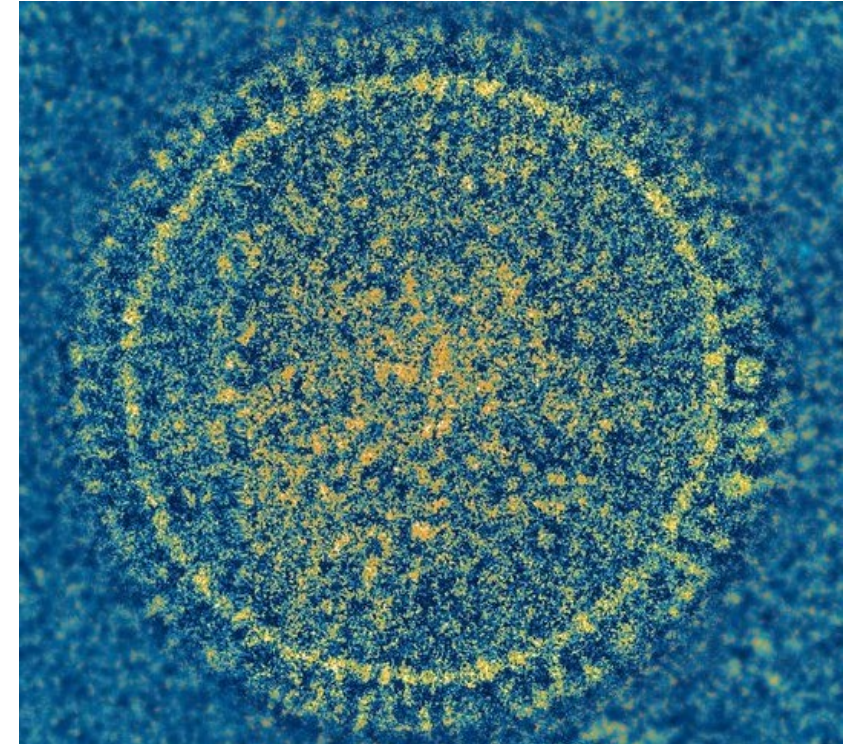


Epidemiology and Burden of Respiratory Syncytial Virus in Older Adults in the U.S.

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Division of Viral Diseases



Advisory Committee on Immunization Practices

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Epidemiology and Burden of RSV in Older Adults

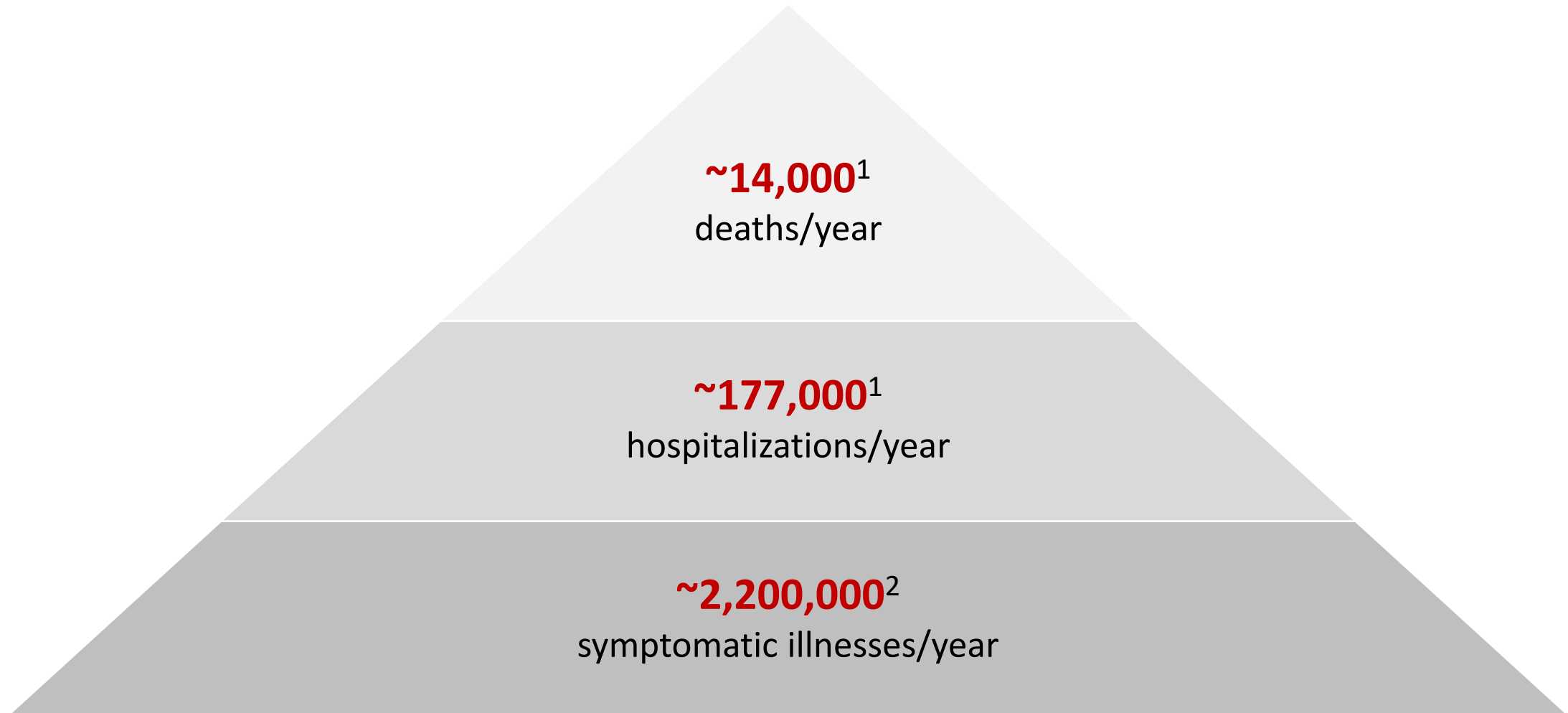
- RSV burden in older adults
- Comparison of influenza v. RSV burden
- Impact of co-morbidities

