COVID Pandemic Updates

March 20, 2023

AHMC COVID Team

Outline

Important Q&A: Vaccination & Masks (1/3)

1. **If I have had 2 shots of WHO EUL COVID vaccines (Sinopharm, AZ, etc.) in other countries, what is the recommended booster?**

CDPH recently published guidelines recommending that anyone receiving 2 doses of WHO-EUL vaccines should receive a bivalent booster in the US.

COVID-19 Vaccine	Primary Series	When to get the vaccine booster dose	Which vaccine booster dose to receive
A mix and match series composed of any combination of FDA-approved, FDA-authorized, or WHO-EUL COVID vaccines	All recommended doses	Booster: at least 2 months; no more than 6 months after getting all recommended doses	Single booster dose of Moderna or Pfizer vaccine. Novavax is not authorized for use as a booster dose at this time.

Source: CDPH

WHO: 11 Vaccines Granted Emergency Use Listing (EUL)
- List of vaccine types, names, approved countries, and trials

Vaccine Type	Vaccine Name	Approved Countries	Trails
Protein Subunit			
Serum Institute of India	COVOVAX	6 countries	7 trials/3 countries
Novavax	Nuvaxoid	40 countries	22 trials/14 countries
RNA			
Moderna	Spikevax	88 countries	70 trials/24 countries
Pfizer/BioNTech	Comirnaty	149 countries	100 trials/31 countries
Non Replication Viral Vector			
CanSino	Convidecia	10 countries	14 trials/6 countries
Janssen (Johnson&Johnson)	Jcovden	113 countries	26 trials/25 countries
Oxford/AstraZeneca	Vaxzevria	149 countries	73 trials/34 countries
Serum Institute of India	Covishield (Oxford/AZ formula)	49 countries	6 trials/1 countries
Inactivated			
Bharat Biotech	Covaxin	14 countries	16 trials/2 countries
Sinopharm (Beijing)	Covilo	93 countries	39 trials/18 countries
Sinovac	CoronaVac	56 countries	42 trials/10 countries

Source: COVID19 Vaccine Tracker Team

Important Q&A: Vaccination & Masks (2/3)

2. Does the bivalent booster entirely replace the other boosters?

On 9/1/22, the new bivalent booster (original & BA.4/5) is now the only approved booster for most in the US. If you never received your primary doses, you will still receive 2 doses of the monovalent vaccines (original) that were introduced in late 2020 (CDC; NYT).

3. It's been 7 months since receiving the bivalent booster. What's next?

Currently, there are no new guidelines for receiving an additional bivalent booster dose. New recommendations will be published once new evidence regarding efficacy and the evolution of Omicron becomes clear. It's speculated that the policy updates will be made in Sep. 2023 (CDC; NYT).

Important Q&A: Vaccination & Masks (3/3)

4. How often can we be re-infected with COVID for the current circulating variants?

COVID has become more adept at re-infecting people. Already, those infected with the first Omicron variant are reporting second infections with the newer variants. A US VA reinfection study (n=433,588) showed that the median time of the second infection was 191 days and the third infection is 158 days. Compared to no reinfection, reinfection contributed to higher death (HR=2.17) & hospitalization (HR=3.32) (Nature; NYT).

5. Does my mask protect me if nobody else is wearing one?

Masks may protect the wearer, even when others around them are mask-free. The protection depends on the quality of the mask and how well it fits. The CDC recently recommended using an N95, KN95, or KF94. Experts say the riskiest places for transmission are buses, followed by trains and planes (CDC; NYT).

2. New COVID Developments & Studies

FDA Advisers Voted 16-1 in Favor of Full Approval of Paxlovid

(CNBC, 3/16/2023)

- **The FDA's independent panel of advisors recommended full approval of Paxlovid for adults and those who are at high risk of getting severely sick with COVID.**
- **The treatment is advised for people over 50 or those who suffer from medical conditions such as high BP or diabetes.**
- **No major safety concerns were identified in the clinical trial data. However, the agency has flagged 137 medications with Paxlovid drug-drug interactions that may lead to serious adverse reactions.**

Source: CNBC

FDA: COVID Rebound "Not Linked" to Paxlovid

(FDA; CNBC, 3/14/2023; 3/16/2023)

- **The FDA found no evidence of a higher rate of symptom rebound after Paxlovid treatment. A slightly higher rebound rate was found among placebo recipients.**
- **Paxlovid showed an 86% reduction in risk of hospitalization or death in high-risk adults who were unvaccinated.**
- **Overall rates of rebound ranged from 10%-16% regardless of the strain or patients' risk of severe disease.**

Source: FDA; CNBC

California COVID State of Emergency Ended on Feb. 28, 2023

(NYT, 2/2/2023)

- **California ended its declaration of emergency on Feb 28, 2023, and the federal government anticipates terminating the national emergency on May 11, 2023.**
- **81 million vaccinations and processing of 186 million tests have been administered in CA.**
- **California insurers continue to COVID costs coverage (testing and vaccination) after the national emergency ends.**
- **COVID vaccines will remain free in the U.S. for insured people.**

First At-Home Combination Test for Flu and COVID Issued EUA by the FDA

(NYT, 2/24/2023)

- **FDA issued an EUA for the first over-the-counter, at-home combination flu and Covid test on 2/24.**
- **The single-use test works with a self-collected nasal swab and provides a result in about 30 minutes.**
- **The test is meant to be used by people 14 and older, or by an adult collecting a sample from someone age 2 or older.**

Source: SFC

It's Time to Stop Calling It a Pandemic

- The pandemic has now reached the endemic phase

(Medscape, 3/17/2023)

Three Reasons to Call COVID Endemic:

1. **Very high population immunity with no huge surges.**
2. **No longer causing a major crises in health care delivery, nor impacting communities socially and economically as it once did.**
3. **Omicron and its subvariants are causing milder disease overall, either through being less inherently virulent or due to the built up population immunity.**

Source: Medscape

WHO: End of Pandemic Expected in 2023

- "We are certainly in a much better position now than we have been at any time during the pandemic."

(Medscape, 3/20/2023)

- **Tedros: Expects WHO to declare an end to the COVID pandemic later this year because statistics on the virus keep declining.**
- **Recent weekly COVID deaths over a four-week period was lower than when WHO declared COVID a global pandemic 3 years ago.**
- **In the US, COVID-related statistics have gone up and down, but the numbers are now trending downward.**
- **The WHO says there have been >760 million cases and >6.8 million COVID-related deaths. The US has the most cases (>102 million) and deaths (>1.1 million) than any other nation.**

Source: Medscape

WHO Abandons Plans for Second Phase of COVID-Origins Investigation

(Nature, 2/14/2023)

- **The second phase of the WHO investigation into the origins of the COVID pandemic has been cancelled.**
- **The investigation was designed to establish what happened in China and how the virus first infected people, but ongoing challenges and attempts to conduct studies in China have not been possible.**
- **This has disappointed researchers who feel that understanding the virus's origins is essential for preventing future outbreaks.**

Source: Nature

US: Bill to Declassify COVID's Origins Passes

- **House (419-0) and Senate (50-0) vote to declassify COVID origins**

(NPR, 3/10/2023)

- **Bill to declassify information about the pandemic's origins passed the House on Mar. 10.**
- **The House passed the COVID Origins Act of 2023 in a 419-0 vote. The Senate also passed the bill unanimously.**
- **The bill would require the Office of the Director of National Intelligence to declassify information on COVID's origins within 90 days and provide a report to Congress.**
- **Biden has not stated whether he will sign the bill, but is committed to uncovering the pandemic's origins.**

Source: NPR

New Genetic Data Links Pandemic's Origins

- Genetic samples from China appears to link the pandemic's origin to raccoon dogs

(NYT, 3/16/2023)

- **International virus experts found genetic data from a market in Wuhan, China, linking SARS-CoV-2 with raccoon dogs.**
- **Data samples were uploaded by Chinese researchers. After being contacted, the uploaded sequences disappeared from GISAID without explanation.**

Source: NYT

WHO: Withheld COVID Origins Data "Inexcusable"

- WHO is calling on China to be transparent about their data

(Science, 3/17/2023)

- **Researchers recently found new genetic data that links SARS-CoV-2 with raccoon dogs in Wuhan, China. The genetic data showed a mix of COVID and animal DNA, including raccoon dogs and civets.**
- **Although they don't prove the pandemic's origins, WHO said they support the theory that the virus likely was transmitted from animals.**
- **"These data could have — and should have — been shared three years ago," WHO Director-General Tedros said. "We continue to call on China to be transparent in sharing data."**

Source: Science

Cochrane Review: Do Masks Slow Virus Spread?

