Centers for Disease Control and Prevention
National Center for Immunization and Respiratory Diseases

COVID-19–Associated Hospitalizations among Children and Adults — COVID-NET

ACIP Meeting

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Surveillance and Prevention Branch

Coronavirus and Other Respiratory Viruses Division

NCIRD
National Center for Immunization and Respiratory Diseases

COVID-NET: A RESP-NET population-based hospitalization surveillance platform

- RESP-NET: COVID-NET, RSV-NET, FluSurv-NET

- >300 acute-care hospitals

- 98 counties in 13 states

- In 9 of 10 HHS regions

- ~10% of U.S. population

- Positive SARS-CoV-2 within 14 days of or during hospitalization

- Screening or clinician-driven testing

- Clinical data: representative sample of COVID-NET patients
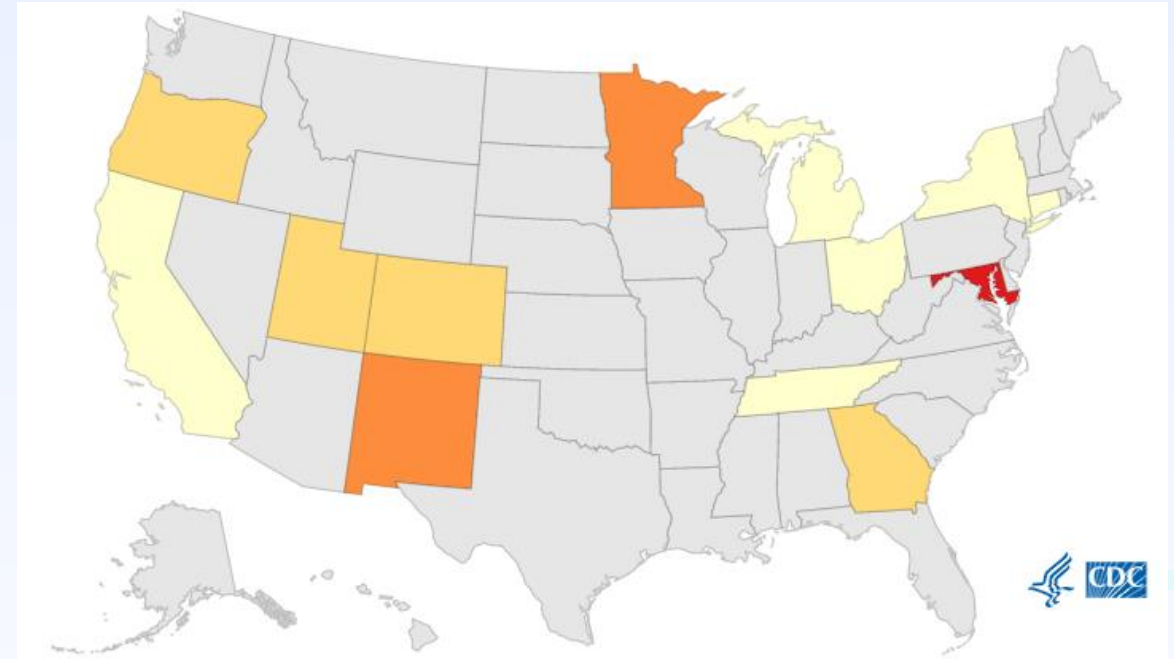
Percentage of state population represented by participating COVID-NET counties

- ⬤ 9% - < 31.75%
- ⬤ 31.75% - < 54.5%
- ⬤ 54.5% - < 77.25%
- ⬤ 77.25% - 100%

COVID-NET
COVID-19-Associated
Hospitalization
Surveillance Network:
A Respiratory Virus
Hospitalization Surveillance
Network (RESP-NET) Platform
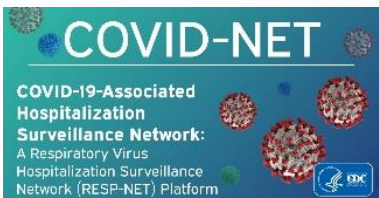
Population-Based Rates of COVID-19-Associated Hospitalizations — COVID-NET, March 2020–May 2024

Weekly Rates: March 2020–May 2024

**Cumulative Rates: Oct 2023–May 2024**
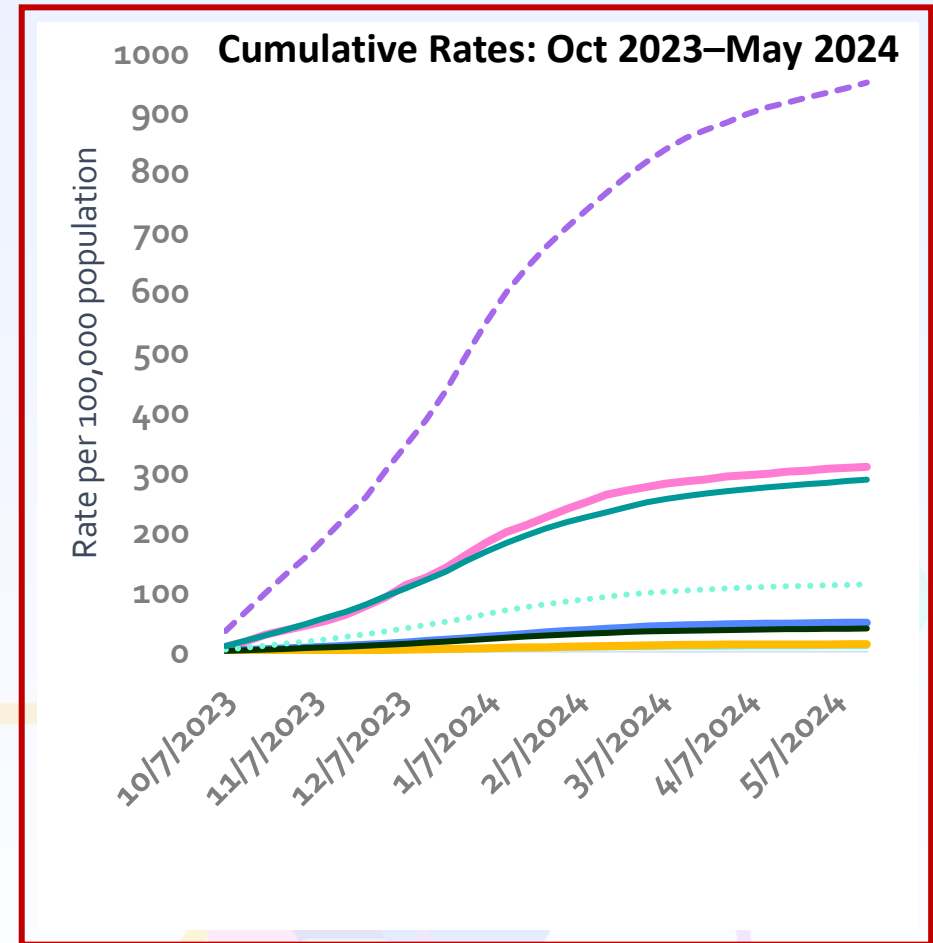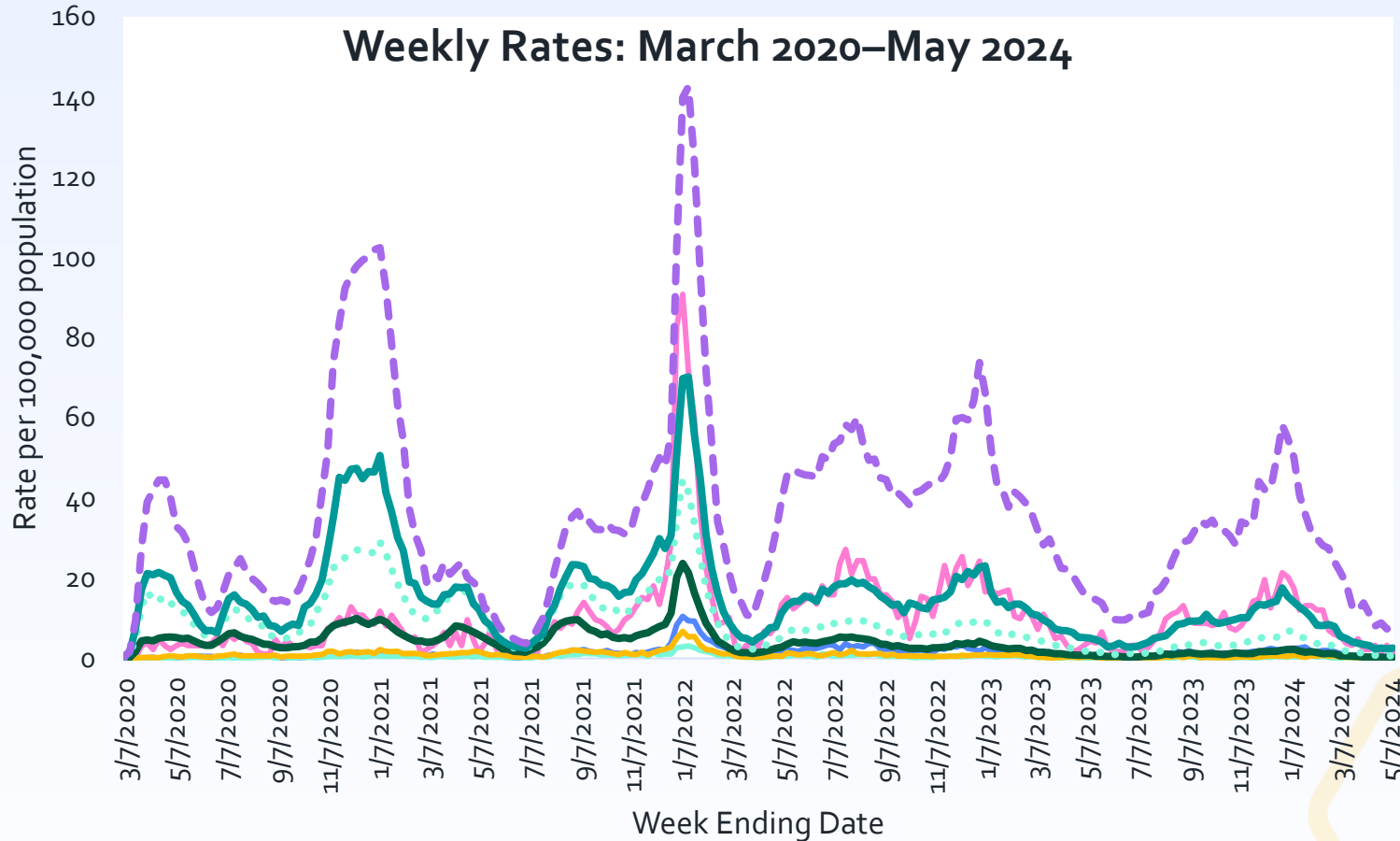
Legend:
- <6 months
- 6 months–4 years
- 5–11 years
- 12–17 years
- 18–49 years
- 50–64 years
- 65–74 years
- ≥75 years

