



Interim Estimates of 2024-2025 COVID-19 Vaccine Effectiveness

Ruth Link-Gelles, PhD, MPH

CDR, US Public Health Service

Coronavirus and Other Respiratory Viruses Division

Centers for Disease Control and Prevention

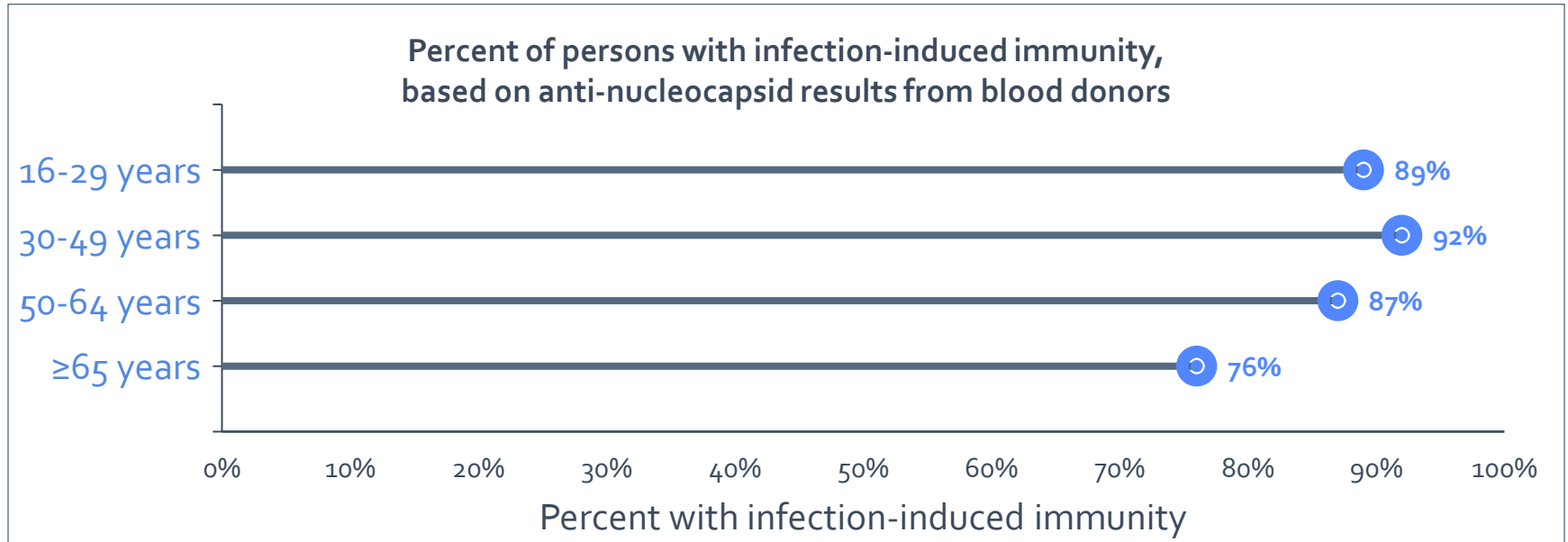
April 15, 2025

Agenda – COVID-19 vaccine effectiveness (VE)

- **Context for interpretation of VE**
- **2024-2025 COVID-19 vaccine coverage**
- **Vaccine effectiveness methods**
- **Interim 2024-2025 COVID-19 vaccine effectiveness**

Context for interpreting COVID-19 VE across age groups: high infection-induced seroprevalence by end of 2023

- High rates of SARS-CoV-2 infection-induced immunity by October – December 2023.*

