



Update on SARS-CoV-2 Genomic Surveillance

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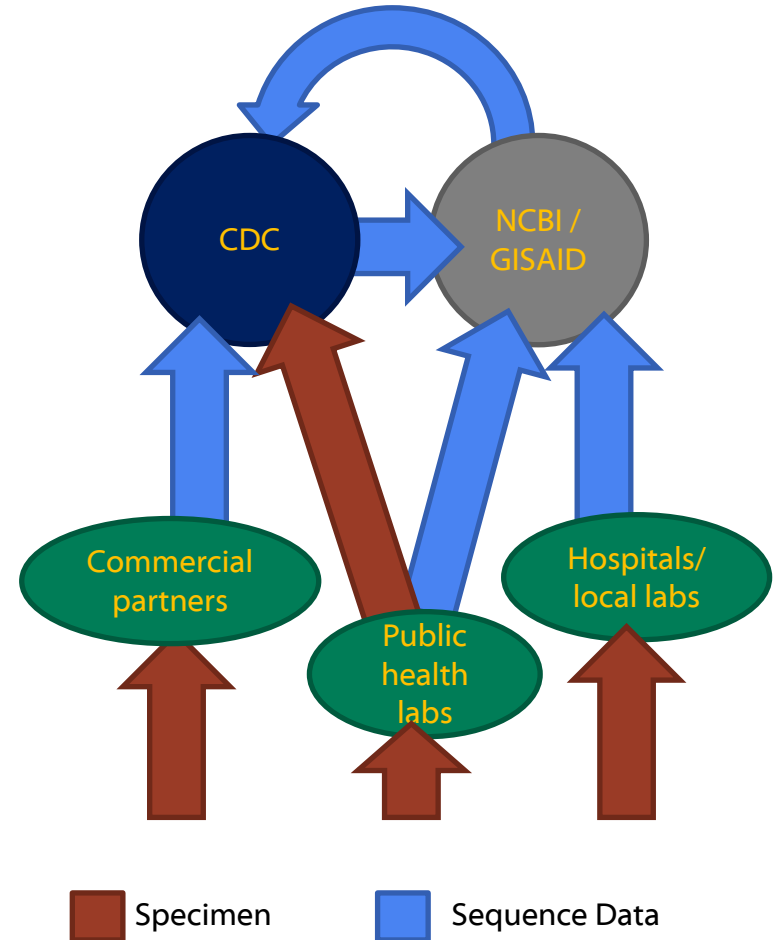
NAIIS Meeting
January 5, 2023

Genomic Surveillance Update

United States, through December 2022

Sources of CDC Genomic Data

- US States send specimens to CDC for sequencing at CDC
- CDC partners with national commercial diagnostic labs to sequence specimens
- State/local public health labs, academic labs, and medical labs deposit sequences labeled as “Baseline Surveillance” into public repositories



Data Lag and Nowcasting

- Data lag
 - There is a variable lag in time from collection to sequence availability
 - Most CDC data has a 2-3 week turnaround—other sources may be longer
- Nowcasting
 - Multivariate model to estimate the *current* proportion of variants, based on weeks-old data
 - 21 weeks of data to fit model
- Citations
 - https://github.com/CDCgov/SARS-CoV-2_Genomic_Surveillance
 - <https://www.cdc.gov/mmwr/volumes/70/wr/mm7023a3.htm>
 - <https://www.cdc.gov/mmwr/volumes/71/wr/mm7106a4.htm>

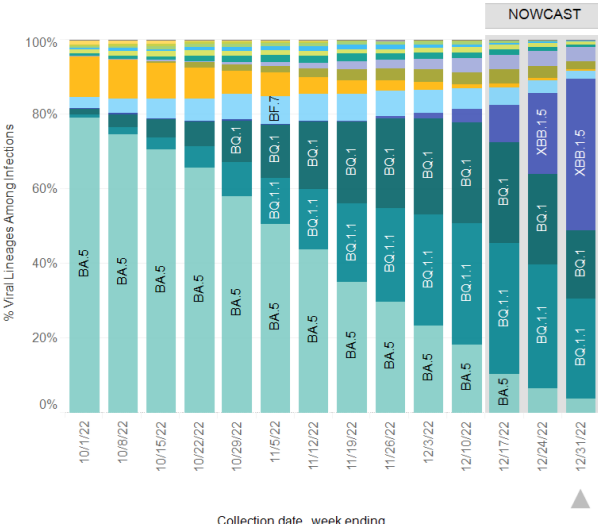
Estimates of Variant Proportions in the US

