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

Epidemiology of Respiratory Syncytial Virus Hospitalizations in Adults — RSV-NET

Advisory Committee on Immunization Practices, October 25, 2023

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Surveillance and Prevention Branch
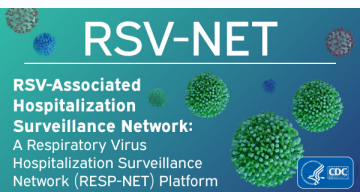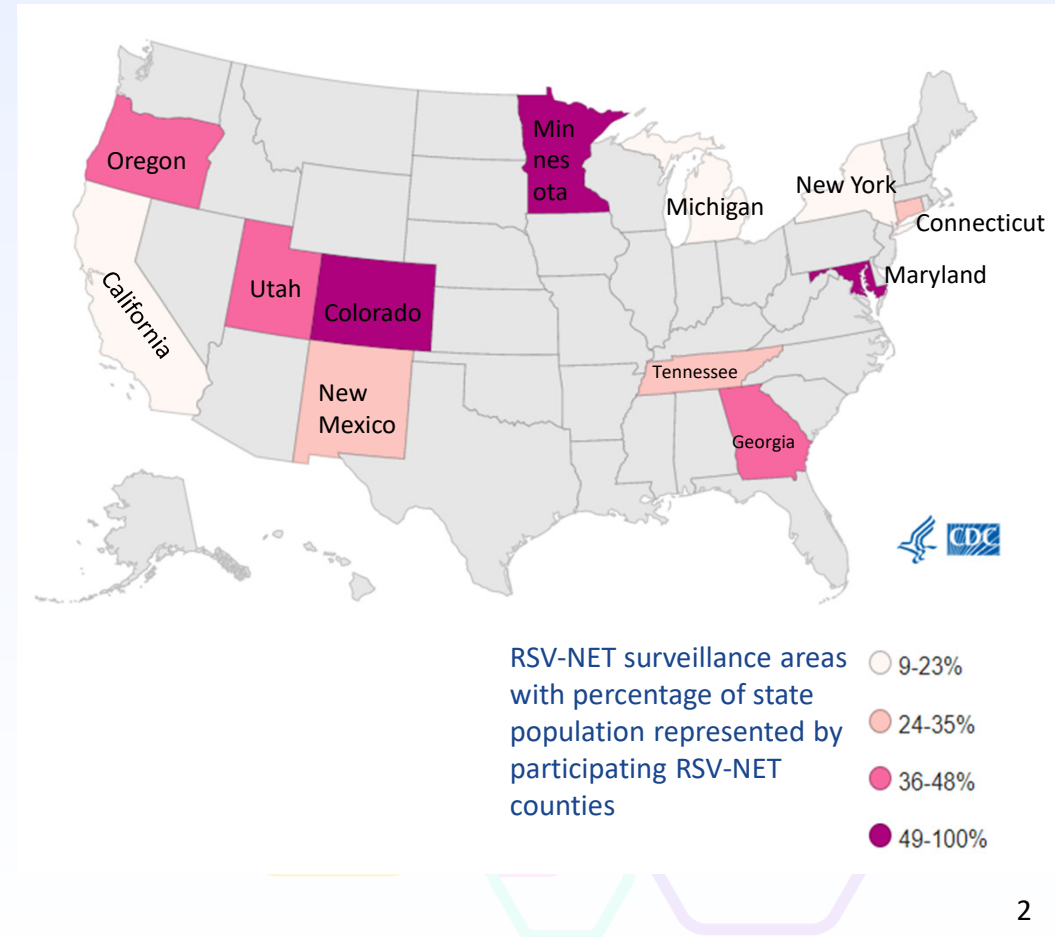
Coronavirus and Other Respiratory Viruses Division

NCIRD
National Center for Immunization and Respiratory Diseases

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

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

- Active, population-based surveillance of laboratory-confirmed RSV-associated hospitalizations
  - >300 acute-care hospitals, 58 counties in 12 states
  - ~8.6% of U.S. population

- Tests positive for RSV within 14 days prior to or during hospitalization
  - Clinician-driven testing

- Clinical data: random sample of RSV-NET patients stratified by age and site

RSV-NET surveillance areas with percentage of state population represented by participating RSV-NET counties

- 9-23%
- 24-35%
- 36-48%
- 49-100%

RSV-NET
RSV-Associated Hospitalization Surveillance Network: A Respiratory Virus Hospitalization Surveillance Network (RESP-NET) Platform

Age groups presented today for adults aged ≥18 years

Age Group	Background/Rationale
18–49 years	Youngest adult group
50–59 years	**Age group for which we are reviewing data today**
60–64 years	60 is youngest age currently recommended for RSV vaccination, with shared clinical decision making, in the U.S.
65–74 years	65 is a common definition of "older adults" and used for other vaccine recommendations • Certain influenza vaccine formulations • Universal pneumococcal vaccination • Age of most Medicare eligibility
≥75 years	75 is the age at which RSV vaccination was recommended by the United Kingdom's Joint Committee on Vaccination and Immunisation (JCVI)*

*https://www.gov.uk/government/publications/rsv-immunisation-programme-jcvi-advice-7-june-2023/respiratory-syncytial-virus-rsv-immunisation-programme-for-infants-and-older-adults-jcvi-full-statement-11-september-2023

Epidemiology of RSV–associated hospitalizations among adults aged 50–59 years

- Demographics
- Rates of RSV-associated hospitalizations
- Underlying medical conditions
- Severe outcomes (ICU admission, mechanical ventilation, death)
  - Comparison of RSV v. influenza v. COVID-19

- Will not present rates of RSV-associated hospitalizations stratified by risk conditions

Characteristics of non-pregnant adults ≥18 years hospitalized with lab-confirmed RSV, RSV-NET, 2014–2015 to 2022–2023

Characteristic		Unweighted N=17,847	Weighted %
Age (years)	18–49 years	2,435	13.6
	50–59 years	**2,492**	**14.0**
	60–64 years	1,790	10.0
	65–74 years	4,079	22.9
	≥75 years	7,051	39.5
Race and ethnicity*	White	10,755	62.2
	Black	3,529	20.4
	Hispanic	1,434	8.3
	Asian or Pacific Islander	1,020	5.9
	American Indian or Alaska Native	90	0.5
	Multirace	89	0.5
	Unknown	367	2.1

- **17,847** hospitalizations over 9 seasons

- **14%** of hospitalizations in **adults aged 50–59 years**

*Black, White, American Indian/Alaska Native and Asian/Pacific Islander people were categorized as non-Hispanic; Hispanic people could be of any race.
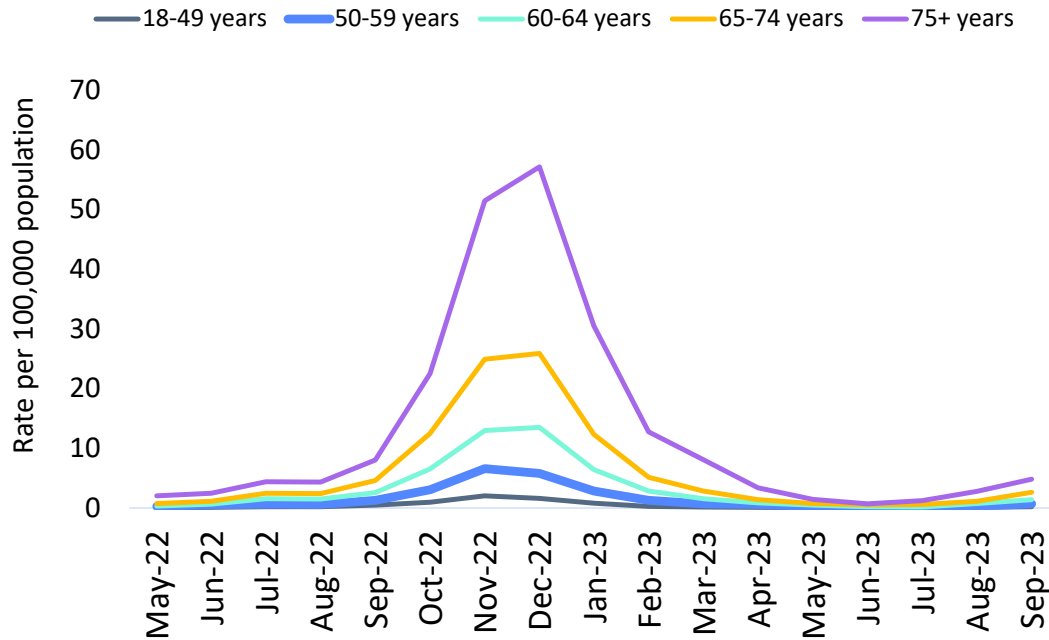
Adjusted RSV-associated hospitalization rates* per 100,000 adults ≥18 years by 5-year age group and year, RSV-NET, 2015–2016 to 2019–2020
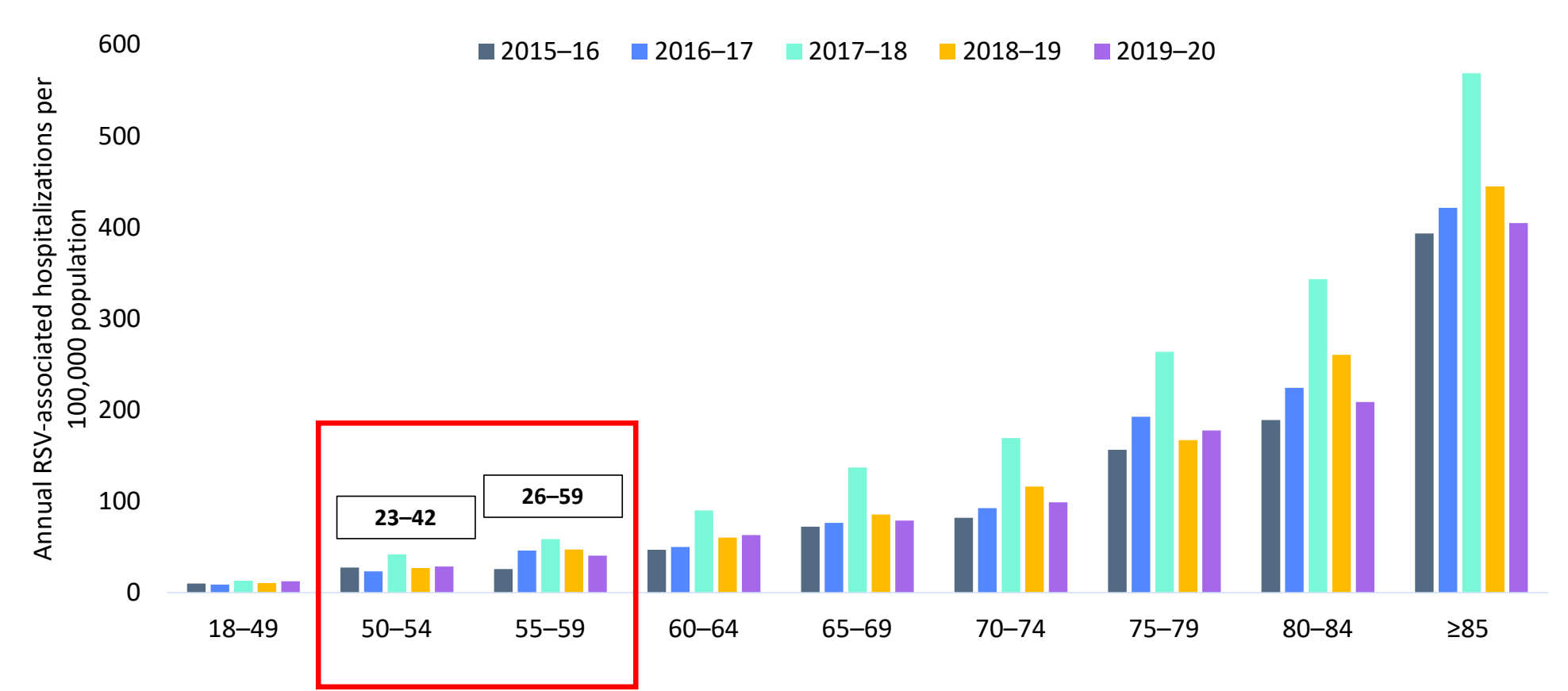

*Unpublished data. Rates are adjusted for the frequency of RSV testing during each season and the sensitivity of RSV diagnostic tests.

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Unadjusted monthly and cumulative RSV-associated hospitalization rates* among adults ≥18 years — RSV-NET, 2022–2023

**Monthly rates
May 2022–September 2023**

**Cumulative rates
October 2022–September 2023**

Legend: 18-49 years, 50-59 years, 60-64 years, 65-74 years, 75+ years
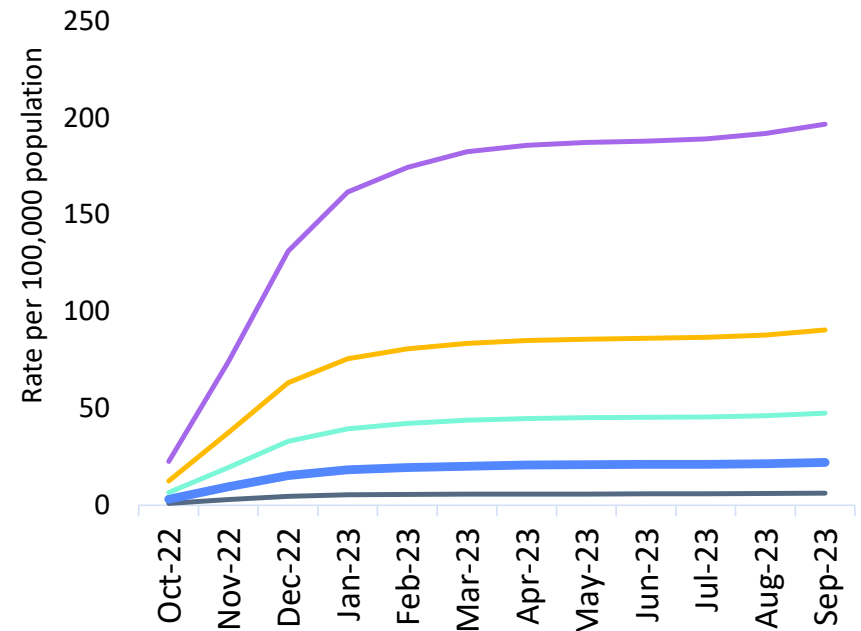
*Rates have not been adjusted for RSV testing practices and underestimate actual rates of RSV-associated hospitalizations, as not all people hospitalized with respiratory illness are tested for RSV; clinician-driven testing practices may differ by disease severity, age, and/or racial and ethnic group of patients and may have changed over time.