RSV Epidemiology and Burden

General Epidemiology

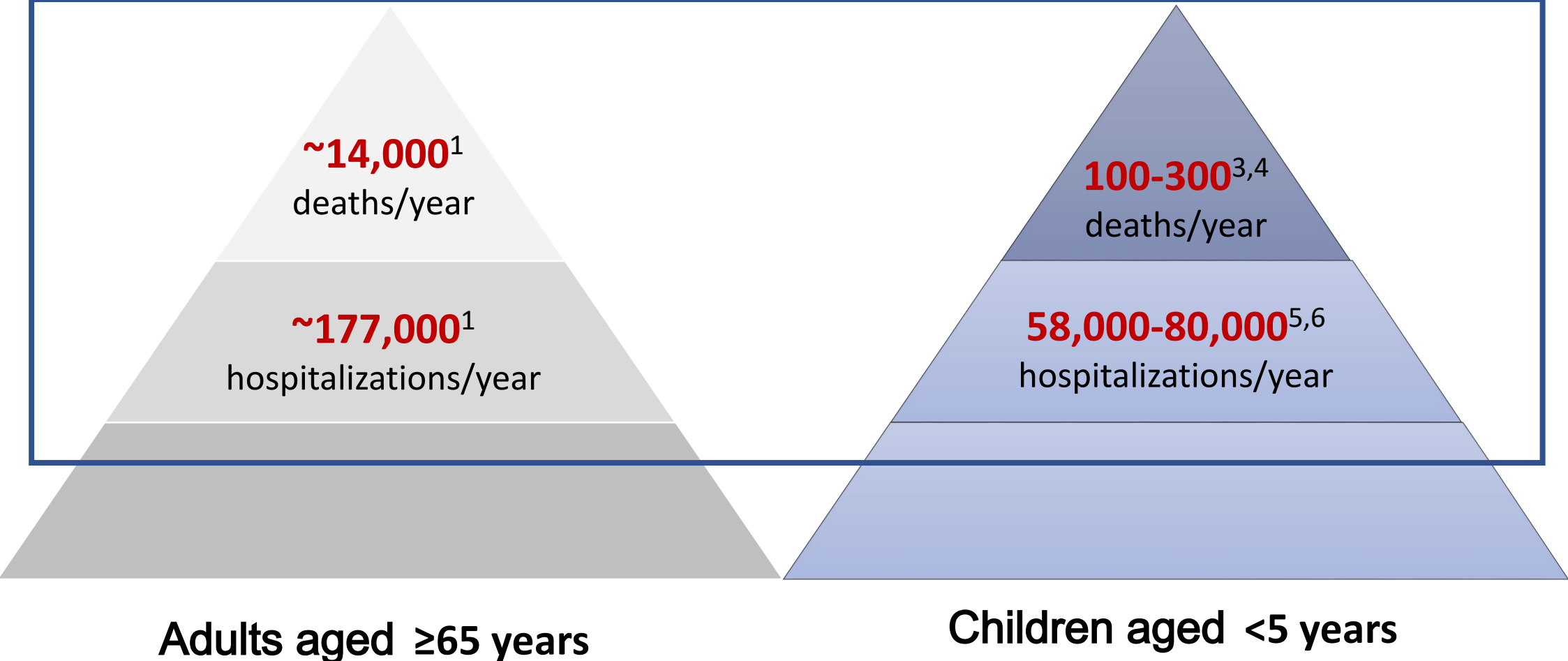
- Frequent cause of severe respiratory illness in older adults
- Lower awareness of RSV in adults among healthcare providers and the public
- Under detection: RSV testing often not performed
- No specific recommended vaccine or treatment in adults

Among adults ≥ 65 years of age in the United States, RSV is associated with...



