875628.
- [6] Fueta, P. & Chido-Amajuoyi, O. Prevalence of HPV infection in the United States: A Comparison of HPV Infection Trends Pre and Post-HPV Vaccine Implementation. *Pediatrics* July 2020, 146 (1 MeetingAbstract) 571; DOI: [https://doi.org/10.1542/peds.146.1\\_MeetingAbstract.571](https://doi.org/10.1542/peds.146.1_MeetingAbstract.571)
- [7] Kim, S.Y., Seo, J. W., & Ryu, E. (2021). Korean college students' attitudes and health behaviour regarding human papillomavirus vaccination. Volume 28, Issue 1, P. 57-62, February 01, 2021. Published: August 20, 2020 DOI: <https://doi.org/10.1016/j.colegn.2020.04.009>
- [8] Centers for Disease Control. Human papilloma virus (HPV) Fact Sheet <https://www.cdc.gov/hpv/index.html>. Accessed 04.20.21.
- [9] McQuillan, G., Kruszon-Moran, D., Markowitz, L., Unger, & Paulose-Ram, R. Ph.D. National Health and Nutrition Examination Survey (NHANES) 2011–2014.
- [10] World Health Organization World Health Organization. GLOBOCAN 2012 cancer incidence and mortality worldwide. Lyon (France): International Agency for Research on Cancer; 2016. [Google Scholar]. [https://www.who.int/news-room/fact-sheets/detail/human-papillomavirus-\(hpv\)-and-cervical-cancer](https://www.who.int/news-room/fact-sheets/detail/human-papillomavirus-(hpv)-and-cervical-cancer) accessed 04.22.21.
- [11] Toh ZQ, Russell FM, Garland SM, Mulholland EK, Patton G, Licciardi PV. Human Papillomavirus Vaccination After COVID-19. *JNCI Cancer Spectr*. 2021 Mar 2;5(2):pkab011. doi:
- [12] Degarege A, Krupp K, Fennie K, Li T, Stephens DP, Marlow LAV, Srinivas V, Arun A, Madhivanan P. Urban-Rural Inequities in the Parental Attitudes and Beliefs Towards Human Papillomavirus Infection, Cervical Cancer, and Human Papillomavirus Vaccine in Mysore, India. *J Pediatr Adolesc Gynecol*. 2018 Oct;31(5):494–502. doi: 10.1016/j.jpog.2018.03.008. Epub 2018 Mar 26. PMID: 29596907; PMCID: PMC6119521.



- [13] Chrysostomou, A. C., & Kostrikis, L. G. (2020). Methodologies of Primary HPV Testing Currently Applied for Cervical Cancer Screening. *Life (Basel, Switzerland)*, 10(11), 290. <https://doi.org/10.3390/life10110290>
- [14] Boakye, E., Tobo, B. B., Rojek, R., Mohammed, K.A., Geneus, C.J., & Osazuwa-Peters, N. (2017) Approaching a decade since HPV vaccine licensure: Racial and gender disparities in knowledge and awareness of HPV and HPV vaccine, *Human Vaccines & Immunotherapeutics*, 13:11, 2713-2722, DOI: 10.1080/21645515.2017.1363133
- [15] American Cancer Society. (2021). <https://www.cancer.org/cancer/cancer-causes/infectious-agents/hpv/hpv-and-hpv-testing.html>.
- [16] Skoulakis A, Fountas S, Mantzana-Peteinelli M, Pantelidi K, Petinaki E. Prevalence of human papillomavirus and subtype distribution in male partners of women with cervical intraepithelial neoplasia (CIN): a systematic review. *BMC Infect Dis*. 2019 Feb 26;19(1):192. doi: 10.1186/s12879-019-3805-x. PMID: 30808285; PMCID: PMC6390310.
- [17] Hirth, J. (2019) Disparities in HPV vaccination rates and HPV prevalence in the United States: a review of the literature, *Human Vaccines & Immunotherapeutics*, 15:1, 146-155, DOI: 10.1080/21645515.2018.1512453
- [18] Yamaguchi, Sekine, Hanley, Kudo, Hara, Adachi, Ueda, Miyagi, & Enomoto. Risk factors for HPV infection and high-grade cervical disease in sexually active Japanese women.
- [19] Ozaydin-Yavuz1, O., Bilgili, S.G., Guducuoglu, H., Yavuz1, I.H., Elibuyuk-Aksac, S., Karadag, A.S. Determinants of high-risk human papillomavirus infection in anogenital warts. *Adv Dermatol Allergol* 2019; XXXVI (1): 76-81. DOI: <https://doi.org/10.5114/ada.2019.82915>
- [20] Moghadam, O. et al. Infectious Agents and Cancer (2020) 15:52 <https://doi.org/10.1186/s13027-020-00318-3>
- [21] Patel PR, Berenson AB. Sources of HPV vaccine hesitancy in parents. *Hum Vaccin Immunother*. 2013 Dec;9(12):2649-53. doi: 10.4161/hv.26224. Epub 2013 Aug 27. PMID: 23982270; PMCID: PMC4162068.
- [22] Domgue J., Chido-Amajuoyi O.G., Yu R.K., Shete S. (2019). Beliefs About HPV Vaccine's Success at Cervical Cancer Prevention Among Adult US Women. *JNCI Cancer Spectr*. 2019 Aug 27;3(4):pkz064. doi: 10.1093/jncics/pkz064. PMID: ; PMCID: PMC690108
- [23] Berenson AB, Hirth JM, Kuo YF, Starkey JM, Rupp RE. Use of patient navigators to increase HPV vaccination rates in a pediatric clinical population. *Prev Med Rep*. 2020 Aug 28;20:101194. doi: 10.1016/j.pmedr.2020.101194. PMID: 32963935; PMCID: PMC7490555.
- [24] Amboree TL, Darkoh C. Barriers to Human Papillomavirus Vaccine Uptake Among Racial/Ethnic Minorities: a Systematic Review. *J Racial Ethn Health Disparities*. 2020 Oct 6:10.1007/s40615-020-00877-6. doi: 10.1007/s40615-020-00877-6. Epub ahead of print. PMID: 33025422; PMCID: PMC8021610.