

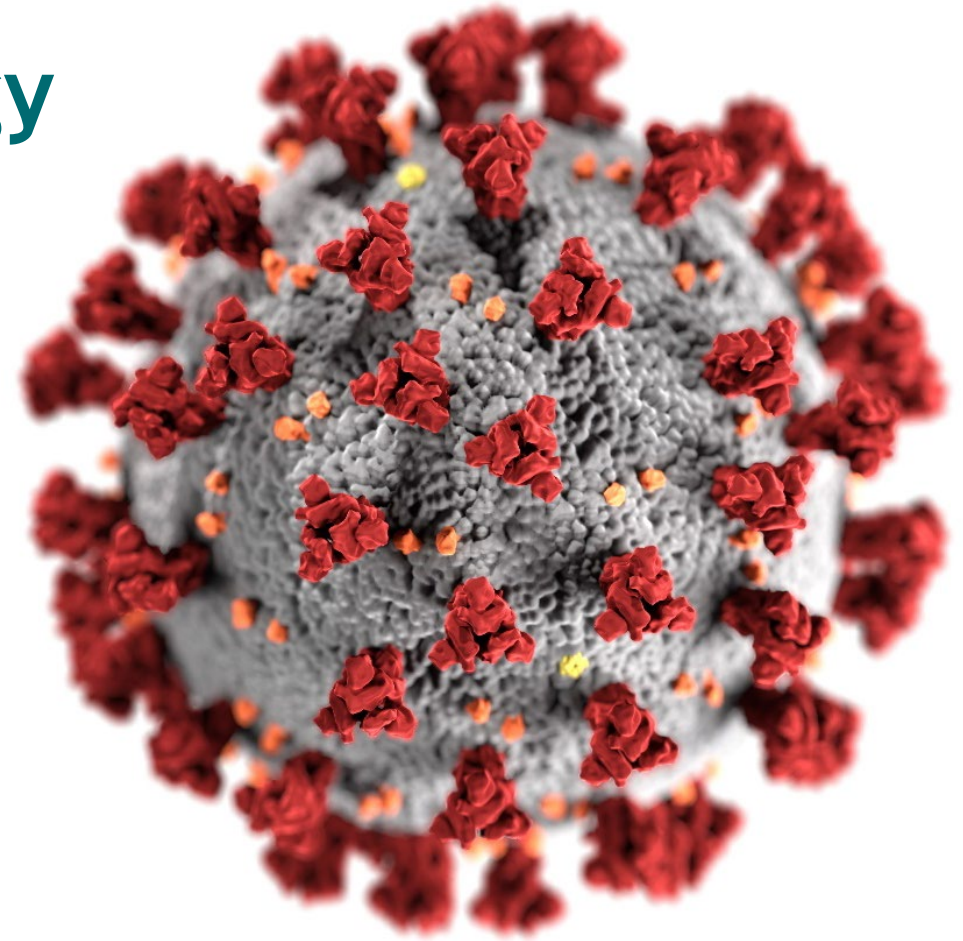
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Update on Current Epidemiology of the COVID-19 Pandemic and SARS-CoV-2 Variants

CDR Heather Scobie, PhD, MPH

Coronavirus and Other Respiratory Viruses Division (Proposed)
Centers for Disease Control and Prevention

