

[Español \(Spanish\)](#)

COVID Data Tracker

Maps, charts, and data provided by CDC, updates Mondays and Thursdays by 8 p.m. ET

[COVID-19 Home >](#)**United States**
At a Glance**Total Hospitalizations****6,272,227****+18.8% in most recent week**

Trend in Hospital Admissions

Total Deaths**1,139,457****+17.6% in most recent week**

Trend in % COVID-19 Deaths

VaccinationsTotal Updated (Bivalent) Vaccine
Doses Distributed
152,508,460[Data Tracker Home](#)[Trends](#)[Maps](#)[Hospitalizations](#)[Deaths](#)[Emergency Department Visits](#)[Vaccination Distribution & Coverage](#)[Vaccine Effectiveness](#)[Variants & Genomic Surveillance](#)

COVID-19 Vaccine Effectiveness Update

Note: Vaccine effectiveness estimates are not expected to change from month to month unless circulating variants significantly change. However, as more time has passed since COVID-19 vaccines have been introduced in the United States, scientists evaluate vaccine effectiveness relative to time since the most recent vaccine the person received to inform future recommendations.

This page highlights the most current and relevant CDC-authored vaccine effectiveness studies and will be updated with data, as well as key findings from the studies by age group. This page may also include a spotlight on one of the studies to explain more detail and context.

Release Date: **August 31, 2023****Includes COVID-19 vaccine effectiveness studies published through August 18, 2023**

What You Need to Know

Staying up to date on COVID-19 vaccination helps protect against hospitalization, critical illness, and death in all age groups. CDC recommends everyone [stay up to date](#) with COVID-19 vaccines for their age group.

Find [clinical and professional resources](#) for COVID-19 vaccines.

CDC works with partners to study COVID-19 vaccine effectiveness using several data collection platforms and study designs. Vaccine effectiveness studies vary based on

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the outcome (such as infection, emergency room visits, hospitalization, or death), population, and study design.

Results of these evaluations are published in CDC's MMWR or other scientific journals. CDC's COVID-19 Vaccine Effectiveness Update summarizes these studies to provide a snapshot of how well COVID-19 vaccines are working in different populations and against currently circulating variants.

- Learn about how CDC monitors how well [COVID-19 vaccines are working](#)
- Learn about vaccine [effectiveness research and monitoring systems](#)

Updates on COVID-19 Vaccine Effectiveness

CDC studies published from April 2023–August 2023 on COVID-19 vaccine effectiveness found the following:

Effectiveness in Adults

- [Effectiveness of Monovalent mRNA COVID-19 Vaccination in Preventing COVID-19–Associated Invasive Mechanical Ventilation and Death Among Immunocompetent Adults During the Omicron Variant Period - IVY Network, 19 U.S. States, February 1, 2022–January 31, 2023 MMWR/ April 28, 2023 / 72\(17\); 463–468](#)
 - Original monovalent (ancestral SARS-CoV-2 strain) mRNA vaccination was 76% effective in preventing COVID-19–associated invasive mechanical ventilation and death up to 6 months after the last dose and remained 56% effective at 1–2 years.
 - Original mRNA COVID-19 vaccines provided substantial, durable protection against COVID-19-associated invasive mechanical ventilation and death. All adults should remain up to date with recommended COVID-19 vaccination to prevent critical outcomes of COVID-19.
- [Estimates of Bivalent mRNA Vaccine Durability in Preventing COVID-19–Associated Hospitalization and Critical Illness Among Adults with and Without Immunocompromising Conditions - VISION Network, September 2022–April 2023 MMWR / May 26, 2023 / 72\(21\); 579–588](#)
 - Among adults aged ≥18 years without immunocompromising conditions, bivalent (ancestral and BA.4/BA.5 strains) vaccine effectiveness (VE) against COVID-19–associated hospitalization declined from 62% at 7–59 days postvaccination to 24% at 120–179 days compared with VE among unvaccinated adults. Among immunocompromised adults, lower bivalent booster VE was observed. However, bivalent booster VE was sustained against critical COVID-19-associated outcomes, including intensive care unit admission or death.
 - Adults should stay up to date with recommended COVID-19 vaccines. Optional additional bivalent vaccine doses are available for older adults and persons with immunocompromising conditions.
- [Effectiveness of Up-to-Date COVID-19 Vaccination in Preventing SARS-CoV-2 Infection Among Nursing Home Residents - United States, November 20, 2022–January 8, 2023 MMWR / June 23, 2023 / 72\(25\); 690–693](#)
 - Among nursing home residents who were up to date with COVID-19 vaccination (most had received a bivalent vaccine), vaccine effectiveness against SARS-CoV-2 infection was 31.2%.
 - Staying up to date with COVID-19 vaccination recommendations and, if eligible, getting an additional bivalent dose, provides additional protection against SARS-CoV-2 infection. Nursing home residents would benefit from the protection offered by staying up to date with recommended COVID-19 vaccinations.