Underlying medical conditions* among non-pregnant adults ≥18 years with RSV-associated hospitalizations — RSV-NET, 2014–2015 to 2017–2018 and 2022–2023

Major underlying condition categories	Unweighted N=7,479	Weighted %
Cardovascular disease (overall)	5,141	57.4
Obesity	2,798	39.0
Diabetes	2,484	34.1
COPD	2,248	31.4
Heart failure	1,984	28.0
Chronic kidney disease	2,003	27.0
Asthma	1,789	24.0
Coronary artery disease (includes CABG, MI)	1,718	24.0
Neurologic condition	1,628	22.6
Immune compromised	1,567	20.8
Chronic metabolic disease, not including diabetes	1,417	19.3
Other chronic lung disease	995	17.1
Chronic liver disease	538	7.2
Autoimmune/inflammatory disease	310	4.5
Blood disorders	287	4.1

94.3% of adults ≥18 years with RSV-associated hospitalization had at least one underlying medical condition:

- **31.4%: 1–2 conditions**

- **62.9%: ≥3 conditions**

*Clinical data, including underlying medical conditions, were collected for all patients with laboratory-confirmed RSV hospitalizations during the 2014–2015 to 2017–2018 seasons, and for an age- and site-stratified random sample of patients with laboratory-confirmed RSV hospitalizations during the 2022–2023 season. Data are presented as unweighted case counts and weighted percentages that were weighted for the probability of selection.

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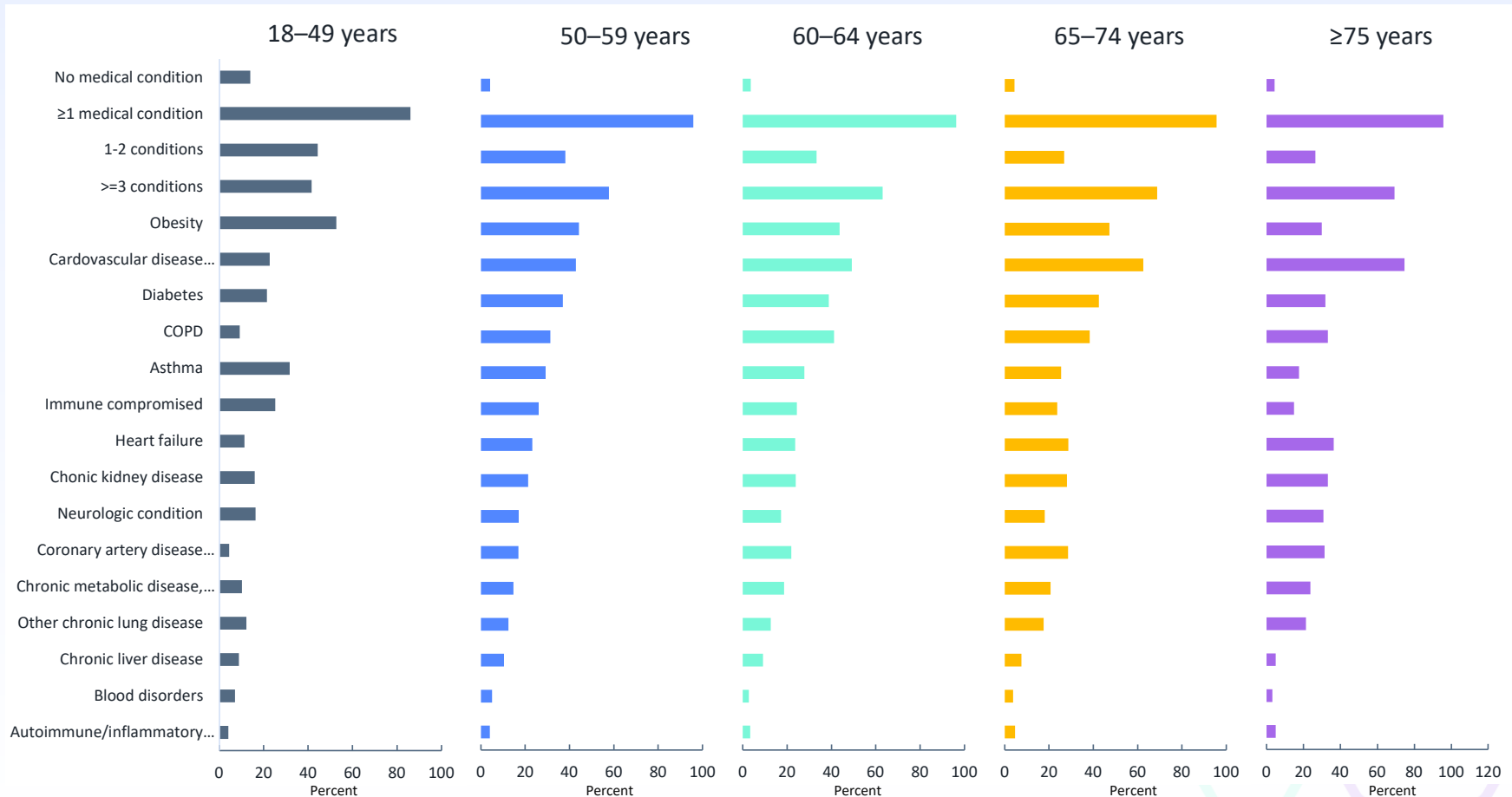
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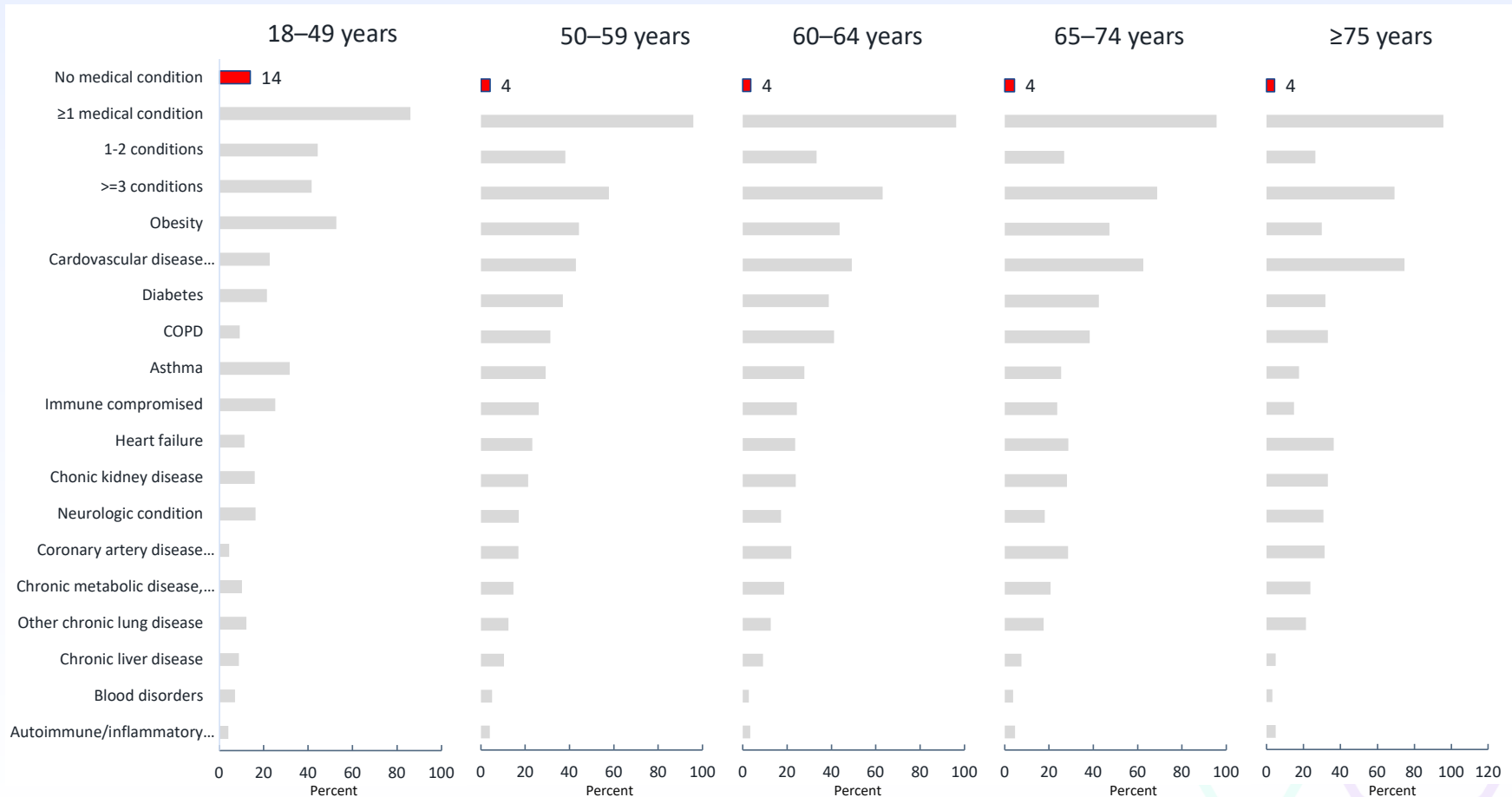
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Frequency of underlying medical conditions among non-pregnant adults with RSV-associated hospitalizations by age group — RSV-NET, 2014–2015 to 2017–2018 and 2022–2023