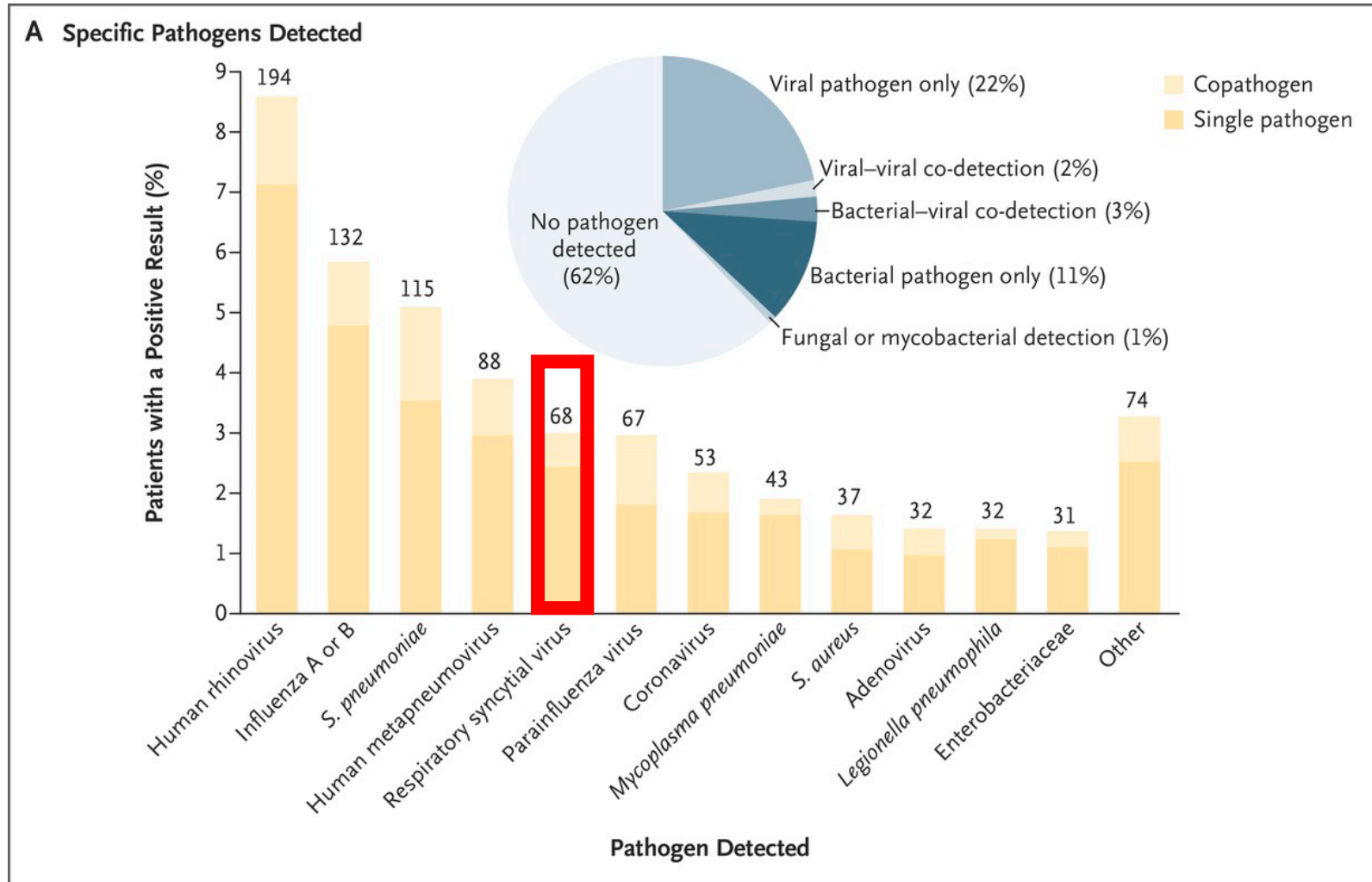
¹Falsey et al, NEJM (2005); ²Adapted from Falsey et al, NEJM (2005)

Burden of hospitalization and death: Older adults and children <5



¹Falsey et al, NEJM (2005); ²Adapted from Falsey et al, NEJM (2005); ³Thompson et al, JAMA, 2003; ⁴Hansen et al, JAMA Network Open, 2022; ⁵Hall et al, NEJM, 2009; ⁶McLaughlin et al, J Infect Dis, 2022

RSV is a frequent cause of pneumonia in hospitalized adults



EPIC study: Pathogen Detection among U.S. Adults with Community- Acquired Pneumonia Requiring Hospitalization, 2010–2012.

- RSV detected in 3% of adults hospitalized with pneumonia
- RSV was fifth most commonly detected pathogen

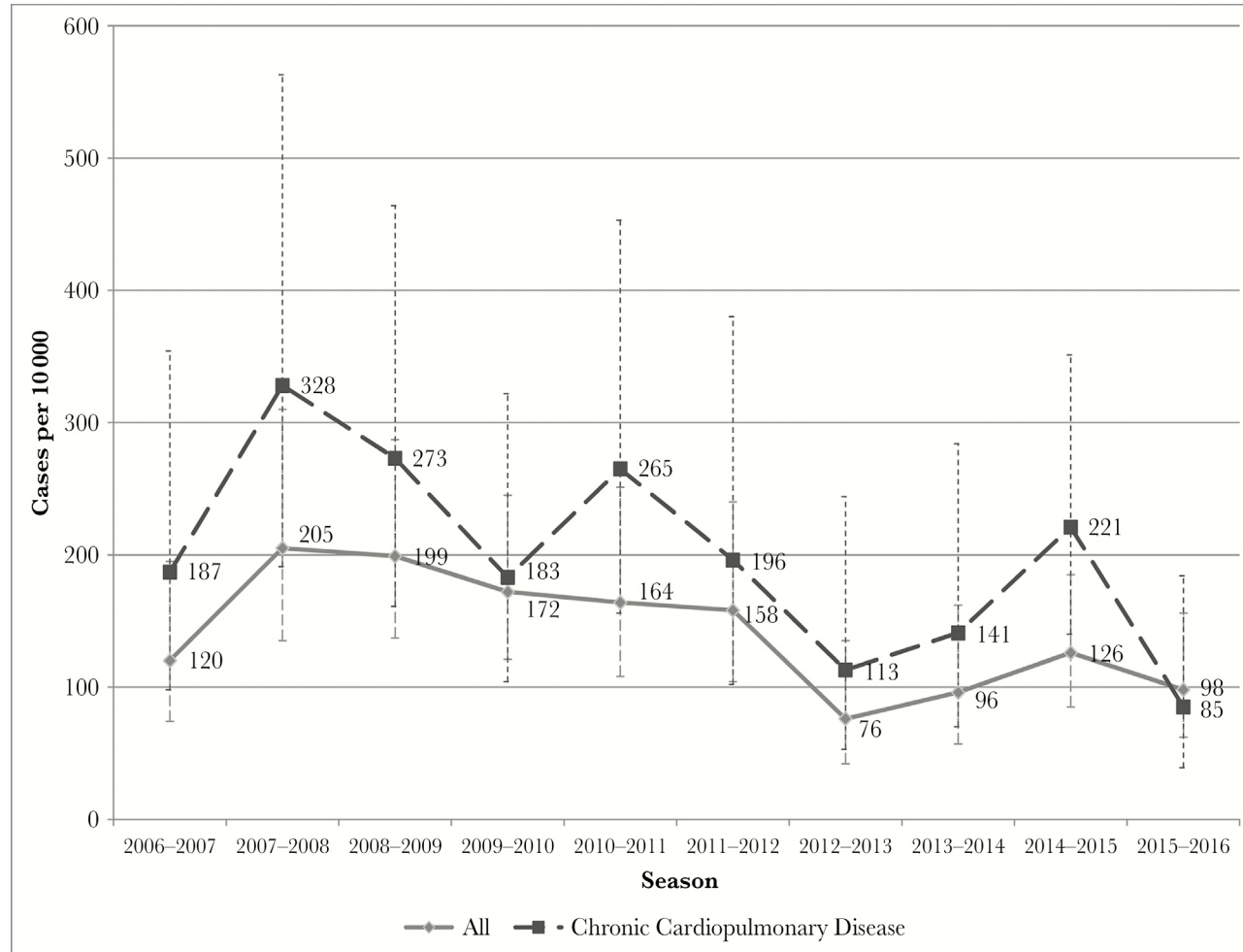
Annual Hospitalization Rates per 100,000 adults in the U.S.