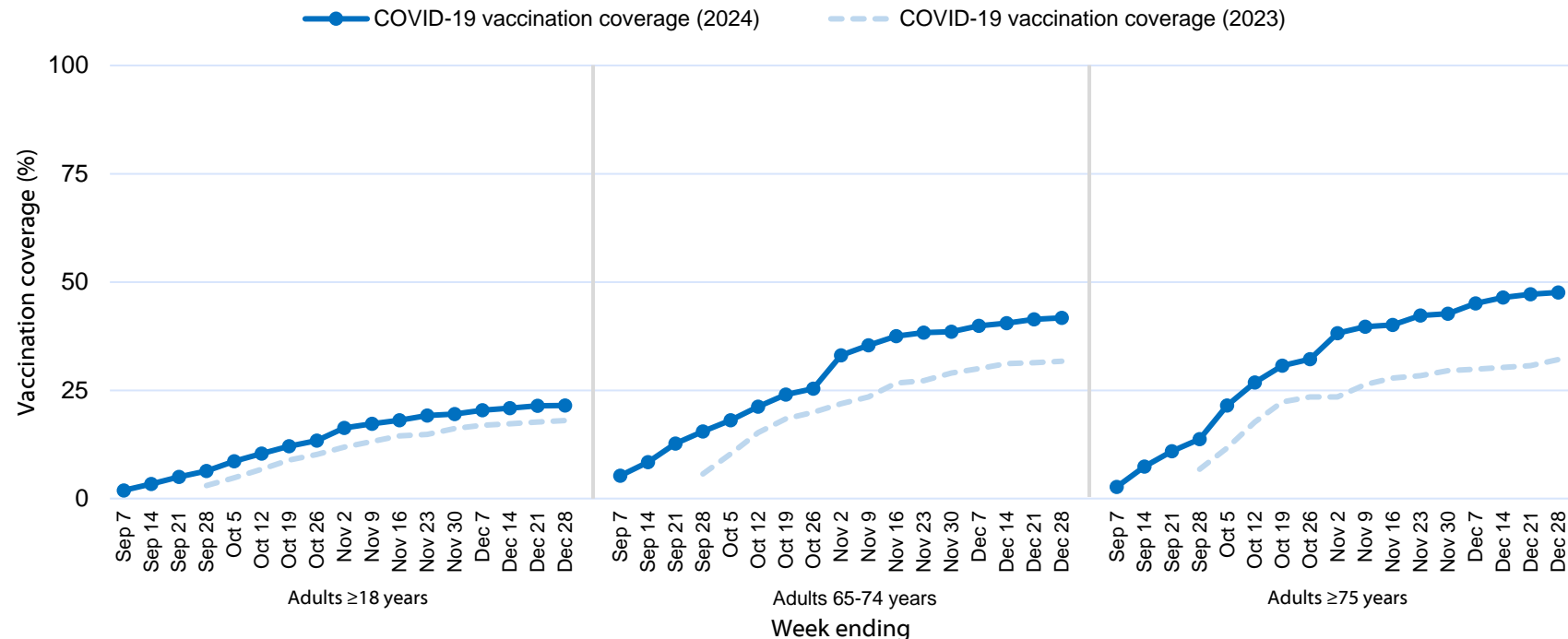


VE findings should be interpreted as the added benefit provided by COVID-19 vaccination in a population with a high prevalence of vaccine- and infection-induced immunity.

* Data on persons aged ≥16 years from a longitudinal, national cohort of ~35,000 blood donors.

Methods and data available at: <https://covid.cdc.gov/covid-data-tracker/#nationwide-blood-donor-seroprevalence-2022>

COVID-19 Vaccination Coverage Among Adults ≥ 18 Years, 65-74 Years, and ≥ 75 Years, 2023 and 2024, NIS-ACM



Slide courtesy of CDC Immunization Services Division.

National Immunization Survey-Adult COVID Module: Data from adults age ≥ 18 years are collected by telephone interview using a random-digit-dialed sample of cell telephone numbers stratified by state, the District of Columbia, five local jurisdictions (Bexar County TX, Chicago IL, Houston TX, New York City NY, and Philadelphia County PA), and Puerto Rico and the U.S. Virgin Islands. Data are weighted to represent the non-institutionalized U.S. population and mitigate possible bias that can result from an incomplete sample frame (exclusion of households with no phone service or only landline telephones) or non-response. All responses are self-reported. For more information about the survey, see <https://www.cdc.gov/nis/about/index.html>.

