

COVID Pandemic Updates

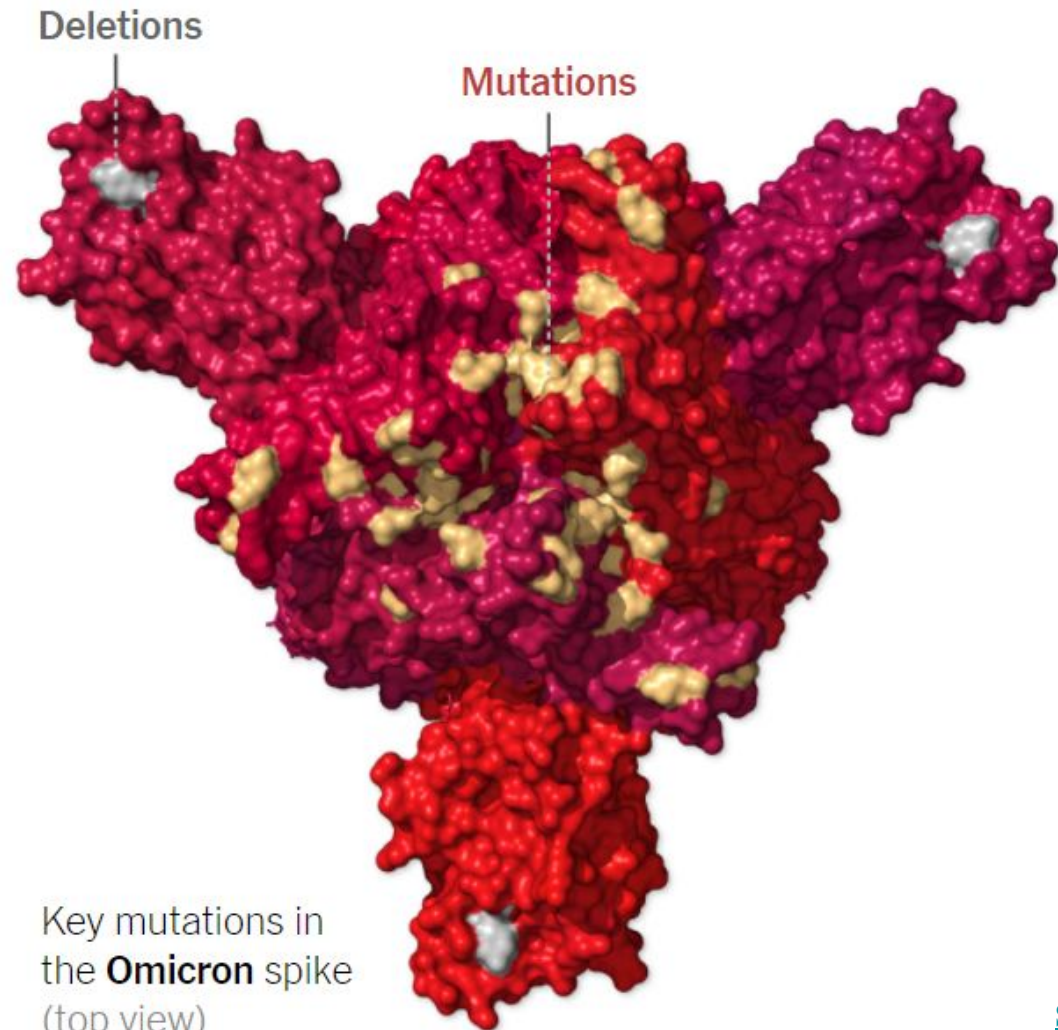
January 7, 2022

AHMC COVID Team

Outline

- 1. New Updates on Omicron and Q&A** **P. 3**
- 2. Updates on New Guidelines and Treatments** **P. 25**
(HHS, CDC, FDA, NIOSH, etc)
- 3. Vaccines and Variants** **P. 43**
- 4. New Cases and Deaths** **P. 52**

1. New Updates on Omicron and Q&A

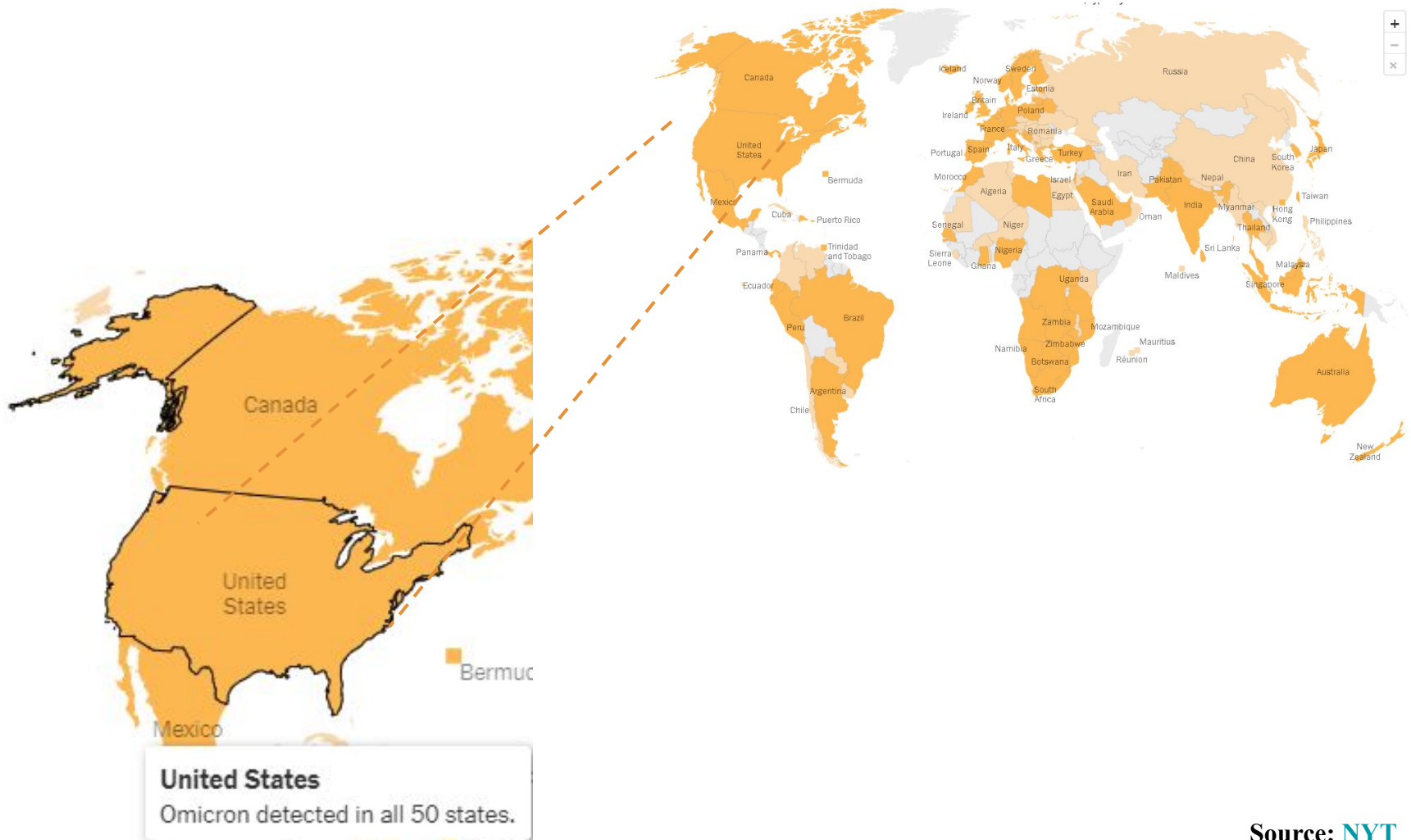


Key mutations in the **Omicron** spike (top view)

The Spread of Omicron Variant Globally

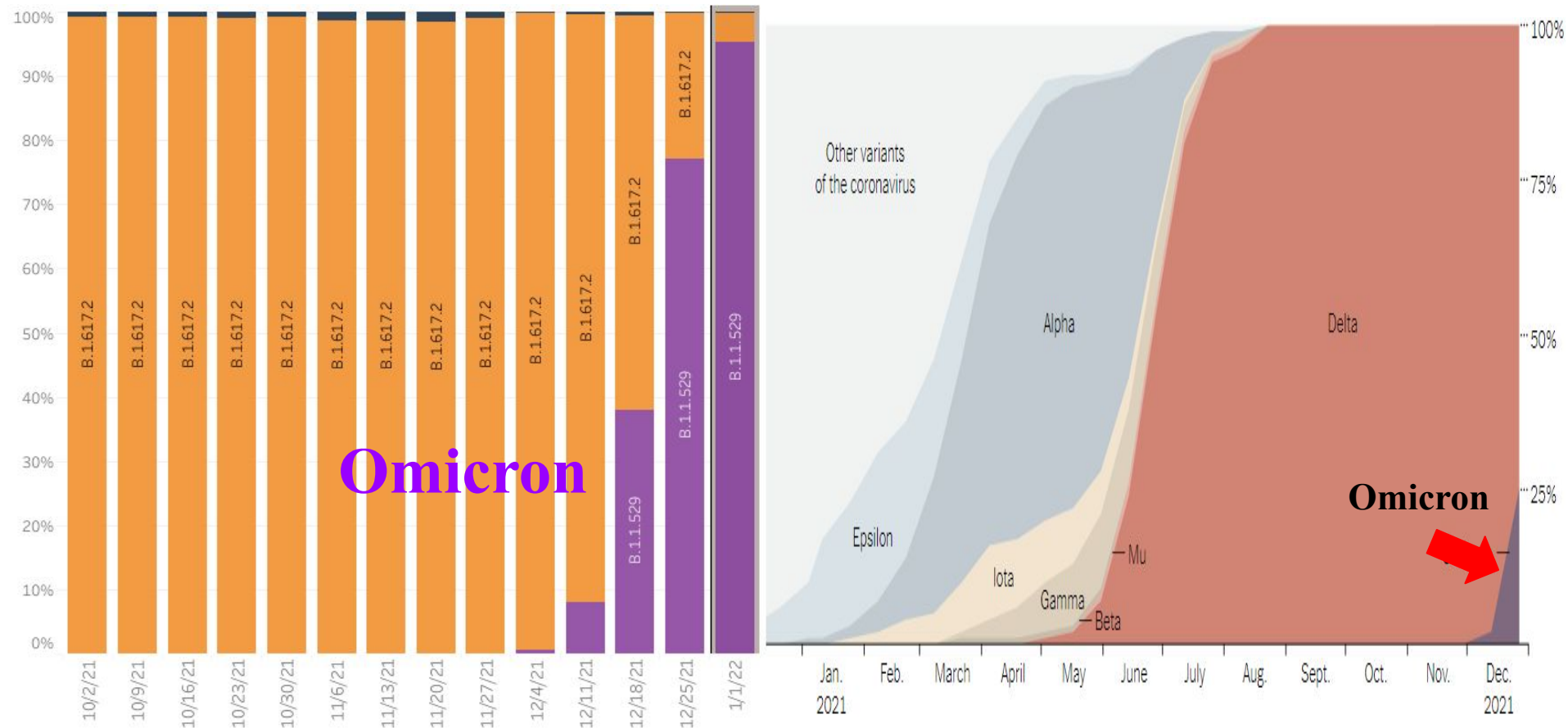
- Tracking on 1/7/2022 (NYT)

- Detected in **128 countries** globally and **50 states** in the US



CDC Data: Omicron Accounts for 95.4% of New Cases in the US (Delta 4.6%)

(CDC; NYT, 1/7/2022)



Symptoms of Original Strain, Delta, and Omicron Variants

(Yale Medicine, 12/21/2021; CDC, 12/17/2021)

Original Strain (CDC, 2/22/2021)

- Fever or chills, Cough, Shortness of breath or difficulty breathing, Fatigue, New loss of taste or smell, etc

Delta (Yale Medicine, 12/21/2021)

- Cough and loss of smell are less common
- Headache, sore throat, runny nose, and fever are more common based on UK data

Omicron (CDC, 12/17/2021)

- 4 most common symptoms: cough, fatigue, congestion and runny nose based on CDC data

CDC New MMWR Report on the Symptoms of Omicron

(CDC, 12/28/2021)

- New MMWR report findings on 12/28/2021 from a cluster of 6 cases of Omicron infections in Nebraska suggest this variant may cause **COVID illness within 3 days of exposure** but lead to **milder symptoms than other variants**
- Early evidence suggests Omicron infection has a **shorter incubation period**, a clinical syndrome **similar to or milder than previous variants**, and an **increased risk for reinfection**



Morbidity and Mortality Weekly Report
December 28, 2021

Investigation of a SARS-CoV-2 B.1.1.529 (Omicron) Variant Cluster —
Nebraska, November–December 2021

Omicron Variant: Impact on **Antigen** Diagnostic Tests

(FDA, 12/28/2021)

- FDA cautioned Covid-19 antigen tests **may be less capable** of detecting the fast-spreading Omicron variant based on preliminary studies
- Early data suggests that antigen tests do detect the omicron variant but **may have reduced sensitivity**
- The presence of mutations in the virus can diminish test performance depending on the sequence of the variant
- The FDA and RADx are continuing to evaluate performance of antigen tests using patient samples **with live virus**

More Kids Hospitalized with COVID-19 as Omicron Spreads

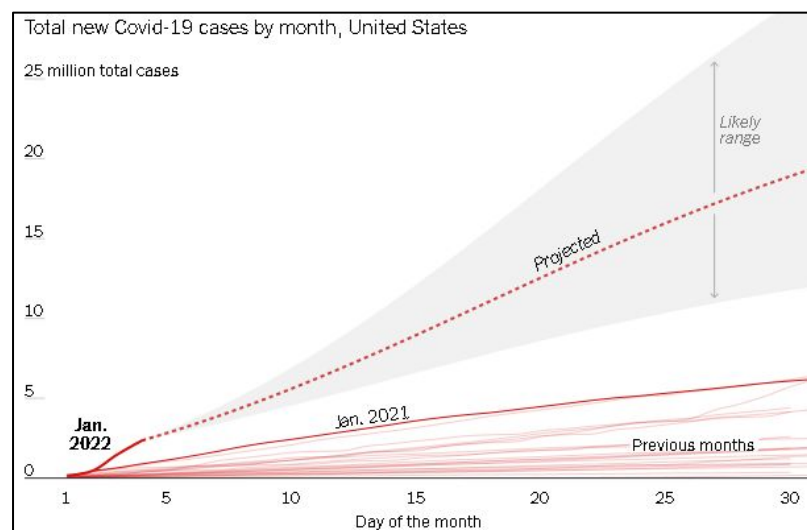
(CBS, 12/28/2021)

- The US is averaging **260 pediatric** COVID hospitalizations a day, **up nearly 30%** from last week
- Health officials said pediatric hospitalizations in NYC rose nearly **five-fold** from the start of Dec and **almost all of those children were unvaccinated**
- In New York state, roughly **27%** of 5-11 y/o are vaccinated. Nationwide, that number **falls to about 23%**
- NY Presbyterian chief pediatrician Dr. Permar said **“this is not just a disease of adults which can be serious enough to be admitted to the hospital”**

Here's When We Expect Omicron to Peak

(NYT 1/6/2022)

- Depict a rapid surge of cases nationally that peaks at record high numbers during **the first one to three weeks** of January
- Due to the **age** of population and **weather** differences, a rapid decline (like South Africa) is not guaranteed
- The implications for hospitalizations and deaths here from the Omicron wave are even **less certain**



Omicron is Spreading Faster than Ever, but New Data Offer Hope (1)

(NYT, 1/3/2021)

Several trends are becoming clearer

1. Omicron seems milder:

Omicron are **far less** likely to be hospitalized than Delta

2. Vaccines, especially boosters, help:

Among symptomatic cases, those who had 3 doses were **88% less likely to be hospitalized** than the unvaccinated

3. Delta remains a threat:

The earlier variant still accounts for a large share of new infections in many countries is significantly more virulent

Omicron is Spreading Faster than Ever, but New Data Offer Hope (2)

(NYT, 1/3/2021)

Here are some other trends to watch for:

1. Hospitalizations rising: In Australia, hospitalizations have **more than doubled** over the past week, to nearly 2,000
2. Risks to older people: In the US, **less than half** of fully vaccinated people over 50 have received a booster dose (CDC)
3. More countries considering a fourth dose: Israel said it would offer a **4th vaccine dose to people age 60 and older**, even though there is so far little evidence about its effectiveness
4. Trouble for the less vaccinated: Poorer nations will be left even farther behind, and ever more vulnerable to Omicron

Hospitalization Outcomes for 4 Waves in South Africa (1)

- Omicron hospitalized were younger, more females, and less severe

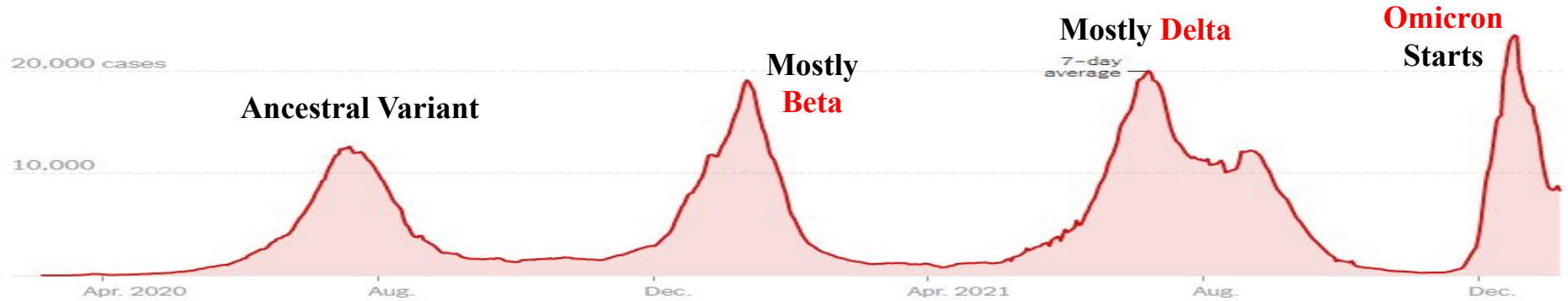
(JAMA, 12/30/2021)

- A South Africa study from a health care group consisting of 49 acute care hospitals (>10,000 beds) examined 4 COVID waves: (1) June-August 2020 (**ancestral variant**), (2) November 2020-January 2021 (**Beta**), (3) May-September 2021 (**Delta**), and (4) November-December 2021 (**Omicron**)
- The most current wave (**Omicron**) compared with earlier waves in South Africa:
 - **Younger patients having fewer comorbidities**
 - **Fewer hospitalizations and respiratory diagnoses**
 - **Decrease in severity and mortality**

Hospitalization Outcomes for 4 Waves in South Africa (2)

- Omicron hospitalized were younger, more females, and less severe

(JAMA, 12/30/2021)

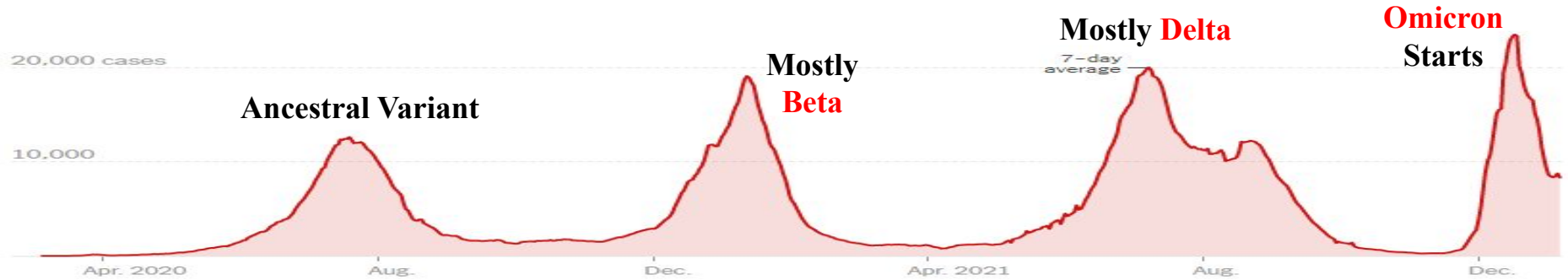


Demographic Characteristics	Wave 1 Jun-Jul 2020 (n=3,875)	Wave 2 Dec 2020 (n=4,632)	Wave 3 Jun 2021 (n=6,342)	Wave 4 Nov-Dec 2021 (n=2,351)	P-Value
Med. Age	53 years	54 years	59 years	36 years	<0.001
Sex (M/F)	1:1.04	1:1.08	1:0.86	1:1.55	<0.001
With Comorbidities	56%	58%	53%	23%	<0.001
With Acute Respiratory Conditions	73%	87%	91%	32%	<0.001

Hospitalization Outcomes for 4 Waves in South Africa (3)

- Omicron hospitalized were younger, more females, and less severe

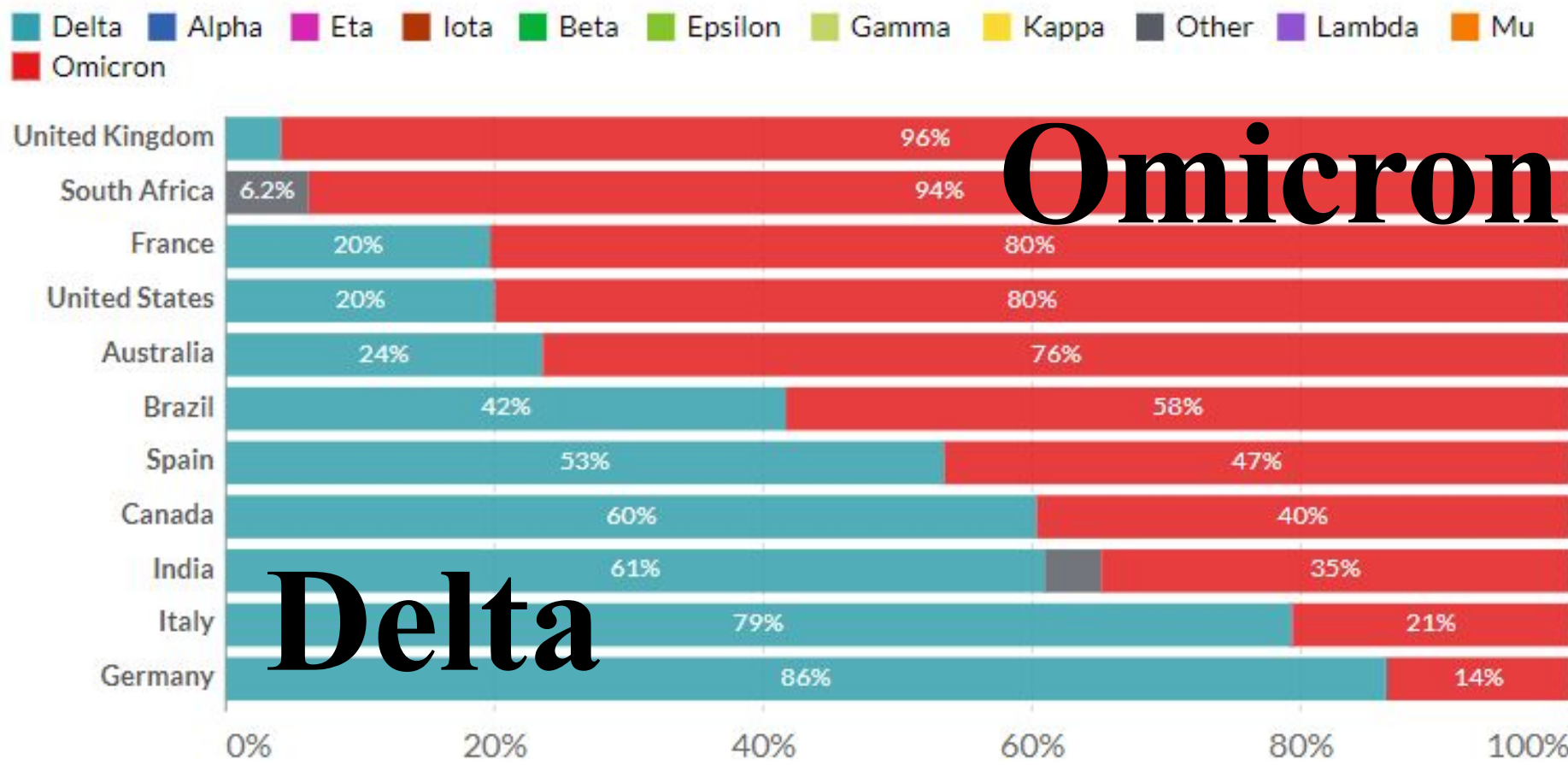
(JAMA, 12/30/2021)



Outcomes	Wave 1 Jun-Jul 2020 (n=2,628)	Wave 2 Dec 2020 (n=3,198)	Wave 3 Jun 2021 (n=4,400)	Wave 4 Nov-Dec 2021 (n=971)	P-Value
Received Oxygene	80%	82%	74%	18%	<0.001
Received Ventilation	16%	8%	12%	2%	<0.001
ICU Admitted	42%	37%	30%	19%	<0.001
Length of Stay	9 days	8 days	7 days	3 days	<0.001
Deaths	20%	26%	29%	3%	<0.001

Q1: Has Omicron already replaced Delta variant?

According to CDC (1/5), Omicron accounts for 95.4% of variant in the US

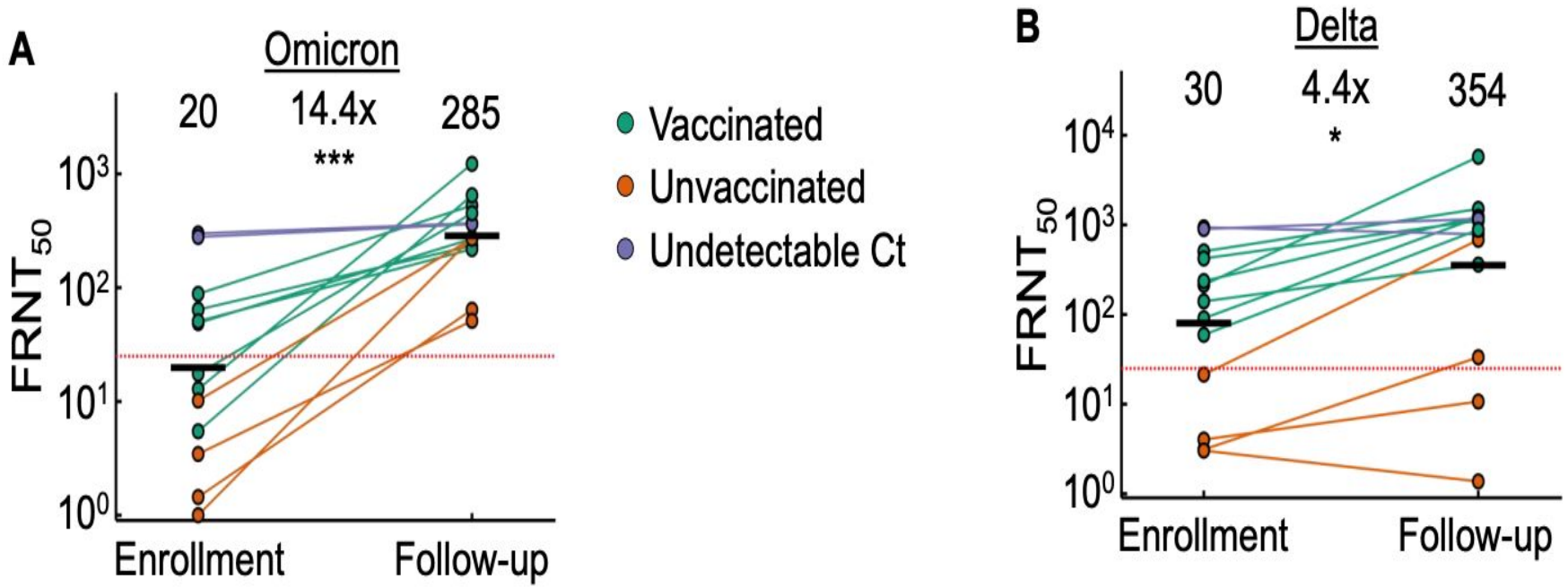


Omicron

Delta

Q2: Can people infected with Omicron enhance their immunity against Delta?

South Africa study showed Omicron variant neutralization increased 14.4-fold and Delta neutralization also increased 4.4-fold after Omicron infection



Q3: Which country has the best policies and responses to the COVID 19 pandemic?

This question addresses social, politic, economic, as well as human right issues; it can be referred to 2 important rankings:

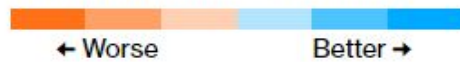
- 1. Bloomberg: 3 dimensions including reopening progress, COVID status, quality of life**
- 2. Our World in Data: Stringency Index**

Bloomberg - 12/22/2021

The Best And Worst Places to Be as The World Finally Reopens

- Chile ranked #1 (74.1), followed by Ireland (72.9), U.A.E. (72.9), Finland (71.6), Canada (70.9), and U.S. #12 (67.1)

Covid Resilience Ranking



Get info and sort on table headers ⓘ

REOPENING PROGRESS COVID STATUS ▼ QUALITY OF LIFE ▼

RANK	CHANGE	ECONOMY	BLOOMBERG RESILIENCE SCORE	VACCINE DOSES PER 100	LOCKDOWN SEVERITY	FLIGHT CAPACITY	VACCINATED TRAVEL ROUTES
1	▲1	Chile	74.1	224.9	41	-17.3%	278
2	▲2	Ireland	72.9	181.2	50	-21.8%	397
3	▼2	U.A.E.	72.9	207.6	52	-27.7%	406
4	▼1	Finland	71.6	166.9	35	-39.4%	402
5	▲2	Canada	70.7	173.7	63	-36.7%	405.5
6	▲8	Colombia	70.4	124.1	47	0.3%	401
7	▼1	Turkey	70.2	150.2	55	-17.2%	397
8	▼3	Spain	70.1	177.5	44	-17.6%	399
9	▼1	Sweden	69.8	165.1	19	-35.4%	240
10	▲2	U.K.	68.3	190.9	49	-35.7%	402.5
11	▼1	Denmark	67.4	185	39	-27.2%	315.5
12	▲1	U.S.	67.1	150.7	48	-11.7%	401

Source: [Bloomberg](#)

COVID-19: Stringency Index

- 1/4/2022

- **Fiji ranked #1 (85.19), followed by Germany (84.26), Greece (80.09), Dominica (79.63), and Italy (76.85). U.S. is #56 (47.69)**

Country	Government Response Stringency Index (0 to 100, 100 = strictest)			
	Jan 22, 2020	Jan 4, 2022	Absolute Change	Relative Change
Fiji	11.11	Dec 20, 2021 85.19	+74.08	+667%
Germany	0.00	Dec 31, 2021 84.26	+84.26	
Greece	0.00	Dec 13, 2021 80.09	+80.09	
Dominica	0.00	Dec 3, 2021 79.63	+79.63	
Italy	0.00	Jan 2, 2022 76.85	+76.85	
China	26.39	Dec 13, 2021 76.39	+50.00	+189%
Jamaica	0.00	Dec 21, 2021 75.93	+75.93	
Canada	2.78	Jan 3, 2022 75.46	+72.68	+2,614%
Suriname	0.00	Dec 26, 2021 75.00	+75.00	
United States	0.00	Dec 13, 2021 47.69	+47.69	

* It does not measure or imply the appropriateness or effectiveness of a country's response. A higher score does not necessarily mean that a country's response is 'better' than others lower on the index. Source: [Our World in Data](#)

Q4: Compare the transmissibility and severity of Omicron and Delta?