September 25-December 31, 2022

United States: 12/25/2022 – 12/31/2022 NOWCAST

United States: 9/25/2022 – 12/31/2022

USA				
WHO Label	Lineage	US Class	%Total	95%PI
Omicron	XBB.1.5	VOC	40.5%	22.7-61.0%
	BQ.1.1	VOC	26.9%	18.9-36.5%
	BQ.1	VOC	18.3%	12.5-25.9%
	BA.5	VOC	3.7%	2.6-5.2%
	XBB	VOC	3.6%	2.5-5.0%
	BN.1	VOC	2.4%	1.6-3.5%
	BF.7	VOC	2.1%	1.4-3.1%
	BA.2.75	VOC	0.9%	0.5-1.4%
	BA.5.2.6	VOC	0.6%	0.4-0.9%
	BA.4.6	VOC	0.3%	0.2-0.5%
	BA.2	VOC	0.3%	0.2-0.5%
	BF.11	VOC	0.3%	0.2-0.4%
	BA.2.75.2	VOC	0.1%	0.1-0.2%
	BA.4	VOC	0.0%	0.0-0.0%
	BA.1.1	VOC	0.0%	0.0-0.0%
	B.1.1.529	VOC	0.0%	0.0-0.0%
BA.2.12.1	VOC	0.0%	0.0-0.0%	
Delta	B.1.617.2	VBM	0.0%	0.0-0.0%
Other	Other*		0.0%	0.0-0.0%



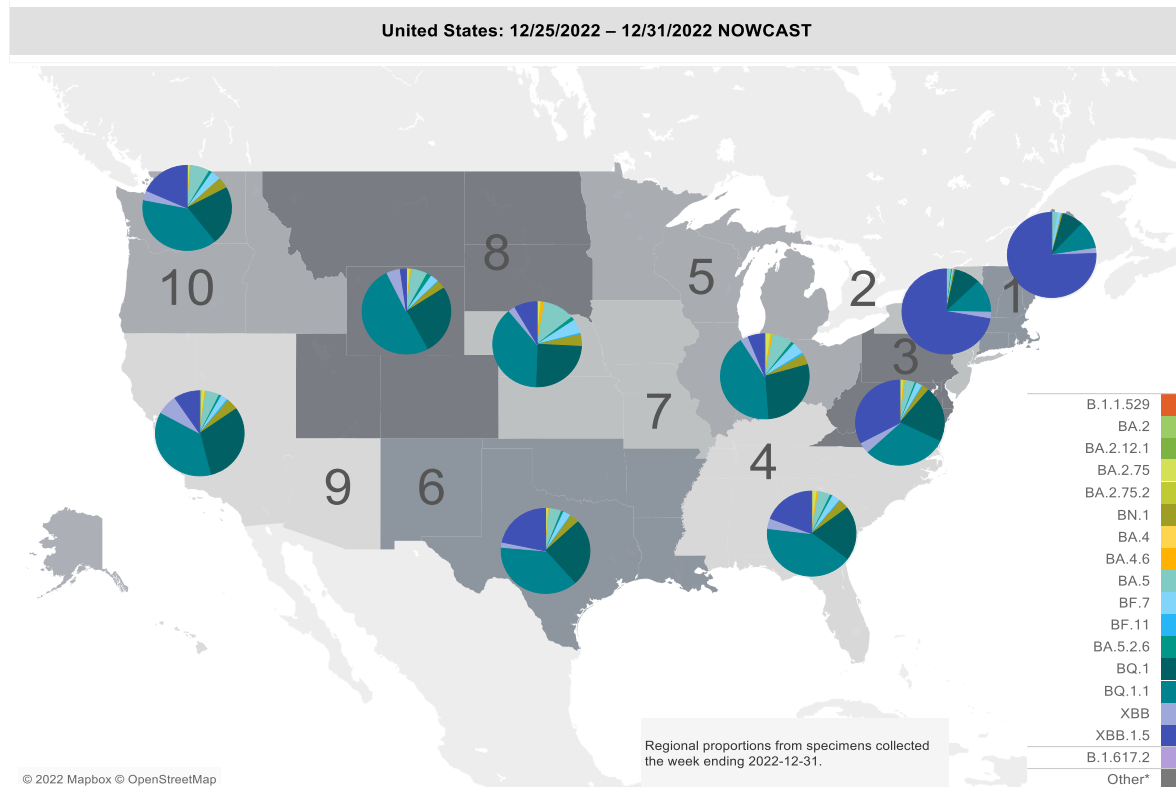
* Enumerated lineages are US VOC and lineages circulating above 1% nationally in at least one week period. "Other" represents the aggregation of lineages which are circulating <1% nationally during all weeks displayed.

