Factors Associated With Receipt of Second Dose of mRNA-1273 Vaccine at Walgreens Pharmacies During the COVID-19 Pandemic

Erin Roberts, MPH†; Amy Shah, MPH†; Renae Smith-Ray, PhD†; Philip Buck, PhD‡; Nicolas Van de Velde, PhD‡; Carla Talarico, PhD‡; James Mansi, PhD‡; Michael Taitel, PhD†

†Walgreen Co. ‡Moderna, Inc.

BACKGROUND

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in late 2019 and spread globally, prompting an international effort to accelerate development of vaccines. Moderna developed a 2-dose messenger RNA-based vaccine, mRNA-1273, which received US Food and Drug Administration (FDA) Emergency Use Authorization in December 2020 and FDA approval in January 2022. US community pharmacies demonstrated their ability to administer vaccines quickly and efficiently during a pandemic. Walgreens is working with the US government to administer mRNA-1273 as part of the COVID-19 mass vaccination effort.

OBJECTIVE

Increase understanding of COVID-19 vaccination uptake at Walgreens pharmacies and vaccine delivery sites, including long-term care facilities, by examining patient characteristics associated with on time receipt of the second dose of mRNA-1273 vaccine.

METHODS

Data from patients aged ≥18 years who received their first dose of mRNA-1273 vaccine at Walgreens pharmacies and vaccine delivery sites between 12/18/2020 and 02/28/2022 were included in the analysis. Those who received other COVID-19 vaccines, were aged <18 years, or opted out of Walgreens research were excluded. The primary outcome is a dichotomous variable indicating whether patients received a second dose of mRNA-1273 at Walgreens between 24 and 42 days after the first dose, per Centers for Disease Control and Prevention (CDC) guidelines. Multivariable logistic regression was conducted to examine associations between patient characteristics, including individual-level and population-level factors, and on time second dose receipt. Community-level parameters, including Social Vulnerability Index[1] (SVI) category, Rural-Urban Commuting Area,[2] and information from the American Community Survey,[3] were matched to patients by Zip Code Tabulation Area.

Table 1. Demographics of Patients Eligible for a Second mRNA-1273 Dose

Demographic	Frequency	Percentage
Sex		
Female	2,563,465	52.63
Male	2,307,450	47.37
Age		
18-21 years	203,639	4.18
22-34 years	1,148,470	23.58
35-54 years	1,552,022	31.87
55-64 years	796,281	16.35
65+ years	1,170,503	24.03
Race/Ethnicity		
White	2,774,316	56.97
Hispanic or Latino	771,809	15.85
Black or African American	528,561	10.85
Asian	230,751	4.74
American Indian or Alaska Native	37,991	0.78
Native Hawaiian or Other Pacific Islander	14,692	0.30
Other	71,627	1.47
Unknown	441,168	9.06

Demographic	Frequency	Mean ± SD
American Community Survey[3] (Community-Level)		
Per capita income	4,868,268	$36,264 ± 17,289
% of population "disabled"	4,869,686	12.98% ± 5.14
% of population "foreign born"	4,870,072	11.74% ± 11.31
% of population "speaks English less than very well"	4,870,072	9.87% ± 16.14
% of population with no health insurance	4,869,069	7.92% ± 5.55
Unemployment rate	4,868,398	5.43% ± 3.67

Demographic	Frequency	Percentage
Social Vulnerability Index[1] Category (Community-Level)		
Low (0-.25)	1,218,617	25.02
Med-Low (.25-.5)	1,612,655	33.11
Med-High (.5-.75)	1,440,120	29.57
High (.75+)	599,523	12.31
Rural-Urban Commuting Area[2] (Community-Level)		
Metropolitan	4,091,334	84.00
Micropolitan	466,484	9.58
Small town	195,755	4.02
Rural areas	117,342	2.41

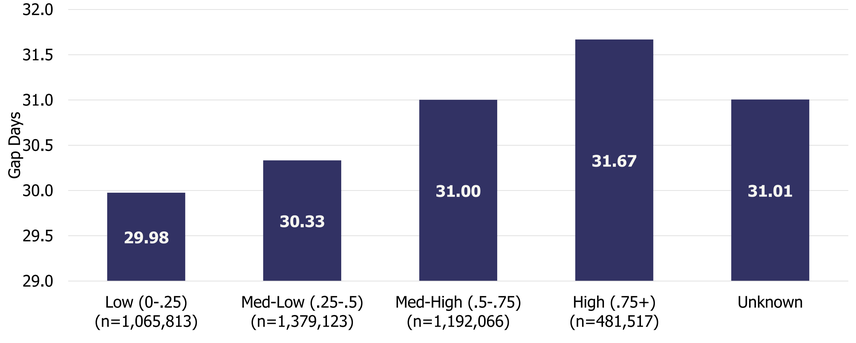
RESULTS

Table 2. Factors Associated With on Time Receipt of a Second mRNA-1273 Dose

Model Parameters	OR	95% CI	
Individual-Level Parameters			
Date of first vaccination	0.995	0.995	0.995
Driving distance to first vaccination (50-mile increments)	0.993	0.993	0.994
Sex			
Male	1.000	n/a	n/a
Female	0.970	0.965	0.975
Age			
18-21 years	1.000	n/a	n/a
22-34 years	1.124	1.113	1.136
35-54 years	1.413	1.402	1.425
55-64 years	1.515	1.502	1.527
65+ years	1.249	1.237	1.262
Race/Ethnicity			
White	1.000	n/a	n/a
American Indian or Alaska Native	0.850	0.824	0.876
Asian	1.115	1.101	1.130
Black or African American	0.835	0.827	0.843
Hispanic or Latino	0.875	0.867	0.884
Native Hawaiian or Other Pacific Islander	0.854	0.812	0.895
Other	0.932	0.911	0.953
Unknown	0.242	0.234	0.249

