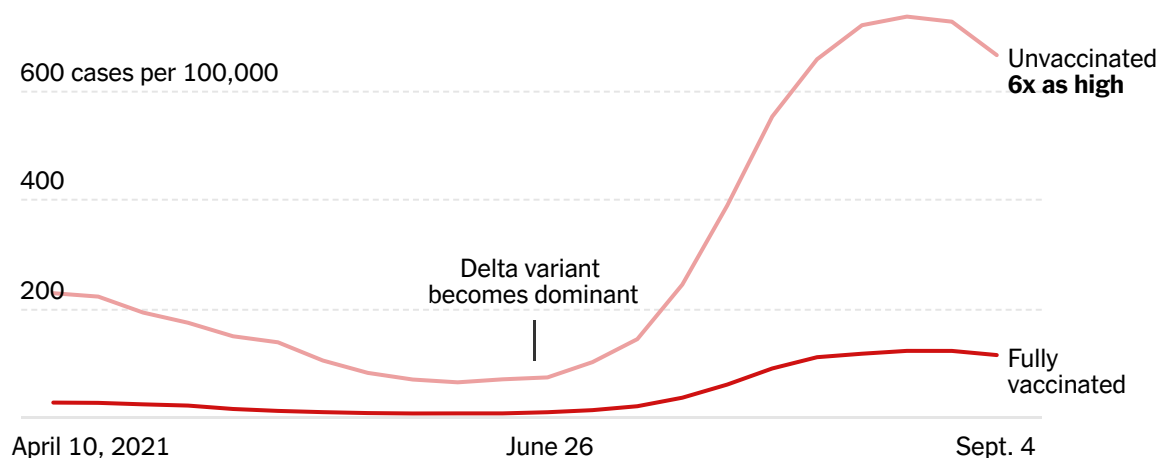


# Who Had Covid-19 Vaccine Breakthrough Cases?

By Aliza Aufrichtig and Amy Schoenfeld Walker Oct. 28, 2021

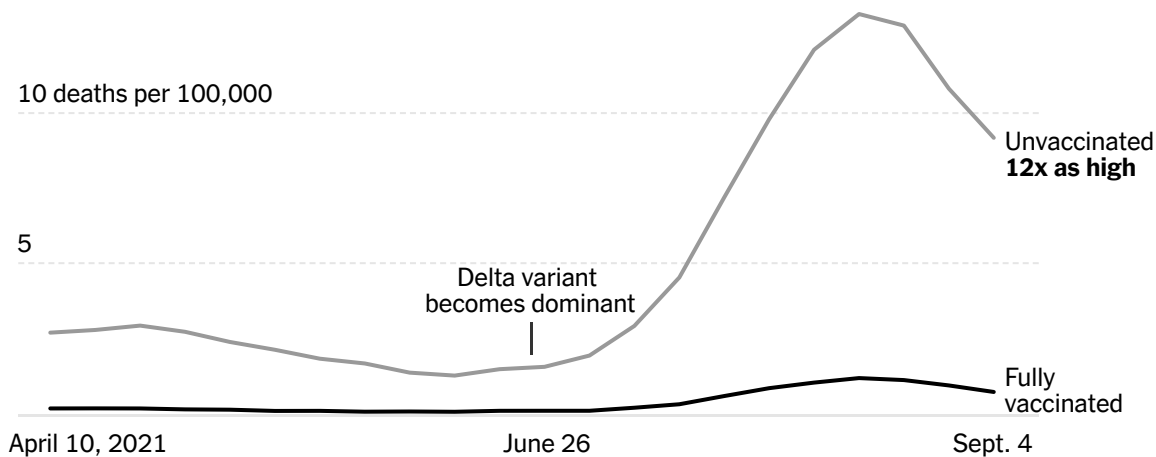
After a summer of reports of breakthrough coronavirus infections, when it seemed that everyone knew someone who tested positive after vaccination, recently released federal data sheds light on how common these cases really were, how severe they became and who was most at risk.

**Average weekly cases by vaccination status**



**Average weekly deaths by vaccination status**

Average weekly deaths by vaccination status



Compared with the unvaccinated, fully vaccinated people overall had a much lower chance of testing positive for the virus or dying from it, even through the summer’s Delta surge and the relaxation of pandemic restrictions in many parts of the country. But the data indicates that immunity against infection may be slowly waning for vaccinated people, even as the vaccines continue to be strongly protective against severe illness and death.