** These data include Nowcast estimates, which are modeled projections that may differ from weighted estimates generated at later dates

BA.1, BA.3 and their sublineages (except BA.1.1 and its sublineages) are aggregated with B.1.1.529. Except BA.2.12.1, BA.2.75, BA.2.75.2, BN.1, XBB and their sublineages, BA.2 sublineages are aggregated with BA.2. Except BA.4.6, sublineages of BA.4 are aggregated to BA.4. Except BF.7, BF.11, BA.5.2.6, BQ.1 and BQ.1.1, sublineages of BA.5 are aggregated to BA.5. Except XBB.1.5, sublineages of XBB are aggregated to XBB. For all the lineages listed in the above table, their sublineages are aggregated to the listed parental lineages respectively. Previously, XBB.1.5 was aggregated to XBB. Lineages BA.2.75.2, XBB, XBB.1.5, BN.1, BA.4.6, BF.7, BF.11, BA.5.2.6 and BQ.1.1 contain the spike substitution R346T.

Estimates of Variant Proportions in the US

December 25-December 31, 2022 (NOWCAST)

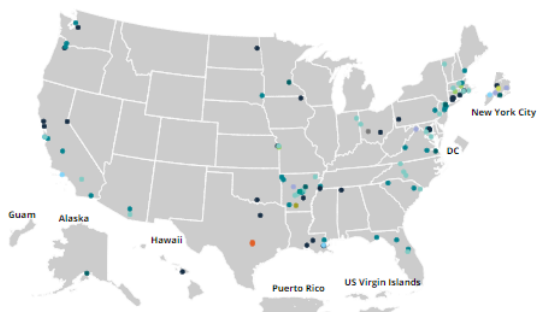


Additions to COVID Data Tracker on Genomic Surveillance

National Wastewater Surveillance System

works with health departments, laboratories, and wastewater utilities to collect and provide information on SARS-CoV-2 infection levels in participating communities.

- Dominant variant of concern based on the highest relative lineage abundance from mixed SARS-CoV-2 samples by sewershed site.
- Relative abundance of aggregated lineages in wastewater samples by jurisdiction.



DOMINANT VARIANT OF CONCERN



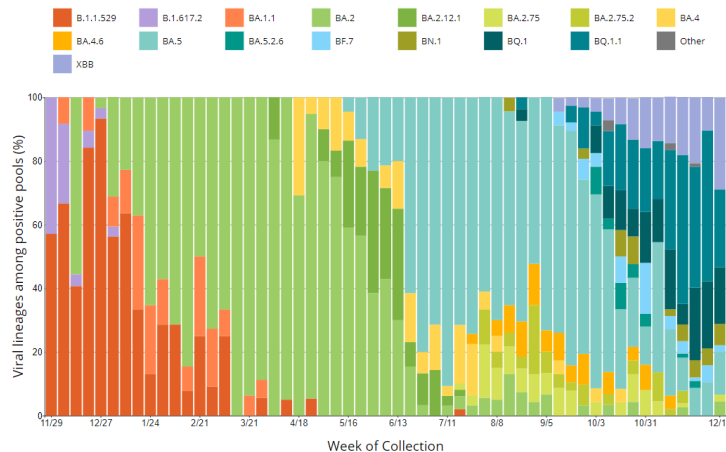
Relative Lineage Abundance, United States

