

# I-VAC Adult Learning Collaborative for COVID-19 Vaccination



Please use your first name and health center name when you join the session



Use the “**chat**” feature to let us know if you have a question



Please remember to **mute your microphone** unless speaking



If you can't connect audio via computer or lose computer audio at anytime, you can call in to session at **(669) 900-6833, Meeting ID 812-8864-4528##**

# Disclosures

- No one in a position to control the education content of the activity has any relevant financial disclosures with ineligible companies to disclose.
- What gets said here today may change based on new data and recommendations
  - Knowledge is shared more rapidly through ECHO



## Mission

to establish and cultivate a robust knowledge network that builds community-based capacity to reduce the health disparities affecting children and adults in underserved communities

[www.echo-chicago.org](http://www.echo-chicago.org)

## Reach



**6000+**

professionals



**1200+**

organizations



**49**

states



**9**

countries



## Impact

**89%**

show increased confidence in their skills after participating in training

**91%**

report at least change to their practice as a result of participating in training

## Breadth

### 35+ topic areas, including:

- Complex pediatric asthma
- Pediatric obesity
- COVID-19
- Diabetes
- Geriatrics for SNFs
- Resistant hypertension
- Childhood adversity & trauma
- Opioid use disorder
- Serious mental illness

} pediatric populations

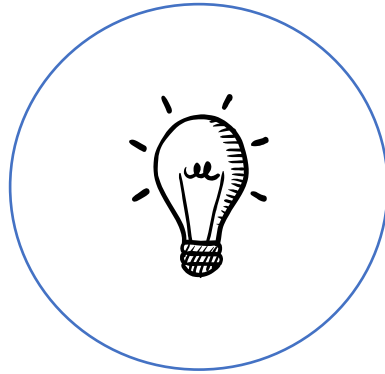
} adult populations

} behavioral health

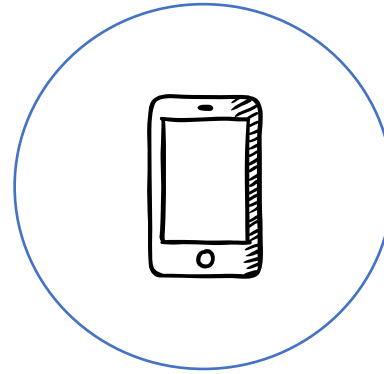
# Illinois Vaccinates Against COVID-19 (I-VAC)



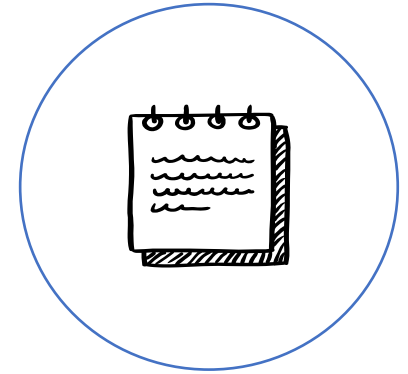
Foundational  
Training



Learning  
Collaboratives



Technical  
Assistance



Toolkit & Outreach  
Materials

Website: <https://www.illinoisvaccinates.com/>

Funding for this project was made possible by the Office of Disease Control, through the Illinois Department of Public Health.

# Session Essentials

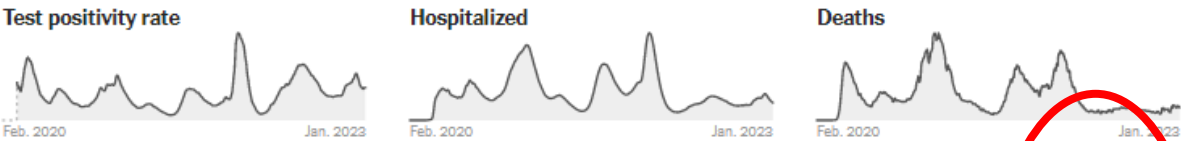
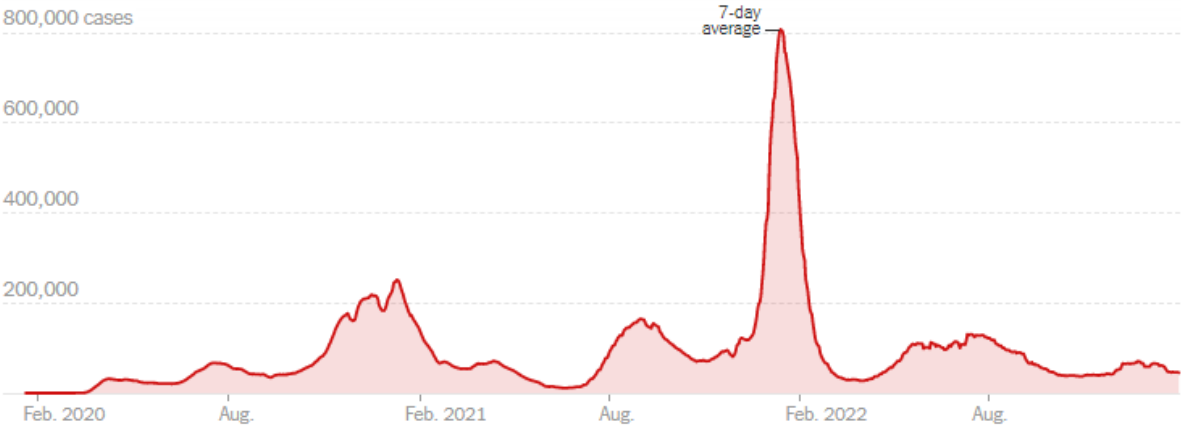
- CME credits
  - Information to claim credits will be shared at the end in April
  - 1 session = 1 *AMA PRA Category 1 Credit*<sup>™</sup>
- Cases
  - SHARE a case with us
    - Specific patient case, general issue (testing, vaccine hesitancy, etc.) or operational/logistical issue
  - Web-based electronic case submission
  - If you would like to present a case at the next session, please let Patrick know at [pgower@peds.bsd.uchicago.edu](mailto:pgower@peds.bsd.uchicago.edu)
- Session slides & recordings
  - Slides and recordings will be posted on <https://www.echo-chicago.org/topic/covid-19-in-adult-populations/> behind a firewall. Registration required to access



# Coronavirus in the U.S.: Latest Map and Case Count

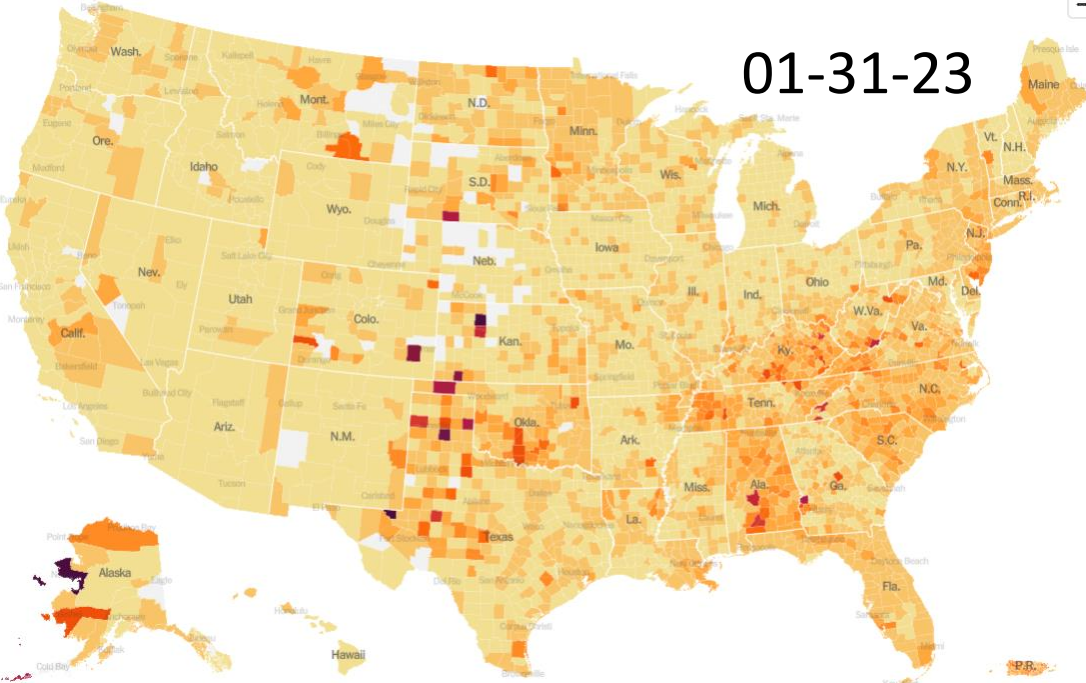
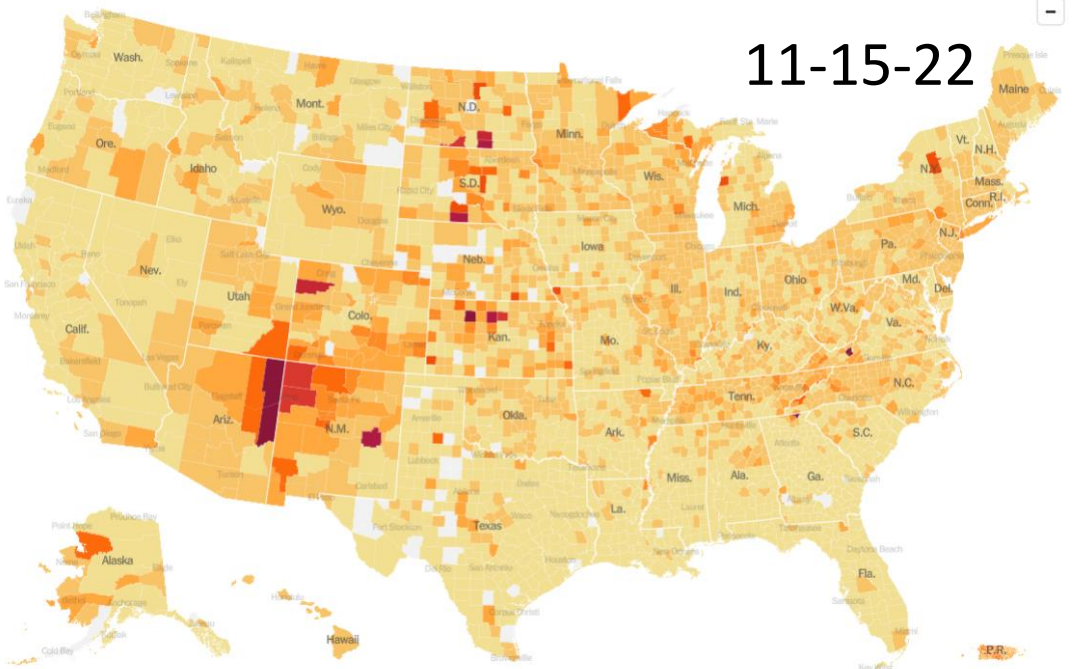
## New reported cases

All time Last 90 days



	DAILY AVG. ON JAN. 31	PER 100,000	14-DAY CHANGE
Cases	45,236	14	-23%
Test positivity	11%	—	-7%
Hospitalized	32,080	10	-22%
In I.C.U.s	4,071	1	-22%
Deaths	488	<1	-9%