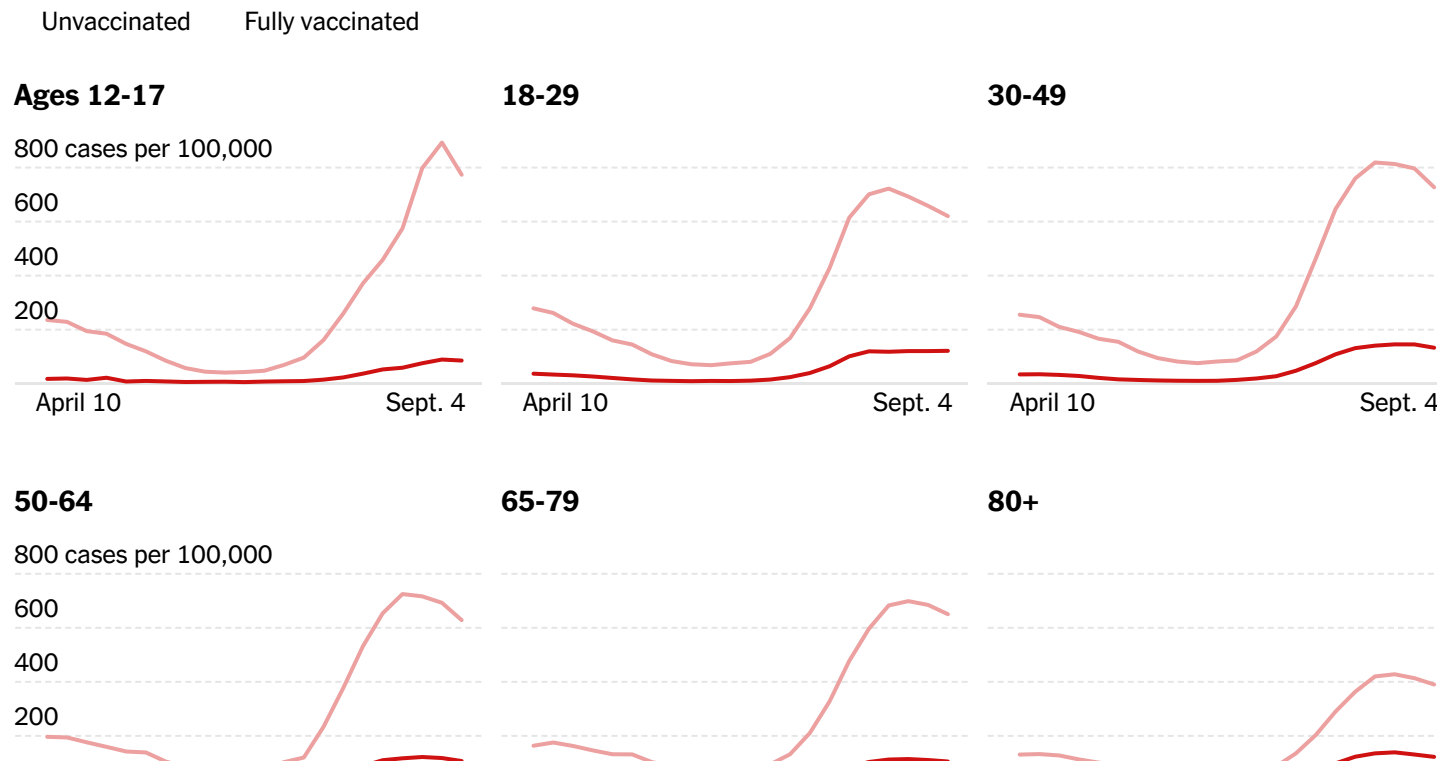
“The No. 1 take-home message is that these vaccines are still working,” said Dr. David Dowdy, an epidemiologist at the Johns Hopkins Bloomberg School of Public Health. “If you saw these data for any disease other than Covid, what everyone’s eyes would be drawn to is the difference between the unvaccinated and fully vaccinated lines.”

The data shows notable differences in breakthrough death rates by age and slight differences in both case and death rates by vaccine brand, trends that experts say are important to consider as tens of millions of Americans weigh whether to get a booster shot.

The data, from the Centers for Disease Control and Prevention, is based on health department records from 14 states and two cities. A second dashboard reveals similar trends for hospitalized patients with and without vaccination.

All vaccinated age groups saw similar rates of breakthrough infection, and they all had much lower rates of infection and death compared with their unvaccinated peers.