Rates highest in ≥75 years, followed by infants <6 months and adults 65–74 years

Age-Adjusted Cumulative Rates of COVID-19-Associated Hospitalizations by Race and Ethnicity, All Ages — COVID-NET, October 2023–May 2024
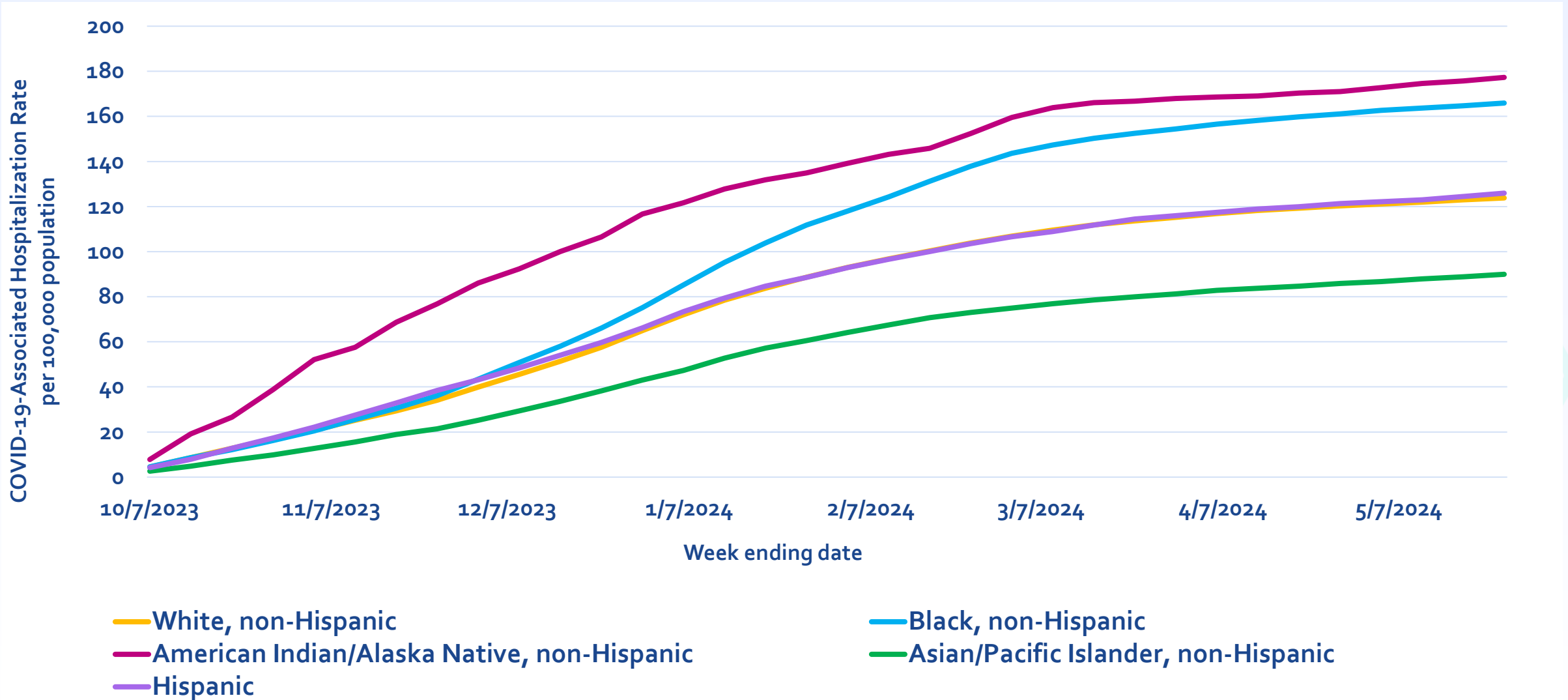
Percent of Weekly Hospitalizations by Age Group — COVID-NET, March 2020–May 2024
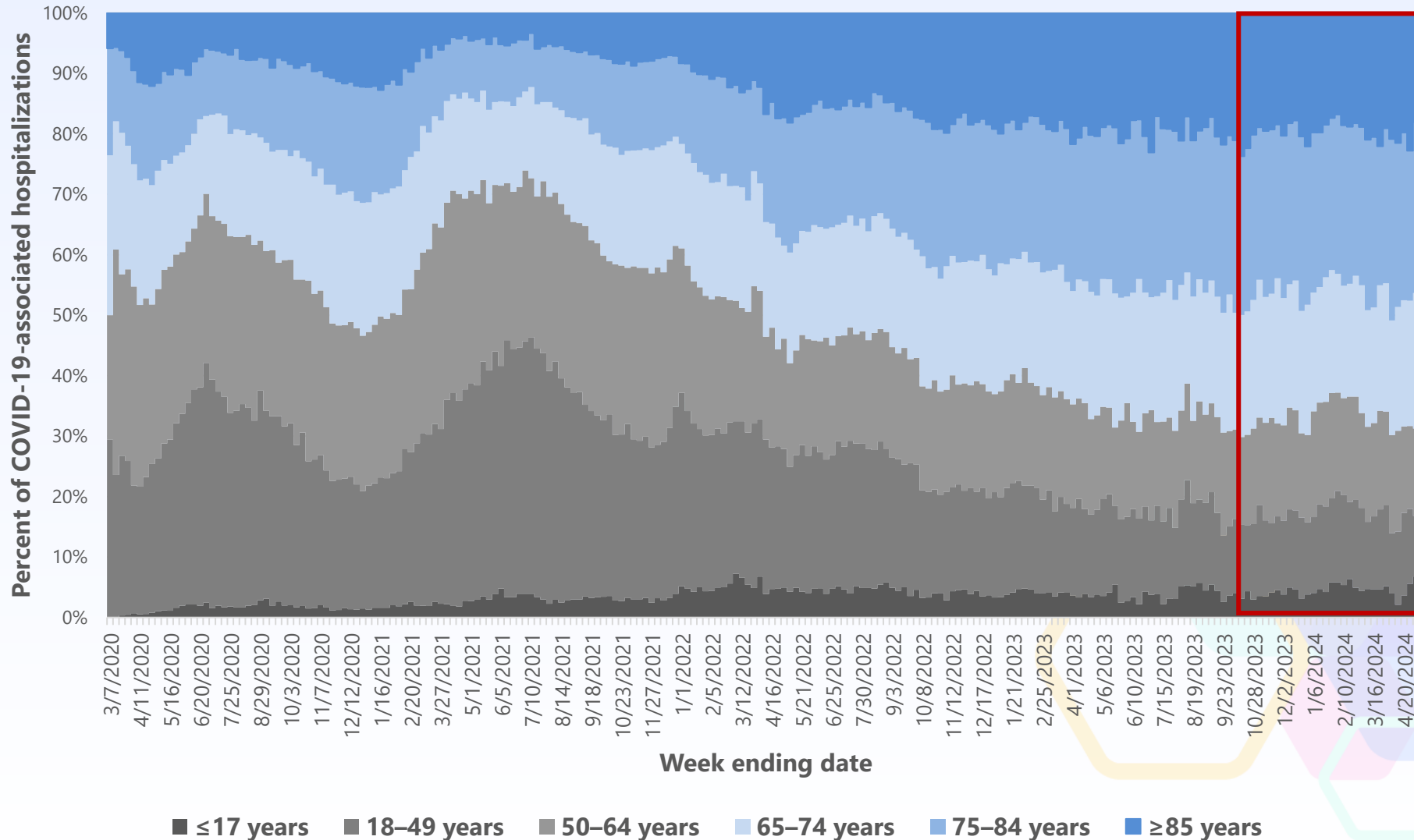
During October 2023– May 2024:

- **≥65**: **67%** of COVID-19 hospitalizations
- **<65**: **33%** of COVID-19 hospitalizations
- **≥75**: **46%** of COVID-19 hospitalizations
- **≤17**: **4%** of COVID-19 hospitalizations