Effectiveness in Children

- [Effectiveness of Monovalent and Bivalent mRNA Vaccines in Preventing COVID-19–Associated Emergency Department and Urgent Care Encounters Among Children Aged 6 Months–5 Years — VISION Network, United States, July 2022–June 2023](#)
 - Using data from the VISION network, CDC evaluated the vaccine effectiveness against COVID-19-associated emergency department and urgent care visits by the length of time since the last dose was received during July 4, 2022–May 2023 among children ages 6 months to 4 years (Pfizer-BioNTech) and 6 months to 5 years (Moderna).
 - Both the original (monovalent) mRNA COVID-19 vaccine series and the bivalent vaccine provide protection against COVID-19-associated emergency department and urgent care visits in children ages 6 months to 4 years (Pfizer-BioNTech) and 6 months to 5 years (Moderna). All children should stay up to date with recommended COVID-19 vaccines, including starting the vaccination series as soon as they're eligible.
 - Children continue to be impacted by COVID-19. As of June 2023, there were more than 2 million COVID-19 cases, more than 20,000 hospitalizations, and more than 400 deaths in U.S. children aged 6 months to 4 years. All children aged 6 months and older should stay up to date with recommended COVID-19 vaccines, including starting the vaccine series as soon as they're eligible and completing it within the recommended time for the best protection.

Read all of CDC's COVID-19 vaccine effectiveness studies that have been published in MMWR: [Reports by Topic | MMWR \(cdc.gov\)](#)

Vaccine Effectiveness (VE) Estimates

The publications in the table are organized by date of publication, with the most recent first. Studies that included more than one outcome or multiple age groups are listed more than once and the table can be sorted by these variables.

Outcome		Age Group					
<input checked="" type="radio"/> All outcomes <input type="radio"/> SARS-CoV-2 infection <input type="radio"/> Multisystem inflammatory syndrome <input type="radio"/> Critical illness <input type="radio"/> Emergency department/urgent care visits <input type="radio"/> Hospitalization <input type="radio"/> Invasive mechanical ventilation (IMV) or death		<input checked="" type="radio"/> All age groups <input type="radio"/> Adults <input type="radio"/> Adolescents <input type="radio"/> Children <input type="radio"/> Infants					
Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
Emergency department/urgent care visits	23% among children aged 6 months–5 years ≥14 days after 1st dose of original monovalent Moderna, Omicron period 29% among children aged 6 months–5 years ≥14 days after 2nd dose of	Children	Original monovalent mRNA, Moderna	8 states	July 4, 2022 – June 17, 2023	VISION	8/18/23 MMWR, Link-Gelles, R

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s) [#]	Population	Study period	Monitoring System	Publication Date/Journal/First author
	original monovalent Moderna, Omicron period						
Emergency department/urgent care visits	17% among children aged 6 months-4 years ≥ 14 days to 1 month after 1st dose of original monovalent Pfizer, Omicron period 37% among children aged 6 months-4 years ≥ 14 days after 2nd dose of original monovalent Pfizer, Omicron period 43% among children aged 6 months-4 years ≥ 14 days after 3rd dose of original monovalent Pfizer, Omicron period	Children	Original monovalent mRNA, Pfizer	8 states	July 4, 2022 – June 17, 2023	VISION	8/18/23 MMWR, Link-Gelles, R
Emergency department/urgent care visits	80% ≥ 14 days after ≥ 1 bivalent dose among children aged 6 months-5 years who received at least a primary series irrespective of manufacturer, Omicron period	Children	Bivalent mRNA	8 states	December 24, 2022 – June 17, 2023	VISION	8/18/23 MMWR, Link-Gelles, R
SARS-CoV-2 infection	31.2% among nursing home residents who were up to date with COVID-19 vaccination, Omicron period	Nursing home residents	Bivalent booster, mRNA	U.S. skilled nursing facilities	Nov. 20, 2022 – Jan. 8, 2023	NHSN	6/23/23 MMWR, Wong, E
Hospitalization	62% during the first 7–59 days after the bivalent dose among immunocompetent adults, Omicron period 24% at 120–179 days after the bivalent dose among immunocompetent adults, Omicron period 28% during the first 7–59 days after the bivalent dose among immunocompromised adults, Omicron period	Adults	Bivalent booster, mRNA	7 states	Sept. 13, 2022 –April 21, 2023	VISION	5/26/23 MMWR Link-Gelles, R