### Average weekly cases by age



April 10

Sept. 4

April 10

Sept. 4

April 10

Sept. 4

While every age group had similar rates of breakthrough cases, death rates varied more drastically by age. Unvaccinated seniors were the most likely to die from Covid of any group. Still, vaccinated people 80 and older had higher death rates than unvaccinated people under 50.

“Age is our top risk factor for vaccine breakthrough deaths,” said Theresa Sokol, the state epidemiologist in Louisiana, one of the jurisdictions that contributed to the C.D.C. data.

### Average weekly deaths by age

Unvaccinated Fully vaccinated

#### Ages 12-17

#### 18-29

#### 30-49

40 deaths per 100,000

20

April 10

Sept. 4

April 10

Sept. 4

April 10

Sept. 4

#### 50-64

#### 65-79

#### 80+

40 deaths per 100,000

20

April 10

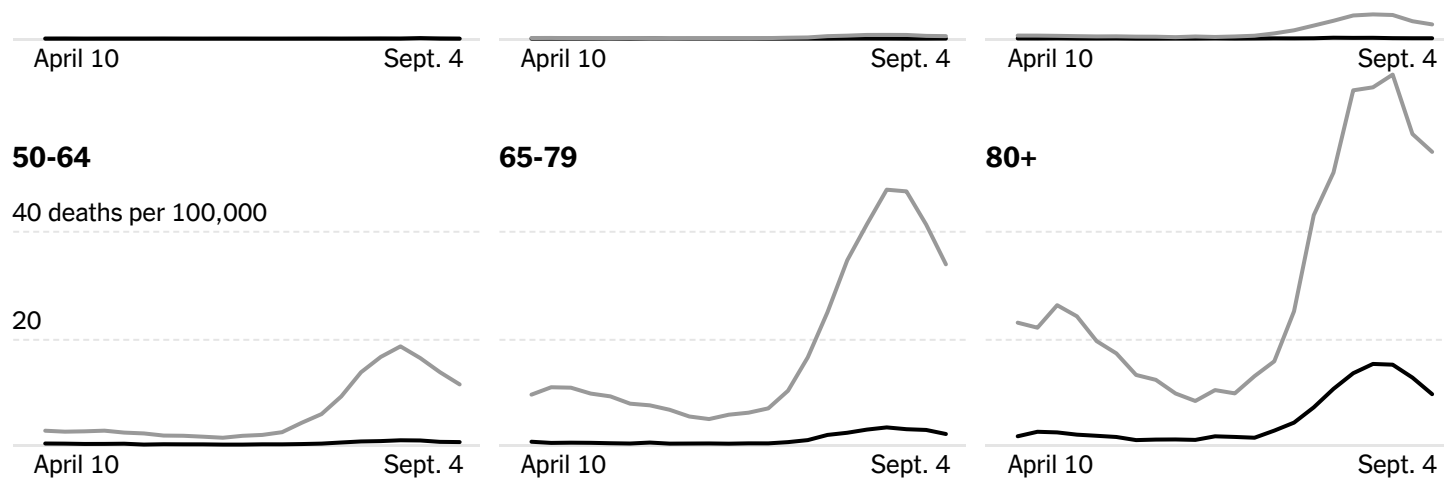
Sept. 4

April 10

Sept. 4

April 10

Sept. 4

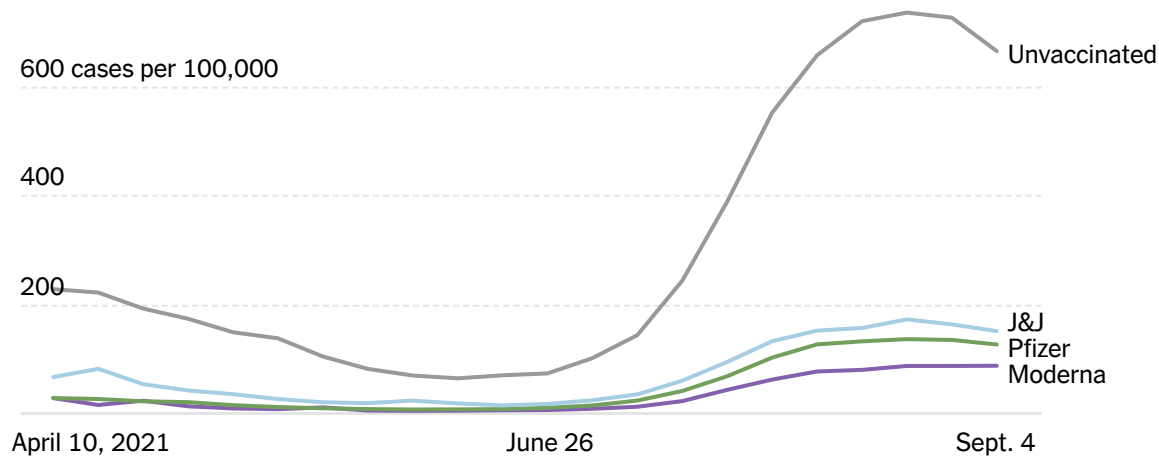


Breakthrough deaths among seniors may be because of immunosenescence, or the weakening of the immune system in older people, said Heather Scobie, an epidemiologist at the C.D.C. who helps lead the team that produced the new data.

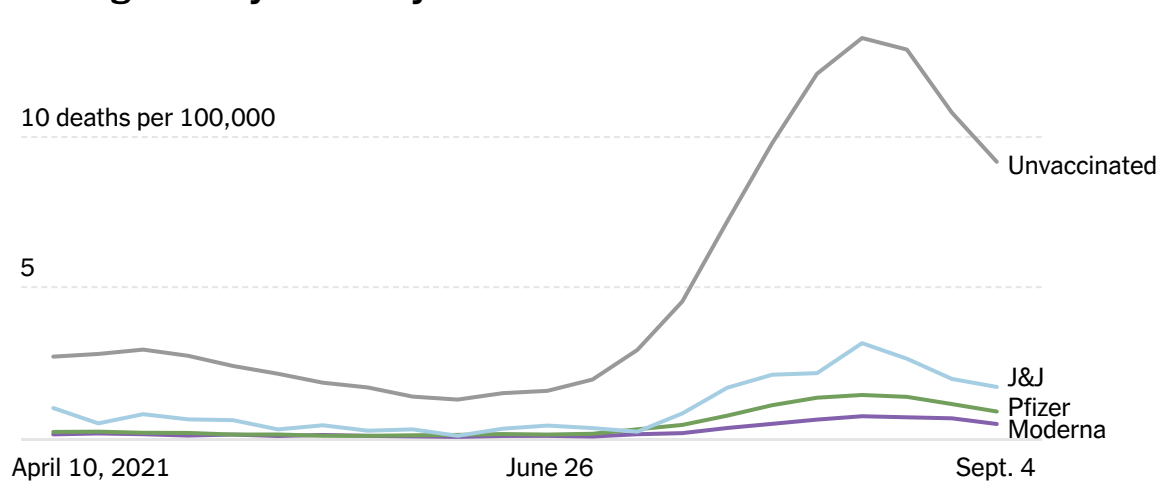
“They don’t usually form as robust a response to vaccination,” added Dr. Scobie. “Hopefully the booster dose for ages 65 years and older will address that issue.”

