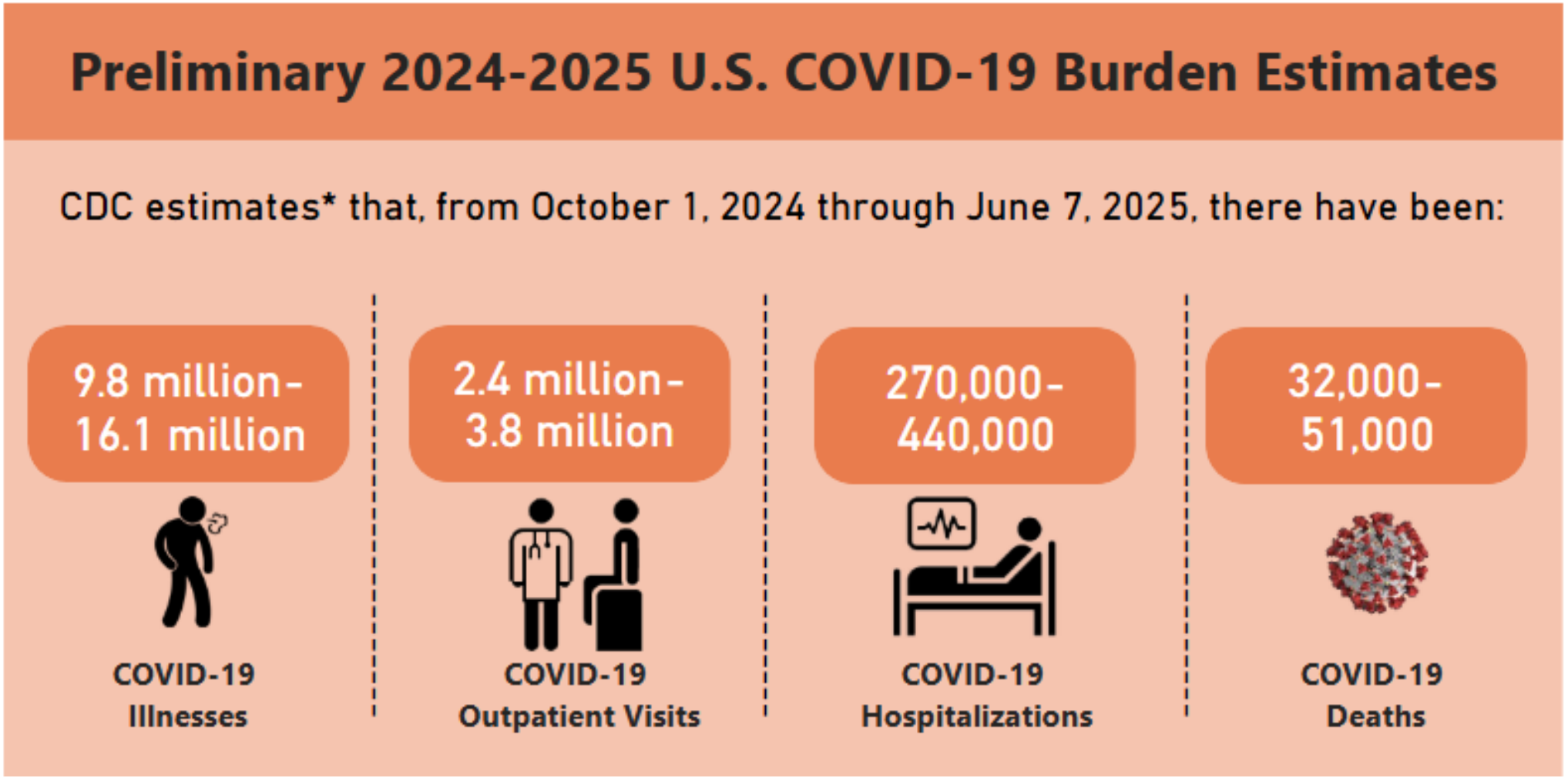
# Current Epidemiology of COVID-19

## Coronavirus and Other Respiratory Viruses Division

Advisory Committee on Immunization Practices (ACIP)

June 25, 2025

# COVID-19 continues to impact Americans' health.




* Based on data from September 29, 2024 through June 7, 2025.

Source: https://www.cdc.gov/covid/php/surveillance/burden-estimates.html

# Long COVID is a significant public health threat.

National surveys in 2023 estimated approximately 9.2 million adults and 0.3 million children in the U.S. had Long COVID.

Among adults aged ≥18 years, **3.6% reported Long COVID symptoms,** and **8.4% reported ever having Long COVID**[1]

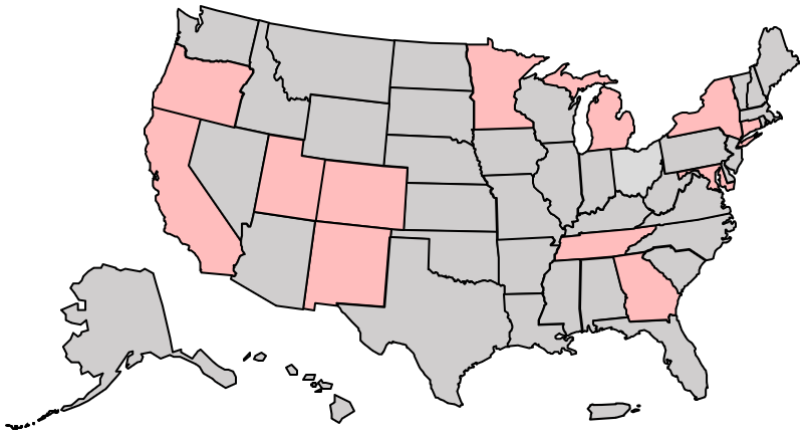
Among children aged 0-17 years, **0.4% reported Long COVID symptoms,** and **1.4% reported ever having Long COVID**[2]

**More than 3 in 5 adults** with Long COVID reported activity limitations[1]

**Almost 4 in 5 children** with Long COVID reported activity limitations[2]


1. Vahratian, et al. Prevalence of Post–COVID-19 Condition and Activity-Limiting Post–COVID-19 Condition Among Adults. doi:10.1001/jamanetworkopen.2024.51151
2. Ford, et al. Long COVID Prevalence and Associated Activity Limitation in US Children. doi:10.1001/jamapediatrics.2024.6206

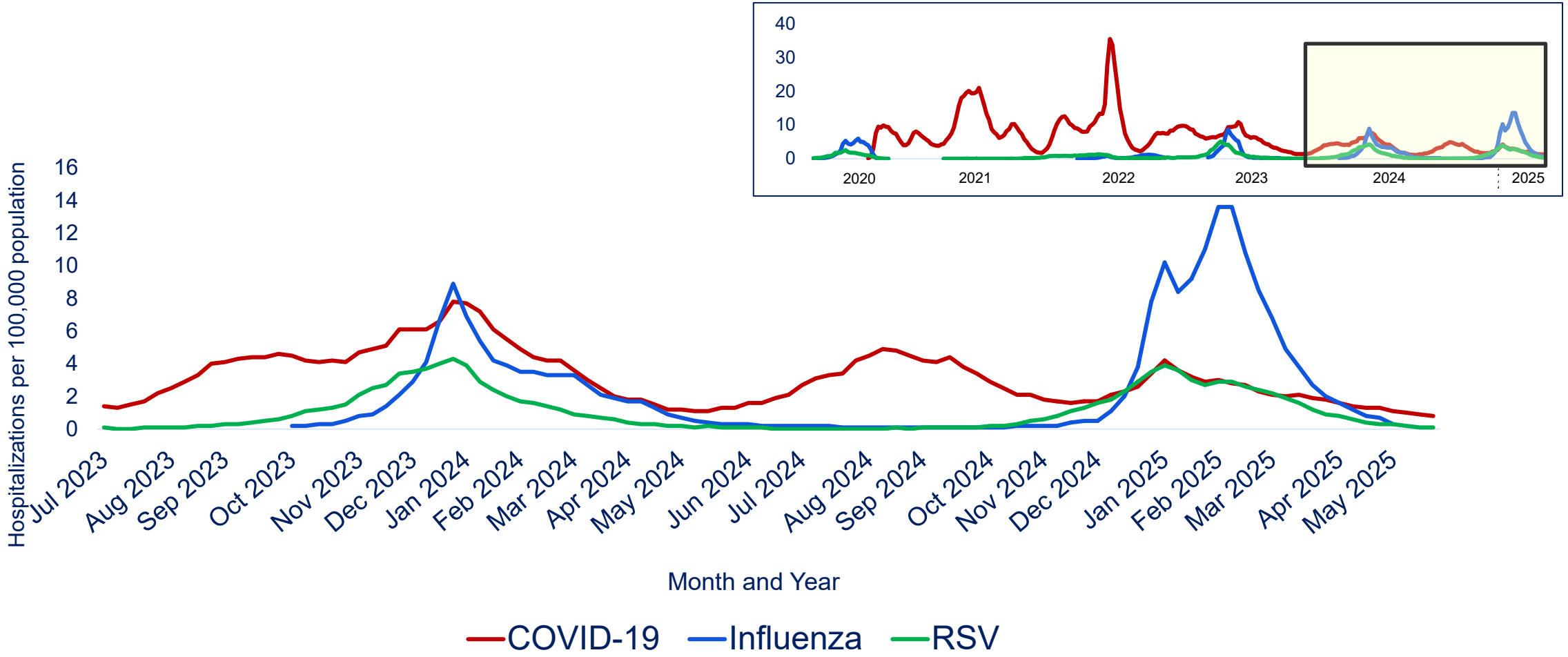
# COVID-NET is a population-based hospitalization surveillance platform.



- **RESP-NET includes COVID-NET, RSV-NET, FluSurv-NET**
- **>300 acute-care hospitals**
- **185 counties in 13 states (population-based rates)**
- **~10% of the U.S. population**
- **Positive SARS-CoV-2 test ≤14 days before admission or during hospitalization**
- **Screening or clinician-driven testing**
- **Clinical data: age- and site-stratified random sample of hospitalized patients**
- **Seasons defined in this presentation as July–June for rates.**
  - Most recent 12 months of sampled data


COVID-NET: https://www.cdc.gov/covid/php/covid-net/index.html Some slides display data from 90 counties in 12 states due to incomplete data.

# Weekly COVID-19-associated hospitalization rates have peaked in both winter and summer.

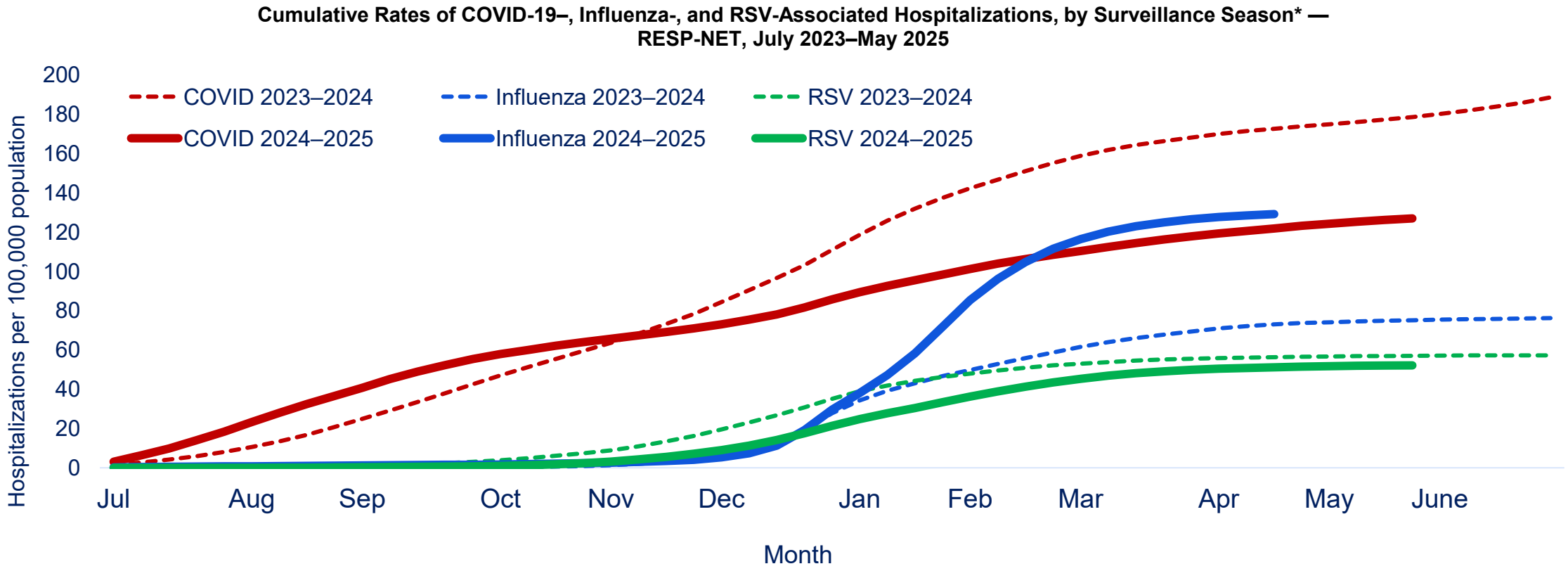



Figures displays weekly Rates of COVID-19–, Influenza-, and RSV-Associated Hospitalizations — RESP-NET, July 2023–May 2025.

Rates for all three pathogens (COVID-19, influenza, and respiratory syncytial virus [RSV]) are laboratory-confirmed. Data source: https://www.cdc.gov/resp-net/dashboard/

Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

# Cumulative COVID-19–associated hospitalization rates for the July 2024–May 2025 period were higher during summer and fall 2024 and lower during the winter months compared to July 2023–June 2024.

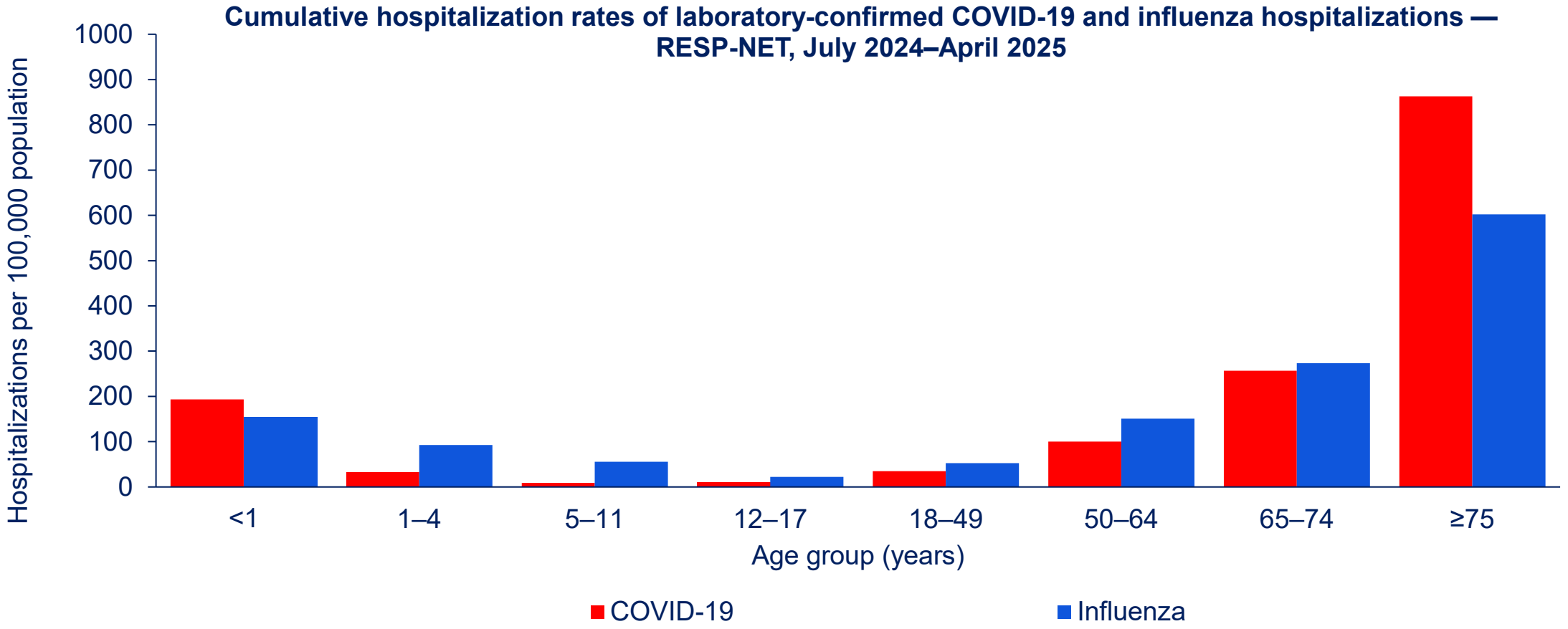



* Seasons are defined as July through June. The 2024–2025 season shows data from July 2024–May 2025 and is ongoing. Influenza surveillance is conducted October – April.

Rates for all three pathogens (SARS-CoV-2, influenza, and respiratory syncytial virus [RSV]) are laboratory-confirmed. Data source: https://www.cdc.gov/resp-net/dashboard/

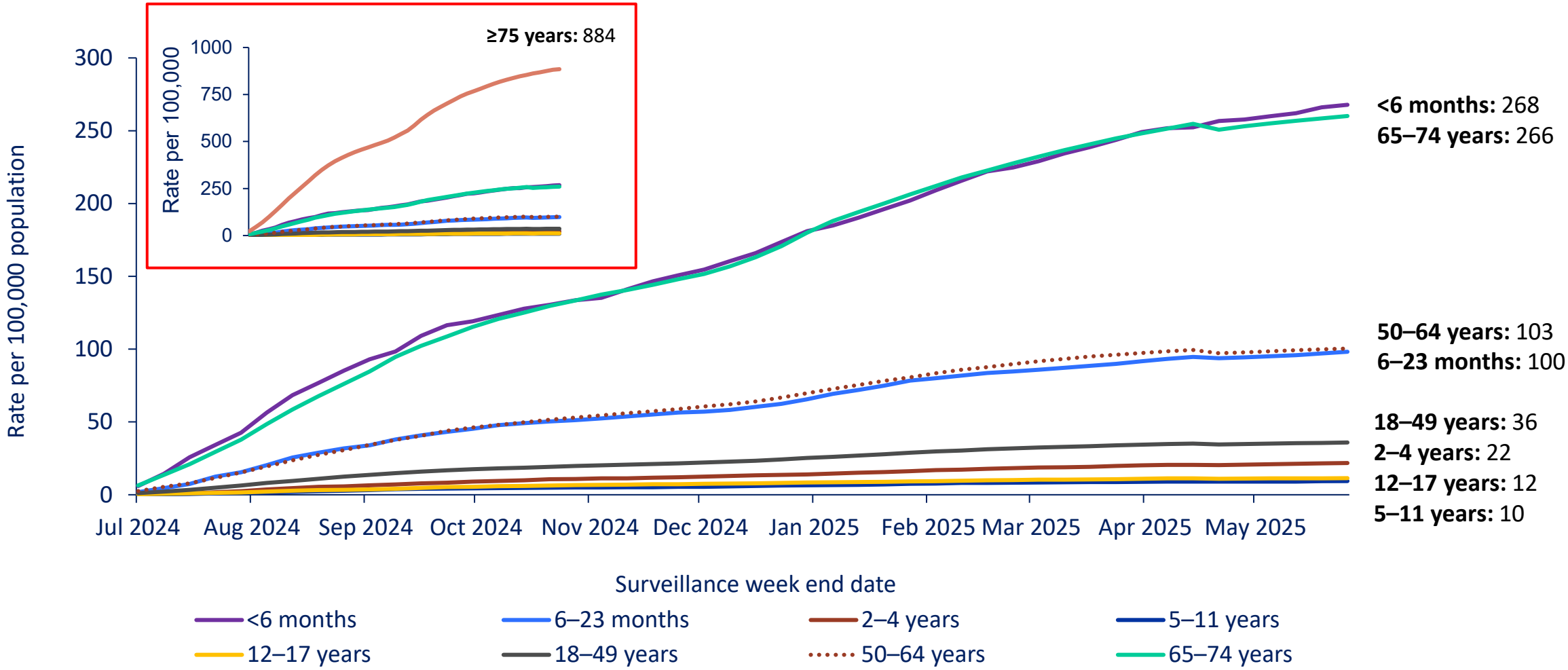
Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

# From July 2024 – April 2025, a period that included a high severity influenza season[1], more infants <1 and adults ≥75 had hospitalizations associated with COVID-19 than influenza.




