

Improving Human Papillomavirus Vaccine Uptake: Barriers and Potential Solutions

Brandon Brown¹, Suellen Hopfer², and Alvin Chan³

¹*University of California, Riverside, School of Medicine, Center for Healthy Communities*

²*University of California, Irvine, Program in Public Health*

³*University of California, Irvine, School of Medicine*

Abstract

© 2015 Californian Journal of Health Promotion. All rights reserved.

Keywords:

Introduction

Despite Food and Drug Administration (FDA) approval in 2006, the Human Papillomavirus (HPV) vaccine continues to have the lowest completion rate of any vaccine in the United States (Reagan-Steiner et al., 2015). Data from the Centers for Disease Control and Prevention (CDC) show that in California, only 48% of females and 31% of males completed the three-dose HPV vaccine series (Reagan-Steiner et al., 2015). These rates remain well below the Healthy People 2020 initiative's target goal of 80% coverage (Department of Health and Human Services, 2013). Although professional medical agencies including the CDC Advisory Committee on Immunization Practices (ACIP) and the American Academy of Pediatrics (AAP) recommend routine HPV vaccination for females and males aged 11 or 12 years for protection against anogenital warts and certain cancers (cervical, vulvar and vaginal cancer in females, penile cancer in males, and anal cancer and oropharyngeal cancers in both females and males) (2012; Markowitz et al., 2014; Petrosky et al., 2015), health care provider vaccine practices vary. While everyone is at risk, the majority affected by HPV disease are underserved racial and ethnic minority groups, reflecting inherent disparities in patient access to treatment for HPV-related complications (Kaiser Family Foundation, 2015).

Potential Barriers to Adolescent HPV Vaccination

There may be several reasons for low HPV vaccine uptake. Missed opportunities during health care visits (Dempsey, Cohn, Vanessa & Mack, 2011; Gellin, 2015) is highlighted as a major barrier by the National Cancer Institute. One reason is inadequate provider time for explaining the need for early vaccination (Perkins et al., 2014). Given the time constraints of the modern-day medical visit, discussion devoted to HPV is frequently a low priority, leaving little time to address parents' concerns (potential vaccine side effects, allergic reactions, and whether the vaccine promotes sexual activity) (Perkins et al., 2013; Brewer et al., 2007). Despite these concerns, there is no evidence to suggest that HPV vaccines are unsafe or promote sexual behaviors (Gee et al., 2011; Jena, Goldman & Seabury, 2015; Stokley et al., 2014).

Another missed opportunity is provider ambivalence in recommending the HPV vaccine (Hopfer & Clippard, 2010; Rosenthal et al., 2010; Weiss, Zimet, Rosenthal, Brennehan & Klein, 2010). Providers may hesitate when insurance coverage is questionable or if extensive paperwork is needed, particularly in safety net clinics. Lack of HPV discussion may give parents the perception that vaccination is optional and less important than other adolescent vaccines (Perkins et al., 2014). Problem-focused clinic visits have the highest proportion of

missed opportunities for vaccination (91-98%), but even in prevention- focused visits, where vaccination is preferentially offered, missed opportunities are still common (61-92%) (Dempsey et al., 2011).

The responsibility for low vaccination rates rests not only with providers and parents, but also with state level policies (Omer, Peterson, Curran, Hinman & Orenstein, 2014). Data are clear that state-mandated school immunization requirements have significantly contributed to improving rates of vaccination coverage among adolescents (Omer, Pan & Halsey, 2007). However, policy alone will not suffice to increase HPV vaccination. Novel communication strategies (Downs, 2014; Miller-Day & Hecht, 2013) are needed to increase acceptance among the general public, given the current attitudes and beliefs surrounding HPV vaccination; the voluntary nature of the vaccine, lack of awareness (Almeida, Tiro, Rodriguez & Diamant, 2012), and general vaccination resistance (Opel et al., 2013), particularly in California.

Solutions and Consequences

Increasing HPV vaccination will require a multifaceted approach. This includes training health care providers on communication strategies to minimize missed opportunities and engage parents in the discussion, implementing school mandates through state level legislation, using prompt reminder systems, developing strategic communication to address distrust and reach resistant subgroups, and expanding HPV vaccine access outside of the traditional medical encounter.