- **Researchers conclude that masks make "little to no difference"**

(Cochrane, 1/30/2023)

- **Systematic review of 78 studies assessing the use of various mask types among more than 610,000 people in various settings.**
- **When comparing the use of medical or surgical masks to no masks, the findings suggest that masks "will probably make little or no difference" on the number of flu or COVID cases.**
- **Researchers cited many potential reasons for masking's lack of effect on virus spread, including poor study design, lower adherence to mask rules, and the quality of masks used.**

Source: Cochrane

COVID Has Worsened a Health Crisis Among Pregnant Women

- 60% maternal death increase compared to 2019

(NYT, 3/16/2023)

- **The National Center for Health Statistics reported a 40% maternal deaths increase when compared with 2020 and a 60% increase when compared with 2019.**
- **At least 400 maternal deaths were due to COVID in 2021, accounting for much of the increase.**
- **Additionally, COVID worsened the maternal mortality rate to 32.9 per 100,000 births in 2021 from 20.1 per 100,000 live births in 2019.**

Source: NYT

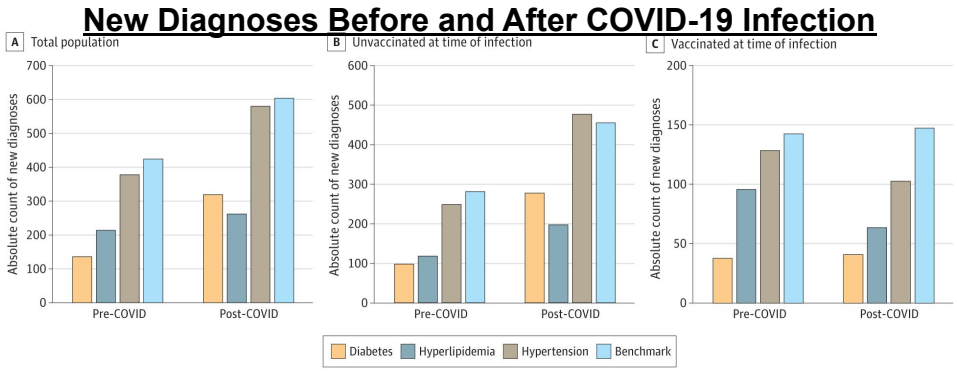
Risk of Diabetes After COVID Infection and Association with Vaccination Status

- **Risk of diabetes after COVID infection increased 2.4x**
- **Post-infection risk is higher for unvaccinated (1.78) vs. vaccinated (1.07)**

(JAMA, 2/14/2023)

- **23,709 patients (~47.4 years) from Cedars-Sinai to estimate odds of a new cardiometabolic diagnosis 90 days after vs. 90 days before COVID infection.**
- **Results showed increased risk of new-onset diabetes (OR=2.35), hypertension (OR=1.54), benchmark diagnoses* (OR=1.42), and hyperlipidemia (OR=1.22).**
- **Risks of new-onset diabetes were higher in unvaccinated (OR=1.78) than vaccinated patients (OR=1.07).**

*** Benchmark diagnoses represent a marker of health care engagement unrelated to COVID (ie, urinary tract infection and gastroesophageal reflux, etc.).**



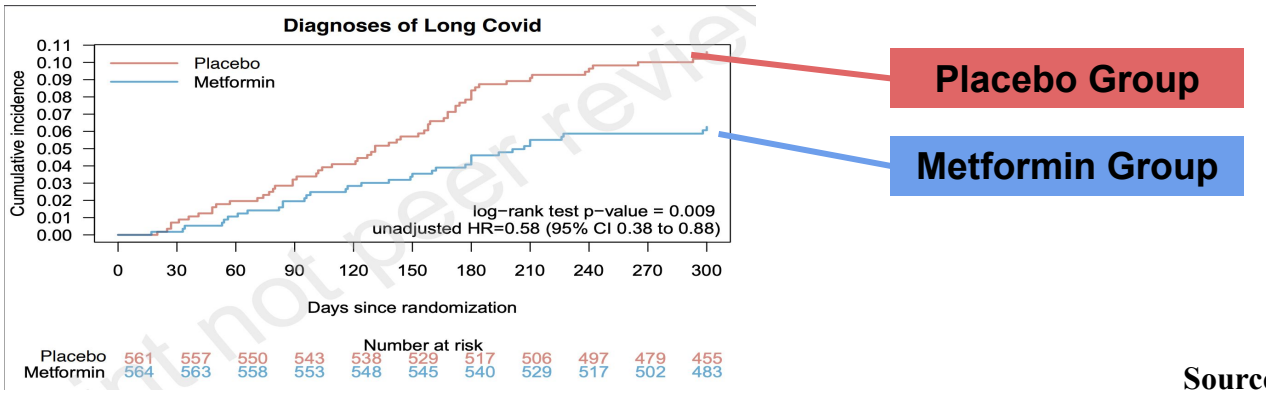
Source: JAMA

Metformin for Outpatient Treatment of COVID and Prevention for Development of Long COVID

- **42% relative decrease and 4.3% absolute decrease in Long COVID**

(SSRN/The Lancet, 3/6/2023)

- **13,435 individuals with PCC and 26,870 individuals with no evidence of COVID (mean age 51 years; 58.4% female).**
- **Cumulative incidence of developing long COVID was 6.3% in Metformin group and 10.6% in placebo group. HR for developing long Covid in Metformin group was 0.58. This translates to a 42% relative decrease and 4.3% absolute decrease in the Long COVID incidence.**



Source: SSRN/The Lancet

3. Healthy Lifestyle Habits & Cardiovascular Health Outcomes of COVID

Harvard Study: 6 Habits That Could Cut Your Long COVID Risk in Half (1/2)

- **Healthy lifestyle factors led to 49% lower risk of long COVID**

(JAMA, 2/6/2023; Parade, 2/15/2023)

1. **BMI**

- **Researchers defined a healthy Body Mass Index (BMI) as 18.5-24.9.**

2. **Smoking**

- **Smoking is a risk factor for more severe COVID cases. It also increases your chances for long COVID, according to the new study.**

3. **Alcohol**

- **Alcohol consumption increased during the early stages of the pandemic. Limiting alcohol consumption can reduce your odds of developing long COVID.**
- **CDC suggests women limit themselves to one drink or less per day and men to two drinks or less.**

Source: JAMA, Parade

Harvard Study: 6 Habits That Could Cut Your Long COVID Risk in Half (2/2)

- Healthy lifestyle factors led to 49% lower risk of long COVID

(JAMA, 2/6/2023; Parade, 2/15/2023)

4. **Diet**

- **Healthy diets promote healing and can be regenerative, which can be helpful in decreasing long COVID risk.**

5. **Exercise**

- **Getting at least 150 minutes of exercise per week was another habit that could cut COVID odds.**

6. **Sleep**

- **Research suggests 7-9 hours sleep per day reduces long COVID risk.**
- **Good sleep hygiene includes consistent bedtime routines, eliminating electronics from the bedroom, limiting alcohol and large meals before bedtime, and completing exercise 4-6 hours before bed.**

Source: JAMA, Parade

Individuals With Long COVID More Likely to Experience Heart Problems

- **Cardiac complications may be 2.3 to 2.5-fold higher for long COVID**

(American College of Cardiology, 2/23/2023)

- **982 studies published between 2020-2022 were screened and 11 studies with heart problems were selected for meta-analysis.**
- **Researchers found that individuals with long COVID were significantly more likely than those who never had COVID to experience heart problems.**
- **Of more than 5.8 million participants across the 11 studies, ~450,000 experienced cardiac complications. Among those with long COVID, the rate of cardiac complications was 2.3 to 2.5-fold higher compared with those in the control group.**

Source: ACC

Six Studies: Post-COVID Cardiovascular Outcomes

- 1.6 to 2-fold increased risk of heart attack and stroke after infection
- The following 6 slides will be a review of the studies in the table

Study	Characteristics	CV Outcomes at Follow-Up	Source
1. US Veterans Health Administration	90% males; mean age 61	1.7-fold risk of heart attack 1.6-fold risk of stroke	Nature, 2022
2. TriNetX Network	Unvaccinated; mean age 44	2-fold risk of heart attack; 1.6-fold risk of stroke	Lancet, 2022
3. US Insurance Claims Database	Unvaccinated; mean age 50	2-fold risk of stroke, PE, DVT, all-cause death	JAMA, 2023
4. US Pandemic (through March 2022)	US population across 5 Covid waves	4.9% more cardiovascular deaths than expected (2 years)	Nature, 2023
5. Korean National Database	>62,000 unvaccinated; >168,000 vaccinated; mean age ~50	>2-fold risk of heart attack and stroke for unvaccinated vs. vaccinated	JAMA, 2022
6. NCATS (US Consortium, NIH)	>1.9 million patients; mean age 45	2-fold risk of heart attack and stroke for unvaccinated vs. vaccinated	JACC, 2023

Study 1

Long-Term Cardiovascular Outcomes of COVID

- **1.7-fold and 1.6-fold increased risk of heart attack and stroke, respectively**

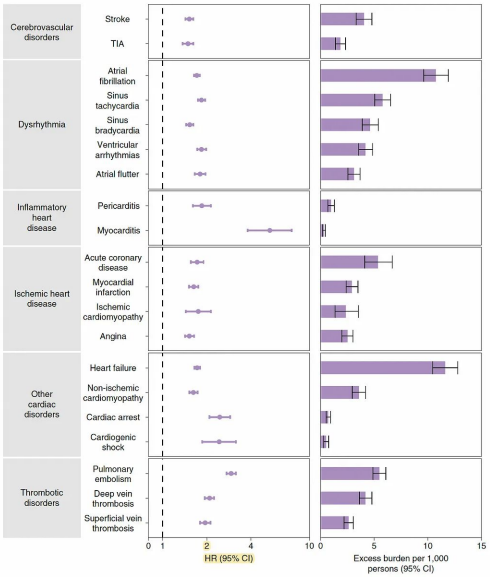
(Nature, 2/7/2022)

Study Design

- **US Department of Veterans Affairs cohort of 153,760; median age 60 and 90% male; two control groups of over 5 million.**

Study Outcome

- **Beyond the first 30 days of infection, people with COVID exhibited increased risks and 12-month burdens of incident cardiovascular diseases. 1.7-fold increased risk of heart attack and 1.6-fold increased risk of stroke.**



Source: Nature

Study 2

Long-Term Cardiovascular Outcomes in COVID Survivors Among Unvaccinated Population

- 2-fold risk of heart attack and 1.6-fold risk of stroke for COVID survivors

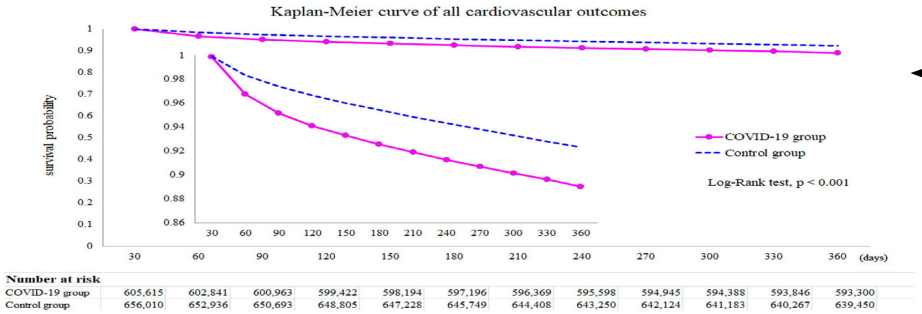
(The Lancet, 8/11/2022)

Study Design

- >42 million records between Jan. 1, 2019 and Mar. 31, 2022; a total of 4,131,717 participants recruited; two cohorts created based on test results.

