

Increasing Human Papillomavirus Vaccination Rates Among Early Adolescents with Low Socioeconomic Status

Kimberly Pham¹, Somi Singh MS², Ryan Walters PhD¹, Cristina Fernandez MD⁴, Jayan Vasudevan MD⁴, Cathy Hudson MD⁴, Anthony Yaghmour MD⁴ Meera Varman MD^{1,4}

¹Creighton University, ²Kansas City University, Nebraska, ³Children's Hospital and Medical Center, ⁴Pediatric Infectious Diseases, Omaha, Omaha, Nebraska

Abstract

Almost 43,000 people in the United States have an HPV-associated cancer each year in various sites, including the vagina, cervix, penis and anus. Most of these cancers can be prevented by the 9-valent human papillomavirus (HPV) vaccination, which is currently recommended by the Advisory Committee on Immunization Practices (ACIP). Unfortunately, the rate of individuals who have been fully vaccinated against HPV in the United States is below 50%. The first goal of our study was to analyze vaccination rates of patients between 9- and 15-years-old at the Catholic Health Initiative (CHI) Pediatrics Clinic in Omaha, Nebraska, which was providing fewer than the recommended number of HPV vaccinations. The second goal of this study was to conduct two provider-focused interventions. Prior to the intervention periods, we provided a lunch-and-learn session for PCPs and healthcare staff to discuss the importance of HPV vaccination. In the first intervention, we evaluated daily schedules to decrease missed opportunities. In the second intervention, we sent weekly reminder emails to PCPs. Results indicated that immunization rates were significantly higher during the first intervention and maintenance period following the intervention, compared to baseline. Furthermore, rates during the second intervention and maintenance periods were significantly higher than in the first. That said, the baseline immunization rate was significantly lower in 2018 than it was in 2017. Rates during the second intervention period in 2018 were higher than in 2017 when no intervention was in place, however, this is the only time-period which differs significantly from its 2017 counterpart.

Background

- HPV is an oncovirus affecting both men and women and is associated with cervical, vaginal, anal and penile cancers and approximately 24,400 women and 18,300 men in the United States are affected by these cancers annually.
- The 4vHPV vaccine showed an 89% decrease in cancers associated with HPV 16 and 18 as well as decreases in the incidence of anogenital warts caused by HPV 6 and 11 among females between the ages of 14-24 years⁴.
- The 9vHPV vaccine immunizes against nine different types of HPV, protects against five additional types of HPV that are associated with about 15% of cervical cancers¹⁻³.
- Less than 50% of adolescents are fully vaccinated in the United States².
- Series completion for females 13-17 in 2015 in Nebraska was 48.2% (± 8.6) compared to 32.2% (± 7.2%) for males and 67.3% of female and 54.3% of male have either only received one or even none of the HPV vaccine doses⁵
- Series completion is 2-doses between 9 to 14 years of age and 3 for 15 and above. The 2-dose HPV vaccine lowers potential adverse effects and is more cost effective⁶.

Methods

- Three interventions were implemented: (1) a 1 hour lunch and learn session with PCP and healthcare staff, (2) review of daily schedules to capture opportunistic appointments, and (3) weekly educational HPV reminder emails to PCPs.
- Lunch and Learn Session: to pediatricians and the staff. Provided information about HPV and strategies to implement to optimize acceptance of the vaccine.
- Review of daily schedules: two graduate students visited the clinic three times a week for one month to review daily schedules and identify opportunistic appointments for patients between the ages of 9-14 years old, not up to date on their HPV vaccination status.
- Maintenance data was gathered for 2 months after the second intervention.
- The third intervention: 6 reminder emails sent to providers for one month.
- Topics covered in the emails included: national HPV rate vs NE rate, current clinic HPV rate, vaccination outcome/effect on cancer, tips for communication with parents, tips for communication with healthcare staff, and tips for sustainability.
- Maintenance data was gathered for 2 months after the third intervention.

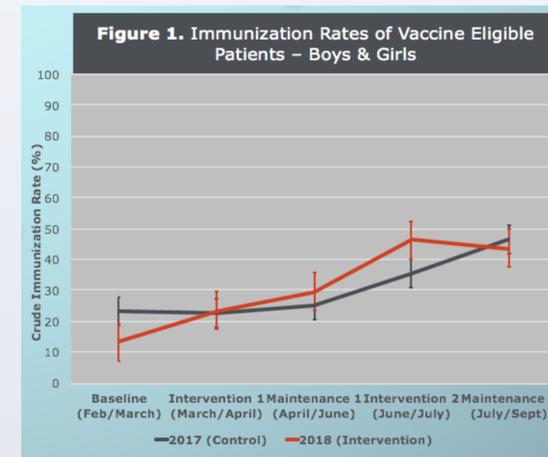
Results

- The baseline rate of eligible patients that were vaccinated was significantly lower in 2018 than in 2017.