Legend: ≤17 years | 18–49 years | 50–64 years | 65–74 years | 75–84 years | ≥85 years

Y-axis: Percent of COVID-19-associated hospitalizations
X-axis: Week ending date

Epidemiology of COVID-19–associated hospitalizations among infants, children and adolescents

Population-Based Rates of COVID-19-Associated Hospitalizations among Children and Adolescents Ages ≤17 Years — COVID-NET, March 2020–May 2024
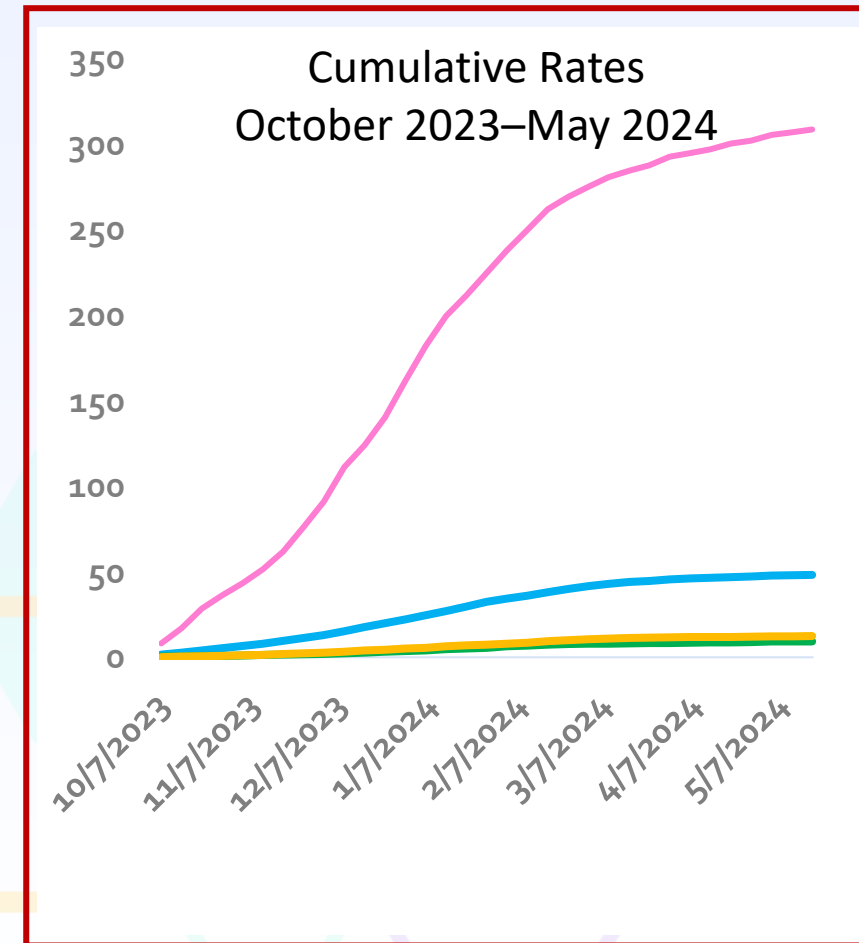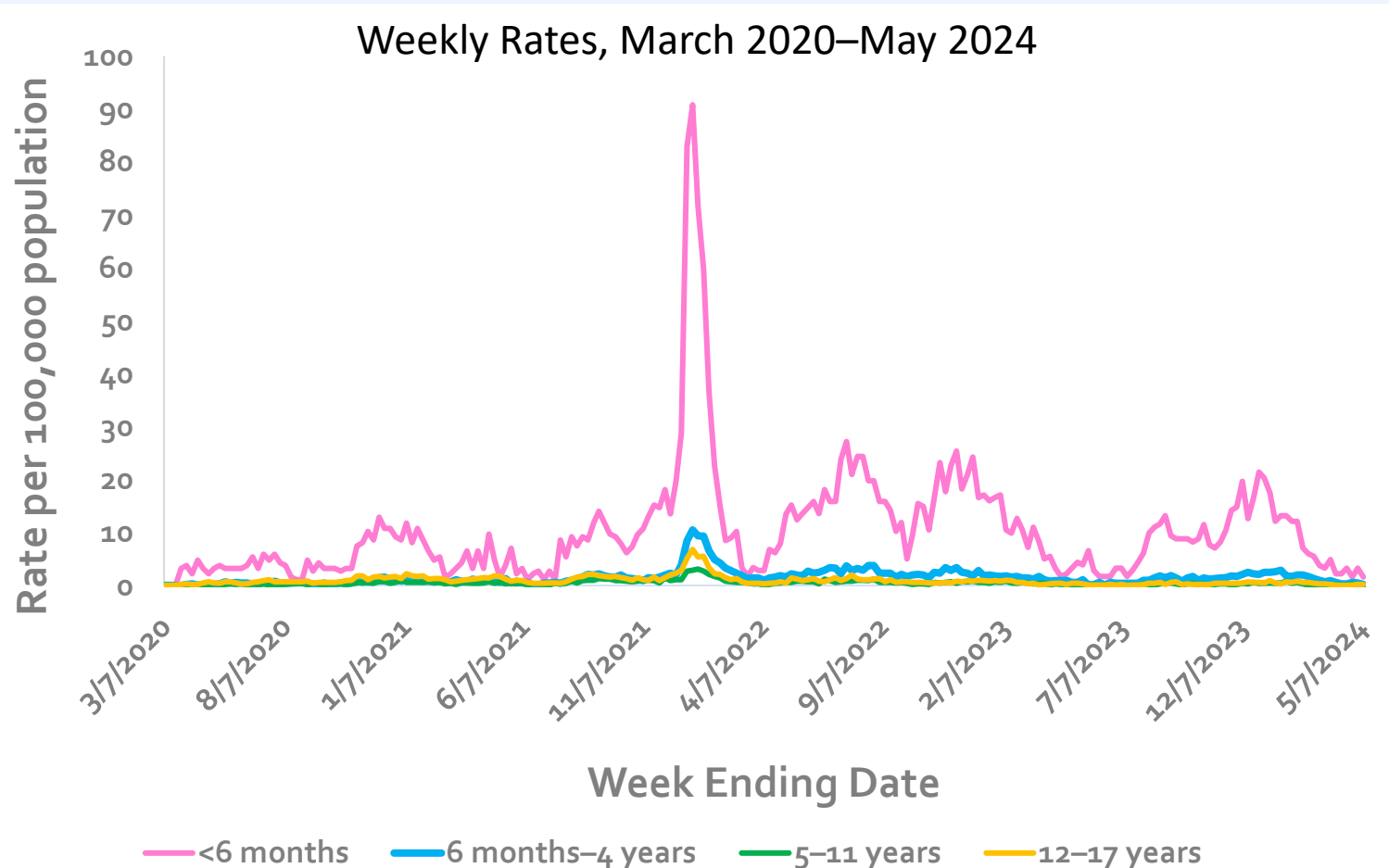
Weekly Rates, March 2020–May 2024