Study Outcome

- COVID survivors had increased risk of stroke (HR=1.618), arrhythmias (HR=2.407), myocarditis (HR=4.406), ischemic heart disease (HR=2.811), heart failure (HR=2.296) and thromboembolic disorders (HR=2.648).



Survival Probability

Control Group

COVID-19 Group

Source: The Lancet

Study 3

1-Year Adverse Outcomes Among US Adults With Post–COVID Conditions vs. Those Without COVID

2-fold or greater risk of cardiovascular outcomes after COVID infection

(JAMA, 3/3/2023)

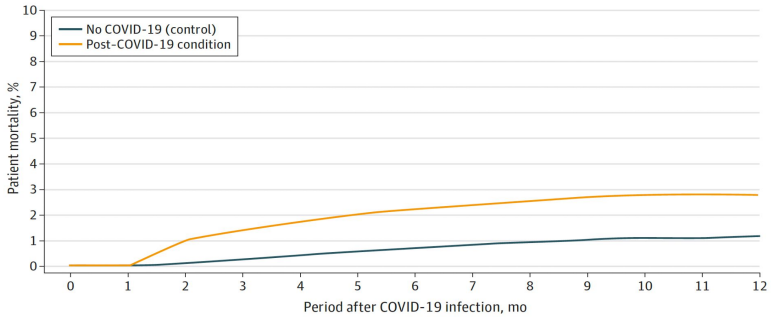
Study Design

- **13,345 people with Covid matched with 26,870 control without Covid. Mean age was 50 and 58% were women, all unvaccinated.**

Study Outcome

- **After 12 months, there was a 2-fold increase in stroke risk and >2-fold increase in all-cause mortality, as well as other major cardiovascular outcomes, including PE and DVT for the infection group.**

Figure 2. Twelve-Month Mortality Among Individuals With Post-COVID-19 Condition vs Those Without COVID-19



Post-COVID Condition
2.8% Mortality

No COVID
1.2% Mortality

Source: JAMA

Study 4

Excess Cardiovascular Mortality Across Multiple COVID Waves

- **Excess cardiovascular deaths in men/women were 5.7%/4.0%**

(Nature, 2/27/2023)

- **From Mar 2020-Mar 2022, 90,160 excess cardiovascular deaths (CVD) reported, or 4.9% more CVD than expected.**
- **Two large peaks of national excess cardiovascular mortality were observed during the periods of Mar-Jun 2020 and Jun-Nov 2021, coinciding with two peaks of COVID deaths.**
- **Excess CVD deaths were dominated by acute CVD events, including ischemic heart disease (49.0%), hypertensive disease (24.7%) and cerebrovascular disease (19%).**

Source: Nature

Study 5

Full Vaccination Against COVID Reduced Risk of AMI (aHR 0.48) and Ischemic Stroke (aHR 0.40)

(JAMA, 7/22/2022)

- **Full vaccination against COVID was associated with a reduced risk of AMI and ischemic stroke. The findings support vaccination, especially for those with risk factors for cardiovascular diseases.**
- **The adjusted risk was significantly lower in the fully vaccinated group (aHR=0.42). The adjusted risk was significantly lower in fully vaccinated patients for both AMI (aHR=0.48) and ischemic stroke (aHR=0.40).**

Source: JAMA

Study 6

Impact of Vaccination on Major Adverse Cardiovascular Events in Patients with COVID Infection

- **2-fold risk of heart attack and stroke for unvaccinated vs. vaccinated**

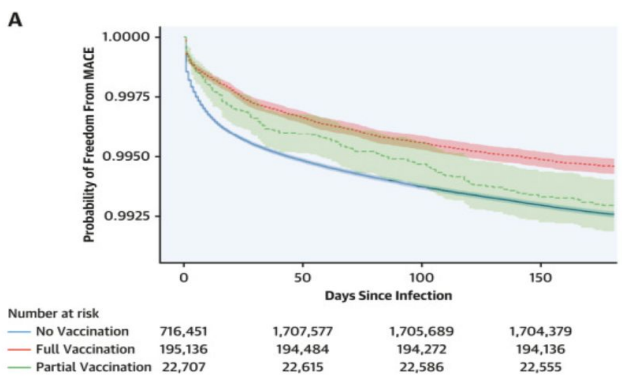
(JACC, 3/7/2023)

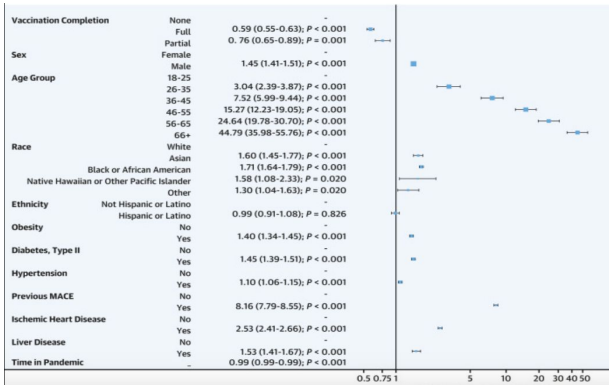
Study Design

- **Over 1.9 million patients; mean age 45; comparing vaccinated vs. unvaccinated.**

Study Outcome

- **Full vaccination was associated with decreased risk of myocardial infarction and ischemic stroke after COVID.**





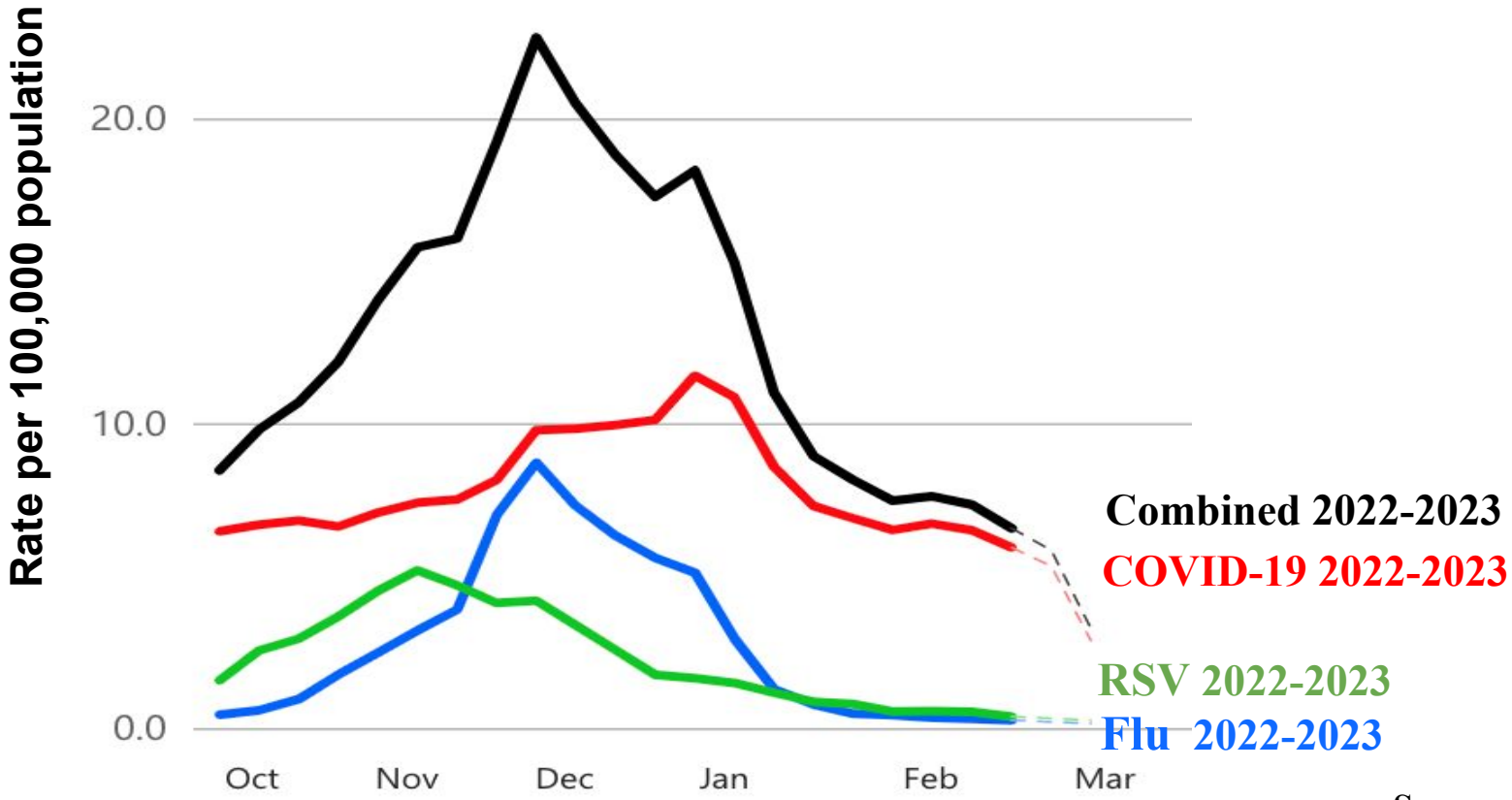
Source: JACC

4. Cases, Hospitalizations, Deaths & Forecasts

Weekly Rates of Respiratory Virus-Associated Hospitalizations Among Adults Ages 65+