- 1. **UK data: Omicron infections are 67% fewer than Delta among those in need of emergency care**
- 2. **South Africa: Omicron infections are 80% fewer than Delta among those requiring hospitalization**

	Delta	Omicron
Transmissibility	Ro = 5-8 (CDC)	<ul style="list-style-type: none"> • 4.2X (Japan study) - 5.4X (UK study) higher than Delta • Multiplies 70X faster in respiratory tract than Delta (Hong Kong study)
Severity	2X hospitalization than original strain (The Lancet)	67% (University of Edinburgh study) - 80% (South Africa study) reduction in hospitalization than Delta

Source: Symptoms ([UC Davis](#); [CDC](#)), Transmissibility ([CDC](#); [Japan study](#); [UK study](#); [Hong Kong study](#)), Severity ([The Lancet](#); [University of Edinburgh study](#); [South Africa study](#))

Q5: Compare the effectiveness of COVID vaccines against Omicron?

1. The risks of both infection and hospitalization decreased after full vaccination
2. Full vaccination (2-24 weeks after) reduced 18% infection and 67% hospitalization
3. Booster (2+ weeks after) reduced 63% infection and 68% hospitalization

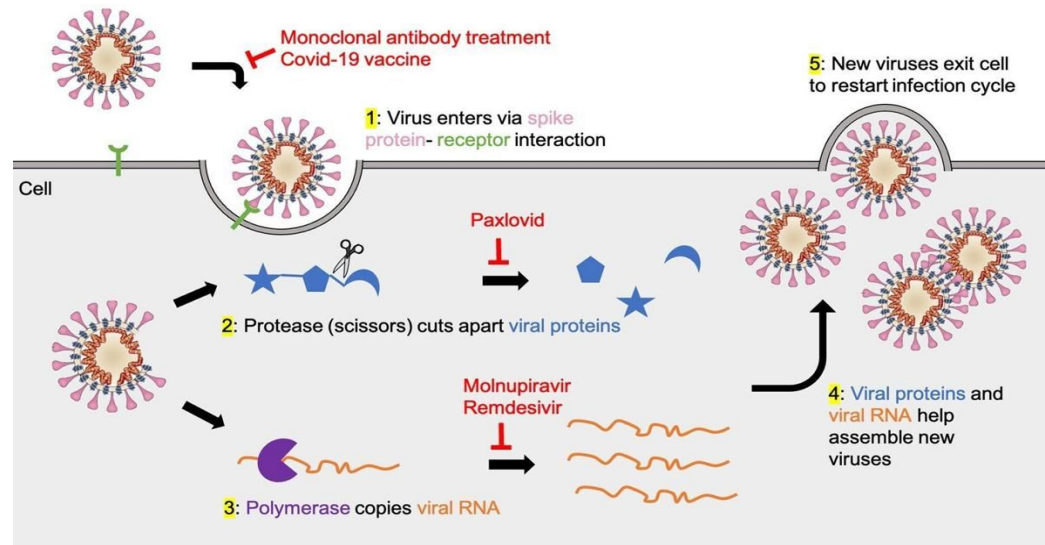
	Dose 1	Dose 2	Dose 2	Dose 3
Time after injection	4+ weeks	2–24 weeks	25+ weeks	2+ weeks
Infection risk reduced	26% less risk	18% less risk	2% less risk	63% less risk
Hospitalization risk reduced	35% less risk	67% less risk	51% less risk	68% less risk

Q6: Is Delmicron the Neutralized Variant of Delta and Omicron?

1. **Delmicron is not a new variant** (informal definition), it's a simultaneous infection of Delta and Omicron
2. The symptoms are **similar to Delta and Omicron**, including, fever, long-term cough, loss of taste and smell, headache, runny nose, and sore throat
3. **Florona is not a new variant** (informal definition), it's a simultaneous infection of COVID and flu. The symptoms are including cough, fever, and runny nose

Q7: Are the medications from Pfizer and Merck effective against Omicron?

- Yes, these medications have different mechanisms that do not target Omicron's mutated spike protein
- The Paxlovid drug inhibits protease and treats Covid by **cutting off viral replication**
- Molnupiravir interferes with viral RNA replication, disrupting the function of many viral proteins and **shutting off viral replication**



[Source](#)

2. Updates on New Guidelines and Treatments



A National Strategy for COVID New Normal

- **Experts' viewpoint on leveraging national resources and capacities for COVID-19 containment**

(JAMA, 1/6/2021)

Testing, Surveillance, and Mitigation Strategies

- sustain a greatly improved public health infrastructure, including a comprehensive, permanently funded system for **testing, surveillance, and mitigation measures that does not currently exist**

Redefining the Appropriate National Risk Level

- The “**new normal**” recognizes **COVID is but one of several circulating respiratory viruses** that include influenza, respiratory syncytial virus (RSV), and more

Vaccines and Therapeutics

- Needs investment in **variant-specific vaccines**, alternative vaccine administration mechanisms, and research into the optimal vaccination strategies

NIH New Guideline (1): Tixagevimab + Cilgavimab (Evusheld) for **Pre-Exposure Prophylaxis** Treatment (NIH, 1/5/2022)

- On December 8, 2021, FDA issued EUA for the anti-SARS-CoV-2 **monoclonal antibodies (mAbs) tixagevimab plus cilgavimab (Evusheld)**
- The EUA allows this combination to be used as **pre-exposure prophylaxis (PrEP)** in certain individuals who, if infected, are at high risk of progressing to severe COVID-19
- The Panel recommends **using tixagevimab plus cilgavimab as PrEP** for adults and adolescents (aged ≥ 12 years and weighing ≥ 40 kg) who do not have infection, who have not been recently exposed to an individual with infection

NIH New Guideline (2): Therapies for High-Risk, Nonhospitalized Patients With Mild to Moderate COVID-19

(NIH, 12/30/2021)

- The FDA recently issued EUAs that allow 2 oral antiviral agents (**Paxlovid and Molnupiravir**) to be used as treatments for COVID in nonhospitalized patients with mild to moderate COVID
- The Panel's recommendations **take into account the efficacies of these drugs and the high prevalence of Omicron** variant of concern (VOC)
- The Panel's current outpatient treatment recommendations:
 - **Paxlovid** (nirmatrelvir 300 mg plus ritonavir 100 mg) orally twice daily for 5 days
 - **Sotrovimab** 500 mg administered as a single intravenous (IV) infusion
 - **Remdesivir** 200 mg IV on Day 1 followed by remdesivir 100 mg IV on Days 2 and 3
 - **Molnupiravir** 800 mg orally twice daily for 5 days

NYT's Drug and Treatment Tracker

- The status of 33 COVID-19 drugs and treatments

(NYT, review as of 1/7/2022)

- 12/23/2021: The F.D.A. authorizes Merck's **Molnupiravir** for EUA
- 12/22/2021: The F.D.A. authorizes Pfizer's **Paxlovid** for high-risk patients
- 12/8/2021: FDA authorized Evusheld (AZD7442) for EUA
- 12/7/2021: Convalescent plasma moved to “**not promising**” after a WHO announcement

We are following 33 coronavirus treatments for effectiveness and safety:



CDC Shortens **Isolation and Quarantine** Recommendations for General Population (1)

(CDC, 12/27/2021)

- If **Tested Positive** (regardless of vaccination status):

Isolation

Day 1-5

Day 6-10



Stay home for 5 days



If you have no symptoms or your symptoms are resolving after 5 days, you can leave your house—**continue to wear a mask** for 5 additional days

CDC Shortens **Isolation and Quarantine** Recommendations for General Population (2)

(CDC, 12/27/2021)

- If **Exposed to COVID**, and you are boosted or have completed primary series within 6 months (Pfizer/Moderna)/2 months (J&J):

Quarantine

Day 1



**Wear a mask
around others
for 10 days**

Day 5



Get tested on Day 5
(if you develop symptoms get a
test and stay home)

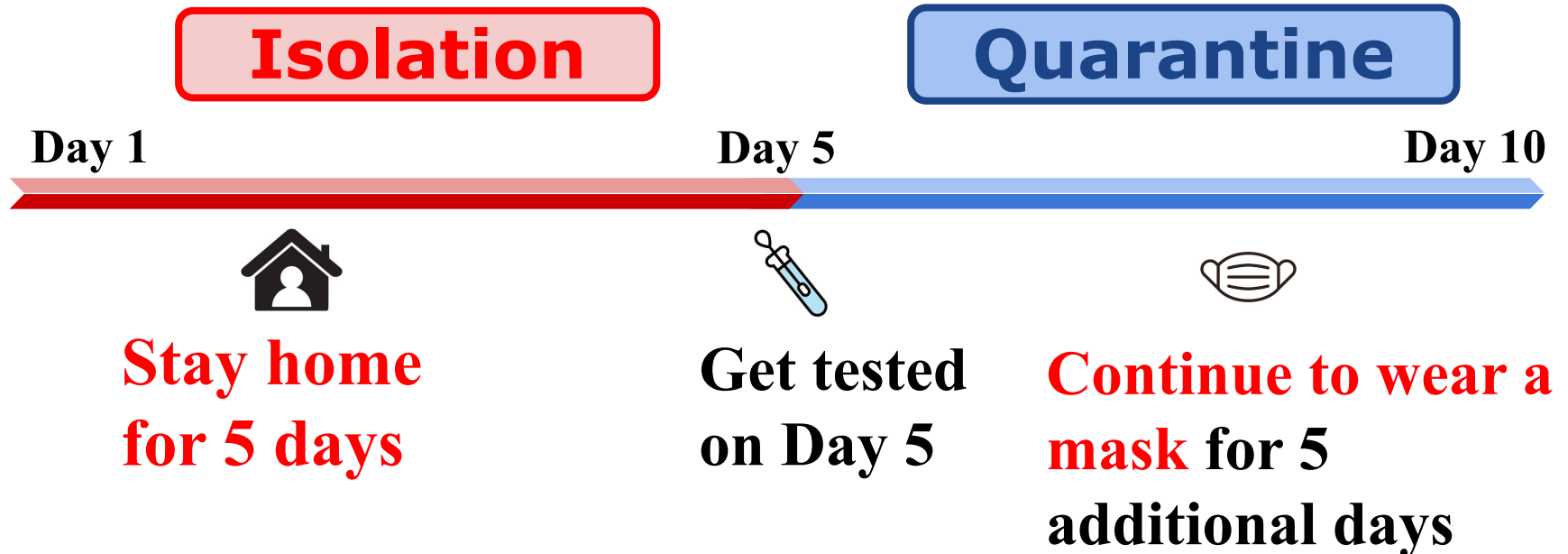
Day 10



CDC Shortens **Isolation and Quarantine** Recommendations for General Population (3)

(CDC, 12/27/2021)

- If **Exposed to COVID**, and you are not boosted or unvaccinated:



COVID-19 Lab Test Update

(CDC, 12/23/2021)

- **After December 31, 2021, CDC withdraw EUA of the CDC 2019-Novel Coronavirus (2019-nCoV) Real-Time RT-PCR Diagnostic Panel**
- **CDC encourages laboratories to consider adoption of a multiplexed method that can facilitate detection and differentiation of SARS-CoV-2 and influenza viruses**
- **The assays can test for both influenza and SARS-CoV-2 and can save both time and resources during influenza season**

False-Positive Results in Rapid Antigen Tests

(JAMA, 1/7/2022)

- A false-positive result was defined as a positive screen on a rapid antigen test and a subsequent negative confirmatory PCR
- There were 903,408 rapid antigen tests with 1,322 positive results (0.15%), of which 1103 had PCR information. The number of false-positive results was 462 (**0.05%** of screens and **42%** of positive test results with PCR information)
- The overall rate of false-positive results among the total rapid antigen test screens for SARS-CoV-2 was **very low**

Early Data Suggests Home Tests Lag with Omicron

- **3 days delay for antigen test to detect Omicron after PCR**
(Becker's Hospital Review, 1/6/2022)

- Findings showed it took an average of three days for the rapid antigen test to detect infection after a participant's first positive PCR test
- Some participants transmitted the virus to others between the time they received a false-negative rapid result and positive PCR result
- Yale School of Public Health: Rapid antigen tests **may not be as fit-for-purpose in routine workplace** screening to prevent asymptomatic spread of omicron, compared to prior variants, given the **shorter time from exposure** to infectiousness and **lower infectious doses for transmission**

Strategies to Mitigate Healthcare Personnel Staffing Shortages

-CDC's mitigation strategies offer a continuum of options for addressing staffing shortages

(CDC, 12/23/2021)

Work Restrictions for HCP With SARS-CoV-2 Infection			
Vaccination Status	Conventional	Contingency	Crisis
Boosted, Vaccinated, or Unvaccinated	10 days OR 7 days with negative test ¹ , if asymptomatic or mildly symptomatic (with improving symptoms)	5 days with/without negative test, if asymptomatic or mildly symptomatic (with improving symptoms)	No work restriction, with prioritization considerations (e.g., asymptomatic or mildly symptomatic)
Work Restrictions for Asymptomatic HCP with Exposures			
Vaccination Status	Conventional	Contingency	Crisis
Boosted	No work restrictions, with negative test on days 2 ¹ and 5-7	No work restrictions	No work restrictions
Vaccinated or Unvaccinated, even if within 90 days of prior infection	10 days OR 7 days with negative test	No work restriction with negative tests on days 1 ¹ , 2, 3, & 5-7	No work restrictions (test if possible)

FDA: Pfizer-BNT Vaccine Expanding Usage

- **Booster expanded to 12-15**
- **Booster for Pfizer-BNT shortened to 5 months**

(FDA 1/3/2021)

- **FDA amended the EUA for the Pfizer-BioNTech COVID-19 Vaccine to:**
 - Expand the use of a single **booster** dose to include use in individuals **12- 15 y/o****
 - Shorten the time between the completion of primary vaccination and a booster dose to **at least 5 months****
 - Allow for a third primary series dose for certain **immunocompromised children 5 through 11 years of age****
- **Children 5 through 11 years of age who are fully vaccinated and are not immunocompromised do not need a third dose at this time, but the FDA will continue to review information and communicate with the public**

FDA: Convalescent Plasma Update

(FDA 12/28/2021)

- **Limits the authorization to the use of convalescent plasma for the treatment **in patients with immunosuppressive disease or who are receiving immunosuppressive treatment****
- **Patients may be treated in outpatient or inpatient settings**
- **FDA revised acceptable tests and increase qualifying result cutoffs with high titers of anti-SARS-CoV-2 antibodies**

FDA-Testing Update

(FDA 12/28/2021)

- Total of **419 tests** and sample collection devices are authorized by the FDA under EUAs
 - a. 290 molecular tests and sample collection devices
 - b. 87 antibody and other immune response tests
 - c. 42 antigen tests
- Home collected tests include
 - a. 67 molecular authorizations
 - b. 1 antibody authorization that can be used with home-collected samples
 - c. 19 EUA for a molecular prescription/ antigen OTC/at-home test

NIOSH's New Mask Study and Recommendation

(Am J Infect Control, 12/30/2021)

- A NIOSH study found specific **face mask combinations and fit modifications** that can be implemented by healthcare workers, patients, and the public to improve mask fit and performance:



Medical Mask



Double Masking



Brace over Medical Mask

Cough Aerosols

>56%

>85%

≥95%

Exhaled Aerosols

>42%

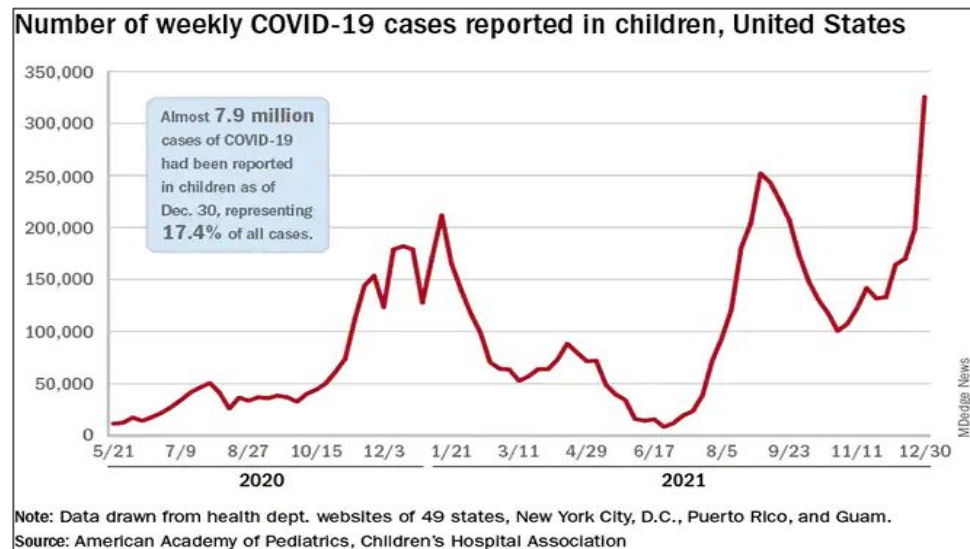
>91%

≥99%

Children and COVID: New Cases, Admissions Are Higher Than Ever

(Medscape, 1/4/2022)