Methods

Measuring COVID-19 vaccine effectiveness

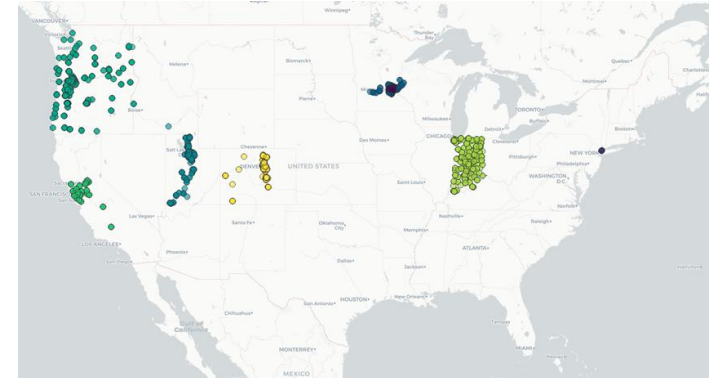
Measure	Definition	Example vaccinated group	Example comparison group
Absolute VE	Compares frequency of health outcomes in vaccinated and unvaccinated people	Received original monovalent COVID-19 vaccine	Received no COVID-19 vaccines ever
Relative VE	Compares frequency of health outcomes in people who received one type of vaccine to people who received a different vaccine	Received bivalent COVID-19 vaccine	Eligible for, but did not receive, bivalent COVID-19 vaccine, but received original monovalent COVID-19 vaccine
VE of 2024-2025 COVID-19 vaccines*	Compares people who received 2024-2025 COVID-19 vaccine to people who did not, regardless of past vaccination	Received 2024-25 dose	Eligible for, but did not receive, an 2024-25 dose , regardless of past vaccination history

*Vaccine effectiveness was also measured this way for 2023-2024 COVID-19 vaccines

VISION Multi-Site Network of Electronic Health Records

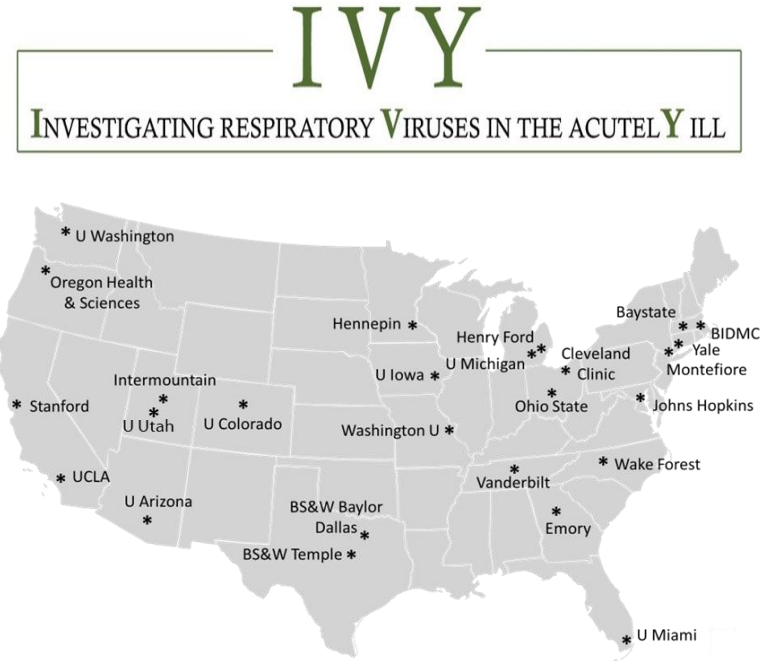
>300 emergency departments and urgent cares and >200 hospitals

- **Design:** Test-negative design
- **Population:** Adults ≥ 18 years visiting a participating emergency department or urgent care (ED/UC) or hospitalized with COVID-19-like illness (CLI) with a SARS-CoV-2 NAAT test result within 10 days before or 72 hours after encounter
 - **Cases:** CLI with *positive* NAAT or antigen for SARS-CoV-2 and no positive NAAT for RSV or influenza
 - **Controls:** CLI with *negative* NAAT for SARS-CoV-2 and no positive NAAT for influenza (≥ 18 years) or RSV (≥ 60 years)
- **Vaccination data:** Documented by electronic health records and state and city registries



IVY Network — 26 hospitals, 20 U.S. States

- **Design:** Test-negative, case-control design
- **Population:** Adults aged ≥ 65 years hospitalized with COVID-like illness (CLI)* and SARS-CoV-2 test results within 10 days of illness onset and 3 days of admission
 - **Cases:** CLI and test *positive* for SARS-CoV-2 by NAAT or antigen
 - **Controls:** CLI and test *negative* for SARS-CoV-2, influenza and RSV by RT-PCR
- **Vaccination data:** Electronic medical records (EMR), state and city registries, and plausible self-report
- **Specimens:** Nasal swabs obtained on all patients for central RT-PCR testing and whole genome sequencing



*CLI is defined as presence of any one of the following: fever, cough, shortness of breath, chest imaging consistent with pneumonia, or hypoxemia
NAAT = nucleic acid amplification test