- COVID, Flu, and R.S.V trending down

(CDC, 3/20/2023)



Source: CDC

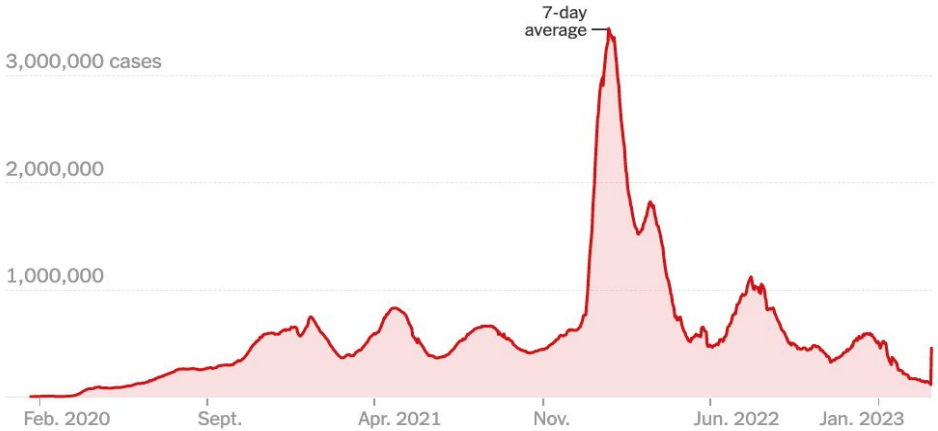
Global Cases and Deaths Trending Down

(NYT; Worldmeter, 3/10/2023)

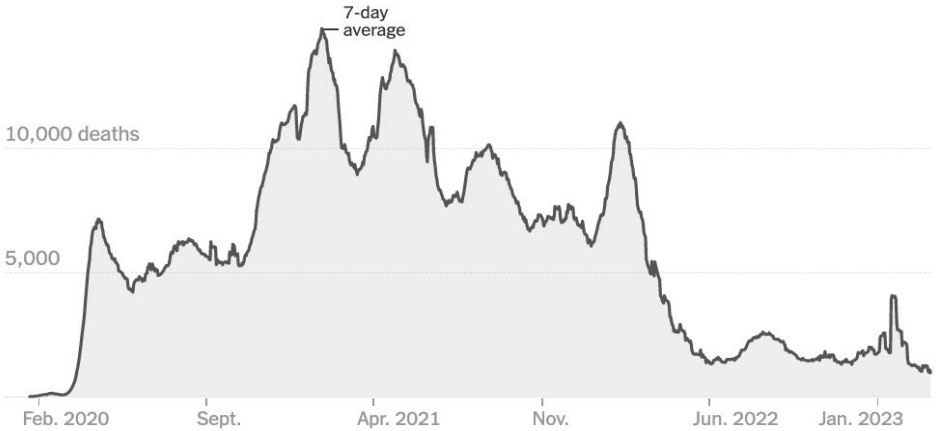
- **Cases: 682 million (8% of world population)**
- **Deaths: 6.8 million (0.08%)**
- **Vaccine: 5.55 billion; 72.3% (1 dose); 67% (2 doses)**
- **1st Booster: 35%**

NYT: Global data on cases and deaths is no longer reported as of March 10, 2023 (except US)

Global Cases



Global Deaths



Source: NYT 1, 2, Worldmeter 1, 2

US and California Daily Cases are Decreasing

- US: 105,972,038 cases; 1,151,642 deaths

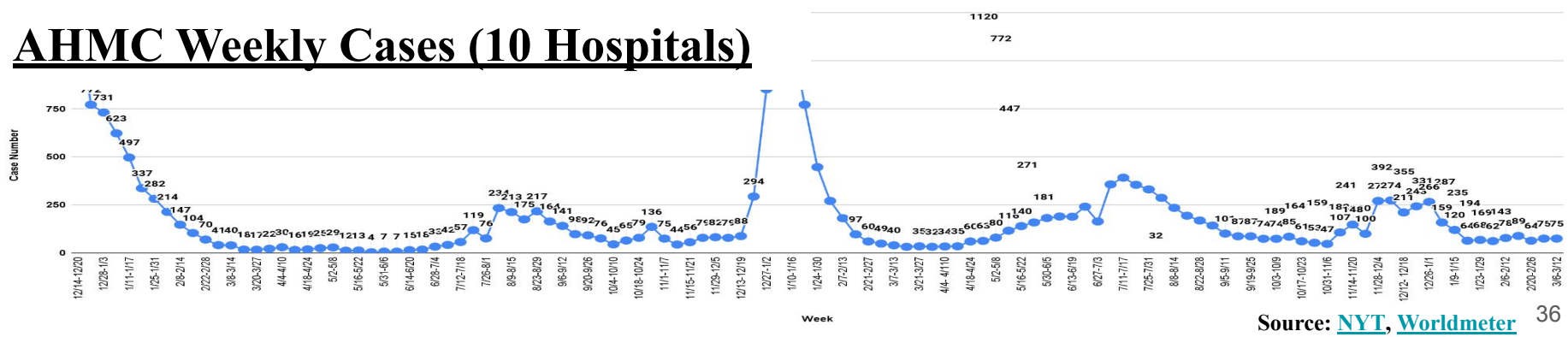
- CA: 12,151,801 cases; 101,718 deaths

(NYT; Worldmeter, 3/10/2023)

US Cases

California Cases

AHMC Weekly Cases (10 Hospitals)



Source: NYT, Worldmeter

New Admissions of Patients Decreased by 89%

(8/1/20-3/18/2023)

United States | All Ages

6,049,231
Total Admissions
Aug 01, 2020 - Mar 18, 2023

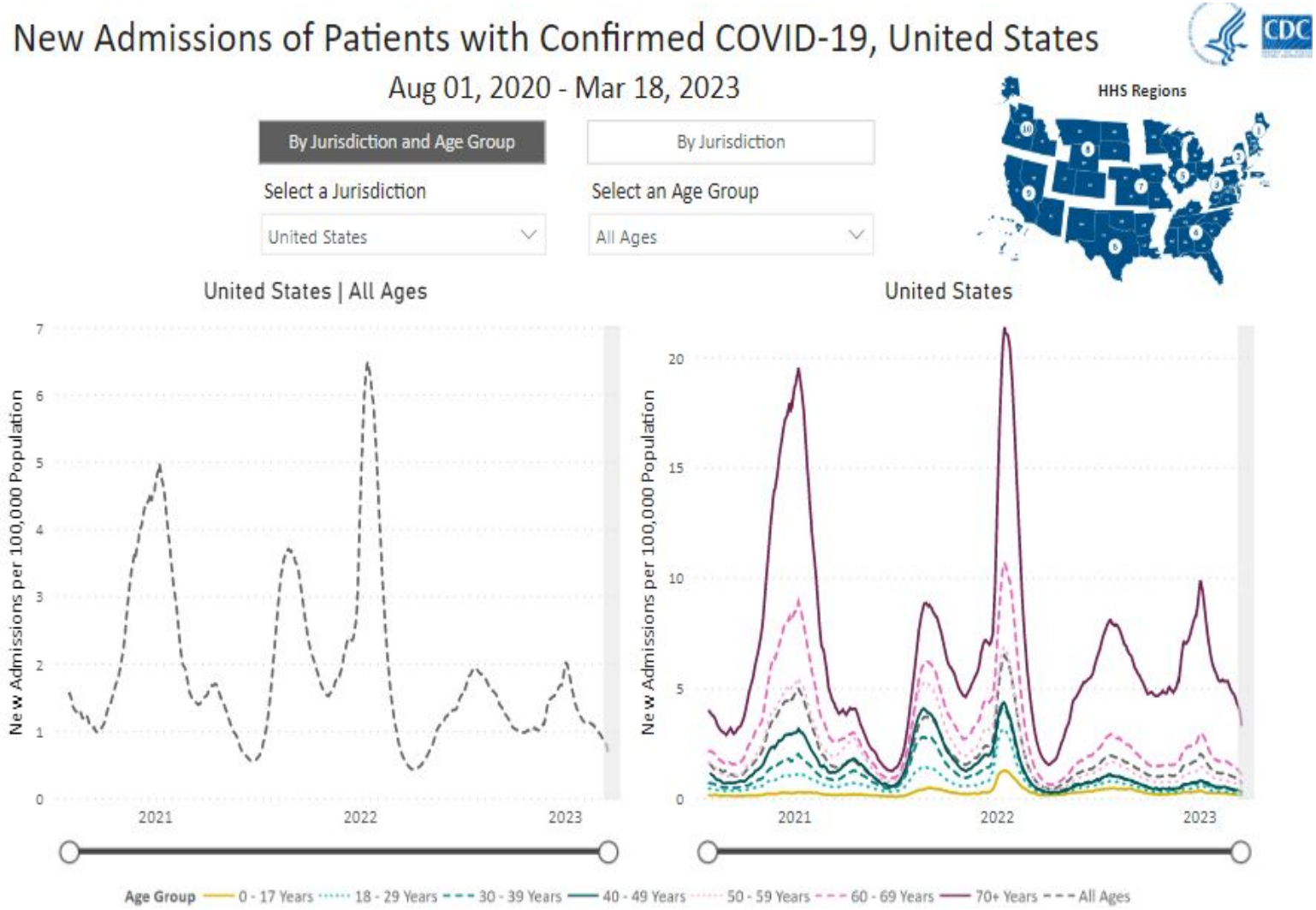
2,294
Current 7-Day Average
Mar 12, 2023 - Mar 18, 2023