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s) [#]	Population	Study period	Monitoring System	Publication Date/Journal/First author
	13% at 120–179 days after the bivalent dose among immunocompromised adults, Omicron period						
Critical illness	69% during the first 7–59 days after the bivalent dose among immunocompetent adults, Omicron period 50% by 120–179 days after the bivalent dose among immunocompetent adults, Omicron period 40% during the first 7–59 days after the bivalent dose among immunocompromised adults, Omicron period 53% at 120–179 days after the bivalent dose among immunocompromised adults, Omicron period	Adults	Bivalent booster, mRNA	7 states	Sept. 13, 2022 –April 21, 2023	VISION	5/26/23 MMWR Link-Gelles, R
Invasive mechanical ventilation (IMV) or death	76% <6 months after the last original monovalent dose among immunocompetent adults 56% at ≥1 year after last original monovalent dose among immunocompetent adults	Adults	Original monovalent mRNA	21 U.S. Hospitals	Feb. 1, 2022 – Jan. 31, 2023	IVY	4/28/23 MMWR DeCuir, J
SARS-CoV-2 infection	40% among children age 3–5 years 14 days to 1 month after 1st dose of monovalent Moderna, Omicron period 60% among children age 3–5 years 14 days to 2 months after 2nd dose of monovalent Moderna, Omicron period 36% among children age 3–5 years 3 to 4 months after 2nd dose of monovalent Moderna, Omicron period	Children	mRNA, Moderna	49 states, Washington, D.C., and Puerto Rico	July 4, 2022– February 5, 2023	ICATT	2/17/23 MMWR, Fleming Dutra K

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s) [#]	Population	Study period	Monitoring System	Publication Date/Journal/First author
SARS-CoV-2 infection	19% among children age 3-4 years 14 days to 1 month after 1st dose of monovalent Pfizer, Omicron period 40% among children age 3-4 years 14 days to 3 months after 2nd dose of monovalent Pfizer, Omicron period 31% among children age 3-4 years 14 days to 4 months after 3rd dose of monovalent Pfizer, Omicron period	Children	mRNA, Pfizer	49 states, Washington, D.C., and Puerto Rico	July 4, 2022–February 5, 2023	ICATT	2/17/23 MMWR, Fleming Dutra K
SARS-CoV-2 infection	52% relative VE among adults age 18-49 ≥14 days after bivalent booster dose compared with those who received 2-3 monovalent doses only, BA.5-related sublineages 43% relative VE among adults age 50-64 ≥14 days after bivalent booster dose compared with those who received 2-4 monovalent doses only, BA.5-related sublineages 37% relative VE among adults age ≥65 ≥14 days after bivalent booster dose compared with those who received 2-4 monovalent doses only, BA.5-related sublineages	Adults	Bivalent Booster, mRNA	49 states, Washington, D.C., and Puerto Rico	December 1, 2022–January 13, 2023	ICATT	2/3/2023 MMWR, Link-Gelles R
SARS-CoV-2 infection	49% relative VE among adults age 18-49 ≥14 days after bivalent booster dose compared with those who received 2-3 monovalent doses only, XBB/XBB.1.5-related sublineages 40% relative VE among	Adults	Bivalent Booster, mRNA	49 states, Washington, D.C., and Puerto Rico	December 1, 2022–January 13, 2023	ICATT	2/3/2023 MMWR, Link-Gelles R