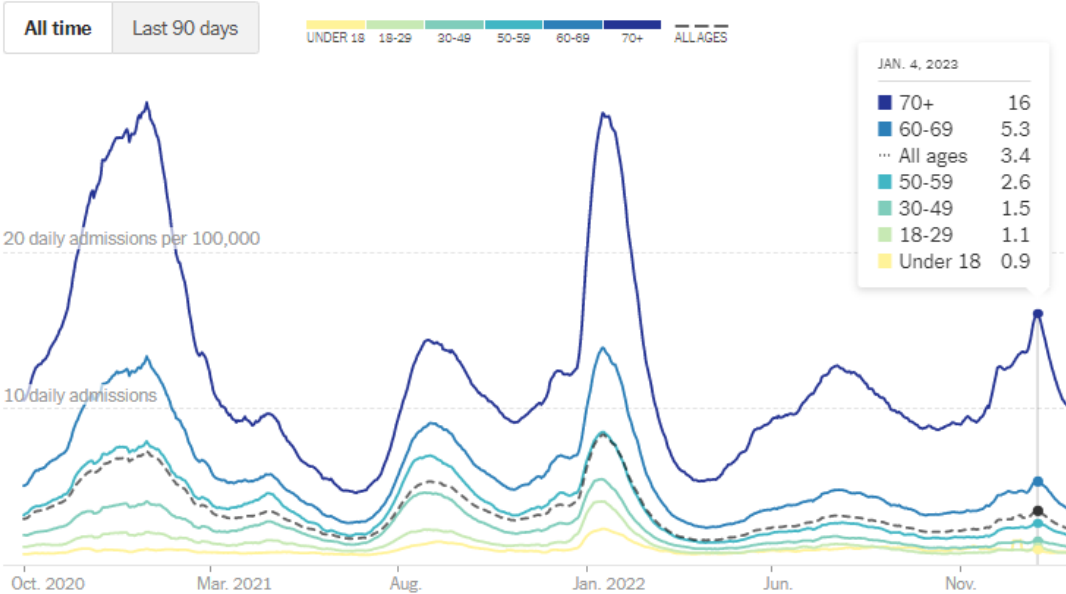
About this data





## Daily new hospital admissions by age

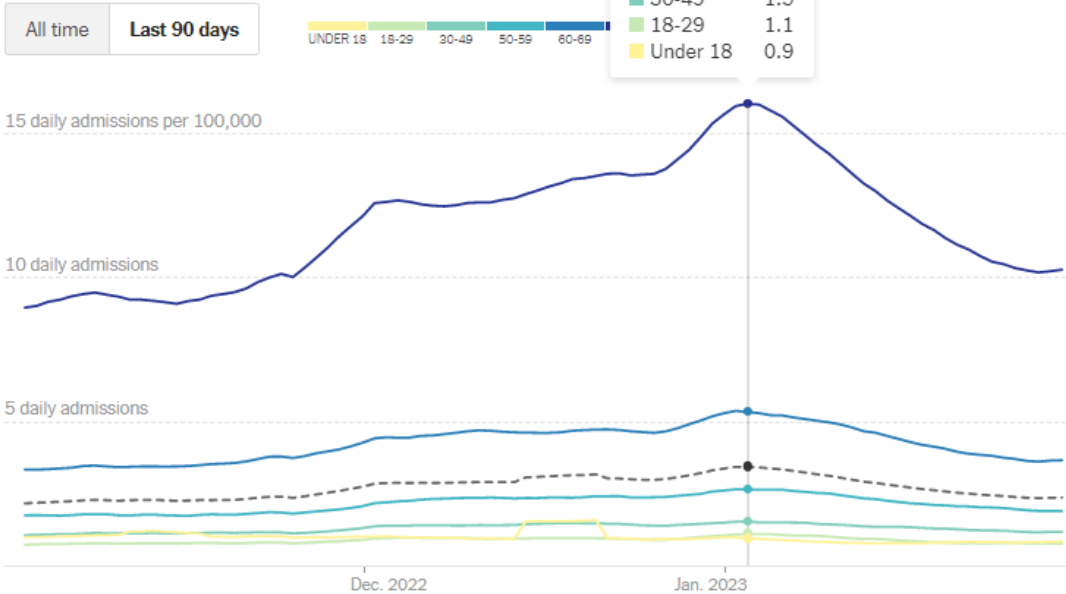
This chart shows for each age group the number of people per 100,000 that were newly admitted to a hospital with Covid-19 each day, according to data reported by hospitals to the U.S. Department of Health and Human Services.



[About this data](#)

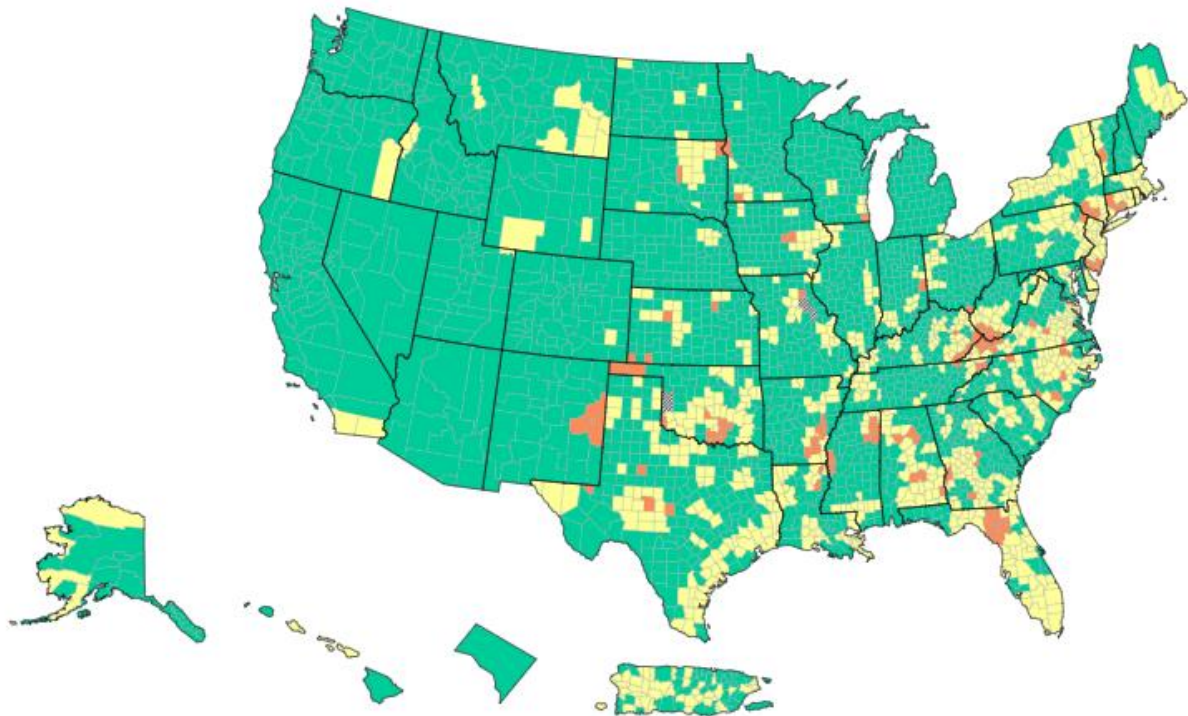
## Daily new hospital admissions by age

This chart shows for each age group the number of people per 100,000 that were newly admitted to a hospital with Covid-19 each day, according to data reported by hospitals to the U.S. Department of Health and Human Services.



[About this data](#)

# COVID-19 Community Levels of All Counties in US



GU AS MP VI

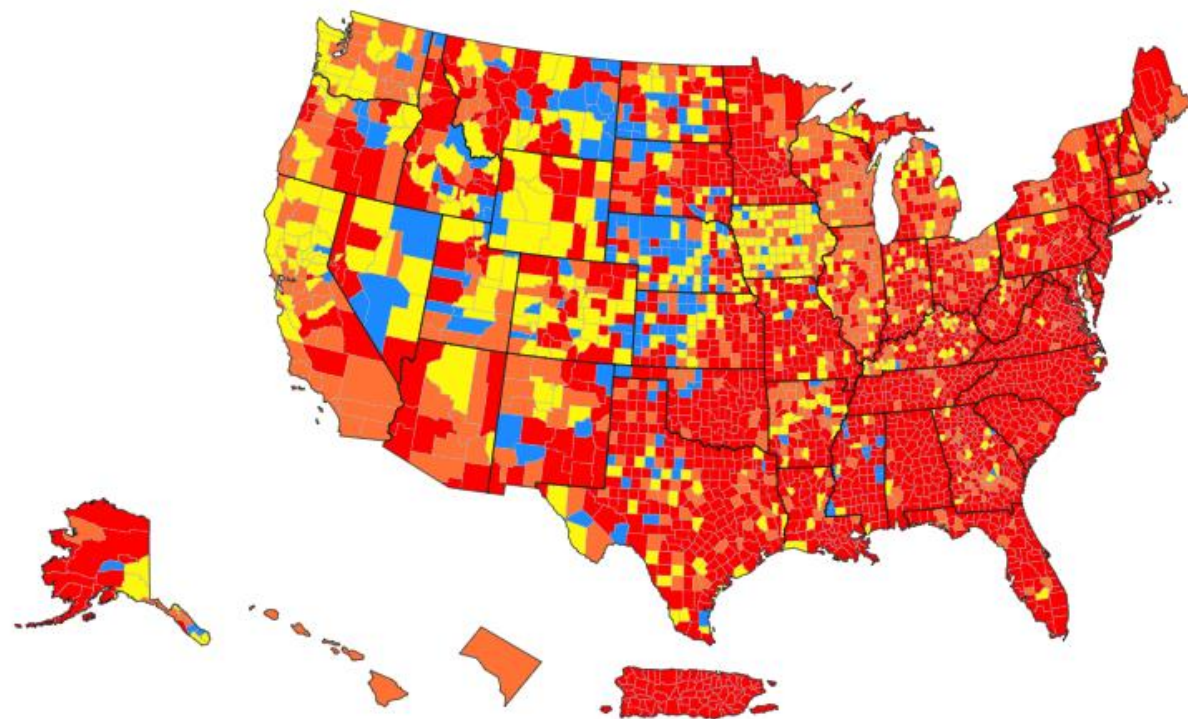
COVID-19 Community Levels in US by County

	Total	Percent	% Change
High	118	3.67%	- 2.42%
Medium	864	26.86%	- 4.52%
Low	2235	69.47%	6.94%

[How are COVID-19 Community Levels calculated?](#)



# Community Transmission of All Counties in US



Community Transmission in US by County

	Total	Percent	% Change
High	3990	123.84%	52.42%
Substantial	1194	37.06%	22.38%
Moderate	908	28.18%	19.46%
Low	352	10.92%	5.74%

[How is community transmission calculated?](#)

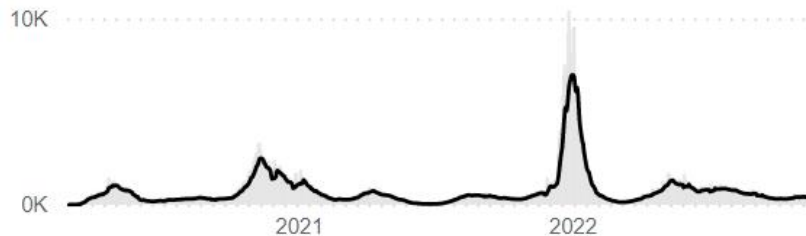
● High ● Substantial ● Moderate ● Low ▨ No Data

**SUMMARY** CASES CASES BY ZIP TESTS VACCINES VACCINES BY ZIP

[? Learn how to use this dashboard.](#)