2,872
Prior 7-Day Average
Mar 05, 2023 - Mar 11, 2023

21,525
Peak 7-Day Avg
Jan 09, 2022 - Jan 15, 2022

-20.1%
% Change from Prior 7-Day Avg of
Mar 05, 2023 - Mar 11, 2023

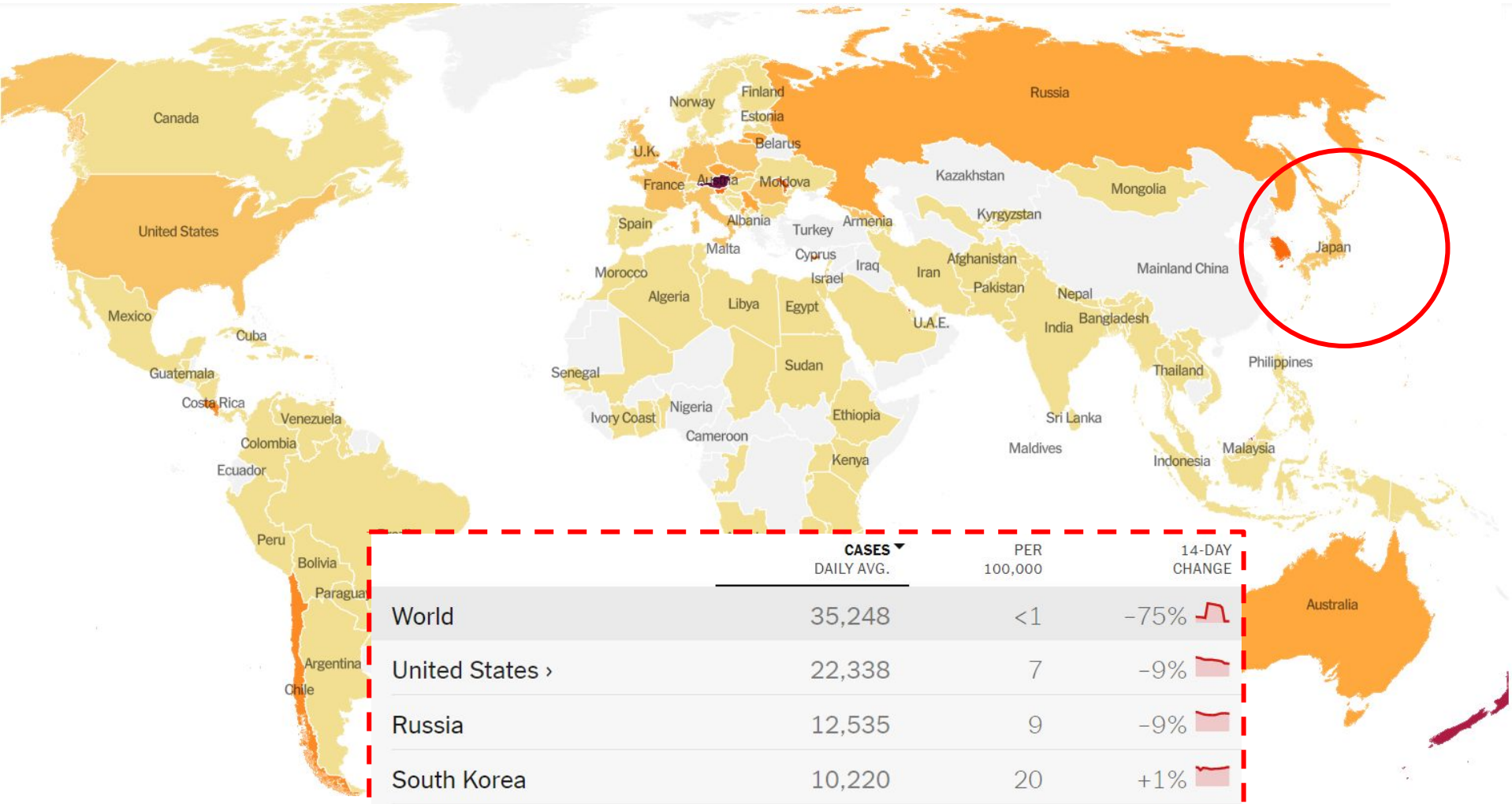
-89.3%
% Change from Peak 7-Day Avg of
Jan 09, 2022 - Jan 15, 2022



Source: CDC

Global COVID Hotspots

(NYT, 3/10/2023)



	CASES DAILY AVG.	PER 100,000	14-DAY CHANGE
World	35,248	<1	−75%
United States ›	22,338	7	−9%
Russia	12,535	9	−9%
South Korea	10,220	20	+1%
Japan	9,679	8	−39%
Germany	6,641	8	−55%

Source: NYT

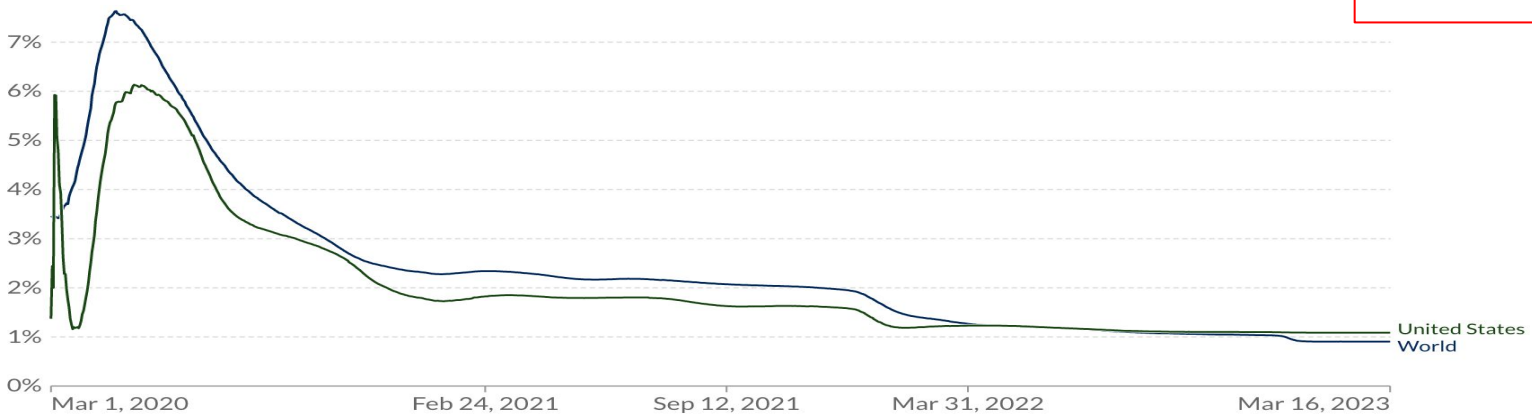
Global's 7-Day CFR is Trending Down

- Fully vaccinated rate is 67%, increase in infectivity and subvariant severity remain the same

(OWID, 3/20/2023)

Cumulative CFR: Global 1.02%; US 1.08%

(Flu CFR=0.1%)



US: 1.09%

Global: 0.9%

7-day rolling CFR: Global 0.91%; US 1.2%

US: 0.71%

Global: 0.48%

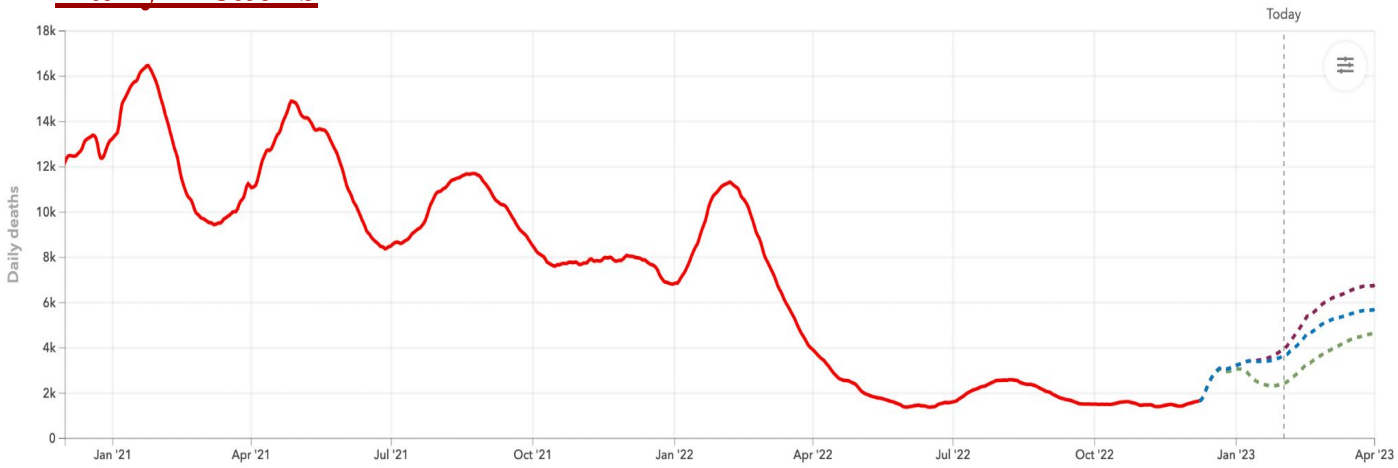
Source: OurWorld in data

IHME: 3-Month Global Forecast

- Daily deaths projected to increase to 0.19/100k under current scenario

(IHME/University of Washington, 3/20/2023)