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s) [#]	Population	Study period	Monitoring System	Publication Date/Journal/First author
	adults age 50-64 ≥14 days after bivalent booster dose compared with those who received 2-4 monovalent doses only, XBB/XBB.1.5-related sublineages 43% relative VE among adults age ≥65 ≥14 days after bivalent booster dose compared with those who received 2-4 monovalent doses only, XBB/XBB.1.5-related sublineages						
Emergency department/urgent care visits	56% ≥7 days after bivalent booster compared with no vaccination, Omicron BA.5 period 34% relative VE ≥7 days after bivalent booster compared with those who received their last monovalent dose 2-4 months earlier 50% relative VE ≥7 days after bivalent booster compared with those who received their last monovalent dose ≥11 months earlier	Adults	Bivalent Booster, mRNA	9 states	September 13, 2022– November 18, 2022	VISION	12/16/2022 MMWR, Tenforde M
Hospitalization	59% 7 days after bivalent booster among immunocompetent adults compared with no vaccination 48% relative VE ≥7 days after bivalent booster compared with those who received their last monovalent dose ≥11 months earlier	Adults	Bivalent Booster, mRNA	9 states	September 13, 2022– November 18, 2022	VISION	12/16/2022 MMWR, Tenforde M
Hospitalization	84% 7 days after bivalent booster among immunocompetent adults	Adults	Bivalent Booster, mRNA	22 hospitals in 18 states	September 8, 2022–	IVY	12/16/2022 MMWR, Surie D

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	compared with no vaccination, Omicron period 73% relative VE \geq 7 days after bivalent booster among immunocompetent adults ages >65 compared with monovalent vaccination alone, Omicron period				November 30, 2022		
SARS-CoV-2 infection	56% relative VE among ages 18-49 years compared with those who received their last monovalent dose ≥ 8 months earlier 48% relative VE among ages 50-64 years compared with those who received their last monovalent dose ≥ 8 months earlier 43% relative VE among those ages ≥ 65 years compared with those who received their last monovalent dose ≥ 8 months earlier	Adults	Bivalent Booster, mRNA	49 states, Washington, D.C., and Puerto Rico	September 14, 2022–November 11, 2022	ICATT	11/22/2022 MMWR, Link-Gelles R
Hospitalization	39% ≥ 14 days after 2nd dose, BA.1/BA.2 period 69% ≥ 7 days after 3rd dose, BA.1/BA.2 period 61% ≥ 7 days after 4th dose, BA.1/BA.2 period 41% ≥ 14 days after 2nd dose, BA.4/BA.5 period 31% ≥ 7 days after 3rd dose, BA.4/BA.5 period 60% ≥ 7 days after 4th dose, BA.4/BA.5 period (median interval between the last dose and illness onset = 145 days)	Adults	mRNA	18 states	December 26, 2021–August 31, 2022	IVY	10/21/2022 MMWR, Surie D
Hospitalization	36% ≥ 14 days after 2nd dose among	Adults	mRNA	10 states	December 16, 2021–	VISION	10/21/2022 MMWR, Britton A

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	immunocompromised adults, Omicron period 57% ≥7 days after 3rd dose among immunocompromised adults, Omicron period 69% 7-89 days after 3rd dose among immunocompromised adults, Omicron period 44% ≥90 days after 3rd dose among immunocompromised adults, Omicron period				August 20, 2022		
Hospitalization	61% for 2 doses during BA.1 92% for 3 doses 7-119 days after 3 rd dose during BA.1 85% for 3 doses ≥120 days after 3 rd dose during BA.1 24% for 2 doses during BA.2/BA.2.12.1 69% for 3 doses 7-119 days after 3 rd dose during BA.2/BA.2.12.1 52% for 3 doses ≥120 days after 3 rd dose during BA.2/BA.2.12.1 55% for 3 doses among ≥50yo ≥120 days after 3 rd dose during BA.2/BA.2.12.1 80% for 4 doses among ≥50yo >1 week after 4 th dose during BA.2/BA.2.12.1	Adults	mRNA	10 states	Dec 18, 2021–Jun 10, 2022	VISION	7/22/2022 MMWR. Link-Gelles R
SARS-CoV-2 infection	58% overall, without prior infection 67% ≤150 days of receipt of the 2nd dose of Pfizer-BioNTech, pre-Delta period 75% ≤150 days of receipt	Adults	mRNA	4,315 residents in 105 nursing homes in 10 states	Dec 14, 2020–Nov 9, 2021	N/A	7/20/2022 CID. Hatfield KM