January 26, 2022



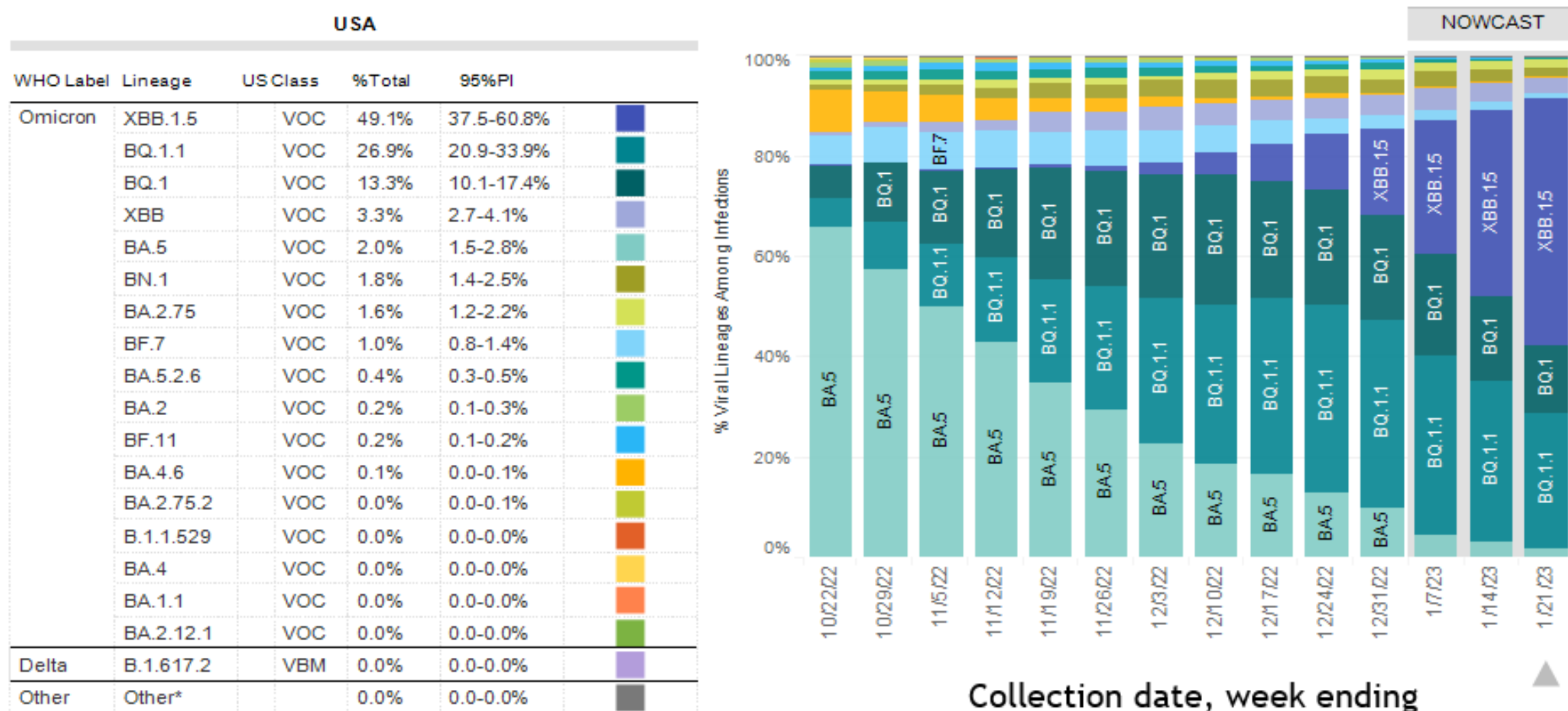
cdc.gov/coronavirus

SARS-CoV-2 Variants



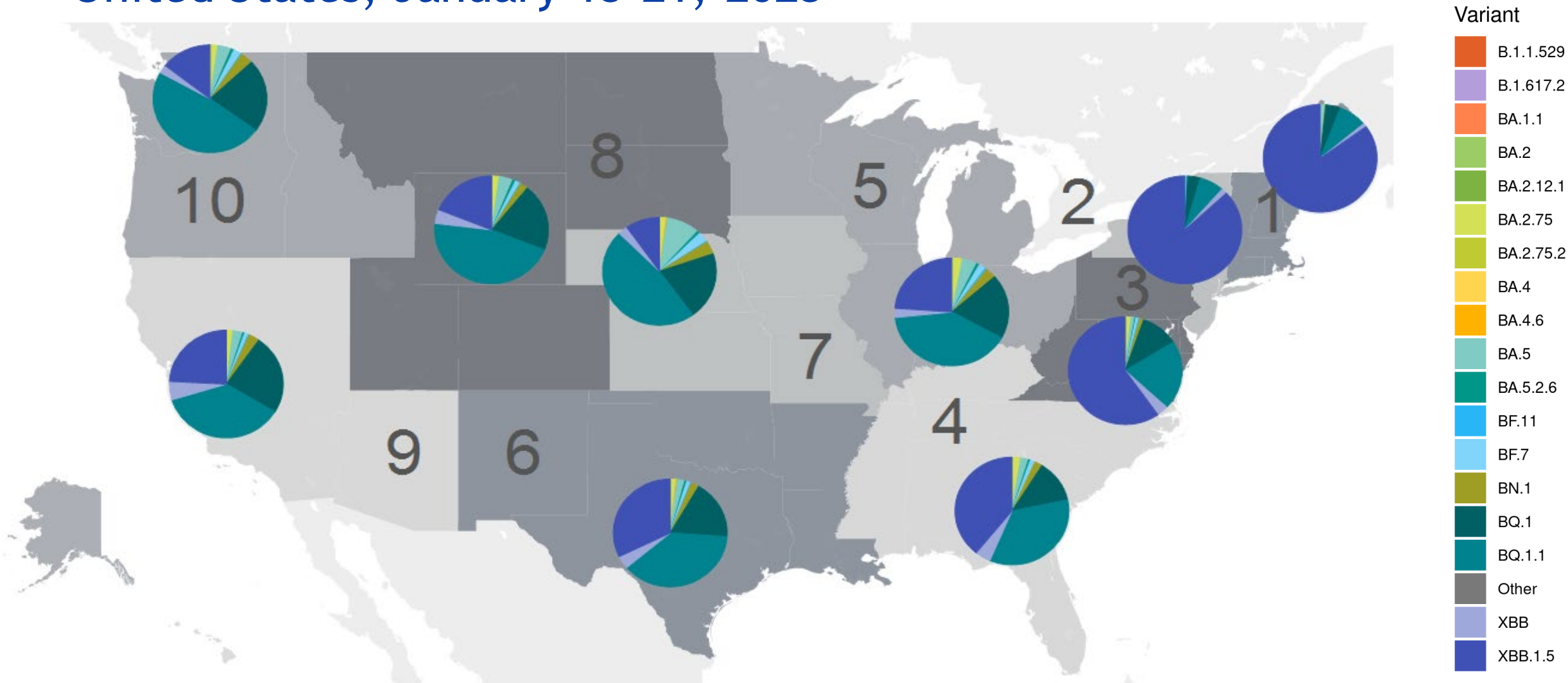
Trends in Weighted Variant Proportion Estimates & Nowcast

United States, October 16, 2022-January 21, 2023



Nowcast Estimates of Variant Proportions by HHS Region

United States, January 15-21, 2023



HHS=Health and Human Services

<https://covid.cdc.gov/covid-data-tracker/#variant-proportions> Accessed Jan 20, 2023

Convergent Evolution of Different Omicron Sub-lineages

Key changes in the spike receptor binding domain

44% of circulating lineages BA.4/BA.5-related
(spike component included in bivalent vaccine)

BA.5 - L452R, F486V, R493Q

*BF.7 - **R346T**

*BF.11 - **R346T**

*BA.5.2.6 - **R346T**

BQ.1 - **K444T**, N460K

BQ.1.1 - **R346T**, **K444T**, N460K

Change impacts some monoclonal antibodies

Sub-lineage $\leq 1\%$ in U.S. as of January 21, 2023

Bolded sub-lineages are expanding in U.S.

BA.4 - L452R, F486V, R493Q

*BA.4.6 - **R346T**

BA.2

BA.2.75 - D339H, **G446S**, N460K, R493Q

*BA.2.75.2 - D339H, **R346T**, **G446S**, N460K, F486S, R493Q

BN.1 - **R346T**, K356T, F490S

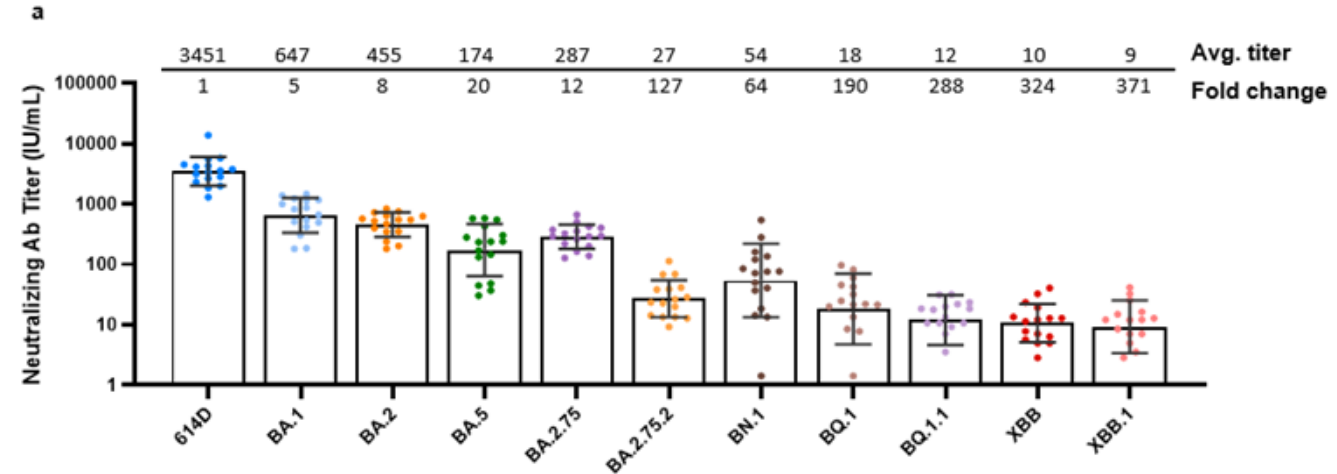
XBB - D339H, **R346T**, L368I, **V445P**, **G446S**, N460K, F486S, F490S, R493Q

XBB.1.5 - D339H, **R346T**, L368I, **V445P**, **G446S**, N460K, S486P, F490S, R493Q

Neutralization Activity of Monovalent Booster Sera (2021) and Bivalent Booster (2022) Sera Against Omicron Lineages