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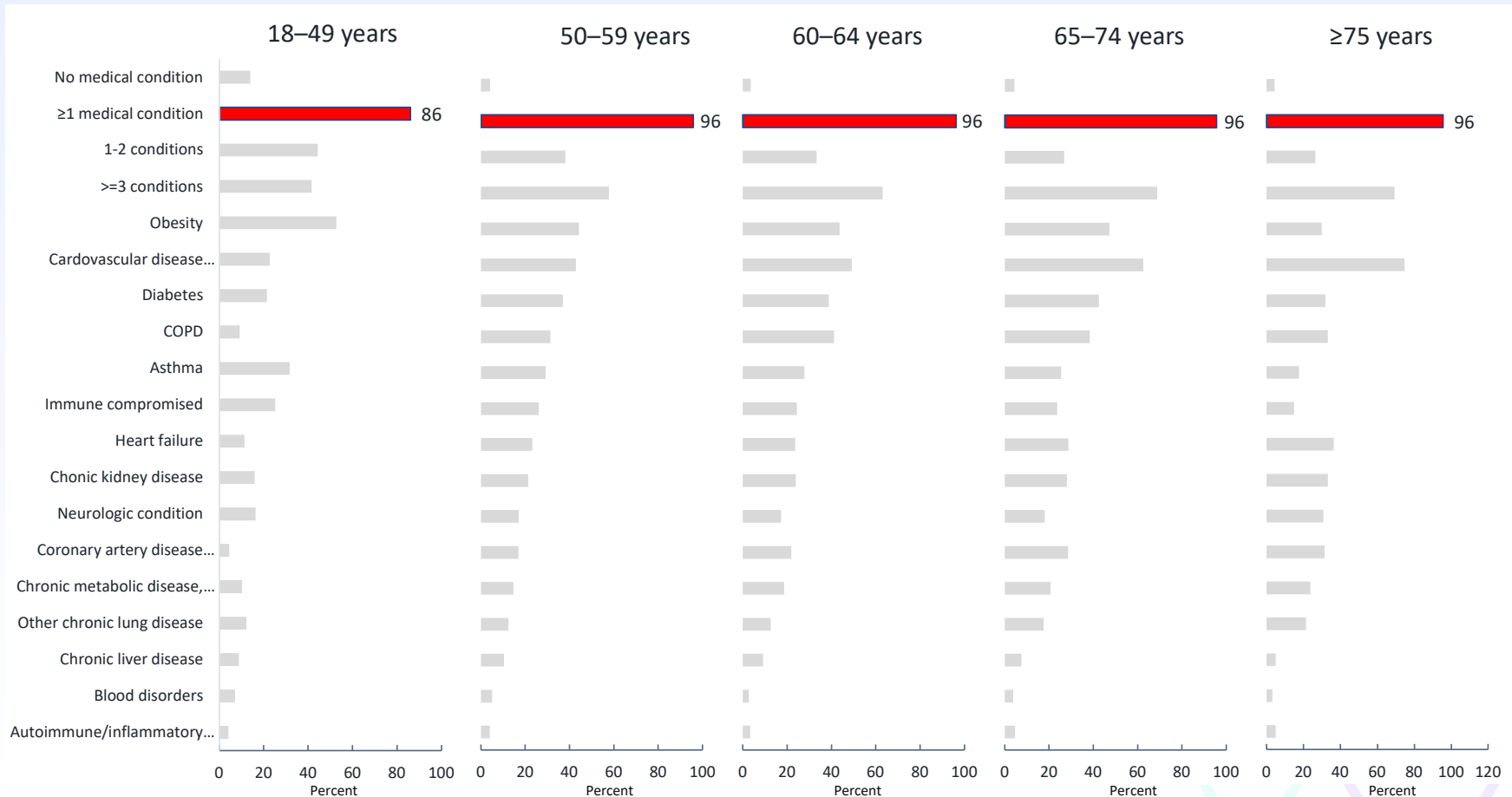
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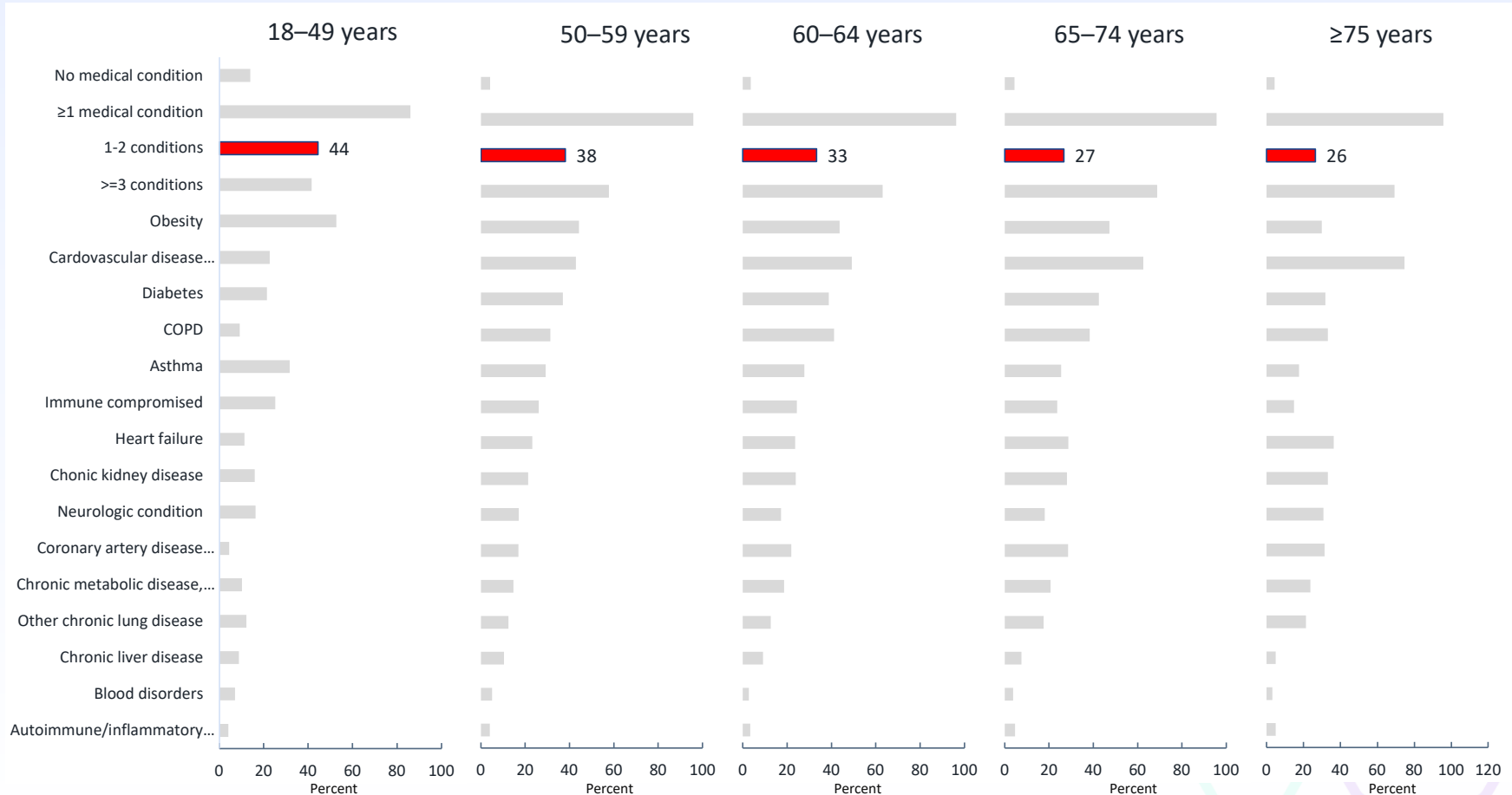
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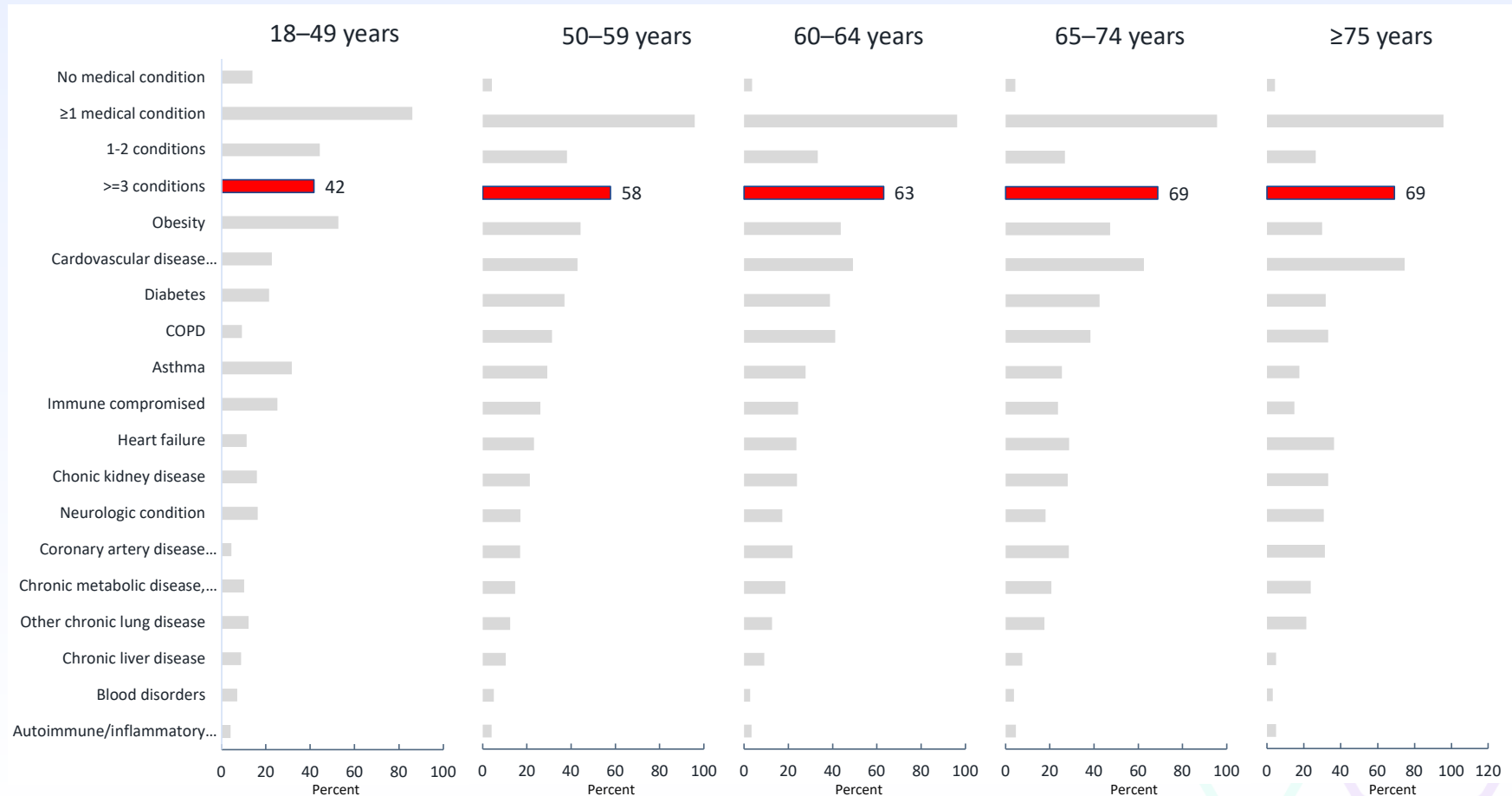
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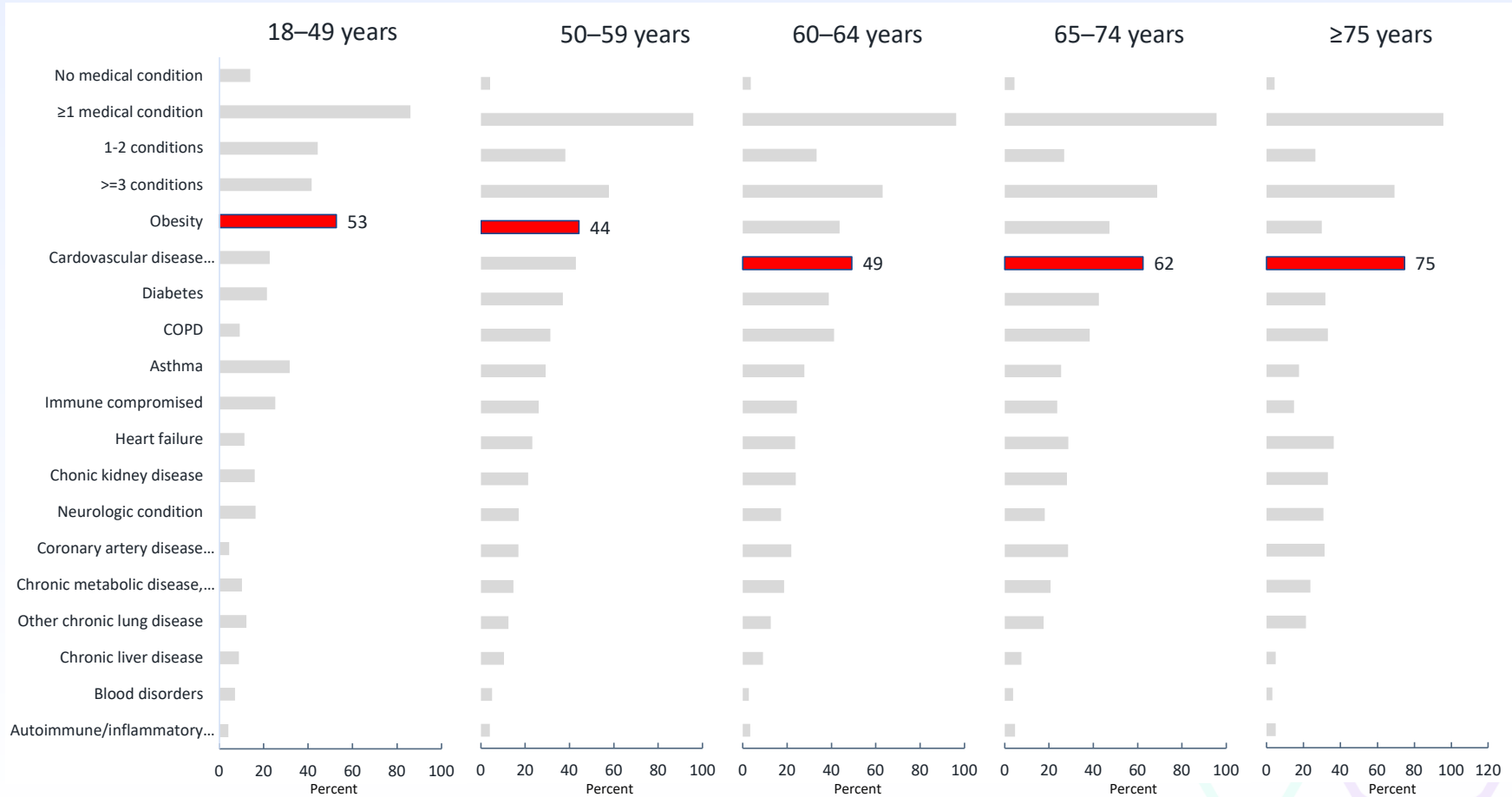
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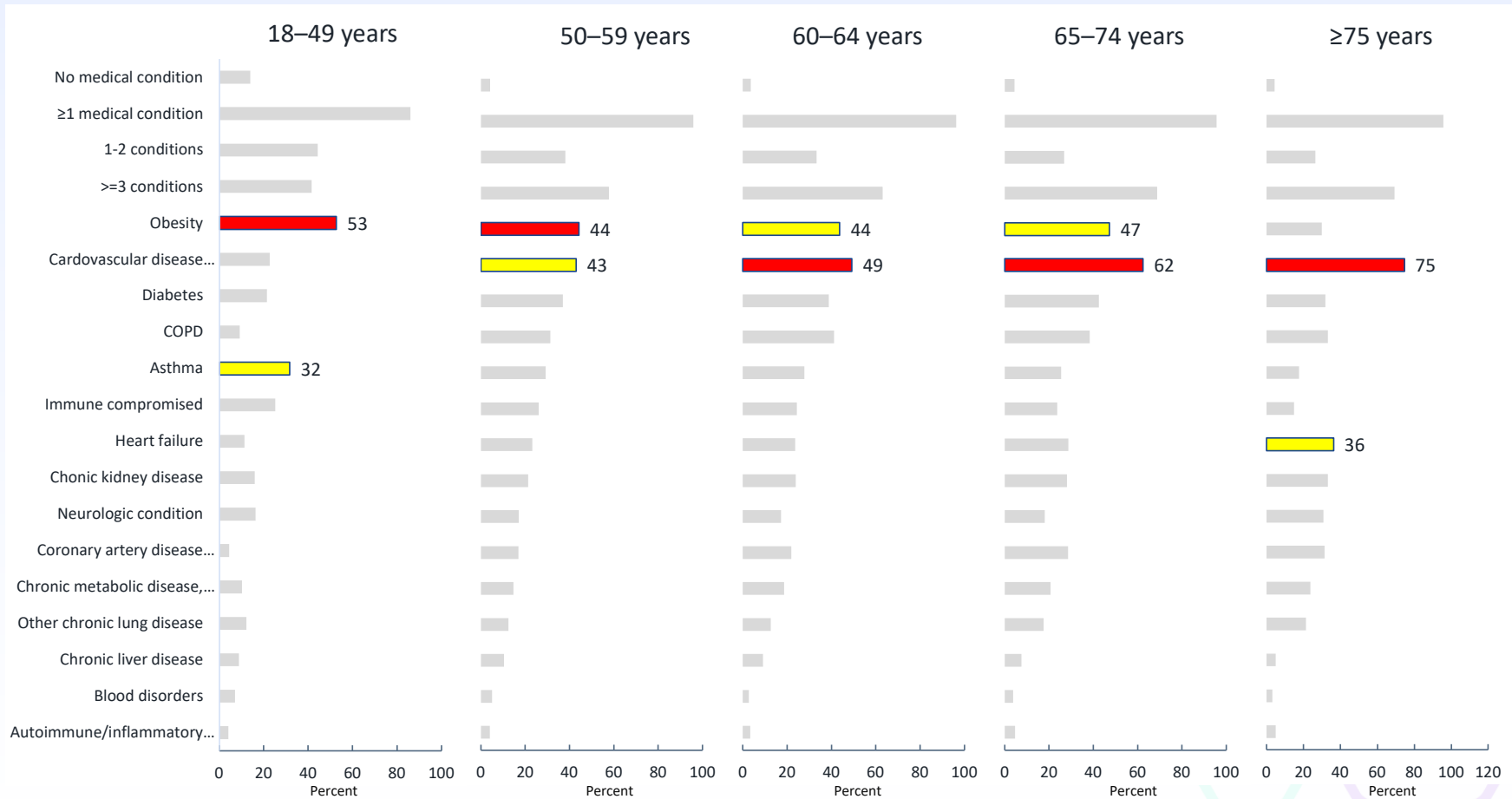

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Frequency of underlying medical conditions among non-pregnant adults with RSV-associated hospitalizations by age group — RSV-NET, 2014–2015 to 2017–2018 and 2022–2023