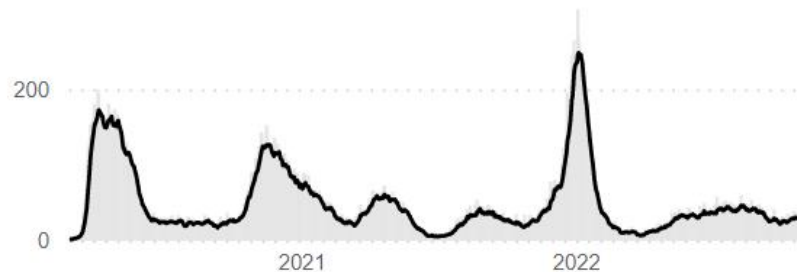
## LABORATORY-CONFIRMED CASES

**403** ▼ **420** (-4%) **715,827** **14.9**  
Current daily avg Prior week Cumulative Daily rate per 100,000



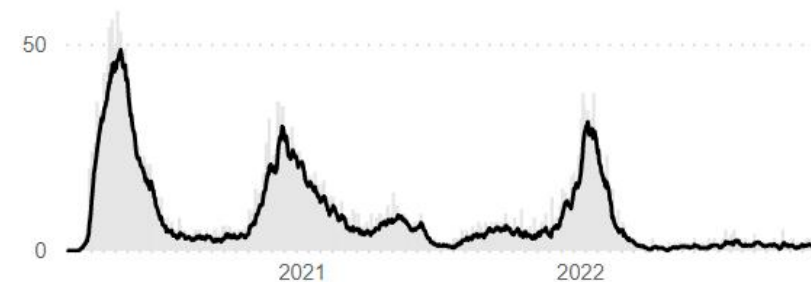
## HOSPITALIZATIONS

**28** ▼ **28** (-2%) **48,538** **1.0**  
Current daily avg Prior week Cumulative Daily rate per 100,000



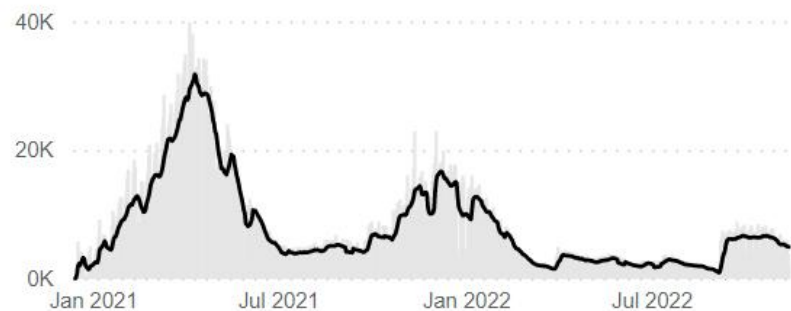
## DEATHS

**0.29** ▼ **1.00** (-71%) **7,930** **0.0**  
Current daily avg Prior week Cumulative Daily rate per 100,000



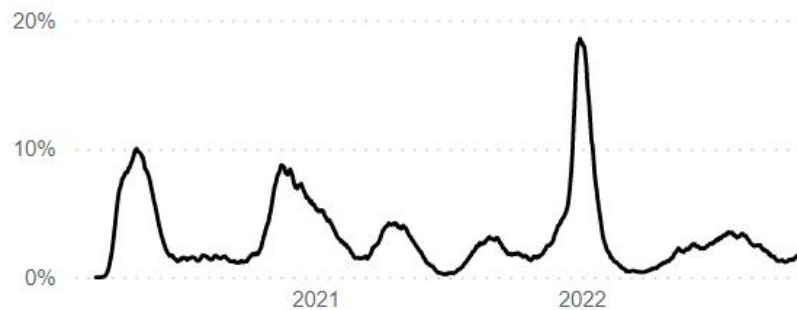
## VACCINATIONS ADMINISTERED

**4,920** ▼ **5,551,502** **71.1%** **79.6%**  
Current daily avg Cumulative Completed series At least one dose



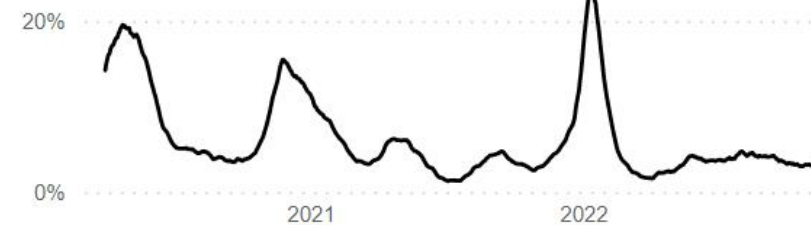
## EMERGENCY ROOM VISITS

**1.8%** ▼ **1.9%**  
Current daily avg Prior Week



## HOSPITAL BEDS IN USE

**3.6%** ▲ **3.2%**  
Current daily avg Prior Week

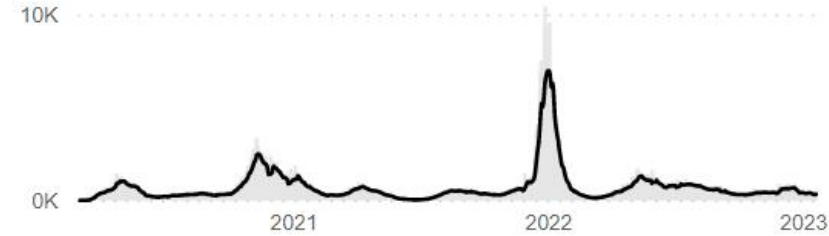


**SUMMARY** CASES CASES BY ZIP TESTS VACCINES VACCINES BY ZIP

[Learn how to use this dashboard.](#)

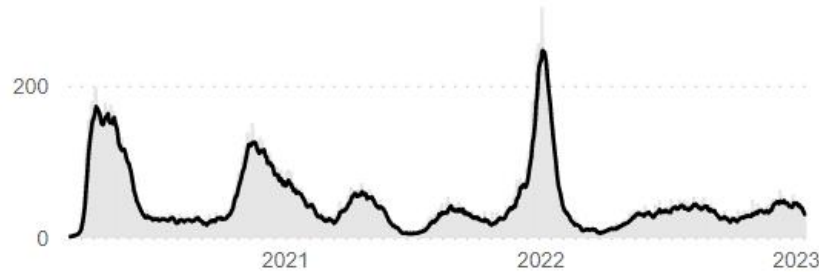
## LABORATORY-CONFIRMED CASES

**329 ▼** **372 (-12%)** **749,322** **12.2**  
Current daily avg Prior week Cumulative Daily rate per 100,000



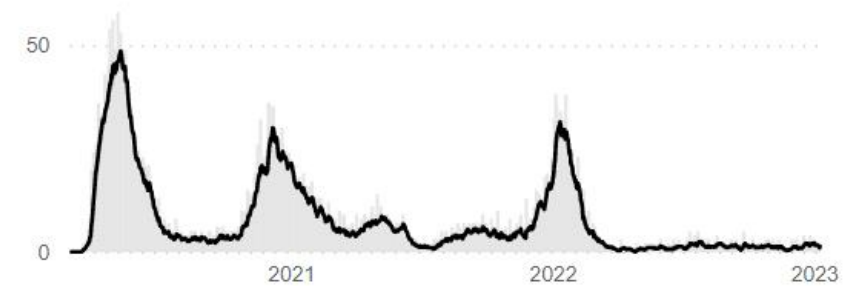
## HOSPITALIZATIONS

**31 ▼** **42 (-26%)** **50,532** **1.1**  
Current daily avg Prior week Cumulative Daily rate per 100,000



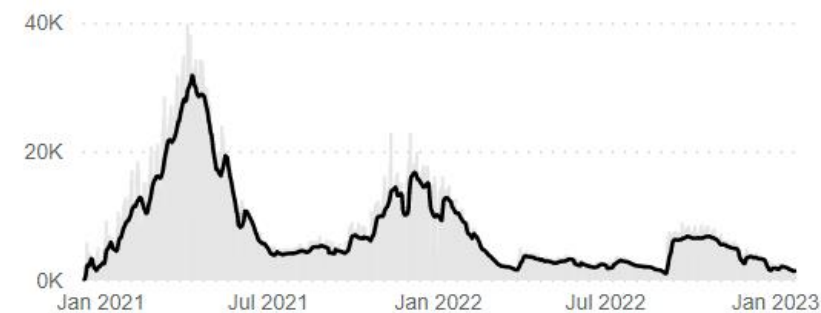
## DEATHS

**1.29 ▼** **1.57 (-18%)** **8,040** **0.0**  
Current daily avg Prior week Cumulative Daily rate per 100,000



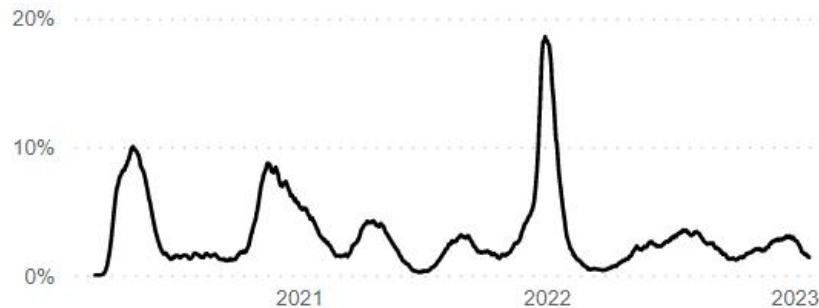
## VACCINATIONS ADMINISTERED

**1,335 ▼** **5,738,118** **70.7%** **80.2%**  
Current daily avg Cumulative Completed series At least one dose



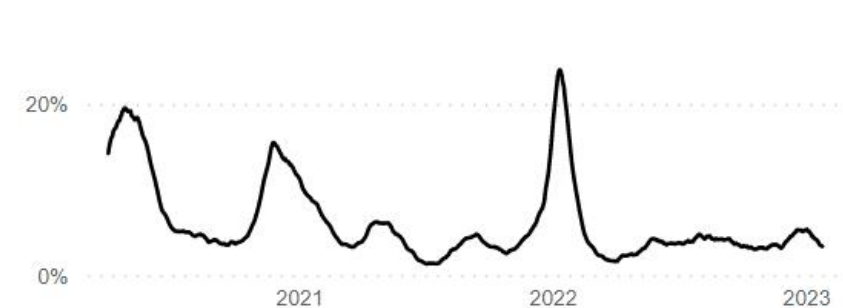
## EMERGENCY ROOM VISITS

**1.4% ▼** **1.6%**  
Current daily avg Prior Week



## HOSPITAL BEDS IN USE

**3.4% ▼** **4.0%**  
Current daily avg Prior Week





## Our local risk based on CDC COVID-19 Community Levels is:

# Low

	New cases per 100,000 population (last 7 days) <i>[Goal is &lt;200]</i>	New admissions per 100,000 population (last 7 days) <i>[Goal is &lt;10]</i>	Percent of staffed inpatient beds occupied by COVID-19 patients (last 7 days) <i>[Goal is &lt;10%]</i>
City of Chicago	85	8.0	3.5%
Cook County (including City of Chicago)	84	9.1	4.3%

*Chicago metrics are calculated based on Chicago-level data.*

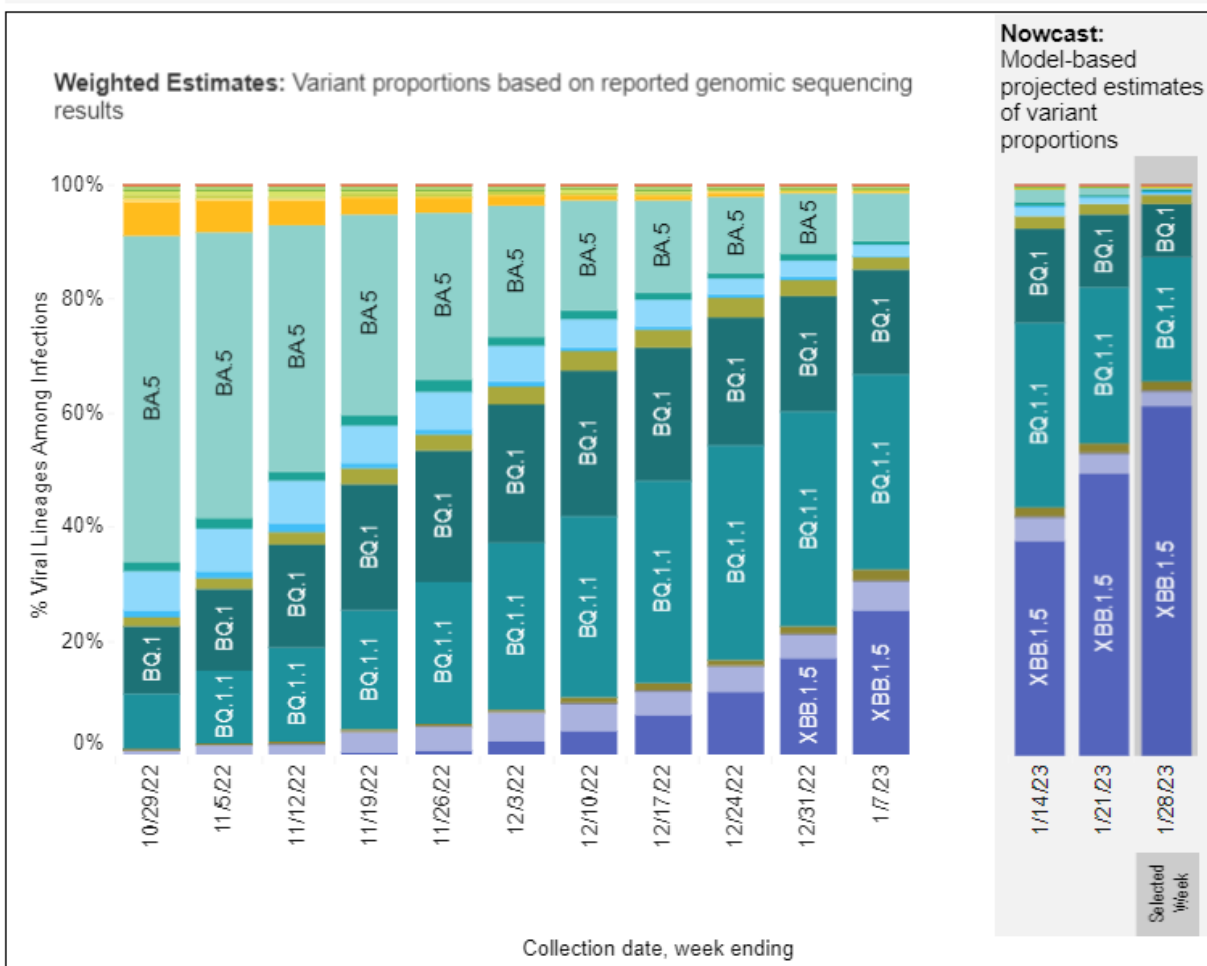
*Cook County metrics are calculated by the CDC and posted on the [CDC Community Levels website](#).*

*Data current as of 1/25/2023.*

## Weighted and Nowcast Estimates in United States for Weeks of 10/23/2022 – 1/28/2023



Hover over (or tap in mobile) any lineage of interest to see the amount of uncertainty in that lineage's estimate.



## Nowcast Estimates in United States for 1/22/2023 – 1/28/2023

USA				
WHO label	Lineage #	US Class	%Total	95%PI
Omicron	XBB.1.5	VOC	61.3%	51.5-70.3%
	BQ.1.1	VOC	21.8%	16.6-27.9%
	BQ.1	VOC	9.3%	6.9-12.3%
	XBB	VOC	2.8%	2.2-3.5%
	CH.1.1	VOC	1.5%	1.1-2.1%
	BN.1	VOC	1.4%	1.0-1.8%
	BA.5	VOC	0.7%	0.5-1.0%
	BF.7	VOC	0.6%	0.5-0.9%
	BA.5.2.6	VOC	0.2%	0.2-0.3%
	BA.2	VOC	0.1%	0.1-0.2%
	BF.11	VOC	0.1%	0.1-0.2%
	BA.2.75	VOC	0.1%	0.0-0.1%
	BA.4.6	VOC	0.0%	0.0-0.0%
	BA.2.75.2	VOC	0.0%	0.0-0.1%
	B.1.1.529	VOC	0.0%	0.0-0.0%
	BA.4	VOC	0.0%	0.0-0.0%
	BA.1.1	VOC	0.0%	0.0-0.0%
	BA.2.12.1	VOC	0.0%	0.0-0.0%
Delta	B.1.617.2	VBM	0.0%	0.0-0.0%
Other	Other*		0.0%	0.0-0.1%

\* Enumerated lineages are US VOC and lineages circulating above 1% nationally in at least one week period. "Other" represents the aggregation of lineages which are circulating <1% nationally during all weeks displayed.

