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Vaccine Uptake in a Predominantly Black and Latinx Cohort Hospitalized for COVID-19

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BACKGROUND

- Vaccine uptake has been notably lower in minoritized populations in the US[1, 2]
- The impact of previous infection with SARS-CoV-2, disease severity, and persistent symptoms on the uptake of COVID-19 vaccines and boosters in predominantly Black and Latinx communities has not been examined
- We aimed to describe correlates of vaccine uptake in a minoritized cohort hospitalized for COVID-19 during the first pandemic wave in New York City, and investigate whether those with more severe initial COVID-19 and persistent symptoms would be less likely to get vaccinated

Table 1: Baseline characteristics by vaccination status

Characteristic	N	Unvaccinated[1]	Vaccinated[1]	p-value[2]
Age (Years)	894	61 (40, 74)	59 (48, 69)	0.6
Age Groups	894			**<0.001**
18-34		35 (18%)	58 (8.3%)	
35-54		44 (22%)	206 (30%)	
55-64		31 (16%)	191 (27%)	
≥65		89 (45%)	240 (35%)	
BMI (kg/m²)	744	28 (24, 34)	29 (26, 33)	0.4
Sex at Birth	894			0.5
Male		111 (56%)	407 (59%)	
Female		88 (44%)	288 (41%)	
Combined Race/Ethnicity	873			**<0.001**
White		28 (14%)	37 (5.5%)	
Black		32 (16%)	101 (15%)	
Latinx		89 (45%)	384 (57%)	
Other		48 (24%)	154 (23%)	
Length of Stay	742	6 (3, 13)	6 (3, 14)	0.8
Smoking Status	892			0.6
Never Smoker		152 (77%)	546 (79%)	
Active Smoker		13 (6.6%)	33 (4.8%)	
Former Smoker		33 (17%)	115 (17%)	
Comorbidities				
Hypertension	894	109 (55%)	371 (53%)	0.7
Diabetes	894	57 (29%)	244 (35%)	0.089
Hyperlipidemia	892	55 (28%)	215 (31%)	0.4
COPD/Asthma	894	19 (9.5%)	31 (4.5%)	**0.006**
Coronary Artery Disease	894	24 (12%)	55 (7.9%)	0.069
Dementia	890	19 (9.6%)	33 (4.8%)	**0.011**
Heart Failure	894	24 (12%)	48 (6.9%)	**0.018**
Chronic Kidney Disease	894	8 (4.0%)	43 (6.2%)	0.2
Cerebrovascular Accident	894	13 (6.5%)	34 (4.9%)	0.4
Other Pulmonary Condition	894	3 (1.5%)	4 (0.6%)	0.2
Malignancy	894	8 (4.0%)	17 (2.4%)	0.2
Any Comorbidity	893	130 (65%)	466 (67%)	0.6
Previous Influenza Vaccination	890	73 (37%)	289 (42%)	0.2
Concurrent Influenza Vaccination	889	23 (12%)	318 (46%)	**<0.001**
Disposition	894			0.5
ED		35 (18%)	107 (15%)	
Admit		128 (64%)	476 (68%)	
ICU		36 (18%)	112 (16%)	
COVID-19 Severity	894			0.6
Mild		132 (66%)	487 (70%)	
Moderate		35 (18%)	103 (15%)	
Severe		32 (16%)	105 (15%)	
Supplemental Oxygen	894			0.3
No		61 (31%)	239 (34%)	
Yes		138 (69%)	456 (66%)	
Follow-Up Encounters	894			**0.042**
0		88 (44%)	245 (35%)	
1-4		76 (38%)	284 (41%)	
≥5		35 (18%)	166 (24%)	

[1]Median (IQR); n (%)
[2]Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test

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In a minoritized cohort hospitalized for COVID-19 during the first pandemic wave in New York City, older age and concurrent influenza vaccination were associated with **increased COVID-19 vaccine** and **booster** uptake as well as on-time vaccination. No association was found between vaccine uptake and disease severity or persistence of symptoms.

