

# Effectiveness of mRNA COVID-19 Vaccines Among Healthcare Personnel Monroe County, NY: December 2020-June 2022

Savanah Russ, MPH; Christopher Myers, MS; Erin Licherdell, MPH; Thomas Peer, MPH; Christine Hurley, RN, BSN;  
Cate Concannon, MPH; Acacia Bowden, BA; Ellen Chinchili, BA; Alan Alvarado, BS, BA; Ghinwa Dumyati, MD  
Emerging Infections Program, Center for Community Health & Prevention at the University of Rochester Medical Center

Savanah Russ, MPH  
savanah\_russ@urmc.rochester.edu  
49 Prince Street, Suite 1001  
Rochester, NY  
14607

## BACKGROUND & OBJECTIVES

- COVID-19 vaccine effectiveness (VE) among healthcare personnel (HCP) was found to be high in the spring of 2021 (>90%)
- Estimation of COVID-19 VE among HCP during Delta and Omicron dominant periods remains limited

### Objectives:

- Determine VE of COVID-19 vaccines against symptomatic disease during changing periods of SARS-CoV-2 variant dominance
- Assess levels of waning immunity over time among HCP

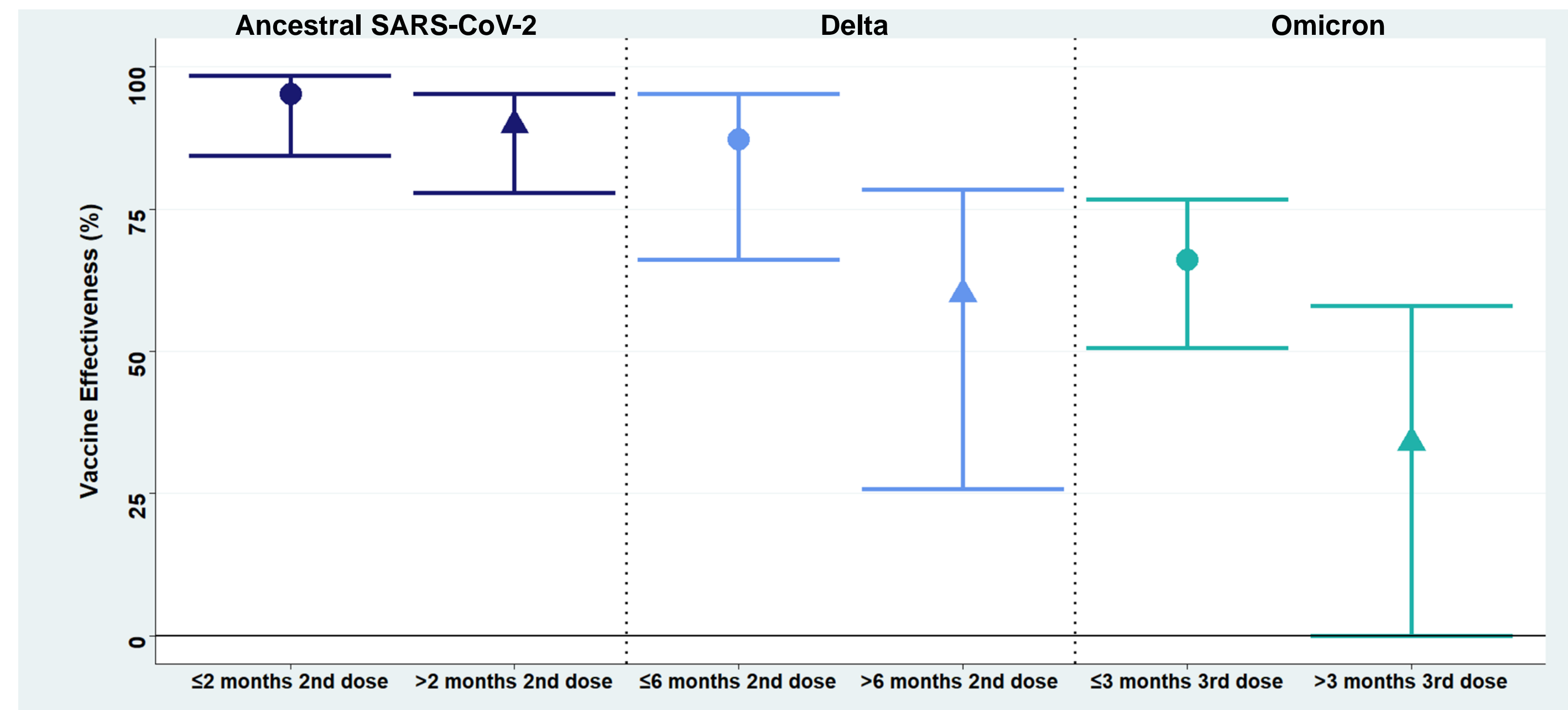
## STUDY POPULATION

- Test negative case-control study
- HCP working at two acute care hospitals in Monroe County, NY tested for SARS-CoV-2 after 12/28/2020 with no prior COVID-19 diagnosis
- Cases:** HCP with positive validated antigen test or nucleic acid amplification test (NAAT), and ≥1 COVID-19 symptom
- Controls:** HCP with negative NAAT
- Cases and controls matched to enrollment test week