\*\* These data include Nowcast estimates, which are modeled projections that may differ from weighted estimates generated at later dates

# BA.1, BA.3 and their sublineages (except BA.1.1 and its sublineages) are aggregated with B.1.1.529. Except BA.2.12.1, BA.2.75, XBB and their sublineages, BA.2 sublineages are aggregated with BA.2. Except BA.2.75.2, CH.1.1 and BN.1, BA.2.75 sublineages are aggregated with BA.2.75. Except BA.4.6, sublineages of BA.4 are aggregated to BA.4. Except BF.7, BF.11, BA.5.2.6, BQ.1 and BQ.1.1, sublineages of BA.5 are aggregated to BA.5. Except XBB.1.5, sublineages of XBB are aggregated to XBB. For all the other lineages listed, their sublineages are aggregated to the listed parental lineages respectively. Previously, CH.1.1 was aggregated to BA.2.75. Lineages BA.2.75.2, XBB, XBB.1.5, BN.1, BA.4.6, BF.7, BF.11, BA.5.2.6 and BQ.1.1 contain the spike substitution R346T.



## *U.S. Plans to End Public Health Emergency for Covid in May*

The end of the emergency, planned for May 11, will bring about a complex set of policy changes and signals a new chapter in the government's pandemic response.

Give this article



196



The White House said that the nation needed an orderly transition out of the public health emergency, which has been in effect for all of President Biden's time in office.  
Haiyun Jiang/The New York Times

- Free COVID tests (and associated medical visits) private payors offers now may end once PHE is lifted
- End of PHE does not impact coverage for COVID vaccines/boosters
- No cost-sharing of COVID tests for Medicare beneficiaries will end
- Coverage for oral antivirals for Medicare beneficiaries will continue
- No cost-sharing of COVID tests and treatment will end for Medicaid will end one year from end of PHE



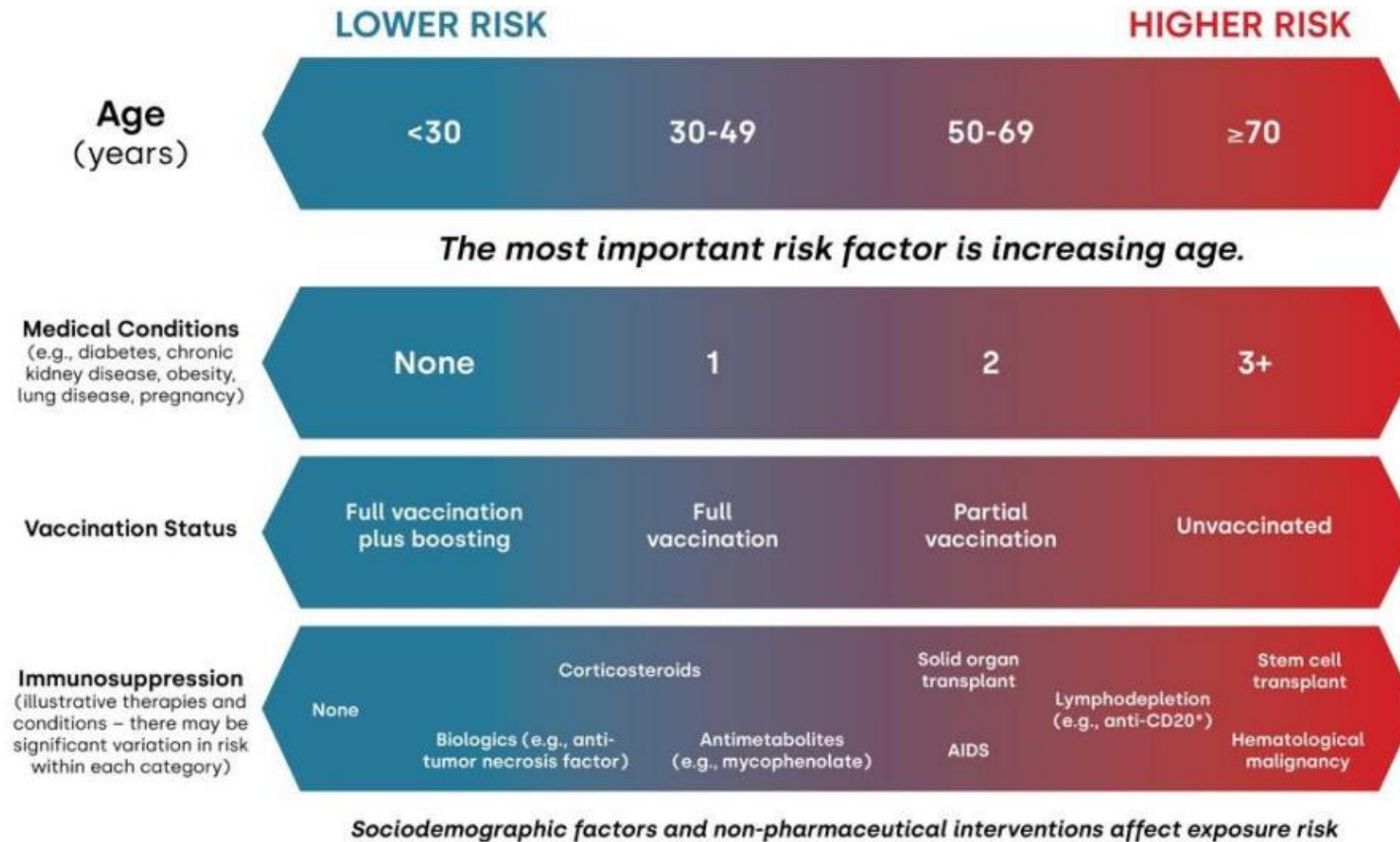
By Sharon LaFraniere and Noah Weiland

Jan. 30, 2023

# Treatment Update

# COVID-19 Risk Continuum

## COVID-19 Risk Continuum



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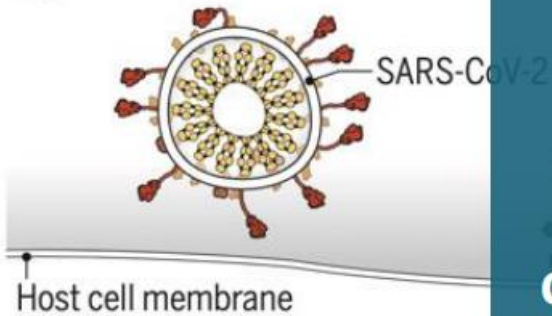
This resource was funded in part by a cooperative agreement with the Centers for Disease Control and Prevention (grant number NU53CK000574). The Centers for Disease Control and Prevention is an agency within the Department of Health and Human Services (HHS). The contents of this resource do not necessarily represent the policy of CDC or HHS, and should not be considered an endorsement by the Federal Government.

Original illustration by Dr.  
William Werbel. Adapted  
for the

**COVID-19** Real-Time  
Learning Network  
Brought to you by CDC and AIDSA

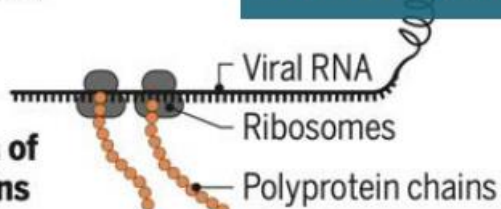
# SARS CoV-2 Antivirals

## 1 Attachment and entry

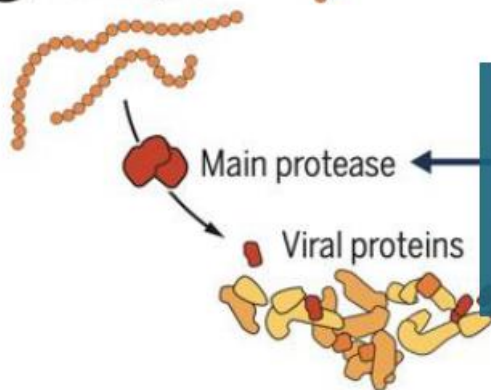


**Anti-spike monoclonal antibodies, including bebtelovimab:**  
**Not active against most circulating SARS CoV-2 variants**

## 2 Translation of viral proteins



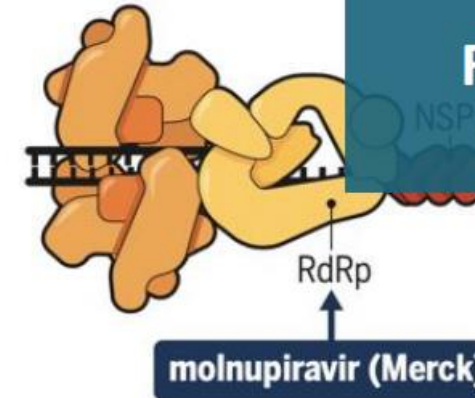
## 3 Proteolysis



**Protease inhibitor:**  
**Nirmatrelvir/ritonavir (Paxlovid)**

## 4 RNA replication

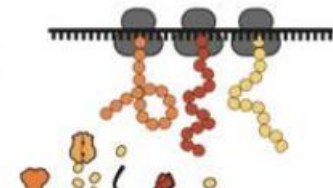
Replication transcription complex



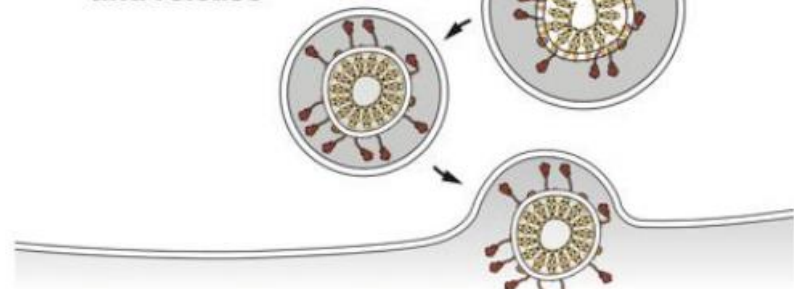
**Molnupiravir (Lagevrio)**

**Remdesivir (Veklury)**

## 5 Transcription and translation of structural and accessory proteins



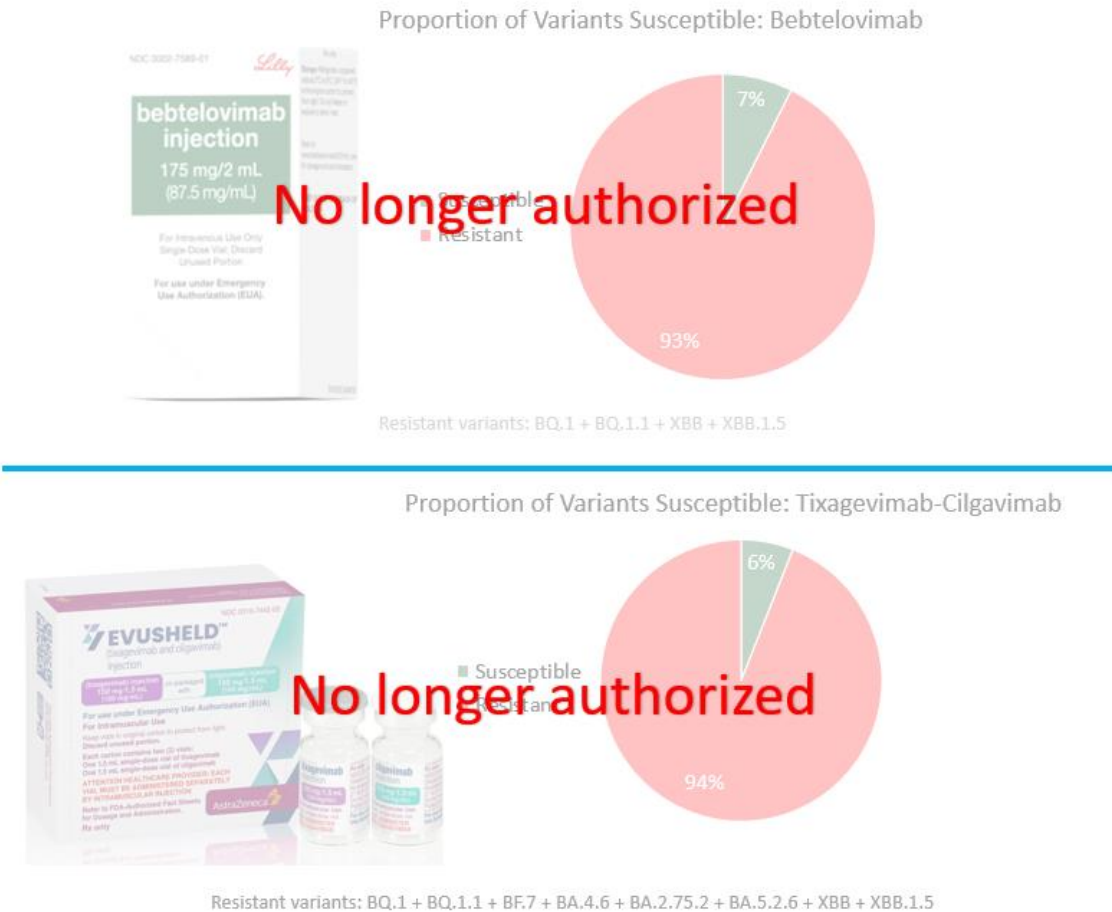
## 6 Assembly, packaging, and release





Current COVID-19 Variants of Concern		Fold Reduction in Susceptibility	
Omicron Variant (PANGO lineage)	Key Substitutions Tested	Bebtelovimab	Tixagevimab-cilgavimab
<u>BA.1.1</u>	BA.1 + R346K	No change	176
<u>BA.2</u>	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H	No change	5.4
<u>BA.2.12.1</u>	BA.2 + L452Q	No change	5*
<u>BA.2.75</u>	BA.2 + D339H, G446S, N460K, R493Q (reversion)	No change	2.4-15*
<u>BA.4</u>	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H	No change	33-65*
<u>BA.5</u>	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H	No change	2.8-16
<u>BA.4.6</u>	BA.4 + R346T	No change	>1000*
<u>BF.7</u>	BA.4 + R346T	No change*	>5000*
<u>BQ.1</u>	BA.5 + K444T, N460K	>672*	>2000*
<u>BQ.1.1</u>	BA.5 + R346T, K444T, N460K	>672*	>2000*
<u>XBB</u>	BA.2 + R346T, L368I, V445P, G446S, N460K, F486S, F490S	Not promising	>1400*
<u>XBB.1.5</u>	XBB (F486P replaces F486S)	Not promising	>5000*

