4-14-2017

Predictors of HPV Vaccination Series Completion in Philadelphia Adolescents

Karie Youngdahl, MPH
Thomas Jefferson University, kbyoungdahl@gmail.com

Ami S. Patel, PhD, MPH
Centers for Disease Control & Prevention & Philadelphia Department of Public Health

Amy E. Leader, DrPH, MPH
Thomas Jefferson University, amy.leader@jefferson.edu

Predictors of HPV Vaccination Series Completion in Philadelphia Adolescents

KB Youngdahl[a], MPH, AS Patel[b], PhD, MPH, AE Leader[a], DrPH, MPH

[a]Thomas Jefferson University College of Population Health, Philadelphia, PA [b]Centers for Disease Control & Prevention & Philadelphia Dept. of Public Health

Background

- Healthy People 2020 establishes the goal that 80% of adolescents ages 13-15 will have completed the human papillomavirus (HPV) vaccination series by 2020.
- In 2015, the CDC estimated that only 41.9% of U.S. girls and 28.1% of U.S. boys ages 13-17 had completed the 3-dose series.
- Among 7 local areas surveyed by the 2015 National Immunization Survey, Philadelphia had the highest ≥ 3 dose (58.6%) HPV vaccine uptake for girls. Rates for Philadelphia boys (≥ 3 dose = 43.4%) were higher than the U.S. average.
- Sociodemographic factors such as race/ethnicity, provider/insurance type, and income may affect series completion rates.

Research Aim

- This study analyzed data from the Philadelphia KidsPlus Immunization information System (IIS) to look at factors associated with HPV vaccine series completion.

Methods

- The sample included 50,185 Philadelphia-resident adolescents born between 2000 and 2003 who received **at least 1 dose of HPV vaccine**.
- HPV vaccination records were collected until 3/1/2016.
- Adolescents who took the first dose after 8/31/2015 were excluded to allow for a 6-month interval between doses 1 and 3.
- χ^2 tests were performed and followed by bivariate and multivariable logistic regression analysis to compare differences in HPV vaccine series completion across race/ethnicity, ZIP codes, provider type, and age.
- A 2-dose analysis was performed given the 12/2016 recommendation that adolescents who begin the series before age 15 need only 2 doses of vaccine. Participants who reached age 15 before 8/31/2015 were excluded from the 2-dose analysis.

Table 1 Demographic Characteristics, Philadelphia recipients of at least 1 dose HPV vaccine, birth years 2000-2003

Characteristics	Female (n=25150)	Male (n=24700)
Age		
15	7033 (28.0)	6837 (27.7)
14	6585 (26.2)	6557 (26.5)
13	6145 (24.4)	5944 (24.1)
12	5387 (21.4)	5362 (21.7)
Race/Ethnicity		
Black/African American	12259 (48.7)	12278 (49.7)
Hispanic	4497 (17.9)	4433 (17.9)
White	3528 (14.0)	3299 (13.4)
Asian	1194 (4.7)	1218 (4.9)
Unknown	2675 (10.6)	2490 (10.1)
Other	993 (3.9)	979 (4.0)
Income (% FPG)		
≤100%	4082 (16.2)	4217 (17.1)
101-150%	10839 (43.1)	10733 (43.5)
151-200%	7253 (28.8)	7010 (28.4)
>200%	2963 (11.8)	2717 (11.0)
Provider Type		
VFC Provider	18878 (75.1)	18597 (75.3)
Community HC/FQHC	3274 (13.0)	3205 (13.0)
Others	730 (2.9)	707 (2.9)
Dose 1	25150 (100)	24700 (100)
Dose 2	19055 (75.8)	18055 (73.1)
Dose ≥ 3	12544 (49.9)	11132 (45.1)

Abbreviations: FPG, Federal Poverty Guidelines, VFC, Vaccines for Children; HC, Health Center; FQHC, Federally Qualified Health Center

Results

Table 2

Multivariable logistic regression analysis of factors associated with 3 dose HPV vaccination, Philadelphia adolescents birth years 2000-2003