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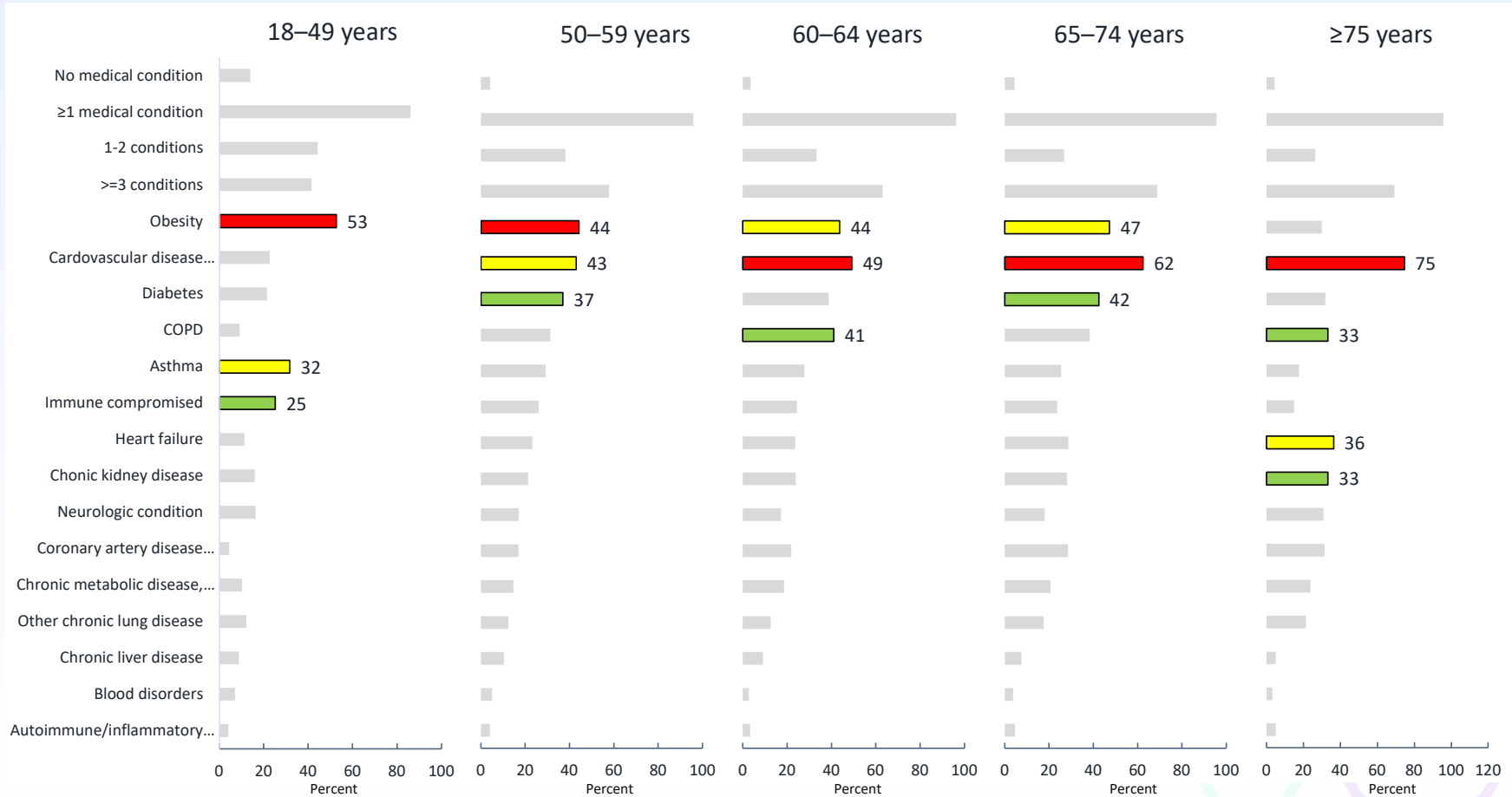
Frequency of underlying medical conditions among non-pregnant adults with RSV-associated hospitalizations by age group — RSV-NET, 2014–2015 to 2017–2018 and 2022–2023

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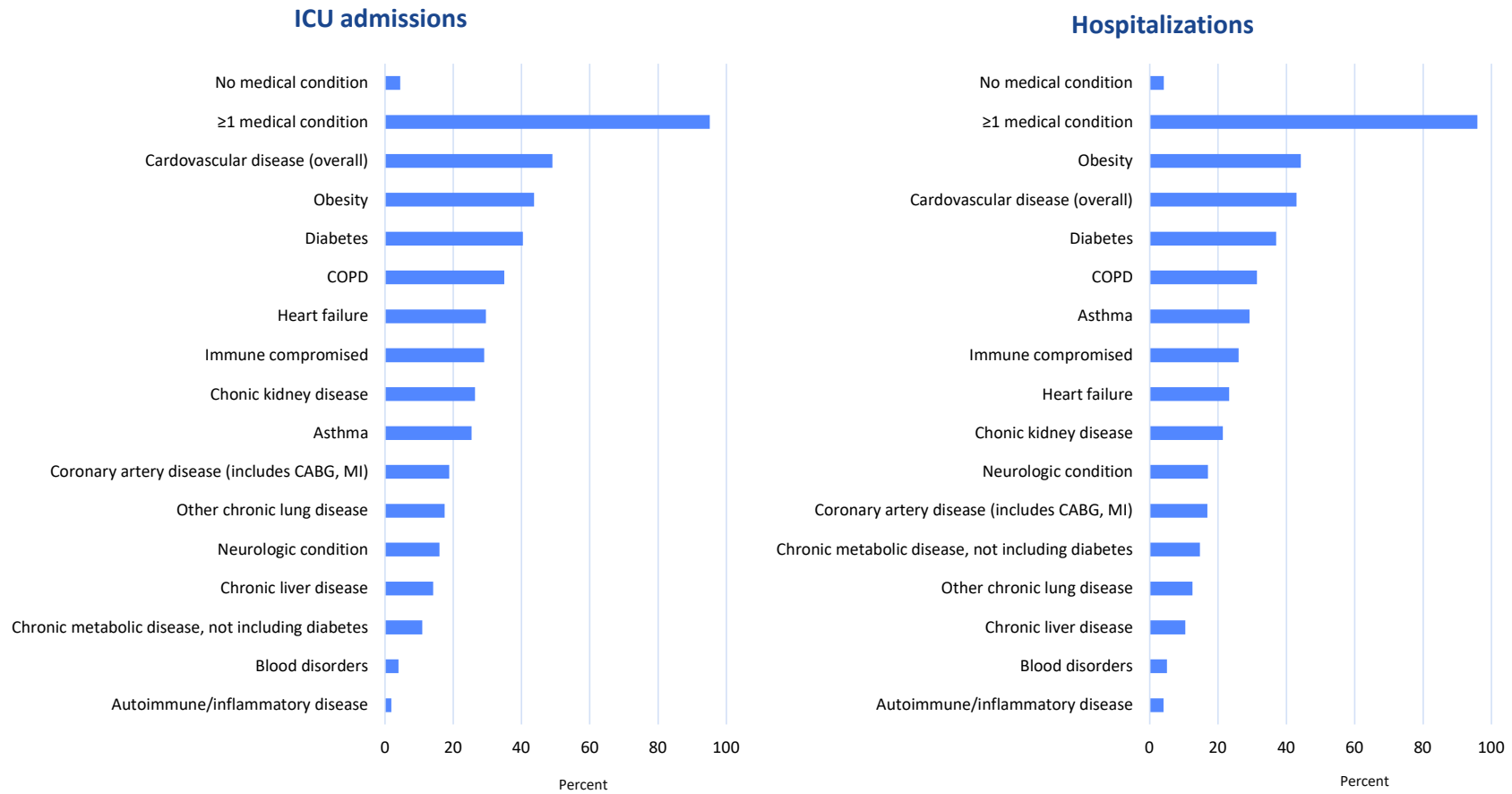
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Prevalence of certain medical conditions* among non-pregnant adults with RSV-associated hospitalizations (RSV-NET, 2014–2015 to 2017–2018 and 2022–2023) and among the general population (National Center for Health Statistics†, 2022) by age group

Condition	50–64 years			≥65 years		
	General population % (95% CI)	RSV-NET % (95% CI)	RSV-NET/Pop	General population % (95% CI)	RSV-NET % (95% CI)	RSV-NET/Pop
Coronary artery disease	5.0 (4.4, 5.6)	18.9 (16.9, 21.0)	3.8	15.3 (14.4, 16.2)	31.3 (29.1, 33.6)	2.0
COPD	6.2 (5.5, 6.9)	35.4 (32.9, 37.9)	5.7	9.8 (9.1, 10.5)	33.2 (30.1, 35.5)	3.4
Diabetes mellitus	13.8 (12.9, 14.7)	37.7 (35.1, 40.4)	2.7	20.1 (19.1, 21.1)	31.8 (29.6, 34.1)	1.6
Asthma	9.1 (8.4, 9.9)	28.6 (26.3, 31.0)	3.1	8.0 (7.3, 8.6)	17.6 (15.8, 19.4)	2.2
Obesity	37.6 (36.2, 38.9)	46.4 (43.7, 49.0)	1.2	30.4 (29.2, 31.6)	28.4 (26.1, 30.8)	0.9

Frequency of underlying medical conditions among adults aged 50–59 years with ICU admissions and RSV-associated hospitalizations — RSV-NET, 2014–2015 to 2017–2018 and 2022–2023

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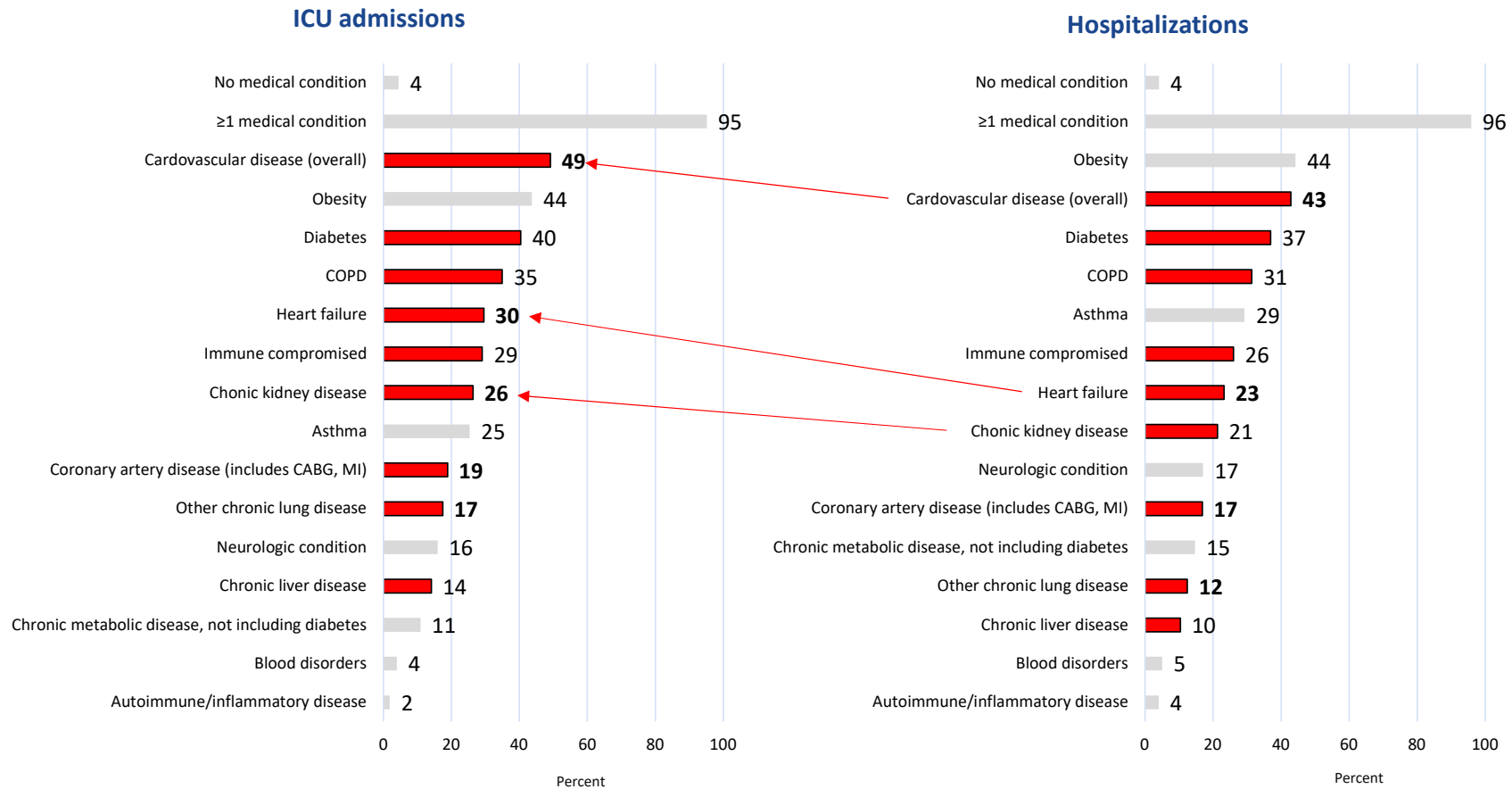
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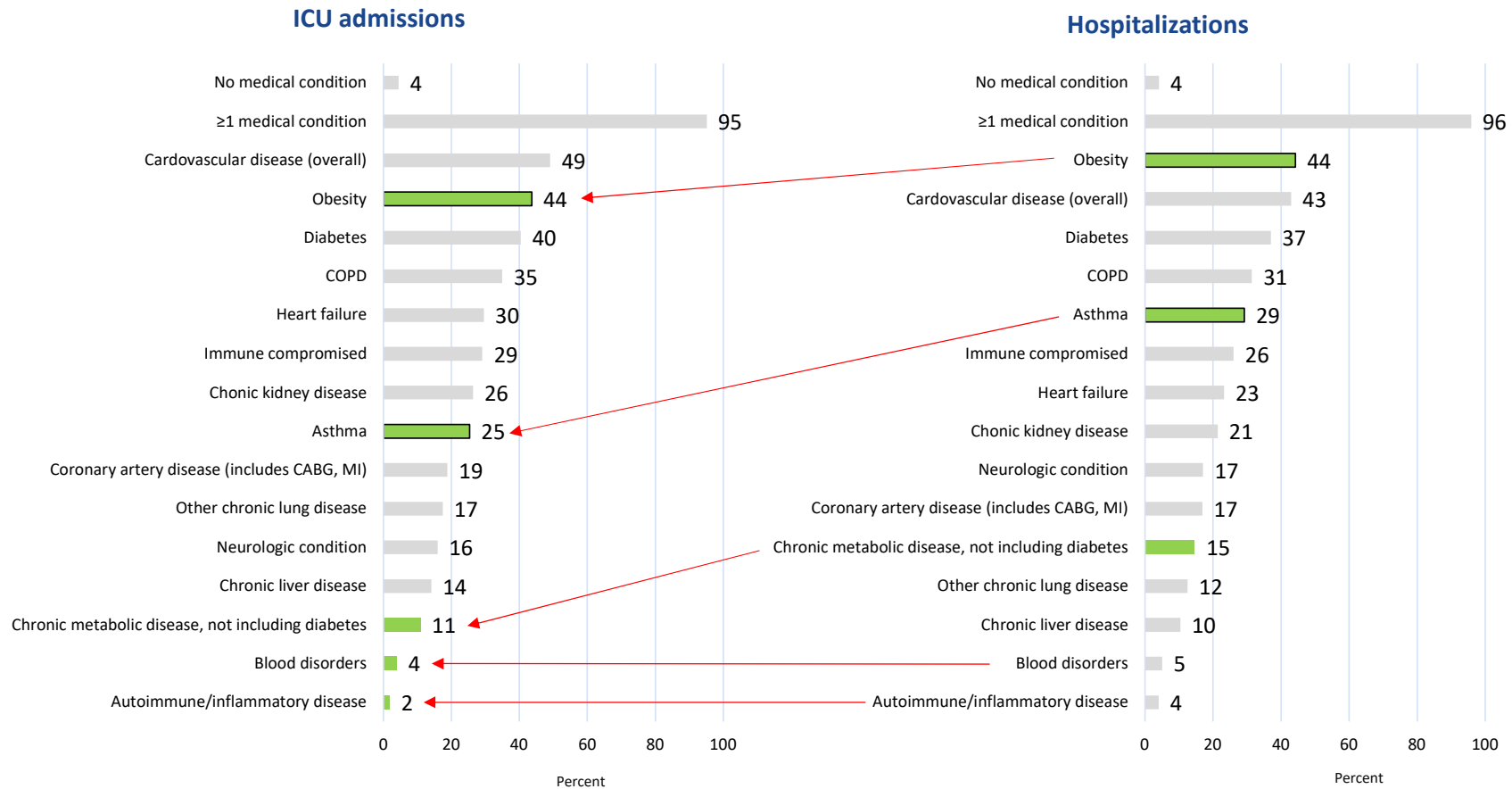
ICU admissions

