

# COVID-19 Vaccine Effectiveness

## House Oversight Committee

OPERATION WARP SPEED: President-elect Trump's Operation Warp Speed — which encouraged the rapid development and authorization of the COVID-19 vaccine — was highly successful and helped save millions of lives. <https://oversight.house.gov/release/final-report-covid-select-concludes-2-year-investigation-issues-500-page-final-report-on-lessons-learned-and-the-path-forward/>

**Our World in Data (University of Oxford)** How do death rates from COVID-19 differ between people who are vaccinated and those who are not? - Our World in Data <https://ourworldindata.org/covid-deaths-by-vaccination>

## Recent Articles Regarding COVID-19 Vaccine's Effectiveness:

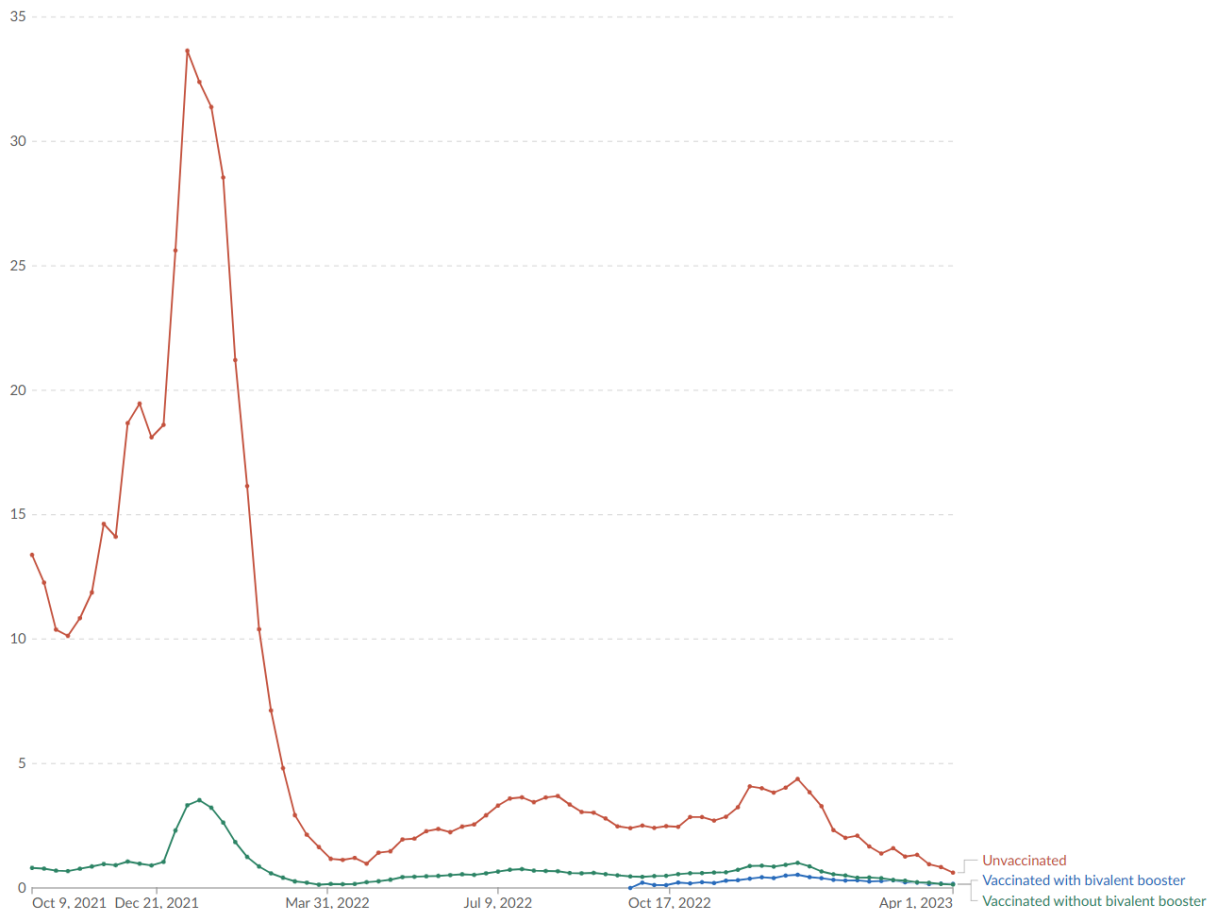
### United States: COVID-19 weekly death rate by vaccination status, All ages

Death rates are calculated as the number of deaths in each group, divided by the total number of people in this group. This is given per 100,000 people.