Age group, years	3 seasons, 2 sites: 2017-2020 ¹	3 seasons, 1 site: 2006-2009 ²	National data (modeling study): 1997-2009 ^{4, 5}
18 – 49	7.7 – 11.9	n/a	9
50 – 64	33.5 – 57.5	82	28
≥65	136.9 – 255.6	254	84 (ages 65 – 74) 258 (75+)

High incidence of RSV hospitalization among older patients

¹Branche AR, et al. Clin Infect Dis. 2021. doi: 10/1093/cid/ciab595. [Epub ahead of print]; Funding: Merck. Hospitalized adults ≥ 18 years old with ≥ 2 ARI symptoms or exacerbations of underlying cardiopulmonary disease in Rochester, NY and NYC; ²Widmer, K. et al. JID 2012; 206:56-62.. Funding: NIH/CDC. Widmer K et al. IORV 2014 May;8(3):347-52. Funding: CDC. ⁴Matias, et al. BMC Public Health, 2017 Mar 21;17(1):271. Funding: GSK. ⁵Average seasonal burden.

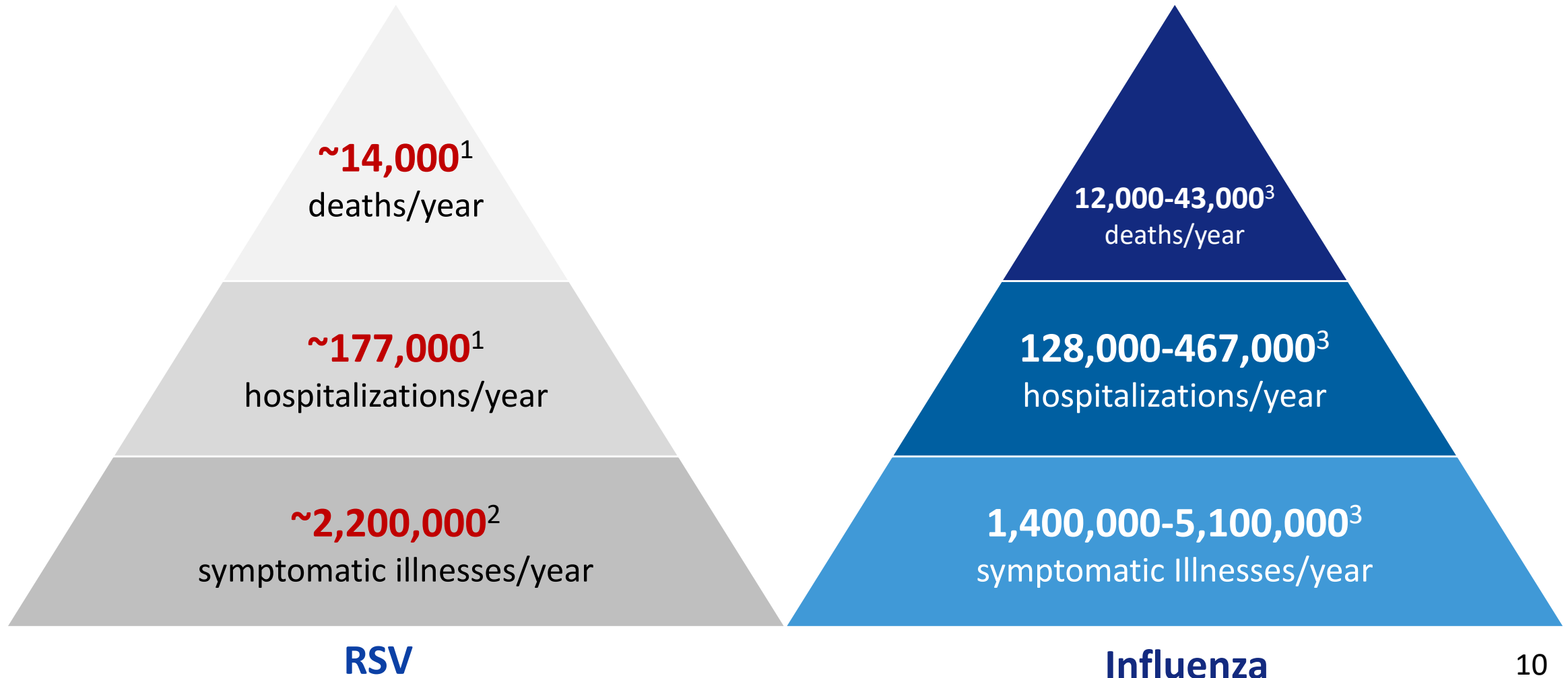
Substantial burden of medically attended outpatient visits for RSV in older adults



- **11%** of outpatients with acute respiratory illness
- **19%** had a serious outcome¹
- Rates nearly **2x** higher in patients with chronic cardiopulmonary disease compared with others

Seasonal incidence and 95% confidence limits of medically attended RSV by age group in a community cohort of adults ≥60 years old