Addressing missed opportunities at health care visits offers the greatest hope for improving vaccine coverage. Providers must provide a strong and clear recommendation. The HPV vaccine must be treated the same as other age-based recommended vaccines such as tetanus, diphtheria, acellular pertussis (Tdap) and meningococcal conjugate (MCV), and not as an option contingent upon adolescents' current sexual activity status. To prompt providers to recommend the HPV vaccine, electronic health record provider reminder systems can be used.

Recent studies show that such prompt systems can improve HPV vaccination rates, (Rand et al., 2015; Ruffin et al., 2015; Szilagyi et al., 2015) but only 16% of pediatric practices use them (Rand et al., 2015).

Addressing mistrust and reaching resistant subgroups of the population will require novel communication strategies, such as peer leader social network intervention approaches (Campbell & Salathe, 2013; Salathe & Khandelwal, 2011; Simmons et al., 2015). We know from communication theory the importance of trust in our sources when adopting and advocating recommended public health prevention measures. Concerns of the general public have been a consistent barrier in successful adoption of vaccination programs, especially when they are volitional (Kahn & Rickerts, 2015). Interventions must build communication and trust with targeted communities using culturally resonant and linguistically competent messages (Miller-Day & Hecht, 2013; Won, Middleman, Auslander & Short, 2015).

To prepare parents for their children's first dose of HPV vaccine, HPV infection counseling should be included as part of anticipatory guidance. Reframing HPV from the "promiscuity vaccine" or "STI vaccine" in the media to an anti-cancer vaccine can circumvent the association with sexual behavior. Parents may refuse the vaccine stating that their children are not yet sexually active. Postponing the vaccine not only increases the risk of disease in our children, but also perpetuates the perception to parents that vaccination is optional. We can build on lessons learned from the once controversial hepatitis B vaccine, which is now the universally accepted, to teach about HPV.

Another strategy for closing the gap includes recommending HPV vaccination when adolescents make clinic visits for other vaccines such as meningitis or flu. Expanding access to venues outside of the traditional medical office to school-based health centers, pharmacies, safety net health clinics, and public health departments can promote further opportunities for vaccination. This has been shown to be

successful in our state (Tiro et al., 2012). Strengthening available Immunization Information Systems will allow schools and pharmacies to view and query patient immunization records to recommend and provide timely vaccination (Gellin, 2015).

Mandates requiring HPV vaccine for school entry is another option. A policy implemented at the school level will bypass any sociodemographic disparities and guarantee that no child will be disproportionately vulnerable to HPV-related disease. California is beginning to eliminate personal and religious belief vaccine exemptions for children in public school, though HPV is not included (SB 277). In 2007, at least 24 states and D.C. introduced legislation to specifically mandate the HPV vaccine for school (California withdrew its bill). We must applaud Rhode Island for joining Washington DC and Virginia in incorporating all CDC recommended vaccines (including HPV) into their school immunization regulations, and hope it will gain traction in the local media and spread to California.

Conclusion

The HPV vaccine should not be treated differently than other age-based routinely recommended vaccines. In order to truly make HPV vaccine part of standard care, we need to improve provider practices and policies, improve knowledge on vaccine myths and benefits, and expand access to the vaccine. Routine HPV vaccination in schools is a way to automate and improve uptake, and we can only hope that the message behind the recent Rhode Island HPV vaccine mandate will gain traction in the local media and spread to California. Lawmakers, educators, and scientists who support universal HPV vaccination must continuously communicate with, educate, and partner with community members on new mandates such as with HPV vaccination to improve health literacy and public health. Community members who believe in the HPV vaccine can further provide pressure on lawmakers to solve the low HPV vaccine uptake issue in California. None of us should have to suffer from diseases that can be avoided, especially when the solution is within our grasp. We have a vaccine that can prevent cancer—so let's make sure we use it.