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	of the 2nd dose of Moderna, pre-Delta period 33% >150 days of receipt of the 2nd dose of Pfizer-BioNTech, Delta period 77% >150 days of receipt of the 2nd dose of Moderna, Delta period						
Hospitalization	52% overall 70% against ICU admission 47% against non-ICU hospitalization 80% during Delta 38% during Omicron 69% for either variant when maternal vaccination occurred after 20 weeks of pregnancy 38% when maternal vaccination occurred during the first 20 weeks of pregnancy	Infants (<6 months)	mRNA (maternal vaccination)	30 pediatric hospitals across 22 states	Jul 1, 2021–Mar 8, 2022	Overcoming Covid-19	6/22/2022 NEJM, Halasa NB
SARS-CoV-2 infection	17.8% 14 days to 1 month since one dose of Janssen 8.4% 2 to 4 months since one dose of Janssen 27.9% two doses of Janssen, 14 days to 1 month since last dose 29.2% two doses of Janssen, 2 to 4 months since last dose of Janssen 61.3% Janssen/mRNA booster, 14 days to 1 month since last dose 45.3% Janssen/mRNA booster, 2 to 4 months since last dose 68.9% 3 mRNA doses, 14 days to 1 month since last dose 62.8% 3 mRNA doses, 2 to 4 months since last dose	Adults	Janssen, mRNA	49 states, Washington, D.C., and Puerto Rico	Jan 2–Mar 23, 2022 (Omicron)	ICATT	5/25/2022 NEJM, Accorsi EK

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
SARS-CoV-2 infection	60.1% among children during month 0 after the second dose 28.9% during month 2 after the second dose 59.5% among adolescents during month 0 after the second dose 16.6% during month 2 after the second dose 71.1% among adolescents 2 to 6.5 weeks after third dose	Children (5–11 years) Adolescents (12–15 years)	mRNA	49 states, Washington, D.C., and Puerto Rico	Dec 26, 2021–Feb 21, 2022 (Omicron)	ICATT	5/13/2022 JAMA, Fleming-Dutra KE
SARS-CoV-2 infection	46.9% (relative VE compared to primary series only) after additional or booster dose	Nursing home residents	mRNA	U.S. skilled nursing facilities	Feb 14–Mar 27, 2022 (Omicron)	NHSN	5/6/2022 MMWR, Prasad N
Hospitalization	68% in children after 2 doses, median interval since vaccination 34 days (Omicron [†]) 93% in adolescents after 2 doses, 2 to 22 weeks after vaccination (Delta [†]) 92% in adolescents after 2 doses, 23 to 44 weeks after vaccination (Delta [†]) 43% in adolescents after 2 doses, 2 to 22 weeks after vaccination (Omicron [†]) 38% in adolescents after 2 doses, 23 to 44 weeks after full vaccination (Omicron [†])	Children (5–11 years) Adolescents (12–18 years)	mRNA	23 states	Jul 1, 2021–Feb 17, 2022	Overcoming Covid-19	3/30/2022 NEJM, Price AM
Critical illness	96% after 2 doses (Delta [†]) 79% after 2 doses (Omicron [†])	Adolescents (12–18 years)	mRNA	23 states	Jul 1, 2021–Feb 17, 2022	Overcoming Covid-19	3/30/2022 NEJM, Price AM
Emergency department/urgent care visits	24% after 1 Janssen dose 54% after 2 Janssen doses 79% after 1 Janssen+1 mRNA dose 83% after 3 mRNA doses (median interval between receipt of the most recent dose and the ED/UC	Adults	Janssen, mRNA	10 states	Dec 2021–Mar 2022	VISION	3/29/2022 MMWR, Natarajan K