Cumulative Rates October 2023–May 2024

Legend: <6 months | 6 months–4 years | 5–11 years | 12–17 years

Population-Based Rates of COVID-19-Associated Hospitalizations among Children and Adolescents Ages 6 months–17 Years — COVID-NET, March 2020–May 2024
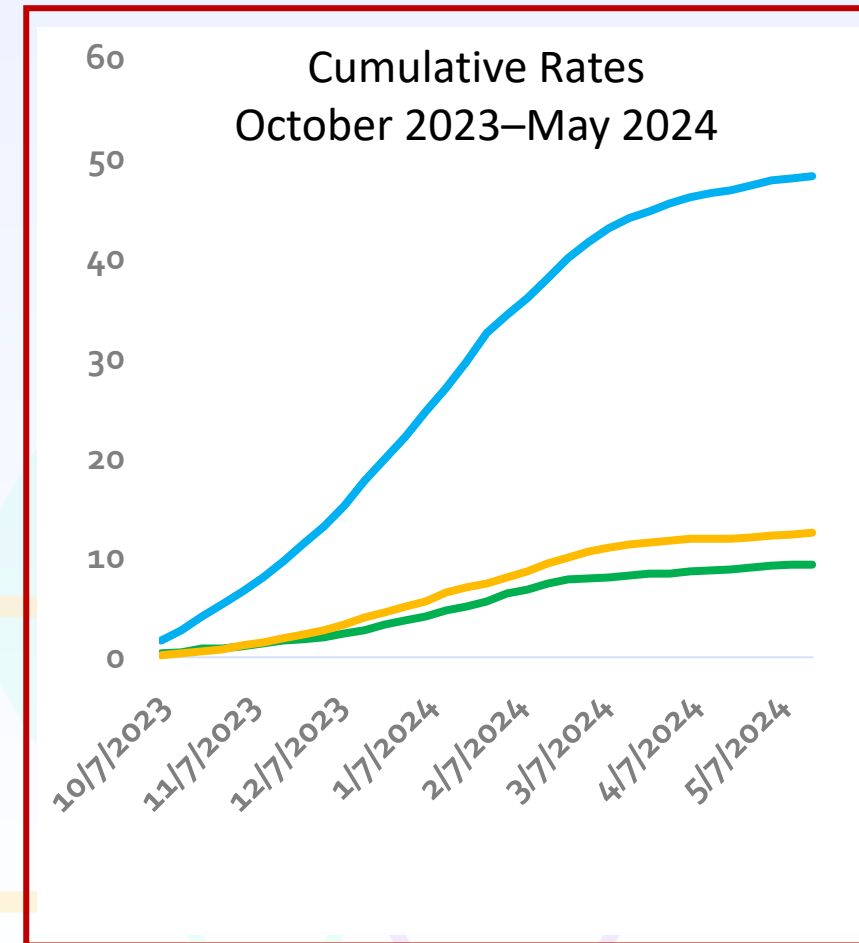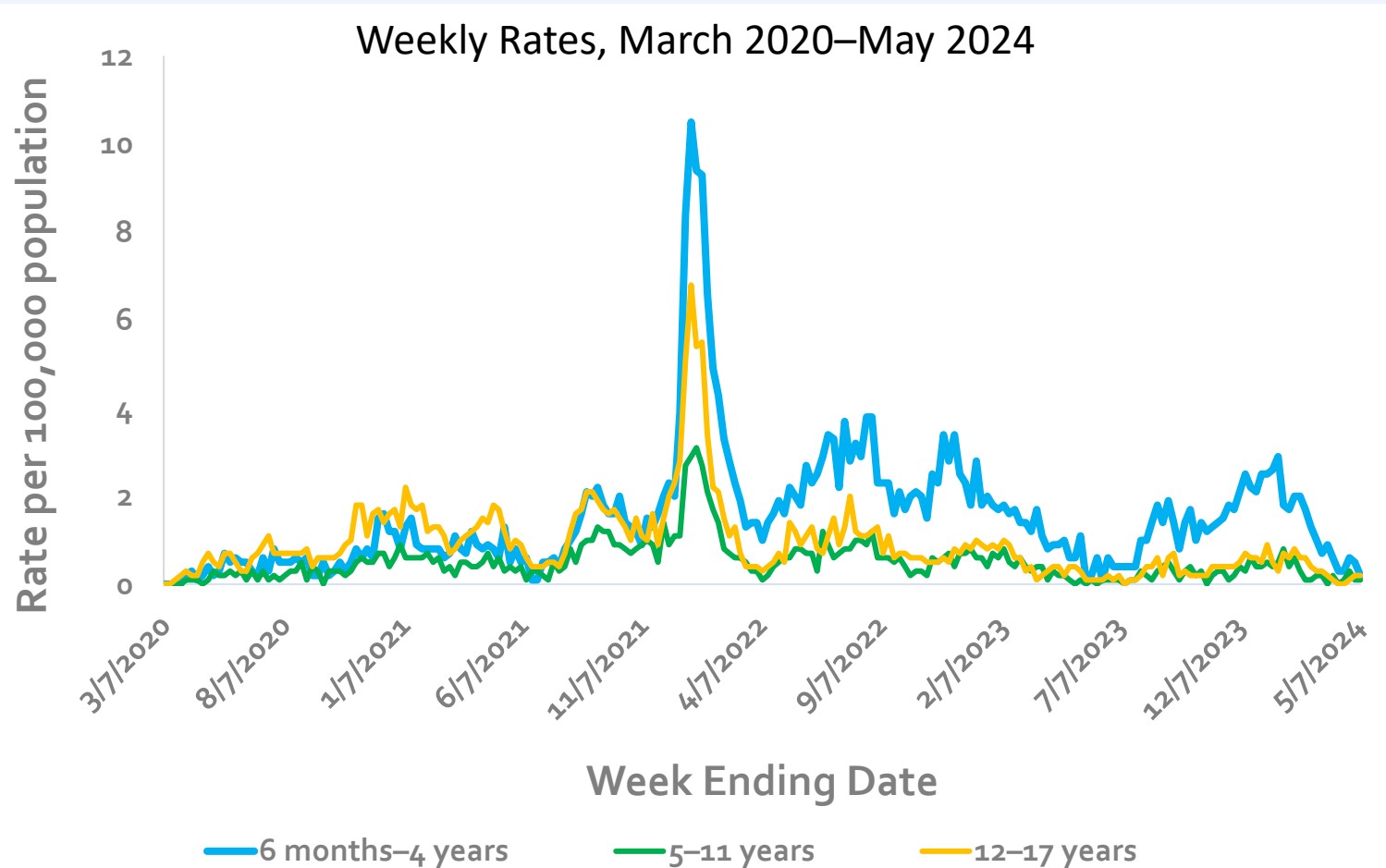
Underlying Medical Conditions among Infants and Children Ages ≤4 Years with COVID-19-associated Hospitalization, by Age Group — COVID-NET, July 2023–March 2024

<6 months:
75% with no underlying conditions

6 months–<2 years:
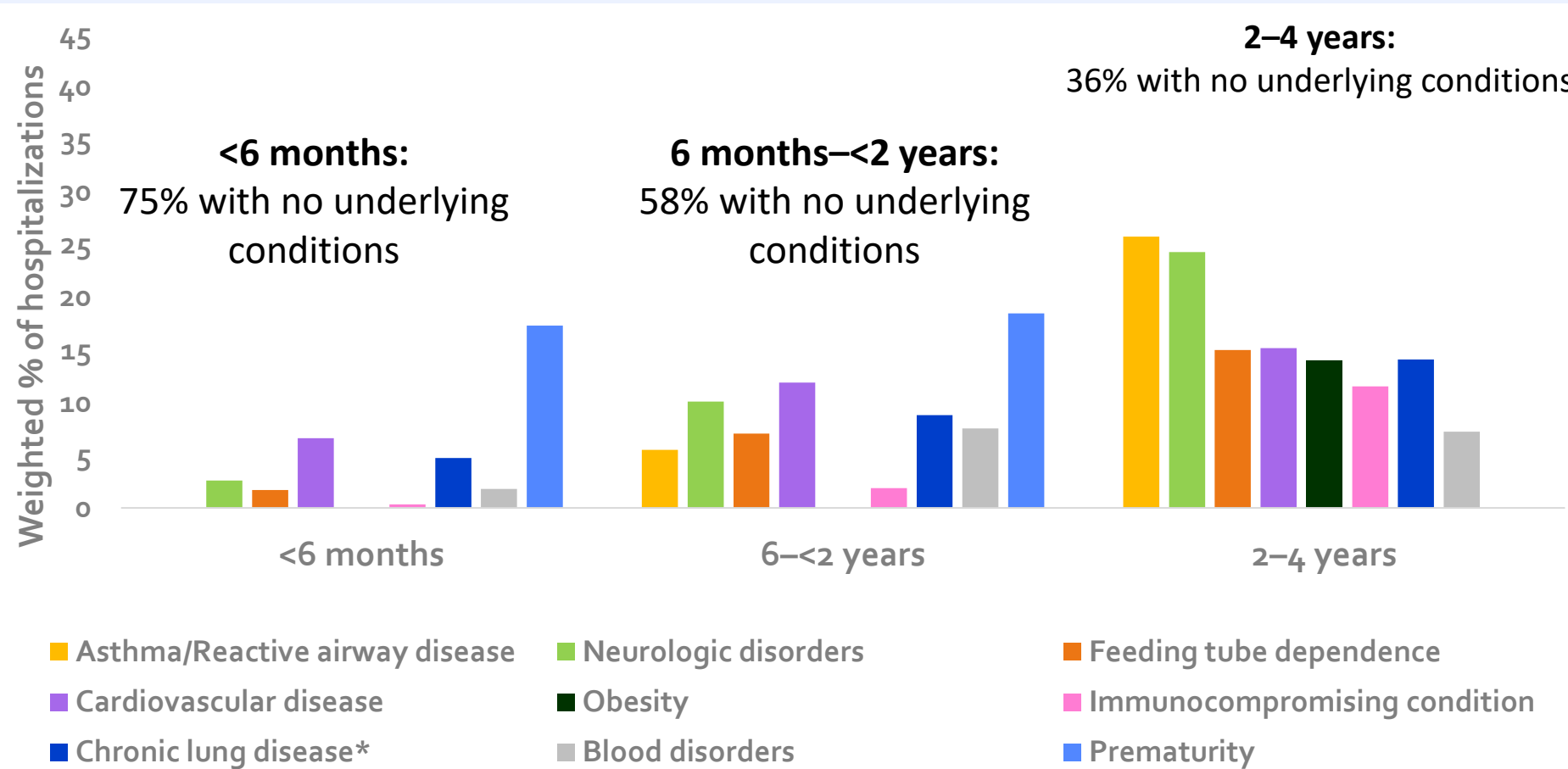58% with no underlying conditions

2–4 years:
36% with no underlying conditions

Weighted % of hospitalizations

- **50%** of infants, children, and adolescents ages ≤17 years with COVID-19-associated hospitalization have **no** underlying medical conditions.

Legend:
- Asthma/Reactive airway disease
- Neurologic disorders
- Feeding tube dependence
- Cardiovascular disease
- Obesity
- Immunocompromising condition
- Chronic lung disease*
- Blood disorders
- Prematurity

Data are limited to hospitalizations where COVID-19 is a likely primary reason for admission.

* Not including not asthma or reactive airway disease. Among children <2 years old, chronic lung disease includes bronchopulmonary dysplasia and chronic lung disease of prematurity.

