

# Factors associated with uptake of meningococcus B vaccine after ACIP Category B recommendation

Emily Watkins, MD; Kirsten Feemster, MD, MPH

Children's Hospital of Philadelphia/Hospital of the University of Pennsylvania; Children's Hospital of Philadelphia/Philadelphia Department of Public Health

## Background

Two meningococcus B vaccines (MenB) were licensed for 10-25 year olds in 2015 and given a Category B recommendation with a preferred vaccination window of 16-18 years old in those without high-risk comorbidities. Little is known about the uptake of MenB vaccine after Category B recommendation. We aimed to identify sociodemographic and clinical factors associated with MenB vaccine receipt in adolescents.

## Methods

- Retrospective cohort study of 16-23 year old patients presenting for well or sick visits to one of 31 pediatric primary care practices between October 23, 2015 and April 30, 2017.
- Data source: shared electronic health record.
- Outcomes: receipt of at least one MenB vaccine dose and MenB series completion ( $\geq 2$  doses)
- Chi square analysis and logistic regression were used to examine associations between MenB receipt, patient/provider demographics, MCV4 vaccine receipt and high-risk comorbidities.

### Cohort demographics

Table 1		Total (%) N=45,428
Sex	Female	23167 (51)
	Male	22261 (49)
Age group at first visit	16-18	31307 (68.9)
	19-23	14121 (31.1)
Race	White	26280 (57.8)
	Black	13186 (29.3)
	Asian	1237 (27.2)
Language*	English	35004 (98.6)
	Not English (39 languages)	495 (1.4)
*Language data available for 78% of records		
Insurance	Medicaid	10507 (23.2)
	Private insurance	34854 (76.8)
	Self pay	1 (0.002)
Receipt of MenACWY during study	Received MenACWY	14753 (32.5)
Comorbidities	Sickle cell disease	543 (1.2)
	Complement component deficiency	3 (0.007)
	Asplenia	19 (0.04)
Provider years in practice*	$\leq 10$ years	7564 (23.6)
	11-20 years	9205 (28.7)
	21-30 years	9330 (29.1)
	>30 years	5939 (18.5)
*Provider data available for 70.5% of records		
Practice location	Urban	9845 (21.7)
	Suburban	35583 (78.3)

## Results

- Of 45,428 patients, 21% initiated the MenB vaccination series and 43% of those patients completed the series.
- MenB vaccination rates by practice site ranged from 1.4% to 45.1% (Figure 1).

### Factors associated with MenB vaccination, univariate regression

Table 2	Odds ratio, initiating series	95% CI	Odds ratio, completing series	95% CI
Male sex	1.02	0.98-1.07	0.99	0.93-1.06
Age group at first visit: 19-23 years old	<b>1.79</b>	1.74-1.83	<b>2.29</b>	2.23-2.36
White race (vs not white)	<b>1.16</b>	1.12-1.21	<b>2.01</b>	1.94-2.08
Language: not English	<b>0.69</b>	0.63-0.75	<b>0.65</b>	0.57-0.74
Private insurance	<b>1.31</b>	1.25-1.37	<b>2.41</b>	2.31-2.51
Receipt of MenACWY during study period	<b>1.91</b>	1.87-1.96	<b>1.24</b>	1.18-1.31
Urban practice location	<b>0.77</b>	0.72-0.82	<b>0.34</b>	0.25-0.43
Male sex of provider	0.95	0.88-1.02	0.95	0.82-1.07
Provider in practice $\leq 30$ years	<b>1.26</b>	1.19-1.32	<b>1.29</b>	1.17-1.41
Comorbidities present	1.13	0.93-1.33	0.85	0.54-1.16

Odds ratios which achieved significance are in bold.

- In univariate analysis, patients were significantly more likely to initiate and complete the vaccine series if they were  $\geq 19$  years old at first visit, of white race, had private insurance, received MenACWY during the study period, and were seen by a provider in practice  $\leq 30$  years (Table 2).
- Patients were significantly less likely to complete the series if they were not English-speaking and if they received care in a urban practice location (Table 2).

### Factors associated with MenB vaccination: multivariate regression

Table 3	Odds ratio, initiating series	95% CI	Odds ratio, completing series	95% CI
Age group at first visit: 19-23 years old	<b>2.99</b>	2.94-3.05	<b>3.27</b>	3.19-3.34
White race (vs not white)	1.01	0.96-1.07	<b>1.31</b>	1.22-1.38
Private insurance	<b>1.23</b>	1.15-1.27	<b>1.68</b>	1.55-1.76
Receipt of MenACWY during study period	<b>3.11</b>	3.05-3.17	<b>2.12</b>	2.05-2.21
Urban practice location	<b>0.82</b>	0.72-0.84	<b>0.44</b>	0.32-0.53

Odds ratios which achieved significance are in bold.

- In multivariate analysis, age, private insurance, receipt of MenACWY, and urban location remained significantly associated with initiating and completing the vaccine series (Table 3).
- White race was significantly associated with series completion only.

## Results

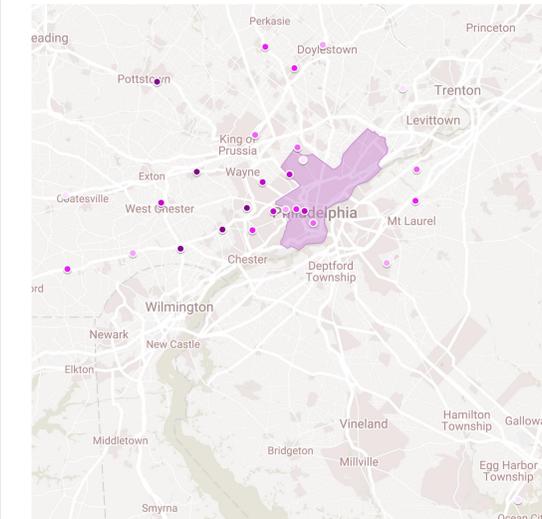


Figure 1: Heat map demonstrating variability in uptake of MenB vaccine between primary care practices. Rates of vaccination of 16-23 year olds ranged from 1.4% to 45.1%.

## Discussion

- MenB uptake in this population was low.
- Patients who were 19-23 years old at their first visit within the study period were significantly more likely to receive MenB, despite a preferred vaccination window of 16-18 years old.
- There were significant sociodemographic disparities in receipt of MenB vaccine, and notable variation in vaccination rates by site and provider years in practice.
- The presence of comorbidities did not significantly contribute to vaccination in the primary care setting. However, MenB may have been administered by subspecialists.
- Our analysis of provider-level factors and the contribution of language to vaccination rates was limited by incomplete data.

## Conclusions

Advice and acceptance in the setting of a Category B recommendation may not be uniform, and appears to be affected by sociodemographic and provider factors. Further study of provider preferences and practices is needed to elucidate how these factors influence MenB receipt in teens.

## Acknowledgements

Thanks to the Department of Biomedical and Health Informatics for extracting EHR data.