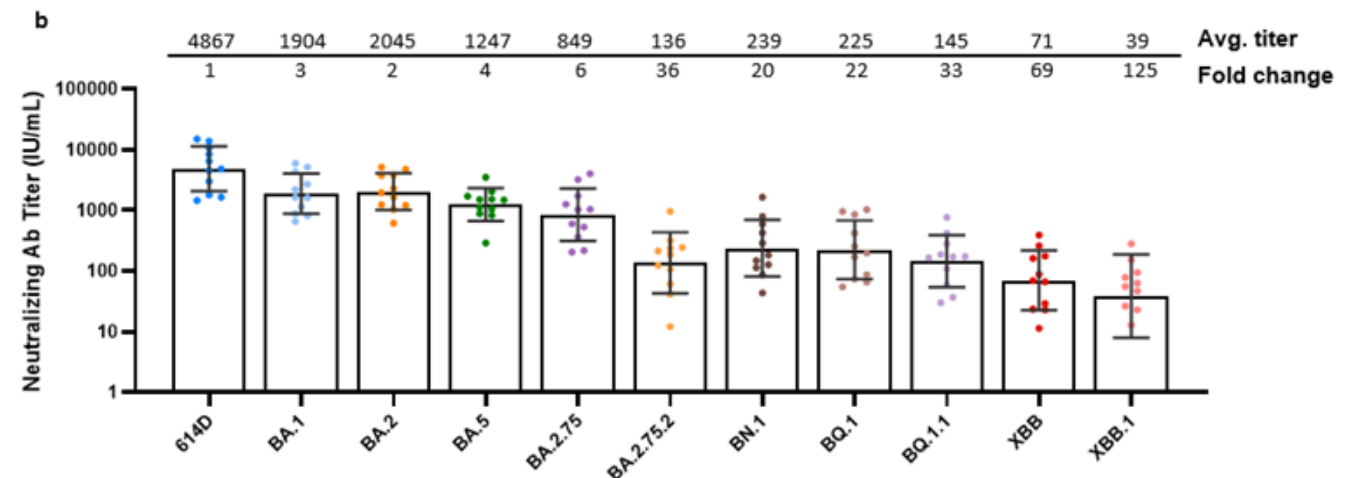
Monovalent Booster

3 monovalent doses in total,
sera collected 2-6 weeks after last dose



Bivalent Booster

3 monovalent doses + 1 bivalent dose in total,
sera collected 2-7 weeks after last dose



COVID-19 Trends



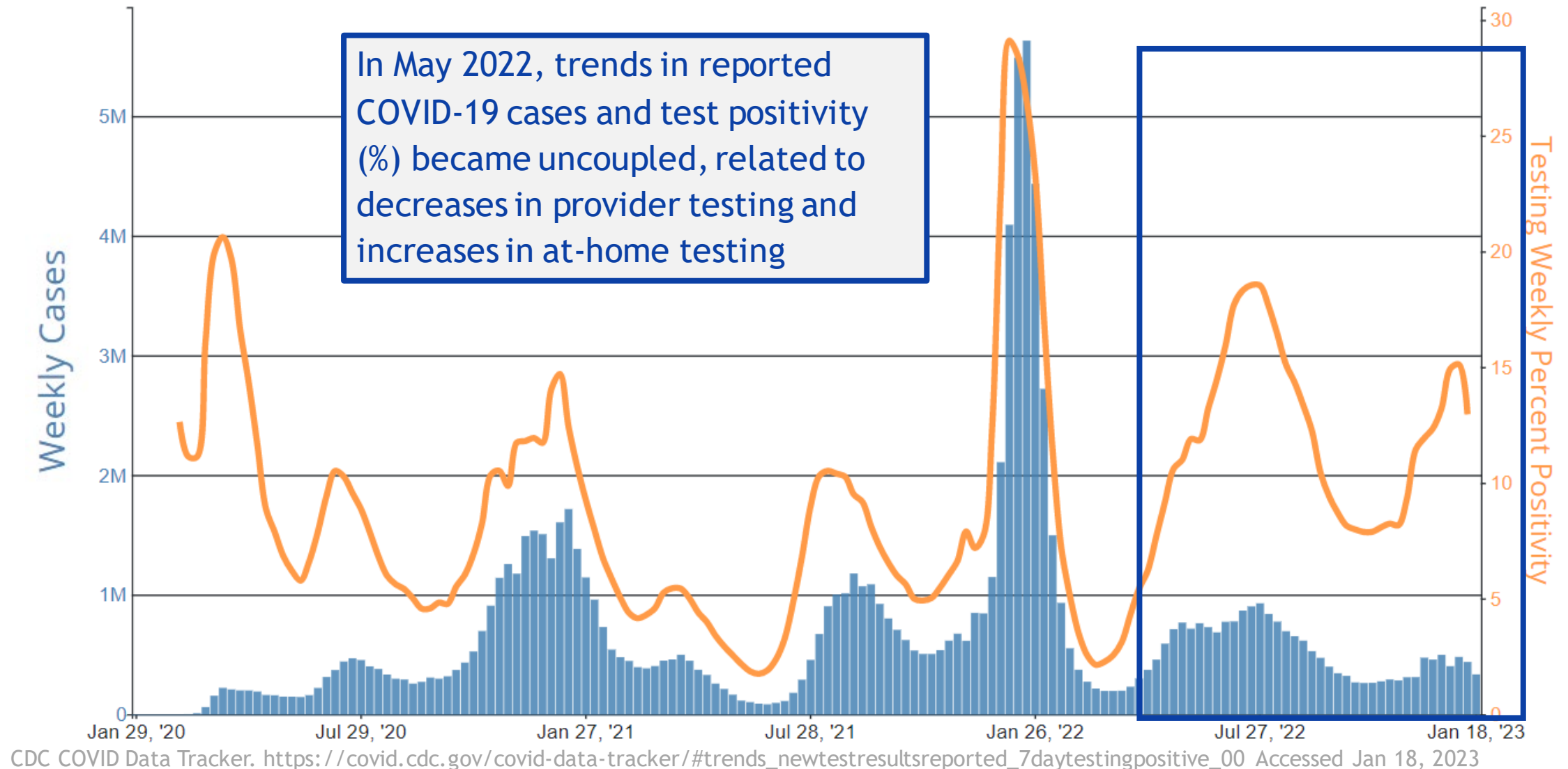
Reported COVID-19 Cases and Deaths in the United States