Percent of COVID-19-Associated Hospitalizations with Underlying Medical Conditions among Children and Adolescents Ages 5–17 Years with COVID-19-associated Hospitalizations, by Age Group — COVID-NET, July 2023–March 2024

5–11 years: 20% with no underlying conditions

12–17 years: 22% with no underlying conditions

Weighted % of hospitalizations

5–11 years bars: 47, 38, 21, 18, 19, 15, 13, 8

12–17 years bars: 30, 36, 19, 22, 13, 17, 11, 14

Legend:
- Asthma
- Feeding tube dependence
- Obesity
- Chronic lung disease, not including asthma
- Neurologic disorders
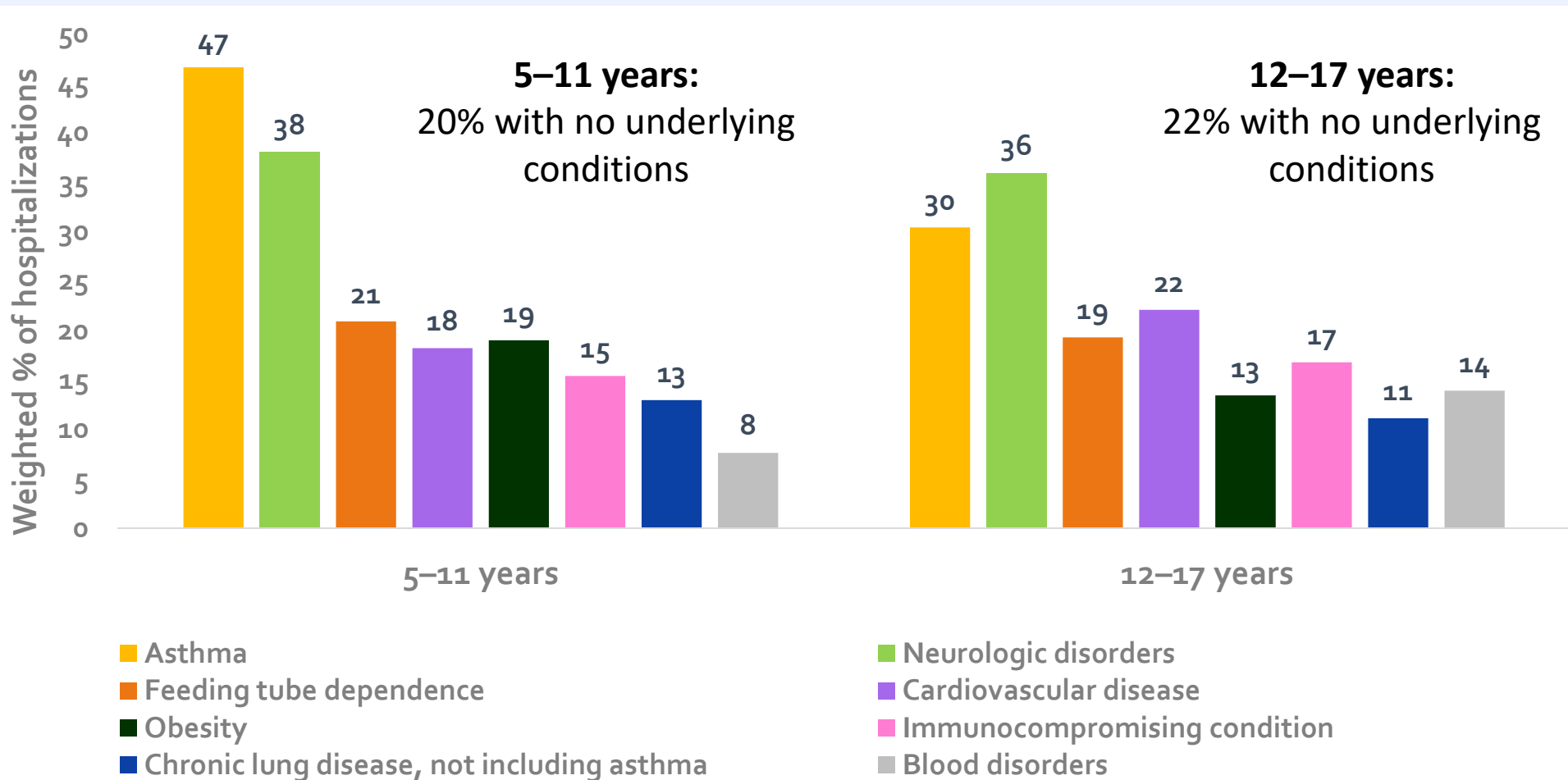- Cardiovascular disease
- Immunocompromising condition
- Blood disorders

- **50%** of infants, children, and adolescents ages ≤17 years with COVID-19-associated hospitalization have **no underlying medical conditions**.
- Among COVID-19-associated hospitalizations, children and adolescents **ages ≥5 years** are **more likely to have underlying medical conditions** relative to infants and children ages ≤4 years.

Data are limited to hospitalizations where COVID-19 is a likely primary reason for admission.
*Only the most common underlying conditions are presented.*

Underlying Medical Conditions among Patients Admitted to ICU among Children and Adolescents Ages ≤17 Years with COVID-19-associated Hospitalization, July 2023–March 2024

Age category	Among all hospitalized children, % with no underlying conditions	Among those admitted to ICU, % with no underlying conditions (n=363)	Among those with no underlying conditions, what % were admitted to ICU? (n=791)
<6 months	75%	56%	18%
6–23 months	58%	52%	17%
2–4 years	32%	28%	20%
5–11 years	16%	4%	5%
12–17 years	18%	19%	28%
Overall ≤17 Years	**50%**	**40%**	**18%**

Hospitalizations are limited to those with COVID-19 as a likely primary reason for admission.

Vaccination Status among Children and Adolescents Ages ≤17 Years with COVID-19-associated Hospitalizations, by Age Group — COVID-NET, October 2023–March 2024
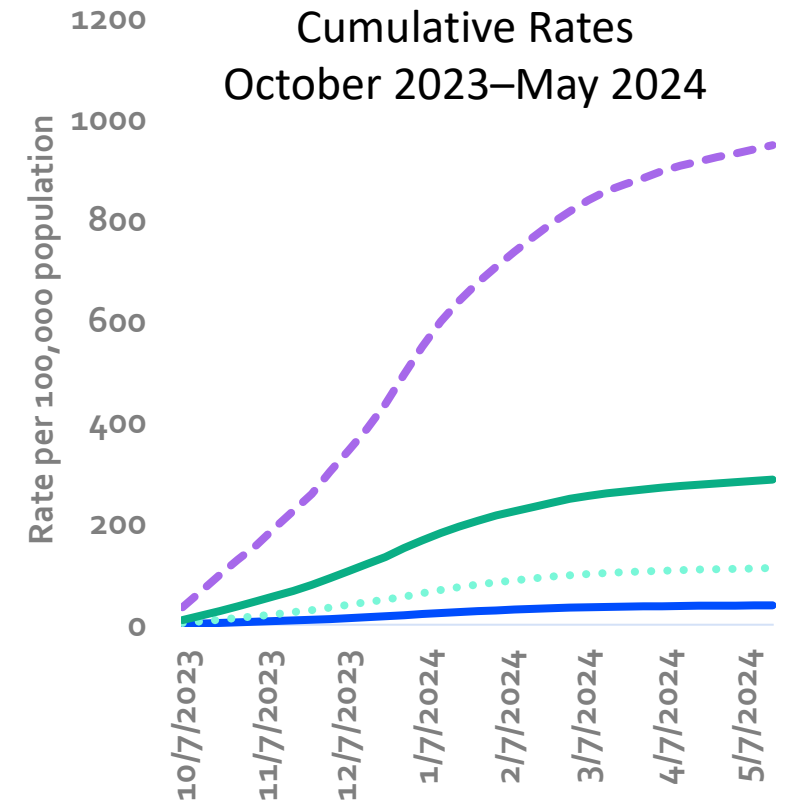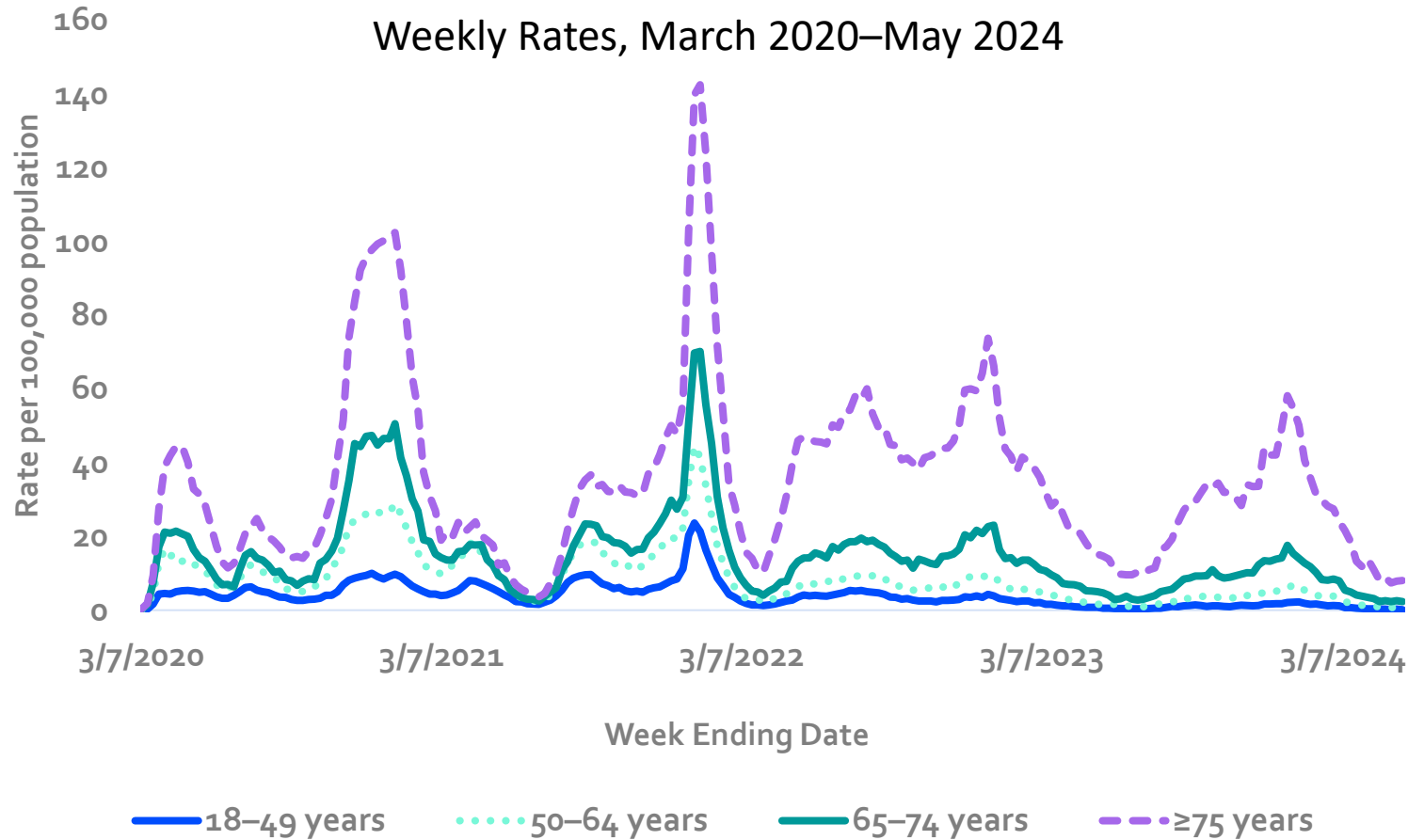