Among adults ≥ 65 years of age in the United States, RSV is associated with a similar burden of disease as influenza

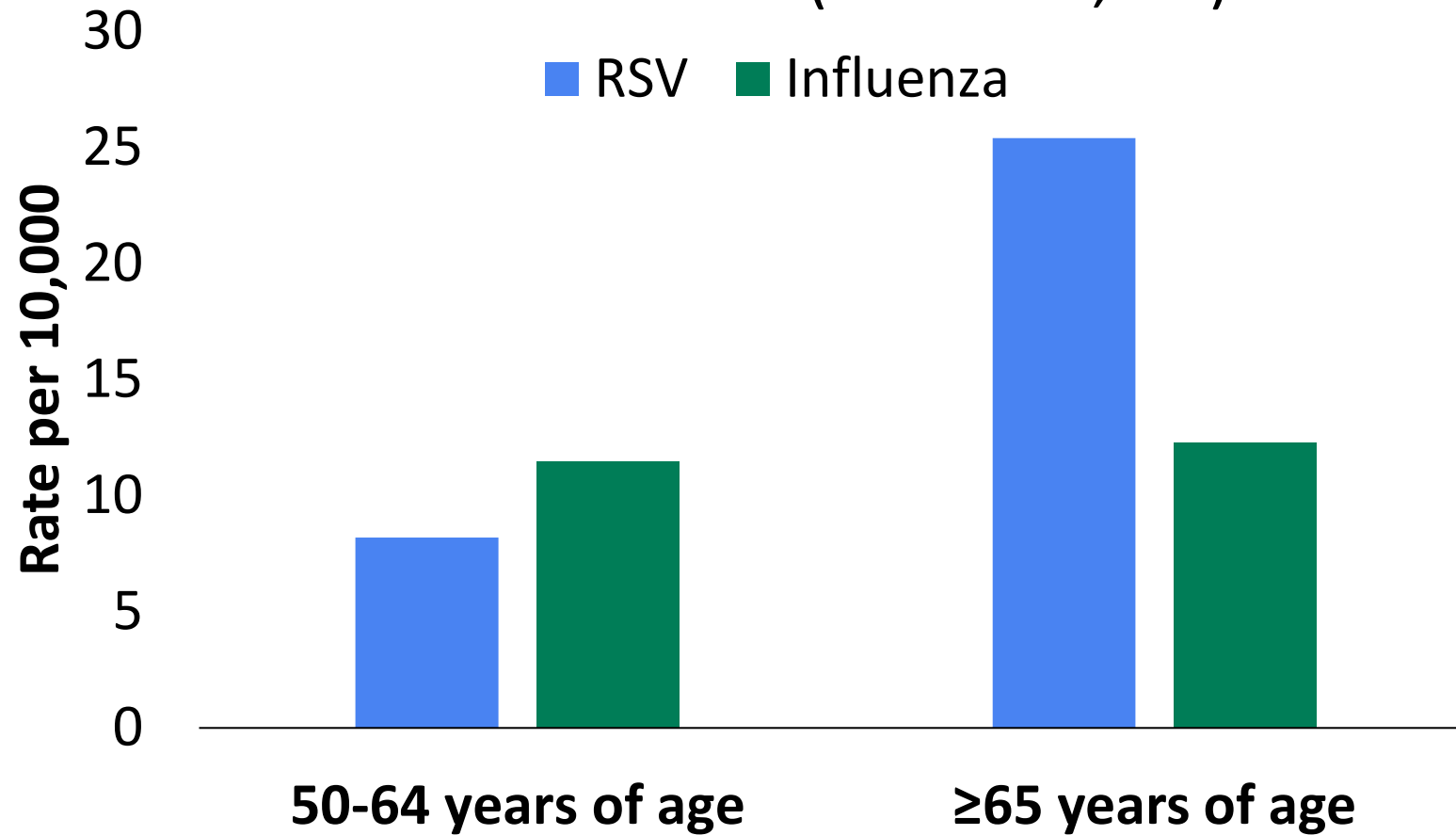


¹Falsey et al, NEJM (2005); ²Adapted from Falsey et al, NEJM (2005); ³Estimated Influenza Disease Burden 2015-2016 through 2019-2020, CDC (2022):

<https://www.cdc.gov/flu/about/burden/past-seasons.html>

Similar RSV and influenza hospitalization rates and severity in older adults

Years 2006-2009 (Nashville, TN)