Condition	Percent
No medical condition	4
≥1 medical condition	95
Cardovascular disease (overall)	49
Obesity	44
Diabetes	40
COPD	35
Heart failure	30
Immune compromised	29
Chonic kidney disease	26
Asthma	25
Coronary artery disease (includes CABG, MI)	19
Other chronic lung disease	17
Neurologic condition	16
Chronic liver disease	14
Chronic metabolic disease, not including diabetes	11
Blood disorders	4
Autoimmune/inflammatory disease	2

Percent

Hospitalizations

Condition	Percent
No medical condition	4
≥1 medical condition	96
Obesity	44
Cardovascular disease (overall)	43
Diabetes	37
COPD	31
Asthma	29
Immune compromised	26
Heart failure	23
Chonic kidney disease	21
Neurologic condition	17
Coronary artery disease (includes CABG, MI)	17
Chronic metabolic disease, not including diabetes	15
Other chronic lung disease	12
Chronic liver disease	10
Blood disorders	5
Autoimmune/inflammatory disease	4

Percent

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*Clinical data were collected for all patients with laboratory-confirmed RSV hospitalizations during the 2014–2015 to 2017–2018 seasons, and for an age- and site-stratified random sample of patients with laboratory-confirmed RSV hospitalizations during the 2022–2023 season. Displayed percentages were weighted for the probability of selection.

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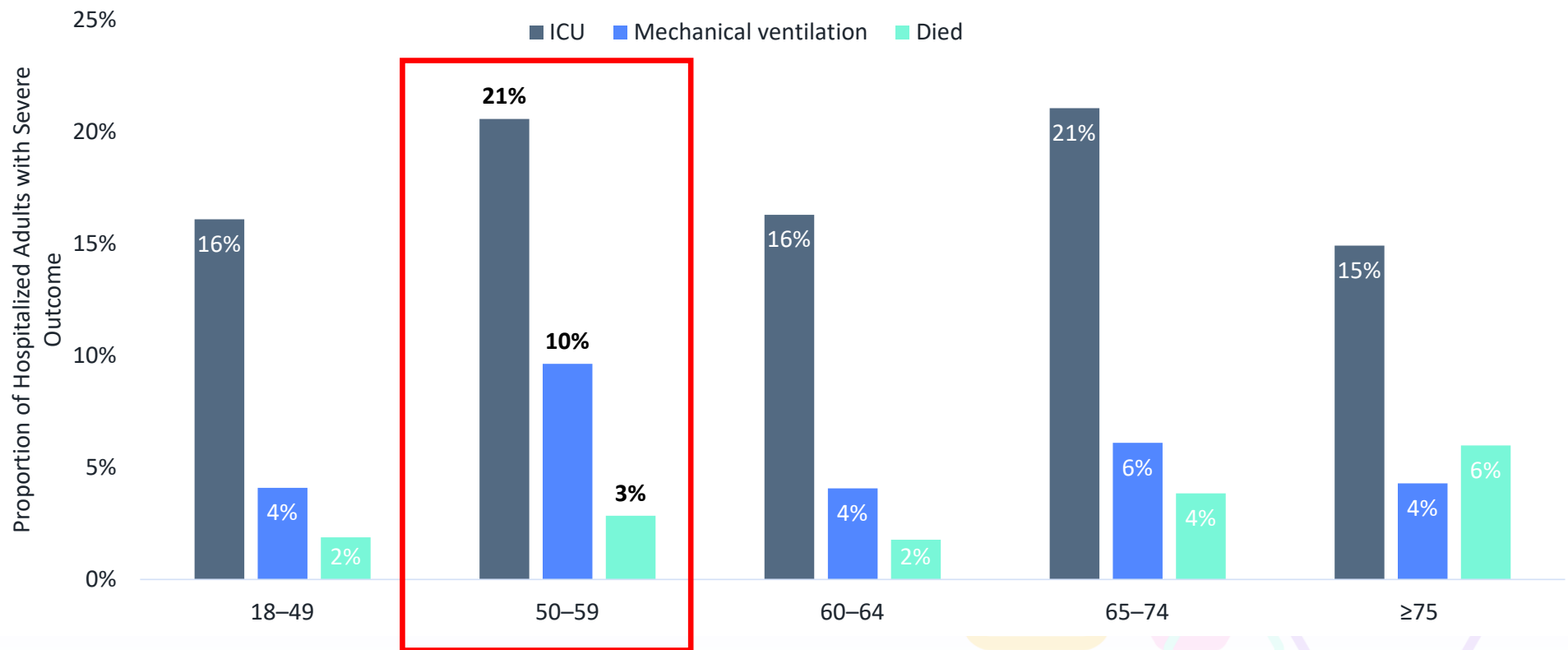
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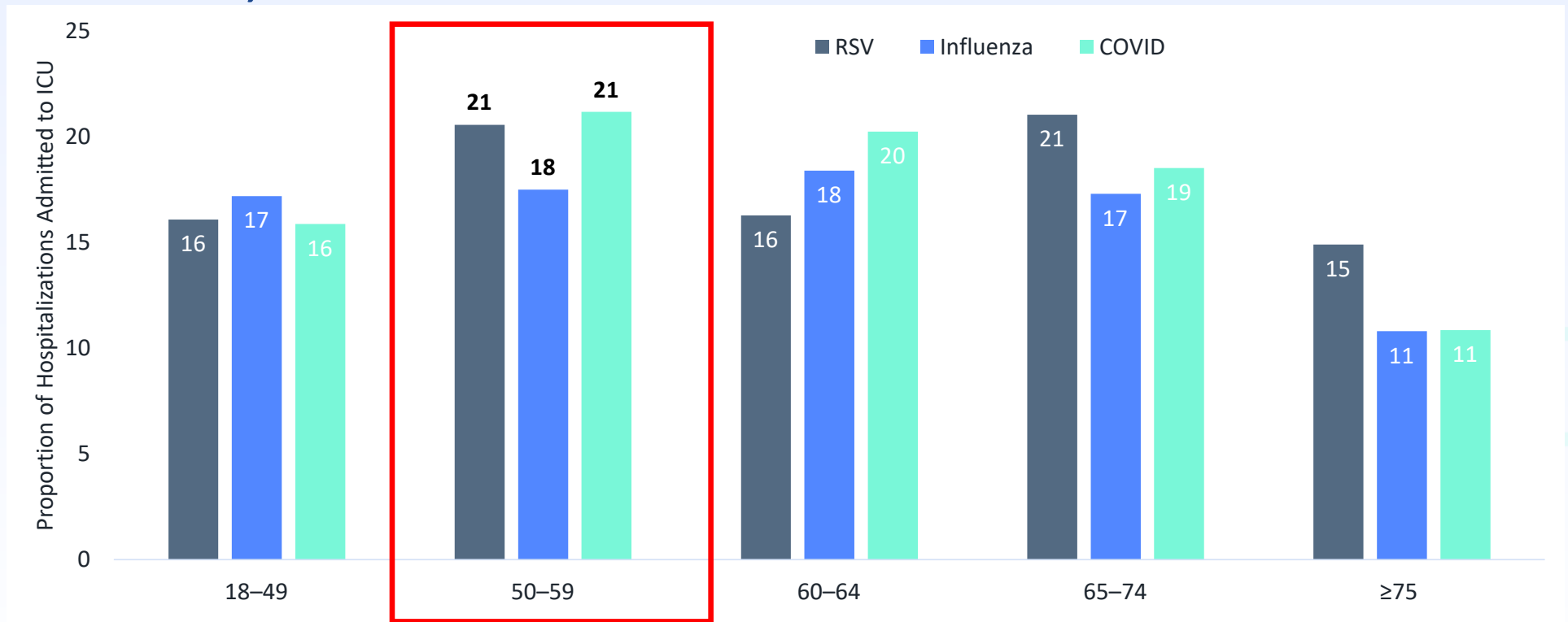
Percentages of non-pregnant adults ≥18 years with RSV-associated hospitalization who experienced severe outcomes by age group, RSV-NET, 2022–2023

ICU = intensive care unit
*Clinical data, including severe outcomes, were collected for an age- and site-stratified random sample of patients with laboratory-confirmed RSV hospitalizations during the 2022–2023 season. Displayed percentages were weighted for the probability of selection.

Percentages of non-pregnant adults ≥18 years with laboratory-confirmed hospitalization admitted to intensive care unit (ICU), RSV-NET, FluSurv-NET, COVID-NET, 2022–2023
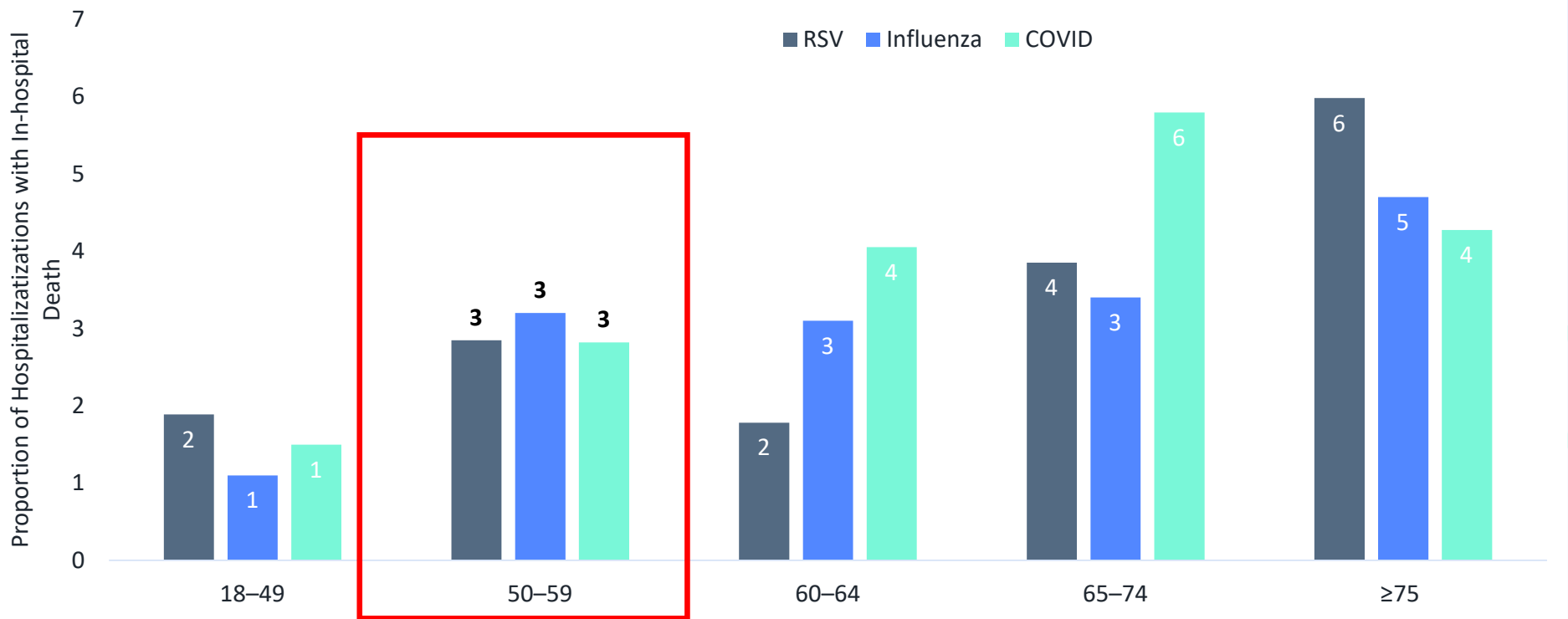

*Clinical data, including severe outcomes, were collected for an age- and site-stratified random sample of patients with laboratory-confirmed RSV, Influenza, and COVID-19 hospitalizations during the 2022–2023 season. Displayed percentages were weighted for the probability of selection.
†Patients with severe disease may be more likely to be tested for RSV, Influenza, or COVID-19 which may overestimate proportions of patients admitted to the ICU.
‡Data shown here does not take patient vaccination or treatment status into account.
§FluSurv-NET surveillance occurred during October 2022–April 2023; RSV-NET and COVID-NET surveillance occurred year-round.

