SKIN

SUPPLEMENT

The Effect of Offering Pneumococcal Vaccines During Specialty Care on Vaccination Rates in Patients Receiving Immunosuppressive Therapy

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eMETHODS

Study Participants: Clinics and Groups

The four dermatology practices were in two clinics. Clinic #1 was in the county hospital system and offered comprehensive care. Clinic #2 was a university clinic with a private practice and a dermatology resident continuity clinic. Resident continuity clinics are structured to enable residents to develop longitudinal relationships with patients with skin disease. Subsets of eligible patients in both clinics were subject to the QI intervention (QI group) based on their treating physician. All patients in the QI group were seen by the same dermatologist or a resident physician under the supervision of that dermatologist (SEW). Four other dermatologists provided care to the remainder of eligible patients receiving care in the Clinics. Patients receiving care from these four dermatologists were not subject to the QI intervention and were retrospectively identified as comparison group patients. All eligible patients seeking care between September (Clinic #1) or November (Clinic # 2) of 2019 through March 30, 2020 were included in analyses. All were followed for immunization completion through July of 2020.

Immunization Status Measure

The primary outcome measure was immunization status. We created a three-level ordinal immunization status variable based on ACIP guidelines. According to ACIP guidelines, patients on immunosuppressive medications should receive both PVC13 and PPSV23. PPSV23 immunization is recommended ≥ 8 weeks after the initial PVC13 immunization. A second dose of PPSV23 is recommended 5 years after the initial dose.

In accordance with these guidelines, we categorized patients as having no immunization, partial immunization, or full immunization. Two groups of patients were categorized as fully immunized: 1) those who received PVC13 immunizations within the last five years who had PPSV23 ≥ 8

weeks after PVC13, and 2) those who received PVC13 greater than 5 years ago who have had two doses of PPSV23 in their adult life. Patients with no immunization were those who had never received either vaccination or they had a single PPSV23 immunization greater than five years ago. Partially immunized patients met one of three criteria: 1) they received one PPSV23 vaccination in the last five years, 2) they received PVC13 within the previous 5 years without an additional PPSV23, or 3) they received PVC13 greater than 5 years ago with or without one additional PPSV23.

Statistical Analyses

The adjusted logistic regression model examining whether there were significant changes in immunization status for the two groups over time was used to generate the average adjusted probabilities of persons in the QI and comparison group being at each level of immunization at each observation. These probabilities represent average predicted probabilities conditional on all observations having the given immunization level value. We multiplied these probabilities by 100 and expressed them as percentages. We also examined associations between immunization levels at initial observation and the presence and duration of immunosuppressive medication use prior to initial observation; groups were combined for this analysis. We used Wilcoxon rank-sum tests to determine whether immunization level differed for persons with and without immunosuppressive medication use prior to initial observation. We used Spearman's rank correlation to evaluate the association between immunization levels at initial observation and the duration of prior immunosuppressive use. We then analyzed data for the subset of patients who were newly prescribed immunosuppressive medication during the project. We calculated the unadjusted proportions of these patients receiving any immunization during the project period for each group, testing the significance of differences using Pearson's chi-squared tests.

Last, we conducted analyses that included only persons in the QI group who were not fully immunized at initial observation. We examined unadjusted and adjusted associations between the receipt of these patients receiving one or more pneumonia vaccinations during the project and demographic, care delivery, and patient health variables. Unadjusted associations were tested with Pearson's chi-squared tests and Wilcoxon rank-sum tests for categorical and ordinal variables, respectively. We tested adjusted associations using logistic regression.

SUPPLEMENTAL RESULTS

Supplemental Table 1. Unadjusted associations between receipt of one or more pneumonia vaccinations during the QI project and patient characteristics. Includes persons in the QI group who were not already fully immunized at initial observation (n=129).

