

Receipt of Influenza Vaccination as Predictor of COVID-19 Vaccination among United States Veterans

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BACKGROUND

Vaccine hesitancy has been a major barrier during the COVID-19 pandemic. Surveys administered to assess vaccine acceptance have indicated several factors associated with an individual's intention to receive COVID-19 vaccination, including risk perception, concern for side effects, political orientation, male sex, and having received an influenza vaccine.¹⁻³ However, it is unknown whether these factors predict receipt of vaccination. We analyzed receipt of influenza vaccination, age, sex, and rurality to determine whether these factors predicted COVID-19 vaccination in the Veterans Health Administration (VHA).

METHODS

We extracted COVID-19 vaccine status among Veterans with any VHA outpatient or inpatient visit from 12/01/2020 - 12/01/2021. To ensure participants were engaged in ongoing VHA care, deceased individuals, and those with no visits in the prior year were excluded. We estimated association of proportion of years of VHA care in which influenza vaccine was received in the preceding 5 years with COVID-19 vaccination by logistic regression (R version 4.1.1), adjusting for age, sex, and rurality of home address. All data was extracted from the VHA Corporate Data Warehouse.

RESULTS

- We identified 5,700,590 Veterans with at least one outpatient/inpatient visit during the study period, with median age 66 years (IQR 51-75), of whom 5,131,617 (90%) were male.
- A total of 3,704,617 (65%) received at least 1 COVID-19 vaccination.
- Individuals who received an influenza vaccination during each year in care had more than 4 times the odds of receiving COVID-19 vaccination than those who never received an influenza vaccination. (Table).
- Age groups 50-64 years had twice the odds, and 65-74 and over 75 years had 3 times the odds of receiving COVID-19 vaccination versus those 18-49 years.
- Females had slightly higher odds than males of receiving COVID-19 vaccination.
- Veterans living in rural and highly rural areas had lower odds of receiving COVID-19 vaccination versus those in urban areas.

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Multiple logistic regression analysis of predictors of COVID-19 vaccination among Veterans cared for in the Veterans Health Administration (VHA), December 2020 – December 2021. N=5,700,590

Characteristic	COVID-19 Vaccination Status		aOR (95% CI)	P value
	Vaccinated	Unvaccinated		
Proportion of years in care influenza vaccine received ¹ (median (IQR))	0.5 (0, 0.8)	0 (0, 0.5)	4.96 (4.93-4.99)	<0.001
Age Group (years)	No. (%)	No. (%)	reference	
18 to 49	592,192 (44.6)	735,052 (55.4)	reference	
50 to 64	860,497 (63.6)	492,734 (36.4)	2.09 (2.08-2.10)	<0.001
65 to 74	1,151,191 (73.5)	414,710 (26.5)	3.05 (3.04-3.07)	<0.001
75 and older	1,000,737 (75.7)	353,477 (24.3)	3.14 (3.13-3.16)	<0.001
Sex				
Female	340,445 (59.8)	228,528 (40.2)	1.14 (1.13-1.15)	<0.001
Male	3,364,172 (65.6)	1,767,445 (34.4)	reference	
Rurality ²				
Urban	2,521,178 (67.6)	1,211,026 (32.4)	reference	
Rural	1,136,679 (60.3)	748,535 (39.7)	0.63 (0.63-0.64)	<0.001
Highly rural	40,712 (56.6)	31,192 (43.4)	0.50 (0.49-0.51)	<0.001
Unknown	6,048 (53.7)	5,220 (46.3)	0.59 (0.57-0.62)	<0.001

Abbreviations: aOR = Adjusted Odds Ratio, CI = Confidence Interval.

- ¹ Proportion of years in care influenza vaccine received was calculated by dividing the total number of years a Veteran received influenza vaccine by the total number of years the Veteran received care for the 5 years prior to the study time period.
- ² VHA uses the Rural Urban Commuting Areas (RUCA) system to define rurality (www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/)

CONCLUSIONS

- Yearly influenza vaccination was strongly linked to receipt of COVID-19 vaccination, indicating that prior influenza vaccine acceptance predicted COVID-19 vaccination. We surmise that individuals who receive annual influenza vaccination may be generally less vaccine hesitant, and/or may have better access to VHA vaccination services and are therefore more likely to accept COVID-19 vaccination.
- Higher odds of receiving COVID-19 vaccination among older Veterans may be due to, particularly early on in vaccine roll-out, strong efforts made to target and vaccinate those most at-risk for severe illness.
- Lower odds of receiving COVID-19 vaccine in rural areas may be multifactorial. Decreased access to care, as well as higher levels of vaccine hesitancy may both play a role.
- Public health efforts to reduce vaccine hesitancy (including targeted messaging to younger individuals, and those in rural areas) as well as efforts to increase access to care among these groups are important to increase vaccine acceptance in preparation for the next pandemic, as well as to decrease annual disease burden.
- Providers should be encouraged to co-administer influenza vaccine and bivalent COVID-19 boosters.

LIMITATIONS

- Our analysis did not consider race/ethnicity.
- Vaccines received outside VHA and not recorded in the VHA medical record were not captured.
- Total number of COVID-19 vaccines received, including whether individuals received booster vaccination, was not evaluated.
- We did not assess whether the total number of outpatient/inpatient visits was associated with COVID-19 vaccine uptake

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