Model Parameters (Continued)	OR	95% CI	
American Community Survey[3] (Community-Level)			
Per capita income ($10,000 increments)	0.992	0.990	0.995
Percentage of population "disabled" (5% increments)	0.986	0.982	0.991
Percentage of population "foreign born" (5% increments)	1.030	1.028	1.031
Percentage of population "speaks English less than very well" (5% increments)	1.066	1.064	1.068
Percentage of population with no health insurance (5% increments)	0.892	0.890	0.895
Unemployment rate (5% increments)	1.012	1.010	1.014
Rural-Urban Commuting Area[2]			
Metropolitan	1.000	n/a	n/a
Micropolitan	0.978	0.970	0.987
Small town	0.968	0.956	0.980
Rural areas	0.981	0.965	0.997
Social Vulnerability Index[1] Category			
Low (0-.25)	1.000	n/a	n/a
Med-Low (.25-.5)	0.954	0.947	0.962
Med-High (.5-.75)	0.874	0.864	0.883
High (.75+)	0.820	0.807	0.832

Figure 1. Mean Number of Days Between First and Second mRNA-1273 Dose* by Community-Level Social Vulnerability Index[1] Category

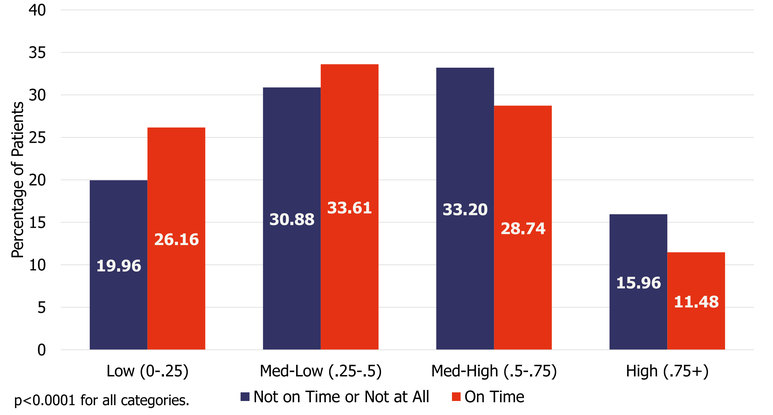


*All patients regardless of if they received the second dose on time (24-42 days after first dose) or late (>42 days after first dose). p<0.0001 for all categories.

RESULTS (CONTINUED)

4,870,915 patients were eligible for a second mRNA-1273 dose, with 81.5% (n=3,970,906) receiving their second dose at Walgreens within the CDC's recommended time frame. The overall mean length of time between doses was 30.6 days; this significantly differed by SVI category (Figure 1). Logistic regression modeling revealed several significant predictors of receiving a second dose on time; of note, patients who received their second dose on time were significantly more likely to be older than 21 years, as well as Asian or White. At the population level, patients who received their second dose on time were significantly more likely to live in Zip Code Tabulation Areas with a lower percentage of residents without health insurance, as well as areas with lower SVI. Specifically, patients in Med-High and High SVI areas were significantly less likely to receive their second dose on time compared to those living in lower SVI areas (Figure 2).

Figure 2. Percentage of Patients Receiving a Second mRNA-1273 Dose on time versus Not on Time/Not at All by Social Vulnerability Index[1] Category



p<0.0001 for all categories.

CONCLUSIONS

More than 80% of this broad study population received their second dose of mRNA-1273 vaccine per CDC recommendations. Patients living in traditionally disadvantaged areas that are more vulnerable to negative effects on human health caused by external stress were less likely to receive a second dose of mRNA-1273 vaccine on time and waited longer to receive their second dose compared to those living in areas with less social vulnerability. Additional outreach to these patients about the importance of on time receipt of subsequent vaccines doses, including boosters, would further benefit the health of these communities.

REFERENCES

1. Agency for Toxic Substances and Disease Registry. *CDC/ATSDR's Social Vulnerability Index (SVI)*. Updated February 8, 2022. Accessed March 4, 2022. https://www.atsdr.cdc.gov/placeandhealth/svi/index.html
2. Rural-Urban Commuting Area Codes. U.S. Department of Agriculture. Updated August 17, 2020. Accessed April 22, 2022. https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx
3. Explore Census Data. United States Census Bureau. Accessed April 22, 2022. https://data.census.gov/cedsci/

Presented at ISPOR 2022; May 15–18, 2022; Washington, DC.
This research was funded by Moderna, Inc.
For more information on this presentation, please contact research@walgreens.com.