

## *Appalachian Parent and Provider Views on the Use of Pharmacies for Human Papillomavirus Vaccination in Adolescents*

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### ABSTRACT

The human papillomavirus (HPV) vaccine uptake in West Virginia is lagging despite being highly protective against HPV-related diseases. This study aimed to determine parent and provider perceptions on using pharmacies for HPV vaccination in adolescents. The study surveyed both parents and providers in a rural academic institution. Providers were surveyed before and six months after an educational intervention that instructed providers on local legislation and the logistics of prescribing the HPV vaccine through pharmacies. The provider survey assessed awareness of pharmacy vaccine access and prescribing practices. Parents of adolescents were surveyed to determine what patients might benefit most from pharmacy access for vaccination. A total of 71 providers completed the initial survey, and 45 completed the six-month assessment. Only 22.5% were aware of the pharmacy legislation at the initial survey, and 64.4% were aware at six months ( $p < .001$ ). Most providers (69% on initial survey and 78% at six months) reported that they thought pharmacy access for vaccination would benefit rural patients. Most providers also reported they would be “likely” or “very likely” to prescribe the HPV vaccine through a pharmacy. A total of 121 parents completed the survey. Only 16 parents (13.2%) were aware of pharmacy vaccine access. Of parents whose adolescents had started the series, 78.1% felt pharmacy vaccine access would have been “very beneficial.” Pharmacy provision of HPV vaccination for adolescents is underutilized. Parents and providers have favorable views on using pharmacies for HPV vaccination.

### KEYWORDS

Human papillomavirus, vaccination, HPV, pharmacy

### INTRODUCTION

Human papillomavirus (HPV) infection is responsible for nearly all cervical cancers, genital warts, and other cancers of the anogenital region and oropharynx.<sup>1-4</sup> In 2018, the estimated number of new disease-associated HPV infections in the 15-to 24-years-old American population was 7.1 million.<sup>5</sup> Vaccination against HPV has been recommended by the Centers for Disease Control (CDC) since 2006 for females and 2011 for males to prevent new HPV infections and HPV-associated diseases; however, vaccination rates remain suboptimal.<sup>6</sup> In 2017, in West Virginia, 67.5% of females and 54% of males had received one dose of the HPV vaccine series, and only 48.6% of females

and 39.3% of males had completed the series.<sup>6</sup> These numbers fall well below the Healthy People 2030 target of 80% coverage.

Traveling to a health care provider’s office can be a barrier to completing the HPV vaccine series, especially in rural areas. Provision of easier and closer access for vaccination may improve vaccination rates,<sup>7</sup> which is especially important given that West Virginia has significantly higher rates of HPV-related diseases relative to other states. In 2017, legislation was passed that allows pharmacies to provide HPV vaccines to patients ages 11-18 with a prescription from a health care provider (WV House Bill 2518). Pharmacies are typically more accessible to patients

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than their primary care provider's offices in rural areas. Pharmacist administration of other vaccines has been found to significantly improve access to immunization.<sup>8</sup> The purpose of this study was to determine parent and provider perceptions of the feasibility of pharmacy utilization for HPV vaccination of adolescents.

## METHODS

### PROVIDER SURVEY

This study was conducted in a small academic institution in Appalachia that serves surrounding rural WV counties. Pediatric, family practice, and OBGYN providers within this academic institution were surveyed regarding HPV vaccination practice. Survey questions included how often they provided HPV vaccinations, if they were aware of legislation allowing pharmacy access, Likert scale questions on the benefits of pharmacy access for HPV vaccination, and the likelihood of prescribing the HPV vaccine through a pharmacy in the future. Educational sessions with providers were then conducted, and legislation was reviewed along with the logistics of prescribing the vaccine through a pharmacy in the electronic health record. Six months later, the same departments completed the same survey regarding vaccination practice, awareness of pharmacy legislation, perspectives about what patient groups might benefit most from this practice, and the likelihood of prescribing the vaccine through a pharmacy in the future.