Lineage #	% Sites
BA.5	26
BQ.1	7
BQ.1.1	37
Other	24
XBB	6

Traveler-based Genomic Surveillance Program

collects clinical specimens from travelers arriving at several major international airports in the United States for early detection of variants entering the country and to fill gaps in global surveillance.

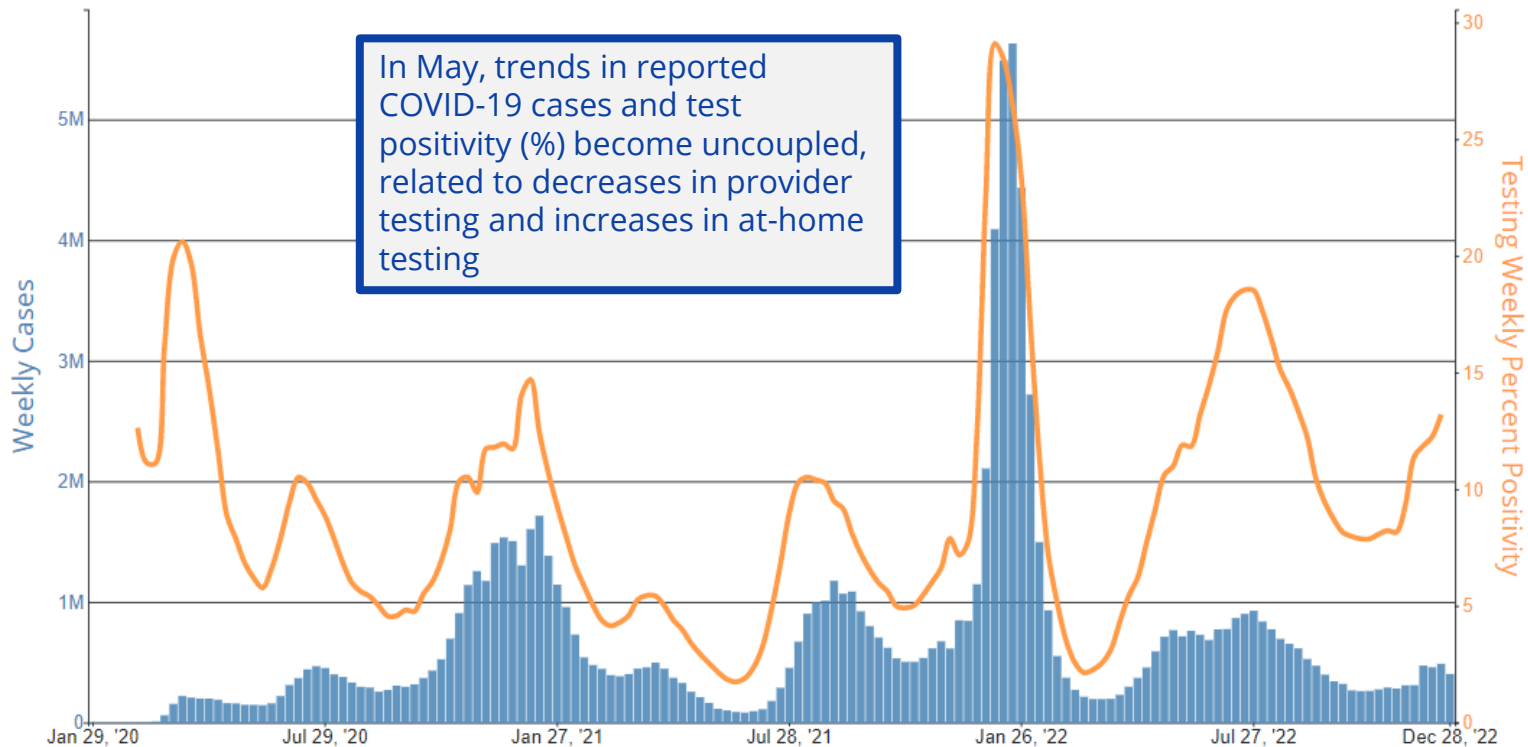
- Positivity rate for pooled samples by collection week
- Proportion of SARS-CoV-2 variants in pooled samples from arriving international air travelers, grouped by country of origin.