Variable	Total n=129 Column % (95% CI)	Vaccine Not Received n=24 Column % (95% CI)	Vaccine Received n=105 Column % (95% CI)	p-value
Gender				
Female	64.3 (55.6, 72.2)	66.7 (45.4,82.8)	63.8 (54.1, 72.5)	0.792
Male	35.7 (27.8, 44.4)	33.3 (17.2, 54.5)	36.2 (27.5, 45.9)	
Age				
<=34	22.5 (16.0, 30.6)	25.0 (11.4, 46.4)	21.9 (14.9, 31.0)	0.610
35-44	22.5 (16.0, 30.6)	33.3 (17.2, 54.5)	20.0 (13.3, 28.9)	
45-54	19.4 (13.4, 27.2)	12.5 (3.9, 33.2)	21.0 (14.1, 29.9)	
55-64	25.6 (18.7, 33.9)	20.8 (8.7, 42.1)	26.7 (19.0, 36.1)	
>=65	10.1 (5.9, 16.7)	8.3 (2.0, 28.8)	10.5 (5.8, 18.1)	
Primary insurance				
Private	13.2 (8.3, 20.3)	8.3 (2.0, 28.8)	14.3 (8.7, 22.5)	0.007
Public (Medicare or Medicaid)	52.7 (44.0, 61.3)	45.8 (27.0, 65.9)	54.3 (44.6, 63.7)	
County program	24.0 (17.4, 32.3)	16.7 (6.2, 37.7)	25.7 (18.2, 35.0)	
Uninsured	10.1 (5.9, 16.7)	29.2 (14.2, 50.5)	5.7 (2.6, 12.3)	
Patient Used Translator				
Yes	17.1 (11.4, 24.7)	8.3 (2.0, 28.8)	19.0 (12.6, 27.8)	0.208
No	82.9 (75.3, 88.6)	91.7 (71.2, 98.0)	81.0 (72.2, 87.4)	
Count of prior office-based contacts (all provider specialties)				
0-3 visits	30.2 (22.8, 38.8)	33.3 (17.2, 54.5)	29.5 (21.5, 39.1)	0.89
4-8 visits	29.5 (22.2, 38.0)	33.3 (17.2, 54.5)	28.6 (20.7, 38.1)	
9-14 visits	26.4 (19.4, 34.7)	20.8 (8.7, 42.1)	27.6 (19.8, 37.1)	
>=15 visits	14.0 (8.9, 21.2)	12.5 (3.9, 33.2)	14.3 (8.7, 22.5)	
Visit type at project initiation				
Initial	20.2 (14.0, 28.1)	25.0 (11.4, 46.4)	19.0 (12.6, 27.8)	0.512

Follow-up	79.8 (71.9, 86.0)	75.0 (53.6, 88.6)	81.0 (72.2, 87.4)	
Number of indications other than medication(s) and age[a]				
0 indications	46.5 (38.0, 55.3)	45.8 (27.0, 65.9)	46.7 (37.2, 56.4)	0.131
1 indication	34.1 (26.4, 42.8)	41.7 (23.6, 62.3)	32.4 (24.0, 42.0)	
2 indications	12.4 (7.7, 19.4)	8.3 (2.0, 28.8)	13.3 (8.0, 21.4)	
3 indications	6.2 (3.1, 12.0)	0	7.6 (3.8, 14.6)	
4 indications	0.8 (0.1, 5.4)	4.2 (0.5, 25.5)	0	
Immunosuppresive medications used prior to initial observation				
No	16.3 (10.8, 23.8)	12.5 (3.9, 33.2)	17.1 (11.0, 25.7)	0.578
Yes	83.7 (76.2, 89.2)	87.5 (66.8, 96.1)	82.9 (74.3, 89.0)	

[a] Includes heart disease (congestive heart failure or coronary artery disease), diabetes, lung disease (chronic obstructive pulmonary disease or asthma), chronic renal failure, or being a current smoker. Possible range 0-5, actual range 0-4.

Supplemental Table 2. Initial vs. final immunization status for specialty care patients after receiving QI intervention (unadjusted analysis). N = 146

Pneumococcal Immunization Status at Initial Observation.	**Immunization Status at Final Observation. Unadjusted row percentages (95% CI) [a]**		
	No immunization n=20	Partially immunized n=70	Fully immunized n=56
No immunization n = 102	19.6 (12.9, 28.6)	64.7 (54.8, 73.4)	15.7 (9.8, 24.2)
Partially immunized n = 27	n/a	14.8 (5.5, 34.1)	85.2 (65.9, 94.5)
Fully immunized n = 17	n/a	n/a	100.0
Total n = 146	13.7 (9.0, 20.4)	47.9 (39.9, 56.1)	38.4 (30.8, 46.6)

[a] Two-sided 95% confidence intervals computed using the logit transformation.