- The rate of new COVID-related hospital admission reached a new high of **0.74 per 100,000 children as of Dec. 31**. The highest rate seen before the current Omicron-fueled surge was **0.47 per 100,000 in early September**
- Over 325,000 new cases of COVID-19 in children were reported during the week ending Dec. 30, surpassing the previous high of 252,000 recorded in early September



Homeschooling and Adolescent Sleep Duration and Health During COVID-19 Pandemic

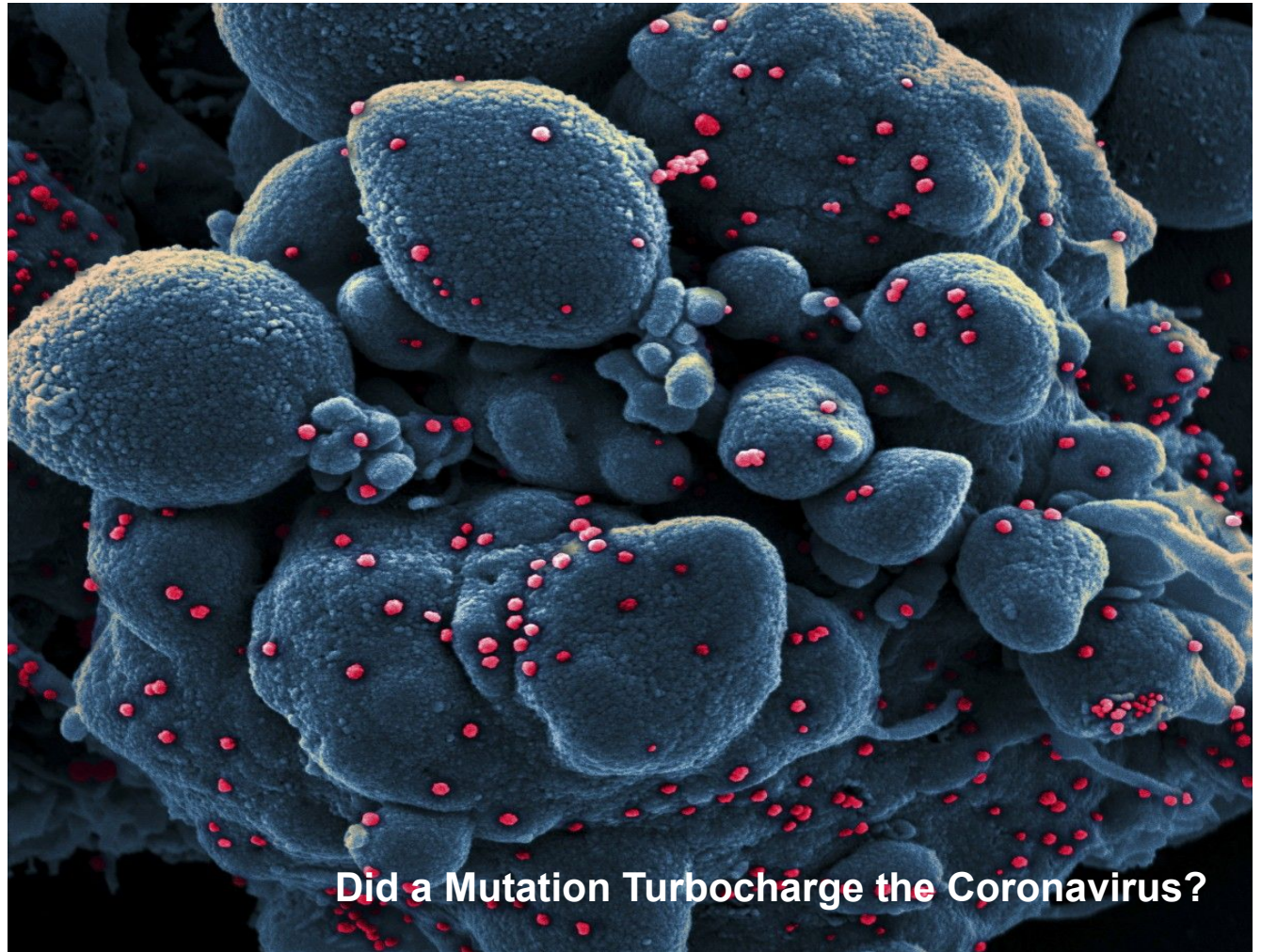
-The adolescent sleep 75 minutes more on school scheduled days during homeschooling (JAMA, 1/5/2022)

- Cross-sectional online surveys among 21 public high schools students in Zurich, Switzerland

Results

- During school closures, the **sleep period** on scheduled days was **75 minutes longer** ($P < .001$) and the **students had better Health-Related Quality of Life (HRQoL)** ($P < .001$) and less consumption of caffeine ($P < .001$) and alcohol ($P < .001$)
- School closure has a negative association with psychological distress
- The beneficial association was increased sleep duration
- **The findings provide support for delaying school start times for adolescents**

3. Vaccines and Variants



The Types of COVID Vaccines and Other Vaccines

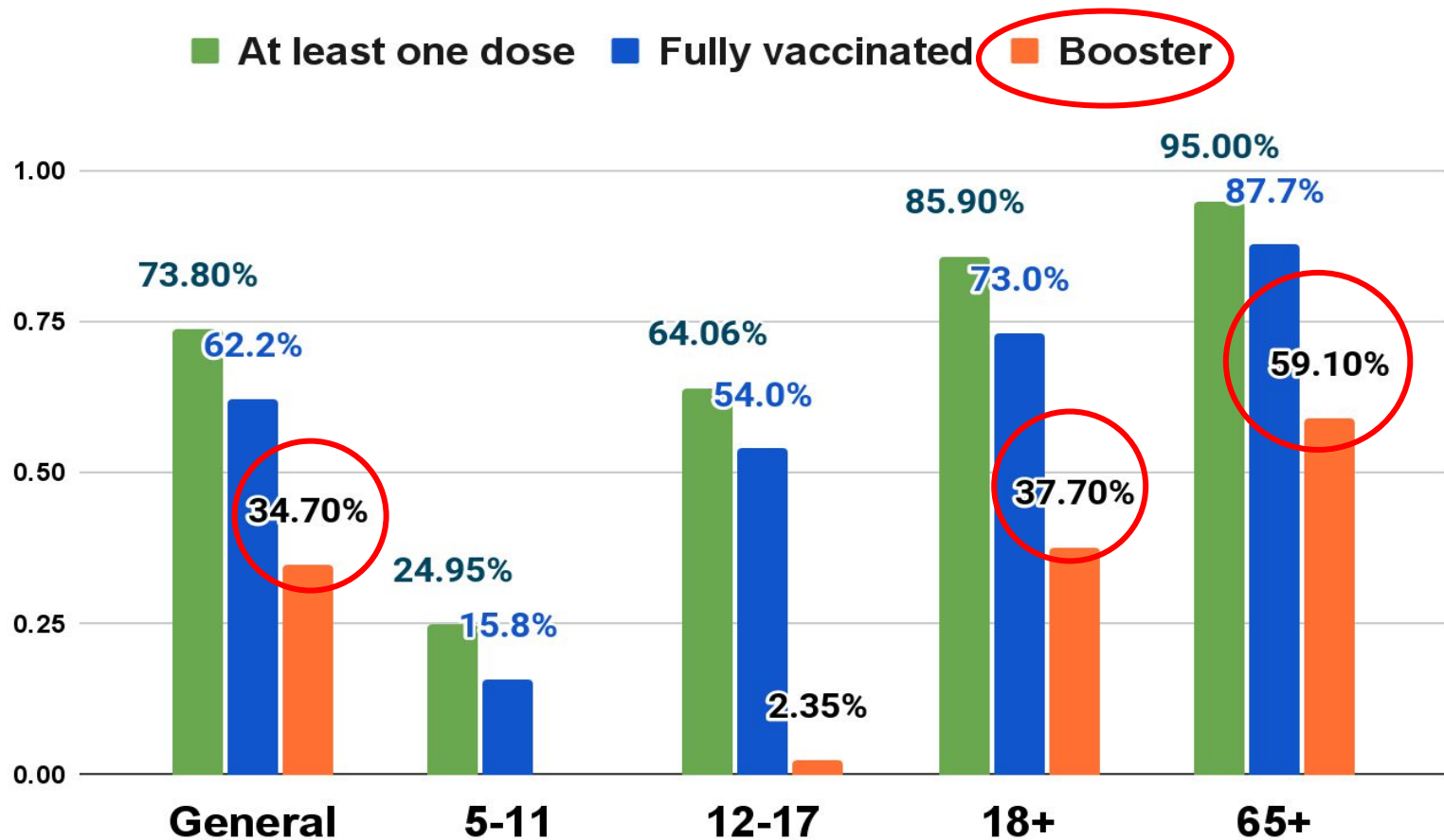
(HHS, 12/20/2021)

Other Vaccines	Other Diseases	COVID-19
Inactive vaccines	Hepatitis A, Flu, Polio	Sinopharm, Sinovac, COVAXIN
Live-attenuated vaccines	MMR, Rotavirus, Smallpox, Chickenpox, Yellow Fever	None
Messenger RNA (mRNA) vaccines	None	Pfizer-BNT, Moderna
Subunit, Recombinant Vaccines	Hepatitis B, Haemophilus influenzae type b, HPV, whooping cough, Pneumococcal disease, Meningococcal disease, Shingles	Covovax (Novavax)
Toxoid Vaccines	Diphtheria, Tetanus	None
Viral Vector Vaccines	Clinical trial: Zika, flu & HIV.....	Janssen (J&J), Oxford-AstraZeneca (AZ)

COVID-19 Vaccinations in the US

Pfizer, Moderna, and J&J

- **Booster accounts for 35% in general population and 59% in 65+ y/o**
(CDC, 1/5/2022)



Variant Classification Scheme

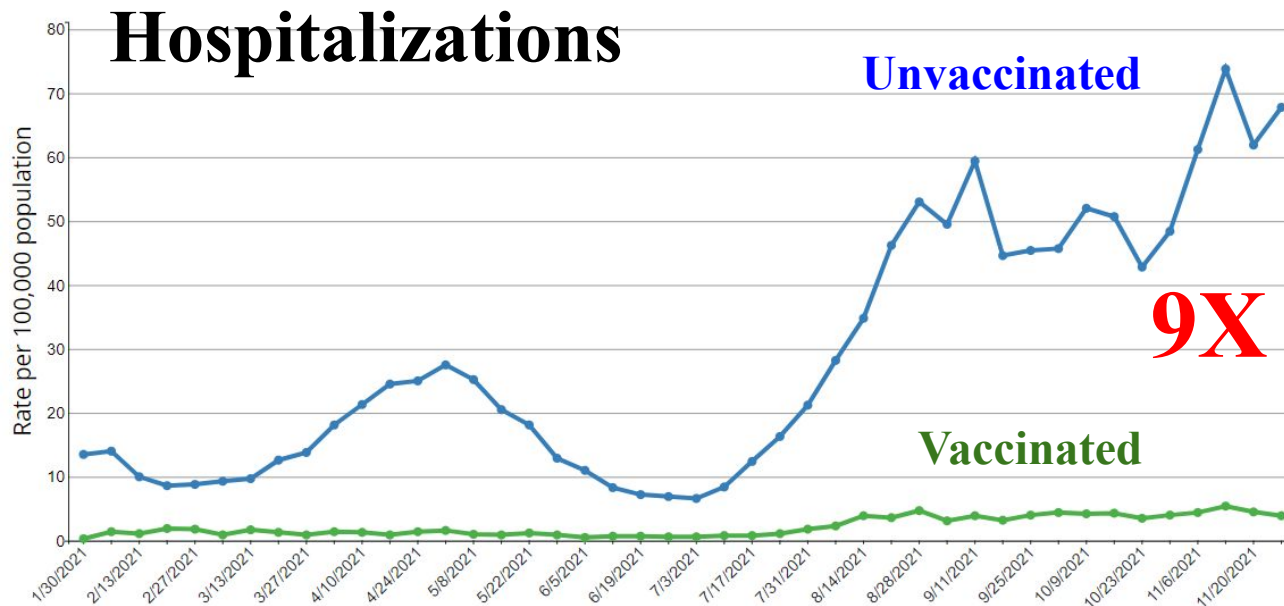
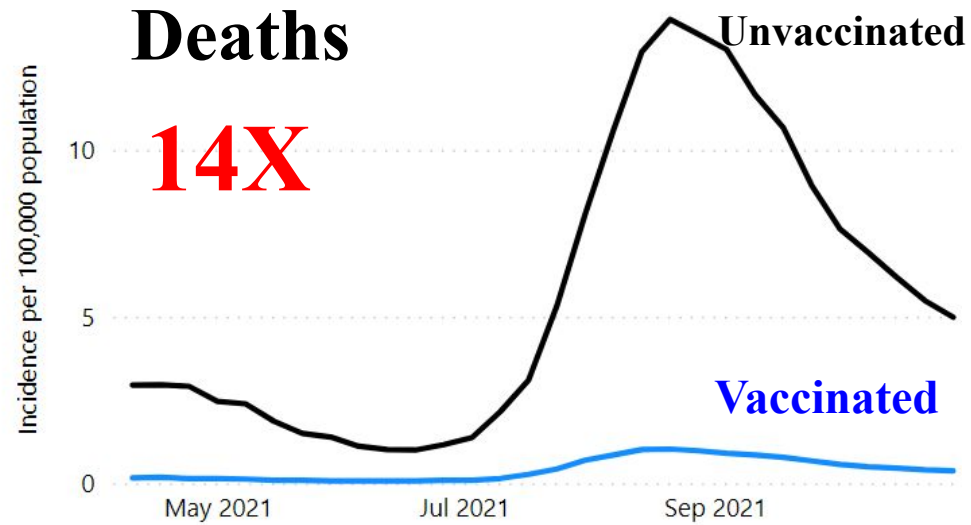
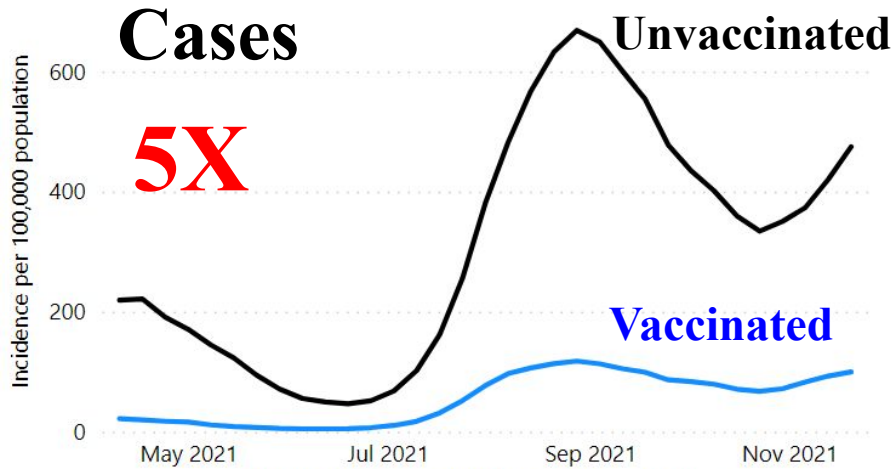
- Omicron listed as VOC by both the WHO and CDC

(CDC & WHO, review as of 12/21/2021)