METHODS

- This retrospective cohort study utilized electronic health records of the first 894 consecutive adult patients who survived hospitalization for COVID-19 at a large quaternary care medical center in Northern Manhattan between 1 March and 8 April 2020
- We abstracted data regarding demographics, comorbidities, oxygen requirements during hospitalization, persistence of symptoms at 3- and 6-months after admission, COVID-19 vaccinations through November 2022, and influenza vaccination during the 2018-2019 through 2021-2022 seasons.
- Unadjusted and adjusted logistic regression analyses were conducted to describe the predictors of COVID-19 vaccination, delayed vaccination (first dose after 6 May 2021), and boosting
- Statistical analyses were performed using R V.4.2.1

Table 2: Unadjusted and adjusted logistic regression analysis of vaccine uptake, delayed vaccination, and boosting

Characteristic	N	Vaccinated vs. not vaccinated				N	Vaccinated on time vs. delayed vaccination				N	Received booster vs. vaccinated and not boosted			
		Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value		Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value		Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age (Years)	894	1.00 (0.99, 1.01)	0.8			695	0.96 (0.95, 0.97)	<0.001			695	1.02 (1.01, 1.03)	<0.001		
Age Groups	894					695					695				
18-34		--		--			--		--			--		--	
35-54		2.83 (1.66, 4.81)	**<0.001**	2.40 (1.36, 4.24)	**0.002**		0.24 (0.13, 0.45)	**<0.001**	0.20 (0.09, 0.44)	**<0.001**		1.76 (0.97, 3.27)	0.068	1.63 (0.86, 3.15)	0.14
55-64		3.72 (2.12, 6.58)	**<0.001**	2.67 (1.46, 4.93)	**0.002**		0.19 (0.10, 0.36)	**<0.001**	0.15 (0.06, 0.35)	**<0.001**		3.86 (2.10, 7.29)	**<0.001**	3.30 (1.69, 6.60)	**<0.001**
≥65		1.63 (1.00, 2.63)	**0.049**	1.14 (0.67, 1.93)	0.6		0.10 (0.05, 0.18)	**<0.001**	0.10 (0.04, 0.23)	**<0.001**		3.17 (1.75, 5.87)	**<0.001**	2.50 (1.26, 5.05)	**0.009**
BMI (kg/m²)	744	1.01 (0.98, 1.03)	0.7			580	1.03 (1.01, 1.06)	**0.009**	1.01 (0.98, 1.04)	0.4	580	0.99 (0.97, 1.01)	0.4		
Sex at Birth	894					695					695				
Male		--		--			--		--			--		--	
Female		0.89 (0.65, 1.23)	0.5				1.06 (0.76, 1.47)	0.7				1.01 (0.75, 1.37)	>0.9		
Combined Race/Ethnicity	873					676					676				
White		--		--			--		--			--		--	
Black		2.39 (1.27, 4.51)	**0.007**	2.81 (1.38, 5.78)	**0.005**		2.86 (1.15, 8.18)	**0.033**	1.87 (0.65, 6.31)	0.3		0.76 (0.34, 1.65)	0.5		
Latinx		3.27 (1.89, 5.61)	**<0.001**	3.66 (1.97, 6.83)	**<0.001**		2.15 (0.94, 5.85)	0.10	1.46 (0.56, 4.59)	0.5		0.67 (0.32, 1.33)	0.3		
Other		2.43 (1.34, 4.37)	**0.003**	2.76 (1.41, 5.41)	**0.003**		2.63 (1.10, 7.36)	**0.043**	1.68 (0.61, 5.47)	0.3		0.74 (0.34, 1.54)	0.4		
Length of Stay	742	1.00 (0.99, 1.00)	0.3			581	1.00 (0.99, 1.01)	0.8			581	1.01 (1.00, 1.02)	0.12		
Smoking Status	892					694					694				
Never Smoker		--		--			--		--			--		--	
Active Smoker		0.71 (0.37, 1.42)	0.3				1.69 (0.81, 3.43)	0.2				0.72 (0.35, 1.45)	0.4		
Former Smoker		0.97 (0.64, 1.50)	0.9				0.84 (0.53, 1.31)	0.5				1.18 (0.79, 1.80)	0.4		
Any Comorbidity	893	1.08 (0.78, 1.51)	0.6			694	0.54 (0.39, 0.76)	**<0.001**	0.98 (0.62, 1.59)	>0.9	694	1.67 (1.22, 2.31)	**0.002**	1.08 (0.73, 1.59)	0.7
Previous Influenza Vaccination	890					692					692				
No		--		--			--		--			--		--	
Yes		1.23 (0.89, 1.71)	0.2				0.63 (0.45, 0.88)	**0.007**	0.91 (0.59, 1.40)	0.7		1.79 (1.31, 2.45)	**<0.001**	1.09 (0.76, 1.56)	0.6
Concurrent Influenza Vaccination	889					692					692				
No		--		--			--		--			--		--	
Yes		6.43 (4.14, 10.4)	**<0.001**	7.44 (4.61, 12.5)	**<0.001**		0.45 (0.32, 0.63)	**<0.001**	0.50 (0.33, 0.77)	**0.002**		3.65 (2.65, 5.05)	**<0.001**	3.30 (2.33, 4.72)	**<0.001**
Disposition	894					695					695				
ED		--		--			--		--			--		--	
Admit		1.22 (0.78, 1.85)	0.4				0.70 (0.46, 1.10)	0.12				1.40 (0.92, 2.13)	0.12	1.10 (0.69, 1.75)	0.7
ICU		1.02 (0.59, 1.74)	>0.9				0.83 (0.47, 1.44)	0.5				2.06 (1.20, 3.57)	**0.009**	1.68 (0.93, 3.05)	0.085
Supplemental Oxygen	894					695					695				
No		--		--			--		--			--		--	
Yes		0.84 (0.60, 1.18)	0.3				0.91 (0.65, 1.28)	0.6				1.12 (0.82, 1.54)	0.5		
Follow-Up Encounters	894					695					695				
0		--		--			--		--			--		--	
1-4		1.34 (0.95, 1.91)	0.10	1.02 (0.69, 1.51)	>0.9		0.89 (0.62, 1.29)	0.5				1.30 (0.92, 1.84)	0.14		
≥5		1.70 (1.11, 2.67)	**0.017**	0.93 (0.57, 1.54)	0.8		0.67 (0.43, 1.04)	0.077				1.27 (0.86, 1.90)	0.2		