The federal data also makes it clear that all three brands of vaccine administered in the United States substantially reduced rates of cases and deaths. But among those vaccinated, Johnson & Johnson recipients had slightly higher rates of breakthrough cases and related deaths. And Pfizer-BioNTech recipients had slightly higher rates than those who got Moderna.

#### Average weekly cases by vaccine manufacturer



#### Average weekly deaths by vaccine manufacturer



Similar data from scientific studies helped shape the new federal recommendation that all Johnson & Johnson recipients, 18 and older, receive a booster dose at least two months after getting the first shot, said Dr. Scobie.

In contrast, booster shot recommendations for those who got the Pfizer or Moderna vaccine are focused on high-risk groups, including those over 65, and younger adults at greater risk of severe Covid-19 because of medical conditions or where they work.

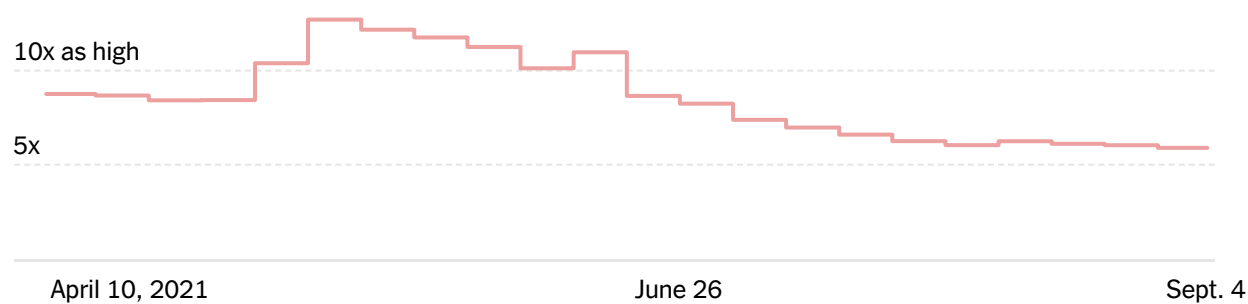
The C.D.C. data, which will be updated monthly, is the closest yet to a detailed, nationally representative view of breakthrough cases and deaths. States are not required to report this information — though many do in myriad formats — and the C.D.C. had previously only provided estimates of total breakthrough hospitalizations and deaths.