Interim Estimates of 2024-2025 COVID-19 Vaccine Effectiveness

Characteristics of emergency department and urgent care encounters and hospitalizations among adults aged ≥18 years with COVID-19-like illness, by COVID-19 case status and CDC vaccine effectiveness network — VISION and IVY Networks

September 2024–January 2025

Characteristic	Vaccine effectiveness network and setting, no. (column %)								
	VISION ED/UC encounters, all adults aged ≥18 years			VISION hospitalizations, all adults aged ≥65 years			IVY hospitalizations, immunocompetent adults aged ≥65 years		
	Total	COVID-19 case- patients	COVID-19 control- patients	Total	COVID-19 case- patients	COVID-19 control- patients	Total	COVID-19 case- patients	COVID-19 control- patients
Total	137,543	10,459	127,084	34,411	2,846	31,565	1,929	683	1,246
Median age	53 [34, 72]	58 [37, 74]	53 [34, 71]	78 [72, 84]	79 [73, 86]	78 [71, 84]	77 [71, 84]	78 [72, 85]	76 [70, 83]
Age group									
18-64 years	88,858 (65)	6,113 (58)	82,745 (65)	--	--	--	--	--	
≥65 years	48,685 (35)	4,346 (42)	44,339 (35)	34,411 (100)	2,846 (100)	31,565 (100)	1,929 (100)	683 (100)	1,246 (100)
Immunocompromised*	--	--	--	8,192 (24)	598 (21)	7,594 (24)	--	--	

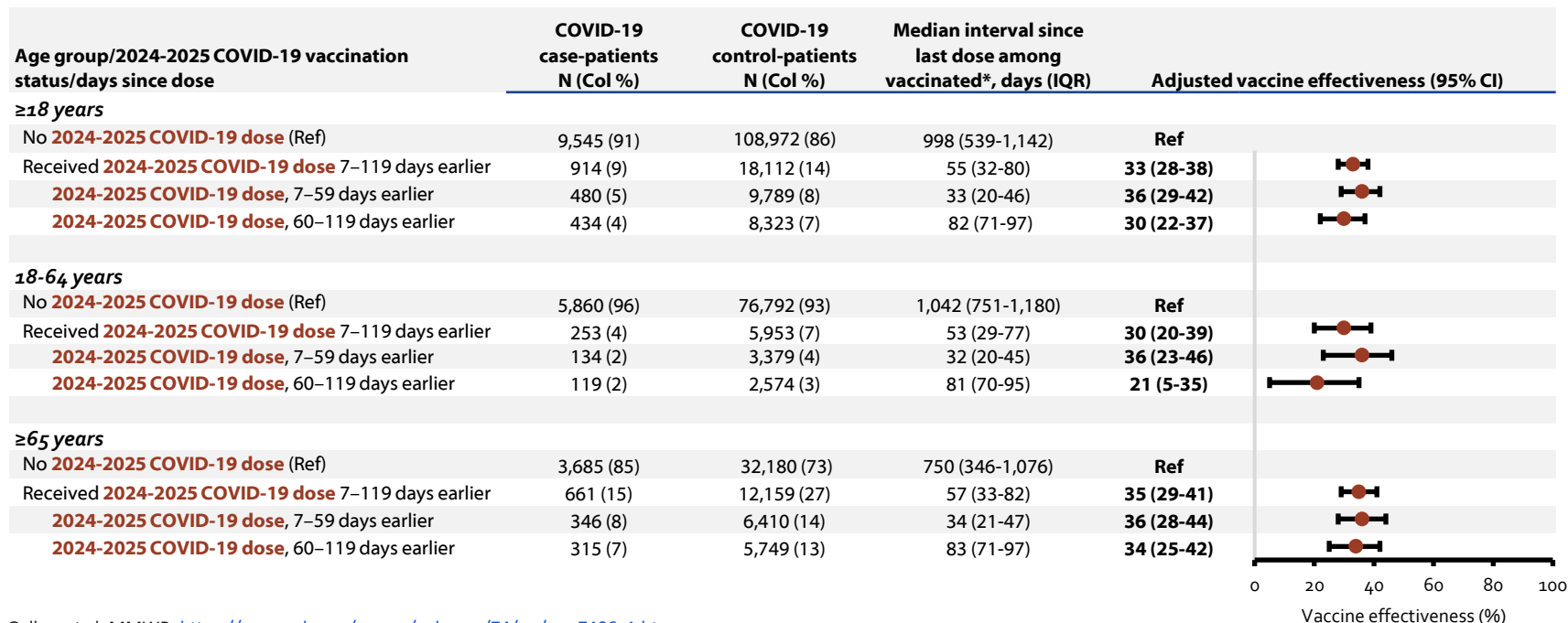
Link-Gelles, et al. MMWR: <https://www.cdc.gov/mmwr/volumes/74/wr/mm7406a1.htm>

ED/UC = emergency department/urgent care

* Immunocompromised status is not evaluated for ED/UC encounters due to a higher likelihood of incomplete discharge diagnosis codes in this setting.