Source: FDA healthcare provider fact sheets. Last updated January 26, 2023  
No change: < 5-fold reduction in susceptibility  
\* Performed in pseudotyped virus-like particles rather than authentic SARS-CoV-2 virus



Last updated January 26, 2023





# If you have a weakened immune system or live with someone who does, create a COVID-19 action plan

## Prevention Measures:

Get an updated COVID-19 vaccine



Improve ventilation and spend time outdoors



Learn about testing locations and treatment options **before** getting exposed or sick



Get tested if you've been exposed or have symptoms\*



Wash your hands often



Wear a well-fitting mask and maintain distance in crowded spaces



\*Talk to your doctor about treatment options if you test positive



[bit.ly/mm7205e3](https://bit.ly/mm7205e3)

JANUARY 27, 2023

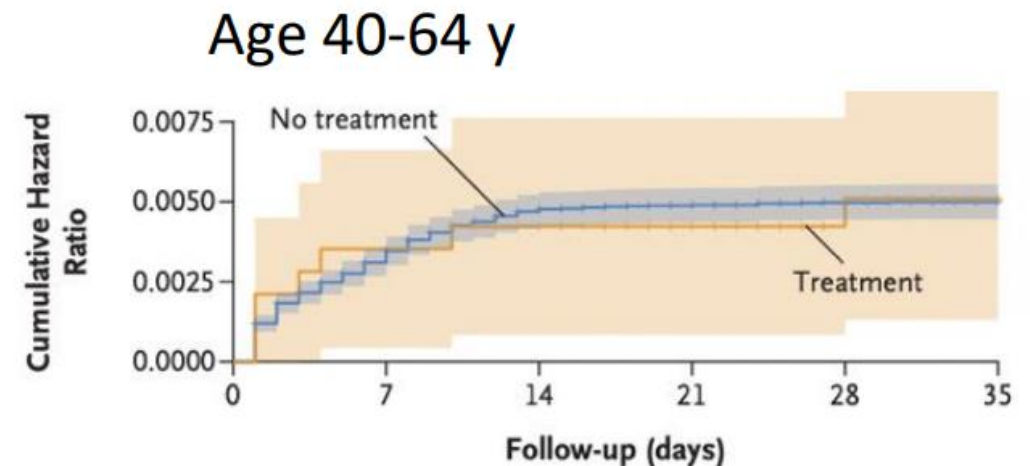
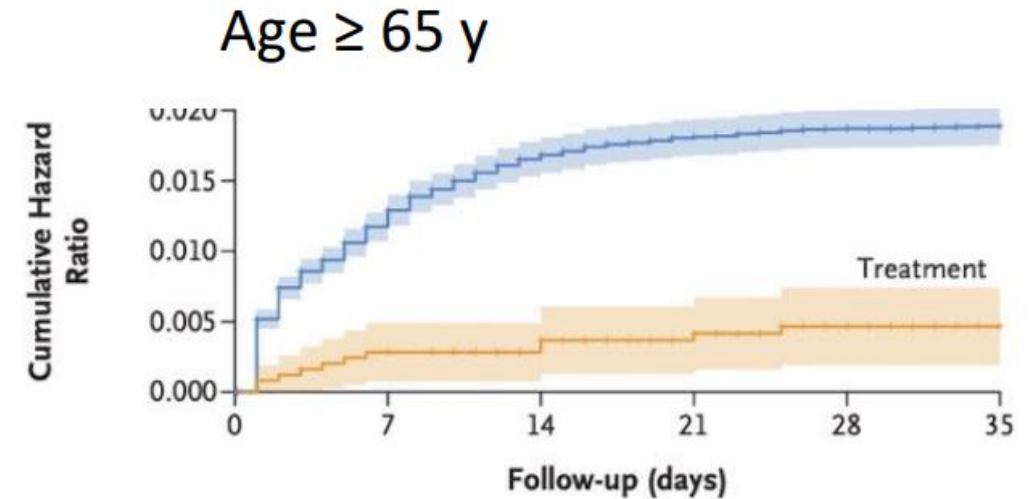
**MMWR**

# Small molecule antivirals anticipated to be active against new variants

	1) Nirmatrelvir/r	2) Remdesivir	3) Molnupiravir
<b>Efficacy</b> (hospitalization/death in <u>unvaccinated, high risk</u> )	<ul style="list-style-type: none"> <li>•Relative risk reduction: <b>88% (EPIC-HR)</b></li> <li>•Absolute risk: 6.3%→0.8%</li> <li>•NNT: 18</li> </ul>	<ul style="list-style-type: none"> <li>•Relative risk reduction: <b>87% (PINETREE)</b></li> <li>•Absolute risk: 5.3%→0.7%</li> <li>•NNT: 22</li> </ul>	<ul style="list-style-type: none"> <li>•Relative risk reduction: <b>30% (MOVE-OUT)</b></li> <li>•Absolute risk: 9.7%→6.8%</li> <li>•NNT: 35</li> </ul>
<b>Pros</b>	<ul style="list-style-type: none"> <li>•Highly efficacious</li> <li>•Oral regimen</li> <li>•Ritonavir studied (safe) in pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>•Highly efficacious</li> <li>•Studied in pregnancy</li> <li>•Few/no drug interactions</li> </ul>	<ul style="list-style-type: none"> <li>•Oral regimen</li> <li>•Not anticipated to have drug interactions</li> </ul>
<b>Cons</b>	<ul style="list-style-type: none"> <li>•Drug drug interactions</li> </ul>	<ul style="list-style-type: none"> <li>•Requires IV infusion on 3 consecutive days</li> </ul>	<ul style="list-style-type: none"> <li>•Lower efficacy</li> <li>•Concern: mutagenicity</li> <li>•Not recommended in pregnancy/children</li> </ul>

# Nirmatrelvir/r in People with Previous Immunity

- Retrospective cohort study in Israel
- N/r (n=3902); No N/r (n=105,352)
- ~80% had previous immunity (vaccination, prior infection, both)
- $\geq 65$  y: hospitalization less likely in treated group (hazard ratio, 0.27). Benefit regardless of previous immunity status.
- Patients aged 40–64, hospitalizations similar in treated and untreated groups





# Molnupiravir (MOV) in Vaccinated Adults: PANORAMIC

- Open-label, randomized controlled trial in UK, Dec 2021 to April 2022
- $\approx 25,000$  non-hospitalized adults with COVID and symptoms for  $\leq 5$  days
- MOV + usual care vs. usual care
- Aged  $\geq 50$  y or  $\geq 18$  y with high-risk comorbidity
- 94% received  $\geq 3$  COVID vaccine doses
- Hospitalization/death: 1% in both groups
- Time to self-reported recovery: 9 days (MOV) vs. 15 days (usual care)

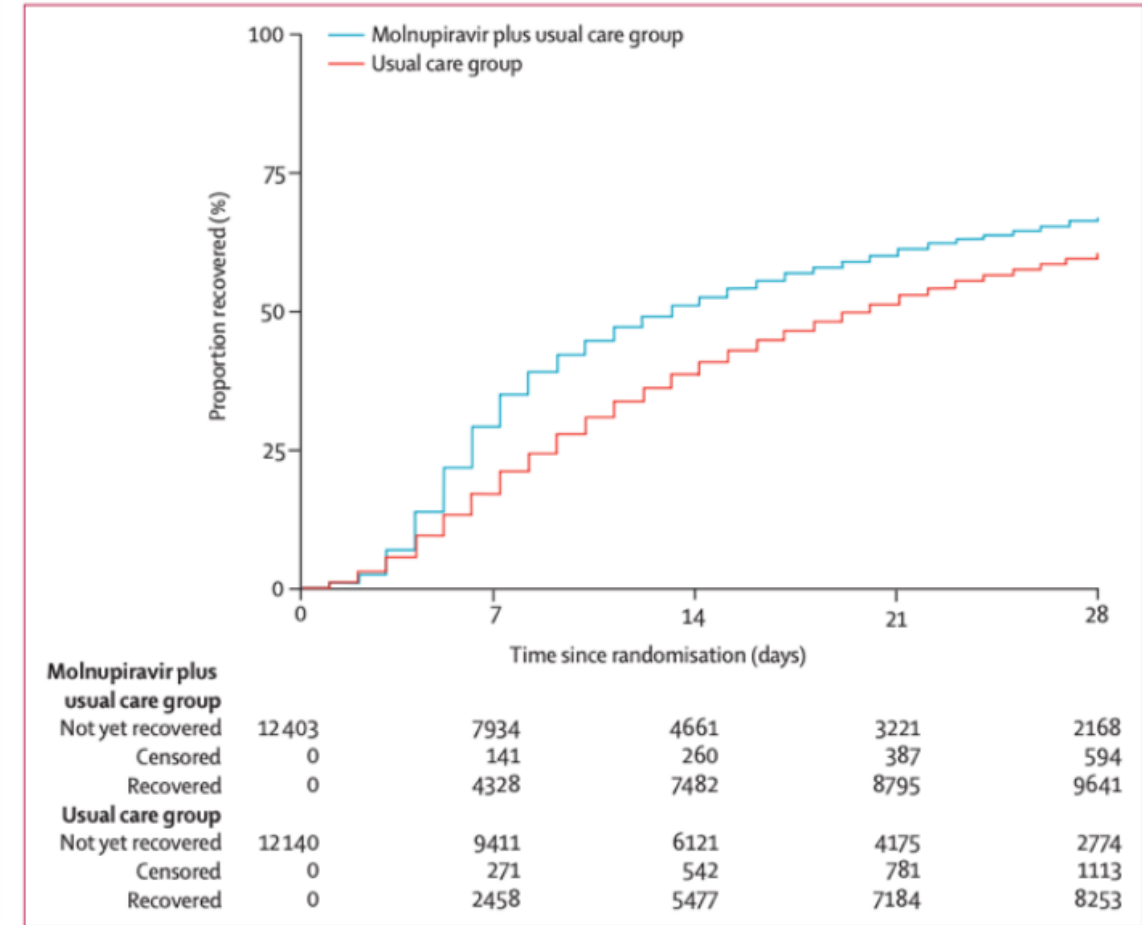
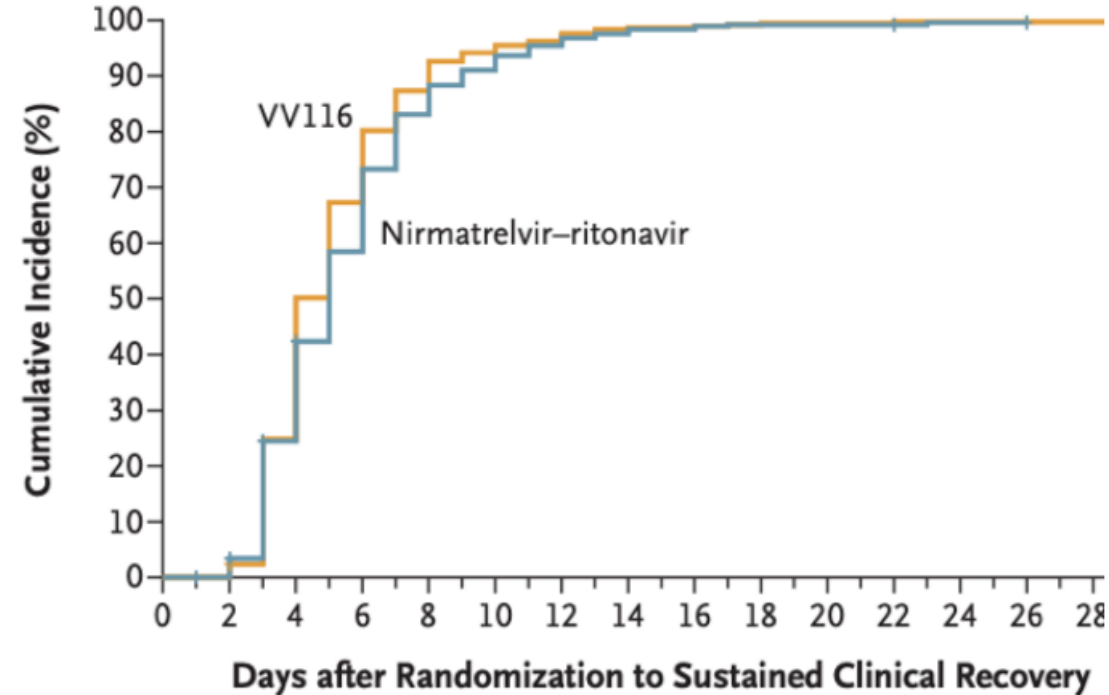