### PARENT SURVEY

Parents of adolescents ages 11-18 were also surveyed. Parents were recruited from provider offices within the same academic institution. Adolescent HPV vaccination status, gender, and WV county of residence were collected, along with a survey of Likert scale questions about the usefulness of pharmacy access for vaccination. Parent responses were compared by rural and urban county designation based on the West Virginia Higher Education Policy Commission definition based on geographic Health Professional Shortage Areas (HPSAs), medically underserved areas, and

census tracts.<sup>9</sup> Distance in miles to their pharmacy and their primary care provider was also recorded. Parents were asked to consider the pharmacy they use routinely as their "home" pharmacy to determine the distance in miles. Parents participating in the survey were given a water bottle and pen for their participation.

Provider responses were compared before and six months after the educational intervention. Parental responses were compared by adolescent gender and rural/urban county designation, based on US Census population codes. Proportions were compared using Chi-square statistics. Institutional review board approval was obtained. Funding was obtained through the Mountains of Hope West Virginia Cancer Coalition.

## RESULTS

### PROVIDER SURVEY

Seventy-one total participants completed the initial provider survey. Of these providers, 100% recommended the HPV vaccine series to their patients. However, six of the providers reported not giving the vaccine in practice. Forty-five total providers completed the follow-up survey. Only two of these providers reported not giving the vaccine in practice, and both reported the reason as they do not see patients in the recommended age group for the vaccine. Table 1 shows how many providers completed the surveys from each department (OBGYN, family practice, and pediatrics). Only 22.5% of providers (16/71) were aware of the pharmacy legislation at the initial survey. On the six-month follow-up survey, 64.4% (29/45) were aware of the legislation ( $p < .001$ ). Only one provider reported providing the HPV vaccine through a pharmacy at the time of the initial survey, and this was a pediatrician.

Most providers (49/71, 69% on the initial survey and 35/45, 78% on the follow-up survey) reported that pharmacy access would benefit rural patients. Most providers also reported they would be "likely" or "very likely" to prescribe the vaccine to adolescents through a pharmacy. This did not change



	Initial Survey	Six-Month Survey
<b>Family Practice</b>	24	18
<b>Pediatrics</b>	30	16
<b>OBGYN</b>	18	12
<b>Male</b>	28	20
<b>Female</b>	43	25

**TABLE 1:** Number of provider participants by department at the initial survey and six-month survey.

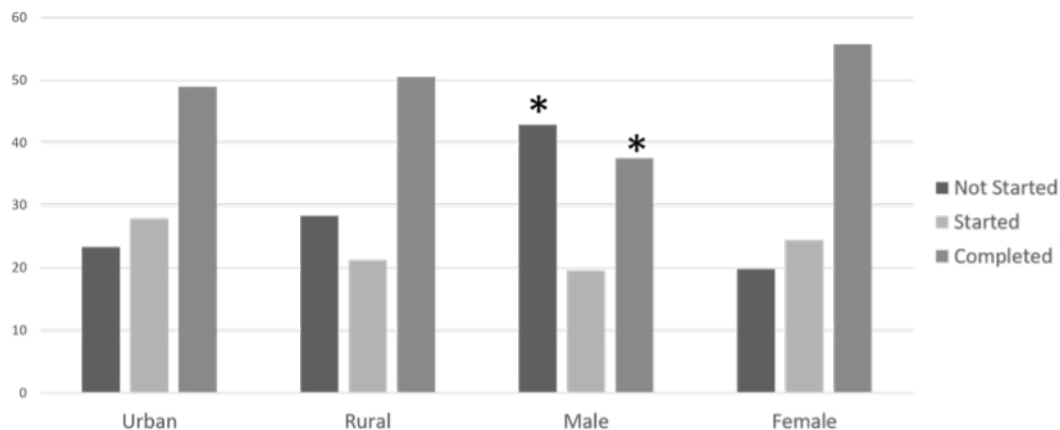
significantly at six months (51/71, 71.8% vs. 33/45, 73.3%,  $p=0.86$ ). However, after six months, only two providers reported prescribing the vaccine to an adolescent through a pharmacy. Both providers were OBGYNs.