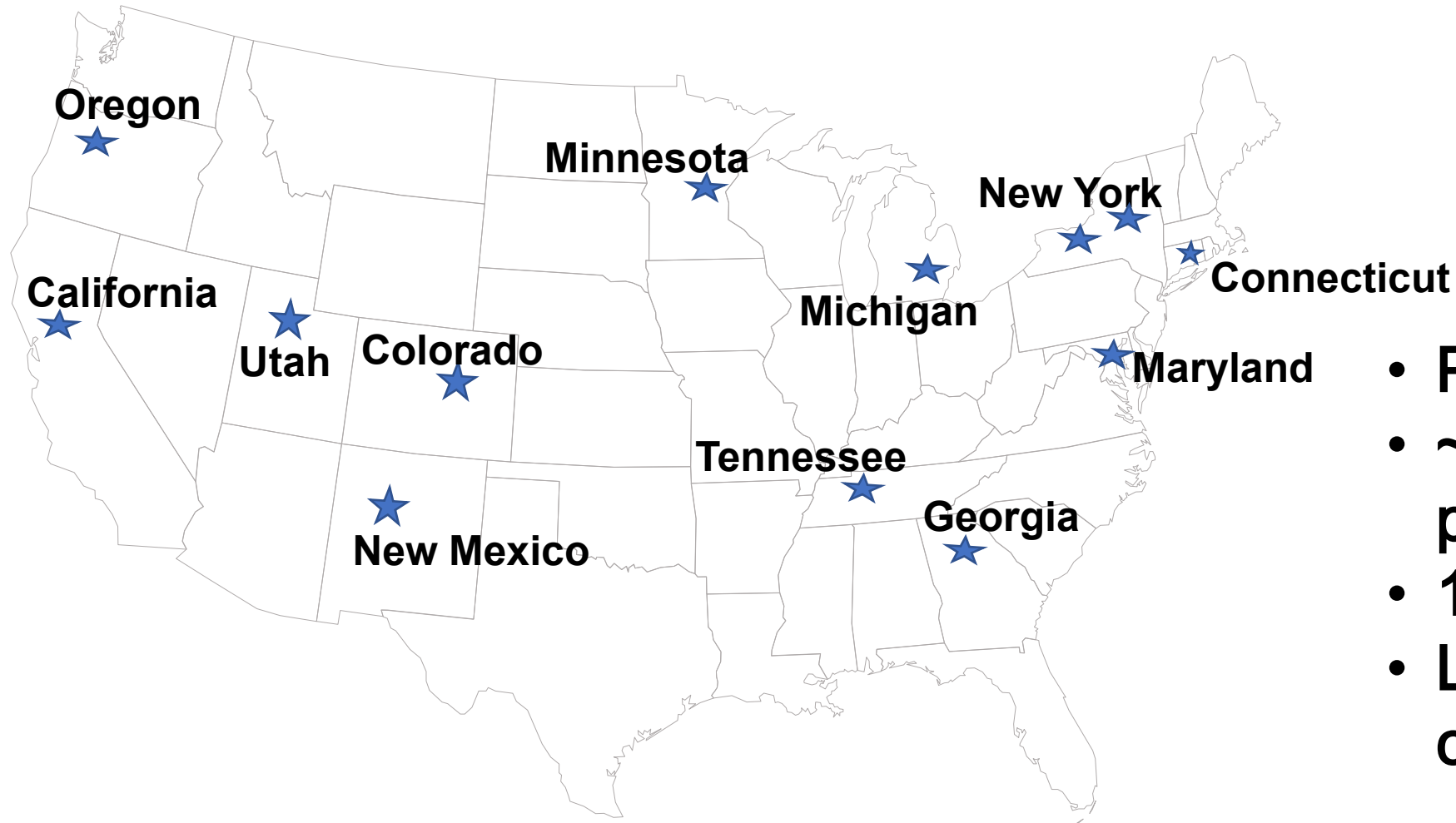


Adults ≥65 years hospitalized with acute respiratory illness over 3 seasons

- **6.1%: RSV**
- **6.5%: Influenza**
- **Similar clinical severity**

Clinical outcomes and co-morbid conditions

Respiratory Syncytial Virus Associated Hospitalization Surveillance Network (RSV-NET)



- Population -based
- ~8.6% of U.S. population
- 12 states
- Laboratory - confirmed RSV

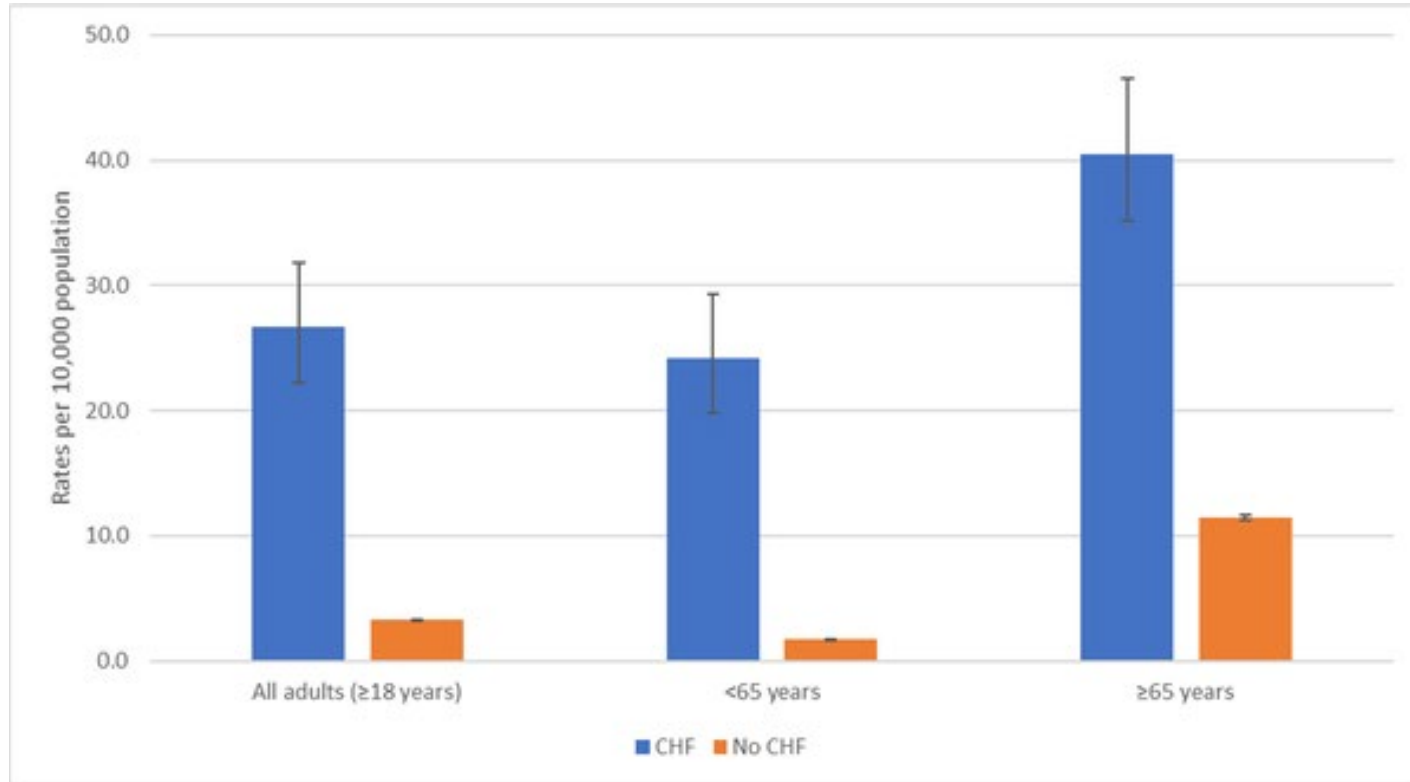
Underlying medical conditions among adults ≥ 18 years hospitalized for RSV: RSV-NET 2014-2018