Figure 3: Time from randomisation to first reported recovery from COVID-19

# VV116 vs Nirmatrelvir-Ritonavir (NMV/r)

- VV116: oral remdesivir analogue
- Phase 3, observer-blinded, randomized trial during Omicron outbreak in China
- 771 adults with mild to moderate COVID-19 and high risk of progression to severe disease
- About 75% fully vaccinated or boosted
- Randomized: VV116 or NMV/r for 5 days
- Time to sustained clinical recovery: VV116 non-inferior to NMV/r; median time to symptom resolution was 7 days in both groups
- No deaths or progression to severe disease

**Sustained clinical recovery**  
(alleviation of symptoms for two consecutive days)





# COVID-19 Update

Edward Linn, MD

## 2023:

## Where we are?

## Where are we going?

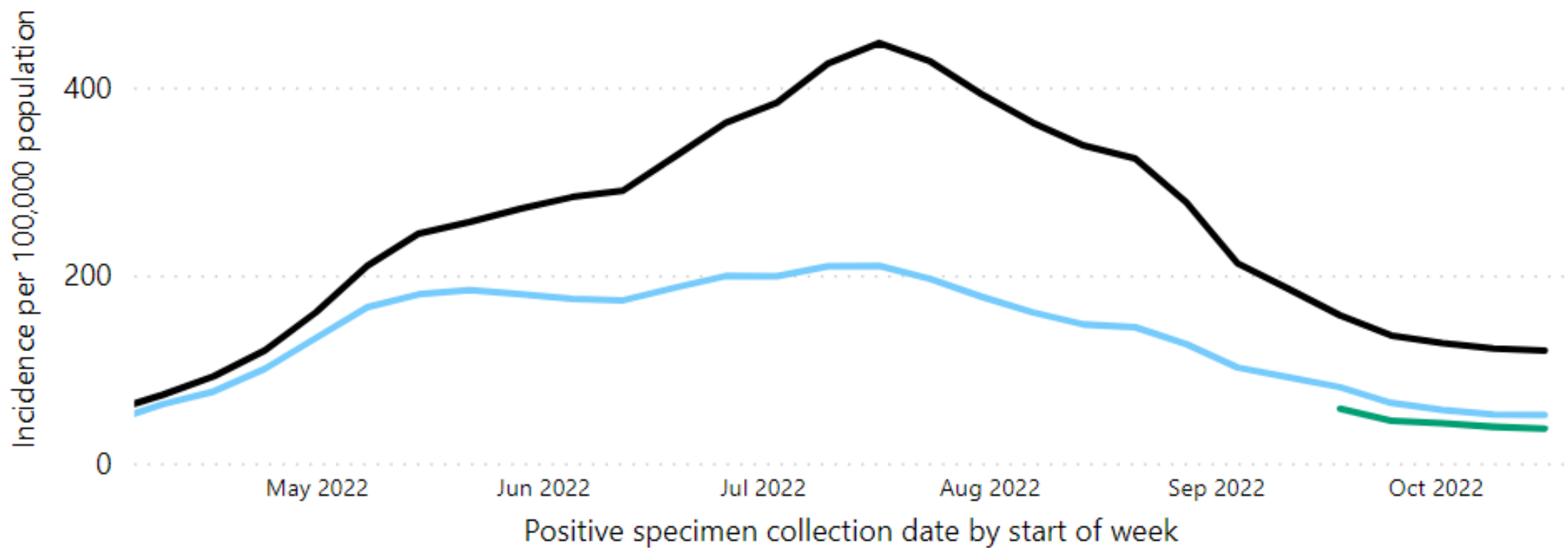
# What We Know About COVID-19 Vaccines

- Safe, well-tested, and effective
- Help prevent of severe illness, hospitalization, and death
- Help protect against long COVID
- The risk of myocarditis is higher from infection itself

## Rates of COVID-19 Cases by Vaccination Status in Ages 12 and Older

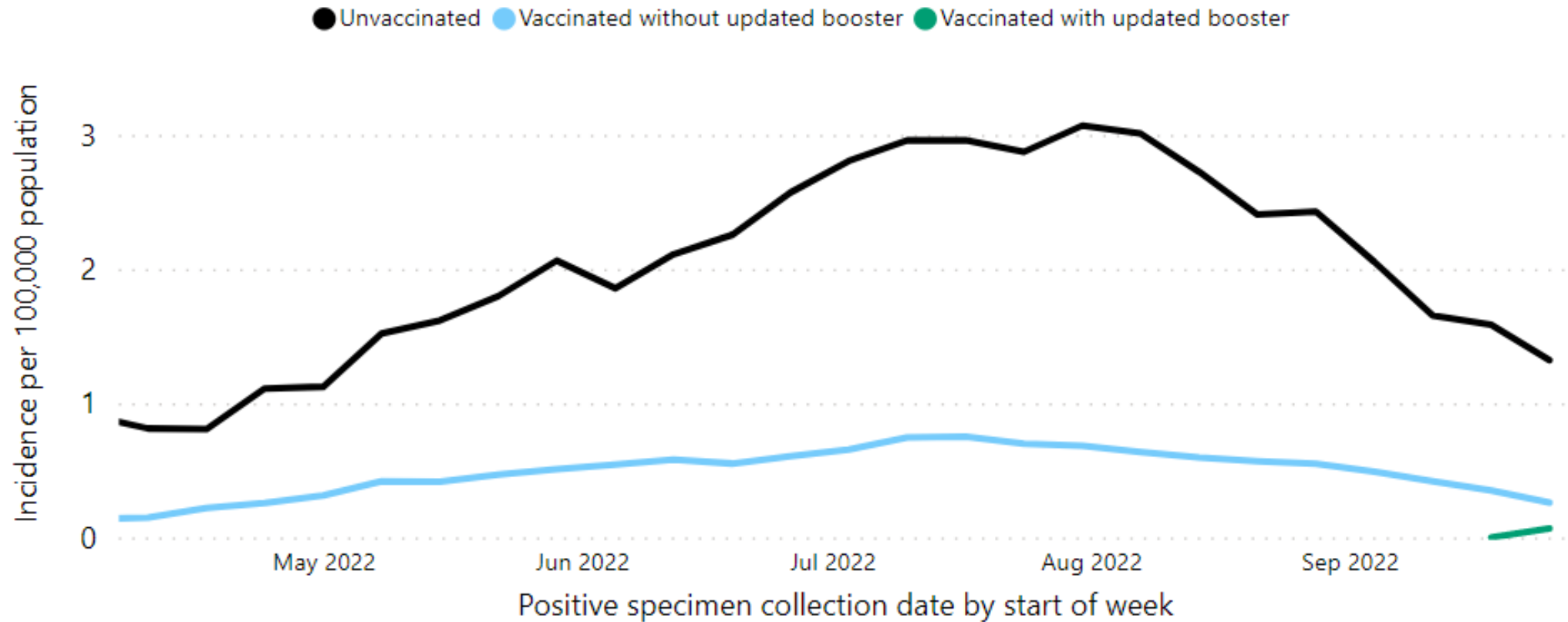
April 03, 2022–October 22, 2022 (21 U.S. jurisdictions)

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



## Rates of COVID-19 Deaths by Vaccination Status in Ages 12 and Older

April 03, 2022–October 01, 2022 (21 U.S. jurisdictions)