	CDC	WHO
Variants of Interest (VOI) Increased Community Transmission	None	Lambda (C.37, Peru), Mu (B.1.621, Columbia)
Variants of Concern (VOC) Decreased Effectiveness of Vaccines/Measures	Delta (B.1.617.2, India), Omicron (B.1.1.529, South Africa)	Alpha (B.1.1.7, U.K.), Beta (B.1.351, South Africa), Gamma (P.1, Brazil), Delta (B.1.617.2, India), Omicron (B.1.1.529, South Africa)
Variant of High Consequence (VOHC) Significant Reduction in Vaccine Effectiveness and More Severe Clinical Disease and Increased	None	None
Variants Being Monitored (VBM) VOI and VOC that are no longer detected or are circulating at very low levels in the US	Alpha (B.1.1.7, U.K.), Beta (B.1.351, South Africa), Gamma (P.1, Brazil), Epsilon (B.1.427, B.1.429), Eta (B.1.525), Iota (B.1.526), Kappa (B.1.617.1), Zeta (P.2), Mu (B.1.621, B.1.621.1)	N/A

Rates of Case, Death, and Hospitalization by Vaccination Status

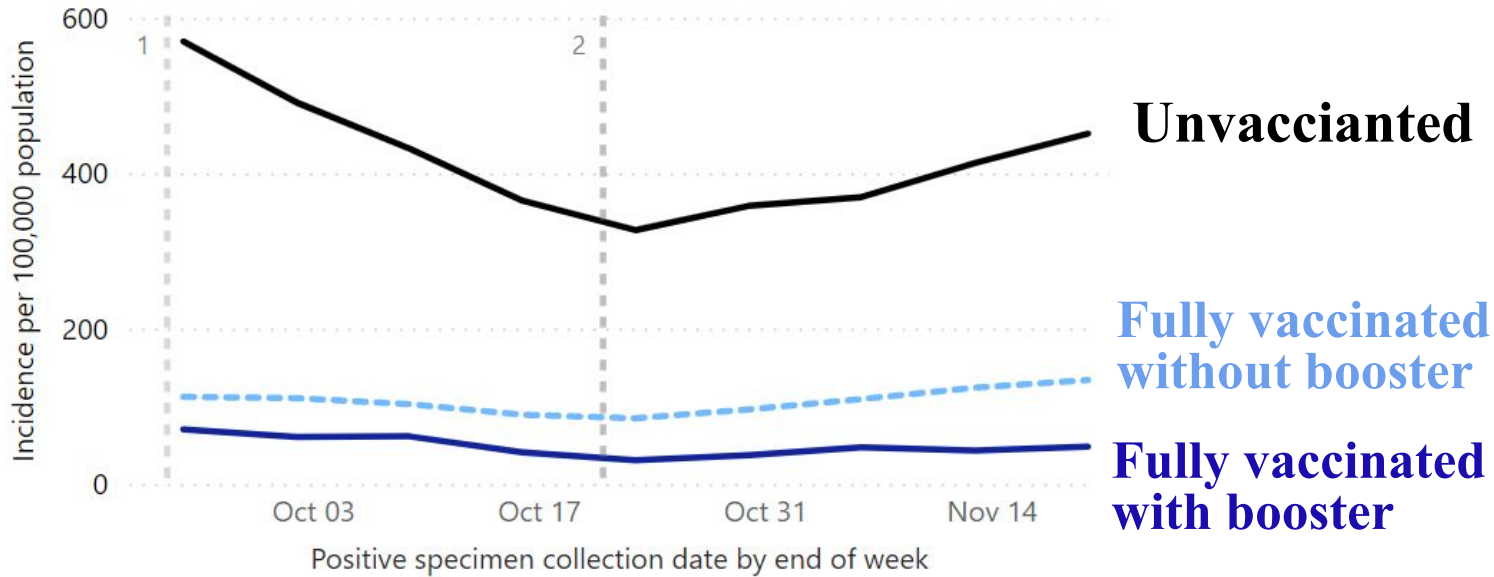
(CDC, 1/7/2022)



Rates of Case and Death by Vaccination Status (Booster)

(CDC, 1/6/2022)

September 19 - November 20, 2021 (17 U.S. jurisdictions)



In October, unvaccinated persons had:

10X

Risk of Testing Positive for COVID-19

AND

20X

Risk of Dying from COVID-19

compared to fully vaccinated persons with additional or booster doses

FDA and CDC Expand COVID-19 Booster Recommendations to 16-and-17-year-olds

(CDC; FDA, 12/9/2021)

- **FDA** amended the EUA for the Pfizer-BNT vaccine, **authorizing the use of a single booster dose for individuals 16 and 17 years of age** at least six months after primary vaccinations
- **CDC** is strengthening its booster recommendations and encouraging everyone 16 and older to receive a booster shot. Initial data suggests that boosters help **broaden and strengthen the protection against Omicron** and other variants

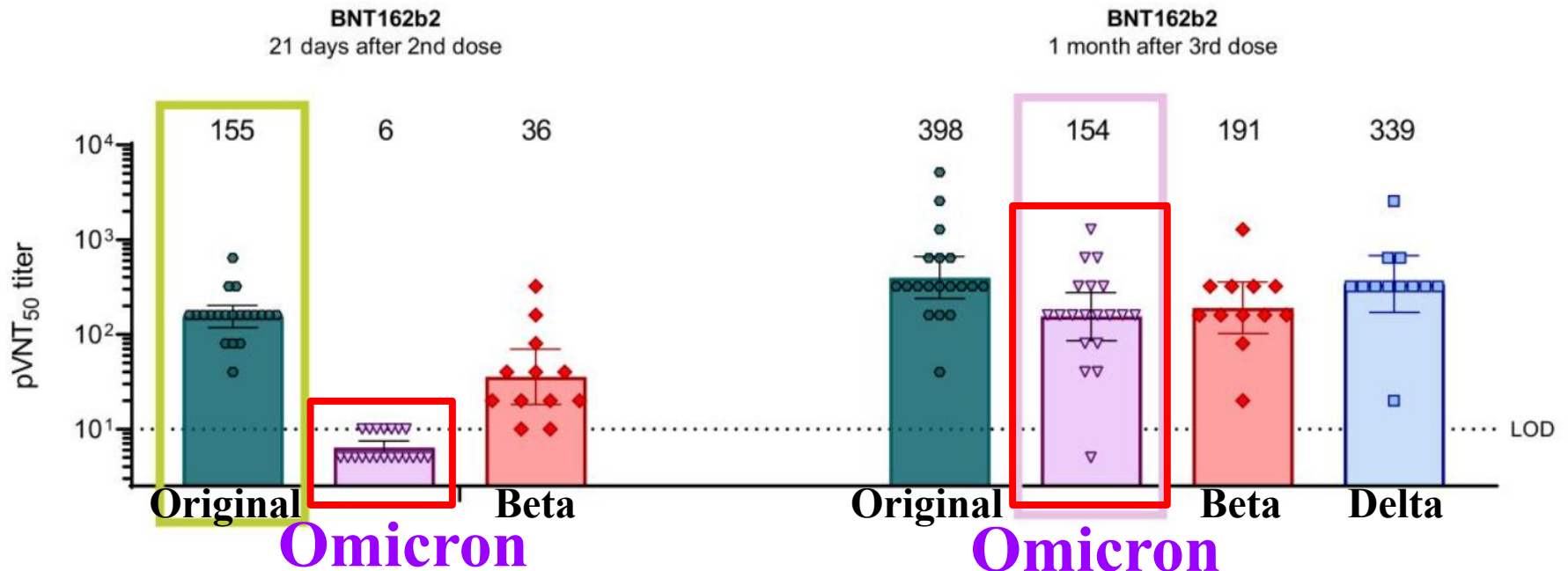
Pfizer-BNT New Updates on Omicron Variant

-Booster doses induced a 25-fold increase in neutralizing antibody titer against Omicron

(Pfizer-BNT, 12/8/2021)

Non-Booster (=6)

Booster (=154)



- Wuhan
- Omicron Variant
- Beta Variant
- Delta Variant

Note: pseudovirus neutralization test (pVNT) was used with the full set of Omicron spike mutations in a pseudovirus system that recapitulates SARS-CoV-2 virus binding, cell entry and trafficking. Each serum was tested simultaneously for its 50% pseudovirus neutralizing titer (pVNT₅₀) against the wild-type and the Omicron variant.

Moderna 3rd Dose Effective against Omicron

(U.S.A. Today, 12/20/2021)

- Moderna said a group that received a 3rd dose **100 microgram** (primary 50 microgram) saw an **83-fold jump** in neutralizing antibodies against Omicron
- Pfizer-BNT study released earlier showed that a 3rd dose boosted neutralizing antibodies against Omicron **more than 25-fold**

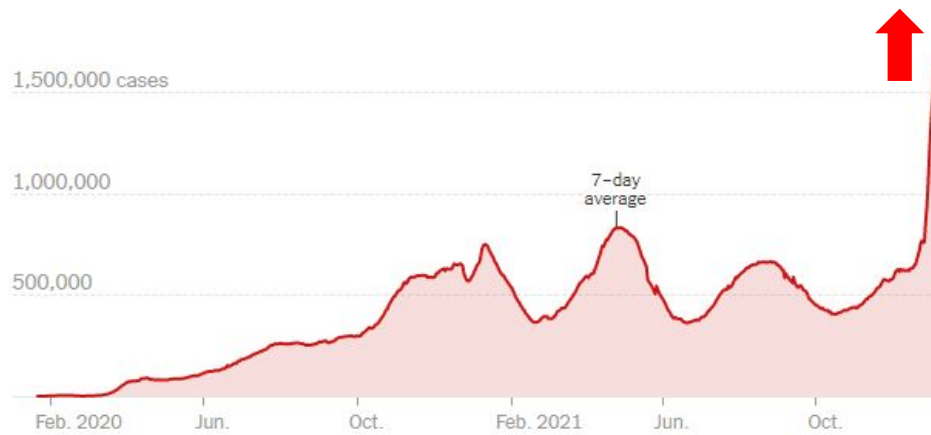
4. New Cases and Deaths



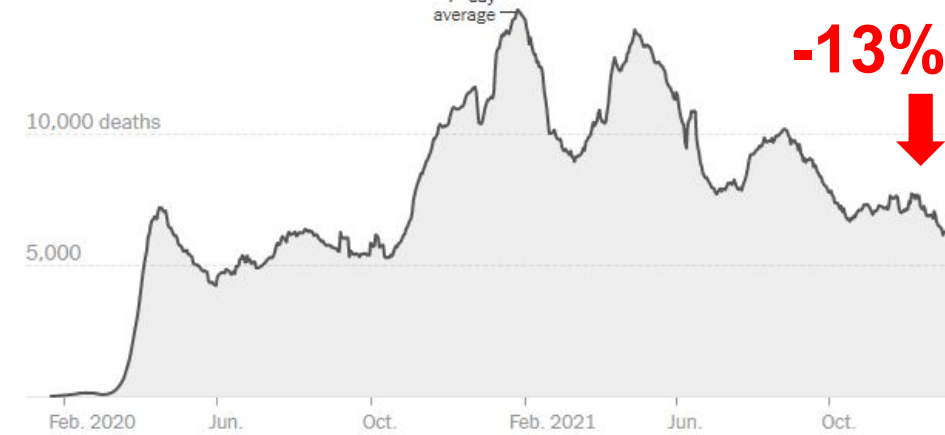
Global New Cases and Deaths 14 Days Changes

(NYT, 1/7/2022)

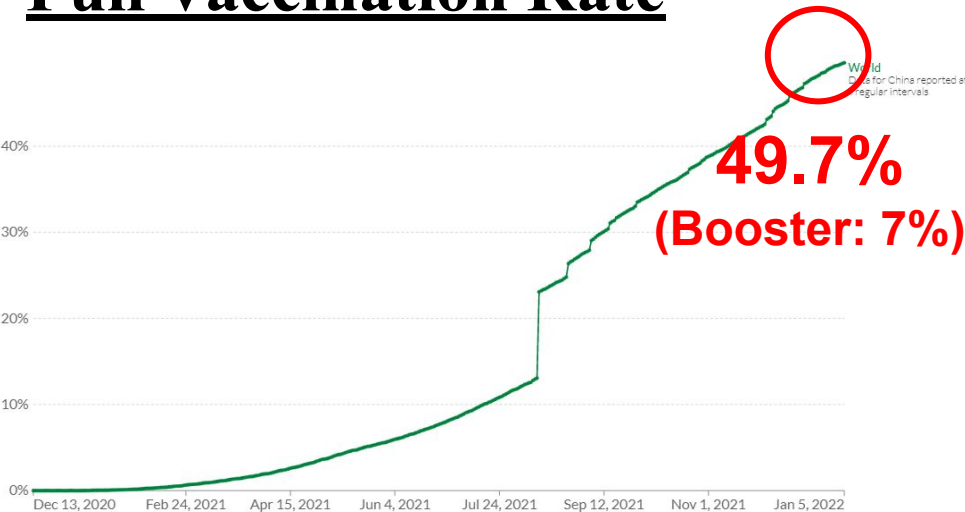
Cases



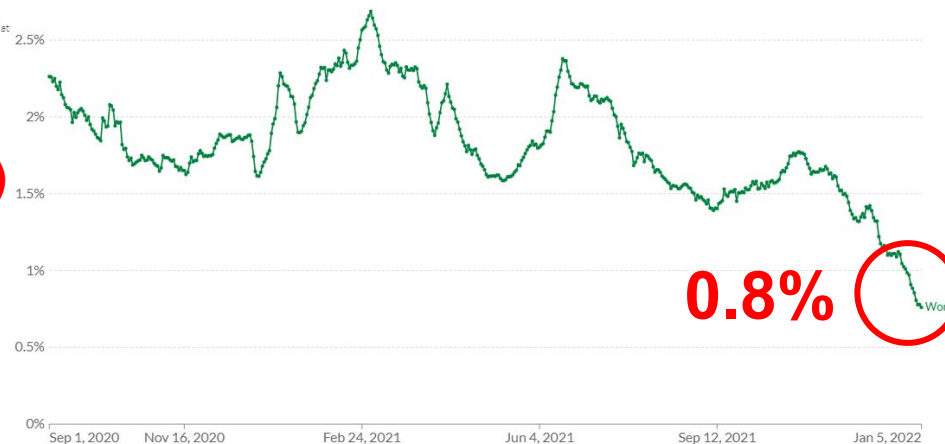
Deaths



Full Vaccination Rate



Case Fatality Rate (CFR)