As of January 18, 2023

101,873,730 reported cases

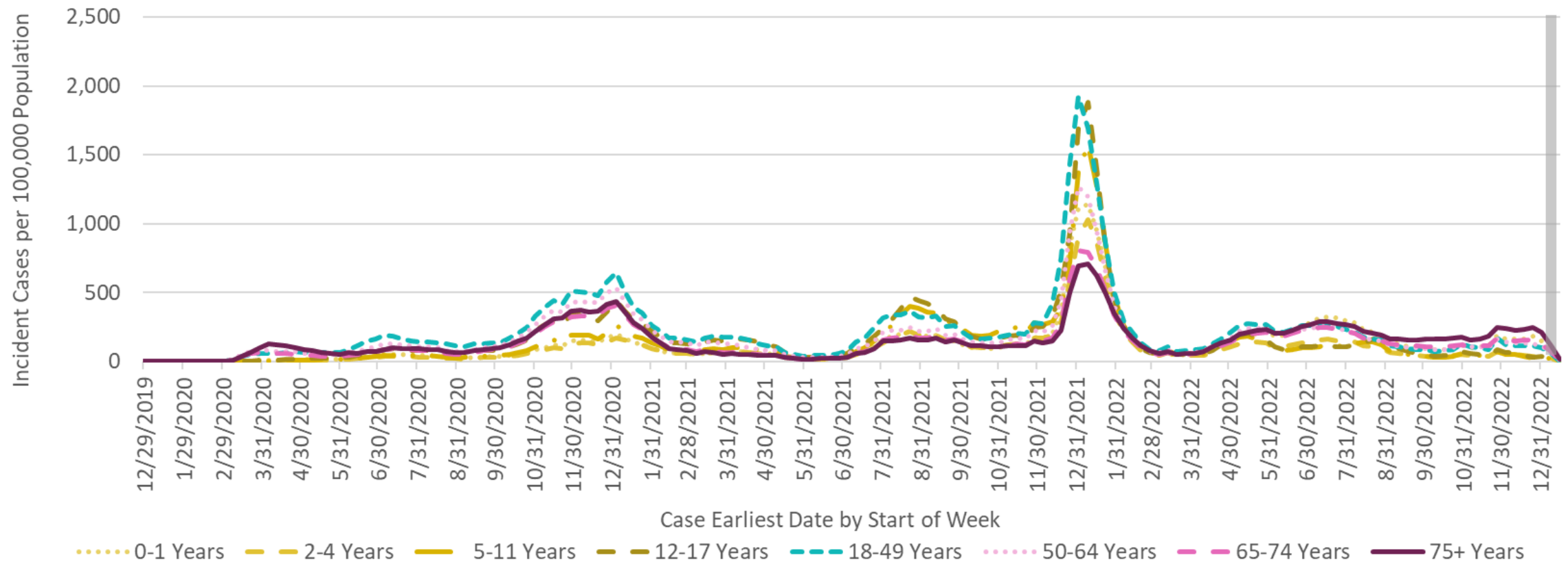
1,099,866 reported deaths

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



COVID-19 Weekly Cases per 100,000 Population by Age Group, United States

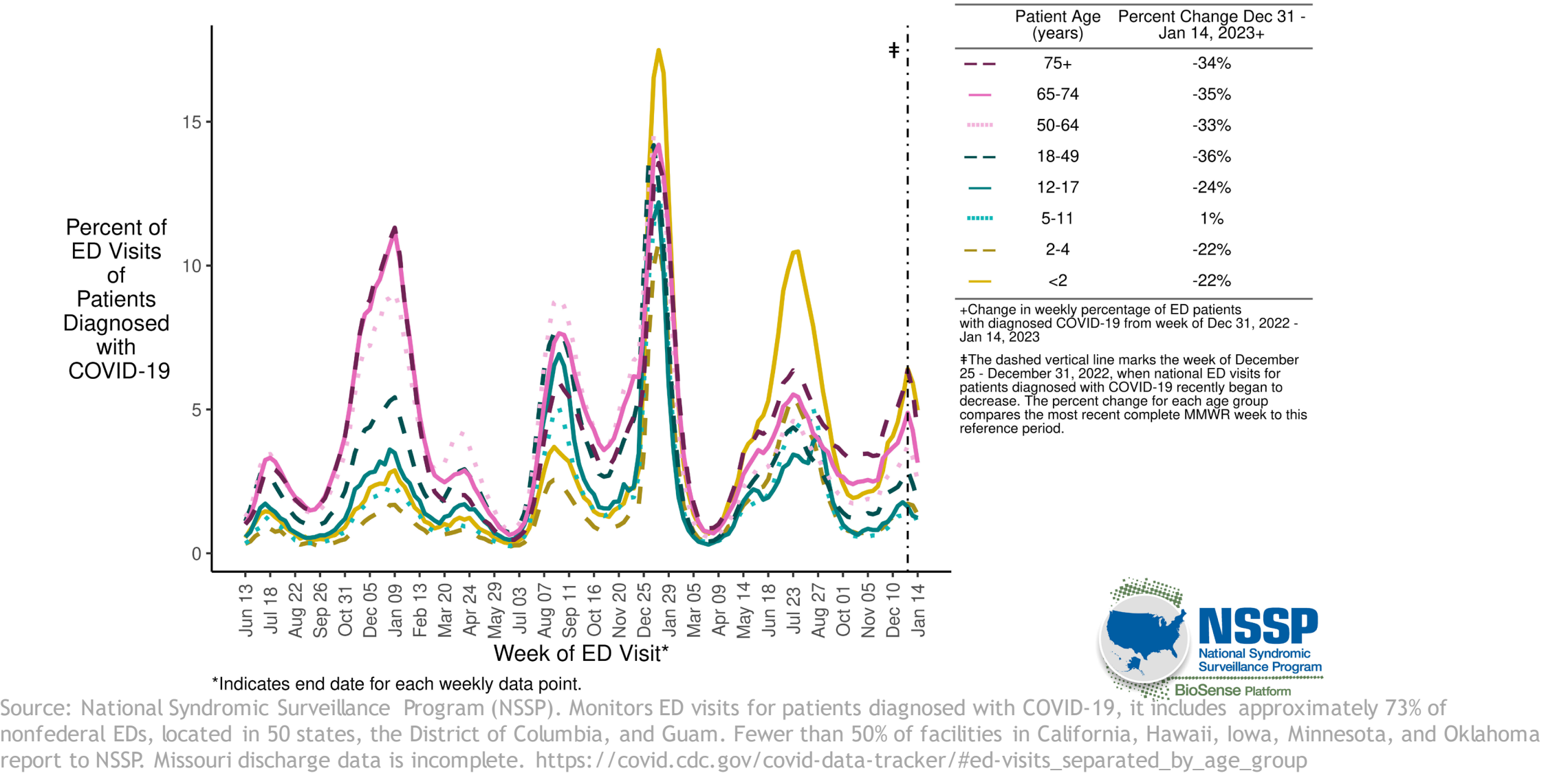
January 1, 2020 - January 18, 2023



Note. Gray bars denote potential 2-week delay in case reporting to CDC.

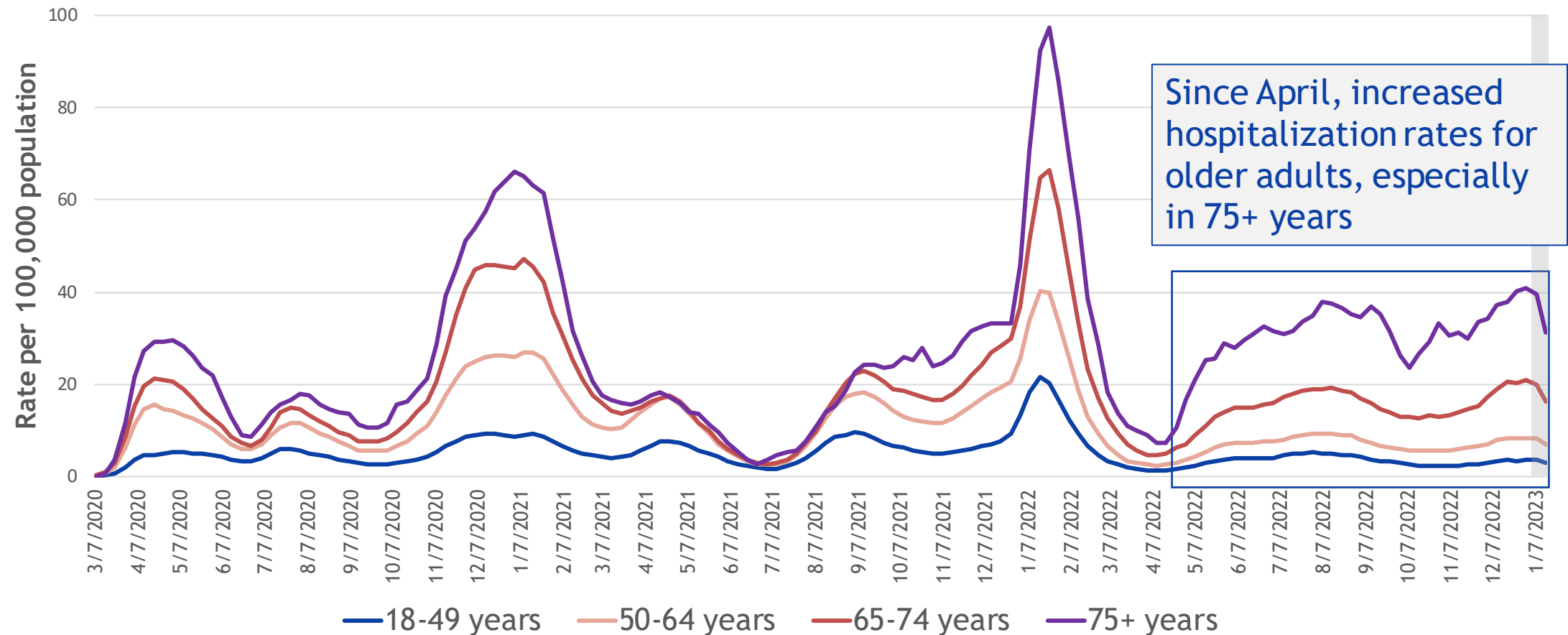
Source: <https://covid.cdc.gov/covid-data-tracker/#demographicsovertime> Accessed Jan 20, 2023