Cumulative hospitalization rates with laboratory-confirmed SARS-CoV-2 and influenza hospitalizations — RESP-NET, July 2024–April 2025. Note that influenza surveillance is conducted from October–April annually. Data source: https://www.cdc.gov/resp-net/dashboard/. Note that rates are not adjusted for testing nor limited to admissions where the respiratory infection is the likely primary reason for admission. [1]https://www.cdc.gov/flu/php/surveillance/in-season-severity.html

# Cumulative COVID-19-associated hospitalization rates are highest among adults aged ≥75 years, followed by adults aged 65–74 years and infants aged <6 months.

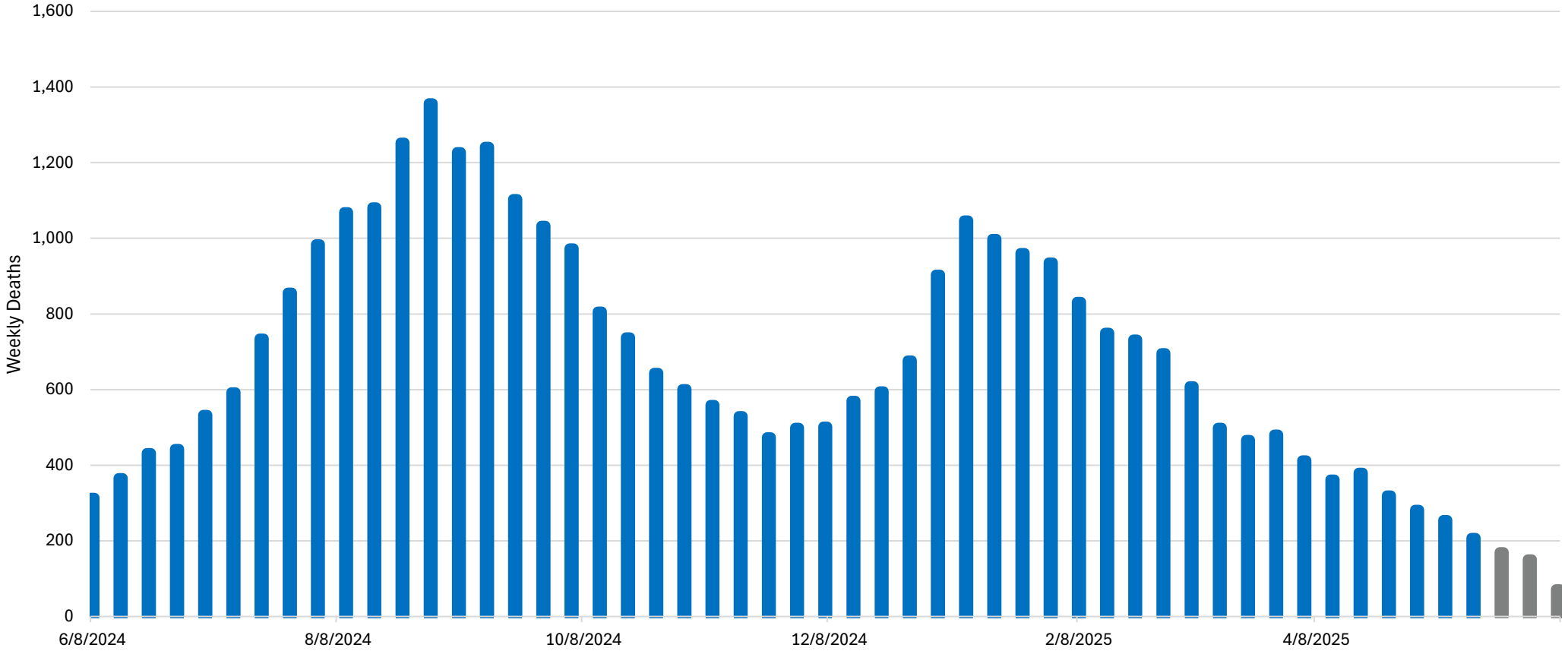



**Weekly rates of COVID-19–associated hospitalizations per 100,000 population by age group—COVID-NET, July 2024–May 2025**

Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

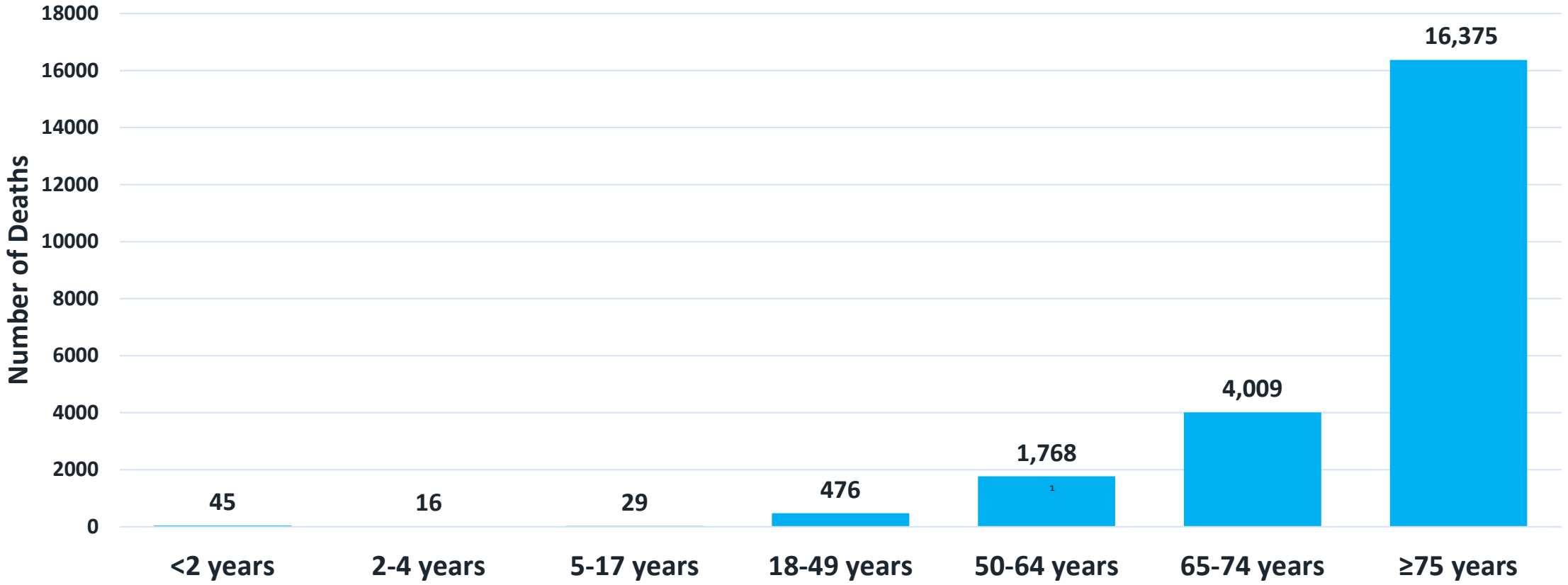
# COVID-19 Mortality

# Weekly number of COVID-19-associated deaths reported to CDC, United States, June 8, 2024 – June 7, 2025



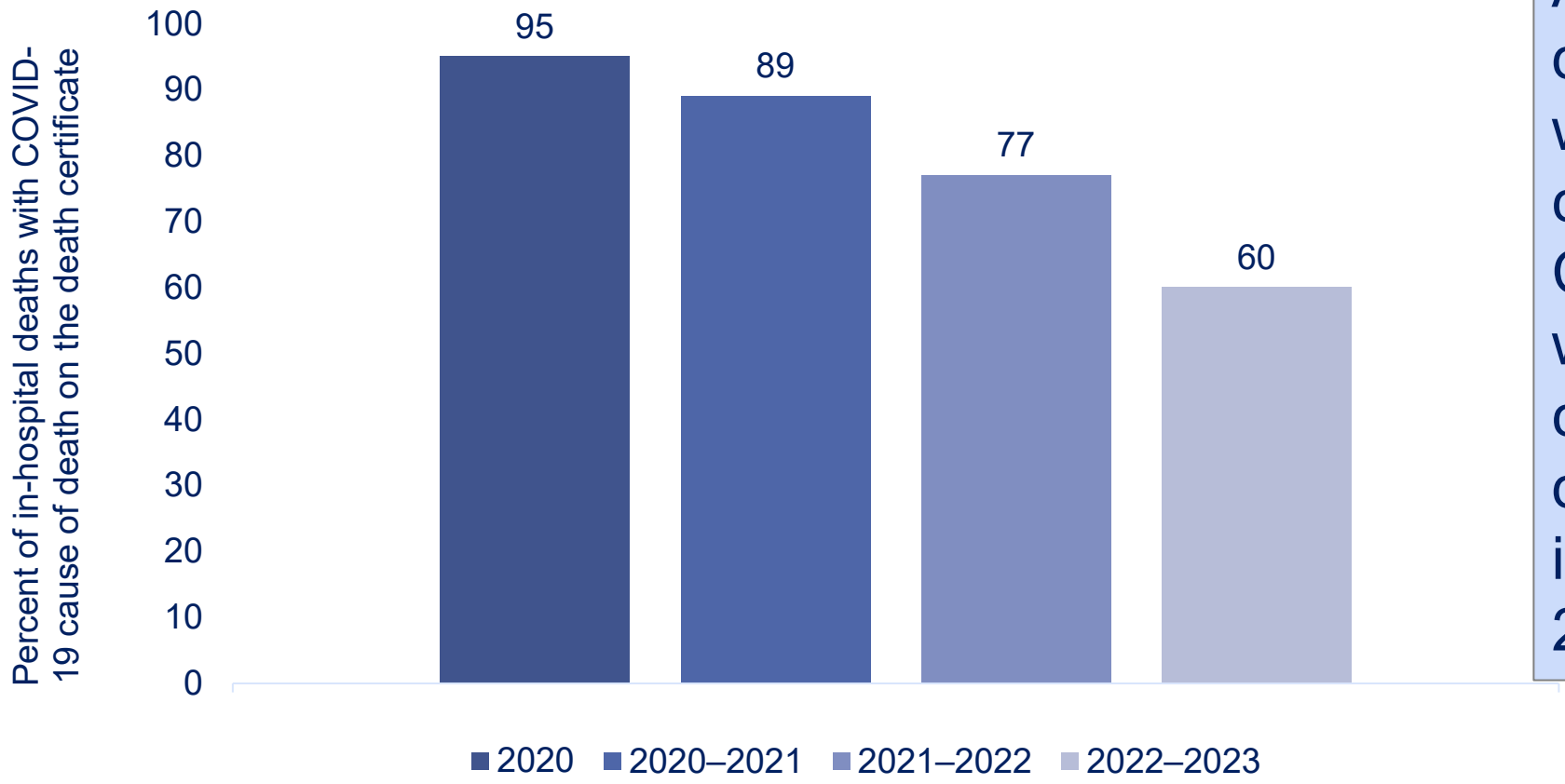

The most recent 3 weeks of mortality counts are shaded grey because NVSS reporting is <95% during this period.
Provisional data are non-final counts of deaths based on reported mortality data in NVSS. Deaths include those with COVID-19, coded as ICD–10 code U07.1, on the death certificate. Death data are displayed by date of death (event). Data include underlying and contributing causes of death.
CDC COVID Data Tracker. National Center for Health Statistics (NCHS) National Vital Statistics System (NVSS). https://covid.cdc.gov/covid-data-tracker/#trends_weeklydeaths_select_00 Accessed June 18, 2025

# Total number of deaths with COVID-19 listed as the underlying cause[1,2] in July 2024–June 2025, by age group, United States




1. Provisional data
2. Underlying cause of death Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Provisional Mortality on CDC WONDER Online Database. Data are from the final Underlying Cause of Death Files, provisional data for 2024 and provisional and partial data from 2025, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Number of deaths includes COVID-19 code (U07.1) as the underlying cause of death. http://wonder.cdc.gov/mcd-icd10-provisional.html, accessed June 20, 2025

# Death certificate data likely underestimate COVID-19-associated deaths.




Among in-hospital deaths in patients with laboratory-confirmed SARS-CoV-2, the proportion with a COVID-19 cause of death listed decreased from **95%** in 2020 to **60%** in 2022–2023.

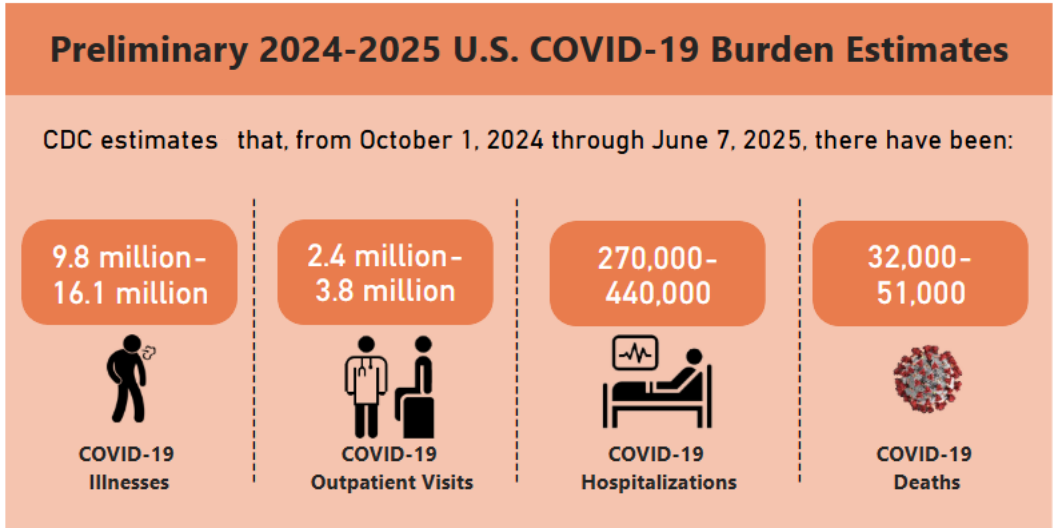
Figure displays the weighted percentage of COVID-19-associated hospitalizations with COVID-19 listed as an underlying or contributing cause of death,* by surveillance period** — COVID-NET, March 2020–September 2023

* COVID-19 as a cause of death was defined as the inclusion of International Classification of Diseases, Tenth Edition (ICD-10) code U07.1 on the death certificate as an underlying or contributing cause of death.

**Surveillance periods are defined as October–September, except for 2020, which was defined as March 2020–September 2020.

# COVID-19 continues to contribute to a large number of deaths in the United States.

| Data source | Estimated COVID-19 deaths since October 2024 |
|---|---|
| Death certificate data* | 20,800 |
| Modeled estimates based on multiple data sources† | 32,000–51,000 |

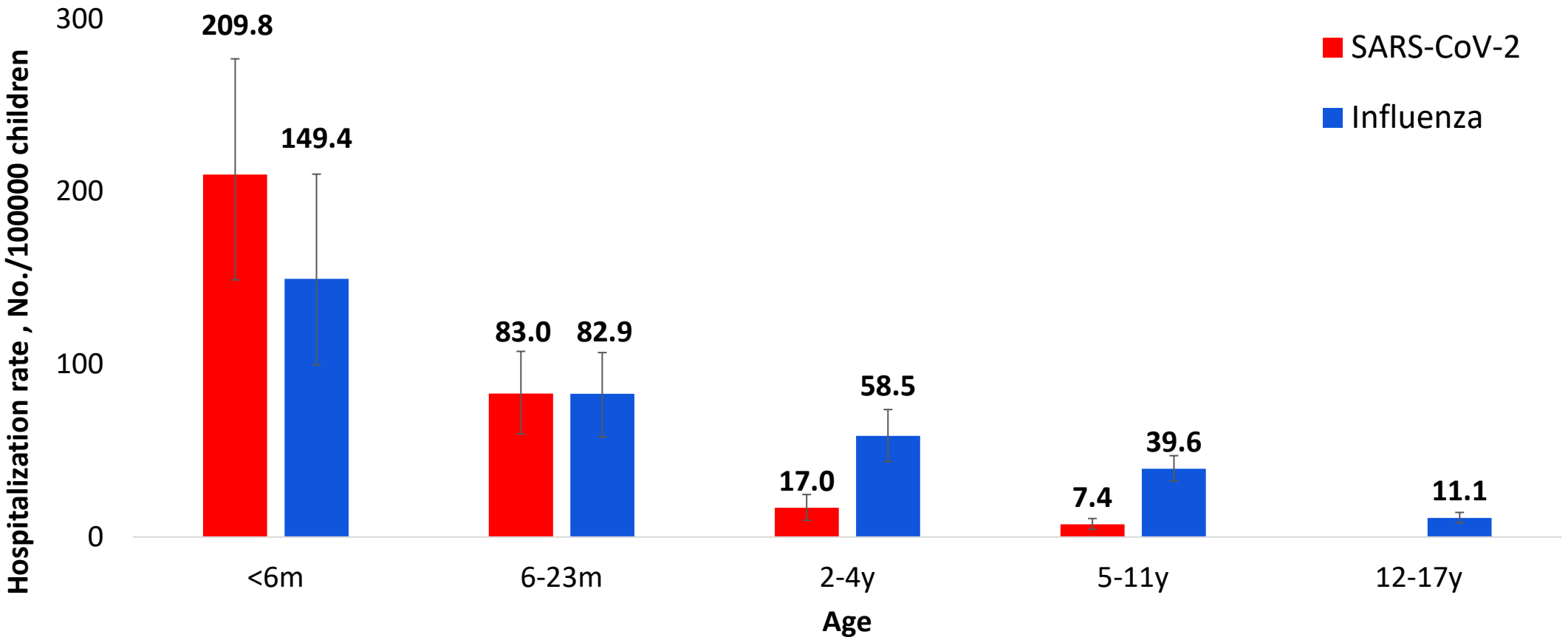



* COVID-19 as a cause of death was defined as the inclusion of International Classification of Diseases, Tenth Edition (ICD-10) code U07.1 on the death certificate (October 2024-May 2025) as underlying or contributing cause of death. Provisional death certificate data from the National Center for Health statistics

† Based on data from September 29, 2024 through June 7, 2025. Source: https://www.cdc.gov/covid/php/surveillance/burden-estimates.html. Accessed June 20, 2025

# Pediatric COVID-19–Associated Hospitalizations

# The highest rates for COVID-19 in the New Vaccine Surveillance Network were observed in infants <6 months of age.




Pediatric COVID-19 and influenza hospitalization rates among children <18 years, New Vaccine Surveillance Network (NVSN), July 2024- March 2025. Rate estimates with standard error >30 due to few detections are not presented. Annual rates presented July – June of each season, with exception of 2024-2025, which represents July 2024 – March 2025.
NVSN, unpublished data