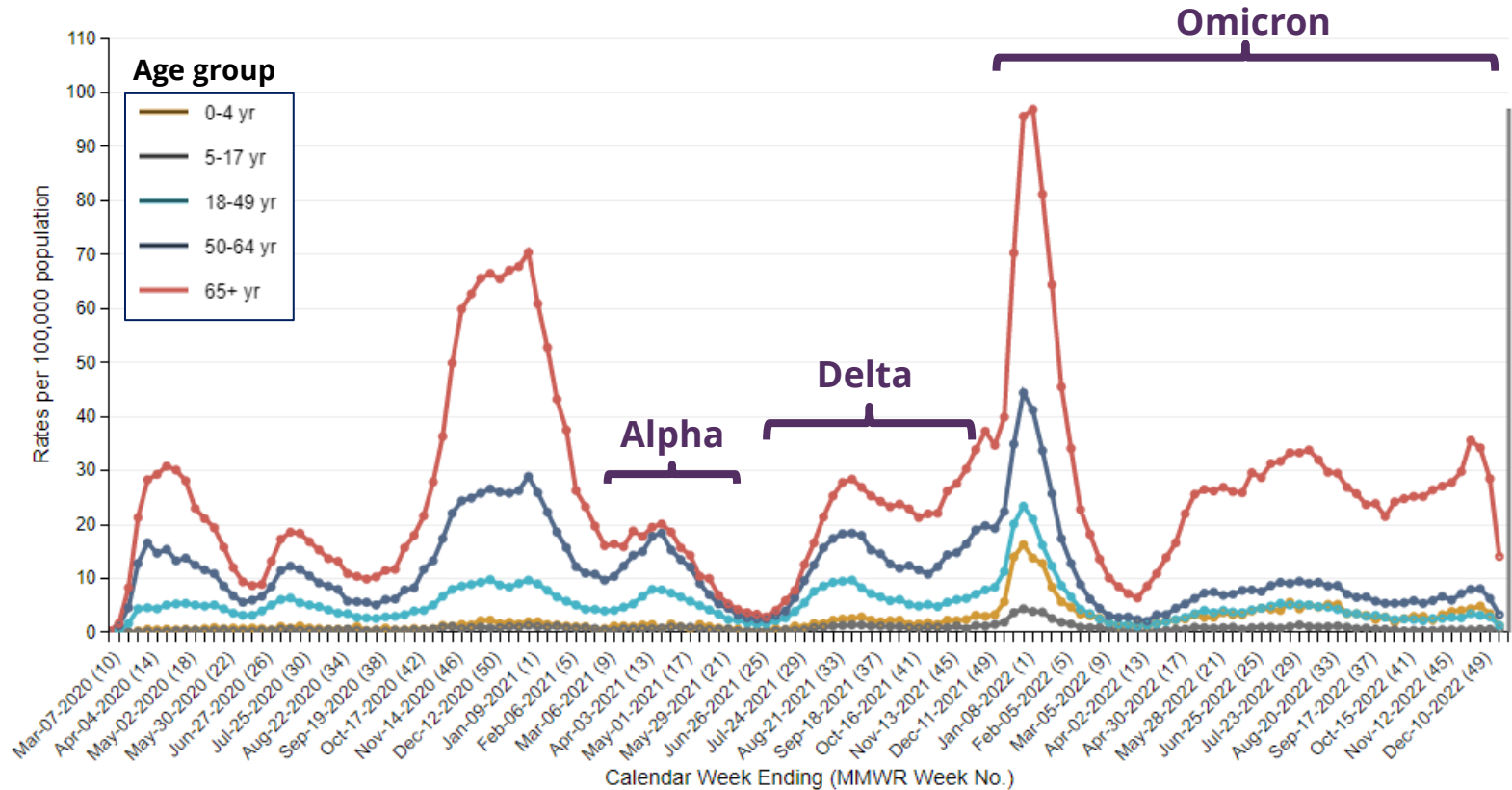
Cases, Hospitalization, and Deaths

United states, through December 2022

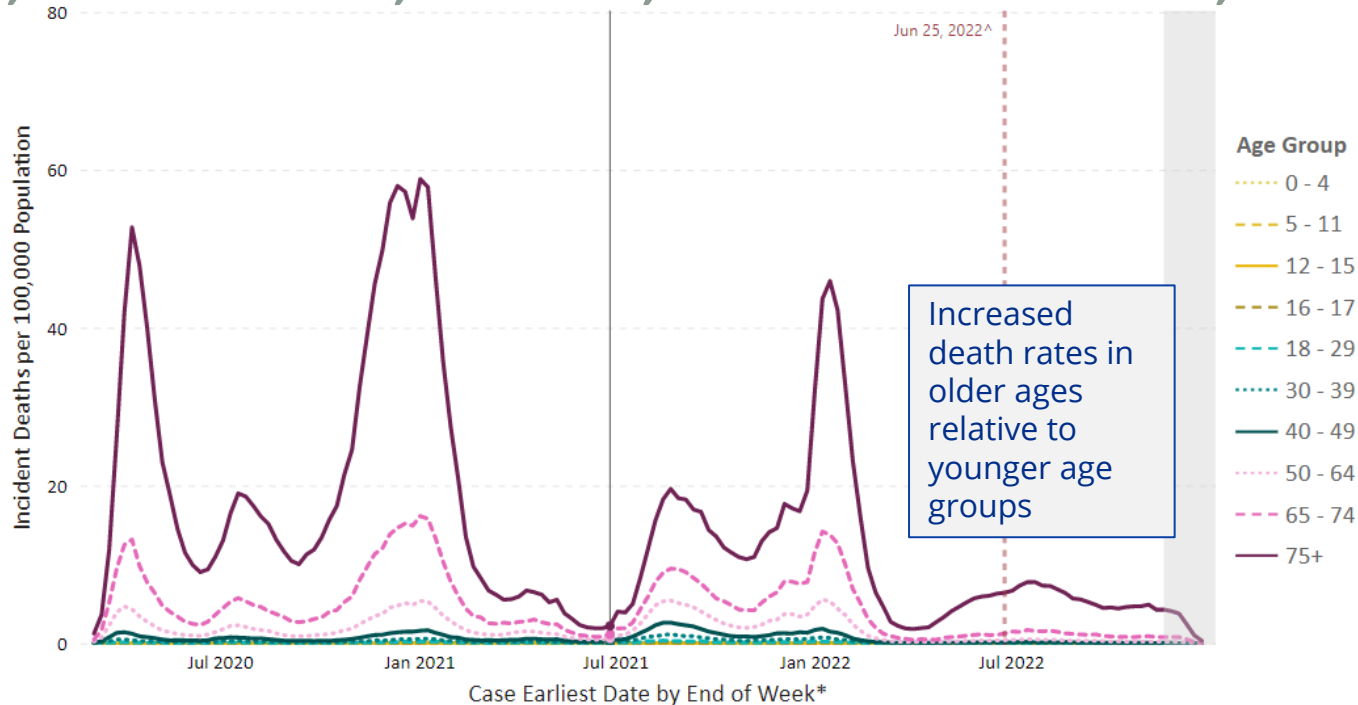
Weekly Trends in Reported COVID-19 Cases and Test Percent Positivity (7-day Moving Average), United States



Weekly Trends in COVID-19-Associated Hospitalization Rates by Age Group — COVID-NET, March 2020 – December 24, 2022



COVID-19 Weekly Deaths per 100,000 Population by Age Group, United States, March 1, 2020 – December 24, 2022



US: Includes data up to the week ending on Dec 24, 2022. Percentage of deaths among reported cases - 0.99%. Percentage of deaths reporting age by date - 99.91%.