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s) [#]	Population	Study period	Monitoring System	Publication Date/Journal/First author
	encounter ranged from 49 to 59 days)						
Hospitalization	31% after 1 Janssen dose 67% after 2 Janssen doses 78% after 1 Janssen+1 mRNA dose 90% after 3 mRNA doses (median interval between receipt of the most recent dose and hospitalization ranged from 48 to 59 days)	Adults	Janssen, mRNA	10 states	Dec 2021–Mar 2022	VISION	3/29/2022 MMWR, Natarajan K
Invasive mechanical ventilation (IMV) or death	94% median 60 days after 3 doses (Omicron [†])	Adults	mRNA	21 U.S. medical centers	Mar 2021–Jan 2022	IVY	3/25/2022 MMWR, Tenforde MW
SARS-CoV-2 infection	31% in children after 2 doses, 14–82 days after 2nd dose (Omicron [†]) 59% in adolescents after 2 doses (Omicron [†]) 87% in adolescents after 2 doses, 14–149 days after 2nd dose (Delta [†])	Children (5–11 years) Adolescents (12–15 years)	mRNA	4 states	Jul 2021–Feb 2022	PROTECT	3/18/2022 MMWR, Fowlkes AL
Hospitalization	85% after 2 doses (Alpha [†]) 81% after 2 doses, >150 days before illness onset (Delta [†]) 88% after 2 doses, 14–150 days (Delta [†]) 94% after 3 doses (Delta [†]) 65% after 2 doses (Omicron [†]) 86% after 3 doses (Omicron [†])	Adults	mRNA	21 U.S. hospitals	Mar 2021–Jan 2022	IVY	3/9/2022 BMJ, Lauring AS
Emergency department/urgent care visits	46% in children within 14–67 days after dose 2 51% in children within 14–67 days after dose 2 (Omicron [†]) 83% in adolescents 12–15 years within 14–149 days after dose 2 76% in adolescents 16–17 years within 14–149 days	Children (5–11 years) Adolescents (12–15 years) Adolescents (16–17 years)	mRNA	10 states	Apr 2021–Jan 2022	VISION	3/4/2022 MMWR, Klein NP

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	after dose 2 38% in adolescents 12–15 years ≥150 days after dose 2 46% in adolescents 16–17 years ≥150 days after dose 2 86% in adolescents 16–17 years ≥7 days after dose 3 81% in adolescents 16–17 years ≥7 days after dose 3 (Omicron ¹)						
Hospitalization	74% in children within 14–67 days after dose 2 92% in adolescents 12–15 years within 14–149 days after dose 2 94% in adolescents 16–17 years within 14–149 days after dose 2 73% in adolescents 12–15 years ≥150 days after dose 2 88% in adolescents 16–17 years ≥150 days after dose 2	Children (5–11 years) Adolescents (12–15 years) Adolescents (16–17 years)	mRNA	10 states	Apr 2021–Jan 2022	VISION	3/4/2022 MMWR, Klein NP
Hospitalization	37% for primary series alone among immunocompetent adults 65% for primary series plus one booster among immunocompetent adults 76% 7–120 days after receipt of booster dose 63% for primary series plus two boosters among immunocompetent adults 49% for primary series alone among immunocompromised adults 69% for primary series plus one booster among immunocompromised adults	Adults	mRNA, Janssen	21 U.S. Hospitals	December 26, 2021–June 30, 2022	IVY	10/11/2022 BMJ Adams, K

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	72% 7-120 days after receipt of booster dose						
Multisystem inflammatory syndrome	84% overall after two doses 78% after two doses among children ages 5-11 90% after two doses among adolescents ages 12-17.	Children (5–11 years) Adolescents (12–17 years)	mRNA	29 pediatric hospitals across 22 states	July 1, 2021- April 7, 2022	Overcoming Covid-19	8/4/2022 CID, Zambrano L
Emergency department/urgent care visits	84% among pregnant adults 14-149 days after 2 nd dose, Delta period 75% among pregnant adults ≥150 days after 2nd dose, Delta period 81% among pregnant adults 7-119 days after 3rd dose, Delta period 3% among pregnant adults 14-149 days after 2nd dose, Omicron period 42% among pregnant adults ≥150 days after 2nd dose, Omicron period 79% among pregnant adults 7-119 days after 3rd dose, Omicron period 124% among pregnant adults ≥120 days after 3rd dose, Omicron period	Adults aged 18-45 years	mRNA	10 states	June 1, 2021-June 2, 2022 (site-dependent)	VISION	9/26/2022 JAMA Open Schrag, S.
Hospitalization	84% among pregnant adults 14-149 days after 2nd dose, Delta period 75% among pregnant adults ≥150 days after 2nd dose, Delta period 81% among pregnant adults 7-119 days after 3rd dose, Delta period 3% among pregnant adults 14-149 days after 2nd dose, Omicron period 42% among pregnant adults ≥150 days after 2nd dose, Omicron period	Adults aged 18-45 years	mRNA	10 states	June 1, 2021-June 2, 2022 (site-dependent)	VISION	9/26/2022 JAMA Open Schrag, S.