Major underlying condition categories (n=4,970)	N=4,970	%
Cardiovascular disease	2833	57.0
Chronic lung disease	2486	50.0
Diabetes mellitus	1692	34.0
Renal disease	1378	27.7
Immunocompromised condition	1126	22.7
Neurologic disorder	1041	21.0
Chronic metabolic disease (except diabetes)	934	18.8
Liver disease	332	6.7
Blood disorders/ hemoglobinopathy	132	2.7
Other disease or condition	429	8.7

94% of hospitalized adults have underlying medical conditions:

- **46%: 1-2 conditions**
- **48%: ≥ 3 conditions**

RSV hospitalization rates much higher in those with congestive heart failure: RSV-NET 2015-2017



28% hospitalized cases had CHF

Higher rates in adults with CHF:

- Overall: 8x
- 50-64: 14x
- ≥65 years: 3.5x

Adjusted rates (per 10,000 population) of RSV-associated hospitalization by congestive heart failure (CHF) status, RSV-NET, 2015–2017 (N = 2042).

RSV in immunocompromised adults at high risk for severe disease

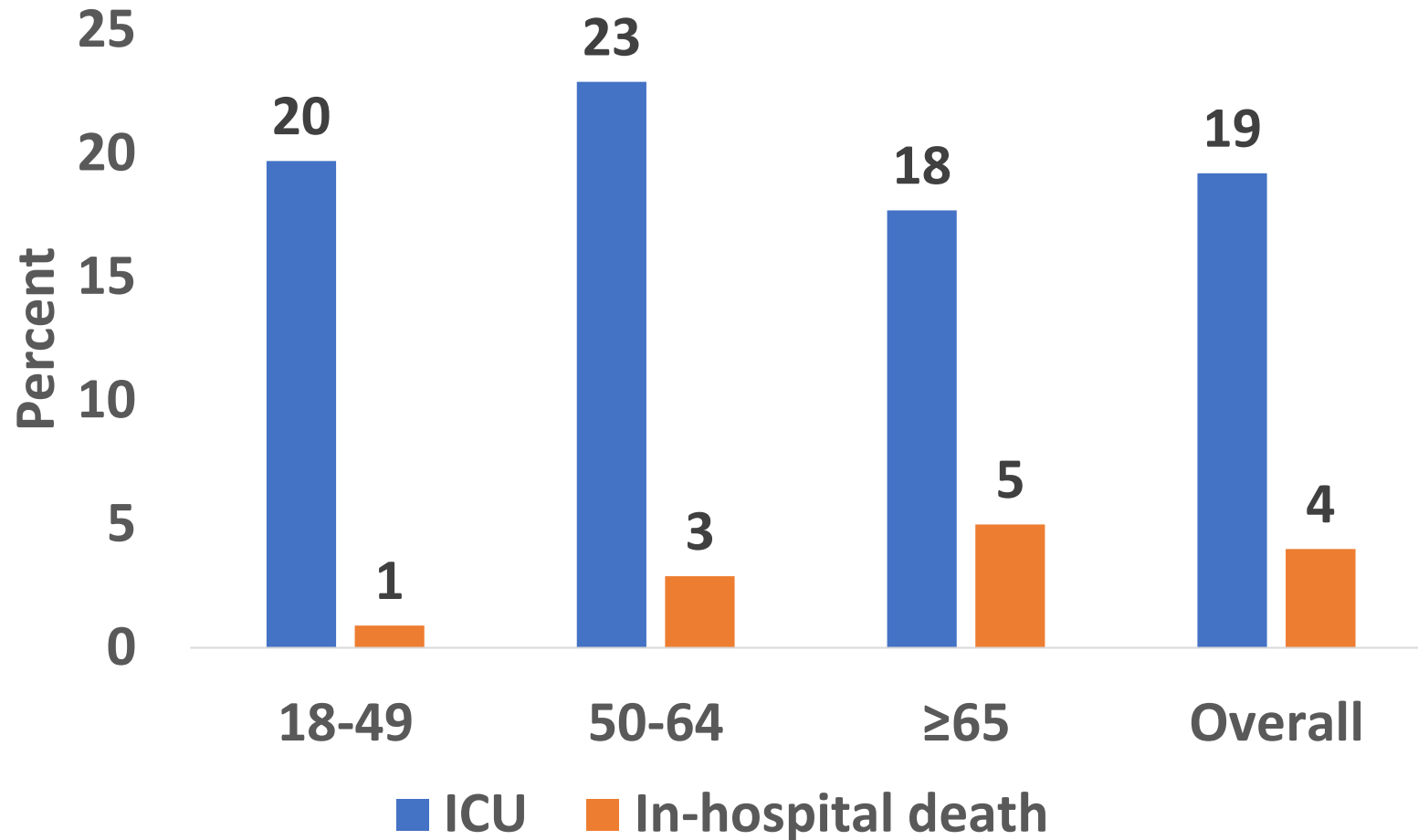
- Greatest risk among:
 - Lung transplant recipients¹
 - Hematopoietic cell transplant (HCT) recipients²
 - Other immunocompromised populations including patients receiving chemotherapy for lymphoma and leukemia
- Incidence of symptomatic illness: 12% (2-year period) and 16% (single season) in lung transplant patients^{3,4}
- Severe outcomes in immunocompromised patients
 - Progression to lower respiratory tract infection common
 - Mortality high: 26% among HCT with proven/probable lower respiratory tract infection⁵