Patients With Diagnosed COVID-19 as a Percent of All Emergency Department Patient Visits, by Age Group, June 13, 2020 - January 14, 2023



Weekly Trends in COVID-19-Associated Hospitalization Rates (3-Week Moving Average) Among Adults by Age Group

COVID-NET, March 2020 - January 14, 2023

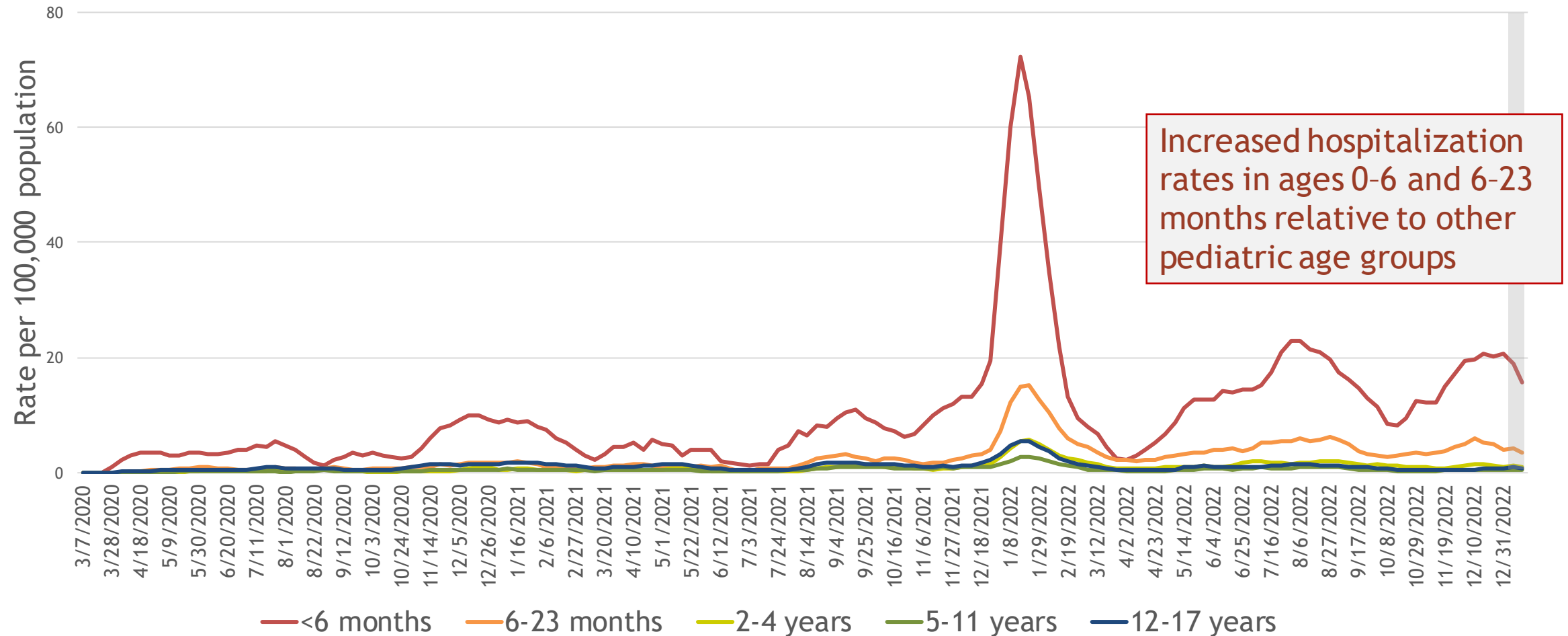


Grey shaded area denotes the most recent 2 weeks where reporting is <95% complete.

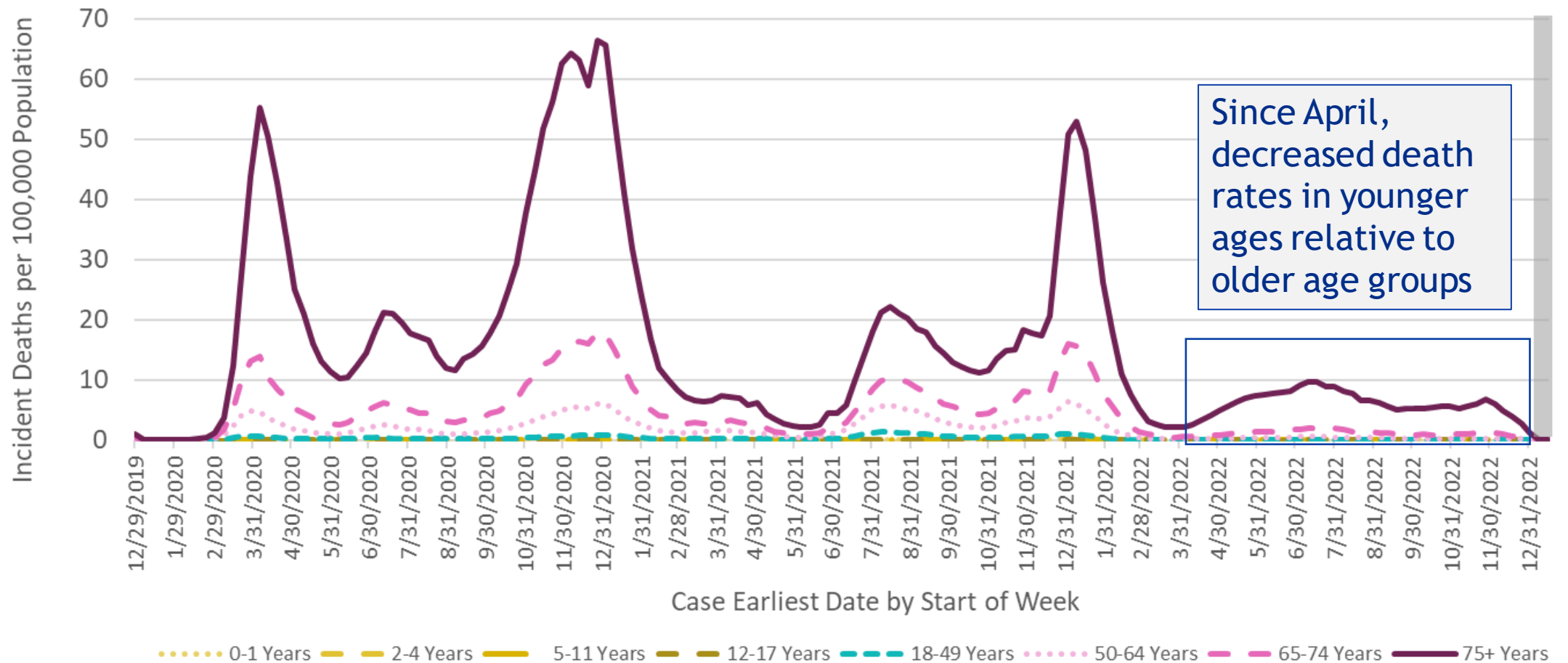
Source: COVID-NET; https://gis.cdc.gov/grasp/COVIDNet/COVID19_3.html Accessed Jan 20, 2022

COVID-19-Associated Hospitalization Rates (3-Week Moving Average) in Children by Age Group

COVID-NET, March 2020 - January 14, 2023



COVID-19 Weekly Deaths per 100,000 Population by Age Group, United States, January 1, 2020 - January 18, 2023



COVID-19 Cumulative Cases and Deaths per 100,000 Population by Age Group, United States, January 2, 2022 - January 18, 2023 (Omicron Variant Period)