# More than half of pediatric COVID-19-associated hospitalizations occur in children aged <2 years.

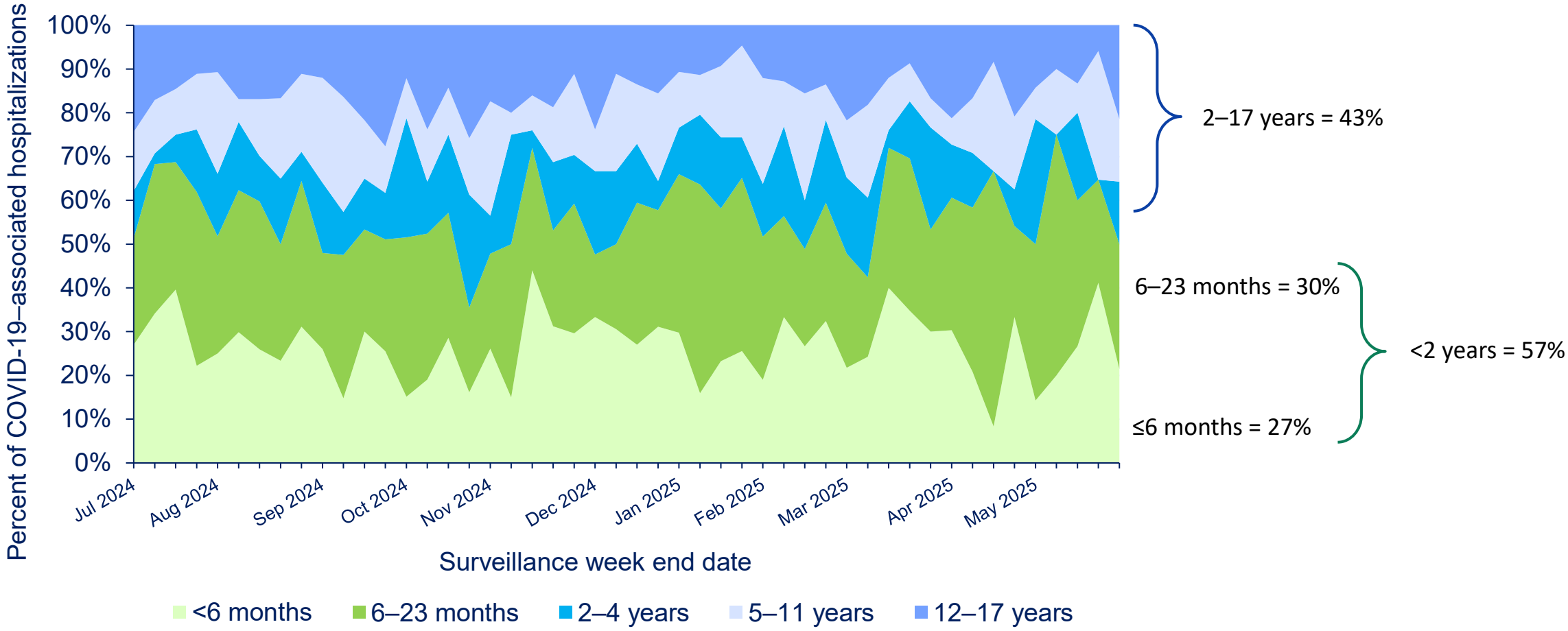
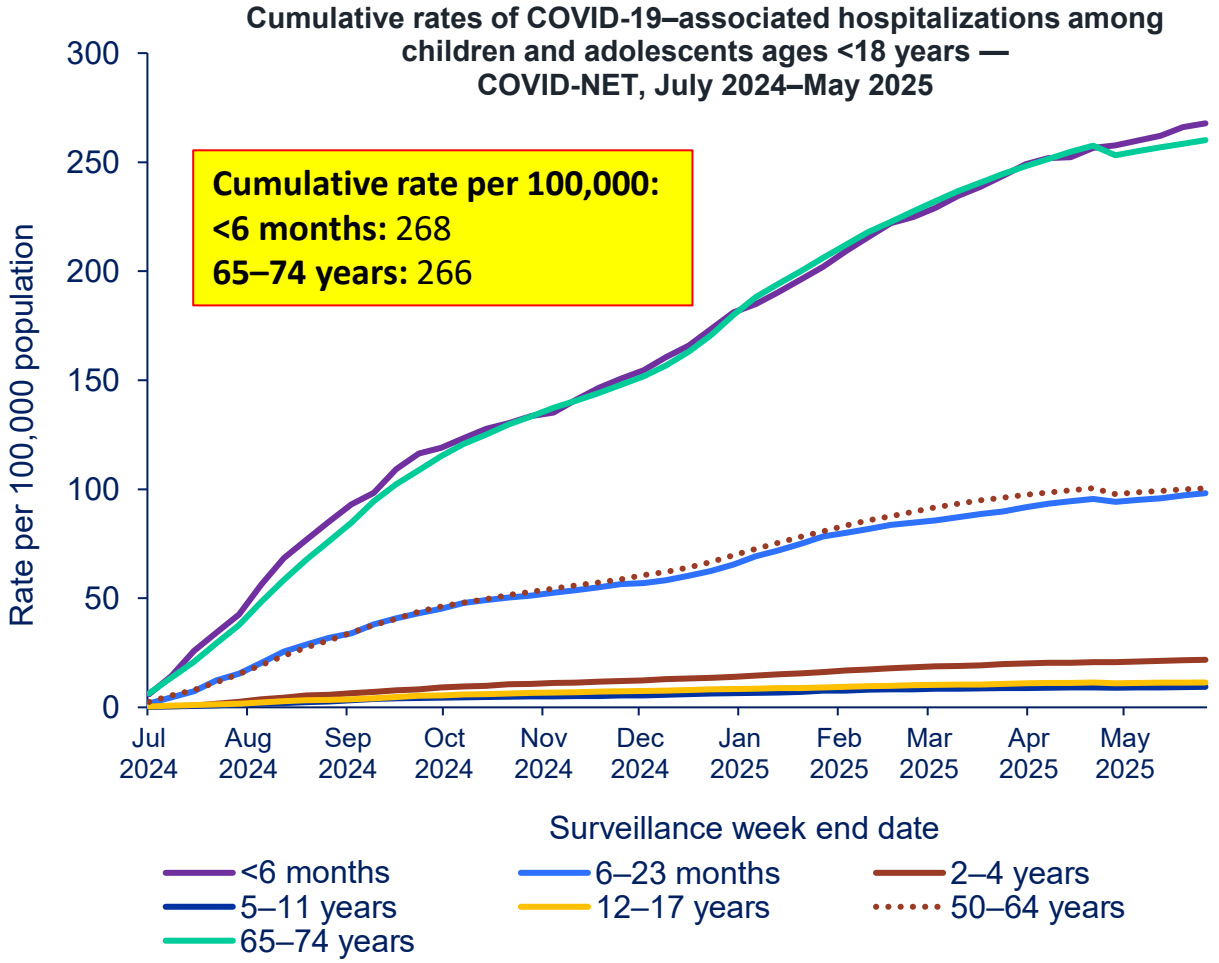



Figure displays percent of weekly COVID-19–associated hospitalizations among children and adolescents, by age group — COVID-NET, July 2024–May 2025.

# COVID-19 causes severe disease in infants ages <6 months.

- **Highest rate of COVID-19-associated hospitalization among all pediatric age groups**
  - Rates comparable to adults ages 65–74 years




Data reported from July 2024–May 2025. Excludes newborns who were admitted during the same hospitalizations as their birth. Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

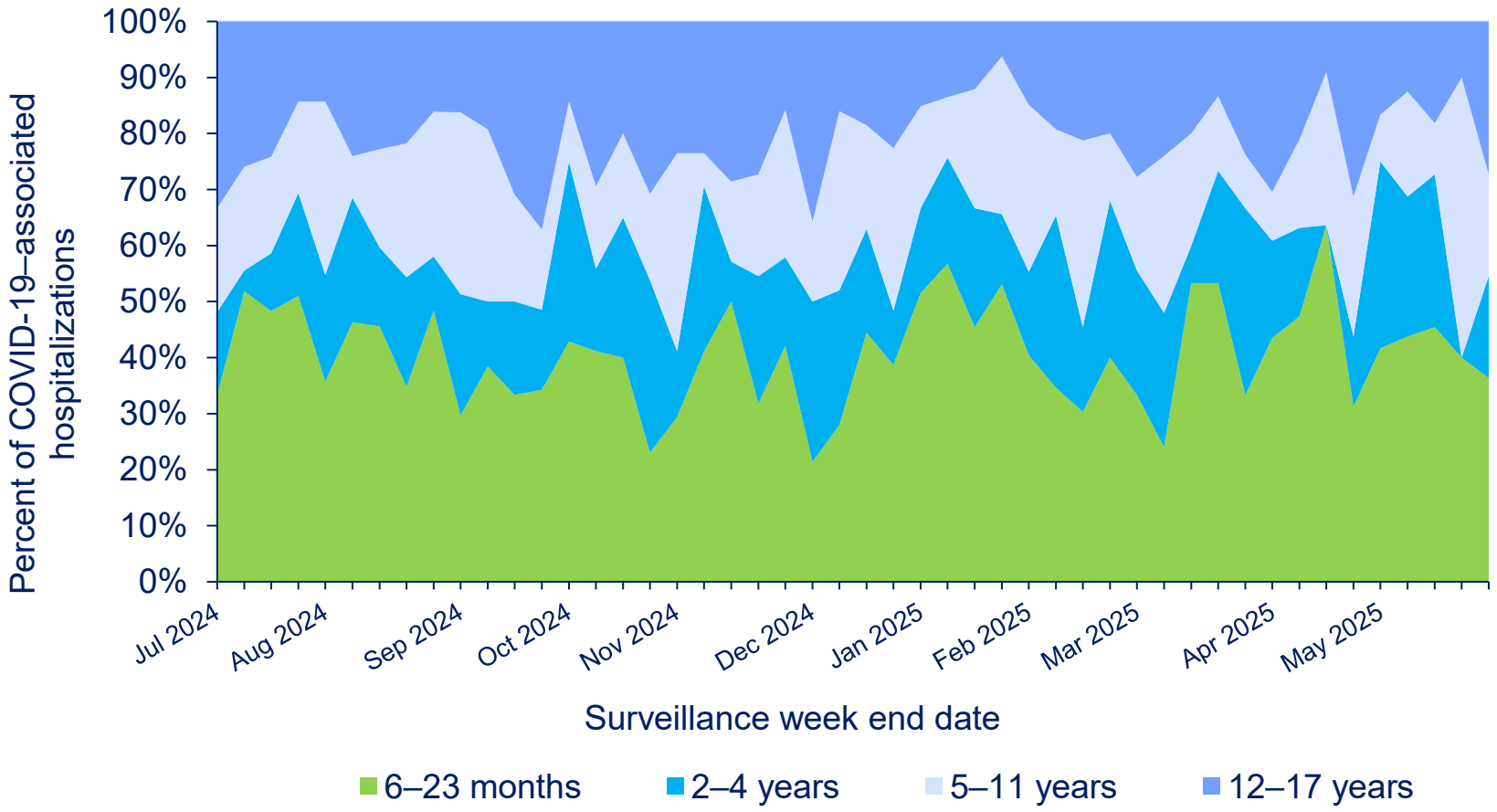
# Infants <6 months experience high rates of severe COVID-19 disease.

- **Among infants <6 months hospitalized recently for COVID-19:**
  - 22% were admitted to the ICU
  - 71% had no underlying medical conditions
  - 3.5% had any record of maternal COVID-19 vaccination during pregnancy

- **No COVID-19 vaccine products are approved for infants ages <6 months.**
- **Any protection must come from transfer of maternal antibodies, either from vaccination during pregnancy or prior infection**

Data reported from April 2024–March 2025. Hospitalizations are limited to those with COVID-19 as the likely reason for admission. Excludes newborns who were admitted during the same hospitalizations as their birth.

# Among vaccine-eligible children and adolescents ages 6 months–17 years, 41% of COVID-19-associated hospitalizations occurred among children ages 6–23 months.

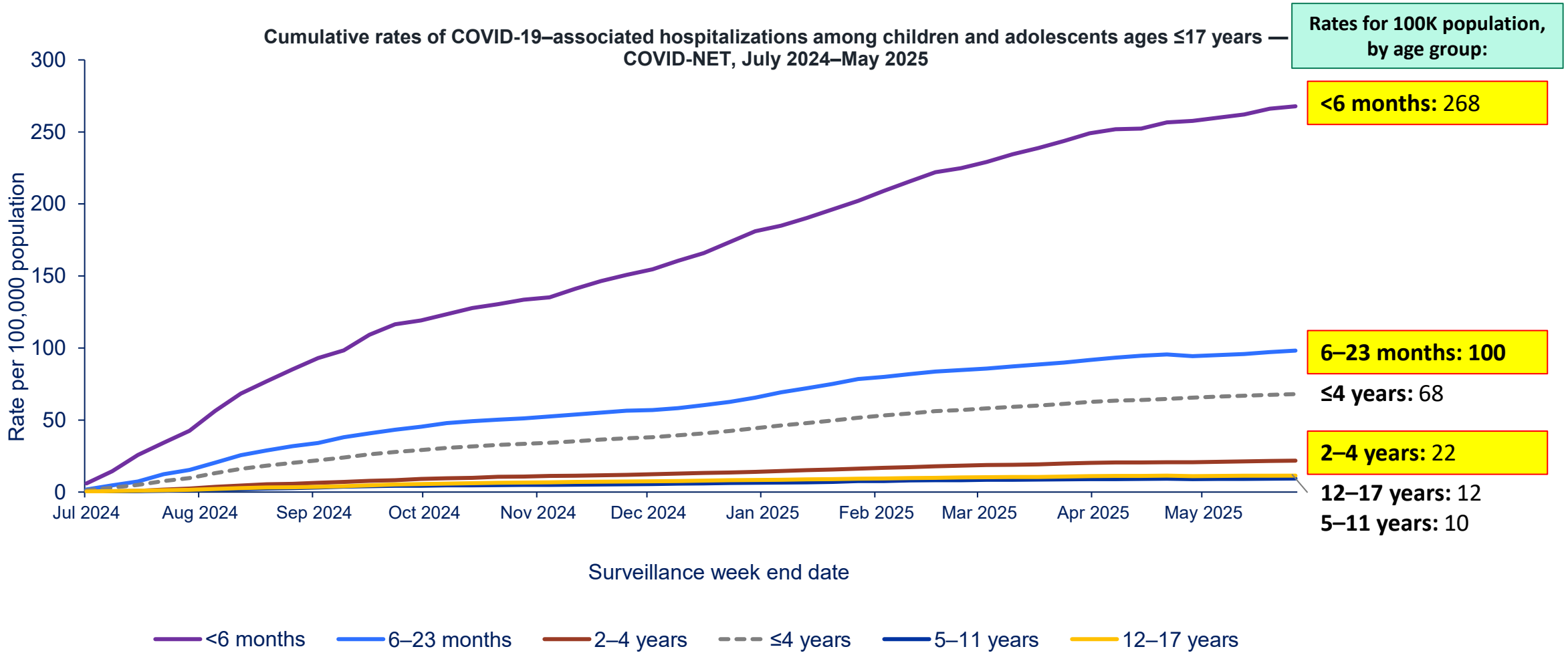



During July 2024–May 2025:

- 6–23 months = 41%
  - 2–4 years = 18%
  - 5–11 years = 20%
  - 12–17 years = 21%

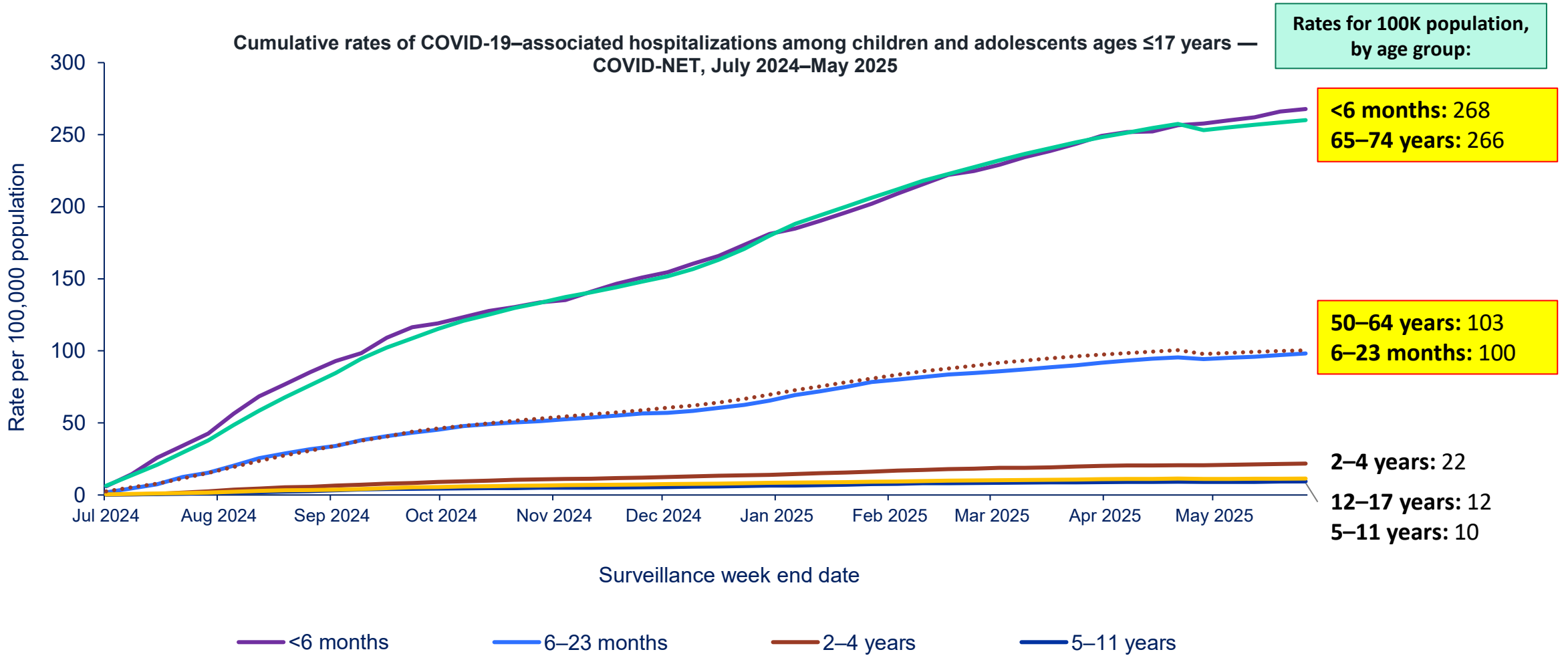
Figure displays the percent of weekly COVID-19–associated hospitalizations among children and adolescents, by age group — COVID-NET, October 2024–May 2025.

# COVID-19-associated cumulative hospitalization rates are highest among the youngest age groups.




Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

# The youngest age groups have comparable rates of cumulative COVID-19-associated hospitalization to some adult age groups, but direct comparisons are challenging.