References

- Almeida, C. M., Tiro, J. A., Rodriguez, M. A., & Diamant, A. L. (2012). Evaluating associations between sources of information, knowledge of the human papillomavirus, and human papillomavirus uptake for adult women in California. *Vaccine, 19*, 3003-3008.
- Campbell, E. M., & Salathe, M. (2013). Complex social contagion makes networks more vulnerable to disease outbreaks. *Scientific Reports, 3*, 1-6. doi: 10.1038/srep01905
- Committee on Infectious Diseases. (2012). HPV vaccine recommendations. *Pediatrics, 129*, 602-605.
- Dempsey, A., Cohn, L., Vanessa, D., & Mack, R. (2011). Worsening disparities in HPV vaccine utilization among 19-26 year old women. *Vaccine, 29*(3), 528-534. doi: 10.1016/j.vaccine/2010.10.051
- Department of Health and Human Services. (2013). Healthy People 2020 topics & objectives: Immunization and infectious diseases.
- Downs, J. S. (2014). Prescriptive scientific narratives for communicating usable science. *Proceedings of the National Academy of Science, 111*, 13627-13633.
- Gee, J., Naleway, A. L., Baggs, J., Yin, R., Li, R., Kuldorff, M., . . . Weintraub, E. S. (2011). Monitoring the safety of quadrivalent human papillomavirus vaccine: Findings from the Vaccine Safety Datalink. *Vaccine, 29*, 8279-8284.
- Gellin, B. (2015). Human papillomavirus vaccines: An ounce of prevention is worth pounds of cures. *Journal of Adolescent Health, 56*, S5-S6.
- Hopfer, S., & Clippard, J. R. (2010). College women's HPV vaccine decision narratives. *Qualitative Health Research, 21*, 262-277. doi: 10.1177/1049732310383868

- Jena, A. B., Goldman, D. P., & Seabury, S. A. (2015). Incidence of sexually transmitted infection after human papillomavirus vaccination among adolescent females. *JAMA Internal Medicine*, *175*, 617-623.
- Kahn, J. A., & Rickerts, V. I. (2015). Innovative clinical and public health strategies to promote adolescent vaccination. *Journal of Adolescent Health*, *56*, S1-2.
- Kaiser Family Foundation. (2015, August 3, 2015). The HPV vaccine: Access and use in the U.S., from <http://kff.org/womens-health-policy/fact-sheet/the-hpv-vaccine-access-and-use-in/#footnote-141348-47>
- Markowitz, L., Dunne, E. F., Saraiya, M., Chesson, H. W., Curtis, C. R., Gee, J., . . . Unger, E. R. (2014). Human papillomavirus vaccination: Recommendations of the advisory committee on immunization (ACIP) *Morbidity and Mortality Weekly Report* (Vol. 63, pp. 1-30). Atlanta, GA: Centers for Disease Control and Prevention.
- Miller-Day, M., & Hecht, M. L. (2013). Narrative means to preventive ends: A narrative engagement approach to adolescent substance use prevention. *Health Communication*, *28*, 657-670.
- Omer, S. B., Pan, W. K. Y., & Halsey, N. A. (2007). Nonmedical exemptions to school immunization requirements: Secular trends and association of state policies with pertussis incidence. *JAMA*, *296*, 1757-1763.
- Omer, S. B., Peterson, D., Curran, E. A., Hinman, A., & Orenstein, W. A. (2014). Legislative challenges to school immunization mandates, 2009-2012. *JAMA*, *311*, 620-621.
- Opel, D. J., Heritage, J., Taylor, J. A., Mangione-Smith, R., Salas, H. S., DeVere, V., . . . Robinson, J. D. (2013). The architecture of provider-parent vaccine discussions at health supervision visits. *Pediatrics*, *132*, 1-10. doi: 10.1542/peds.2013-2037
- Perkins, R. B., Clark, J. A., Apte, G., Vercruyse, J. L., Sumner, J. J., Wall-Hass, C. L., . . . Pierre-Joseph, N. (2014). Missed opportunities for HPV vaccination in adolescent girls: A qualitative study. *Pediatrics*, *143*, 666-674.
- Petrosky, E., Bocchini, J. A., Hariri, S., Chesson, H., Curtis, C. R., Saraiya, M., . . . Markowitz, L. (2015). Use of 9-valent human papillomavirus (HPV) vaccine: Updated HPV vaccination recommendations of the advisory committee on immunization practices. *Morbidity and mortality weekly report*, *64*, 300-304.
- Rand, C. M., Brill, H., Albertin, C., Humiston, S. G., Schaffer, S., Shone, L. P., . . . Szilagyi, P. G. (2015). Effectiveness of centralized text message reminders on human papillomavirus immunization coverage for publicly insured adolescents. *Journal of Adolescent Health*, *56*, S17-S20.
- Reagan-Steiner, S., Pierre-Joseph, N., Jeyarajah, J., Elam-Evans, L., Singleton, J. A., Curtis, C. R., . . . Stokley, S. (2015). National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 years - United States, 2014 *Morbidity and Mortality Weekly Report* (Vol. 64 (29), pp. 784-792). Atlanta, GA: Centers for Disease Control and Prevention.
- Rosenthal, S. L., Weiss, T. W., Zimet, G. D., Ma, L., Good, M. B., & Vichnin, M. D. (2010). Predictors of HPV vaccine uptake among women aged 19-26: Importance of a physician's recommendation. *Vaccine*, *29*(5), 890-895.
- Ruffin, M. T., Plegue, M. A., Rockwell, P. G., Young, A. P., Patel, D. A., & Yeazel, M. (2015). Impact of an electronic health record (EHR) reminder on human papillomavirus vaccine initiation and timely completion. *Journal of American Board Board of Family Medicine*, *28*, 324-333.
- Salathe, M., & Khandelwal, S. (2011). Assessing vaccination sentiments with online social media: Implications for infectious disease dynamics and control. *PLOS Computational biology*, *7*, 1-7.
- Simmons, N., Donnell, D., Ou, S., Celentano, D. D., Aramrattana, A., Davis-Vogel, A., . . . Latkin, C. (2015). Assessment of contamination and misclassification biases in a randomized controlled trial of a social network peer education intervention to reduce HIV risk behaviors among drug users and risk partners in Philadelphia, PA and Chiang, Mai, Thailand. *AIDS and Behavior*. doi: 10.1007/s10461-015-1073-3
- Stokley, S., Jeyarajah, J., Yankey, D., Cano, M., Gee, J., Roark, J., . . . Markowitz, L. (2014). Human papillomavirus vaccination coverage among adolescents, 2007-2013, and post-licensure vaccine