# What the Evidence Says

**People aged 12 and older vaccinated with an updated (bivalent) booster had:**

**14.9X**

*lower risk of dying from COVID-19*

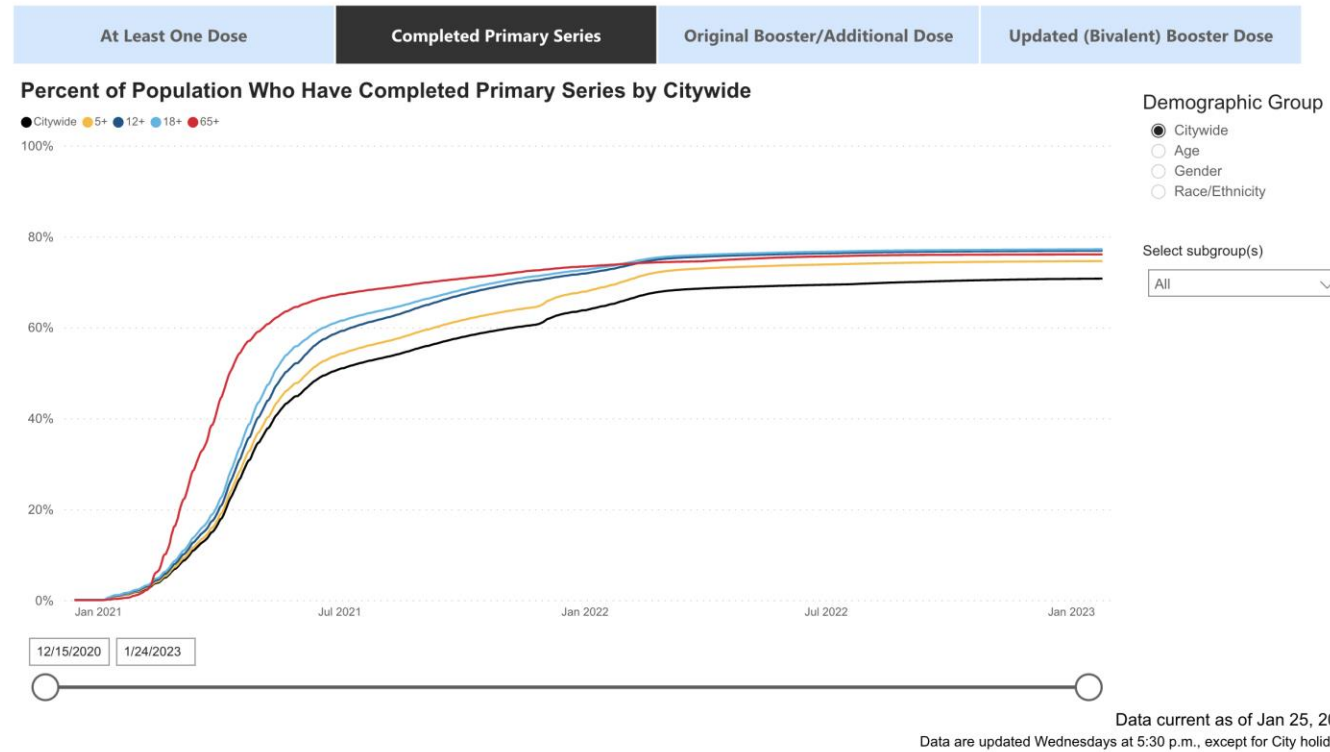
**in September 2022, and**

**3.2X**

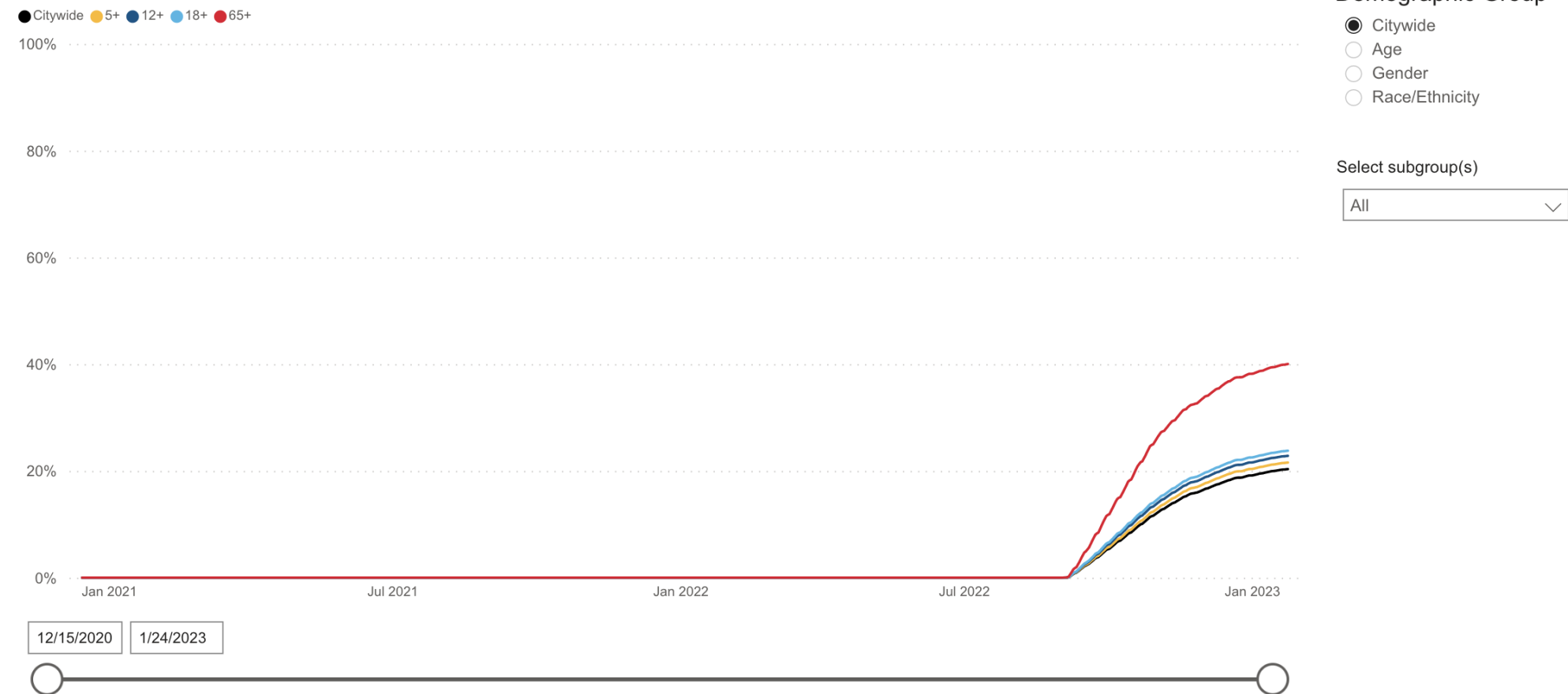
*lower risk of testing positive for COVID-19*

**in October 2022, compared to unvaccinated people.**





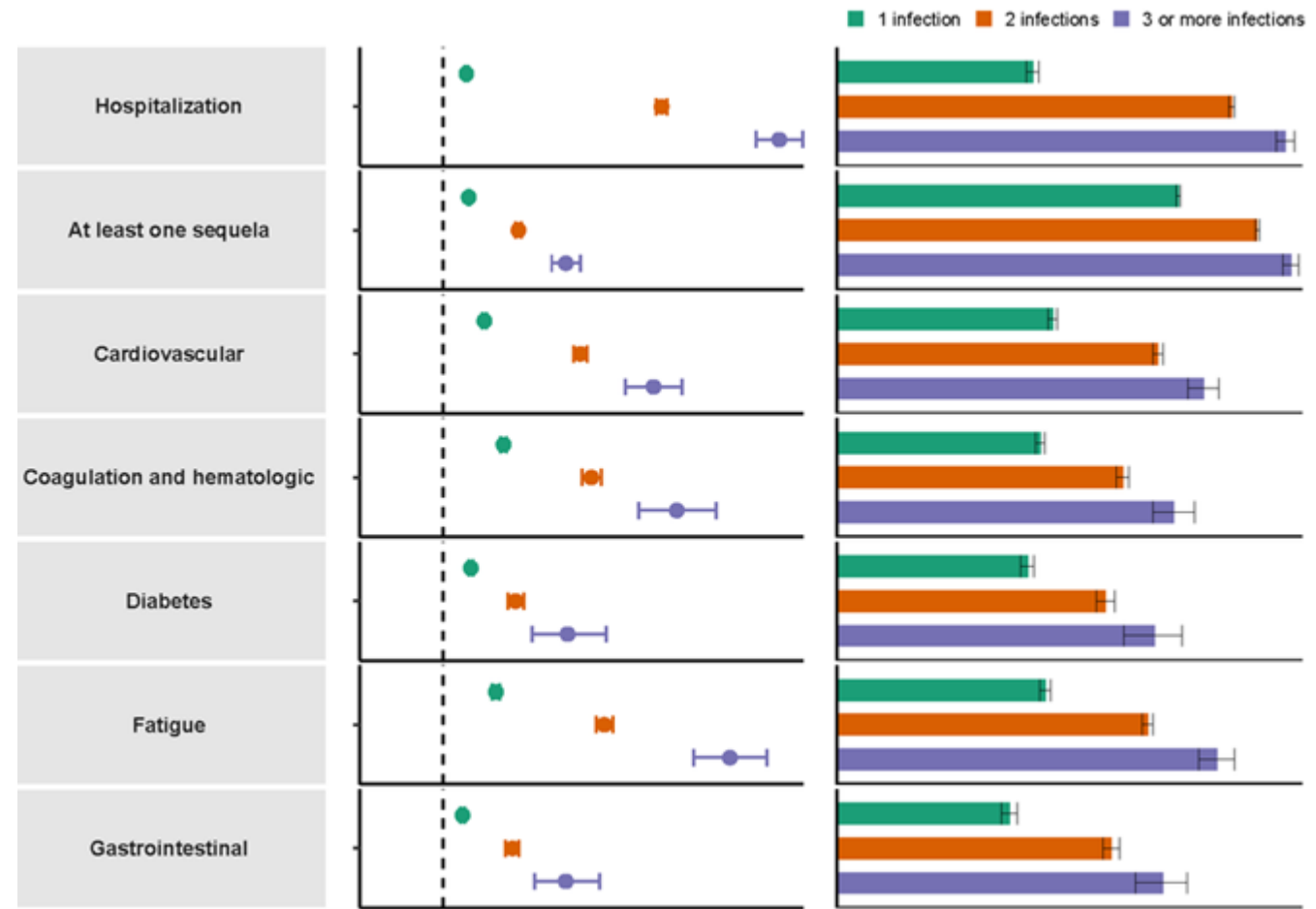
# Percent of Population Who Have Updated (Bivalent) Booster Dose by Citywide



Data current as of Jan 25, 2023.  
Data are updated Wednesdays at 5:30 p.m., except for City holidays.

# COVID-19 Re-infection

- Re-infections are more common due to variants (B.A.2.12.1, BA.4, and BA.5)
- Re-infection contributes additional risks of all-cause mortality, hospitalization, and other adverse health outcomes



# COVID-19 Bivalent “Booster”: Perception v Reality

## Public Perception

- Nationally, only 15% of people age 12 and older and 36% of people age 65 and older have received the latest booster.
- Adults ages 65 and older, who are more vulnerable to negative outcomes from a COVID-19 infection, are more likely than younger adults to express worry about a winter COVID-19 surge (60% vs. 46%) and to worry that they will get seriously sick from the virus (43% vs. 34%).
- About four in ten adults say they have either received the updated bivalent COVID-19 booster dose (22%), which has been available since September, or say they plan to get the new booster as soon as possible (16%).

## Scientific Reality

- Since the start of the pandemic, 1.1 million people in the U.S. have died from COVID-19, with the number of deaths currently rising by 400 per day.(NYT-12/2022)
- Among immunocompetent adults aged  $\geq 65$  years hospitalized in the multistate “IVY Network”, a bivalent booster dose provided 73% additional protection against COVID-19 hospitalization compared with past monovalent mRNA vaccination only. (CDC 11/2022)
- CDC: boosters reduced COVID-19 hospitalizations by [up to 57%](#) for U.S. adults and by [up to 84%](#) for people age 65 and older.
- Vaccines are the “best available protection” against hospitalization and death caused by COVID-19, said Peter Marks, MD, PhD, director of the FDA’s Center for Biologics Evaluation and Research

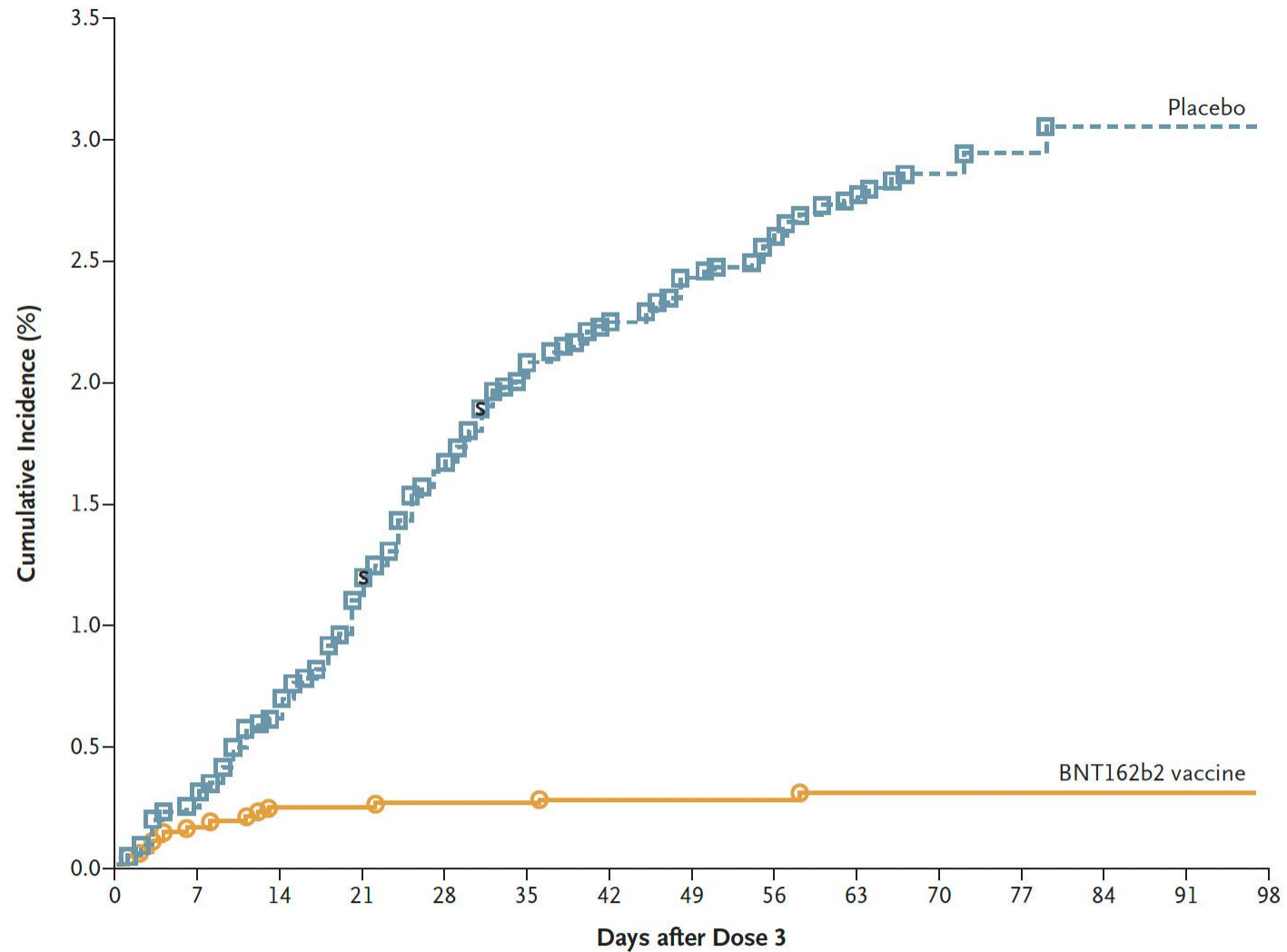
## Bivalent BA.5 Booster Neutralizing Antibody Lab Assessments

Lab	Assay	Bivalent vs. BA.5 Compared to Original	Bivalent vs. XBB Compared to Original^	Citation
Moderna	Live virus	5 to 6-fold improved	4-fold increased	MedRxiv 13 December 2022
Suthar	Live virus	4-fold improved	5-fold increased	NEJM 21 December 2022
Shi	Live virus	3-fold improved	5-fold increased	Nat Medicine 6 December 2022
Zhou/CDC	Live virus	8-fold improved	4-fold increased	bioRxiv 9 January 2023
UT Galveston	Live virus	4-fold improved	2 to 6-fold increased*	bioRxiv 17 November 2022
Ho	Pseudovirus	No difference	Not assessed	NEJM 11 January 2023
Barouch	Pseudovirus	1.3-fold increase	Not assessed	NEJM 11 January 2023
Barouch	Pseudovirus	No difference	Not assessed	bioRxiv 25 October 2022