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Percentages of non-pregnant adults ≥18 years with laboratory-confirmed hospitalization with in-hospital death*, RSV-NET, FluSurv-NET, COVID-NET, 2022–2023

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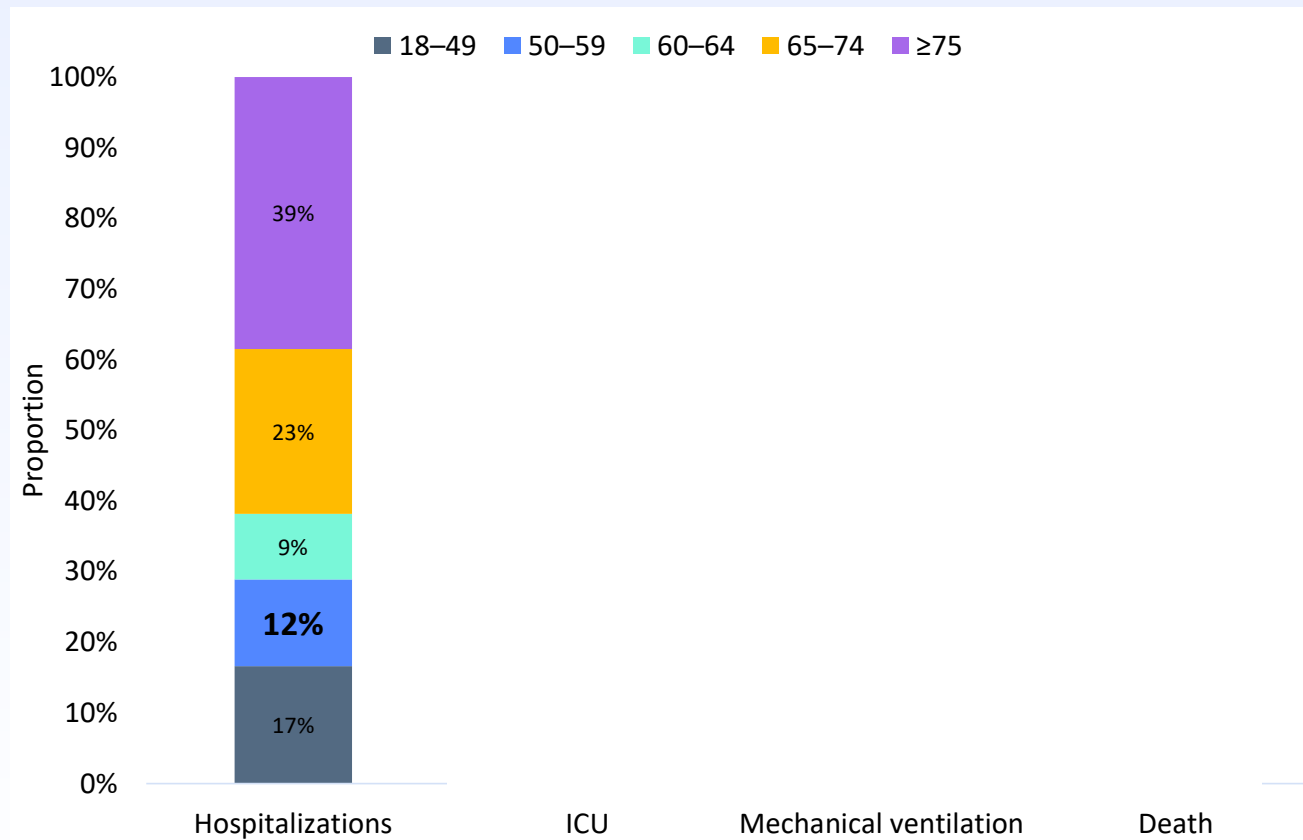†Patients with severe disease may be more likely to be tested for RSV, Influenza, or COVID-19 which may overestimate proportions of patients admitted to the ICU.
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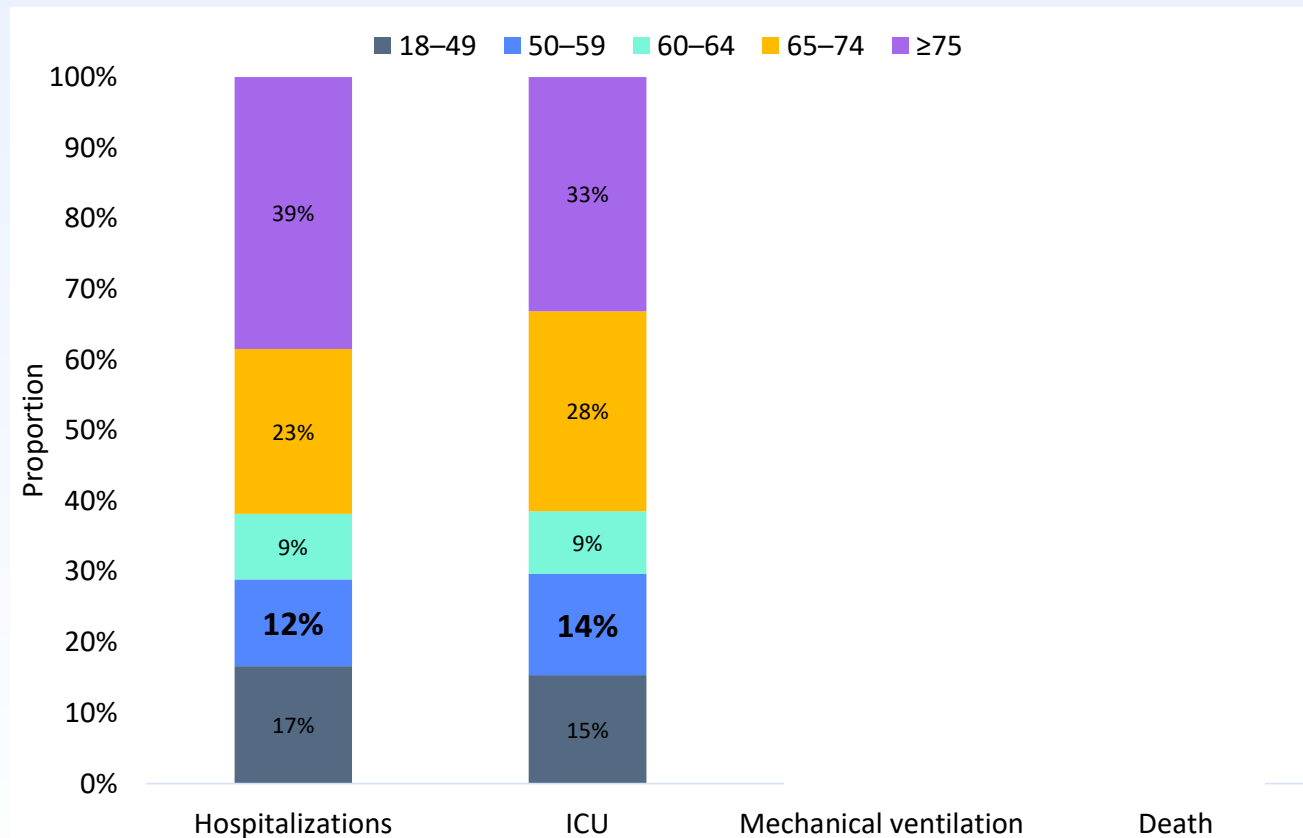
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Distribution of RSV-associated hospitalizations and severe outcomes among adults ≥18 years by age group, RSV-NET, 2022–2023

ICU = intensive care unit
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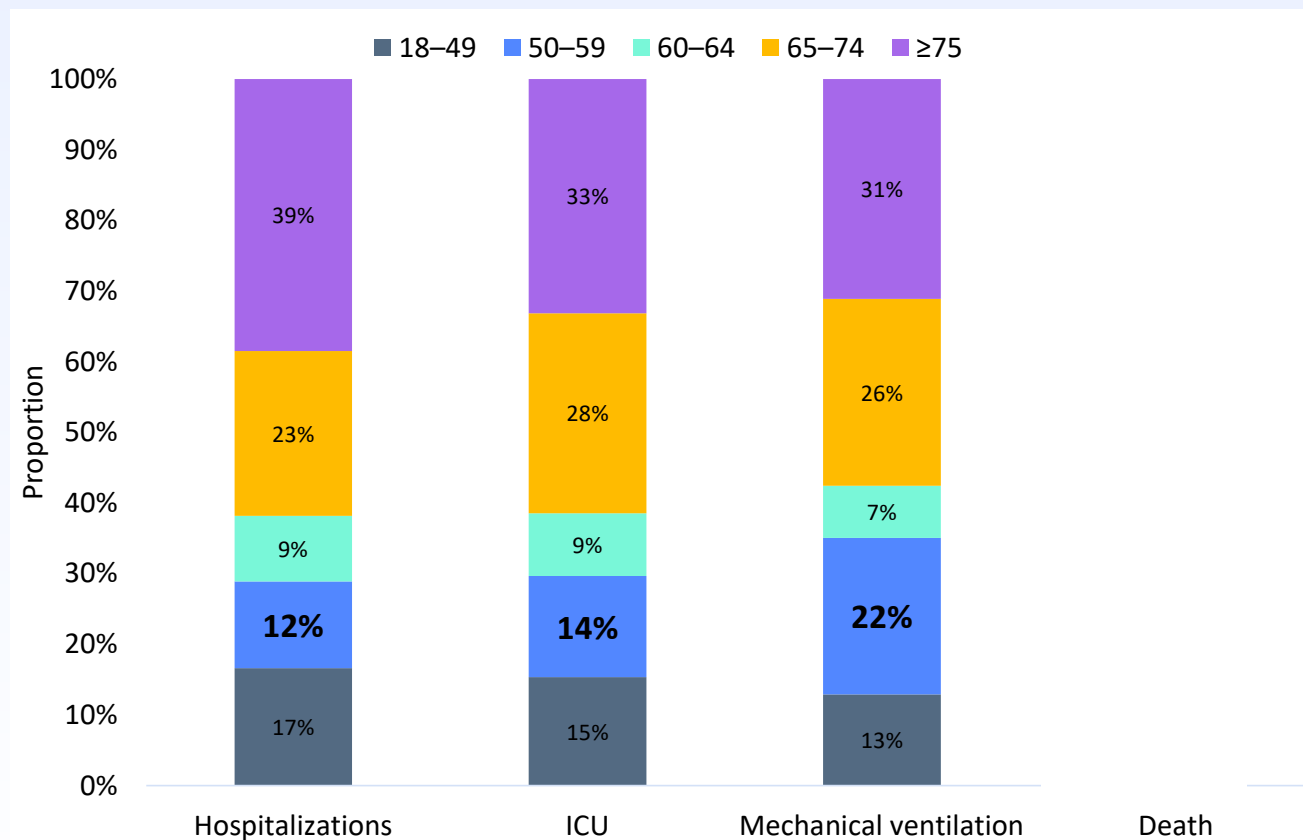
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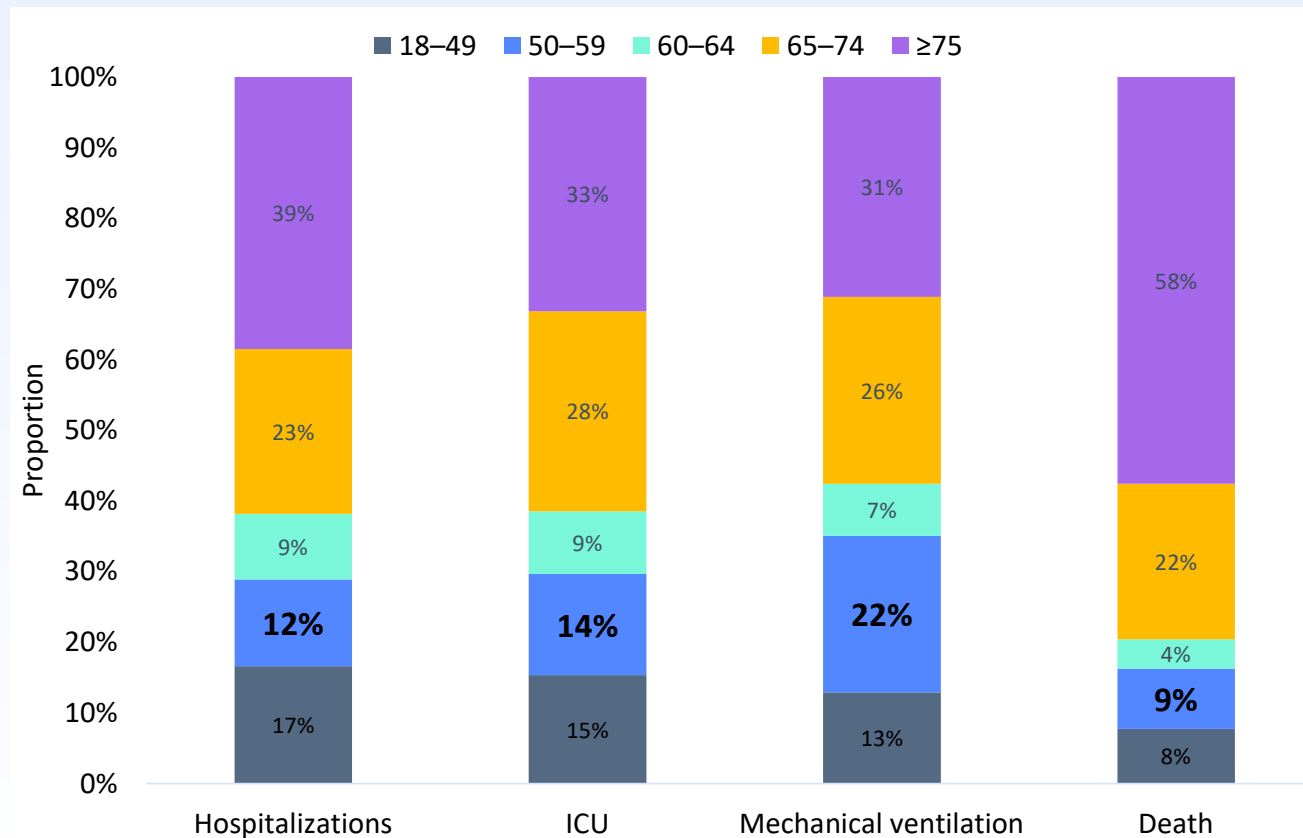
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Median age of non-pregnant adults ≥18 years with RSV-associated hospitalizations by race and ethnicity* — RSV-NET, 2014–2015 to 2022–2023