Our World in Data

Table Chart

Settings



Data source: Centers for Disease Control and Prevention (2023) - [Learn more about this data](#)

Note: The mortality rate for the 'All ages' group is age-standardized to account for the different vaccination rates of older and younger people.  
OurWorldinData.org/coronavirus | CC BY



- 2025 Jan: Real-world effectiveness and causal mediation study of BNT162b2 on long COVID risks in children and adolescents**

Our study suggests that BNT162b2 was effective in reducing risk of long COVID outcomes in children and adolescents during the Delta and Omicron periods. The mediation analysis indicates the vaccine's effectiveness is primarily derived from its role in reducing the risk of SARS-CoV-2 infection. (Meanwhile, the estimated indirect effects [in preventing long COVID), which are effects through protecting SARS-CoV-2 infections, were estimated as 0.04 (95% CI: 0.03–0.05) among adolescents during Delta phase, 0.31 (95% CI: 0.23–0.42) among children and 0.21 (95% CI: 0.16–0.27) among adolescents during the Omicron period....The direct effect of vaccination, defined as the effect beyond their impact on SARS-CoV-2 infections, was found to be statistically non-significant in all three study cohorts...)

[https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(24\)00541-8/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(24)00541-8/fulltext)
- 2025, Jan. 29: The hospital and mortality burden of COVID-19 compared with influenza in Denmark: a national observational cohort study, 2022-24.**

Bager P, Svalgaard IB, Lomholt FK, et al. *Lancet Infect Dis.* 2025 Jan 29:S1473-3099(24)00806-5. doi: 10.1016/S1473-3099(24)00806-5. Epub ahead of print. PMID: 39892410.

[https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(24\)00806-5/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(24)00806-5/fulltext)

"the risk of mortality from COVID-19 was higher than for influenza (aRR 1.23 [95% CI 1.08–1.37]), particularly among those without COVID-19 and influenza vaccination (1.36 [1.05–1.67])"
- 2025, Jan. 27: Severity and Long-Term Mortality of COVID-19, Influenza, and Respiratory Syncytial Virus.**

Bajema KL, Bui DP, Yan L, et al. *JAMA Intern Med.* Published online January 27, 2025. doi:10.1001/jamainternmed.2024.7452

<https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2829342>

"Higher mortality in both seasons was observed for veterans without COVID-19 vaccination in the previous year compared to veterans without seasonal influenza vaccination. In contrast, among groups vaccinated against their respective infections, there were no mortality differences at any time point between COVID-19 and influenza."
- 2024, Feb 1: Early Estimates of Updated 2023–2024 (Monovalent XBB.1.5) COVID-19 Vaccine Effectiveness Against Symptomatic SARS-CoV-2 Infection Attributable to Co-Circulating Omicron Variants Among Immunocompetent Adults — Increasing Community Access to Testing Program, United States, September 2023–January 2024 CDC MMWR. Feb. 1, 2024.**

Overall Vaccine Effectiveness in preventing symptomatic disease was

  - 58% (95% CI = 48%–65%) among those who received testing 7–59 days after receipt of updated vaccine and
  - 49% (95% CI = 36%–58%) among those who received testing 60–119 days after receipt of updated vaccine.

<https://www.cdc.gov/mmwr/volumes/73/wr/mm7304a2.htm>
- 2023, July 15: Maternal and neonatal outcomes of COVID-19 vaccination during pregnancy, a systematic review and meta-analysis**

Regarding immunological outcomes, the risk of SARS-CoV-2 infection during pregnancy or postpartum was significantly reduced in 6820 vaccinated pregnant women compared to 17,010

unvaccinated pregnant women (OR = 0.25, CI = 0.13–0.48,  $P < 0.0001$ ,  $I^2 = 61\%$ ), as evident from qualitative assessment indicating significantly higher postpartum antibody titers compared to that observed in both unvaccinated mothers and mothers who have recently recovered from a SARS-CoV-2 infection. <https://www.nature.com/articles/s41541-023-00698-8>

- **2022, Aug 2: COVID-19 Booster Shots for Older Americans Might be Needed**

Sharon Alroy-Preis, MD, MPH, MBA, the director of Public Health Services in Israel stated on Face the Nation yesterday that they are seeing evidence of the effectiveness of the Pfizer/BioNTech COVID-19 vaccine waning over time. Overall, it is still very effective in preventing hospitalizations and deaths, with the exception of those over 60 who have been fully vaccinated before the end of January 2021. Below is a slide from the Ministry of Health Israel.

<https://www.infectioncontroltoday.com/view/covid-19-booster-shots-for-older-americans-might-be-needed>

[https://www.gov.il/BlobFolder/reports/vaccine-efficacy-safety-follow-up-committee/he/files\\_publications\\_corona\\_two-dose-vaccination-data.pdf](https://www.gov.il/BlobFolder/reports/vaccine-efficacy-safety-follow-up-committee/he/files_publications_corona_two-dose-vaccination-data.pdf)

- **2022, Apr. 22: Hospitalizations of Children Aged 5–11 Years with Laboratory-Confirmed COVID-19 — COVID-NET, 14 States, March 2020–February 2022**

"During the period of Omicron predominance (December 19, 2021–February 28, 2022), COVID-19–associated hospitalization rates in children aged 5–11 years were approximately twice as high among unvaccinated as among vaccinated children."

