HHS Public Access

Author manuscript

Vaccine. Author manuscript; available in PMC 2024 July 30.

Published in final edited form as:

Vaccine. 2017 July 05; 35(31): 3801–3802. doi:10.1016/j.vaccine.2017.05.078.

What might we learn from the more successful uptake of Hepatitis B (HBV) vaccinations to increase Human Papillomavirus (HPV) vaccinations in adolescents?

Moon S. Chen Jr., Ph.D., M.P.H.[a], **Julie H. Dang, M.P.H.**[b]

[a] Professor & Associate Director for Cancer Control, University of California, Davis Comprehensive Cancer Center, 2450 48th Street, Suite 1600, Sacramento, CA 95835, United States.

[b] Director of Community Engagement and Outreach, University of California, Davis Comprehensive Cancer Center, 2450 48th Street, Suite 1600, Sacramento, CA 95835, United States.

Keywords

vaccination; uptake; Hepatitis B virus; Human Papillomavirus; adolescents

1. Introduction

Two vaccinations have the potential to prevent cancer: the vaccination against the Hepatitis B virus (HBV) and the vaccination against the Human Papillomavirus (HPV). HBV vaccinations could substantially prevent the onset of HBV-linked liver carcinoma [1], now the world's second deadliest cancer and HPV vaccinations could greatly reduce the risk of cancers of the cervix, vulvar, vagina, penis, anus, and oropharynx [2]. Together these two vaccinations could decrease the incidence of HBV and HPV infections, two of the most common sexually transmissible diseases in the U.S. [3]. Vaccines for both of these virally-transmissible cancers are safe, cost-effective, require multiple doses, recommended by the Advisory Committee for Immunization Practice (ACIP), and should ideally be administered before sexual activity begins [1–3].

Universal Hepatitis B vaccination programs implemented in the United States significantly reduced the incidence of reported acute hepatitis B cases from 23,404 in 1982 to just 2,953 cases in 2014 [4]. Additionally, despite dismal uptake, prevalence of HPV decreased by more than 50% for vaccine-targeted HPV types [5]. Without question, these vaccines provide primary prevention for their respective targeted cancers, saving lives and money.

In the U.S., HPV vaccination coverage among adolescents aged 13–17 is considerably lower than that for HBV vaccinations and for other vaccinations such as for tetanus, diphtheria,

Corresponding author jtdang@ucdavis.edu.

Conflict of interest

None.

and pertussis (Tdap), meningococcal conjugate (MenACWY), and measles, mumps, rubella (MMR), all typically administered during adolescence or pre-adolescence [6]. In 2015, the three-dose HPV vaccination coverage among 13 to 17 year olds was only 41.9% for girls and 28.1% for boys while the three-dose HBV vaccine coverage was 91.1% [6]. The question is "What might we learn from the more successful uptake of HBV vaccinations to increase HPV vaccinations in adolescents in the United States?"

The purpose of this commentary is to articulate observations regarding the similarities and differences between the approaches to promote HBV and HPV vaccinations and how they might be leveraged to increase uptake of HPV vaccinations. First, we acknowledge differences between these vaccinations that may account for differences in uptake.

2. Differences between uptake of HBV vaccinations versus HPV vaccinations

Both the HBV and HPV vaccines are recommended by the ACIP for inclusion in the childhood vaccine schedule. The three shot HBV vaccine series is recommended to be administered at birth and completed by age 6–18 months and the two shot HPV vaccine is recommended to be administered to 11–12 year olds and given at least six months apart [7]. The ACIP recommended schedule for the HBV vaccine series increased infant hepatitis B vaccination coverage rates from 16% in 1993 to 90% in 2000 [1]. In comparison, the schedule for the HPV vaccine series begins during adolescent and adolescents represent one of the age groups that have the lowest number of preventative medical visits [2]. At this age, adolescents usually see a provider for sports physicals, acute care and other visits not usually associated with obtaining vaccinations [2].

In addition to the ACIP recommendation, school-entry vaccination requirements have been instrumental in increasing vaccine coverage among adolescents [8]. In 2004, adolescents in states requiring hepatitis B vaccine were more likely to initiate (91%) and completed (85%) the series than those in states without requirements (58% initiated; 68% complete) [9]. Currently, 47 states and D.C have hepatitis B vaccination mandates for daycare, K-12 and for college matriculation [10]. In contrast, only 2 states and DC have HPV vaccine mandates for children in secondary schools [10].

The fact that HPV vaccinations are not administered at birth, not a universal prerequisite for school entry, and not required for any other purpose coupled with its association with adolescent sexuality has many regarding it as an optional vaccination [2].

3. Commonalities between HBV and HPV

HBV and HPV have important similarities. These similarities make the uptake strategies for vaccination relevant for comparison and adoption. For instance, HBV and HPV are both DNA viruses, sexually transmissible, and humans are their only reservoir. Vaccination of humans who have never been infected is the most important primary prevention strategy. And just as with the case of smallpox, vaccination paves the way to eventual elimination of HBV and HPV transmissible conditions.

4. Leveraging strategies from HBV vaccination uptake to increasing HPV vaccinations

Risk factors for HBV and HPV are known and intentional identification of those at-risk within a health care system can lead to vaccination. For HBV, the screen-able risk factors are never having been tested for hepatitis B surface antigen and being born in a CDC-defined intermediate to high endemic area (e.g., parts of East Asia, Africa). Identifying those at-risk for HBV through electronic medical records (EMR) would focus on those who have never been tested and being foreign-born. If nativity is not reported in the EMR, then surnames associated with HBV-endemic areas could be surrogate indicators of risk. Electronic messaging to providers to advise testing of these individuals at higher-risk has been effective, achieving statistically significant and impact as demonstrated in a randomized, controlled study [11]. Outside of the health system, bilingual/bicultural lay health educators are also effective in achieving screening and ultimately vaccination [12]. These strategies can be applied to increasing HPV vaccination uptake.

The EMR can be used to both identify adolescents who have never been vaccinated but also prompting providers that their adolescent patients are due their HPV vaccination. Likewise, considering HPV vaccinations just like all of the other vaccinations routinely administered during adolescents and pre-adolescents is recommended. Other evaluation standards such as including the completion of HPV vaccination series as a measure of quality of care in health plans should also be considered [2].

Achieving policy changes such as requiring HPV vaccinations just as HBV vaccinations are the preferred route to significantly increasing uptake. Despite the best intentions of providers who have many competing interests, compliance through administrative means (e.g., entry requirements to school) are much more effective than reliance on providers [6].

5. Conclusion

Increasing the uptake of both HBV and HPV vaccinations are important both in the interest of public health and more specifically for the prevention of selected cancers. Optimal uptake of both HBV and HPV vaccinations will spare suffering, save lives, and save money. Administrative compliance such as the institution of the birth dose for HBV within days of delivery and requirements for school entry has achieved more than 90% completion of the HBV three-dose series for U.S. adolescents compared to less than 50% completion for HPV. Alternatively, with the new CDC recommendations of only two HPV shots for children ages 11–12, we may achieve a higher HPV vaccine completion rate.

Instituting administrative compliance though involves policy change backed by statutory authority. Accomplishing policy change for HPV vaccination to date has been challenging. Thus, options that practitioners can adapt and adopt from HBV should be implemented. Ultimately, promoting optimal uptake of both HBV and HPV vaccinations has the potential of eliminating their roles in health disparities and momentum toward a cancer-free future for those who are vaccinated.

Acknowledgments

This work was supported in part by the National Cancer Institute (U54CA153499) and the Centers for Disease Control and Prevention (1U51PS004633) but the authors are solely responsible for its content.

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