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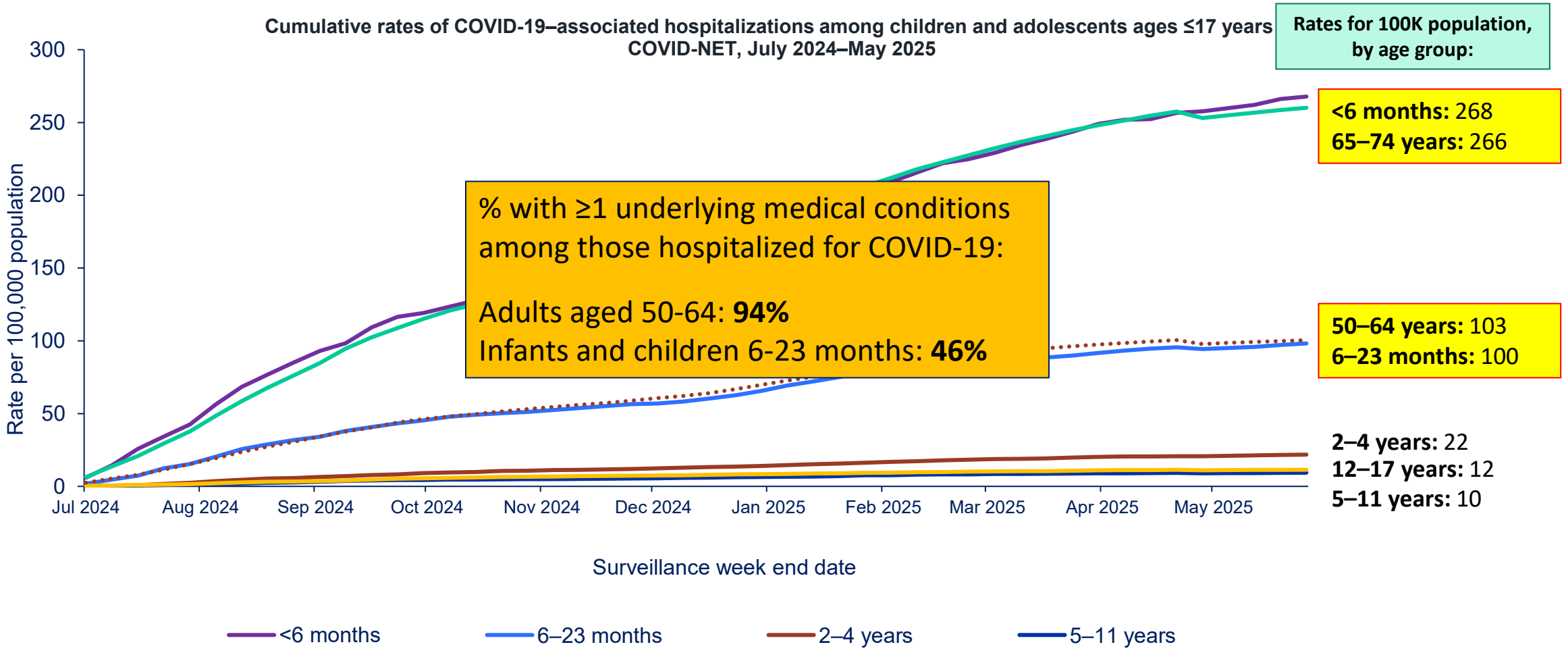
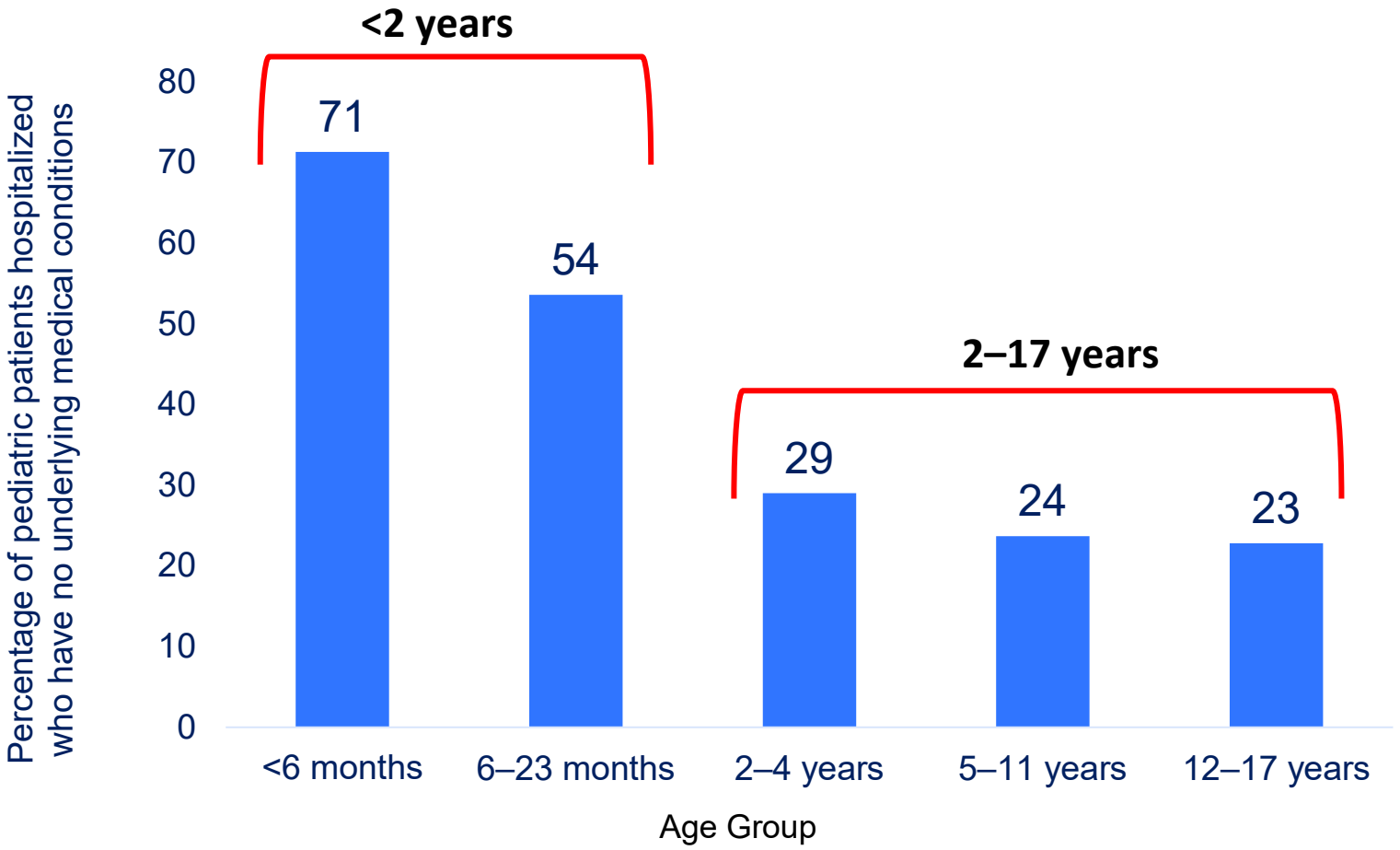



Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

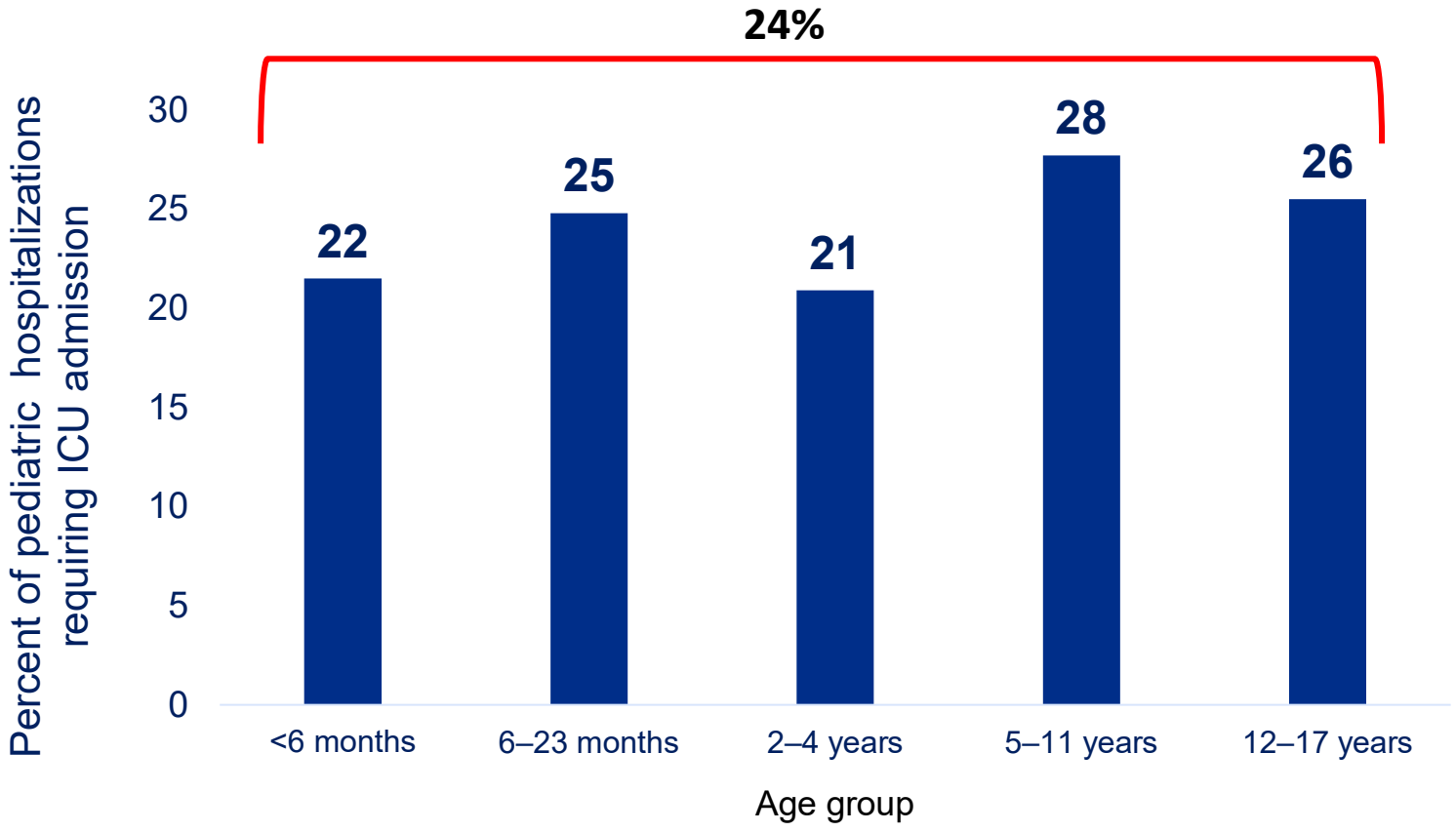
# Proportion of children hospitalized for COVID-19 who had no underlying medical conditions




**Most hospitalized children ages <2 years did not have any underlying medical condition.**

Figure displays the weighted percent of children and adolescents hospitalized for COVID-19 with no underlying medical conditions, by age group — COVID-NET, April 2024–March 2025. Hospitalizations are limited to those with COVID-19 as the presenting complaint upon admission. Pregnant adolescents ages 15–17 years are excluded from proportions presented.

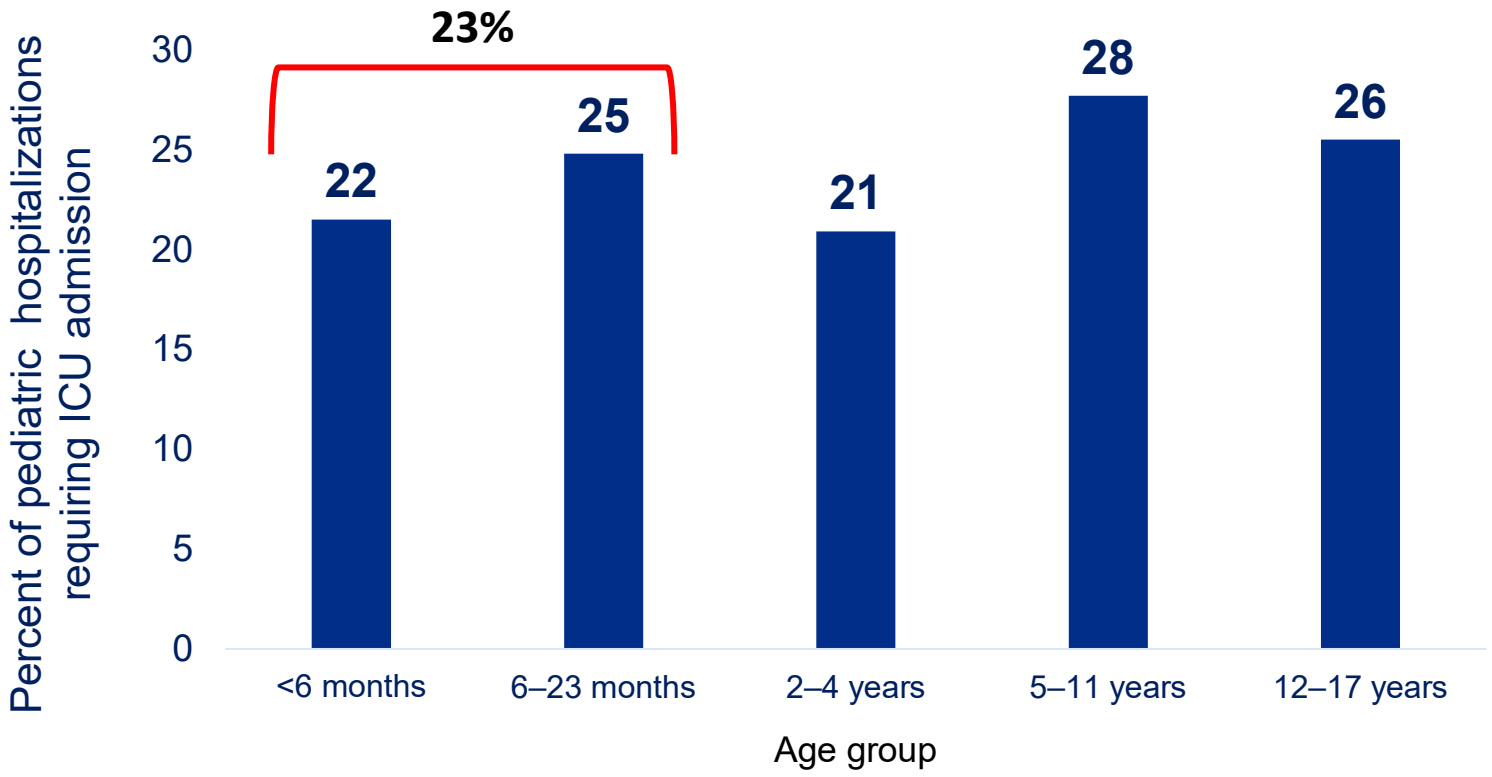
# ~1 in 4 children ages <18 years in all age groups hospitalized for COVID-19 required ICU admission.




Percent of children and adolescents for COVID-19 who were admitted to the ICU, by age group — COVID-NET, April 2024–March 2025

Hospitalizations are limited to those with COVID-19 as the likely reason for admission. Pregnant adolescents ages 15–17 years are excluded from proportions presented.

# ~1 in 4 children ages <18 years in all age groups hospitalized for COVID-19 required ICU admission.



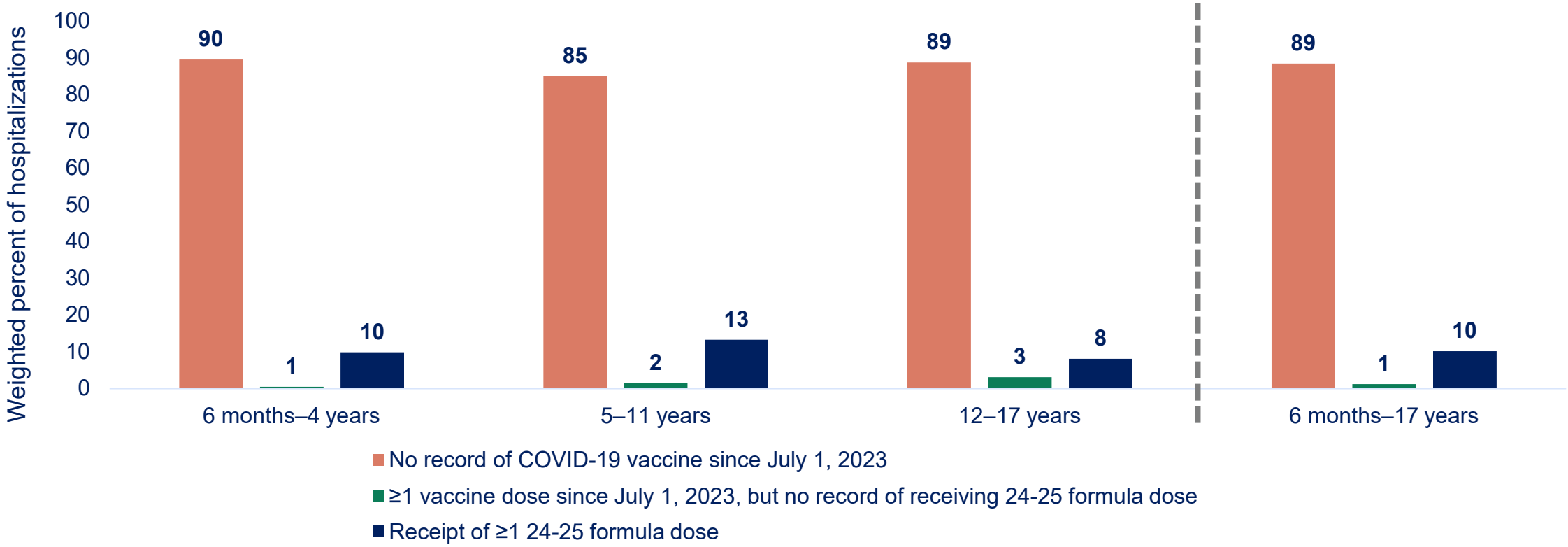

**Among children <2 years admitted to ICU, most (53%) did not have underlying medical conditions.**

Percent of children and adolescents for COVID-19 who were admitted to the ICU, by age group — COVID-NET, April 2024–March 2025

Hospitalizations are limited to those with COVID-19 as the likely reason for admission. Pregnant adolescents ages 15–17 years are excluded from proportions presented.

# 89% of COVID-19 vaccine-eligible children and adolescents who were hospitalized with COVID-19 had no record of receiving the most recently recommended COVID-19 vaccines.