\*range related to prior Covid or not; ^ by geometric median titer GMT

@erictopol





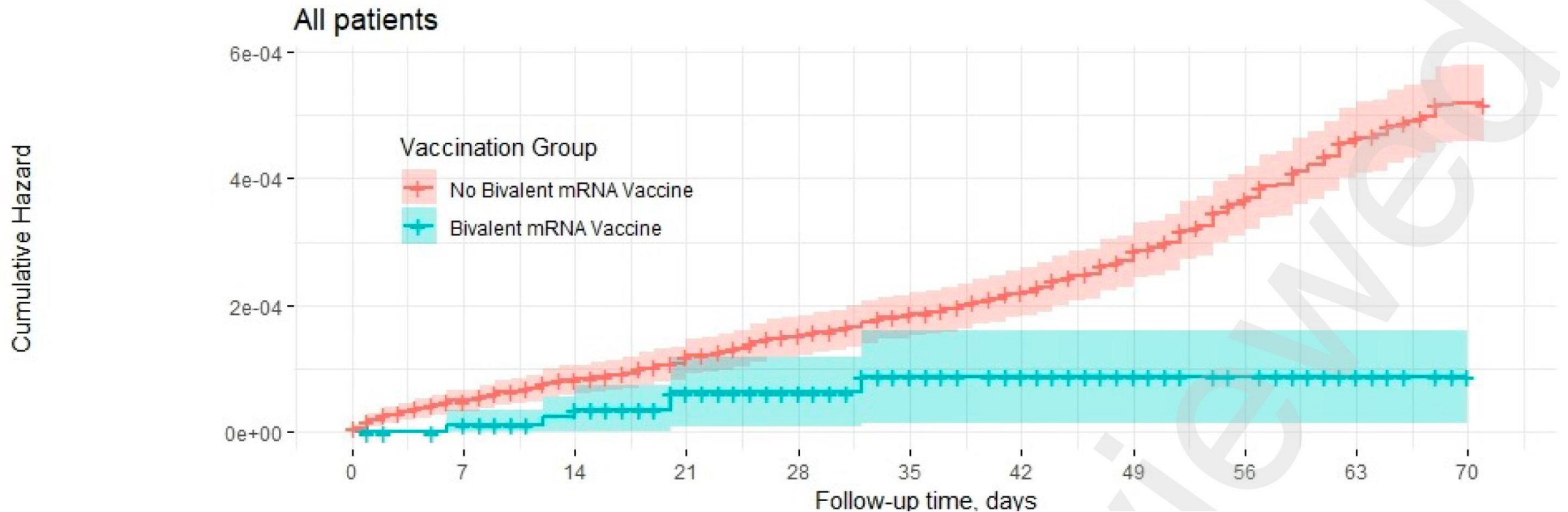
**No. at Risk**

Placebo	4943	4931	4910	4869	4827	4780	4754	4735	4645	4082	2851	1482	204	6	0
BNT162b2 vaccine	5003	4995	4990	4990	4988	4978	4975	4968	4917	4338	3053	1632	236	8	0

N Engl J Med 2022; 386:1910-1921  
DOI: 10.1056/NEJMoa2200674

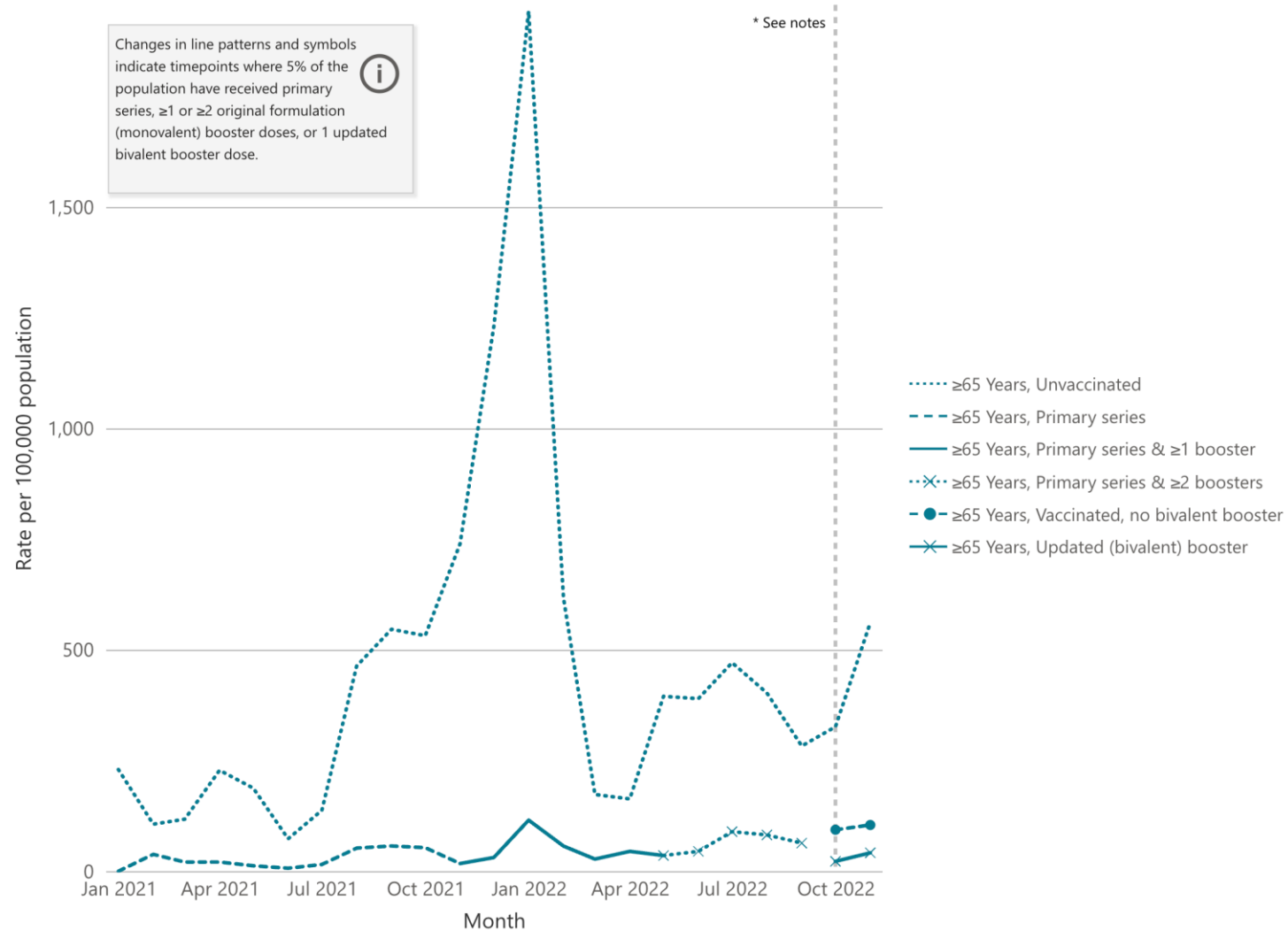
# Recent Israeli Study on the Bivalent Booster

- Among more than 700,000 participants age 65 and older, who either had the bivalent or did not, there was an [81% reduction of Covid hospitalizations](#) (Figure below) and an [86% reduction of deaths](#). During over 70-days follow-up, there were 73 deaths in those without the bivalent and 1 death of a participant who received it (among ~622,000 and 85,000 seniors, respectively).



LANCET Pre-print: Effectiveness of the Bivalent mRNA Vaccine in Preventing Severe COVID-19 Outcomes: An Observational Cohort Study  
Posted: 3 Jan 2023

## Monthly Rates of COVID-19-Associated Hospitalization by Vaccination Status and Age Group, January 2021 - November 2022



These data were posted on December 28, 2022, and reflect hospitalizations through November 2022.

<https://covid.cdc.gov/covid-data-tracker>

# KFF Survey: Reasons for not receiving the booster

- 44% say they do not think they need it.
- 37% say they do not think the benefit is worth it.
- 36% say they have been too busy or have not had the time to get it.
- 23% say they have not gotten the updated booster because they had bad side effects from a previous COVID-19 vaccine dose.
- 17%) vaccinated adults who have not gotten the updated booster say they have not done so because they are waiting to see if COVID-19 cases increase in their area.
- 12% say they are waiting until before they travel or see vulnerable family and friends to get the updated booster.

# Reality: Impact of Politics from KFF Survey

## Democrats

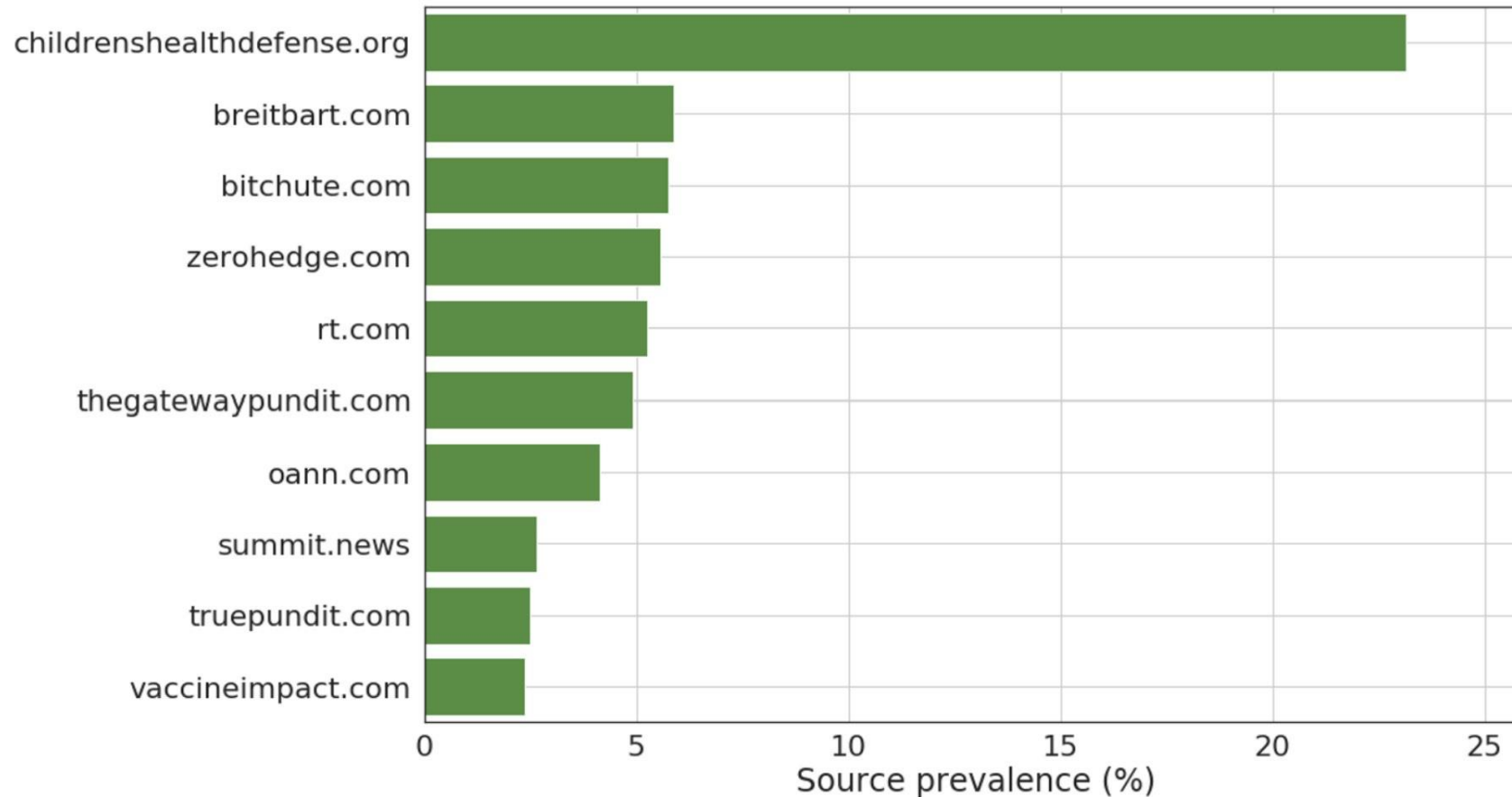
- Democrats also seem eager to get the updated booster with about four in ten (38%) saying they have already done so.
- Democrats are three times as likely as Republicans to report having already gotten the updated COVID-19 booster (38% vs. 12%).

## Republicans

- About three in ten Republicans say they will only get the updated booster if they are required to do so (12%) or say they will “definitely not” get the new COVID-19 booster dose (18%).
- 37% of Republicans are unvaccinated or only partially vaccinated and therefore not eligible for the new updated COVID-19 booster dose.



# Online misinformation is linked to early COVID-19 vaccination hesitancy and refusal



Top low-credibility sources. We considered tweets shared by users geolocated in the U.S. that link to a low-credibility source. Sources are ranked by percentage of the tweets considered

# What does all this mean for the future?

- Significant immune pressure will result in more variants
- Rodents may play an important role as reservoir species
- Vaccine development of highly variable spike glycoprotein will be insufficient to prevent transmission and infection
- “Pan-corona viral” vaccines are required
- Surveillance: Testing strategy is unreliable; future may be wastewater

# Questions?

Next Session: Wednesday, February  
15<sup>th</sup>

For any questions, email us at  
[pgower@peds.bsd.uchicago.edu](mailto:pgower@peds.bsd.uchicago.edu)

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