RESULTS

- The cohort of 894 patients was predominantly Latinx (54%) and Non-Hispanic Black (15%); 22% remained COVID-19 unvaccinated, 41% received at least one influenza vaccine pre-COVID, and 67% had one or more comorbidities
- Of those who received at least one dose of COVID-19 vaccine, 57% received at least one booster, and 31% delayed vaccination
- Twenty-five percent of unvaccinated individuals reported persistent generalized symptoms compared to 18% of vaccinated individuals
- Multiple logistic regression showed that:
  - **Non-White race/ethnicity**, **age 35-64 years**, and **concurrent influenza vaccination** were associated with **uptake of at least one COVID-19 vaccine dose**
  - **Age ≥35** and **concurrent influenza vaccination** were associated with being **vaccinated on time**
  - **Age ≥55** and **concurrent influenza vaccination** were associated with increased **booster uptake**
- **No association** was found between **vaccine uptake** and **disease severity** or **persistence of symptoms**

CONCLUSIONS

- Achieving a deeper understanding of the factors driving vaccine hesitancy and uptake is critical to increasing acceptance of COVID-19 vaccination, especially in communities with historically low uptake of annual vaccines
- COVID-19 vaccination in this cohort was common, with 78% receiving at least one vaccine dose
- No association was found between any metric of vaccine uptake and disease severity or persistence of symptoms
- The association between concurrent influenza vaccination and increased vaccine and booster uptake as well as on-time vaccination suggests that bundling preventive medicine interventions may be an effective strategy for increasing COVID-19 vaccination

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