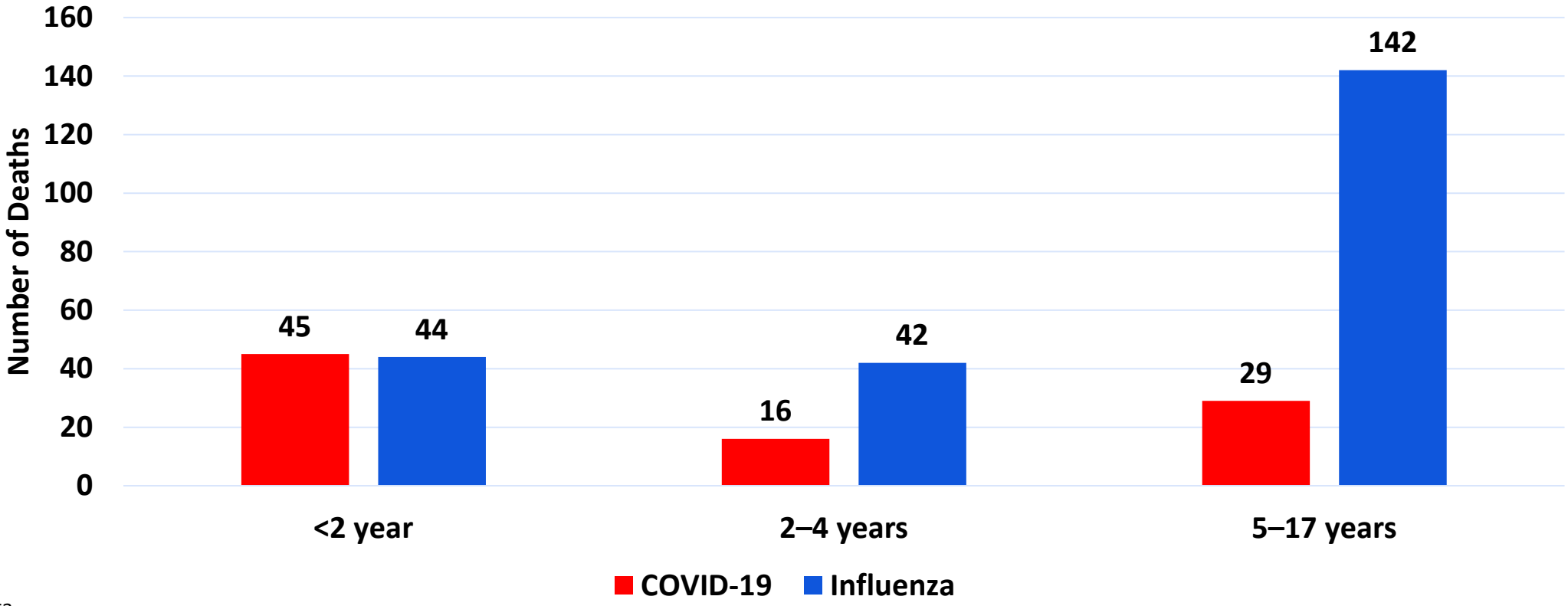
**Vaccination status among children and adolescents with COVID-19–associated hospitalizations, by age group — COVID-NET, October 2024–March 2025**




***No record of COVID-19 vaccine since July 1, 2023****: No recorded doses of any COVID-19 vaccine dose since July 1, 2023.* ***≥1 vaccine dose since July 1, 2023, but no 2024–2025 dose:*** *Received at least one COVID-19 vaccination since July 1, 2023, but no record of receiving 2024-2025 vaccine dose.* ***Receipt of ≥1 24-25 formula dose:*** *Received at least 1 dose of the 2024-2025 vaccine dose. Persons with unknown vaccination status (6.4%) are excluded. Hospitalizations are limited to those with COVID-19 as the presenting complaint upon admission.*

# Pediatric COVID-19 mortality

# Total number of COVID-19- and Influenza-associated deaths[1,2], among ages 0–17 years in July 2024–June 2025, United States




1. Provisional data
2. Underlying cause of death Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Provisional Mortality on CDC WONDER Online Database. Data are from the final Underlying Cause of Death Files, provisional data for 2024 and provisional and partial data from 2025, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Number of deaths includes influenza codes (J09-J11) or COVID-19 code (U07.1) as the underlying cause of death. http://wonder.cdc.gov/mcd-icd10-provisional.html, accessed June 20, 2025

Note: Estimates of pediatric influenza deaths reported to CDC can be found here: https://www.cdc.gov/fluview/surveillance/2025-week-15.html. Estimates will vary due to differences in reporting methods and timeframes used.

# Deaths among children with COVID-19-associated hospitalizations within COVID-NET catchment area

| | Since March 2020 | July 2022–June 2023 | July 2023–March 2025 |
|---|---|---|---|
| In-hospital and out-of-hospital deaths | 128 | 32 | 25 (including 10* since April 2024) |

**COVID-NET represents 10% of the U.S. population**

- **Among 25 pediatric deaths since July 2023:**
  - 13 (52%) were aged <2 years: 9 aged <6 months; 4 aged 6–23 months
  - 18 (72%) had ≥1 underlying medical condition
  - Of the 16 who were age-eligible for COVID-19 vaccination, 14 had no record of COVID-19 vaccination and none were up to date.
- **Death certificate data alone may underestimate COVID-19-associated pediatric deaths**
  - Among the 25 deaths** for whom we have death certificate data with ICD-10 codes, 7 (28%) had COVID-19 listed as a cause of death (COD)
  - Additional 9 (36%) had CODs related to other respiratory or circulatory causes

* In-hospital deaths only; complete death certificate data not yet available.

** Deaths occurred during July 2022 and August 2023.

# Summary

COVID-19 Epidemiology in Infants, Children, and Adolescents

# Summary of COVID-19 Epidemiology for Infants, Children, and Adolescents

- Most (57%) pediatric hospitalizations occur in children **ages <2 years**.
  - Most hospitalized children in these age groups **have no underlying medical conditions**, including 71% of infants ages <6 months and 54% of children ages 6–23 months.
- Rates of COVID-19–associated hospitalizations are **highest among infants ages <6 months,** followed by those ages 6–23 months.
  - Rates of COVID-19-associated hospitalizations among infants ages <6 months are comparable to rates among adults ages 65–74 years
  - No COVID-19 vaccine products are approved for infants ages <6 months. Any protection must come from transfer of maternal antibodies, either through vaccination during pregnancy or prior infection
- Outcomes among hospitalized children can be severe, with **1 in 4 admitted to ICU**.
  - Deaths from COVID-19 continue to occur among infants and children; death certificate data might undercount these.
- The majority (89%) of COVID-19 vaccine-eligible children and adolescents who were hospitalized with COVID-19 had no record of receiving the most recently recommended COVID-19 vaccine.

# COVID-19–Associated Hospitalizations Among Adults Ages ≥18 Years

# Adults ages ≥65 years comprise more than 2/3 of all COVID-19–associated hospitalizations among adults.

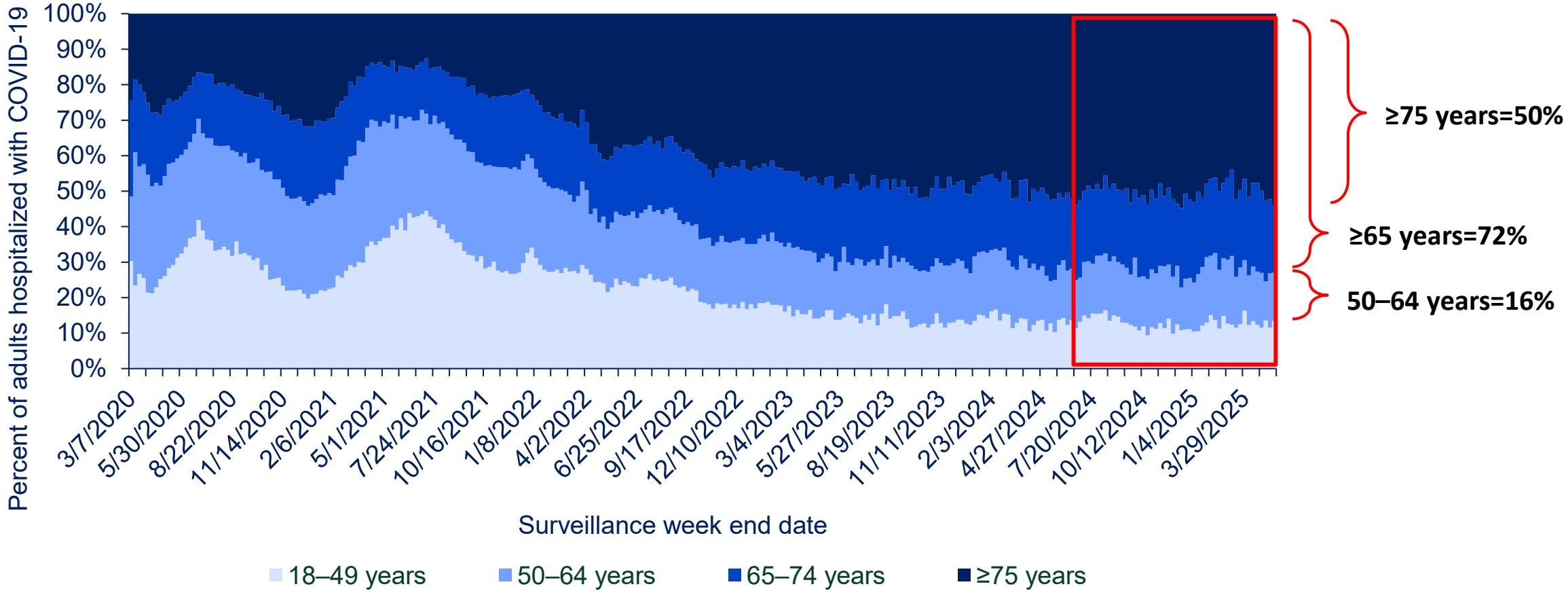
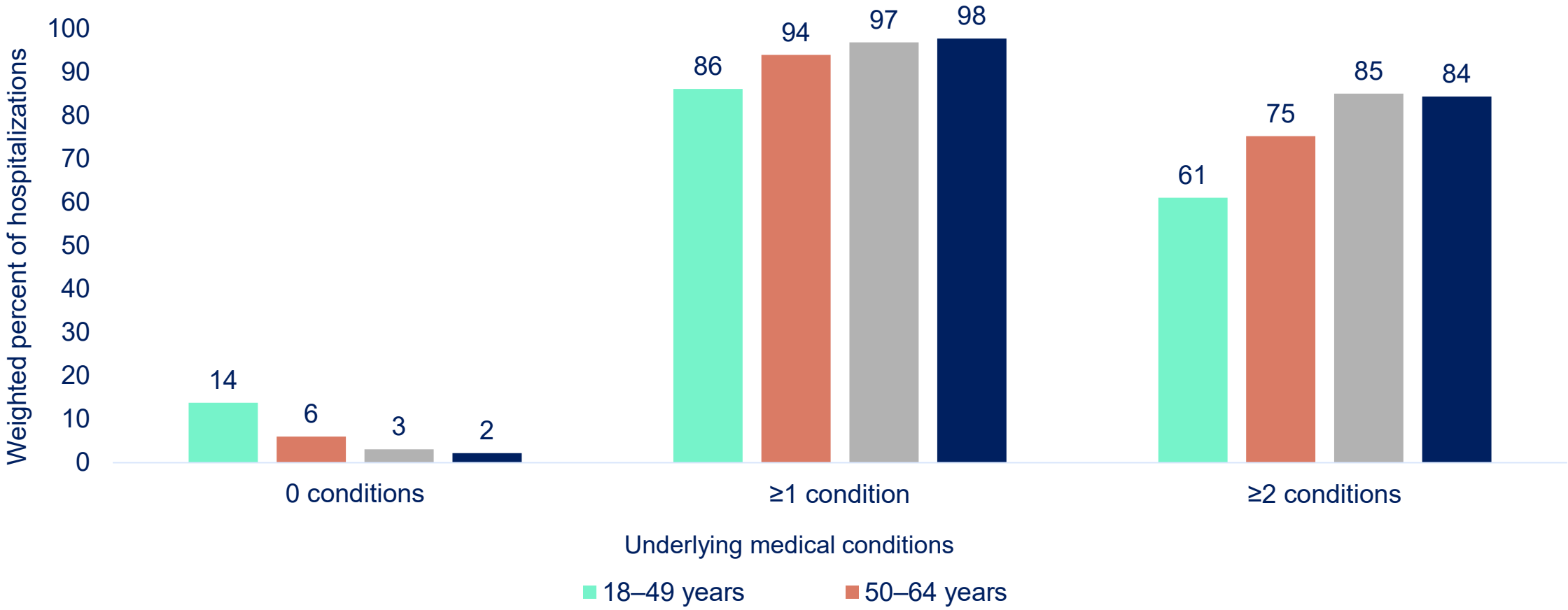



Figure displays the percent of weekly COVID-19–associated hospitalizations among adults ages ≥18 years, by age group — COVID-NET, March 2020–May 2025.

During this same period of January 2024 through March 2025, children and adolescents ages 17 years and younger comprised 4.1% of all COVID-19-associated hospitalizations.

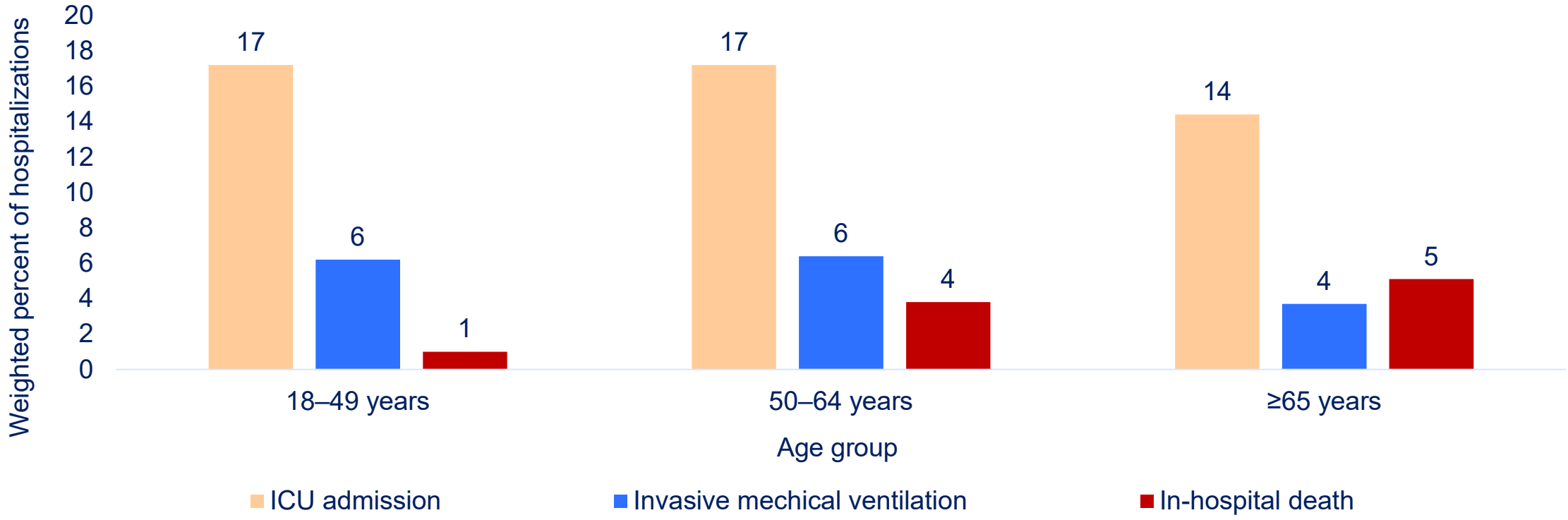
# Most adults hospitalized for COVID-19 have ≥1 underlying medical condition; a majority have ≥2.




Prevalence of underlying medical conditions among adults ages ≥18 years, by age group — COVID-NET, April 2024–March 2025.

Pregnant women ages 18–49 years are excluded from proportions presented. Data are limited to hospitalizations with COVID-19 as the likely reason for admission.

# Among adults hospitalized for COVID-19, 15% were admitted to the intensive care unit (ICU).




**During this period, 85% of all adults hospitalized with COVID-19 who died in-hospital were ages ≥65 years.**

The figure displays the proportion of adults hospitalized for COVID-19 with interventions and outcomes, by age group — COVID-NET, April 2024–March 2025.

Data are limited to hospitalizations where COVID-19 is a likely primary reason for admission. Deaths do not include other COVID-19-related deaths that might occur after a patient is discharged to hospice or deaths that occur soon after hospital discharge that could be attributable to COVID-19-related illness. Pregnant women ages 18–49 years are excluded from proportions presented.

# Most adults hospitalized for COVID-19 had received no COVID-19 vaccine since July 2023.

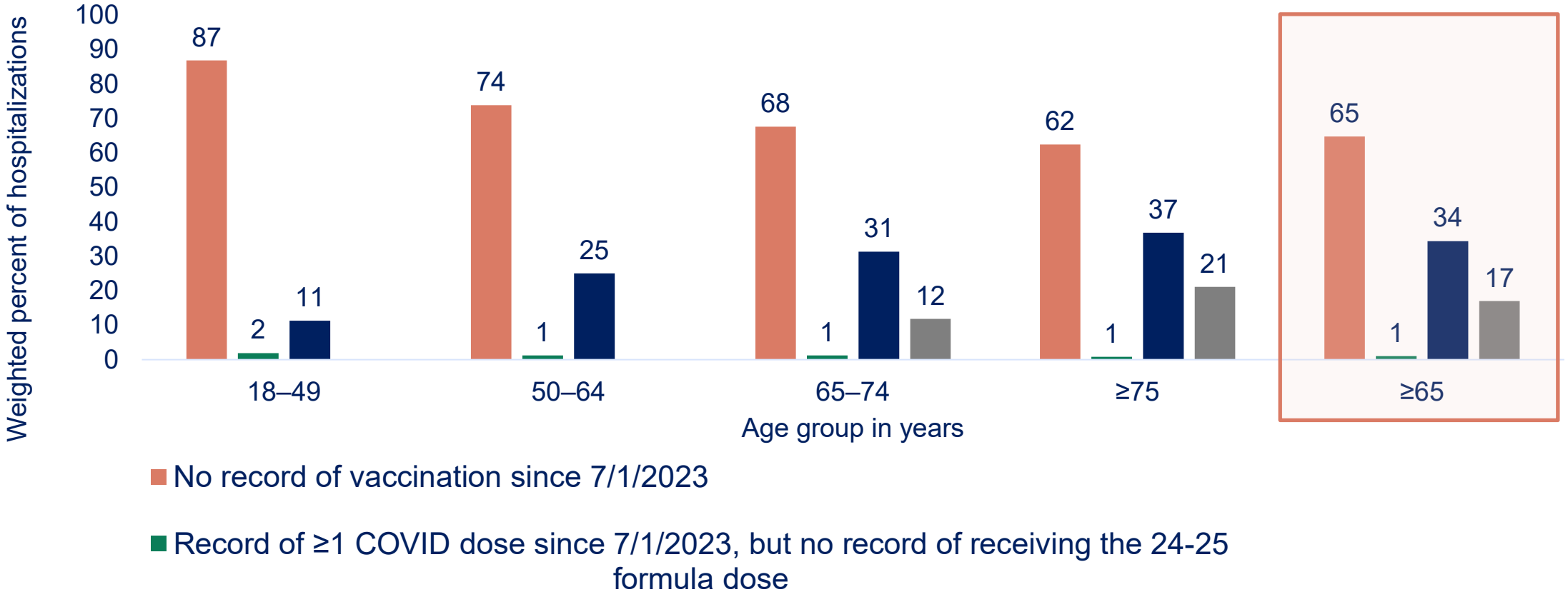



Figure displays the COVID-19 vaccination status among adults hospitalized for COVID-19, by age group — COVID-NET, October 2024–March 2025.
Data are limited to hospitalizations where COVID-19 is a likely primary reason for admission.

# COVID-19-Associated Hospitalizations among Pregnant Women

# Pregnant women with COVID-19–associated hospitalizations, April 2024–March 2025

- Pregnancy status collected from hospitalized women ages 15–49 years
- 28.5% of women ages 15–49 years hospitalized with laboratory-confirmed SARS-CoV-2 infection were pregnant
  - 50% of those had COVID-19-related signs or symptoms

Source: COVID-NET, unpublished data.