Daily Deaths



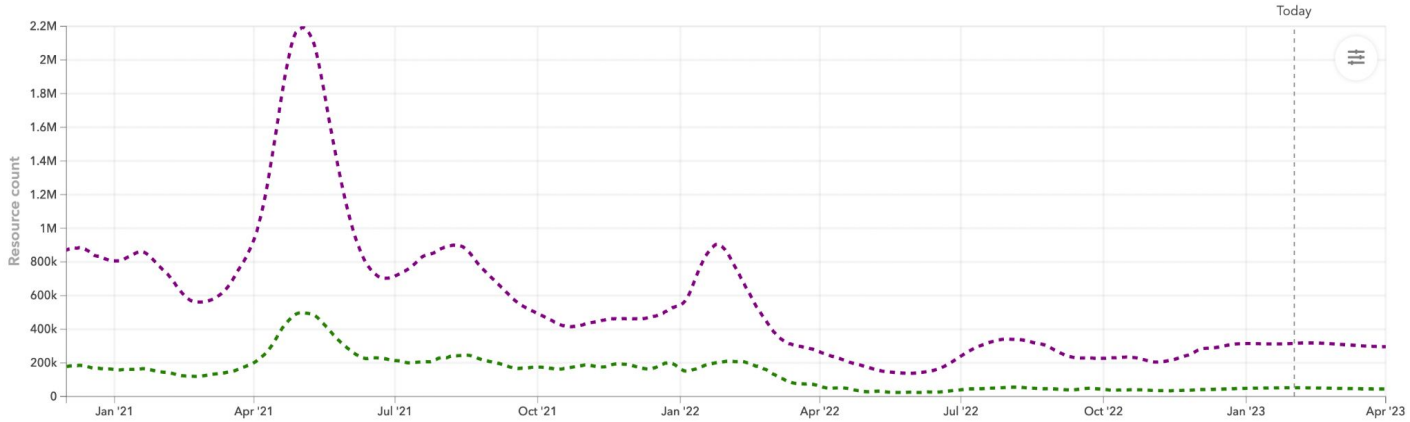
(per100k)

0.19 (Current Projection)

0.17 (Global Antivirals)

0.11 (80% Mask Use)

Hospital Resource Use



(per100k)

14.73 (All Bed Use)

2.45 (ICU Bed 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.

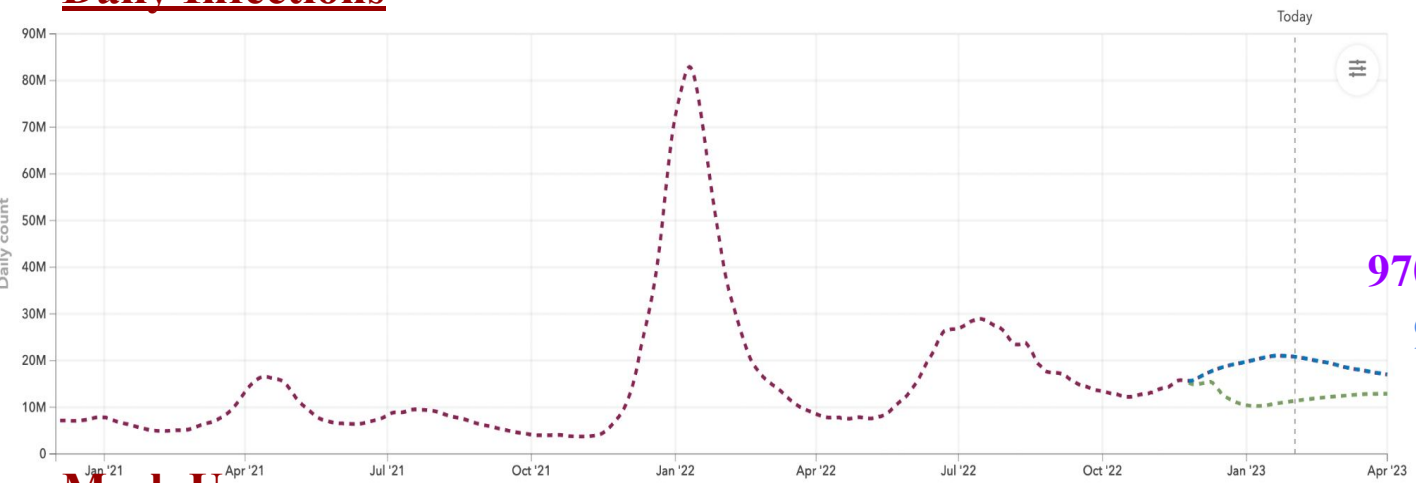
Source: IHME

IHME: 3-Month Global Forecast

- Daily infections projected to decrease to 970.23/100k under current scenario

(IHME/University of Washington, 3/20/2023)

Daily Infections



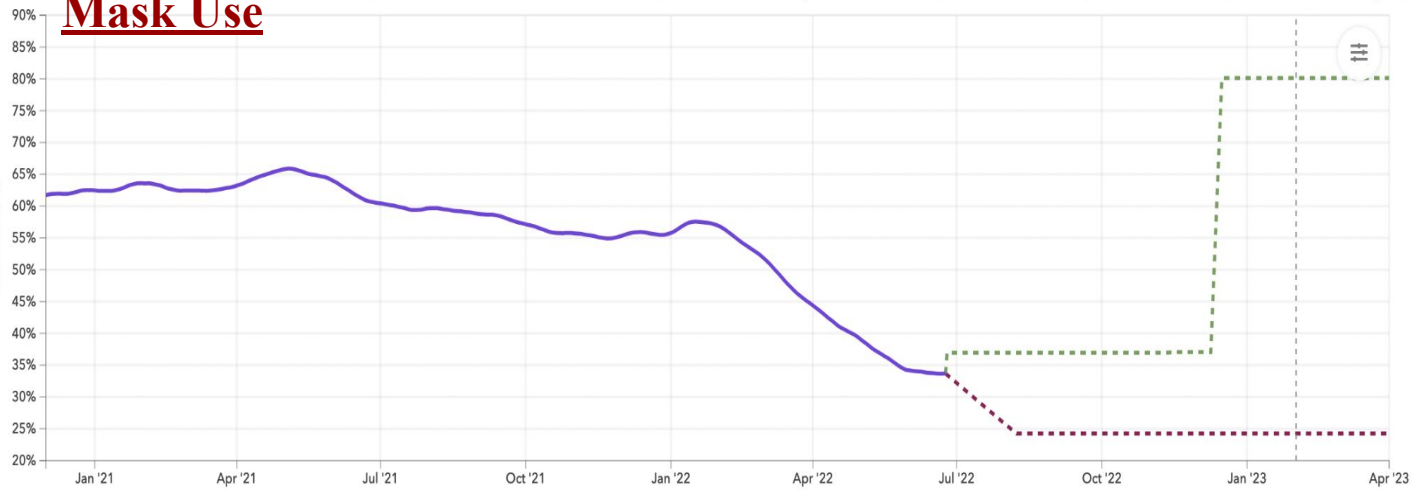
(per100k)

970.23 (Current Projection)

968.83 (Global Antivirals)

529.77 (80% Mask Use)

Mask Use



80% Mask Use

Current Projection

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.