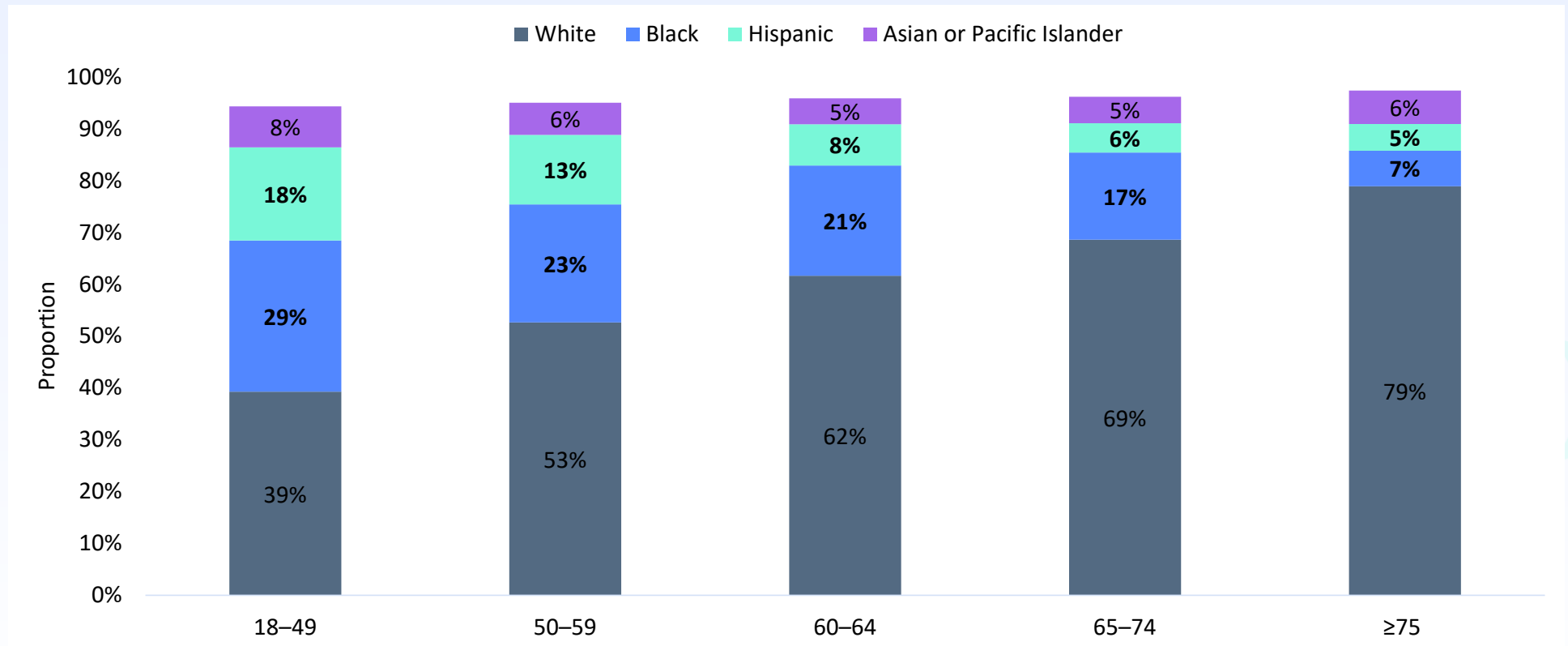|	Unweighted	Weighted %	Median Age	Interquartile range (IQR)
Overall	**17,847**	**-**	**69**	**(58–81)**
White	10,755	62.2	73	(63-82)
Black	3,529	20.4	62	(50-71)
Hispanic	1,434	8.3	62	(48-76)
Asian or Pacific Islander	1,020	5.9	73	(59-83)
American Indian or Alaska Native	90	0.5	64	(54-73)
Multirace	89	0.5	75	(58-84)
Unknown	367	2.1	68	(57-78)

*Black, White, American Indian/Alaska Native and Asian/Pacific Islander people were categorized as non-Hispanic; Hispanic people could be of any race.

Median age of non-pregnant adults ≥18 years with RSV-associated hospitalizations by race and ethnicity* — RSV-NET, 2014–2015 to 2022–2023

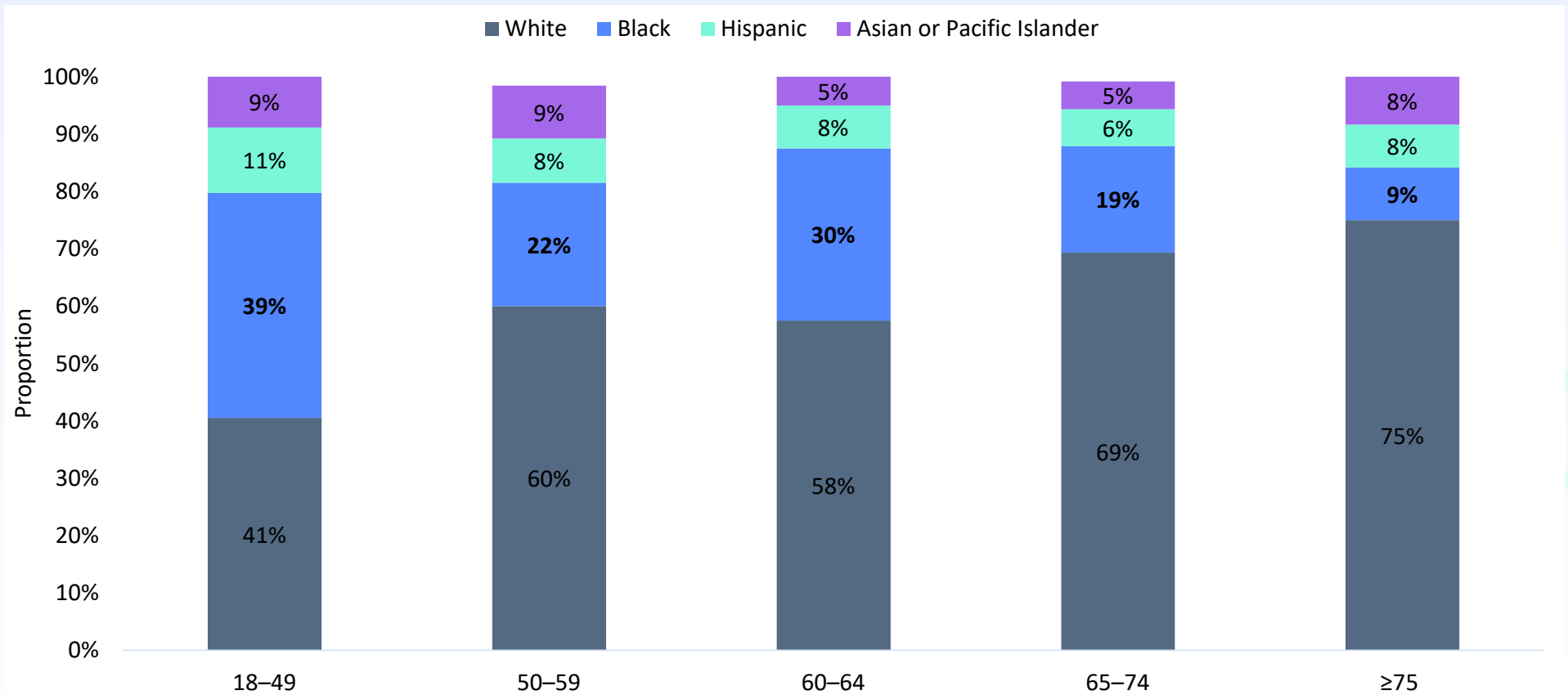|	Unweighted	Weighted %	Median Age	Interquartile range (IQR)
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Distribution of RSV-associated hospitalizations among adults ≥18 years by race and ethnicity* and age group— RSV-NET, 2014–2015 to 2022–2023

Legend: ■ White ■ Black ■ Hispanic ■ Asian or Pacific Islander

Age group	White	Black	Hispanic	Asian or Pacific Islander
18–49	39%	29%	18%	8%
50–59	53%	23%	13%	6%
60–64	62%	21%	8%	5%
65–74	69%	17%	6%	5%
≥75	79%	7%	5%	6%

*Black, White, and Asian/Pacific Islander people were categorized as non-Hispanic; Hispanic people could be of any race. American Indian/Alaska Native persons are not shown due to small numbers.
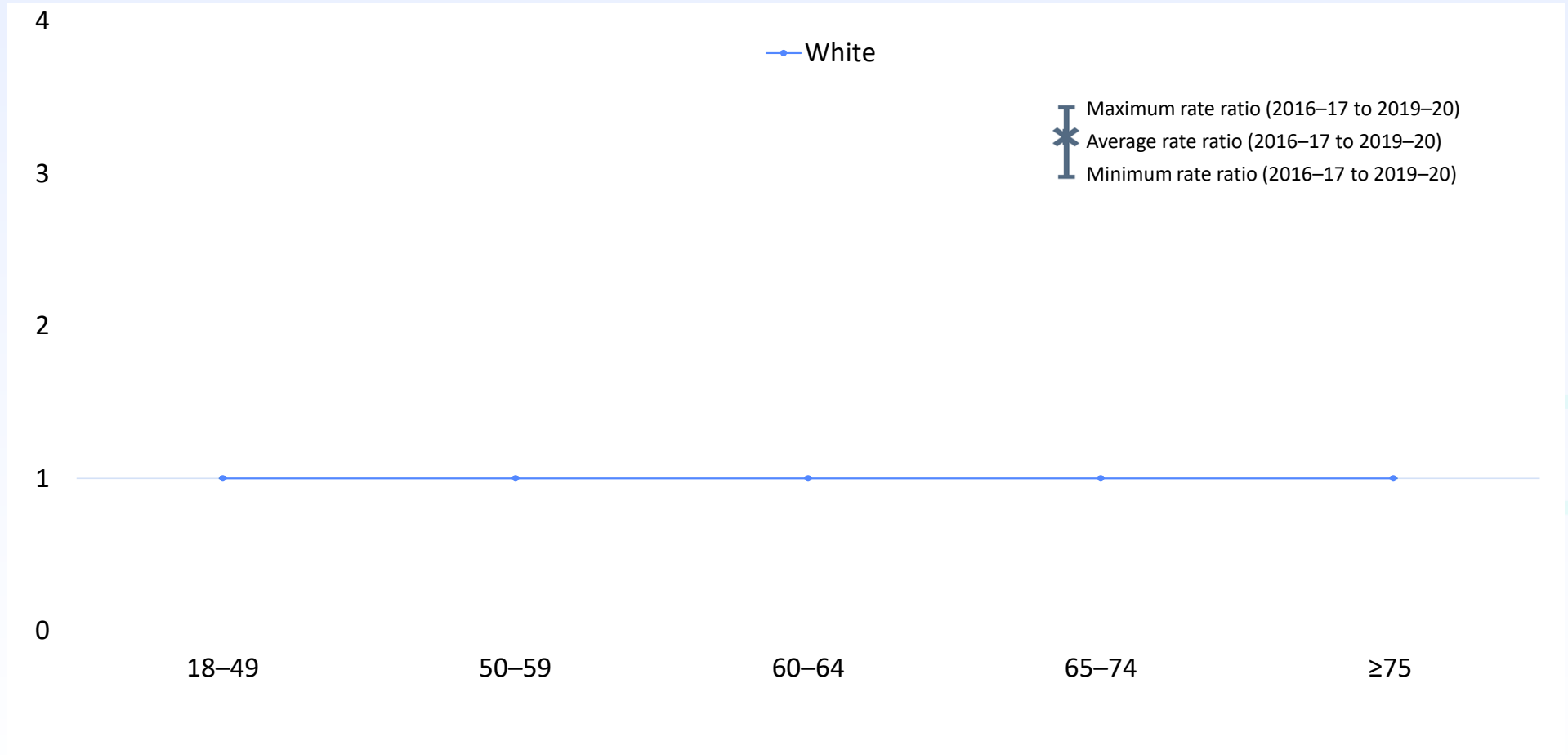
Distribution of RSV-associated ICU admissions among adults ≥18 years by race and ethnicity* and age group — RSV-NET, 2014–2015 to 2022–2023

Legend: ■ White ■ Black ■ Hispanic ■ Asian or Pacific Islander

Y-axis: Proportion (0% to 100%)

18–49
- Asian or Pacific Islander: 9%
- Hispanic: 11%
- Black: 39%
- White: 41%

50–59
- Asian or Pacific Islander: 9%
- Hispanic: 8%
- Black: 22%
- White: 60%

60–64
- Asian or Pacific Islander: 5%
- Hispanic: 8%
- Black: 30%
- White: 58%

65–74
- Asian or Pacific Islander: 5%
- Hispanic: 6%
- Black: 19%
- White: 69%

≥75
- Asian or Pacific Islander: 8%
- Hispanic: 8%
- Black: 9%
- White: 75%

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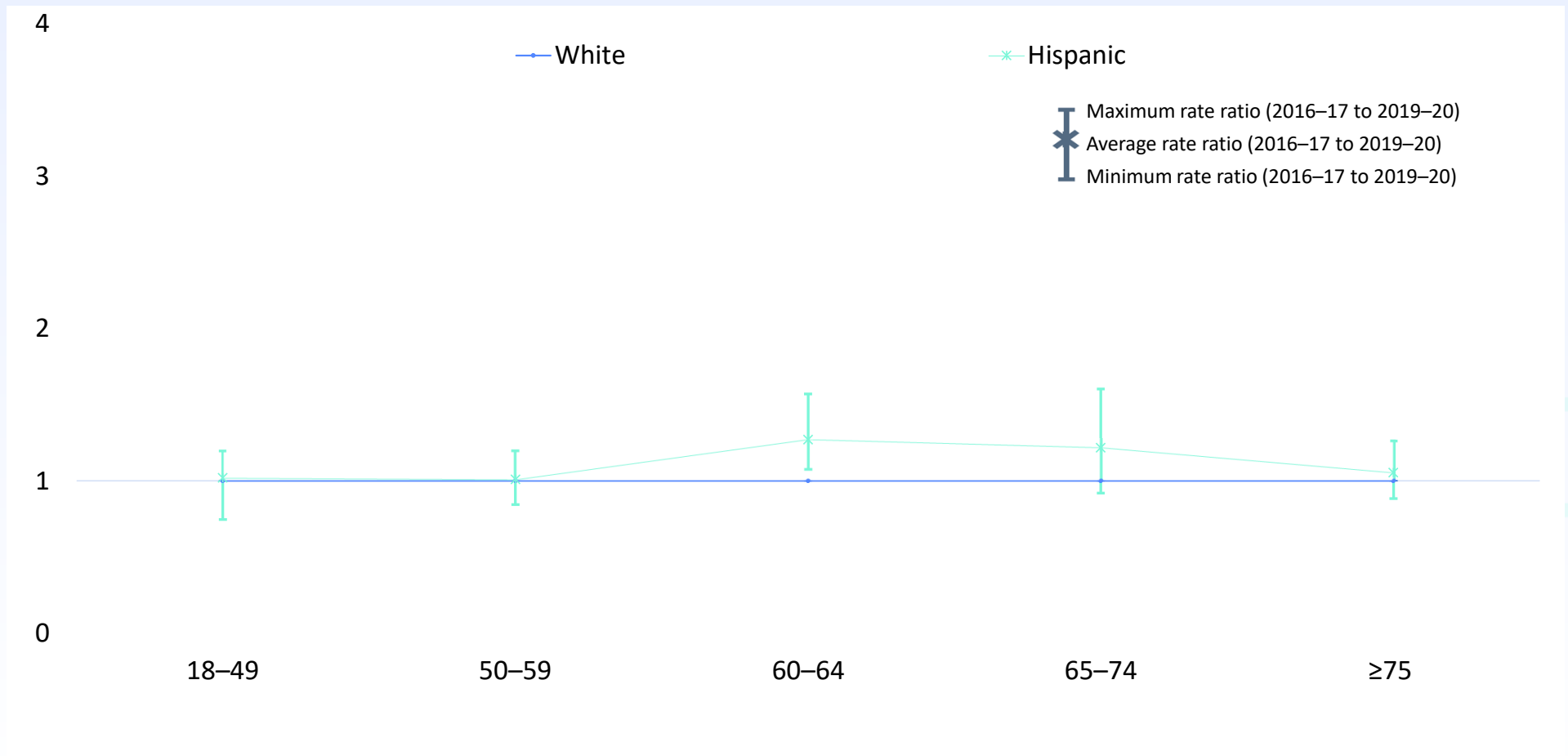
Burden-adjusted hospitalization rate ratios among adults ≥18 years by race and ethnicity* — RSV-NET, 2016–2017 to 2019–2020