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	79% among pregnant adults 7-119 days after 3rd dose, Omicron period 124% among pregnant adults ≥120 days after 3rd dose, Omicron period 99% among pregnant adults, 14-149 days after 2nd dose, Delta period 96% among pregnant adults ≥150 days after 2nd dose, Delta period 97% among pregnant adults 7-119 days after 3rd dose, Delta period 86% among pregnant adults, 14-149 days after 2nd dose, Omicron period 64% among pregnant adults ≥150 days after 2nd dose, Omicron period 86% among pregnant adults, 7-119 days after 3rd dose, Omicron period 53% among pregnant adults ≥120 days after 3rd dose, Omicron period						
Hospitalization	94% among adults <2months after 2nd dose, pre-Delta period 96% among adults <2 months after 2nd dose, Delta period 87% among adults 4-5 months after 2nd dose, pre-Delta period 89% among adults 4-5 months after 2nd dose, Delta period 73% among adults <2 months after 2nd dose, Omicron period 57% among adults 4-5 months after 2nd dose, Omicron period	Adults	mRNA	10 states	January 2021-July 12, 2022	VISION	10/03/2022, BMJ, Ferdinands, J

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s)#	Population	Study period	Monitoring System	Publication Date/Journal/First author
	96% among adults <2 months after 3rd dose, Delta period 89% among adults <2 months after 3rd dose, Omicron period 66% among adults 4-5 months after 3rd dose, Omicron period 72% among adults ages 50-64 years after 4th dose, Omicron period 76% among adults ages 65 years and older after 4th dose, Omicron period 48% among immunocompromised adults after 4th dose, Omicron period						
Emergency department/urgent care visits	95% among adults <2 months after 2nd dose, pre-Delta period 93% among adults <2 months after 2nd dose, Delta period 63% among adults <2 months after 2nd dose, Omicron period 96% among adults <2 months after 3rd dose, Delta period 83% among adults <2 months after 3rd dose, Omicron period 46% among adults 4-5 months after 3rd dose, Omicron period 57% among adults ages 50-64 years after 4th dose, Omicron period 73% among adults ages 65 years and older after 4th dose, Omicron period	Adults	mRNA	10 states	January 2021-July 12, 2022	VISION	10/03/2022, BMJ, Ferdinands, J
SARS-CoV-2 infection	25.8% against infection among adults <60 days	Adults	mRNA	19 states	March 29-July 25,	N/A	9/30/2022, MMWR, McConeghy, K.

Outcome	Vaccine effectiveness*	Age Group	Vaccine(s) [#]	Population	Study period	Monitoring System	Publication Date/Journal/First author
	after 2nd vaccine booster dose				2022		
Critical illness	73.9% against critical illness among adults <60 days after 2nd vaccine booster dose	Adults	mRNA	19 states	March 29–July 25, 2022	N/A	9/30/2022, MMWR, McConeghy, K
Hospitalization	60.1% against hospitalization among adults <60 days after 2nd vaccine booster dose	Adults	mRNA	19 states	March 29–July 25, 2022	N/A	9/30/2022, MMWR, McConeghy, K
Death	89.6% against death among adults <60 days after 2nd vaccine booster dose	Adults	mRNA	19 states	March 29–July 25, 2022	N/A	9/30/2022, MMWR, McConeghy, K

[#]Where applicable, individual vaccine is specified; mRNA refers to COVID-19 vaccines BNT162b2 (Pfizer-BioNTech) and mRNA-1273 (Moderna) for adults; for children and adolescents, mRNA refers to BNT162b2 (Pfizer-BioNTech); Janssen refers to Ad.26.COV2.S (Johnson & Johnson).

*Confidence interval (CI) for all effectiveness estimates is 95%.

[†]Dates used for periods of SARS-CoV-2 variant predominance in the United States differ slightly by study and geographic location, but are approximately: Alpha (March 11–July 3, 2021); Delta (Jul 1–Dec 18, 2021); Omicron (Dec 19, 2021–present: sublineages BA.1 [December 2021–March 2022] and BA.2/BA.2.12.1 [March–October 2022]).

How CDC Monitors Vaccine Effectiveness

COVID-19 Vaccines Work

COVID-19 Vaccine Effectiveness Research

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