- **5%** of children and adolescents ages ≤17 years with COVID-19-associated hospitalizations **received a 2023–2024 vaccine dose.**
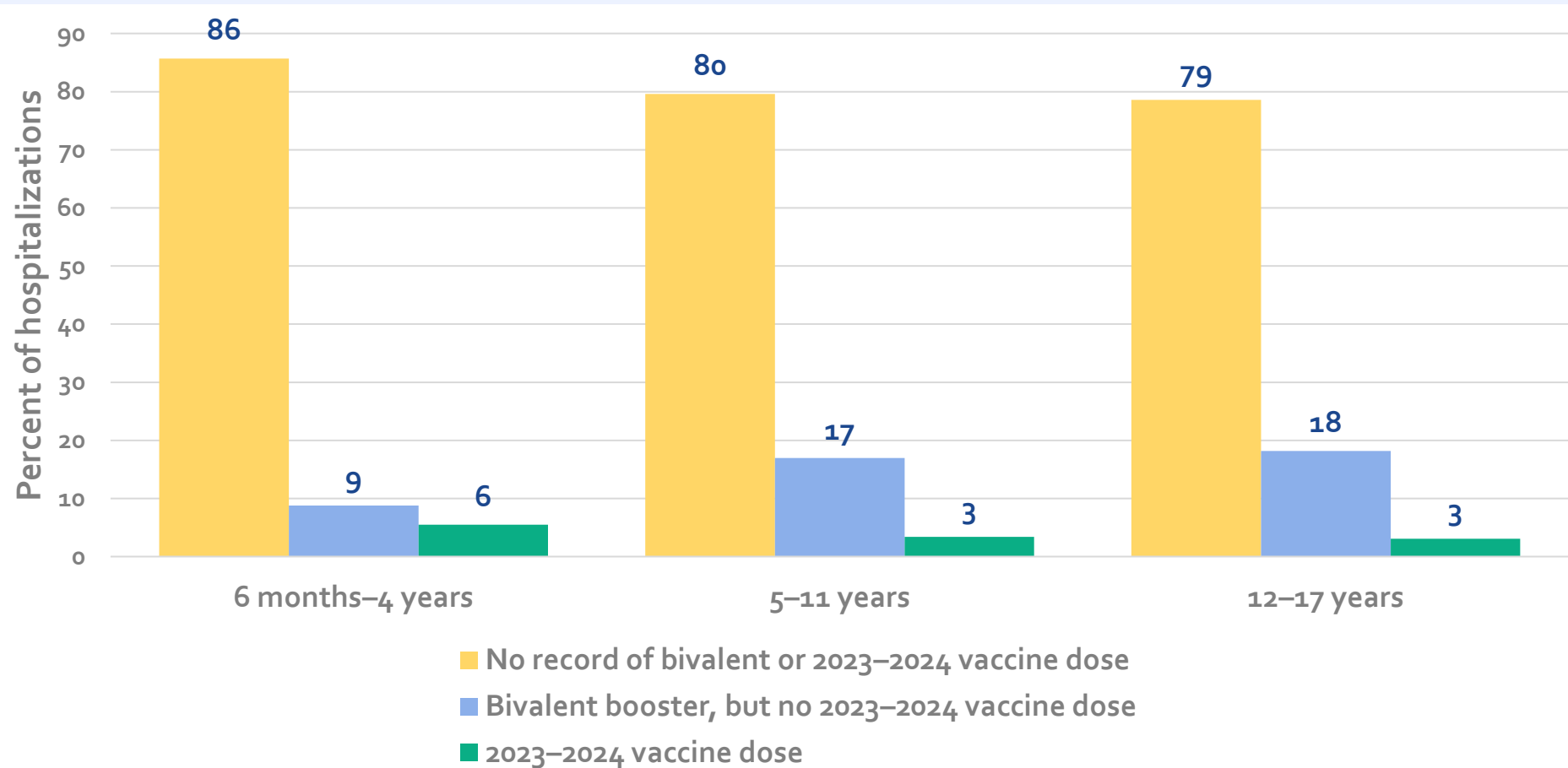
Legend:
- No record of bivalent or 2023–2024 vaccine dose
- Bivalent booster, but no 2023–2024 vaccine dose
- 2023–2024 vaccine dose

No record of bivalent or 2023–2024 vaccine dose: No recorded doses of COVID-19 bivalent or the 2023-2024 vaccine dose since August 2022. *Bivalent booster, but no 2023–2024 vaccine dose*: Received COVID-19 bivalent booster vaccination but no record of receiving 2023-2024 vaccine dose since August 2022. *2023–2024 vaccine dose*: Received 2023-2024 vaccine dose. Persons with unknown vaccination status are excluded. Hospitalizations are limited to those with COVID-19 as the presenting complaint upon admission.

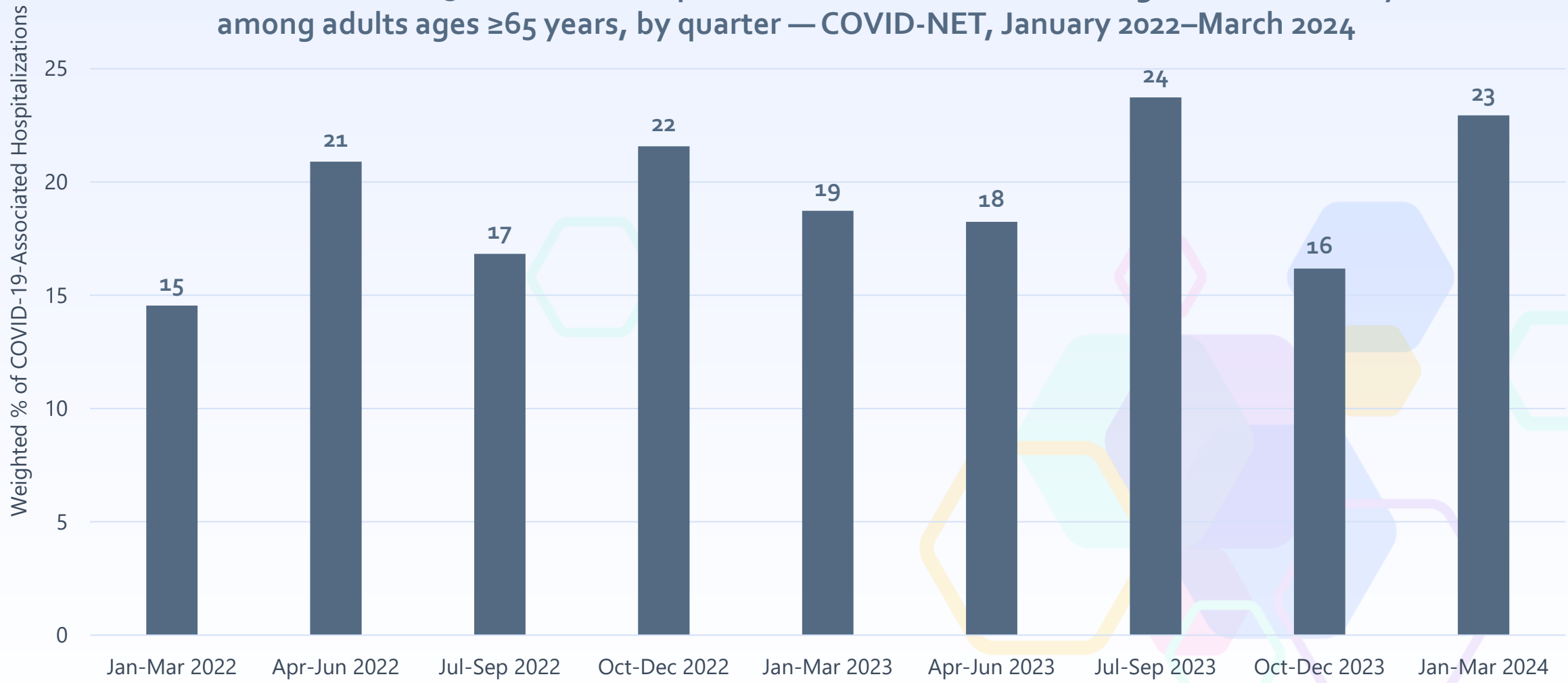# Epidemiology of COVID-19–associated hospitalizations among adults