# Pregnant women with COVID-19–associated hospitalization, April 2024–March 2025

Among 131 hospitalized pregnant women with a laboratory-confirmed SARS-CoV-2-positive test result and COVID-19-related signs or symptoms:

- 50% had no underlying conditions
- 68% were no longer pregnant at discharge, among whom:
  - 83% had a healthy newborn, 11% had a pre-term infant, 1% had an ill infant, and 5% had pregnancy loss*
- 92% have no record of vaccination since July 1, 2023
  - 5.8% received recommended 2024-25 COVID-19 vaccine dose**

* Includes spontaneous miscarriage and abortion.

** Vaccination might have occurred before the pregnancy period and is not necessarily indicative of maternal vaccination status.

Source: COVID-NET, unpublished data.

# Summary

Adults

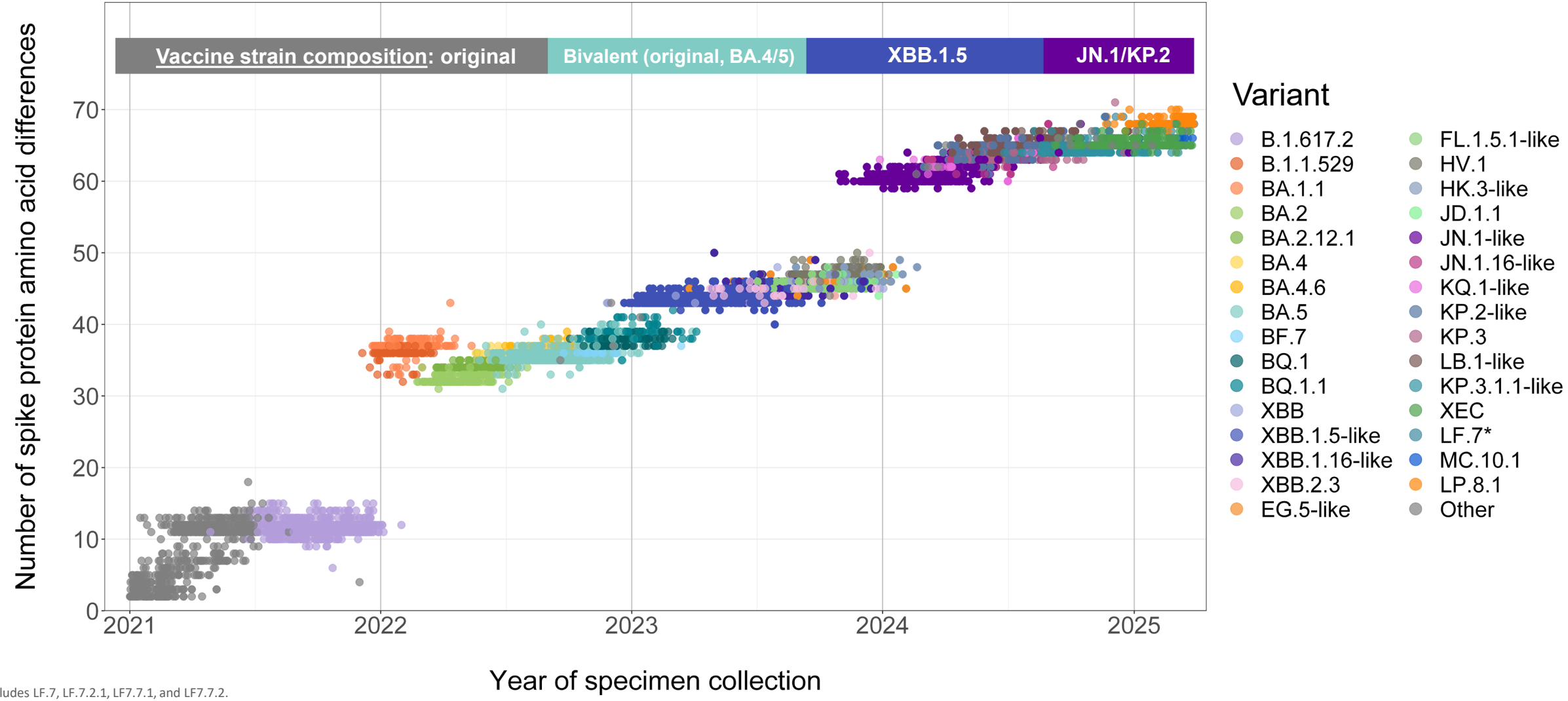
# Summary of COVID-19 Epidemiology for Adults

- Rates of COVID-19–associated hospitalization are highest among oldest adult age groups
  - Adults aged ≥65 years comprise 72% of adult COVID-19–associated hospitalizations
  - Ages ≥75 years: 50% of adult hospitalizations
- COVID-19-associated hospitalization rates have decreased over time, but cumulative rates among adults aged ≥75 years remain high
- Risk of hospitalization with COVID-19 continues year-round, peaking in the winter and summer.
- 65% of adults ages ≥65 years hospitalized with COVID-19 had no record of receiving ≥1 dose of the recommended 2024-25 COVID-19 vaccine prior to hospitalization.
- Most adults with COVID-19-associated hospitalization have ≥1 underlying condition.
- Among SARS-CoV-2-positive pregnant women admitted during April 2024–March 2025 with COVID-19-related symptoms on admission, half had no underlying conditions and most (92%) have no record of COVID-19 vaccination since July 1, 2023

# Genomics

# Subsampled SARS-CoV-2 sequences by lineage group, date of specimen collection, and number of spike protein amino acid differences relative to Wuhan-Hu-1 reference

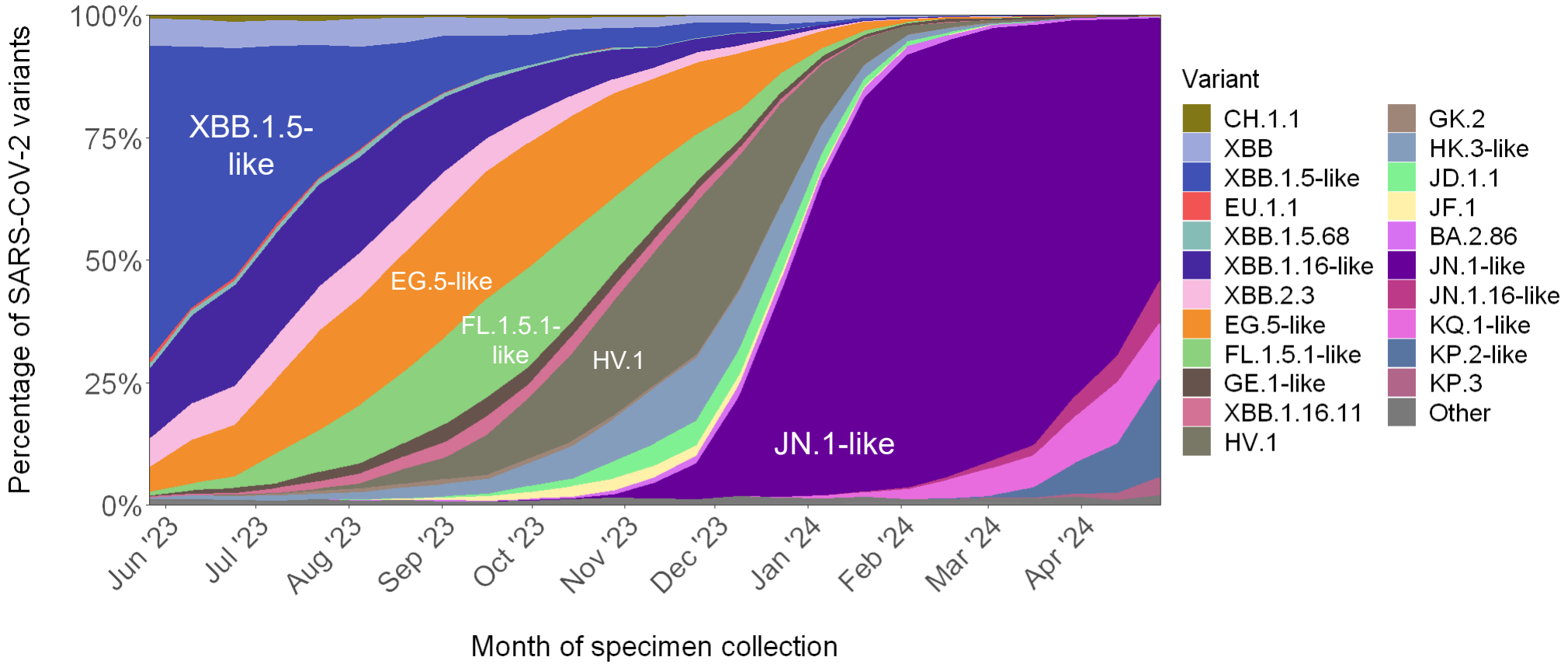
## United States, January 1, 2021–March 29, 2025




* LF.7 includes LF.7, LF.7.2.1, LF7.7.1, and LF7.7.2.

Sequences were subsampled (100 per month) for analysis from an initial dataset of >1 million sequences spanning January 1, 2021–March 29, 2025. **Only lineages circulating at >5% prevalence nationally during at least one 2-week period are displayed.** Sequences are reported to CDC through the National SARS-CoV-2 Strain Surveillance program, contract laboratories, public health laboratories, and other U.S. institutions. Lineages were ordered by date of first appearance on CDC's COVID data tracker (https://covid.cdc.gov/covid-data-tracker/#variant-proportions). Lineages with identical spike receptor binding domain amino acid sequences (residues 332 to 527) were grouped with a representative lineage and denoted as "representative lineage-like." Vaccine availability for a given composition was defined by the estimated date of earliest possible administration.

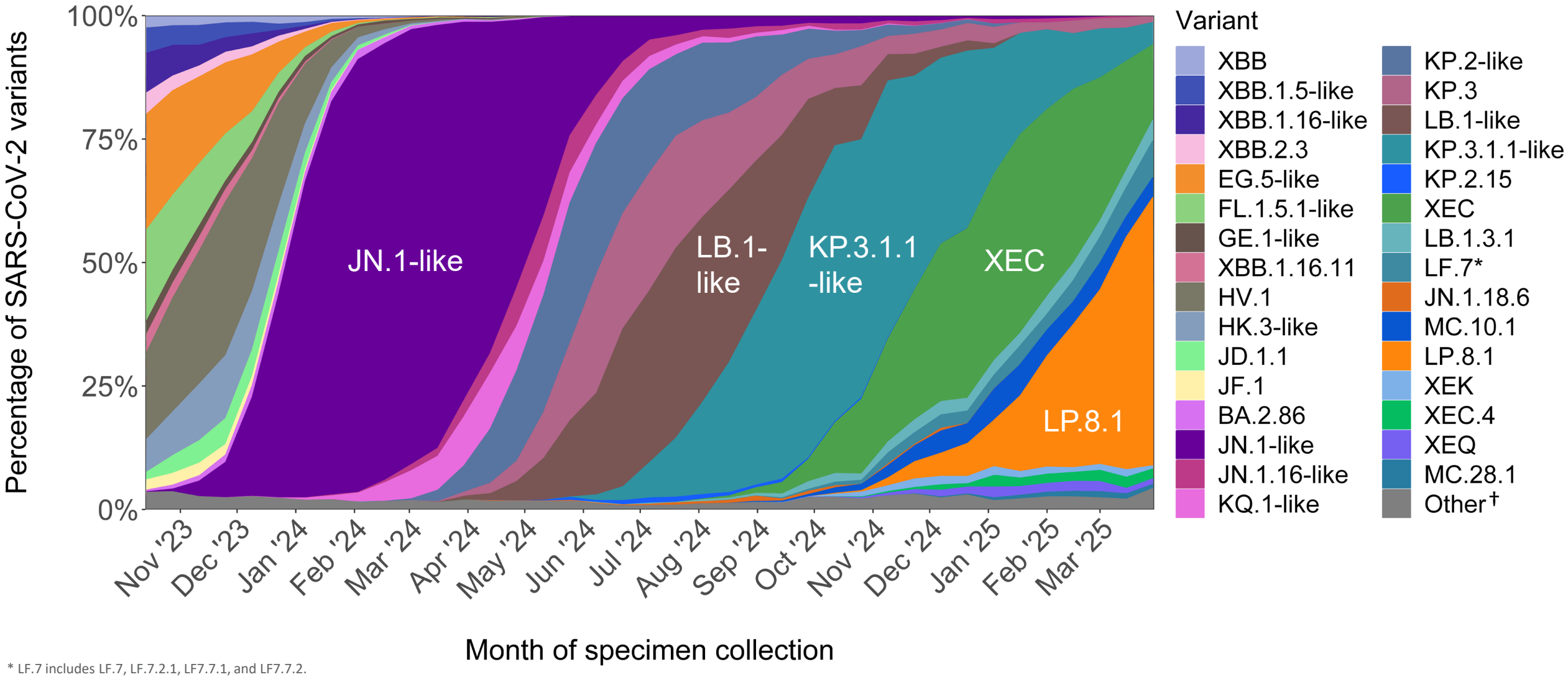
# In winter 2023-2024, we observed a strain replacement of XBB.1.5-like viruses to JN.1-like viruses.




[Genomic Surveillance for SARS-CoV-2 Variants: Circulation of Omicron XBB and JN.1 Lineages — United States, May 2023–September 2024 | MMWR]

# Weighted SARS-CoV-2 Variant Proportion Estimates: XBB and JN.1 Lineages

## United States, October 1, 2023–March 29, 2025

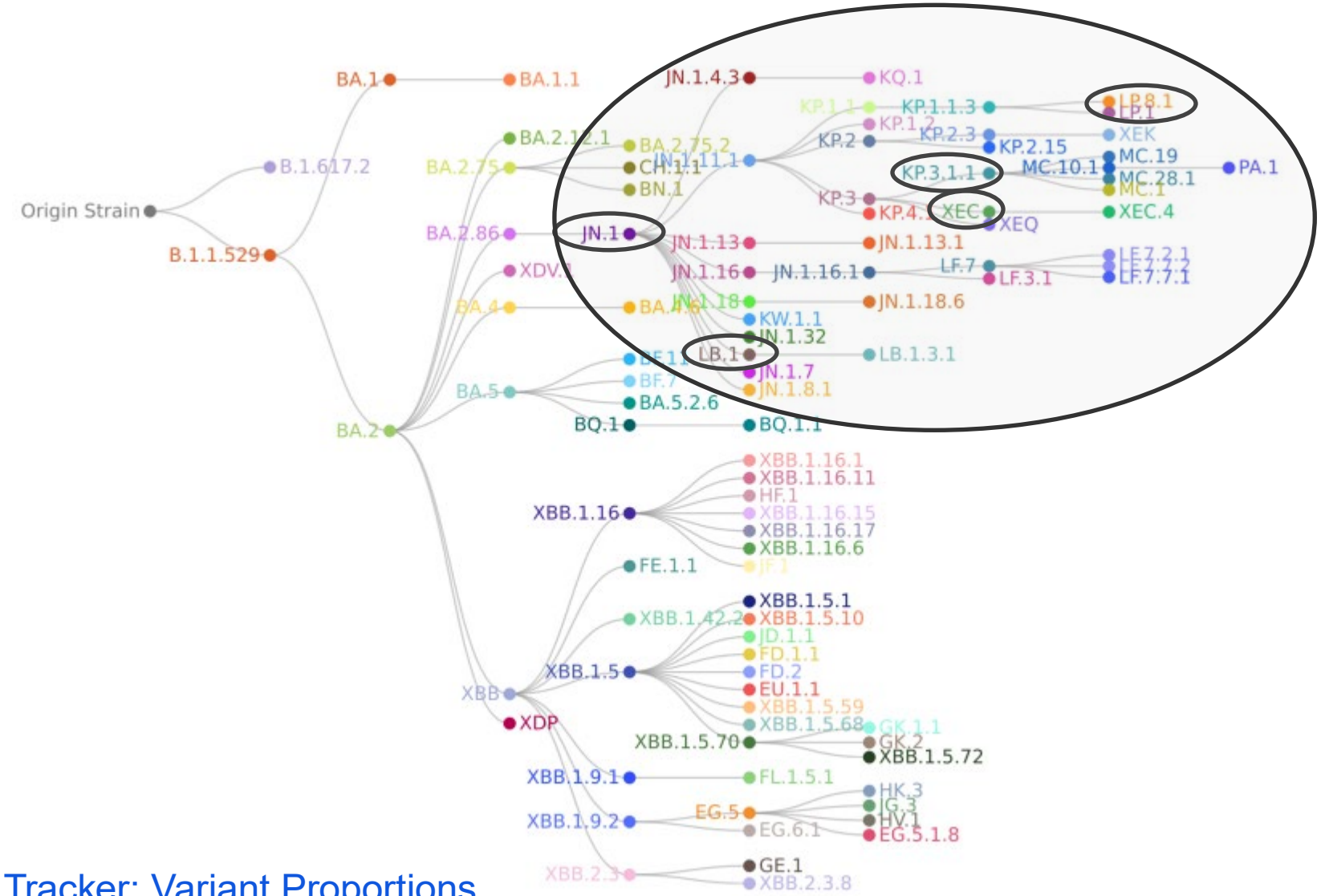



* LF.7 includes LF.7, LF.7.2.1, LF7.7.1, and LF7.7.2.

† "Other" represents aggregated lineages circulating at <1% prevalence nationally during all 2-week periods displayed.

Lineages were ordered by date of first appearance on CDC's COVID data tracker (https://covid.cdc.gov/covid-data-tracker/#variant-proportions). Lineages with identical spike receptor binding domain amino acid sequences (residues 332 to 527) were grouped with a representative lineage and denoted as "representative lineage-like."

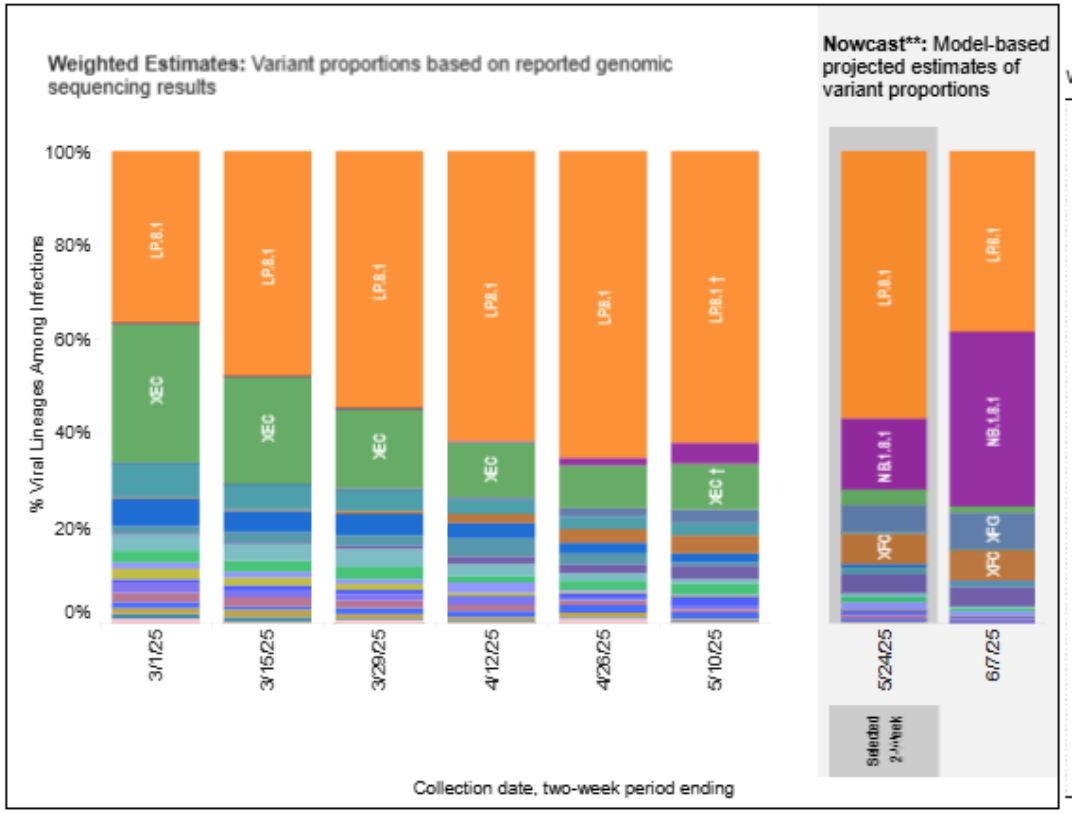
# Viruses that have predominated since January 2025 are all JN.1 descendants.