## METHODS

- Standardized questionnaire administered via phone or online survey designed to collect information on community and occupational exposures, demographics and co-morbidities
- Vaccine history collected via NY state registry or COVID-19 vaccination cards
- Vaccination status determined at time of enrollment test and was defined as vaccinated if receipt of the 2<sup>nd</sup> or 3<sup>rd</sup> dose ≥ 14 days prior to the test (Supplemental Figure 1)
- Conditional logistic regression used to assess VE against symptomatic infection where  $VE = [(1-OR)*100]$
- Regression models adjusted for race/ethnicity, community exposures, and presence of ≥1 co-morbid condition

**FIGURE 1. VACCINE EFFECTIVENESS AGAINST SYMPTOMATIC ILLNESS ACCORDING TO TIME SINCE IMMUNIZATION**



Characteristic	Ancestral SARS-CoV-2 December 28 <sup>th</sup> , 2020-May 21 <sup>st</sup> , 2021		Delta May 24 <sup>th</sup> , 2021-September 26 <sup>th</sup> , 2021		Omicron December 20 <sup>th</sup> , 2021-June 4 <sup>th</sup> , 2022	
	Cases=246	Controls=512	Cases=185	Controls=475	Cases=388	Controls=1021
<b>Median Age (IQR)</b>	34 (18)	35 (18)	35 (17)	35 (18)	36 (18)	36 (19)
<b>Race/Ethnicity</b>						
White Non-Hispanic	154 (62.6)	415 (81.1)	136 (73.5)	394 (82.9)	286 (73.7)	847 (82.9)
Black Non-Hispanic	57 (23.2)	38 (7.4)	24 (13.0)	32 (6.7)	42 (10.8)	58 (5.7)
Other Non-Hispanic	15 (6.1)	25 (4.9)	12 (6.5)	20 (4.2)	37 (9.5)	60 (5.9)
Hispanic	19 (7.7)	25 (4.9)	12 (6.5)	17 (3.6)	19 (4.9)	40 (3.9)
<b>Vaccination Status</b>	2 vs 0 doses		2 vs 0 doses		3 vs 2 doses	
Vaccinated	19 (7.7)	190 (37.1)	151 (81.6)	445 (93.7)	283 (72.9)	874 (85.6)
Unvaccinated	227 (92.9)	322 (62.9)	34 (18.4)	30 (6.3)	105 (27.1)	147 (14.4)

## RESULTS

- HCP participants within all three study time periods were generally young, and Non-Hispanic White (Supplemental Table 1)
- Vaccinated HCP were more likely to be older, identify as Non-Hispanic White, and have higher educational attainment as compared to unvaccinated HCP (Supplemental Table 2)

### COVID-19 Vaccine Effectiveness:

- COVID-19 VE of 2 vs 0 doses among HCP was found to be:
  - Ancestral SARS-CoV-2 dominance: 91.3% (95% CI: 83.4%-95.4%)
  - Delta dominance: 67.5% (95% CI: 41.7%-81.9%)
- COVID-19 VE of 3 vs 2 doses among HCP was found to be 56.9% (95% CI: 40.3%-69.0%) during Omicron dominance
- Vaccine effectiveness fell within each time period as time since receipt increased (Figure 1)
- Despite the introduction of a 3<sup>rd</sup> dose during Omicron dominance, vaccine effectiveness declined

## CONCLUSIONS & IMPLICATIONS

- COVID-19 VE against symptomatic illness among HCP has greatly declined from December 2020
- VE of COVID-19 vaccines among HCP is highly dependent upon time since receipt and dominant variant
- Monitoring of COVID-19 VE among this high-risk population is essential to guide future vaccination efforts
- Limited sample size, and vaccine mandates, prevented analysis of VE during Delta dominant period for 3 vs 2 doses, and 2 vs 0 doses
- Additional evaluation of VE with the introduction of new COVID-19 booster doses will be critical

For supplemental information about our study population and results, scan the QR code  
This work was funded by the Emerging Infections Program at the Centers for Disease Control & Prevention