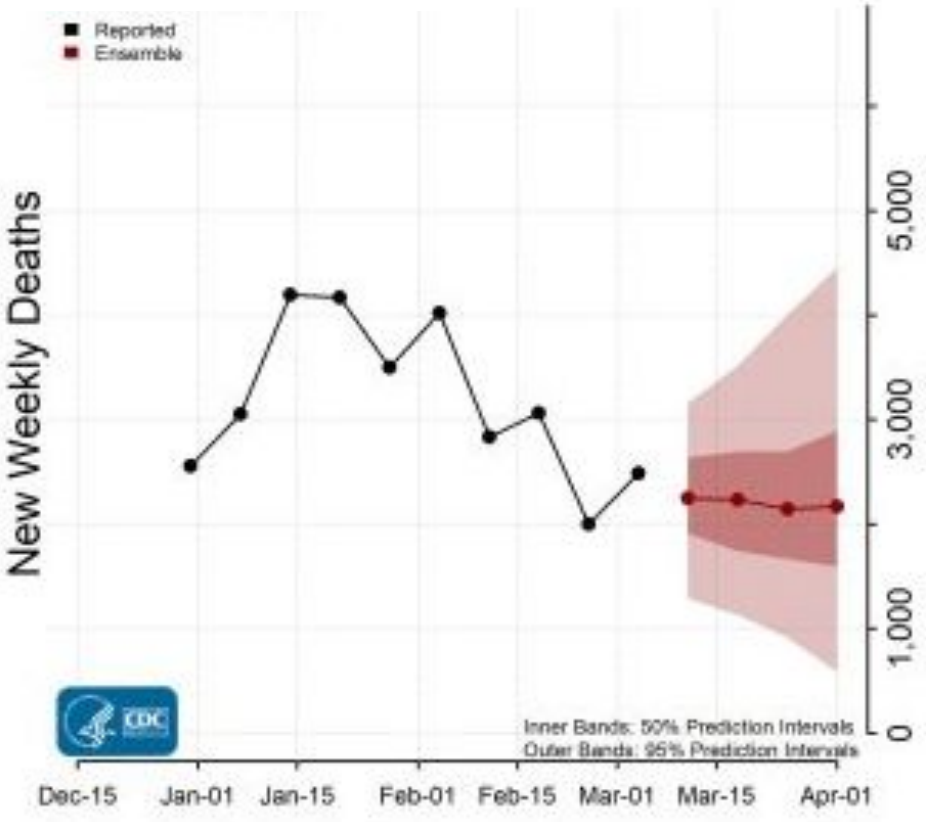
Source: IHME

CDC: US National Forecasts of New Deaths and Hospitalizations

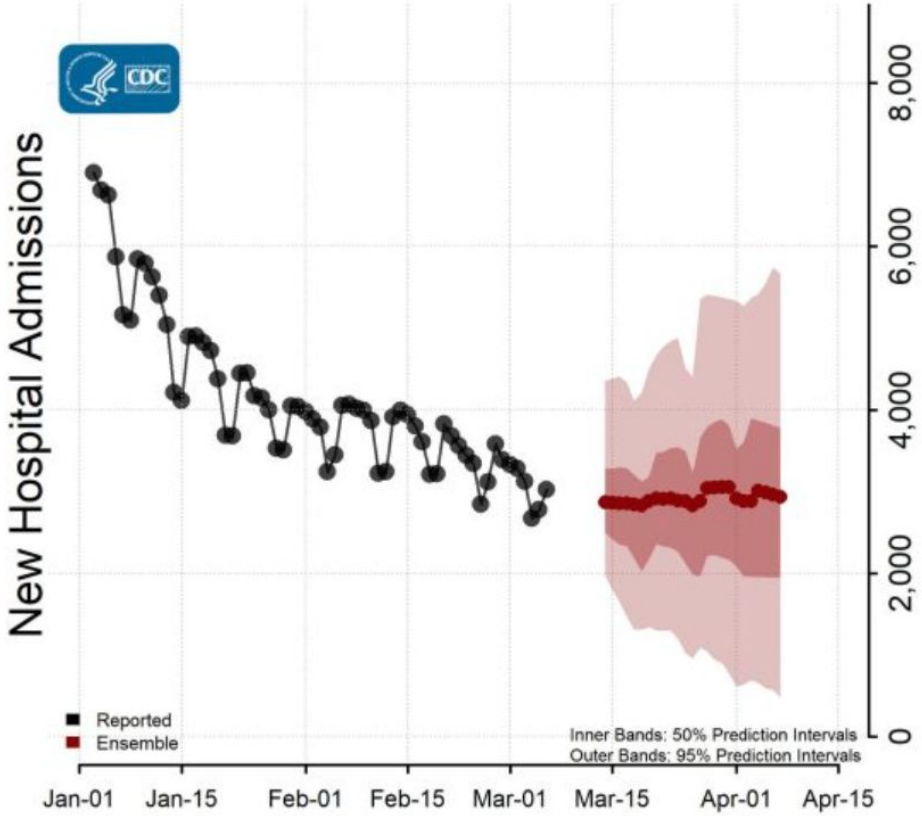
- No change projected

(CDC, 3/20/2022)

New Deaths



Hospitalization



Predictions from 27 institutes across the nation.

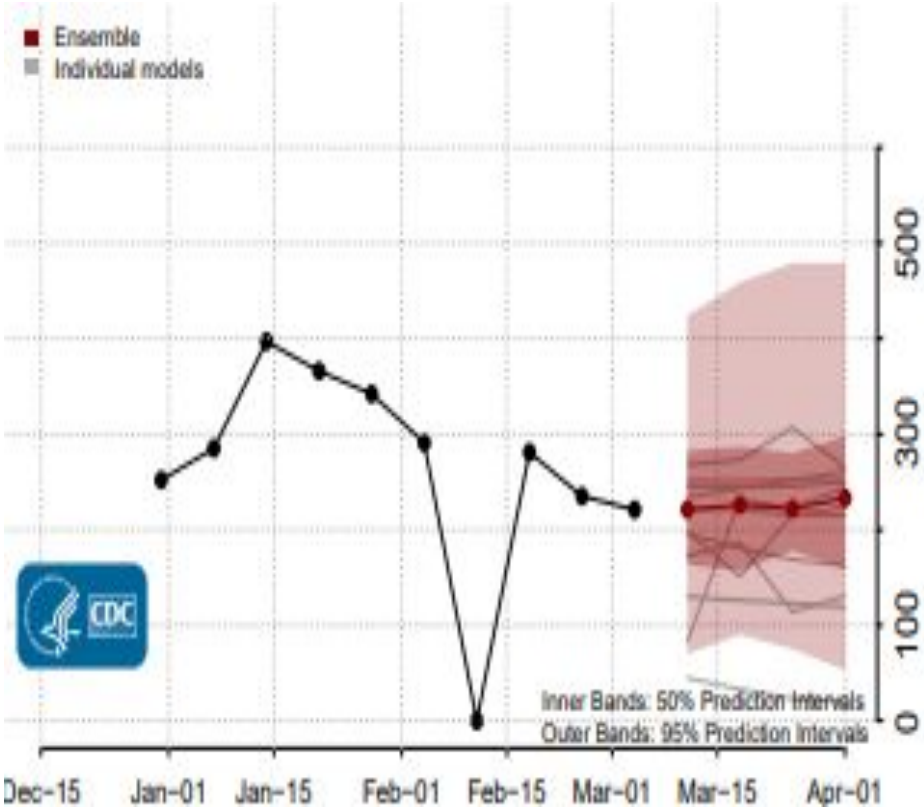
Source: CDC

CDC: California Forecasts of New Deaths and Hospitalizations

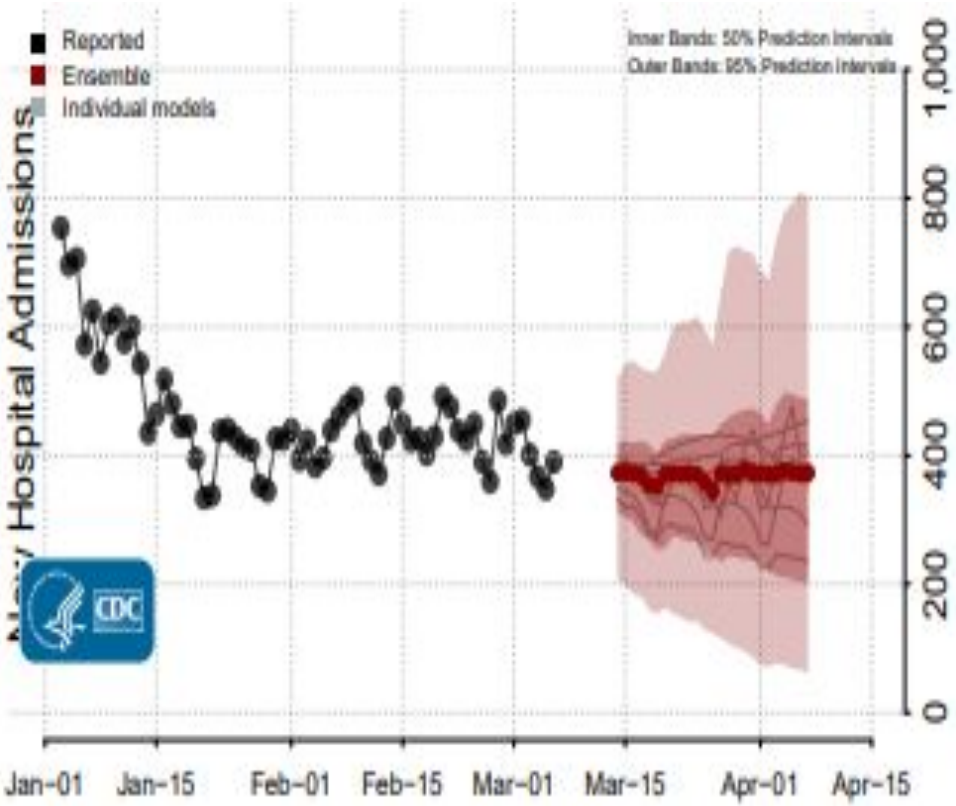
- No change projected

(CDC, 3/20/2022)

New Deaths



Hospitalization



Predictions from 27 institutes across the nation.