[CDC COVID Data Tracker: Variant Proportions]

# Weighted and Nowcast Estimates in the United States for 2-week Periods, 2/16/2025 – 6/7/2025

Due to low numbers of sequences being reported to CDC, precision for the most recent reporting periods is low




USA

| WHO label | Lineage # | %Total | 95%PI |
|---|---|---|---|
| Omicron | LP.8.1 | 57% | 49–64% |
| | NB.1.8.1 | 15% | 7–28% |
| | XFC | 6% | 3–12% |
| | XFG | 6% | 2–13% |
| | LF.7.9 | 4% | 2–6% |
| | XEC | 3% | 2–4% |
| | LF.7 | 2% | 1–3% |
| | LF.7.7.2 | 1% | 0–4% |
| | LB.1.3.1 | 1% | 1–2% |
| | PA.1 | 1% | 1–2% |
| | XEC.4 | 1% | 1–2% |
| | LF.7.7.1 | 1% | 0–2% |
| | MC.10.1 | 1% | 0–1% |
| | KP.3.1.1 | 0% | 0–1% |
| | KP.3 | 0% | 0–1% |
| | XEQ | 0% | 0–1% |
| | XEK | 0% | NA |
| | MC.1 | 0% | NA |

** These data include Nowcast estimates, which are modeled projections that may differ from weighted estimates generated at later dates
# Enumerated lineages are US VOC and lineages circulating above 1% nationally in at least one 2-week period. "Other" represents the aggregation of lineages which are circulating <1% nationally during all 2-week periods displayed. While all lineages are tracke by CDC, those named lineages not enumerated in this graphic are aggregated with their parent lineages, based on Pango lineage definitions, described in more detail here: https://web.archive.org/web/20240116214031/https://www.pango.network/the-pango-nomenclature-system/statement-of-nomenclature-rules.

[CDC COVID Data Tracker: Variant Proportions](#)
As of June 15, 2025

# Convergent Evolution of Different Omicron JN.1 Lineages

## Key changes in the spike receptor binding domain (RBD)* detected relative to KP.2

| Lineage | *N-terminal domain* | | | | | | | | | *Receptor binding domain* | | | | | | | | | *S2* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 22 | 31 | 59 | 146 | 182 | 183 | 184 | 186 | 190 | 346 | 435 | 444 | 445 | 456 | 478 | 493 | 572 | 679 | 748 | 929 | 1086 | 1104 | 1235 |
| **KP.2 Reference †** | **T** | **S** | **F** | **H** | **K** | **Q** | **G** | **F** | **R** | **T** | **A** | **K** | **H** | **L** | **T** | **Q** | **T** | **K** | **E** | **S** | **K** | **L** | **C** |
| KP.3 | | | | | | | | | | R | | | | | | E | | | | | | | |
| KP.3.1.1 | | Δ | | | | | | | | R | | | | | | E | | | | | | | |
| KP.3.3 | | | | | | | | | | R | | | | | | E | | | | | | | |
| KP.2.3 | | Δ | | Q | | | | | | | | | | | | | | | | I | | | |
| JN.1 | | | | | | | | | | R | | | | F | | | | | | | | V | |
| JN.1.16 | | | | Q | | | | | | R | | | | | | | | | | | | V | |
| JN.1.18.6 | N | | S | | | | | | | | | | | | | | | | | | | | |
| KP.2.15 | | Δ | | | | | | | | | | | | | | | | | | | | | |
| LB.1 | | Δ | | | | H | | | | | | | | | | | | | | | | V | |
| LF.7 | N | P | | | R | | | | S | | | R | | | | | I | | | | | V | |
| LP.8.1 | | Δ | | | | | | L | S | | | | R | | | E | | | | | R | | |
| MC.10.1 | | Δ | | | | | | | | R | S | | | | | E | | | | | | | |
| MC.28.1 | | Δ | | | | | | | | | S | | | | | E | | | | | | | F |
| XEC | N | | S | | | | | | | R | | | | | | E | | | | | | | |
| XEC.4 | N | | S | | | | | | | R | | | | | | E | I | | | | | | |
| XEK | N | | S | | | | | | | R | | | | | | E | | | Q | | | | |
| **XFC** | N | P | | | R | | | | S | | | | R | | | E | | R | | | R | | |
| **NB.1.8.1** | N | | S | | | | G | | | | S | | H | | I | E | | | | | | | |

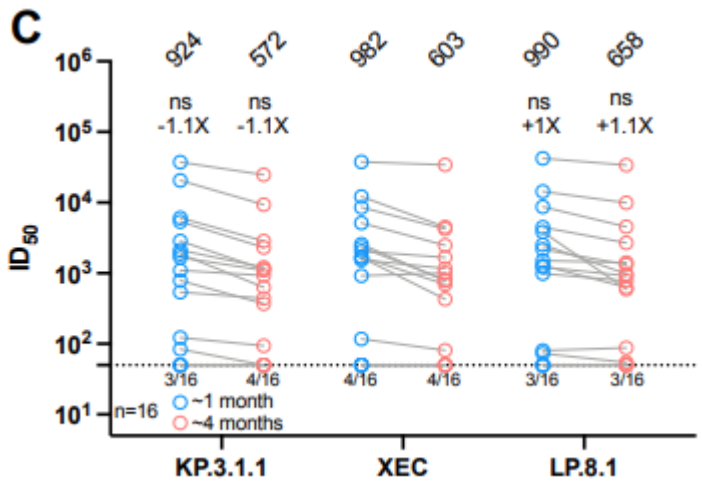
***** Lineages or lineage groups with ≥1% prevalence in at least one 2-week period and substitutions present in ≥50% of sequences belonging to a lineage were included.

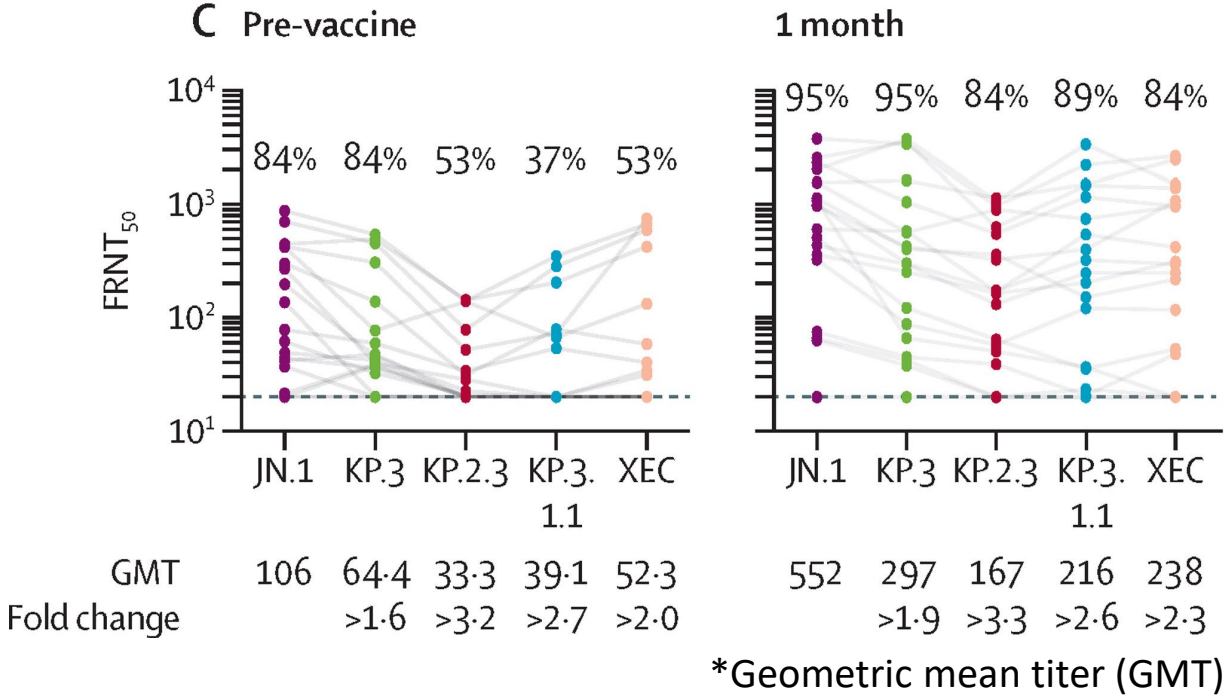
**†** The KP.2 spike protein sequence was used as a reference because of its inclusion in updated mRNA-based 2024–2025 COVID-19 vaccines. Substitutions compared to Wuhan-Hu-1 are underlined.

**§** Indicates sites of independent substitution or deletion in at least two different evolutionary lineages.

**Bolded sub-lineages are expanding in the United States as of June 7, 2025.**

# Human sera collected after 2024-2025 COVID-19 vaccination neutralizes LP.8.1 pseudoviruses and XEC virus.



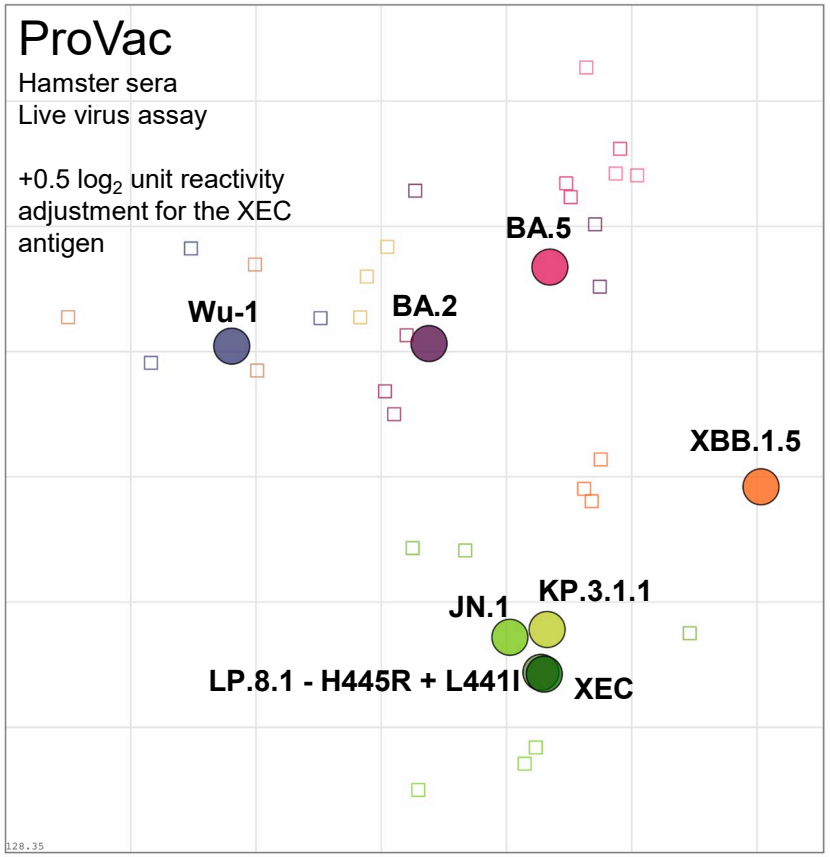




*Geometric mean titer (GMT)

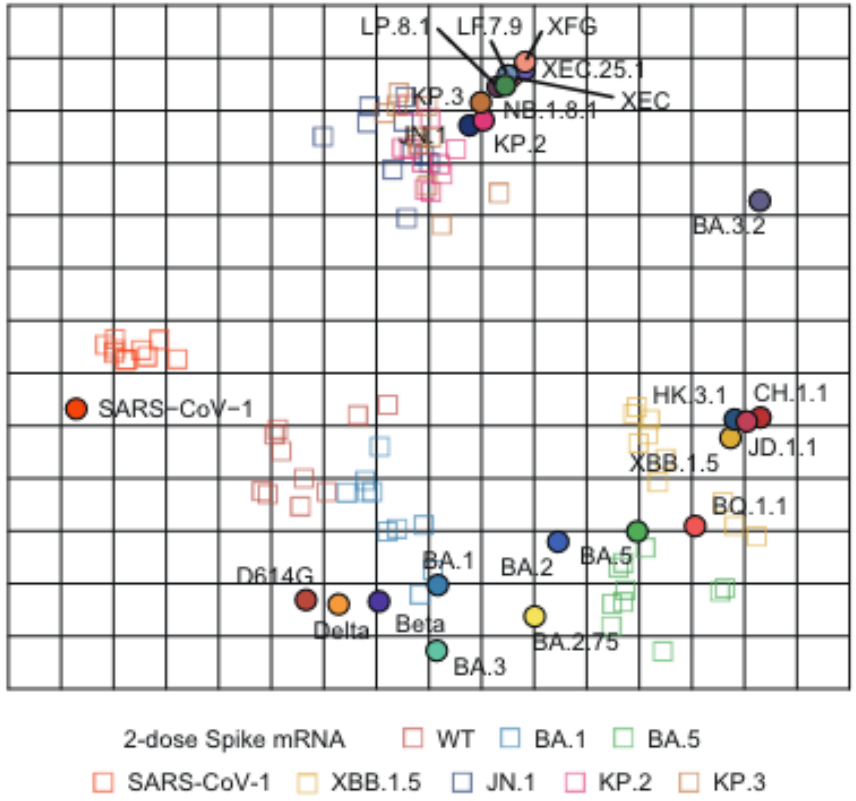
Mellis et al. bioRxiv: Do Existing COVID-19 Vaccines Need to Be Updated in 2025?

Suthar et al. The Lancet Infectious Diseases: The KP.2-adapted COVID-19 vaccine improves neutralising activity against the XEC variant - ScienceDirect

# Antigenic cartography with hamster and human sera indicate that JN.1 lineage viruses group together.




Francis Crick Institute
MRC University of Glasgow Centre for Virus Research
Center for Pathogen Evolution, University of Cambridge




Antigenic and Virological Characteristics of SARS-CoV-2 Variant BA.3.2, XFG, and NB.1.8.1

# Summary of COVID-19 Genomics

- Current viruses are JN.1 descendants with 2-3 substitutions in the spike receptor binding domain in comparison to KP.2 spike
- Current viruses are neutralized with sera from participants who received the 2024-2025 COVID-19 vaccine
- Antigenic cartography indicates JN.1 viruses are antigenically similar

- FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC) reviewed genomic and phenotypic data in May and voted unanimously to recommend a monovalent JN.1-lineage vaccine composition.
  - FDA has advised manufacturers to use JN.1-lineage based COVID-19 vaccines, preferentially using the LP.8.1 strain, for the 2025-2026 COVID-19 vaccines

# Back-up

# Among all age groups, weekly rates of COVID-19–associated hospitalizations are highest among adults ages ≥75 years.

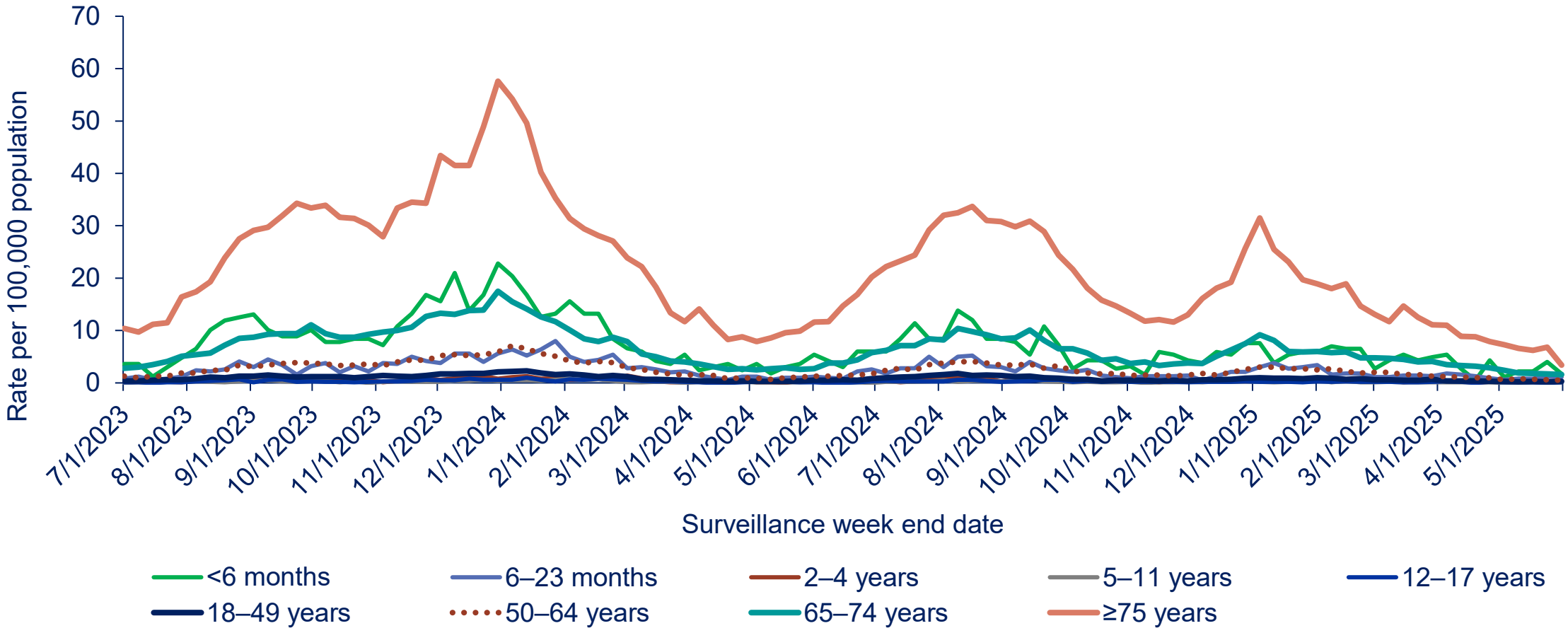



Figure displays the weekly rates of COVID-19–associated hospitalizations — COVID-NET, March 2020–May 2025.

Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

# Among all children and adolescents, rates of COVID-19-associated hospitalizations are highest among infants and children ages <2 years.