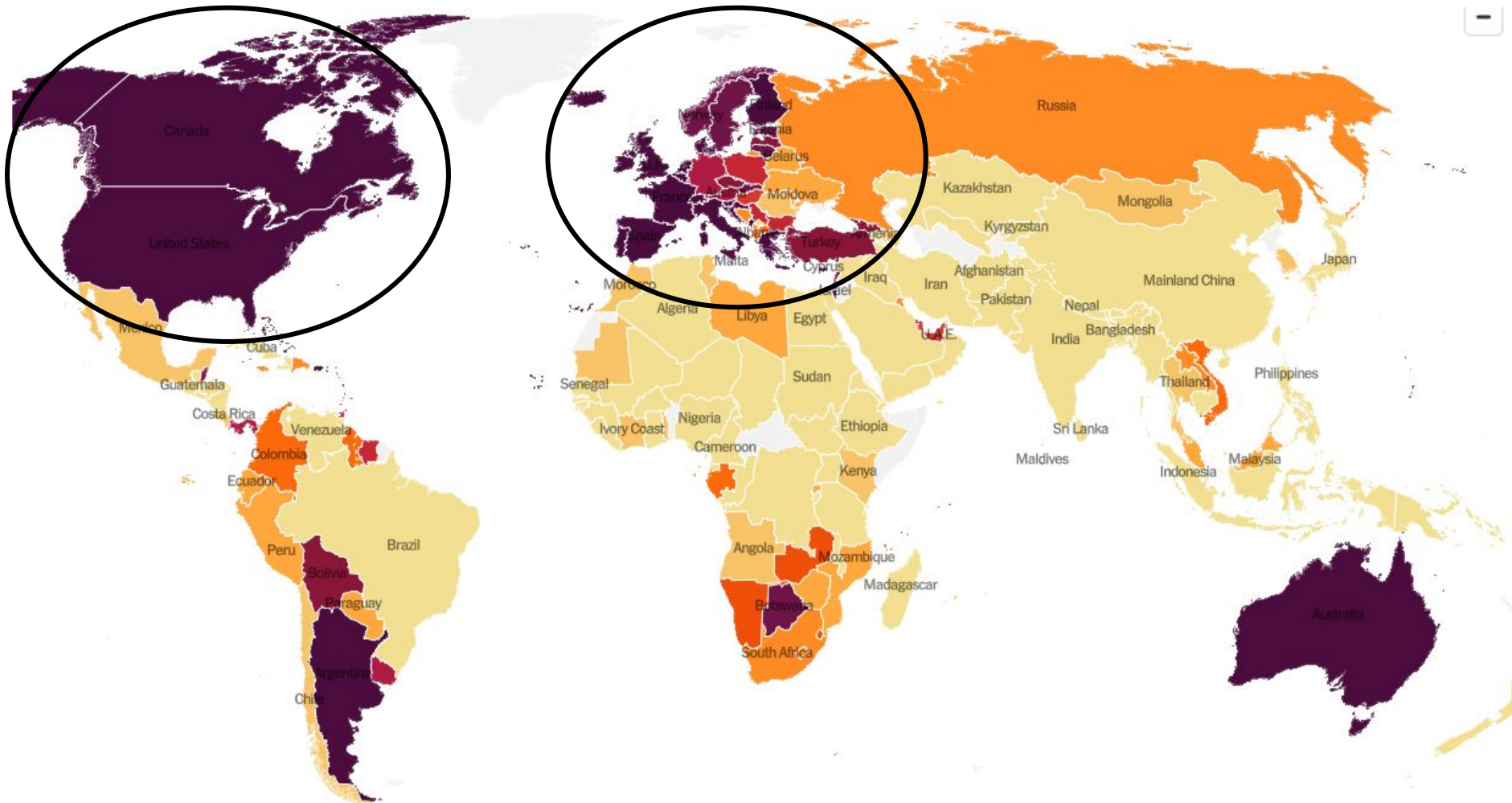


Top 10 Countries with Highest COVID Daily New Cases and 14-Day Changes (Worldometers & NYT, 1/6/2022)

#	Country	Daily New Cases	Total Cases	14-Day Change
1	US	704,661	58,805,186	240% ↑
2	France	332,252	10,921,757	248% ↑
3	UK	194,738	13,835,309	100% ↑
4	Italy	189,098	6,756,024	374% ↑
5	Spain	137,180	6,922,466	213% ↑
6	Argentina	95,159	5,915,695	714% ↑
7	India	90,928	35,109,286	506% ↑
8	Turkey	66,467	9,718,861	175% ↑
9	Australia	64,453	612,106	847% ↑
10	Germany	63,191	7,342,216	-13% ↓

Global COVID-19 Hotspots

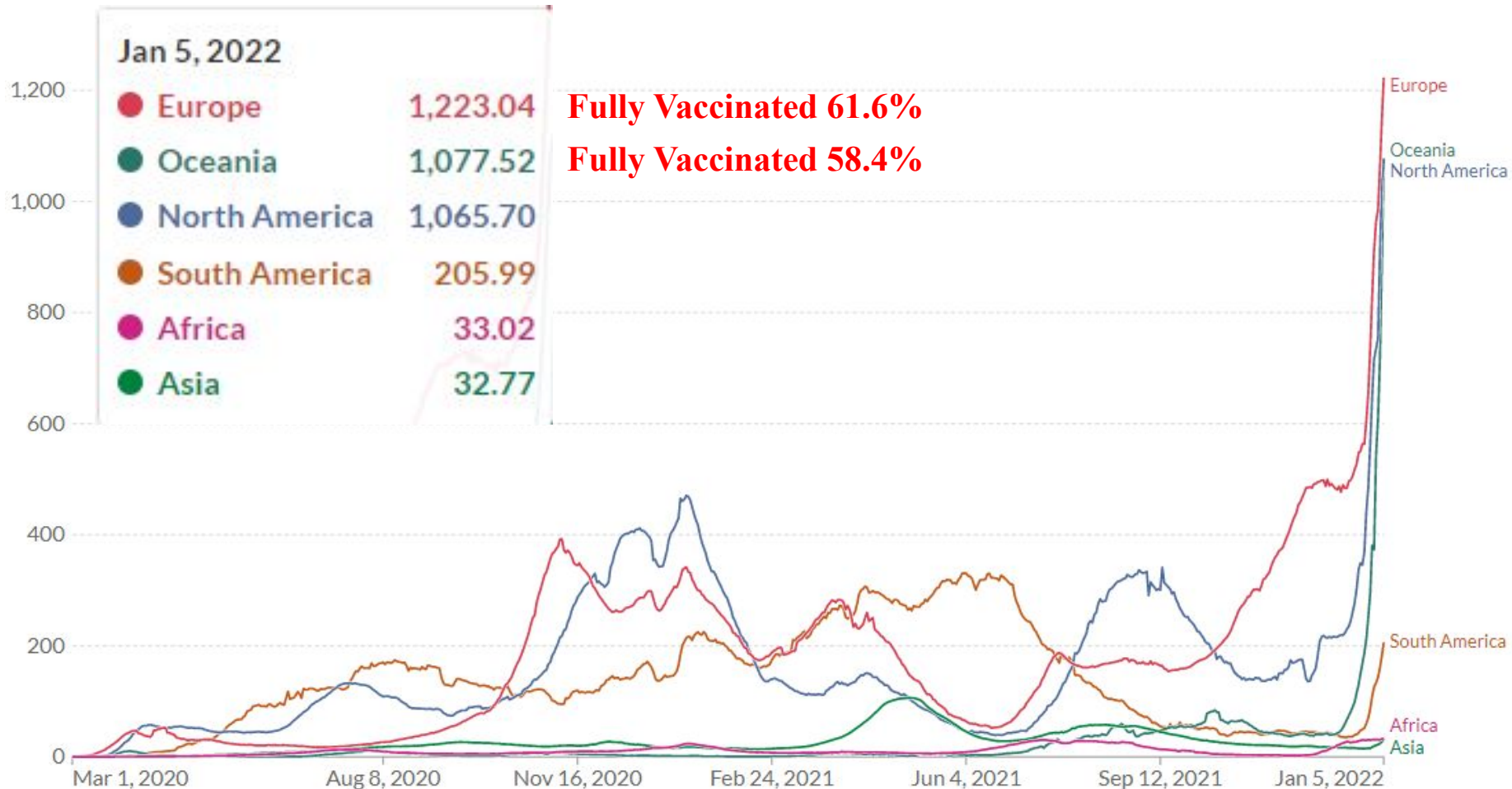
(NYT, 1/6/2022)



Global Cases by 6 Continent

- Surge in Europe despite being the highest fully vaccinated continent (61.6%)

(Our World in Data, 1/6/2022)



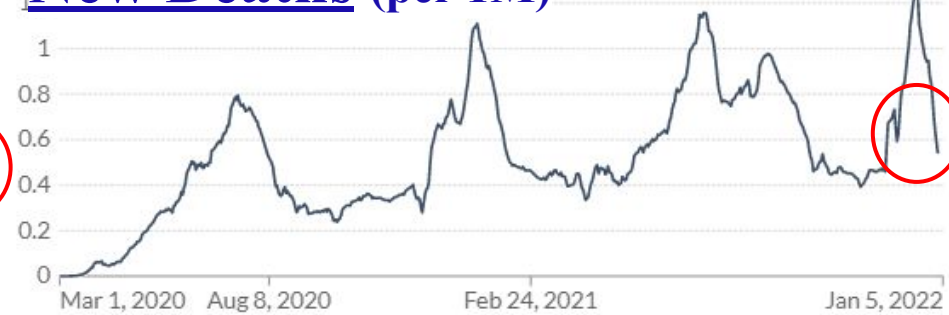
Current Trends in South Africa

- Positivity Rate: 26% ($R_0=0.7$)
- Fully Vaccinated: 27%
- Variant Proportion: Omicron(94%), Delta(0%),other(6.2%)

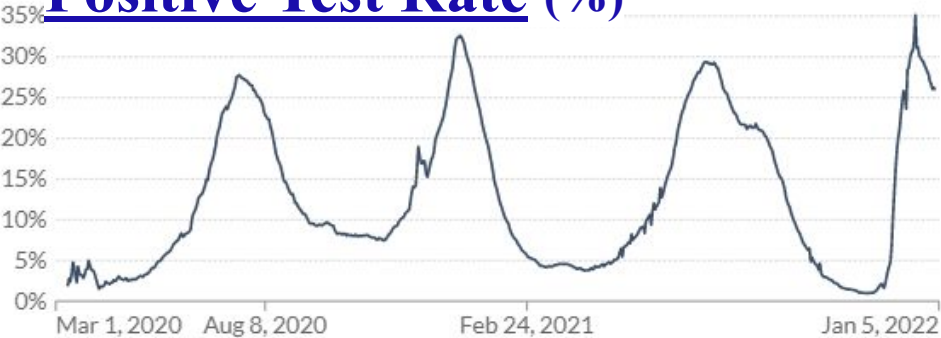
New Cases (per 1M)



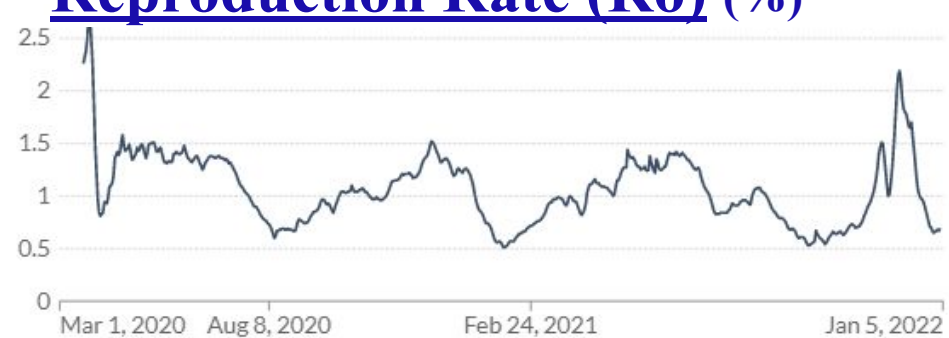
New Deaths (per 1M)



Positive Test Rate (%)



Reproduction Rate (R_0) (%)

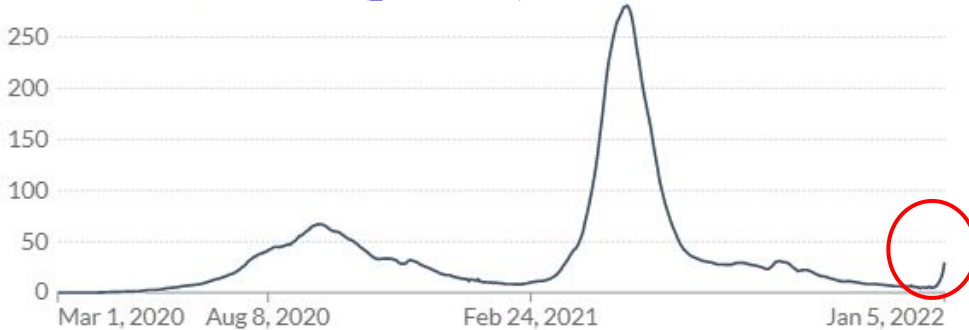


(Our World in Data, 1/6/2022)

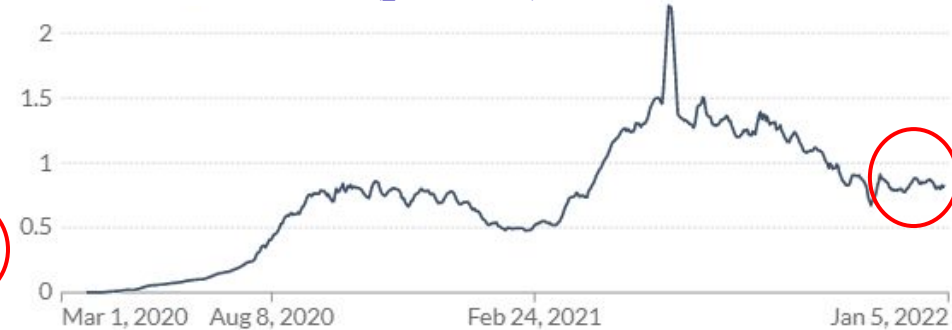
Current Trends in India

- Positivity Rate: 1.6% (R₀=2)
- Fully Vaccinated: 44.3%
- Variant Proportion: Delta (61%), Omicron (35%)

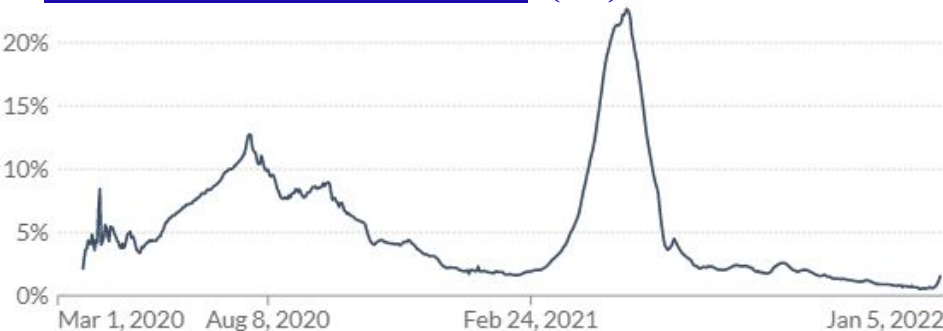
New Cases (per 1M)



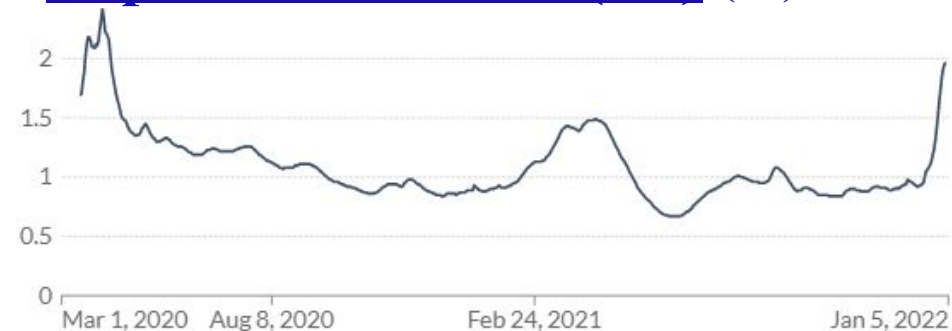
New Deaths (per 1M)



Positive Test Rate (%)



Reproduction Rate (R₀) (%)



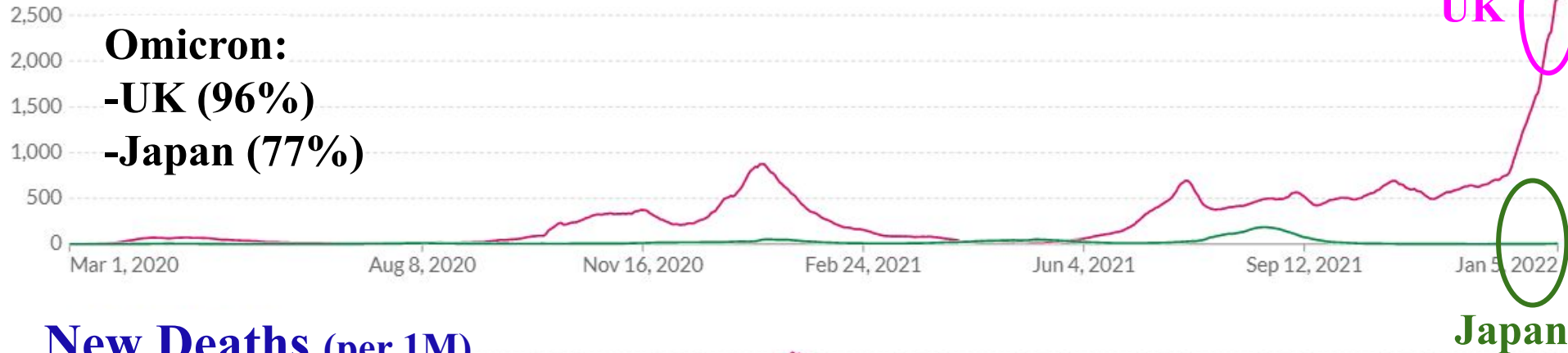
(Our World in Data, 1/6/2022)