— White

Maximum rate ratio (2016–17 to 2019–20)
Average rate ratio (2016–17 to 2019–20)
Minimum rate ratio (2016–17 to 2019–20)

4

3
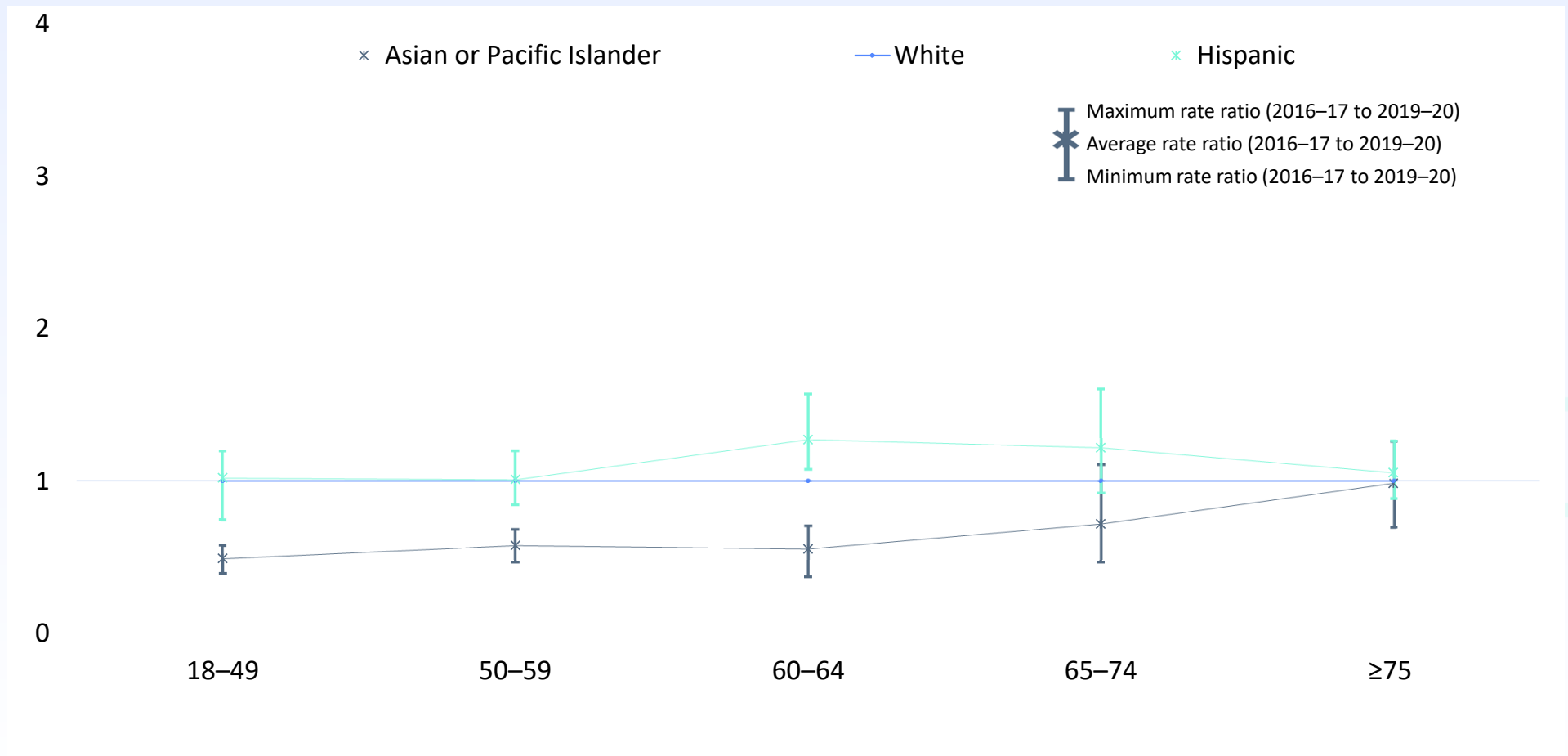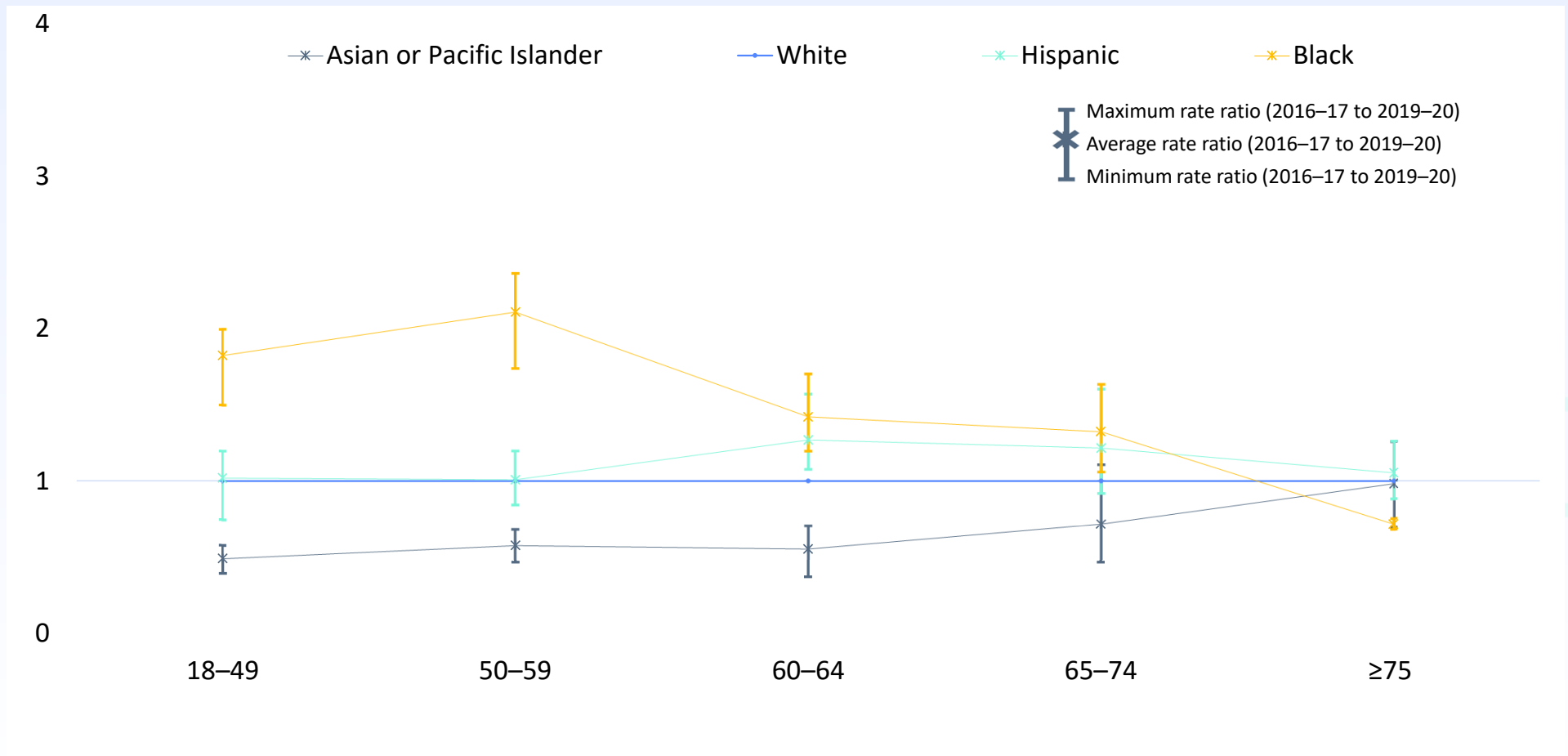
2

1

0

18–49   50–59   60–64   65–74   ≥75

33

*Black, White, American Indian/Alaska Native and Asian/Pacific Islander people were categorized as non-Hispanic; Hispanic people could be of any race.

Burden-adjusted hospitalization rate ratios among adults ≥18 years by race and ethnicity* — RSV-NET, 2016–2017 to 2019–2020

*Black, White, American Indian/Alaska Native and Asian/Pacific Islander people were categorized as non-Hispanic; Hispanic people could be of any race.

Burden-adjusted hospitalization rate ratios among adults ≥18 years by race and ethnicity* — RSV-NET, 2016–2017 to 2019–2020
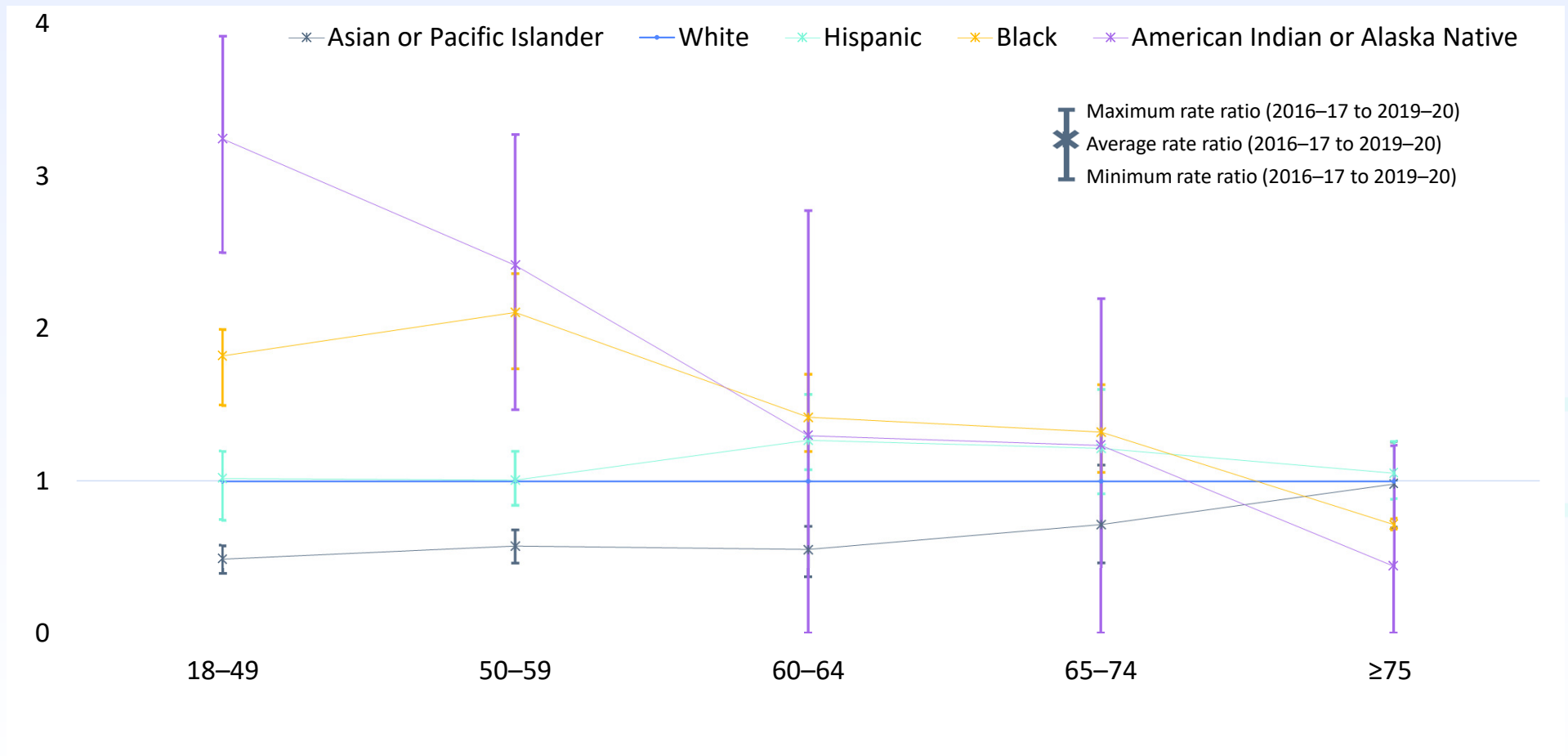
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Burden-adjusted hospitalization rate ratios among adults ≥18 years by race and ethnicity* — RSV-NET, 2016–2017 to 2019–2020

*Black, White, American Indian/Alaska Native and Asian/Pacific Islander people were categorized as non-Hispanic; Hispanic people could be of any race.

Burden-adjusted hospitalization rate ratios among adults ≥18 years by race and ethnicity* — RSV-NET, 2016–2017 to 2019–2020

Legend:
- Asian or Pacific Islander
- White
- Hispanic
- Black
- American Indian or Alaska Native

- Maximum rate ratio (2016–17 to 2019–20)
- Average rate ratio (2016–17 to 2019–20)
- Minimum rate ratio (2016–17 to 2019–20)

X-axis categories: 18–49, 50–59, 60–64, 65–74, ≥75

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