- safety monitoring, 2006-2014, United States *Morbidity and mortality weekly report* (Vol. 63, pp. 620-624). Atlanta, GA: Centers for Disease Control and Prevention.
- Szilagy, P. G., Serwint, J. R., Humiston, S. G., Rand, C. M., Schaffer, S., Vincelli, P., . . . Curtis, C. R. (2015). Effect of provider prompts on adolescent immunization rates: A randomized trial. *Academic Pediatrics, 15*, 149-157.
- Tiro, J. A., Pruitt, S. L., Bruce, C. M., Persaud, D., Lau, M., Vernon, S. W., . . . Skinner, C. S. (2012). Multilevel correlates for human papillomavirus vaccination of adolescent girls attending safety net clinics. *Vaccine, 16*, 2368-2375.
- Weiss, T. W., Zimet, G. D., Rosenthal, S. L., Brenneman, S. K., & Klein, J. D. (2010). Human papillomavirus vaccination of males: attitudes and perceptions of physicians who vaccinate females. *Journal of Adolescent Health, 47*(1), 3-11.
- Won, T. L., Middleman, A. B., Auslander, B. A., & Short, M. B. (2015). Trust and a school-located immunization program. *Journal of Adolescent Health, 56*, S33-S39.

Author Information

*Brandon Brown, PhD, MPH
School of Medicine, Center for Healthy Communities,
University of California, Riverside
Contact: Brandon.brown@ucr.edu

Suellen Hopfer, PhD, CGC
Program in Public Health, University of California, Irvine
Contact: shopfer@uci.edu

Alvin Chan, MDc, MPHc
School of Medicine, University of California, Irvine
Contact: apchan@uci.edu

* corresponding author