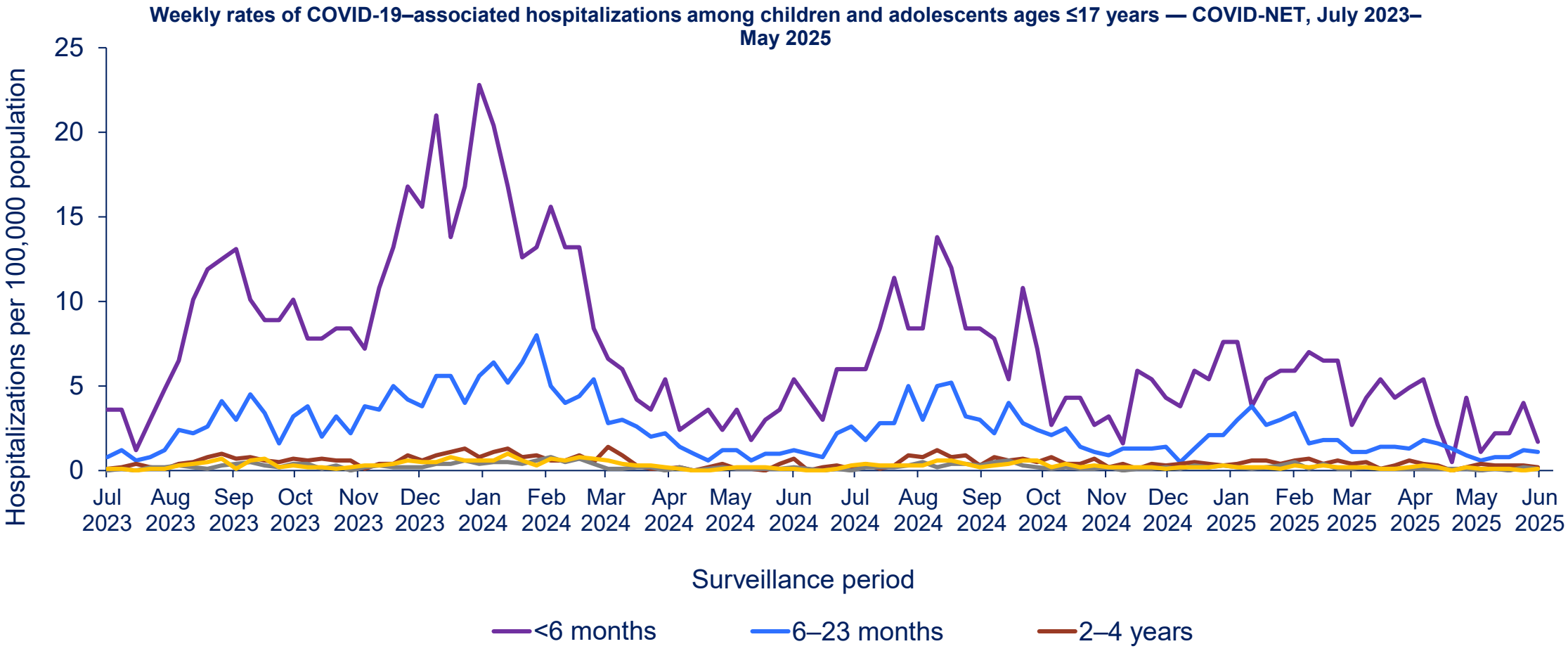
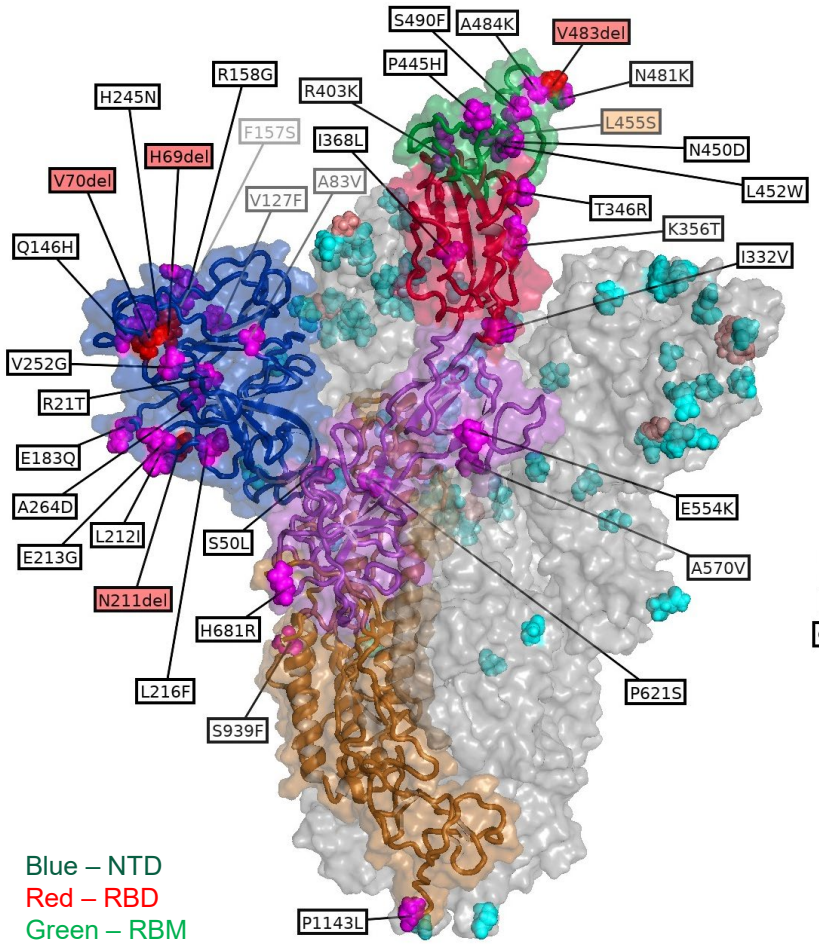
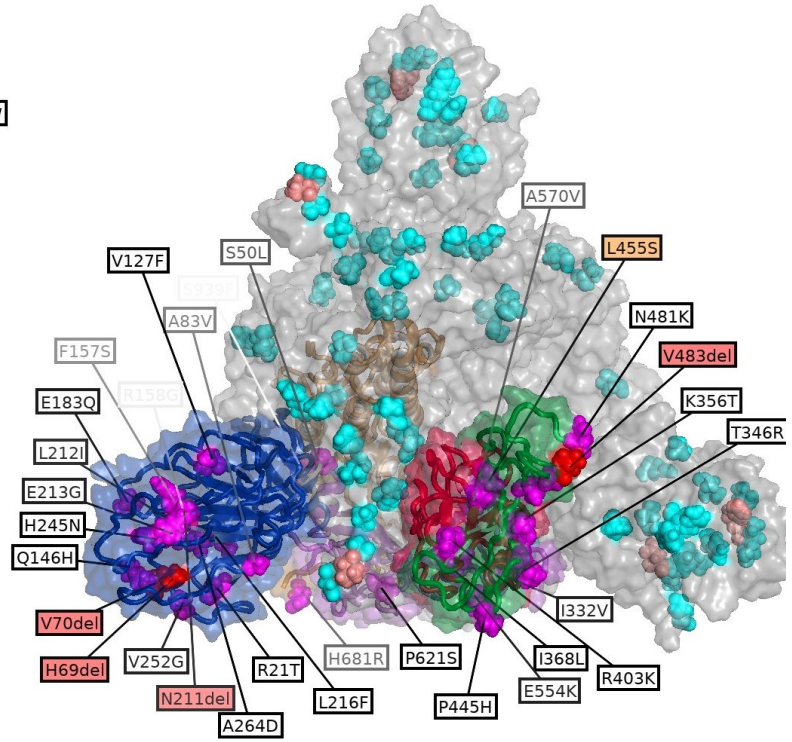


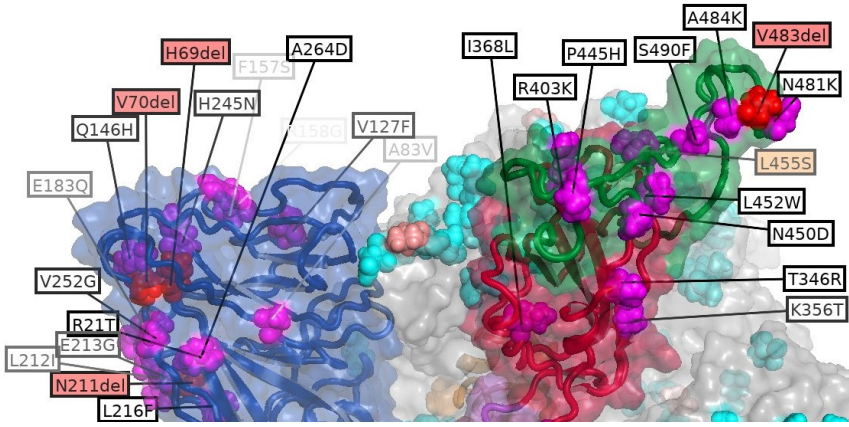

Figure displays weekly rates of COVID-19–associated hospitalizations among children and adolescents ages ≤17 years — COVID-NET, July 2023–May 2025.
Note that rates are not adjusted for testing. Rates are not limited to admissions where the respiratory infection is the likely primary reason for admission.

# Structure of XBB.1.5 vs. JN.1 spike




Blue – NTD
Red – RBD
Green – RBM
Purple – S1
Gold – FCS
Brown – S2

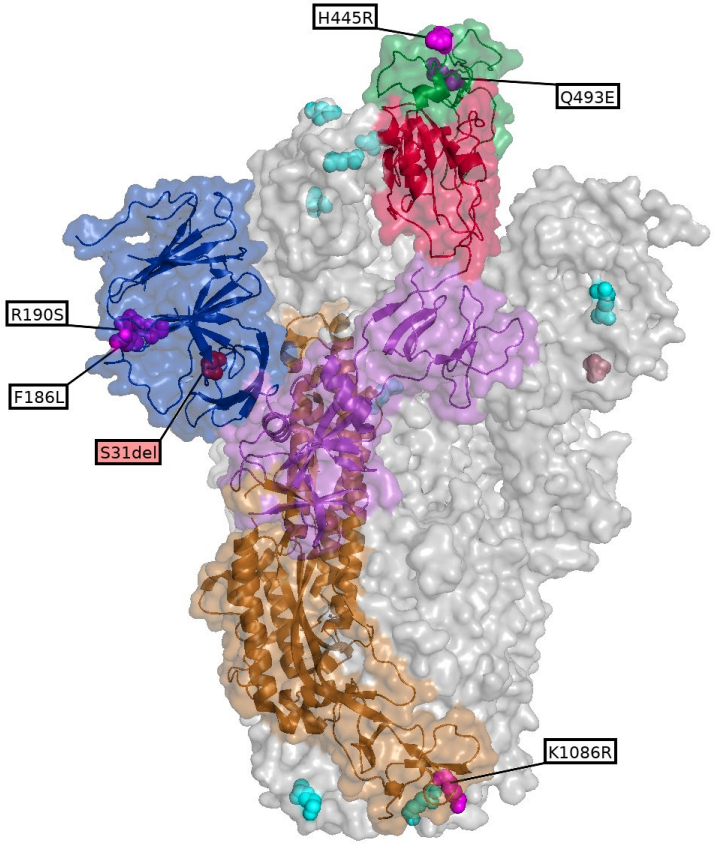


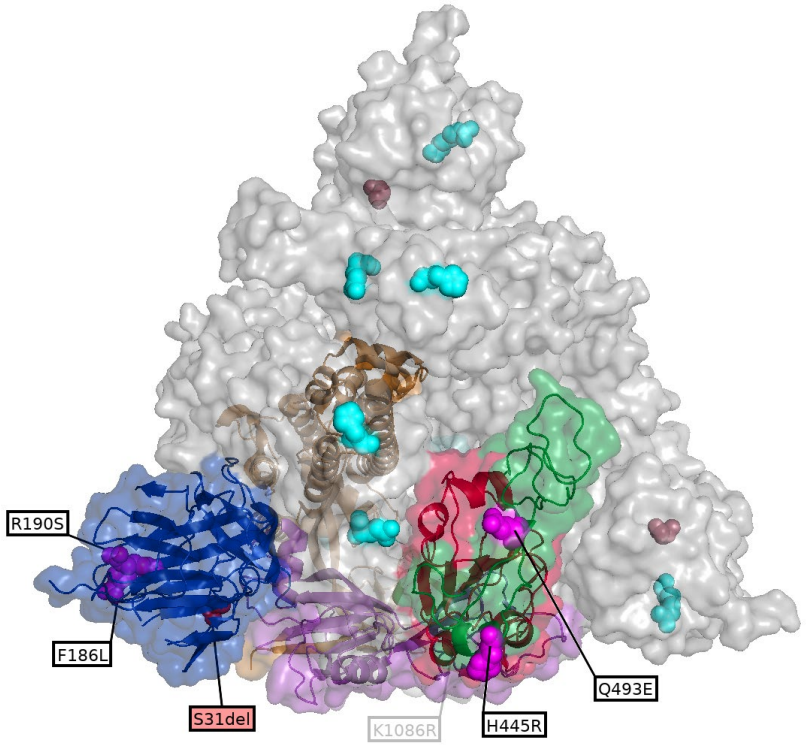



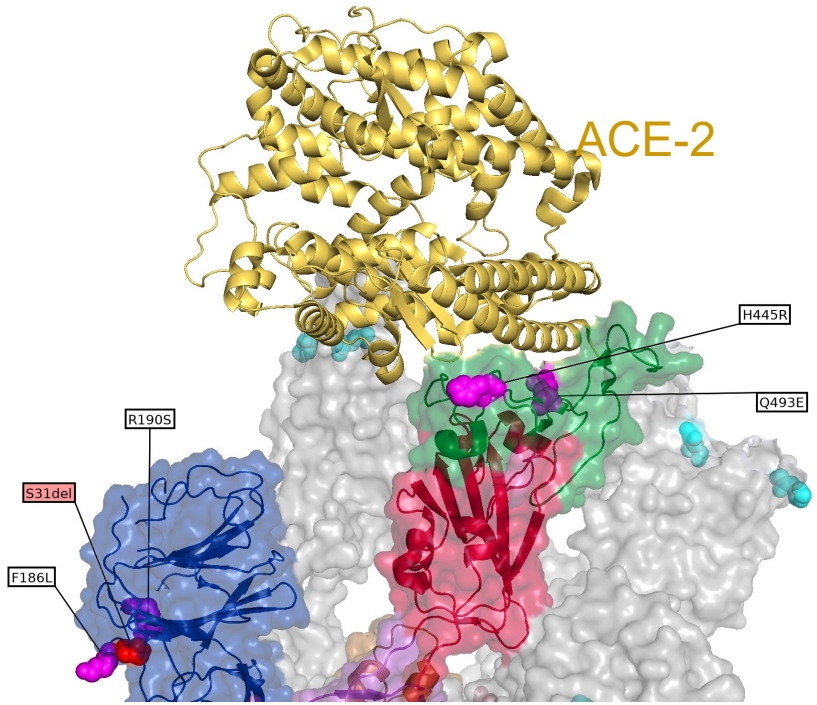

Red sphere – deletions in one chain (labeled)
Magenta sphere – substitutions in one chain (labeled)
Raspberry sphere – deletions in rest 2 chains
Cyan sphere – substitutions in rest 2 chains

Schrodinger homology model of JN.1, starting with 7YR2 (BA.2.75)
Prepared by CDC: Megha Aggarwal, PhD

# LP.8.1, the lineage that predominated this spring, has limited spike substitutions in comparison to KP.2




Blue – NTD
Red – RBD
Green – RBM
Purple – S1
Gold – FCS
Brown – S2

Structure of JN.1 (PDB ID: 8Y5J)

Red sphere – deletions in one chain (labeled)
Magenta sphere – substitutions in one chain (labeled)
Raspberry sphere – deletions in rest 2 chains
Cyan sphere – substitutions in rest 2 chains

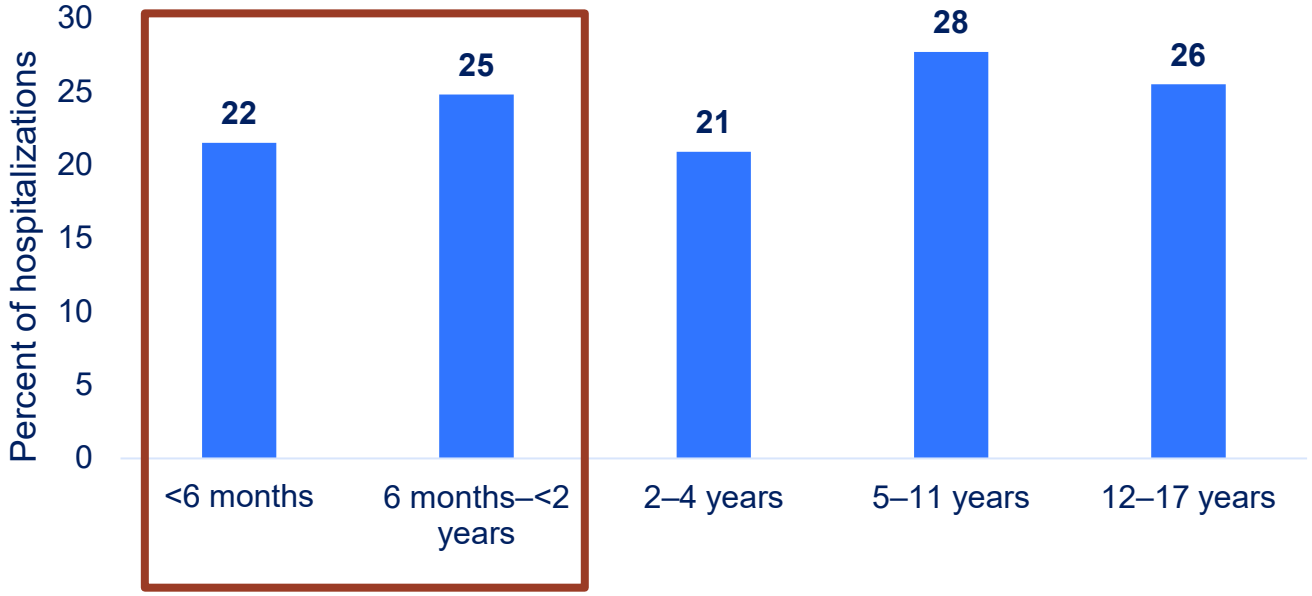
Structure of JN.1 in complex with ACE-2 (PDB ID: 8YZE)

# COVID-NET Summary

- **COVID-19 is estimated to have resulted in more than 250,000 hospitalizations since October 2024.**
- **Among children, rates of COVID-19–associated hospitalizations are highest among children ages <2 years.**
  - 89% of children ages 6 months–17 years admitted for COVID-19 had no record of recent COVID-19 vaccination
  - 1 in 5 children aged <2 years admitted for COVID-19 are admitted to the ICU
    - Of those ages <2 years admitted to the ICU, 53% had no underlying medical conditions
- **Among adults, rates of COVID-19–associated hospitalizations are highest among adults ages ≥75 years.**
- **65% of adults ages ≥65 years hospitalized with COVID-19 had no record of receiving ≥1 dose of the recommended 2024-25 COVID-19 vaccine prior to hospitalization.**
- **Most adults ages ≥18 years hospitalized for COVID-19 have ≥1 underlying medical condition.**
- **Among SARS-CoV-2-positive pregnant women admitted during April 2024–March 2025 with COVID-19-related symptoms on admission**
  - 50% had no underlying medical condition
  - 92% have no record of COVID-19 vaccination since July 1, 2023

# ~1 in 4 children and adolescents hospitalized for COVID-19 are admitted to the intensive care unit (ICU)

**Percent of children and adolescents with COVID-19–associated hospitalizations admitted to the ICU, by age group — COVID-NET, April 2024–March 2025**




| Age category | Among those admitted to ICU, % with no underlying conditions |
|---|---|
| <6 months | 62% |
| 6–23 months | 48% |
| 2–4 years | 23% |
| 5–11 years | 19% |
| 12–17 years | 16% |

During this period, 7 children with COVID-19–associated hospitalization died in-hospital in the COVID-NET catchment area.

Among children <2 years admitted to ICU, most did not have underlying medical conditions

Hospitalizations are limited to those with COVID-19 as the presenting complaint upon admission. Pregnant adolescents ages 15–17 years are excluded from proportions presented.