Age group	COVID-19 Cases per 100,000 Population	COVID-19 Deaths per 100,000 Population
0 - 1 years	12,165.8	3.8
2 - 4 years	7,879.8	0.8
5 - 11 years	9,814.9	0.6
12 - 17 years	10,918.4	0.9
18 - 49 years	13,960.2	7.2
50 - 64 years	11,684.0	44.3
65 - 74 years	10,173.5	129.7
75+ years	11,758.9	510.5

Cumulative COVID-19-Associated Hospitalizations per 100,000 Population by Age Group, COVID-NET, January 2, 2022 - January 14, 2023 (Omicron Variant Period)

Age group	Cumulative Rate
<6 months	902.0
6 - 23 months	260.9
2 - 4 years	88.4
5 - 11 years	40.1
12 - 17 years	66.4
18 - 49 years	245.1
50 - 64 years	488.2
65 - 74 years	977.9
75+ years	1803.0

Trends in COVID-19 Vaccination and Seroprevalence



COVID-19 Vaccinations in the United States

As of January 18, 2023

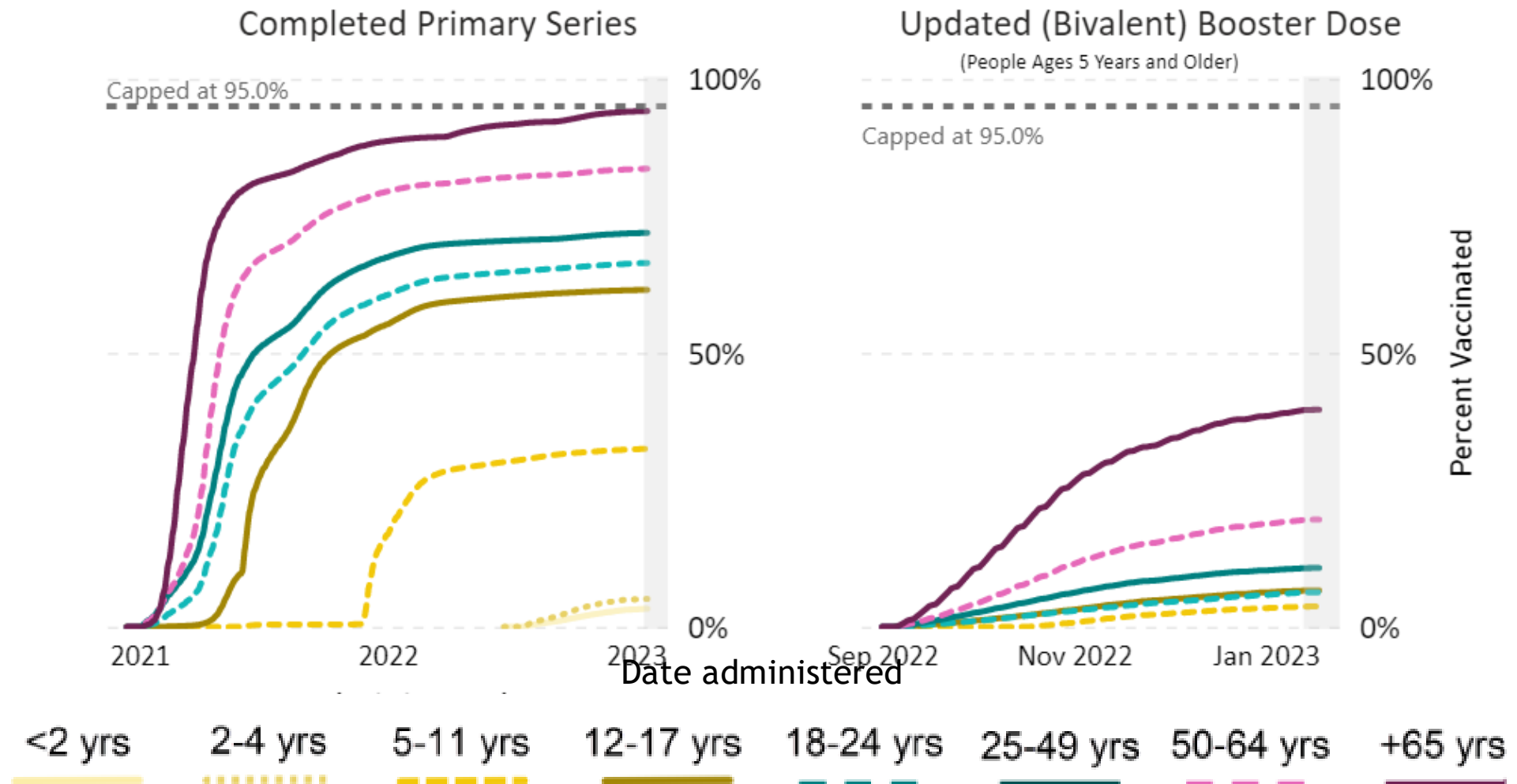
229.5M
People vaccinated with
a primary series

73% Population
≥5 Years of Age

50.6M
People received an
updated (bivalent)
booster dose*

16% Population
≥5 Years of Age

Percentage of People Vaccinated with at Least a Primary Series or Updated (Bivalent) Booster Dose by Age Group and Date Administered, United States, December 14, 2020 - January 18, 2023



U.S. COVID-19 Vaccination Coverage (%) of Total Population by Age Group – January 18, 2023

Coverage / Age (years)	<2	2-4	5-11	12-17	18-24	24-49	50-64	≥65
At least 1-dose	7.3	10.0	39.6	71.8	81.7	85.0	95.0	95.0
Completed primary series	3.3	5.1	32.5	61.5	66.4	71.9	83.6	94.1
1st monovalent booster*	-	-	3.3	16.6	27.2		45.3	64.6
2nd monovalent booster *	-	-	-	-	-	-	10.6	25.3
Bivalent booster**	-	-	3.7	6.7	6.3	10.8	19.6	39.6
Unvaccinated	92.7	90.0	60.4	28.2	18.3	15.0	5.0	5.0