Current Trends in the UK and Japan

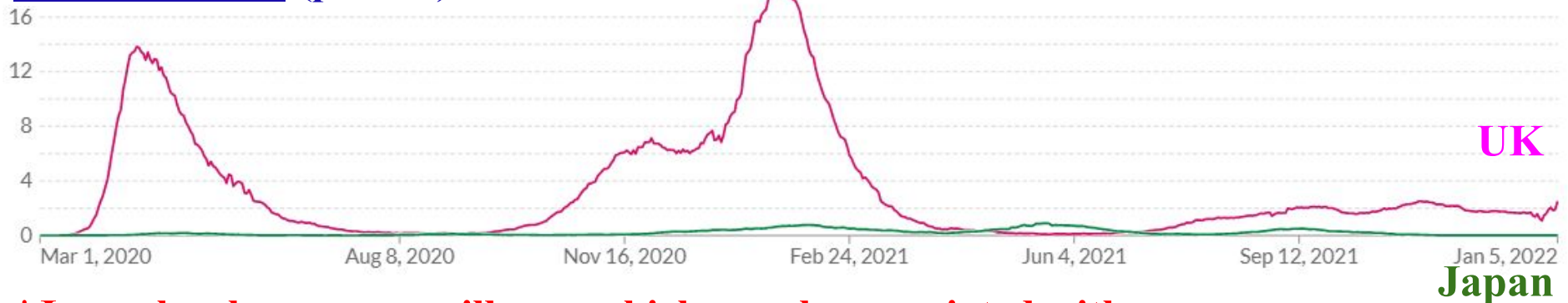
- UK with increased cases, Japan with low cases and lower severe illness

(Our World in Data, 1/6/2022)

New Cases (per 1M)



New Deaths (per 1M)

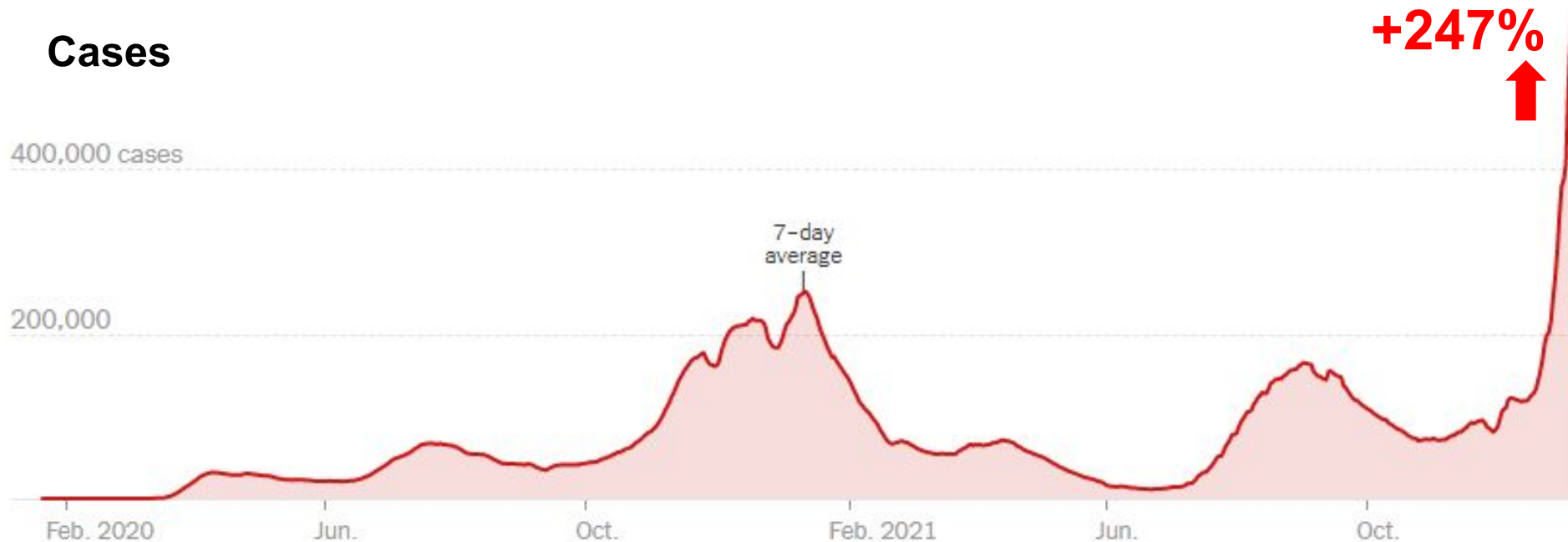


***Japan has lower severe illness, which may be associated with HLA-A24 (>60% in the population of Japan)**

US Trend and 14-Day Change

- Increase in cases (+247%) and decrease in deaths (-3%)
(NYT, 1/6/2022)

Cases



Tests



Hospitalizations

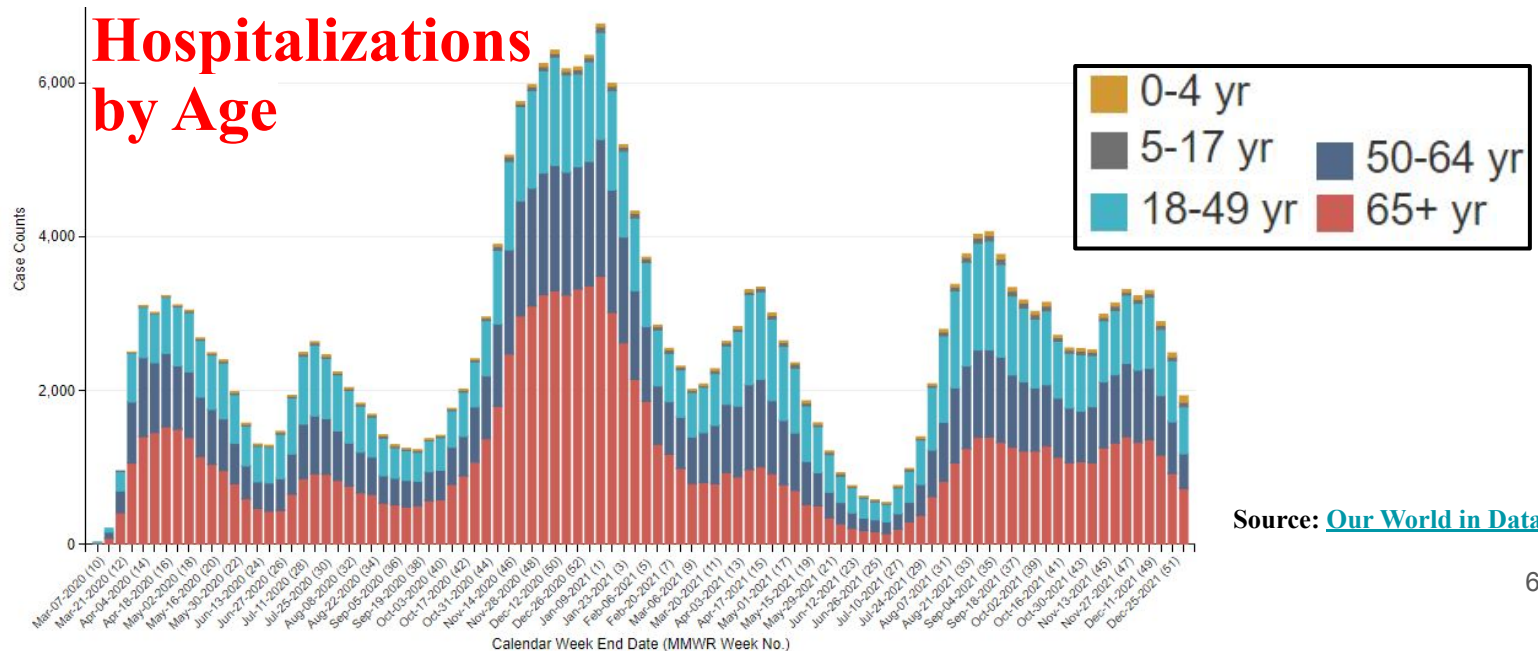
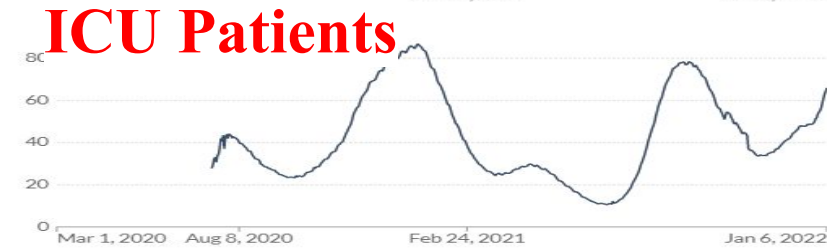
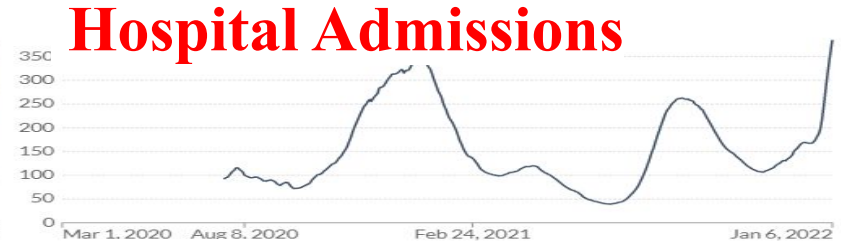
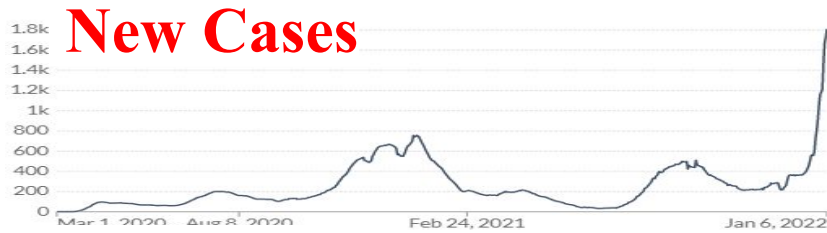


Deaths



US Trend in New Cases, Hospital Admissions, ICU Patients, and New Deaths

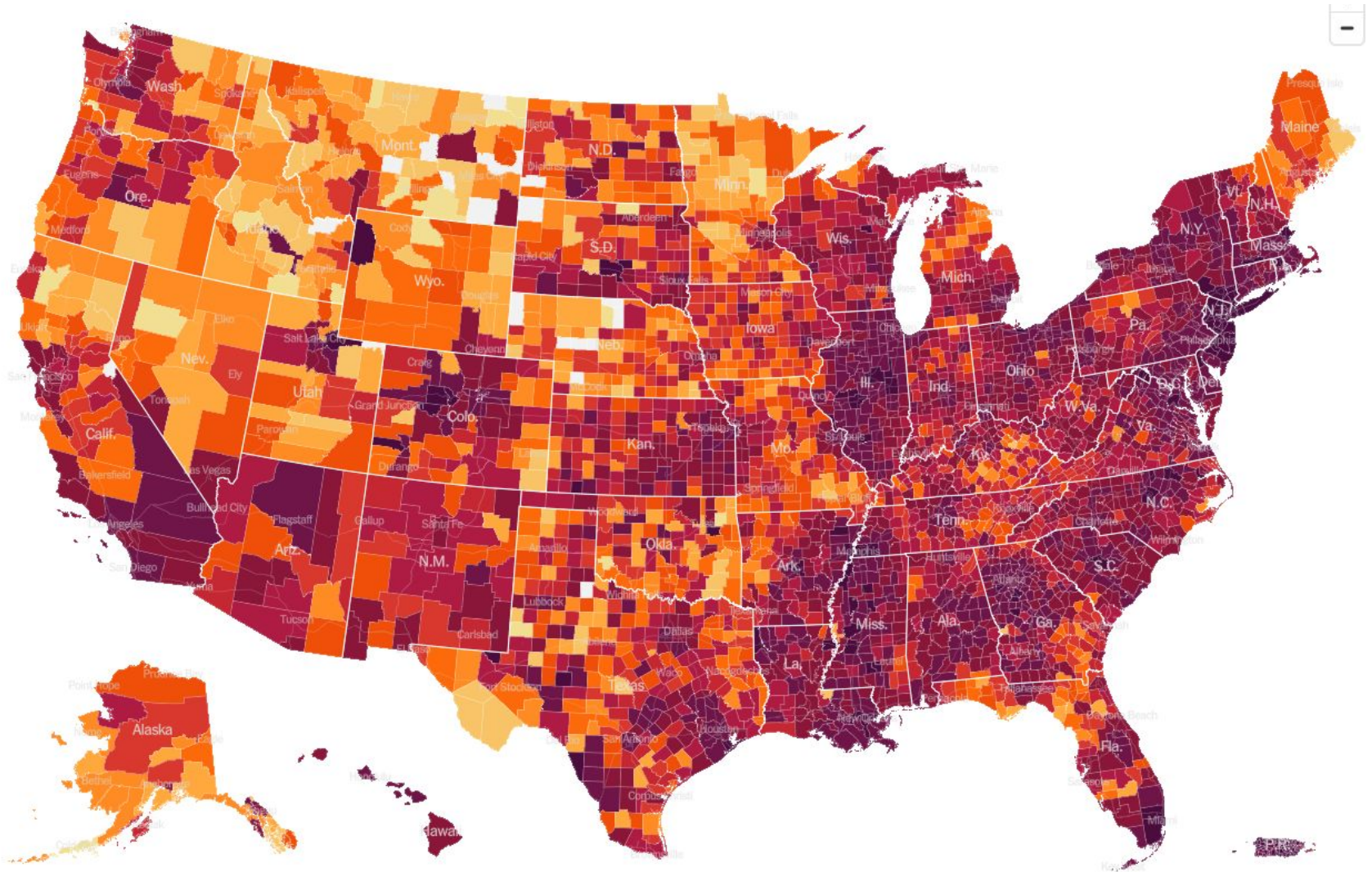
(Our World in Data, 1/7/2022)



Source: [Our World in Data](https://ourworldindata.org)

COVID Hot Spots in the US

(NYT, 1/6/2022)



Top 10 US States with Highest Daily New Cases

(NYT, 1/6/2022)

#	States	Daily New Cases	One or More Shots	Fully Vaccinated	14 Days Change
1	New York	68,627	85%	72%	216% ↑
2	Florida	58,216	75%	64%	441% ↑
3	California	57,019	83%	67%	500% ↑
4	Texas	41,998	67%	57%	403% ↑
5	New Jersey	30,912	84%	71%	279% ↑
6	Illinois	25,133	73%	65%	118% ↑
7	Pennsylvania	22,007	79%	64%	175% ↑
8	Ohio	19,586	61%	55%	88% ↑
9	Georgia	18,574	61%	51%	387% ↑
10	Massachusetts	18,218	91%	75%	196% ↑

Hospital Utilizations in the US

- **Increasing ICU bed use for COVID in the past 14 days**

(HHS, 1/6/2022)