Long-term care facility (LTCF) residents vulnerable to outbreaks and serious illness

- Frequent cause of symptomatic illnesses in LTCF residents¹
- High attack rate in outbreak settings
 - » **13.5%** over 1 month²
- Study of Medicare data estimated RSV-attributable hospitalizations²
 - 2,909,106 LTCF residents ≥65 years
 - 6,196 cardiorespiratory hospitalizations

Attributable cost	\$51,503,105 (\$38,899,971 – \$64,106,240)
Length of stay (LOS)	5.3 days (SE 4.6)
Attributable LOS	32,008 days (95% CI 24,267 – 39,749)

Outcomes among adults ≥ 18 years hospitalized for RSV: RSV-NET 2017-18 to 2019-20 seasons (n=8,214)

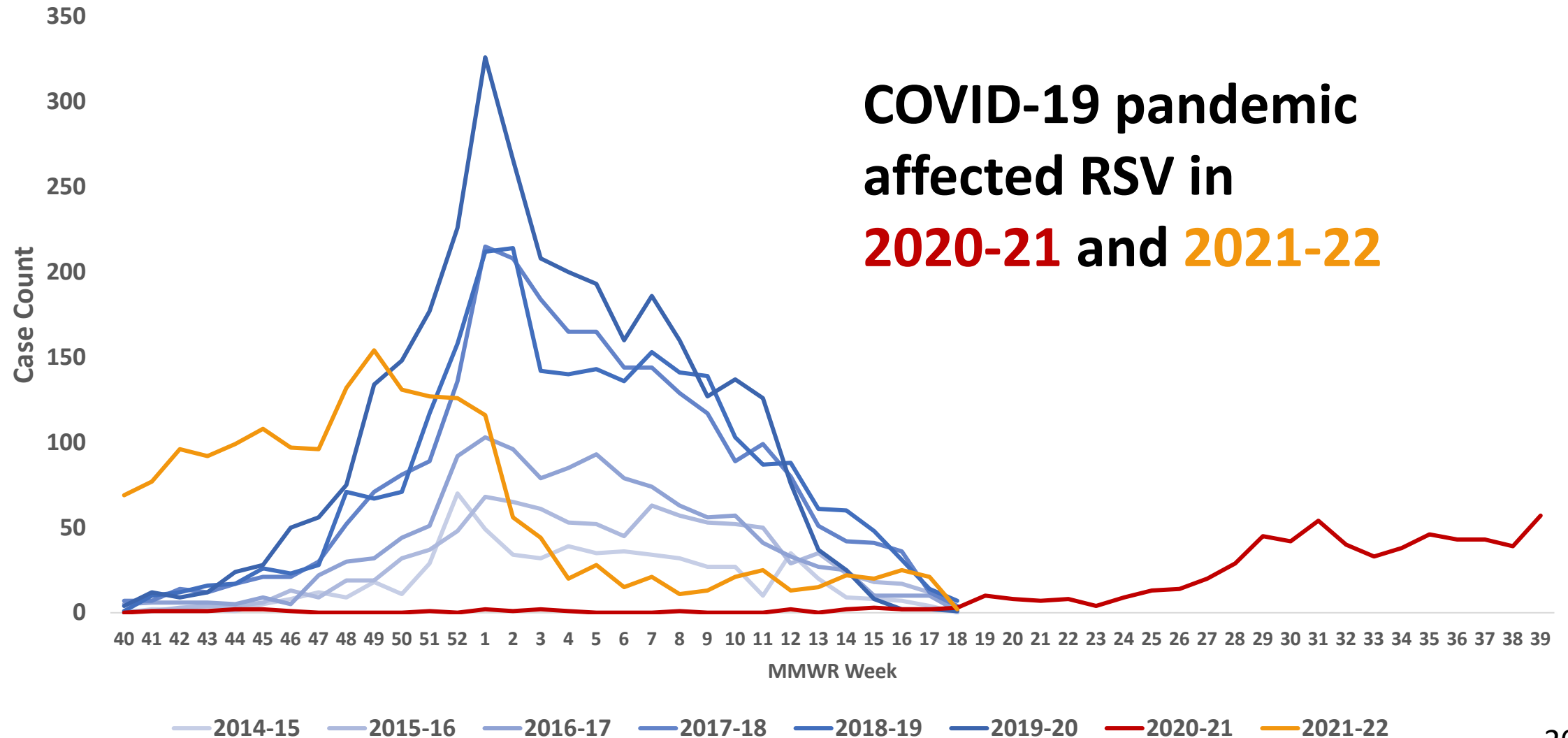


**Severe
outcomes
frequent among
adults
hospitalized for
RSV of all ages**

RSV leads to exacerbations of underlying chronic disease and long-term sequelae

- **RSV infections can result in:**
 - **Acute myocardial infarction**
 - **Stroke**
 - **Exacerbation of asthma and chronic obstructive pulmonary disease**
 - **Long-term decline in respiratory function**
 - **Other sequelae**

RSV hospitalizations in adults by season: RSV-NET 2014-2022



RSV is a major cause of severe illness in older adults

- Frequent, often unrecognized, cause of severe respiratory illnesses
- Burden of severe disease may be comparable to influenza, with variability across seasons
- Adults with co-morbidities, immunocompromised adults, and long-term care facility residents may be particularly at risk for severe illness
- High proportion of those hospitalized with RSV have severe outcomes, including ICU admission and death
- Long-term health consequences

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- Many others....

Questions?

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

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.

