Race and Ethnicity Differences in the HPV vaccine initiation prompted by electronic reminders

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Background

- In the United States, more than 42 million Americans are infected with Human Papillomavirus (HPV), and HPV causes approximately 36,000 cases of cancer in both men and women every year[1].
- HPV-related cancers are largely preventable through vaccination: more than 90% of HPV-related cancers are preventable[2].
- Centers for Disease Control and Prevention (CDC) reported that Hispanic Children ages 9-17 years were less likely to receive one or more HPV vaccines compared to non-Hispanic White Children[3].
- Similarly, Hispanic young adults ages 18-26 years were less likely than non-Hispanic White young adults to have received one or more HPV vaccines[4].

Research Objective

- To investigate the differences in HPV vaccination initiation by race/ethnicity after an electronic reminder.

Program Description

- The HPV electronic reminder project, a quality Improvement project, has created electronic reminder messages that pair strong provider recommendations with brief education on cancer prevention to increase HPV vaccination[5].
- The project was among adolescents and young adults ages 9-25 years with at least one office visit at a primary care clinic in 2021 and who were eligible for HPV vaccine.
- Using a pragmatic randomized controlled study design, the control group received usual care including in-person provider recommendations, visual reminders in exam waiting rooms, bundling of vaccinations, and phone call reminders.
- The intervention group received an electronic reminder (email, text, or patient portal message) at least once, up to three times in addition to the usual care.
- Patients who were pregnant, had immunization contraindications, or had vaccine refusal record were excluded.

Methods

- This was a secondary analysis of the HPV electronic reminder project.
- We focused on the 9 to 26 years old patients who did not have HPV vaccine and compared the HPV vaccine initiation after the electronic reminders were sent among different race/ethnicity groups.
- Descriptive analysis using Chi-square test or Fisher's exact test was performed with frequency distributions.
- Univariate and multivariable logistic regression analysis was conducted to compare the HPV vaccine initiation by race/ethnicity.
- Variance Inflation Factor (VIF) was calculated for each covariate in the multivariable model to assess multicollinearity.

Results

- Among 7408 vaccine-eligible patients, 1942 had not initiated HPV vaccination and received up to 3 electronic reminders.
- Almost 50% of patients were aged 19-26 and 56% were female. Additionally, 61.4% of patients had managed care insurance. (Table 1)

Table 1. Characteristics of patients by HPV vaccine initiation (N=1492)

Variable	HPV Vaccine Initiation N (%)	No HPV Vaccine Initiation N (%)	P-value
Race			
Non-Hispanic White	32 (20.78)	499 (27.91)	**0.023**
Non-Hispanic Black	43 (27.92)	388 (21.70)	
Hispanic	46 (29.87)	415 (23.21)	
Others	33 (21.43)	486 (27.18)	
Age Group			
19-26	30 (19.48)	935 (52.29)	**<0.001**
15-18	30 (19.48)	367 (20.53)	
9-14	94 (61.04)	486 (27.18)	
Gender			
Male	66 (42.86)	783 (43.79)	0.822
Female	88 (57.14)	1005 (56.21)	
Payer			
Medicaid	58 (37.66)	482 (26.96)	**<0.001***
Managed Care	92 (59.74)	1101 (61.58)	
Others	4 (2.60)	205 (11.47)	

* Fisher's exact test was conducted due to the smaller sample size in the cell (n<5)

Results (Cont'd)

- Non-Hispanic Black (Odds Ratio (OR): 1.91, 95% CI: 1.13-3.23) and Hispanic (OR: 1.80, 95% CI: 1.09-2.99) were significantly more likely to initiate the HPV vaccine after the electronic reminders were sent compared to Non-Hispanic White. (Table 2)
- Patients ages 9-14 years (OR: 7.46, 95% CI: 4.69-11.86) and aged 15-18 years (OR: 2.81, 95% CI: 1.60-4.94) were 7.5 and 2.8 times more likely to initiate their HPV vaccination after the electronic reminders were sent compared with patients ages 19-26 years. (Table 2)
- The VIF values were <5, which indicates that the variables are not strongly correlated.

Table 2. Adjusted difference in HPV vaccine initiation after the electronic reminders by race/ethnicity

Variable	Odds Ratio	95% Confidence Interval	P-value
Race			
Non-Hispanic White	1.0	-	Reference
Non-Hispanic Black	1.91	(1.13, 3.23)	**0.015**
Hispanic	1.80	(1.09, 2.99)	**0.022**
Others	1.16	(0.68, 1.98)	0.584
Age Group			
19-26	1.0	-	Reference
15-18	2.81	(1.60, 4.94)	**<0.001**
9-14	7.46	(4.69, 11.86)	**<0.001**
Gender			
Male	1.0	-	Reference
Female	1.16	(0.81, 1.65)	0.417
Payer			
Medicaid	1.0	-	Reference
Managed Care	1.04	(0.71, 1.53)	0.824
Others	0.29	(0.10, 0.83)	**0.021**

Conclusions

- Our results suggest that personalized, electronic reminders that incorporate provider recommendation for HPV vaccination could help improve HPV vaccine initiation among Non-Hispanic Black and Hispanic individuals, especially those who are younger.
- Future studies should further explore how electronic reminders and tailored messaging content (i.e., provider recommendation, education) may influence the difference in HPV vaccine initiation by race and ethnicity.

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