Effectiveness of 2024–2025 COVID-19 vaccination against COVID-19–associated emergency department/urgent care encounters by age group — VISION Network

September 2024 – January 2025



Link-Gelles, et al. MMWR: <https://www.cdc.gov/mmwr/volumes/74/wr/mm7406a1.htm>

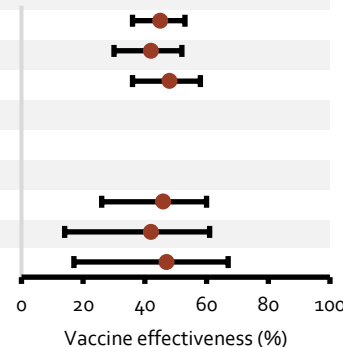
Vaccine effectiveness was calculated by comparing the odds of 2024–2025 COVID-19 vaccination in case-patients and control-patients using the equation: $(1 - \text{adjusted odds ratio}) \times 100\%$. Odds ratios were estimated by multivariable logistic regression. The odds ratio was adjusted for age, sex, race and ethnicity, calendar day, and geographic region. The “no 2024–2025 dose” group included all eligible persons who did not receive a 2024–2025 COVID-19 vaccine dose, regardless of number of previous COVID-19 vaccine doses (if any) received.

* Time since vaccination is for most recent dose, which could have been an original monovalent, bivalent, 2023-2024, or 2024-2025 COVID-19 vaccine.

Effectiveness of 2024–2025 COVID-19 vaccination against COVID-19–associated hospitalization among immunocompetent adults aged ≥65 years — VISION and IVY Networks

September 2024 – January 2025

Age group/2024–2025 COVID-19 vaccination status/days since dose	COVID-19 case-patients N (Col %)	COVID-19 control-patients N (Col %)	Median interval since last dose among vaccinated*, days (IQR)	Adjusted vaccine effectiveness (95% CI)
VISION				
No 2024–2025 COVID-19 dose (Ref)	2,016 (90)	19,198 (80)	775 (357–1,084)	Ref
Received 2024–2025 COVID-19 dose 7–119 days earlier	232 (10)	4,773 (20)	53 (30–77)	45 (36–53)
2024–2025 COVID-19 dose, 7–59 days earlier	129 (6)	2,759 (12)	33 (20–46)	42 (30–52)
2024–2025 COVID-19 dose, 60–119 days earlier	103 (5)	2,014 (8)	81 (70–94)	48 (36–58)
IVY				
No 2024–2025 COVID-19 dose (Ref)	614 (90)	1,021 (82)	Not available	Ref
Received 2024–2025 COVID-19 dose 7–119 days earlier	69 (10)	225 (18)	60 (31–85)	46 (26–60)
2024–2025 COVID-19 dose, 7–59 days earlier	41 (6)	105 (9)	31 (20–45)	42 (14–61)
2024–2025 COVID-19 dose, 60–119 days earlier	28 (4)	120 (11)	85 (72–98)	47 (17–67)