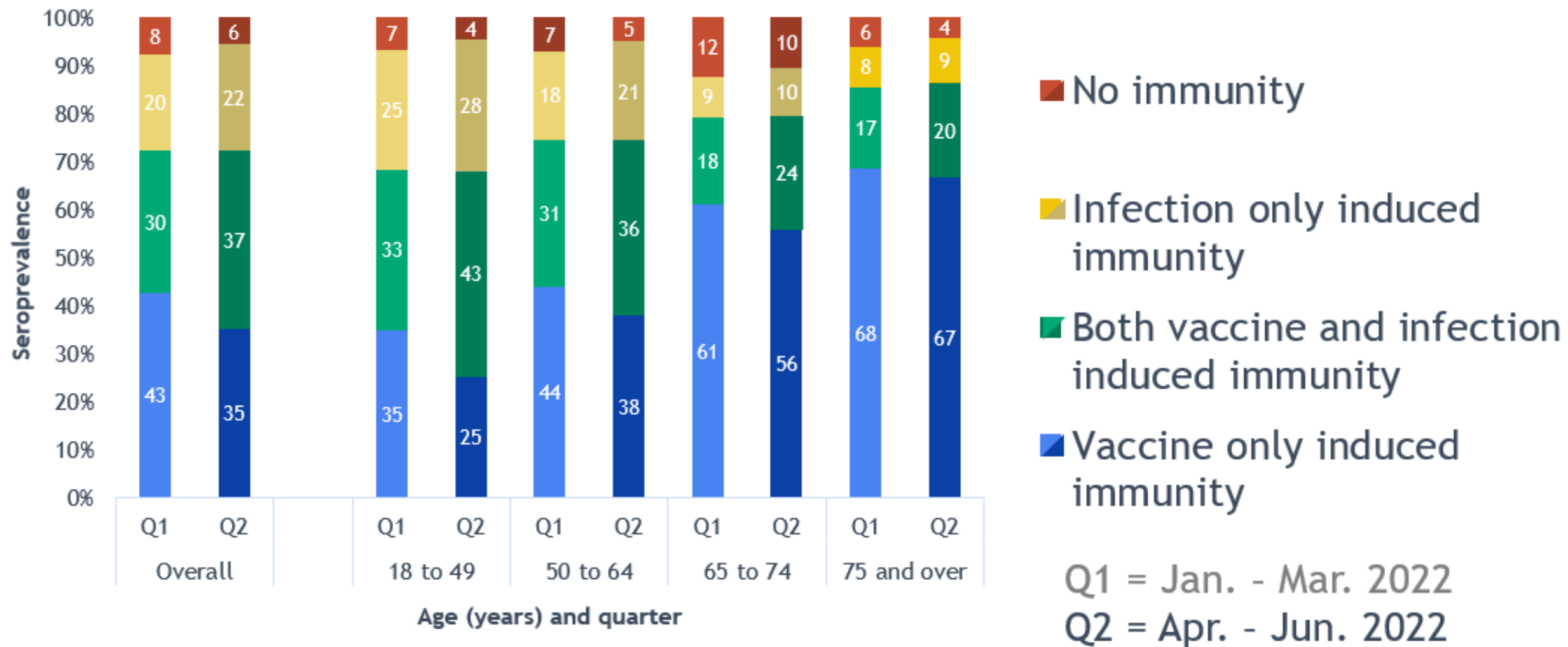
*Monovalent booster dose coverage as of August 26, 2022

** Bivalent booster coverage is independent of 1st and 2nd dose monovalent coverage

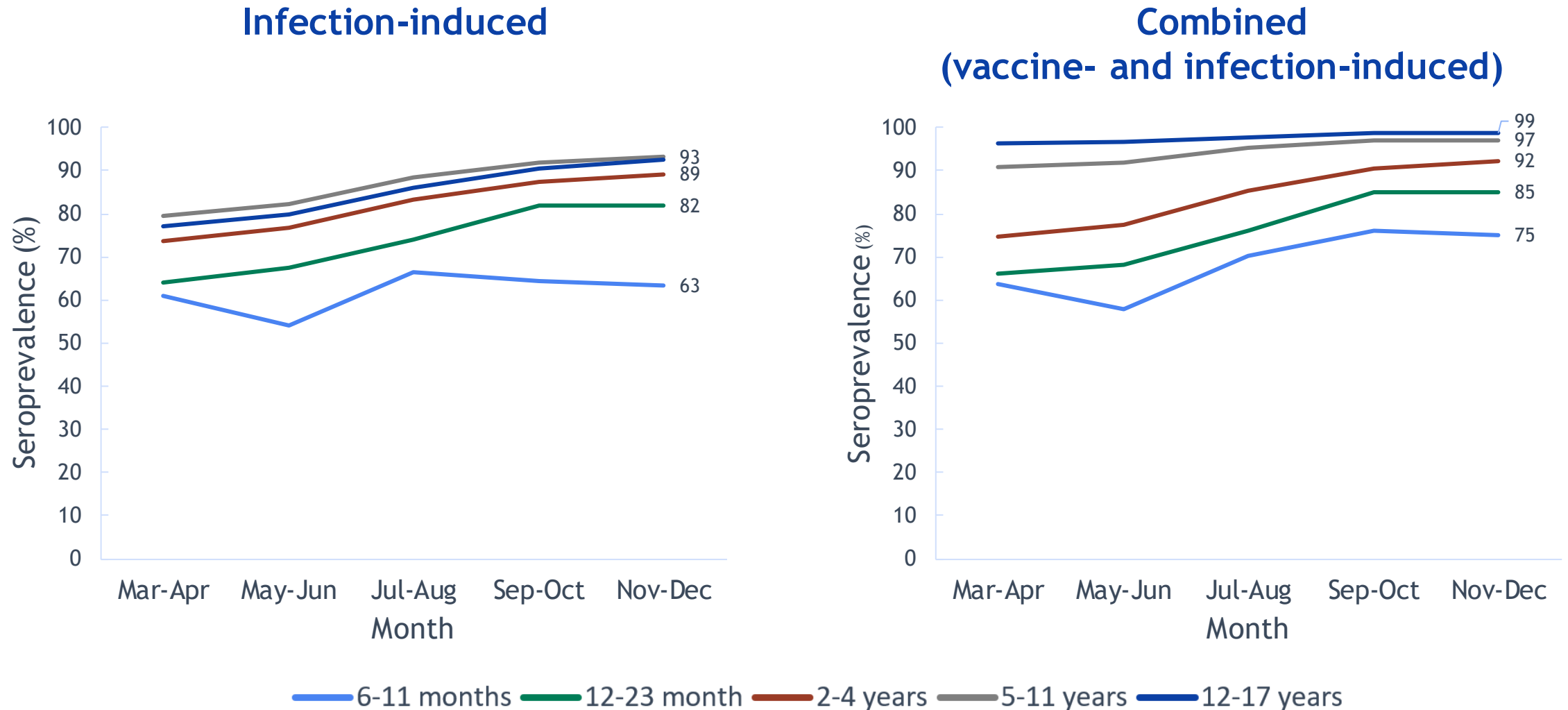
Note: Coverage is capped at 95%

Source: <https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-trends> Updated January 18, 2023

Seroprevalence by Vaccine and Infection History Among U.S. Adult Blood Donors by Age Group, January-June 2022



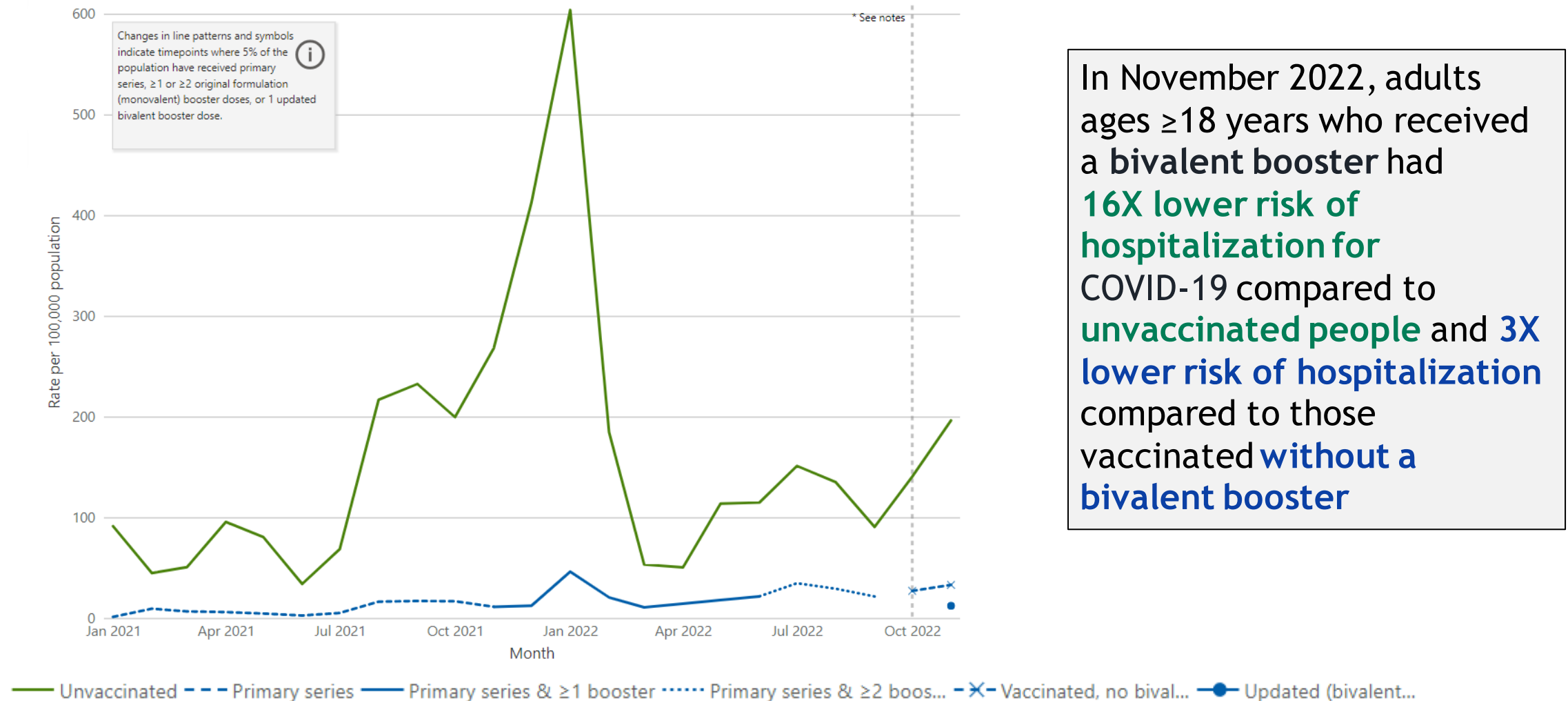
Pediatric Infection-Induced and Combined (Vaccine- and Infection-Induced) Seroprevalence from U.S. Commercial Laboratories – March-December 2022