	Female (n=25150)		Male (n=24700)	
	OR	95% CI	OR	95% CI
Race/Ethnicity				
African American	1.07	0.98-1.17	0.97	0.88-1.06
Hispanic	1.45*	1.31-1.60	1.42*	1.28-1.58
Asian	1.93*	1.66-2.25	1.72*	1.49-2.00
Unknown	0.94	0.84-1.05	0.80*	0.71-0.90
Other	1.15	0.97-1.35	1.10	0.94-1.30
White	ref		ref	
Income (%FPG)				
≤100%	0.84*	0.75-0.93	0.94	0.84-1.05
101-150%	0.79*	0.72-0.87	0.87*	0.79-0.96
151-200%	0.87*	0.79-0.95	0.92	0.83-1.01
>200%	ref		ref	
Age				
12	0.19*	0.18-0.21	0.22*	0.20-0.24
13	0.42*	0.39-0.45	0.43*	0.40-0.46
14	0.75*	0.69-0.80	0.83*	0.78-0.90
15	ref		ref	
Provider				
Community HC/FQHC	0.98	0.91-1.06	0.92*	0.85-1.00
Others	0.94	0.80-1.09	1.18*	1.00-1.38
VFC Provider	ref		ref	

*p<0.05

Table 3

Multivariable logistic regression analysis, 2 dose HPV vaccination, Philadelphia adolescents who began series before 15th birthday

	Female (n=20432)		Male (n=20189)	
	OR	95% CI	OR	95% CI
Race/Ethnicity				
African American	1.08	0.97-1.21	1.00	0.89-1.11
Hispanic	1.52*	1.34-1.74	1.47*	1.29-1.68
Asian	1.81*	1.47-2.22	1.72*	1.42-2.09
Unknown	0.91	0.80-1.04	0.83*	0.73-0.95
Other	1.44*	1.17-1.78	1.18	0.97-1.43
White	ref		ref	
Income (%FPG)				
≤100%	0.90	0.78-1.03	1.04	0.91-1.19
101-150%	0.85*	0.75-0.95	0.92	0.82-1.04
151-200%	0.93	0.82-1.05	0.97	0.86-1.09
>200%	ref		ref	
Age				
12	0.24*	0.21-0.27	0.27*	0.24-0.31
13	0.45*	0.40-0.50	0.49*	0.44-0.55
14	0.72*	0.64-0.81	0.82*	0.74-0.92
15	ref		ref	
Provider				
Community HC/FQHC	1.00	0.90-1.10	0.91	0.83-1.01
Others	0.77*	0.64-0.93	1.18	0.96-1.45
VFC Provider	ref		ref	

*p<0.05

Results

- 49.9% of females and 45.1% of males completed the 3-dose series. 75.8% of females and 73.1% of males completed 2 doses.
- Multivariable logistic regression analysis showed that for females, being Hispanic or Asian was associated with 3-dose series completion and receipt of 2 doses of vaccine.
- Lower-income females were less likely to complete the 3-dose series than the highest-income females. For 2 doses, only the second lowest income category was associated with lower odds of receipt.
- Hispanic and Asian males were more likely than white males to complete the 3-dose series and to receive 2 doses of vaccine.
- For males, only the 101-150% FPG income category was associated with a different 3-dose completion rate than the highest income category. There were no income-related differences with receipt of 2 doses of vaccine.

Discussion

- Hispanic and Asian race/ethnicity are predictors of 3-dose HPV vaccine series completion and 2-dose receipt in Philadelphia adolescents.
- Lower-income Philadelphia females, and some low-income males, are less likely to complete the series than higher-income adolescents.
- African American females have a higher risk of cervical cancer than white and Asian females, and they have the highest cervical cancer death rates of women in the U.S. They make up half of this study population, and their lower tendency to complete the HPV vaccination series in relation to Hispanic and Asian adolescents is an area of special concern and opportunity.
- In 2016, the Advisory Committee on Immunization Practices recommended that only 2 doses of vaccine are needed for adolescents who begin the series before age 15. This analysis did not detect differences in 2 dose vs 3 dose receipt when looking at race and ethnicity. Some differences related to low income disappeared when looking at receipt of 2 doses. This may indicate that low-income Philadelphia adolescents will benefit from the new recommendation.
- Using ZIP code as a proxy for income, lack of demographic information from the IIS, and lack of granularity regarding provider type are limitations of this study. Strengths are a large racially and ethnically diverse sample and the mature IIS from which the data are drawn.
- Further research is needed into factors that may differently affect series completion across the sociodemographic variables in this study. Such factors may include missed opportunities for vaccination, lack of high-quality provider recommendation, parental attitudes toward vaccination and health-care providers, financial barriers, and so on.