Update on SARS-CoV-2 Genomic Surveillance

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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://www.cdc.gov/mmwr/volumes/70/wr/mm7023a3.htm](https://www.cdc.gov/mmwr/volumes/70/wr/mm7023a3.htm)
  - [https://www.cdc.gov/mmwr/volumes/71/wr/mm7106a4.htm](https://www.cdc.gov/mmwr/volumes/71/wr/mm7106a4.htm)
Estimates of Variant Proportions in the US
September 25-December 31, 2022

[Graph showing variant proportions in the US with links to CDC data tracker]

https://covid.cdc.gov/covid-data-tracker/#variant-proportions
Estimates of Variant Proportions in the US
December 25-December 31, 2022 (NOWCAST)

https://covid.cdc.gov/covid-data-tracker/#variant-proportions
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.

**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.

[Map of the United States with relative lineage abundance data](https://covid.cdc.gov/covid-data-tracker/#variant-summary)
Cases, Hospitalization, and Deaths

United states, through December 2022
In May, trends in reported COVID-19 cases and test positivity (%) become uncoupled, related to decreases in provider testing and increases in at-home testing.

Age group

- 0-4 yr
- 5-17 yr
- 18-49 yr
- 50-64 yr
- 65+ yr

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

Increased death rates in older ages relative to younger age groups

https://covid.cdc.gov/covid-data-tracker/#demographicsovertime
COVID-19 Deaths by Vaccination Status
April 2022-October 2022

Rates of COVID-19 Deaths by Vaccination Status in Ages 5 and Older
April 24, 2022–October 29, 2022 (22 U.S. jurisdictions)

- Unvaccinated
- Vaccinated without updated booster
- Vaccinated with updated booster

Deaths per 100,000

Positive specimen collection date by start of week

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

- 18.6X lower risk of dying from COVID-19
- 3.1X lower risk of testing positive for COVID-19

In October 2022, and

In November 2022, compared to unvaccinated people.

https://covid.cdc.gov/covid-data-tracker/#rates-by-vaccine-status
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 in 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
- 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
- Vaccination Trends
  https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-trends
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.