Weekly Population-Based Rates of COVID-19-Associated Hospitalizations among Adults Ages ≥18 Years — COVID-NET, March 2020–May 2024

Weekly Rates, March 2020–May 2024

Cumulative Rates
October 2023–May 2024
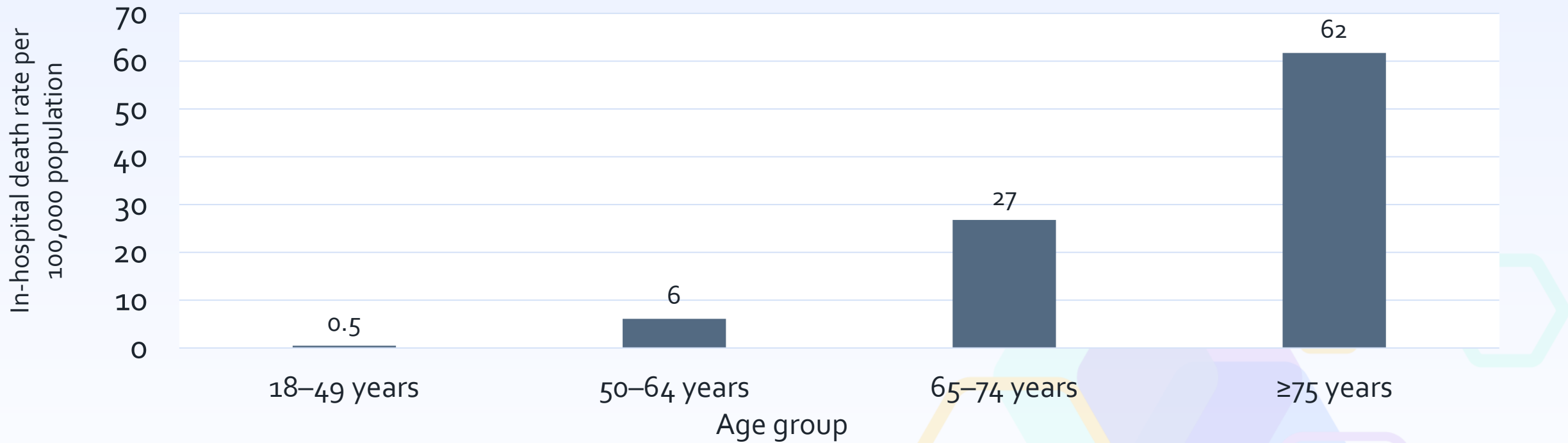
Legend: 18–49 years, 50–64 years, 65–74 years, ≥75 years

During January 2022–March 2024, 19% of COVID-19-associated hospitalizations among adults ages ≥65 years were residents of a long-term care facility.

Percent of COVID-19-associated hospitalizations admitted from a long-term care facility among adults ages ≥65 years, by quarter — COVID-NET, January 2022–March 2024

Weighted % of COVID-19-Associated Hospitalizations

| Jan-Mar 2022	Apr-Jun 2022	Jul-Sep 2022	Oct-Dec 2022	Jan-Mar 2023	Apr-Jun 2023	Jul-Sep 2023	Oct-Dec 2023	Jan-Mar 2024
15	21	17	22	19	18	24	16	23

Cumulative In-Hospital Death Rate during COVID-19-Associated Hospitalization per 100,000 Population by Age Group — COVID-NET, October 2023–March 2024

Weighted percent of in-hospital deaths by age group	18–49 years	50–64 years	65–74 years	≥75 years
	3%	15%	32%	50%

Vaccination Status among Adults Ages ≥18 Years with COVID-19-associated Hospitalization, by Age Group — COVID-NET, October 2023–March 2024
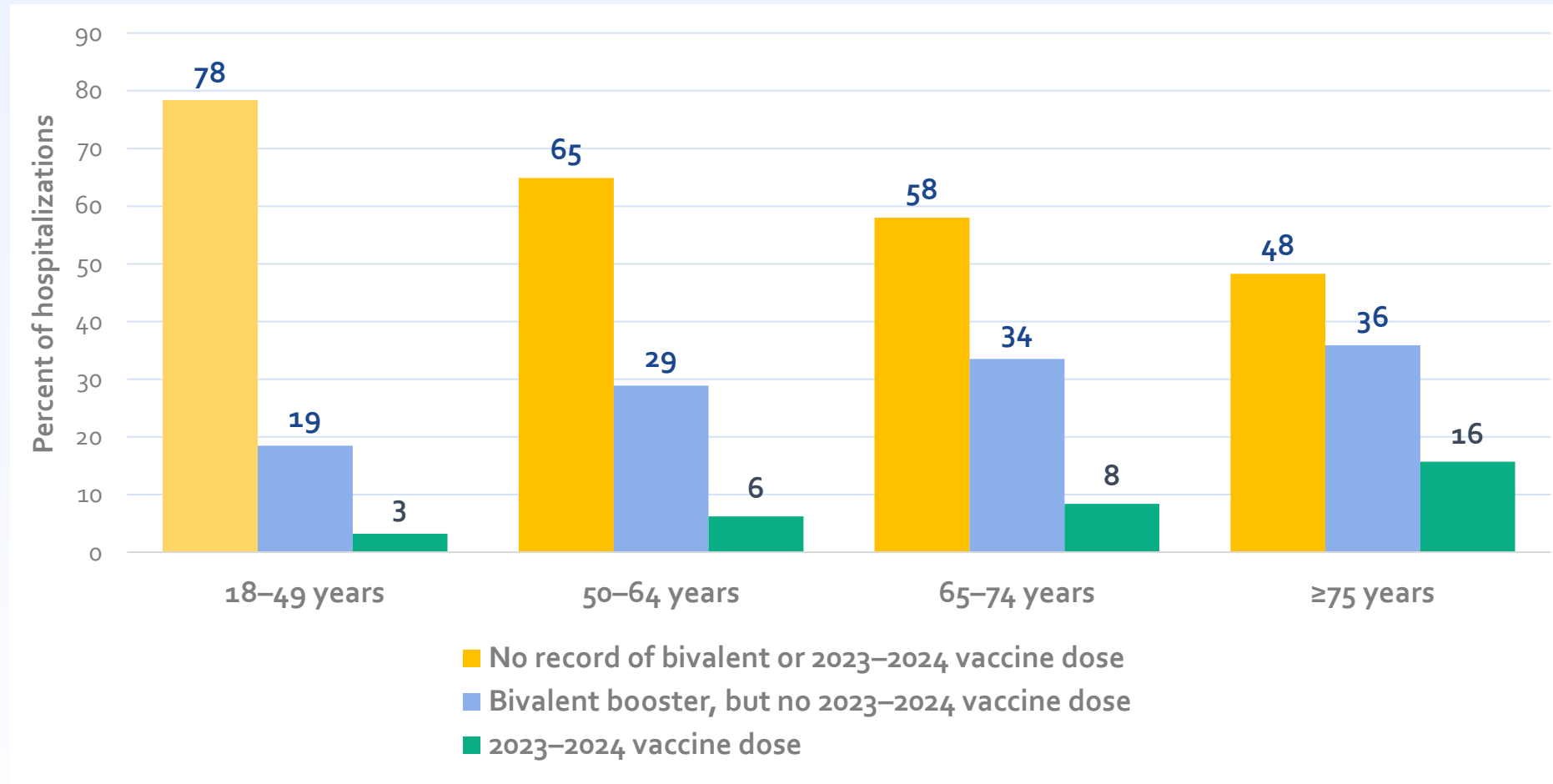
- **11%** of adults ages ≥18 years with COVID-19-associated hospitalizations **received a 2023–2024 vaccine dose.**

- **57%** of COVID-19-associated hospitalizations among adults ages ≥18 years had not received a COVID-19 vaccine after August 2022.

Legend:
- No record of bivalent or 2023–2024 vaccine dose
- Bivalent booster, but no 2023–2024 vaccine dose
- 2023–2024 vaccine dose

Y-axis: Percent of hospitalizations

Data values:
- 18–49 years: 78, 19, 3
- 50–64 years: 65, 29, 6
- 65–74 years: 58, 34, 8
- ≥75 years: 48, 36, 16

No record of bivalent or 2023–2024 vaccine dose: No recorded doses of COVID-19 bivalent or 2023-2024 vaccine dose since August 2022. Bivalent booster, but no 2023–2024 vaccine dose: Received COVID-19 bivalent booster vaccination but no record of receiving 2023–2024 vaccine dose since August 2022. 2023–2024 vaccine dose: Received 2023-2024 vaccine dose. Persons with unknown vaccination status are excluded.