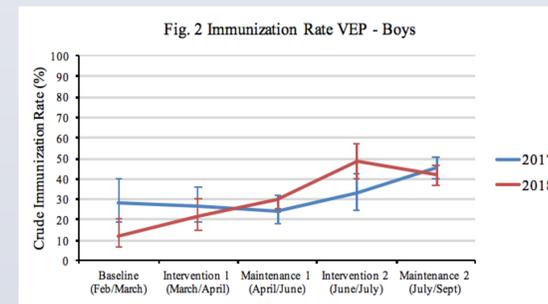
	2017		2018		p
	Immunized / Total Visits	Rate	Immunized / Total Visits	Rate	
Baseline (Feb/March)	34 / 145	23.45	25 / 190	13.16	.014
Intervention 1 (March/April)	47 / 209	22.49	53 / 227	23.35	.831
Maintenance 1 (April/June)	80 / 322	24.84	122 / 412	29.61	.151
Intervention 2 (June/July)	71 / 199	35.68	126 / 272	46.32	.021
Maintenance 2 (July/Sept)	296 / 639	46.32	342 / 786	43.51	.289

Results continued

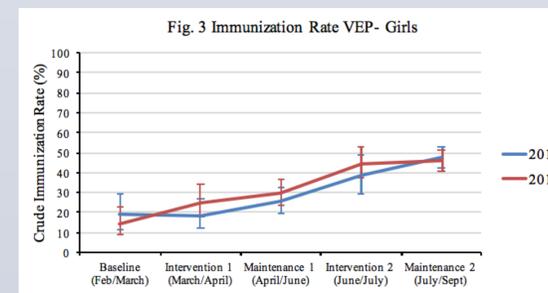
- Immunization rates increased in 2018 during intervention one and maintenance period one compared to baseline.



- Rates during the second intervention period in 2018 were higher than in 2017 when no intervention was in place. This is the only time period which differs significantly from its 2017 counterpart.
- The trend of male vaccination rates increased during intervention one and maintenance period one, and further increased rate during intervention two and maintenance period two.



- Female vaccination rates showed an upward trend from baseline in 2018 to maintenance period two, but there were no significant changes from the same time periods in 2017.



Conclusions

- Provider education can significantly improve HPV vaccination rates and reduce missed opportunities.
- Effects can be maintained by simple email reminders with HPV resources.
- This study shows the effect of a multi-part intervention targeting providers, but further studies are needed to demonstrate the effectiveness of each intervention alone.

References

1. HPV Vaccines: Vaccinating Your Preteen or TeenCenters for Disease Control and Prevention [Internet]; cDecember 13, 2016 [cited 2017 March 4]. Available from: <https://www.cdc.gov/hpv/parents/vaccine.html>.
2. Use of 9-Valent Human Papillomavirus (HPV) Vaccine: Updated HPV Vaccination Recommendations of the Advisory Committee on Immunization Practices [Internet]; cMarch 27, 2015 [cited 2017 March 4]. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6411a3.htm>.
3. Supplemental Information and Guidance for Vaccination Providers Regarding Use of 9-valent HPV [Internet]; cNovember 29, 2016 [cited 2017 March 3]. Available from: <https://www.cdc.gov/hpv/downloads/9vhpv-guidance.pdf>.
4. Garland SM, Kjaer SK, Muñoz N, Block SL, Brown DR, DiNubile MJ, Lindsay BR, Kuter BJ, Perez G, Dominiak-Felden G, et al. Impact and effectiveness of the quadrivalent human papillomavirus vaccine: A systematic review of 10 years of real-world experience. *Clinical Infectious Diseases* August 2016;63(4):519-27.
5. Sarah Reagan-Steiner M, David Yankey M, Jenny Jeyarajah M, Laurie D. Elam-Evans P, C. Robinette Curtis M, Jessica MacNeil M, Lauri E. Markowitz M, James A. Singleton P. National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 years -- united states, 2015. *Morbidity and Mortality Weekly Report* 2016;65(33):850-58.
6. Meites MD E, Kempe MD A, Markowitz MD LE. Use of a 2-dose schedule for human papillomavirus vaccination — updated recommendations of the advisory committee on immunization practices. *MMWR Morbidity Mortal Weekly Report* 2016:1405-8.

Acknowledgements

Thank you to all the staff at the CHI Pediatrics clinic for your support in this study.