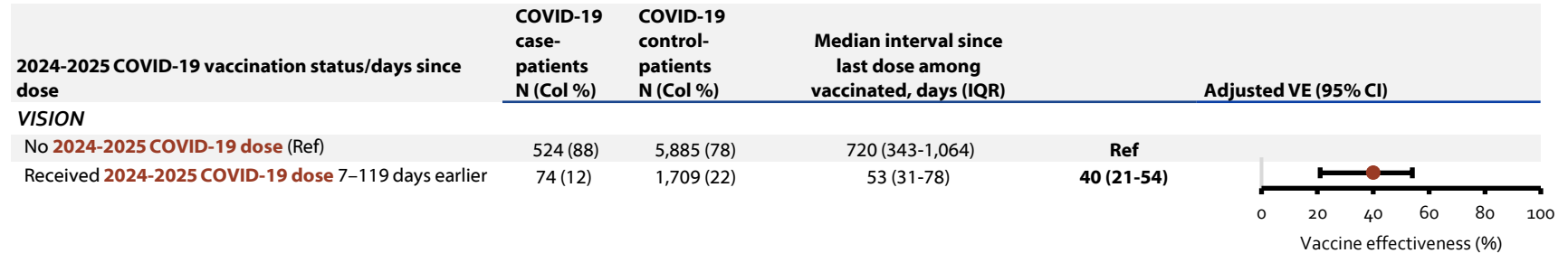
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Vaccine effectiveness was calculated by comparing the odds of 2024–2025 COVID-19 vaccination in case-patients and control-patients using the equation: $(1 - \text{adjusted odds ratio}) \times 100\%$. Odds ratios were estimated by multivariable logistic regression. For VISION, the odds ratio was adjusted for age, sex, race and ethnicity, calendar day, and geographic region. For IVY, the odds ratio was adjusted for age, sex, race and ethnicity, geographic region (U.S. Department of Health and Human Services Region) and calendar time (biweekly intervals). The “no 2024–2025 dose” group included all eligible persons who did not receive a 2024–2025 COVID-19 vaccine dose, regardless of number of previous COVID-19 vaccine doses.

*Time since vaccination is for most recent dose, which could have been an original monovalent, bivalent, 2023–2024, or 2024–2025 COVID-19 vaccine.

Effectiveness of 2024–2025 COVID-19 vaccination against COVID-19–associated hospitalization among immunocompromised adults aged ≥65 years — VISION

September 2024 – January 2025



Link-Gelles, et al. MMWR: <https://www.cdc.gov/mmwr/volumes/74/wr/mm7406a1.htm>

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* Time since vaccination is for most recent dose, which could have been an original monovalent, bivalent, 2023–2024, or 2024–2025 COVID-19 vaccine.

Conclusions: effectiveness of 2024-2025 COVID-19 vaccines

- **2024-2025 COVID-19 vaccination provided additional protection against COVID-19-associated emergency department and urgent care visits and hospitalizations compared to no 2024-2025 vaccine dose.**
- **2024-2025 COVID-19 vaccination also provided additional protection against COVID-19-associated hospitalizations among adults aged ≥ 65 years with immunocompromising conditions.**
- **VE should be interpreted as the added benefit of 2024–2025 COVID-19 vaccination in a population with high levels of infection-induced immunity, vaccine-induced immunity, or both.**
 - Prior SARS-CoV-2 infection contributes protection against future disease, though protection wanes over time.
 - An increase in SARS-CoV-2 circulation in the United States during late summer 2024, just before the 2024–2025 COVID-19 vaccines were approved and authorized, may have resulted in higher population-level immunity against JN.1-lineage strains, which could have resulted in lower measured VE than in a population with less recent infection.

Acknowledgements

CDC

Amanda B. Payne
Lakshmi Panagiotakopoulos
Lauren Roper
Diya Surie

Amadea Britton
Allison Ciesla
Fatimah Dawood
Jennifer DeCuir
Shikha Garg
Amber Kautz
Nathaniel M. Lewis
Josephine Mak
Morgan Najdowski
Caitlin Ray
Emily Reeves
Alexander Webber
Ryan Wiegand

VISION Collaborators

Westat

Sarah Ball
Angela Cheung
Sean Chickery
Patrick Mitchell
Sarah Reese
Elizabeth Rowley
Janet Watts
Zack Weber

Intermountain Health

Kristin Dascomb

Kaiser Permanente Center for Health Research

Stephanie A. Irving

Kaiser Permanente Northern California

Nicola P. Klein

Regenstrief

Shaun J. Grannis

University of Colorado

Toan C. Ong

HealthPartners

Malini B. DeSilva

Columbia University

Karthik Natarajan

IVY Collaborators

Wesley H. Self
Yuwei Zhu
Adam S. Luring
Emily T. Martin
Ithan D. Peltan
Adit A. Ginde
Nicholas M. Mohr
Kevin W. Gibbs
David N. Hager
Matthew E. Prekker
Amira Mohamed
Nicholas Johnson
Jay S. Steingrub
Akram Khan
Jamie R. Felzer
Abhijit Duggal
Jennifer G. Wilson
Nida Qadir
Christopher Mallow
Jennie H. Kwon
Cristie Columbus
Ivana A. Vaughn
Basmah Safdar

Jarrold M. Mosier
Estelle S. Harris
James D. Chappell
Natasha Halasa
Cassandra Johnson

+ many more!