Percent of COVID-19-associated Hospitalizations among Adults Ages ≥18 Years with Underlying Medical Conditions, by Age Group, with Top 4 Categories Highlighted — COVID-NET, July 2023–March 2024

Condition	18–49 years	50–64 years	65–74 years	≥75 years
Chronic lung disease	26	41	51	40
Asthma	19	17	17	10
COPD/Bronchitis	4	19	30	19
Cardiovascular disease	26	56	65	72
CAD/CABG/MI	4	18	34	32
CHF/Cardiomyopathy	8	23	29	29
Stroke/TIA	5	18	13	20
Diabetes	19	41	40	34
Immunocompromising condition	12	22	22	11
Neurologic condition	23	32	29	46
Renal Disease	12	25	25	33
Severe obesity (BMI ≥40 kg/m²)	16	14	6	3

COPD: chronic obstructive pulmonary disease; CAD: coronary artery disease; CABG: coronary artery bypass graft; TIA: transient ischemic attack
Pink cells indicate the 4 most common underlying medical conditions within each age group; dark pink cells indicate the most common condition.

We used 3 data sources to calculate COVID-19–associated hospitalization rates by chronic condition and age group

Numerator

- COVID-19–Associated Hospitalization Surveillance Network (COVID–NET)

Denominator

- Behavioral Risk Factor Surveillance System (BRFSS)
- Census population counts

Prevalence of chronic conditions among hospitalized adults in COVID-NET, adults in COVID-NET states, and adults in the United States aged ≥18 years, 2022

Unadjusted prevalence (%) with 95% confidence intervals
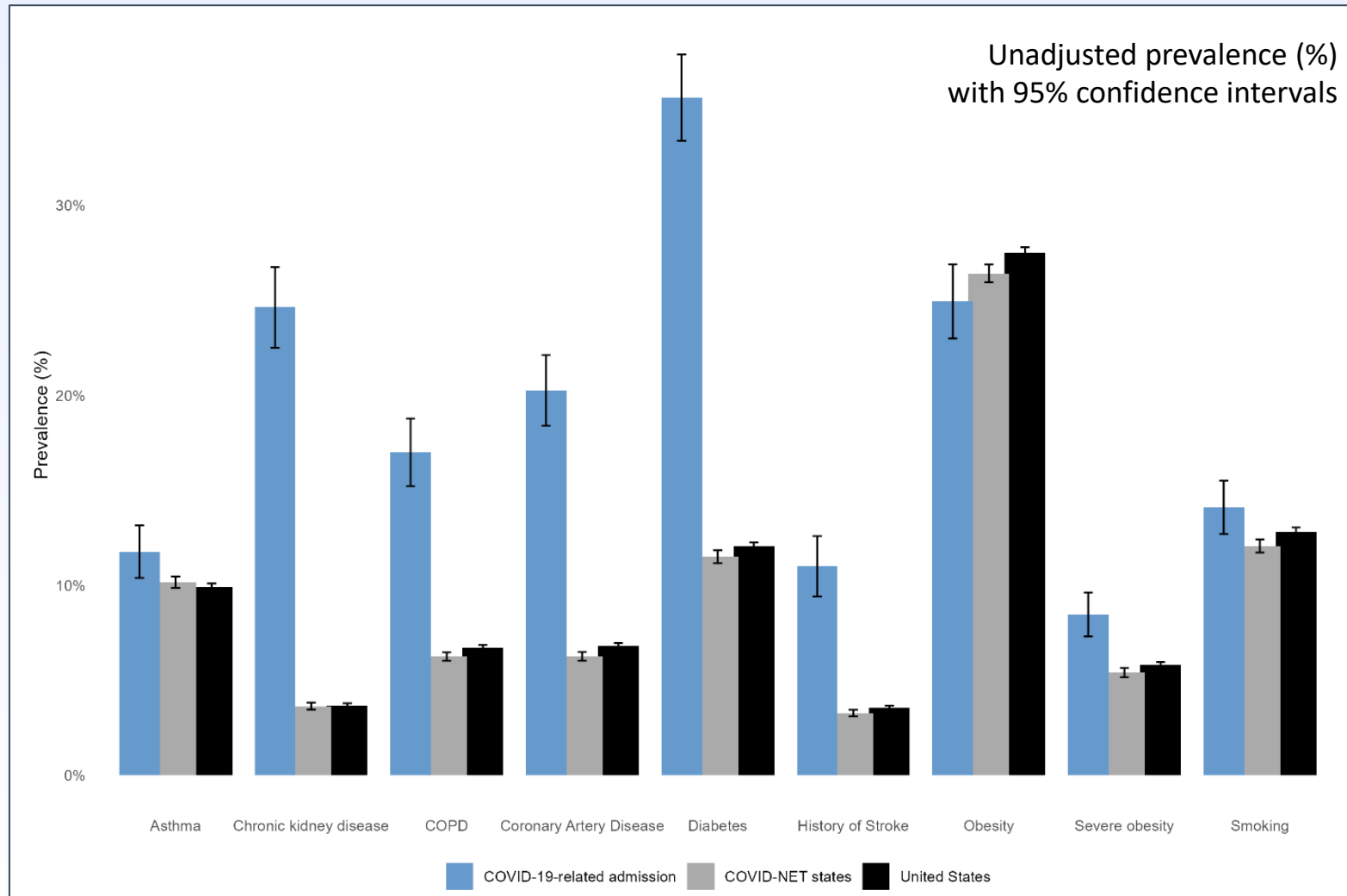
- **Except for asthma and obesity, unadjusted prevalence is higher among hospitalized COVID-19 patients relative to the general population**
- **In adjusted models, except for obesity, all other 8 conditions examined were found to increase the risk for COVID-19-associated hospitalization.**
  - **Magnitude of increased risk varied by condition and age group.**
  - **Age ≥75 remains a strong risk factor for hospitalization even in adjusted models**
- **Results are limited to community-dwelling adults**

Data are preliminary and subject to change. Obesity is defined as BMI 30–39 kg/m²; severe obesity is defined as BMI ≥40 kg/m². Only includes community dwelling residents. Non-community dwelling persons, including those who resided in a long-term care facility upon admission, are excluded. COVID-19-related admissions are those where the primary reason for admission is COVID-19-related illness. Prevalence data from COVID-NET states and United states are obtain from the Behavioral Risk Factor Surveillance System, 2022 data.

Summary – Infants, Children, and Adolescents

- Rates of COVID-19-associated hospitalizations highest among those ≤4 years

- Rates highest among infants ages <6 months who are not vaccine eligible and require a different approach for prevention (e.g., maternal vaccination)

- 50% have no underlying medical conditions
  - Among children with no underlying medical conditions, 18% were admitted to the ICU

- October 2023–March 2024: 5% of hospitalized children 6 months – ≤ 17 years had received a 2023–2024 vaccine prior to admission

Summary – Adults

- 2/3 of all COVID-19-associated hospitalizations among those aged ≥65 years

- During October 2023–March 2024, 11% of hospitalized adult patients had received a 2023–2024 vaccine dose prior to admission

- Underlying conditions increase risk for hospitalization, but age remains strongly associated with the risk for hospitalization
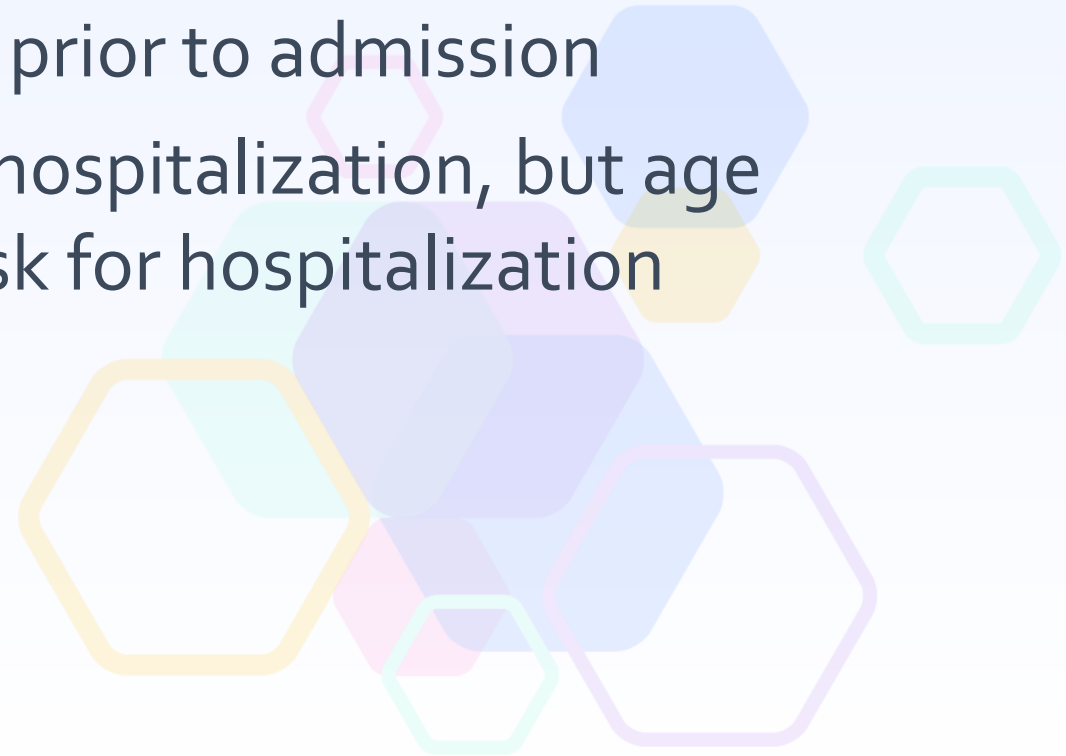
Acknowledgements

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

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