#### PARENT SURVEY

One hundred twenty-one parents completed the parent survey, representing 196 adolescents ages 11-18. 94 (47.9%) adolescents had already completed the HPV vaccine series, 52 (26.5%) had started the series, and 50 (25.5%) had not yet started the series. The 50 adolescents who had not yet started the vaccine series were represented by 45 parents who answered why they had not yet started the vaccine. Of these, 13/45 (28.8%) reported “safety concerns,” 3/45 (6.6%) reported they thought it was “not needed,” 4/45 (8.9%) reported it was “not

recommended by the provider,” 1/45 (2.2%) reported they “did not know about vaccine,” and 23/45 (51%) reported they “had no recent visits or opportunities.” One parent did not respond to this question.

Figure 1 shows the percentage of adolescents who had not started, started, or completed the HPV vaccine based on living in a rural/urban county and gender. HPV vaccine completion was not affected by rural/urban county designation. There was no difference in adolescents who had not started, started, or completed the vaccine series when comparing urban vs. rural. There was a statistical difference between males not started and males completed compared to females of these same criteria. Males were less likely than females to have completed the vaccine series. Parents who live in rural counties reported that they lived closer to a pharmacy than their primary care provider’s office.

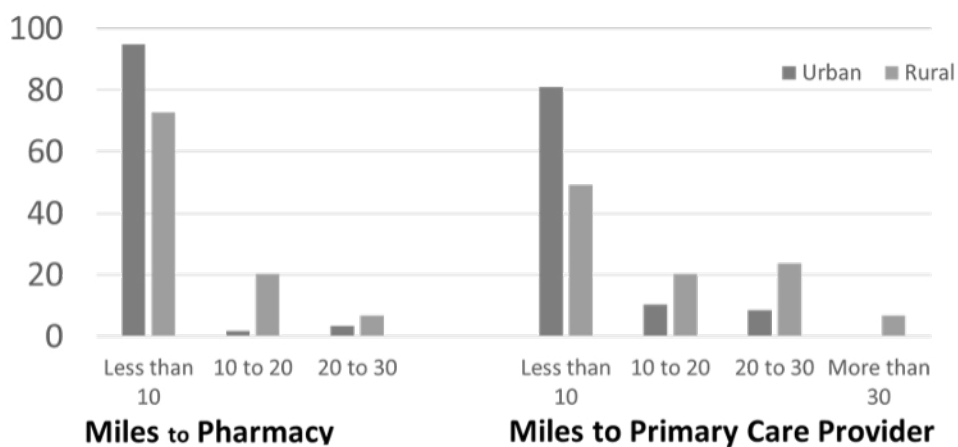


**FIGURE 1:** Percentage of adolescents who had not started, started, or completed the HPV vaccine based on rural/urban county and gender.  
\*denotes statistical significance



Figure 2 shows the distance in miles that parents reported they live from a pharmacy and from their primary care provider.

Only 16/121 (13.2%) parents were aware of pharmacy access for the HPV vaccine. The majority (78.1%) of parents whose adolescents had started or completed the vaccine series felt pharmacy access would have been “very beneficial.” This did not vary by rural/urban designation. More parents who live in rural counties (33.9% vs. 20.7% in urban counties,  $p=0.08$ ) had received vaccines for themselves in pharmacies. However, overall only eight (6.6%) reported their adolescent had ever received any vaccine through a pharmacy.



**FIGURE 2:** Percentage of parents reporting distances to primary care provider (where they typically receive vaccines) and pharmacies in miles.

## DISCUSSION

Pharmacy provision of the HPV vaccination is underutilized for adolescents. The first set of challenges could be related to limited provider awareness to utilize local pharmacies to administer the vaccine to aid in series completion. The majority of surveyed providers agreed that in-pharmacy vaccination of adolescent patients would be beneficial. The provider awareness of the policy increased threefold following educational intervention. However, the number of providers utilizing pharmacists as immunizers remained low. Studies detail multiple engagement barriers providers grapple with when prescribing the HPV

vaccine, including low parent demand, concerns about vaccine safety, parental understanding of vaccine benefits, and the management of reminder or recall notices to complete the series.<sup>10,11</sup> Continued physician education is needed to address these barriers.