<https://www.cdc.gov/mmwr/volumes/71/wr/mm7116e1.htm>

## Vaccine Safety

- **Persistence in risk and effect of COVID-19 vaccination on long-term health consequences after SARS-CoV-2 infection**

The persisting risk of long-term health consequences of SARS-CoV-2 infection and the protection against such risk conferred by COVID-19 vaccination remains unclear. Here we conducted a retrospective territory-wide cohort study on 1,175,277 patients with SARS-CoV-2 infection stratified by their vaccination status and non-infected controls to evaluate the risk of clinical sequelae, cardiovascular and all-cause mortality using a territory-wide public healthcare database with population-based vaccination records in Hong Kong. A progressive reduction in risk of all-cause mortality was observed over one year between patients with SARS-CoV-2 infection and controls. Patients with complete vaccination or have received booster dose incurred a lower risk of health consequences including major cardiovascular diseases, and all-cause mortality than unvaccinated or patients with incomplete vaccination 30–90 days after infection. Completely vaccinated and patients with booster dose of vaccines did not incur significant higher risk of health consequences from 271 and 91 days of infection onwards, respectively, whilst un-vaccinated and incompletely vaccinated patients continued to incur a greater risk of clinical sequelae for up to a year following SARS-CoV-2 infection. This study provided real-world evidence supporting the effectiveness of COVID-19 vaccines in reducing the risk of long-term health consequences of SARS-CoV-2 infection and its persistence following infection.

<https://www.nature.com/articles/s41467-024-45953-1>

- **COVID-19 vaccines and adverse events of special interest: A multinational Global Vaccine Data Network (GVDN) cohort study of 99 million vaccinated individuals.** Faksova K, Walsh D, Jiang Y, Griffin J, et al. *Vaccine*. 2024 Apr 2;42(9):2200-2211. doi: 10.1016/j.vaccine.2024.01.100. Epub 2024 Feb 12. PMID: 38350768. [COVID-19 vaccines and adverse events of special interest: A multinational Global Vaccine Data Network \(GVDN\) cohort study of 99 million vaccinated individuals - ScienceDirect](#)

### **Large Multi-National Study.**

184 million doses of Pfizer

36 million doses of Moderna

23 million doses of Oxford/AstraZeneca

### **Identified the following risks:**

#### *Pfizer/BioNTech (BNT162b2)*

Odds Ratio of 2.86 for Myocarditis after 2<sup>nd</sup> Dose.

#### *Moderna (mRNA-1273)*

Odds Ratio of 3.78 was seen for Acute Disseminated Encephalomyelitis after 1<sup>st</sup> dose.

-- May be as high as one chance in 33,333.

Odds Ratio of 6.10 for Myocarditis after 2<sup>nd</sup> Dose.

#### *Oxford/AstraZeneca (ChAdOx1)*

Odds Ratio of 3.23 was seen for Cerebral Sinus Thrombosis after 1<sup>st</sup> dose.

Odds Ratio of 2.49 for Guillain-Barre Syndrome after 1<sup>st</sup> dose.

Odds Ratio of 1.31 for Myocarditis after 2<sup>nd</sup> Dose.

Odds Ratio of 6.91 for Pericarditis after 3<sup>rd</sup> Dose.

### **Guillain-Barré Syndrome Induced by Vaccination Against COVID-19: A Systematic Review and Meta-Analysis**

**Guillain-Barré Syndrome Induced by Vaccination Against COVID-19: A Systematic Review and Meta-Analysis** <https://pmc.ncbi.nlm.nih.gov/articles/PMC10183219/>

“In conclusion, vaccination against COVID-19 with vector vaccines seems to increase the risk of GBS. GBS occurring following vaccination does differ in characteristics from GBS during the pre-COVID-19 era.”

### **Guillain-Barré Syndrome (GBS) and Vaccines**

CDC monitors GBS cases during each flu season. From data collected, the association between seasonal flu vaccine and GBS has been found to vary from season to season. When there has been an increased risk, it has consistently been in the range of 1-2 additional GBS cases per million flu vaccine doses administered. [Guillain-Barré Syndrome \(GBS\) and Vaccines | Vaccine Safety | CDC](#)

### **Maternal and neonatal outcomes of COVID-19 vaccination during pregnancy, a systematic review and meta-analysis**

Regarding immunological outcomes, the risk of SARS-CoV-2 infection during pregnancy or postpartum was significantly reduced in 6820 vaccinated pregnant women compared to 17,010 unvaccinated pregnant women (OR = 0.25, CI = 0.13–0.48,  $P < 0.0001$ ,  $I^2 = 61\%$ ), as evident from qualitative assessment indicating significantly higher postpartum antibody titers compared to that observed in both unvaccinated mothers and mothers who have recently recovered from a SARS-CoV-2 infection. <https://www.nature.com/articles/s41541-023-00698-8>