US territories are included in case and death counts but not in population counts. Potential six-week delay in case reporting to CDC denoted by gray bars. Weekly data with five or fewer deaths have been suppressed. *Case Earliest Date is the earliest of the clinical date (related to illness or specimen collection and chosen by a defined hierarchy) and the Date Received by CDC. The date for the current week extends through Saturday. ^The death rate for Texas during the week ending Jun 25, 2022, are reflective of a data reporting artifact.

COVID-19 Deaths by Vaccination Status

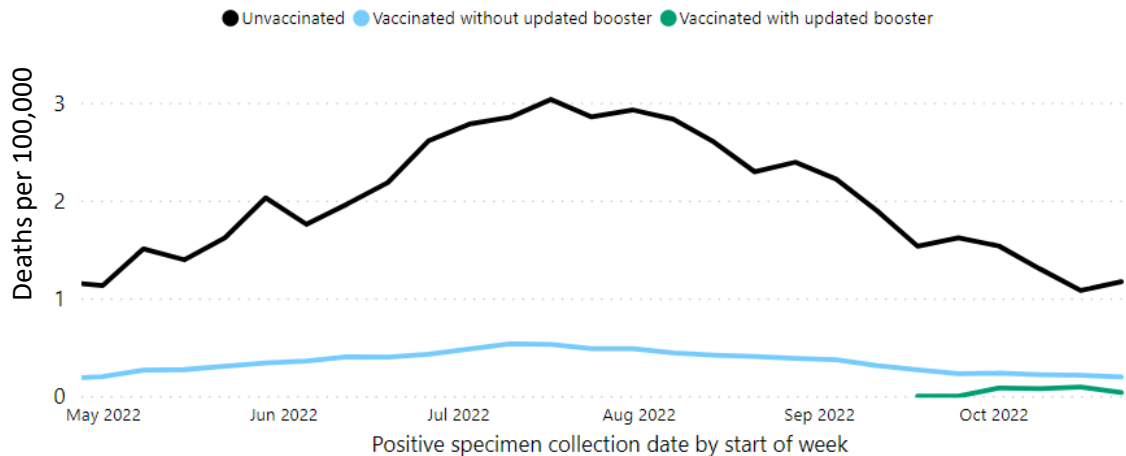
April 2022–October 2022

15.1% of People 5+ with Updated Booster Dose



Rates of COVID-19 Deaths by Vaccination Status in Ages 5 and Older

April 24, 2022–October 29, 2022 (22 U.S. jurisdictions)



People aged 5 and older vaccinated with an updated (bivalent) booster had:

18.6X
lower risk of dying from COVID-19

in October 2022, and

3.1X
lower risk of testing positive for COVID-19

in November 2022, compared to unvaccinated people.

Summary

- XBB.1.5 is the primary lineage increasing in proportion in the US
- BQ.1 and BQ.1.1 (BA.5 descendants) were still responsible for the majority of cases the week ending Dec 31, 2022
- Based on available data, it is not clear whether XBB.1.5 is associated with increases in cases, hospitalizations, or severity
- The over-65 population has an increased risk of hospitalization and death, and these rates are trending higher

Links to data

- SARS-CoV-2 Genomic Surveillance
<https://covid.cdc.gov/covid-data-tracker/#variant-proportions>
- SARS-CoV-2 Published Sequences
<https://covid.cdc.gov/covid-data-tracker/#published-sars-cov-2-sequences>
- SARS-CoV-2 Variant Summary
<https://covid.cdc.gov/covid-data-tracker/#variant-summary>
- COVID-19 Case data
https://covid.cdc.gov/covid-data-tracker/#trends_weeklycases_7daytestingpositive_00
- COVID-Net Hospitalization Data
https://gis.cdc.gov/grasp/COVIDNet/COVID19_3.html
- Vaccination Trends
<https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-trends>

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