The surveyed parents reported a positive outlook on utilizing pharmacy access for vaccine administration in rural areas; almost all of this population lived closer to a community pharmacy than to a primary care provider. Therefore, pharmacy intervention may improve series completion as this location may be more readily accessible to parents. Prior studies have demonstrated a significantly lower vaccination rate

in rural areas;<sup>11,12</sup> however, differences in vaccination rates between locations were not statistically significant in this study. This is most likely related to the patient population surveyed and the small sample size. Males were less likely to receive or complete the HPV vaccine than females, which is consistent with an established national trend.<sup>6</sup> Continued

community outreach and patient counseling have been shown to increase parent and patient awareness and will likely increase the utilization of pharmacy provision in rural areas.

Study limitations included a limited timeline due to grant requirements and COVID-19 restrictions, which limited survey collection. The majority of the patients surveyed were established with a primary care provider and had medical insurance coverage. The uninsured population and adolescent population not getting regular primary care were underrepresented. The literature emphasizes the positive impact a strong recommendation from a health care provider can have on a parent’s decision to get their child vaccinated.<sup>13</sup> Thus, providers still have an important role in counseling patients and their parents prior to the vaccine and should create connections with pharmacists throughout the state administering the vaccine to aid in series

completion. Follow-up research of a provider-pharmacist cohort and barriers to provider use of pharmacies would determine if improved relationships would increase vaccination rates in West Virginia.

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## REFERENCES

1. Walboomers, JM, Jacobs, MV, Manos, MM. Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. *J Pathol.* 1999;189:12-19.
2. Bosch, FX, de Sanjose, SS. Human papillomavirus and cervical cancer: burden and assessment of causality. *J Natl Cancer Inst Monogr* 2003;31:3-13.
3. Greer, CE, Wheeler, CM, Ladner, MB. Human papillomavirus (HPV) type distribution and serological response to HPV type 6 virus-like particles in patients with genital warts. *J Clin Microbiol.* 1995;33:2058-2063.
4. Center for Disease Control and Prevention . Genital HPV: the facts. [http://www.cdc.gov/std/hpv/the-facts/HPV\\_English\\_2011\\_508.pdf](http://www.cdc.gov/std/hpv/the-facts/HPV_English_2011_508.pdf). Accessed January 25, 2013.
5. Kreisel KM, Spicknall IH, Gargano JW, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2018. *Sex Transm Dis* 2021;48:208–14.
6. 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;68:698–702.
7. Calo WA, Shah PD, Gilkey MB, et al. Implementing pharmacy-located HPV vaccination: findings from pilot projects in five US states. *Hum Vaccin Immunother.* 2019; 15(7-8):31-38.
8. Wick JA, Elswick BM. Impact of Pharmacist Delivered Education on Early Parent Awareness and Perceptions Regarding Human Papillomavirus (HPV) Vaccination in the Community Pharmacy Setting in West Virginia. *Innov Pharm.* 2018;9(3):1-6.
9. West Virginia Higher Education Policy Commission <https://www.wvhepc.edu/resources/data-and-publication-center/>.
10. McLean HQ, VanWormer JJ, Chow BDW, et al. Improving Human Papillomavirus Vaccine Use in an Integrated Health System: Impact of a Provider and Staff Intervention. *J Adolesc Health.* 2017;61(2):252-258.
11. Swiecki-Sikora AL, Henry KA, Kepka D. HPV Vaccination Coverage Among US Teens Across the Rural-Urban Continuum. *J Rural Health.* 2019 Sep;35(4):506-517.
12. Lee, M.; Gerend, M.A.; Boakye, E.A. Rural–Urban Differences in Human Papillomavirus Vaccination among Young Adults in 8 U.S. States. *Am. J. Prev. Med.* 2020, 60, 298–299.
13. Perkins RB, Clark JA, Apte G, et al. Missed opportunities for HPV vaccination in adolescent girls: a qualitative study. *Pediatrics* 2014;134(3) e666-674.