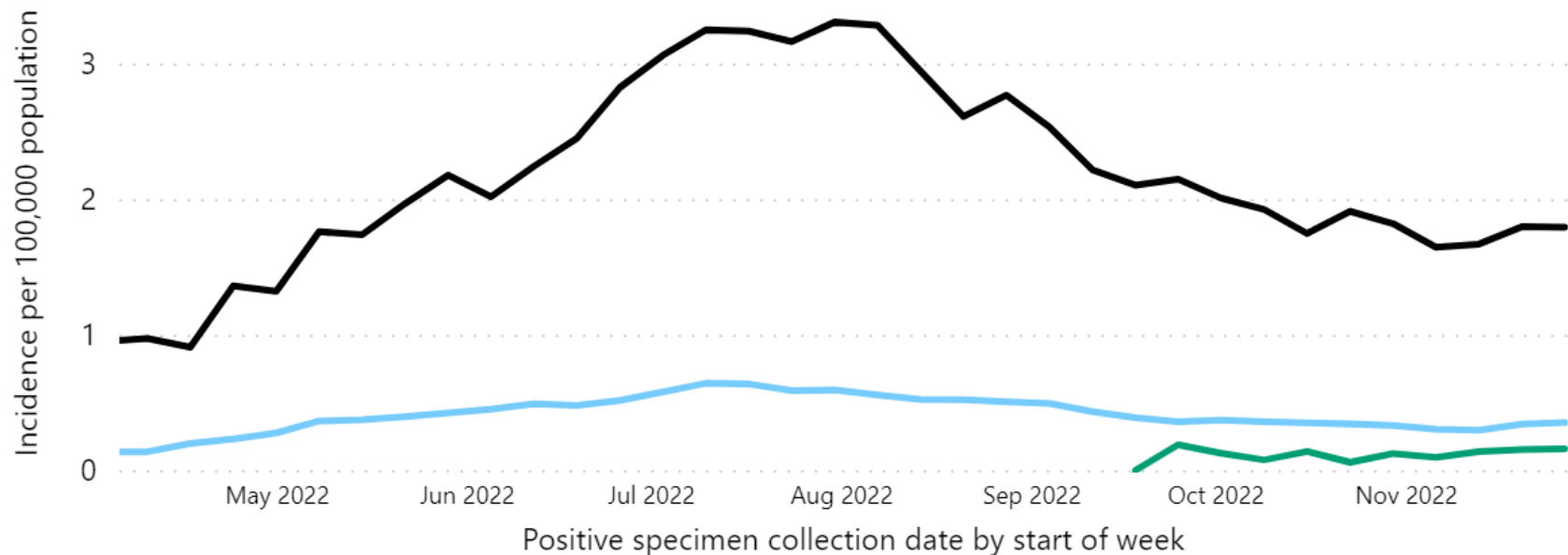
Trends in COVID-19 by Vaccination Status



Age-Adjusted Rates of COVID-19-Associated Hospitalization by Vaccination Status and Receipt of Booster Dose in Adults Ages ≥ 18 Years COVID-NET, January 2021–November 2022



Death Rates by Vaccination Status and Receipt of Bivalent Booster Doses Among People Ages ≥ 12 Years April 3-December 3, 2022 (23 U.S. Jurisdictions)



In November 2022, people ages 5 years and older with **bivalent booster** had **13 times lower risk of dying** from COVID-19, compared to **unvaccinated people** and **2 times lower risk of dying** from COVID-19 than people **vaccinated without a bivalent booster**

● Unvaccinated ● Vaccinated without updated booster ● Vaccinated with updated booster

*Includes either a booster or additional dose.

<https://covid.cdc.gov/covid-data-tracker/#rates-by-vaccine-status>. Accessed Jan 25, 2023

Risk of Severe COVID-19 Illness

- Unvaccinated people at higher risk of severe illness compared with vaccinated people
- Most (75%) vaccinated people with severe COVID-19 illness have multiple risk factors:
 - Older age (most ≥ 65 years, but with risk increasing with age)
 - Underlying medical conditions (with risk increasing with number of underlying conditions)
 - › Immunosuppression
 - › Diabetes mellitus
 - › Chronic kidney disease
 - › Chronic lung disease
 - › Chronic cardiovascular disease
 - › Chronic neurologic disease
- Antiviral drugs can help reduce risk of severe illness in people at higher risk, regardless of vaccination status

Yek et al. MMWR 2022;71:19-25. <https://www.cdc.gov/mmwr/volumes/71/wr/mm7101a4.htm>; Taylor et al. MMWR 2022;71:466-473: <http://dx.doi.org/10.15585/mmwr.mm7112e2> and unpublished COVID-NET data, as described [here](#); Malden et al. MMWR 2022; 71(25);830-833: <https://www.cdc.gov/mmwr/volumes/71/wr/mm7125e2.htm>; Gold et al. MMWR 2022; 71(25);825-829: <https://www.cdc.gov/mmwr/volumes/71/wr/mm7125e1.htm>; Najjar-Debbiny et al. CID 2022; , ciac443, <https://doi.org/10.1093/cid/ciac443> Dryden-Peterson et al. medRxiv 2022.06.14.22276393; <https://doi.org/10.1101/2022.06.14.22276393>

Summary

- CDC continues to monitor emerging variants, like the sub-lineages of Omicron, including prevalence and impact on disease incidence, severity, and vaccine effectiveness over time
- Variation in rates of severe illness related to community transmission and emerging variants; increasing proportion of severe illness occurring in older adults, especially 75+ years, and infants and children <2 years
- Increase in both vaccine derived and infection-acquired immunity in all ages, but susceptibility in children <2 years remains
- Important to stay up-to-date with vaccination, including updated bivalent boosters in eligible populations, to protect against severe COVID-19 illness
- Therapeutics and multiple prevention measures (e.g., masks, ventilation) should be used to protect people at higher risk of severe COVID-19, regardless of vaccination status

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