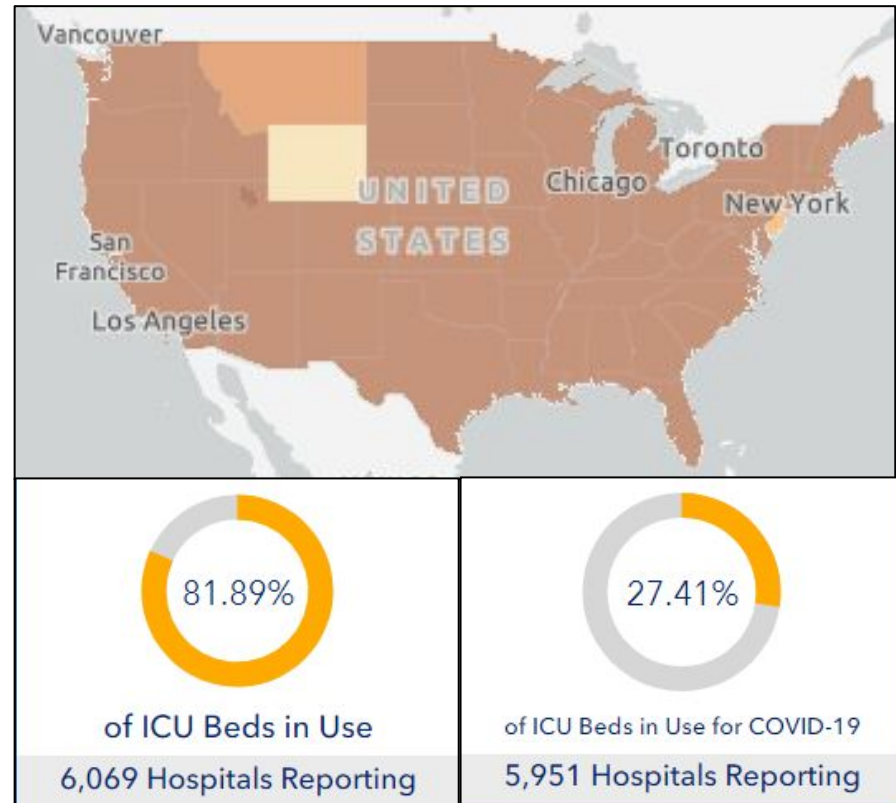
ICU Bed Use

- **81.89% ICU beds in use**
(6,069 Hospitals Reporting)
- **27.41% ICU beds in use for COVID-19** (14 days ago 20.93%)
(5,951 Hospitals Reporting)

Inpatient Bed Use

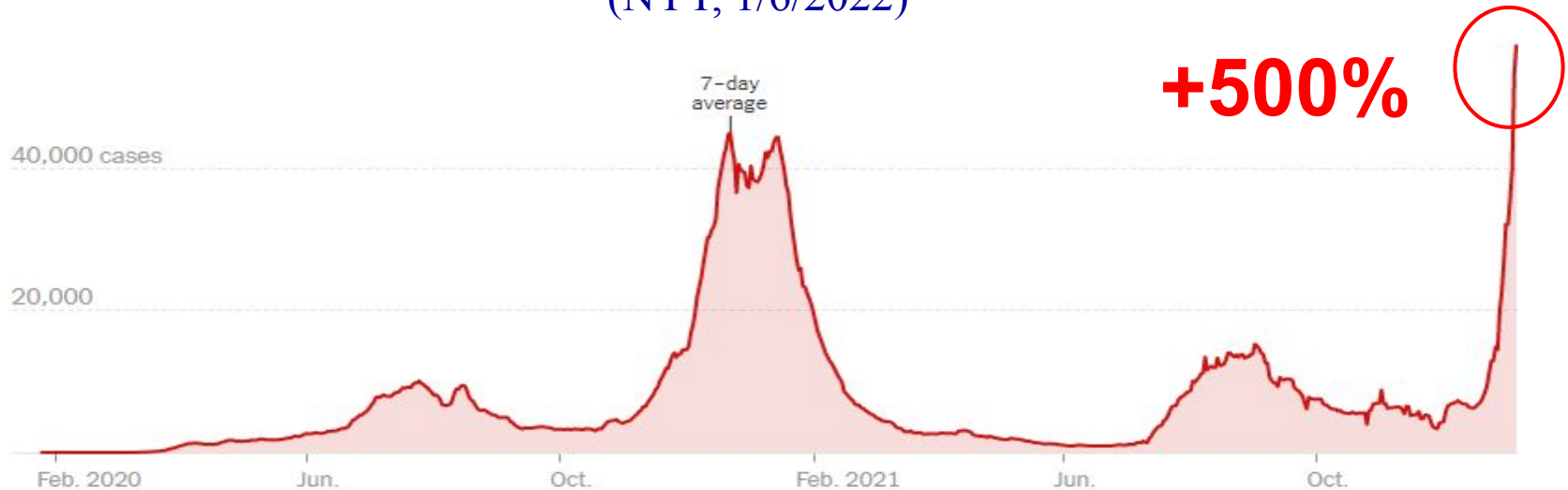
- **78.85% inpatient beds in use**
(6,073 Hospitals Reporting)
- **16.89% Inpatient beds in use for COVID-19** (14 days ago 9.78%)
(5,954 Hospitals Reporting)

[HHS ICU Bed Dashboard](#)



California New Cases Trend

- Increase in cases (+500%), decrease in deaths (-3%) in the past 14 days
(NYT, 1/6/2022)

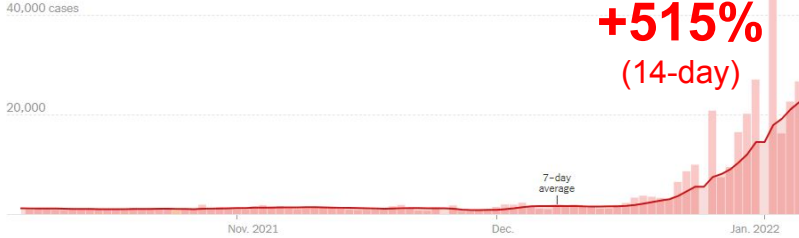


	DAILY AVG. ON JAN. 5	14-DAY CHANGE	TOTAL REPORTED
Cases	57,019	+500%	5,807,748
Tests	250,703	+3%	—
Hospitalized	7,338	+86%	—
Deaths	60	-3%	76,967

90-Day County Trends in AHMC Service Area

(NYT, 1/6/2022)

Los Angeles County



Hospitalized

14-DAY CHANGE
+54%



Deaths

LAST TWO WEEKS
225



Test positivity

14-DAY AVG.
5%



ALL AGES

12 AND UP

65 AND UP

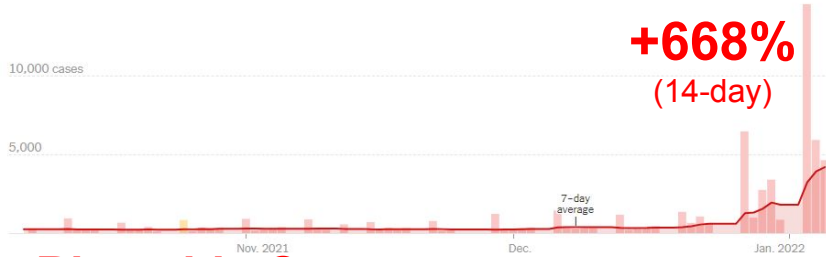
Fully vaccinated

68%

77%

83%

Orange County



Hospitalized

14-DAY CHANGE
+75%



Deaths

LAST TWO WEEKS
44



Test positivity

14-DAY AVG.
8%



ALL AGES

12 AND UP

65 AND UP

Fully vaccinated

68%

77%

88%

Riverside County



Hospitalized

14-DAY CHANGE
+27%



Deaths

LAST TWO WEEKS
59



Test positivity

14-DAY AVG.
10%



ALL AGES

12 AND UP

65 AND UP

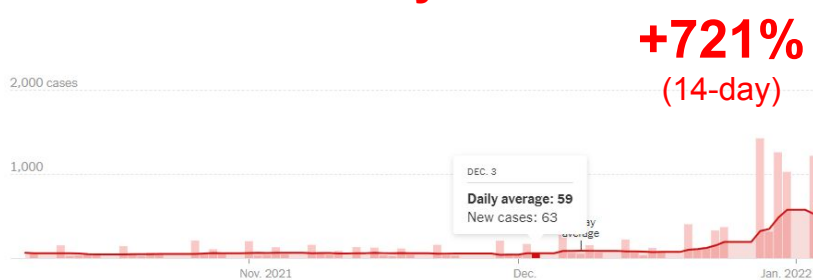
Fully vaccinated

55%

64%

82%

San Mateo County



Hospitalized

14-DAY CHANGE
+24%



Deaths

LAST TWO WEEKS
1



Test positivity

14-DAY AVG.
5%



ALL AGES

12 AND UP

65 AND UP

Fully vaccinated

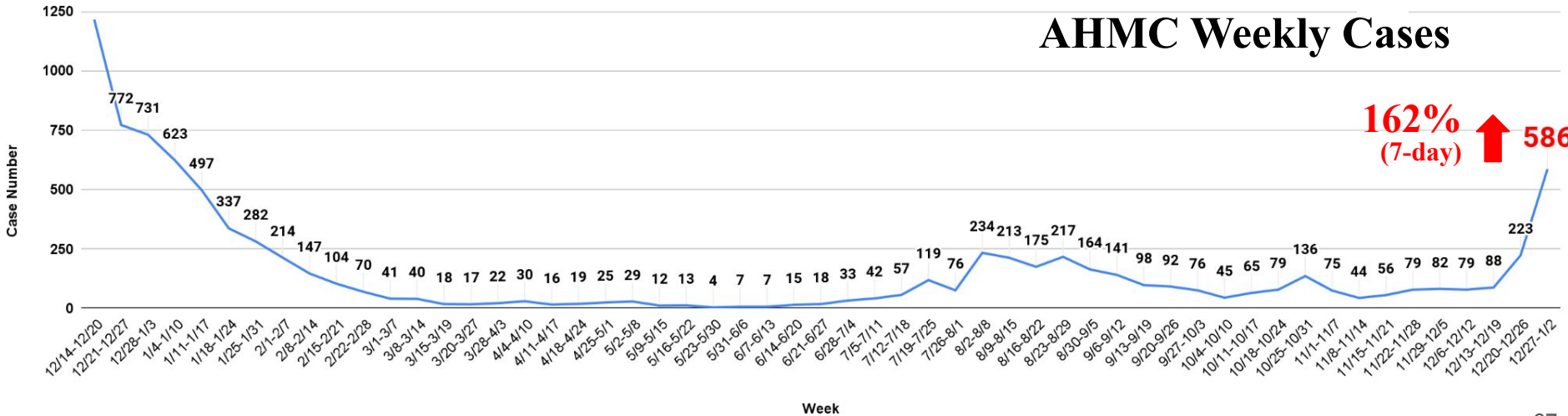
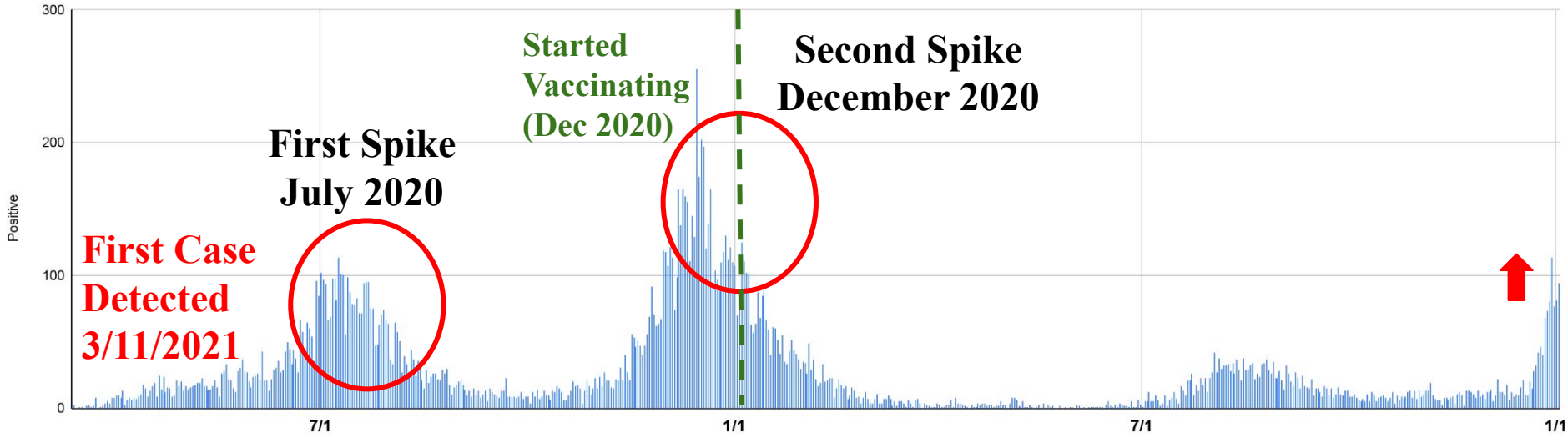
79%

88%

92%

Cases in AHMC Health Increased 162% (7-Day)

(Data as of 1/2/2022)



Forecast

3-Month Global Forecast by IHME (UW)

- Deaths projected to decrease 56% under current scenario

(IHME/University of Washington, 1/6/2022)

Daily Deaths



Hospital Resource Use



Institute for Health Metrics and Evaluation (IHME): a research institute specializing in global health statistics and impact evaluation at the University of Washington in Seattle

Forecast

3-Month Global Forecast by IHME (UW)

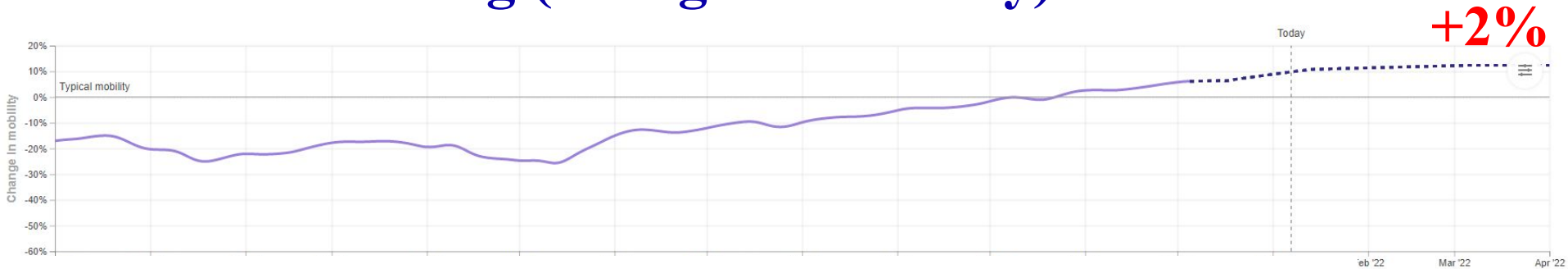
- Projected to increase 26% mask use and 2% change in mobility

(IHME/University of Washington, 1/7/2022)

Mask Use



Social Distancing (change in mobility)



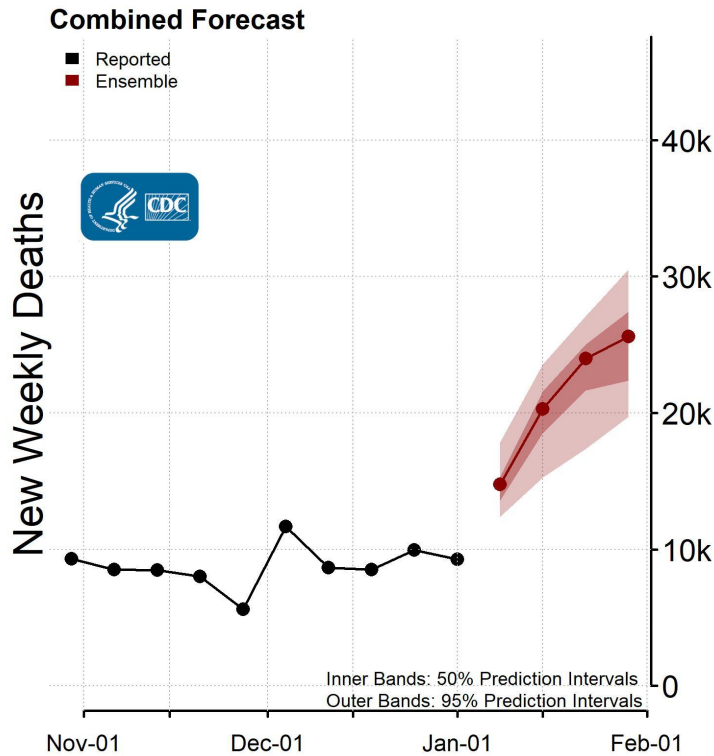
Institute for Health Metrics and Evaluation (IHME): a research institute specializing in global health statistics and impact evaluation at the University of Washington in Seattle

Forecast

US National and California Forecast

- Projected increase in national and California case trend
(CDC, 1/7/2022)

National Forecast



California**