See the latest data for cases and deaths by vaccination status on the U.S. coronavirus tracking page.

The data can also give scientists a crude understanding of the effectiveness of the vaccine over time. If the ratio of cases or deaths among the unvaccinated to those among the vaccinated holds steady, the vaccines are thought to be maintaining their protection.

For example, the ratio of case rates declined somewhat in the summer, to six times as high for the unvaccinated in August from about 11 times as high in mid-June, giving scientists reason to believe that the vaccine's protection against infection might be waning slightly. The ratio for deaths has been flatter over time for all but the oldest age groups, an indication that vaccine protection against death is holding strong.

#### **Ratio of unvaccinated case rate to vaccinated case rate**



#### **Ratio of unvaccinated death rate to vaccinated death rate**



10x

5x

April 10, 2021

June 26

Sept. 4

The C.D.C. data so far runs through early September and captures only the crest of the Delta wave. But data from states like New York and California shows similar patterns through September and October. That suggests that the vaccines, despite some slight differences among the brands, are still working to protect against the most severe outcomes.

## Tracking the Coronavirus

### United States

---

#### Latest Maps and Data

Cases and deaths for every county

#### Vaccinations

How many have been vaccinated, and who's eligible

#### Your Places

Build your own dashboard to track cases

#### Mask Mandates

See state mask guidance for schools and indoors

#### Your County's Risk

See guidance for your local area

#### Hospitals Near You

How many I.C.U. beds are occupied

### World

---

#### Latest Maps and Data

Cases and deaths for every country

#### Global Vaccinations

How many have been vaccinated, by country



## Health

---

### Vaccines

Track their development

### Treatments

Rated by effectiveness and safety

## Previous Projects

---

### Nursing Homes

The hardest-hit states and facilities

### Colleges and Universities

Cases at more than 1,800 schools

### Deaths Above Normal

The true toll of the pandemic in the U.S.

### Deaths Above Normal

The true toll of coronavirus around the world

## Countries

---

Australia

France

Italy

Spain

Brazil

Germany

Japan

U.K.

Canada

India

Mexico

United States

## States, Territories and Cities

---

Alabama

Delaware

Indiana

Massachusetts

Alaska

Florida

Iowa

Michigan

Arizona

Georgia

Kansas

Minnesota

Arkansas

Guam

Kentucky

Mississippi

California

Hawaii

Louisiana

Missouri

Colorado

Idaho

Maine

Montana

Connecticut

Illinois

Maryland

Nebraska

Nevada	Northern Mariana Islands	Rhode Island	Vermont
New Hampshire	Ohio	South Carolina	Virginia
New Jersey	Oklahoma	South Dakota	Washington
New Mexico	Oregon	Tennessee	Washington, D.C.
New York	Pennsylvania	Texas	West Virginia
North Carolina	Puerto Rico	U.S. Virgin Islands	Wisconsin
North Dakota		Utah	Wyoming

## Data

---

[Frequently Asked Questions About the Covid Data](#)

[Access the Open Source Covid Data](#)

Note: The data excludes partially vaccinated people. Overall rates are age-adjusted to make the fully vaccinated and unvaccinated populations more comparable. Data includes reports from Alabama, Arizona, Arkansas, Colorado, Florida, Georgia, Idaho, Louisiana, Massachusetts, Michigan, Nebraska, New Mexico, New York City, Seattle, Utah and Wisconsin.

Sources: Centers for Disease Control and Prevention; Outbreak.info (date when Delta variant became dominant)

**Correction:** Oct. 28, 2021

Labels on charts in an earlier version of this article incorrectly indicated the relationship between vaccination status and infections or deaths from Covid-19. For example, on Sept. 4, 2021, cases of Covid in unvaccinated people were six times as high as for fully vaccinated people, not six times higher.