Source: CDC

Forecasting the Trajectory of COVID into 2023 Under Plausible Variant and Intervention Scenarios

(medRxiv , 3/8/2023)

- **Forecasts in a preprint for hospitalizations and death tolls of 5 different COVID variant scenarios eyeing what might be next and how to prepare.**
- **On a baseline level, if nothing changes from now to Jun., there will be 3.54 billion infections, 6.26 million hospitalizations and 1.58 million deaths.**
- **If any change does occur, the most likely thing to happen will be a shift in an omicron-like variant, which could lead to 5.19 billion infections, 13.6 million hospitalizations and 2.74 million deaths.**
- **The least likely scenario is the emergence of a variant that combines the infectiousness of omicron with the severity of delta, could result in 5.19 billion new infections, 30.2 million hospitalizations and 15.9 million deaths.**

Source: medRxiv

5. Vaccines, Variants, Treatments & Guidelines

CDC: XBB.1.5 Continues Growth

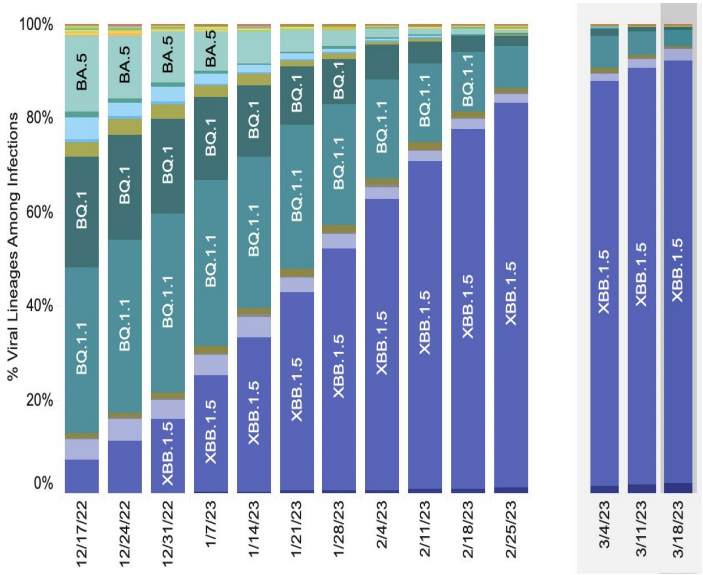
- **XBB.1.5 increased from 86.3% to 90.2% in 3 weeks**
- **BQ.1.1 decreased from 6.9% to 3.5% in 3 weeks**

(CDC, 3/20/2023)

- **XBB.1.5 and XBB.1.5.1 continue to grow across all US regions while all other variants continue to decline.**

Feb. 26-Mar. 4	Mar. 5-Mar. 11	Mar. 12-Mar. 18
XBB.1.5: 86.3%	**XBB.1.5: 88.8%**	**XBB.1.5: 90.2%**
XBB: 1.8% BQ.1.1: 6.9% BQ.1: 1.6%	XBB: 2.1% BQ.1.1: 4.9% BQ.1: 1.1%	XBB: 2.5% BQ.1.1: 3.5% BQ.1: 0.7%
XBB.1.5.1: 1.6%	XBB.1.5.1: 1.9%	XBB.1.5.1: 2.2%

Variant Proportion (US)*



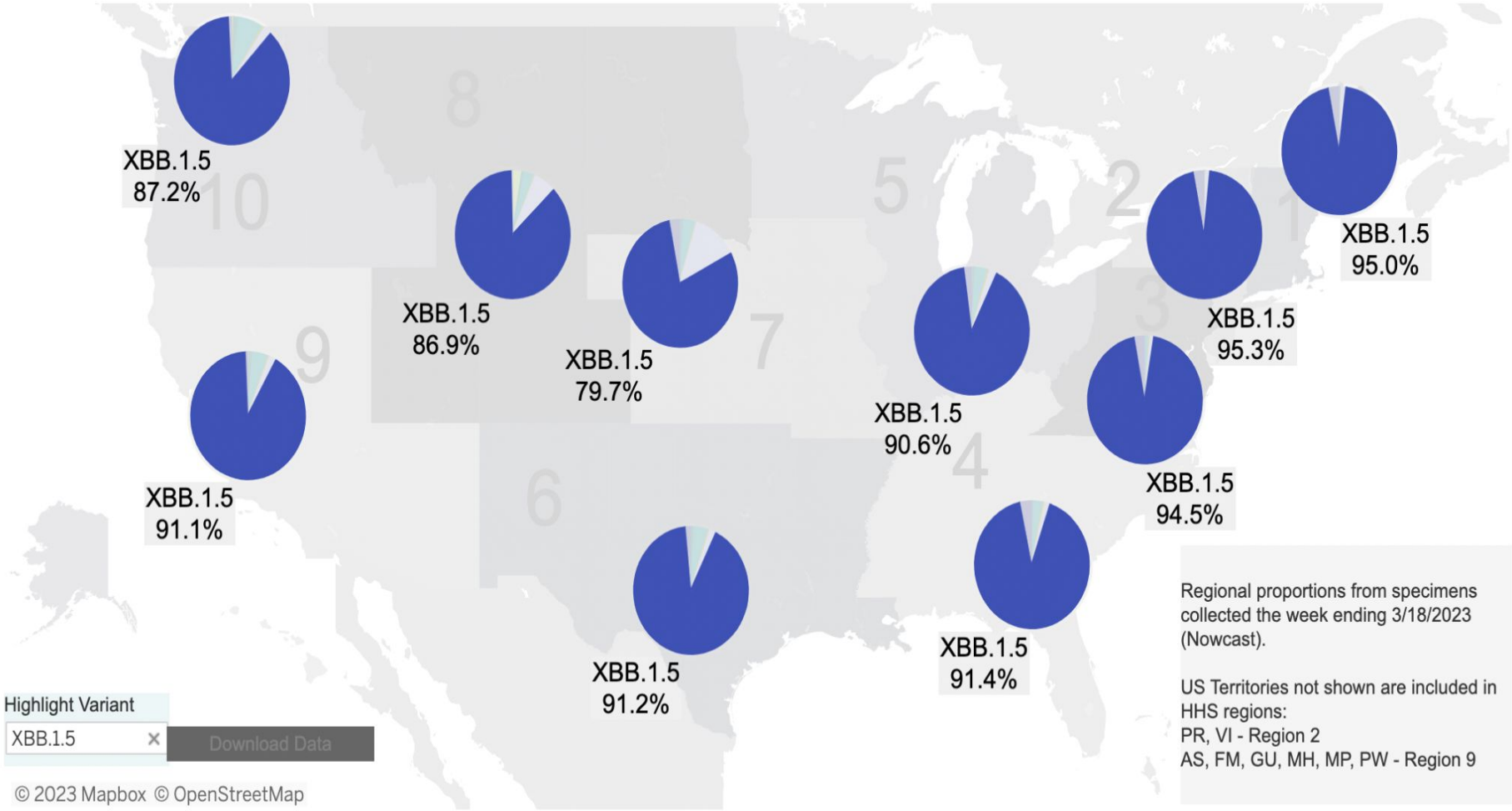
*Variant proportion data subject to change on a week-by-week basis.

Source: CDC

HHS: XBB.1.5 Prevalence by Region

- XBB.1.5 dominance remains unchanged in all regions

(CDC, 3/20/2023)



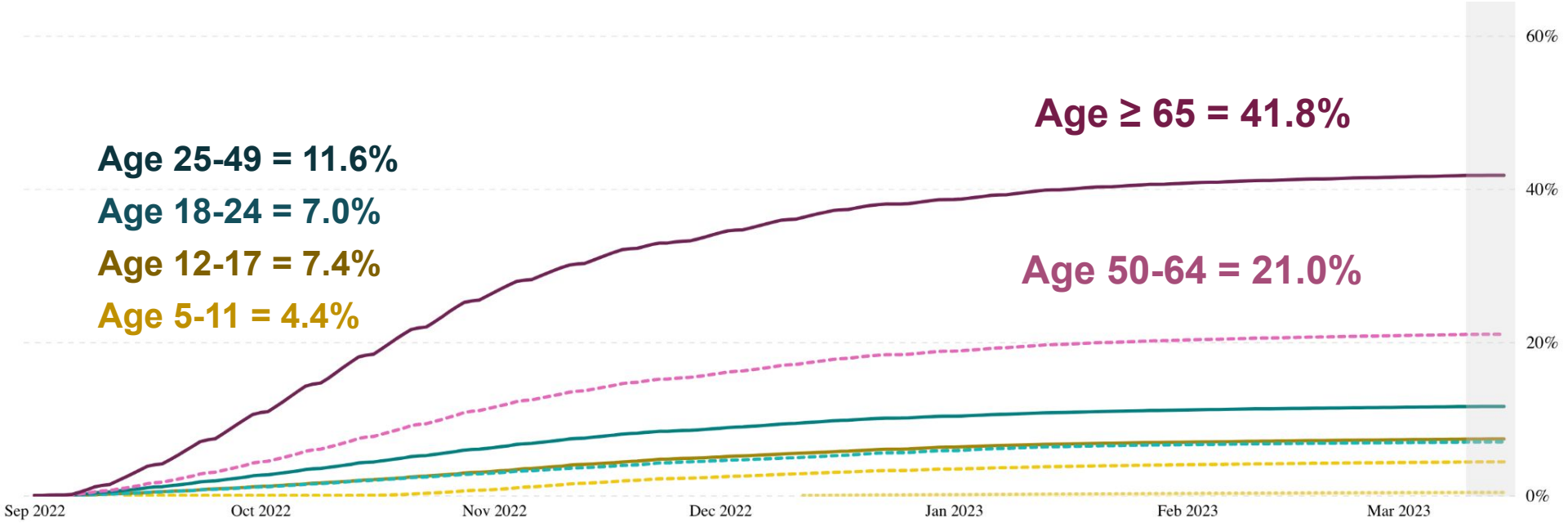
Source: HHS, CDC

Bivalent Booster Uptake in the US

- 54 million (16.4%) have received the bivalent booster

(CDC, 3/20/2023)

	<2 yrs	2-4 yrs	5-11 yrs	12-17 yrs	18-24 yrs	25-49 yrs	50-64 yrs	+65 yrs
At Least One	8.1%	10.5%	39.8%	72.0%	82.1%	85.3%	95.0%	95.0%
Completed Primary	4.1%	5.7%	32.7%	61.7%	66.6%	72.1%	83.8%	94.3%
Updated (Bivalent) Booster	0.3%	0.4%	4.4%	7.4%	7.0%	11.6%	21.0%	41.8%



Source: CDC

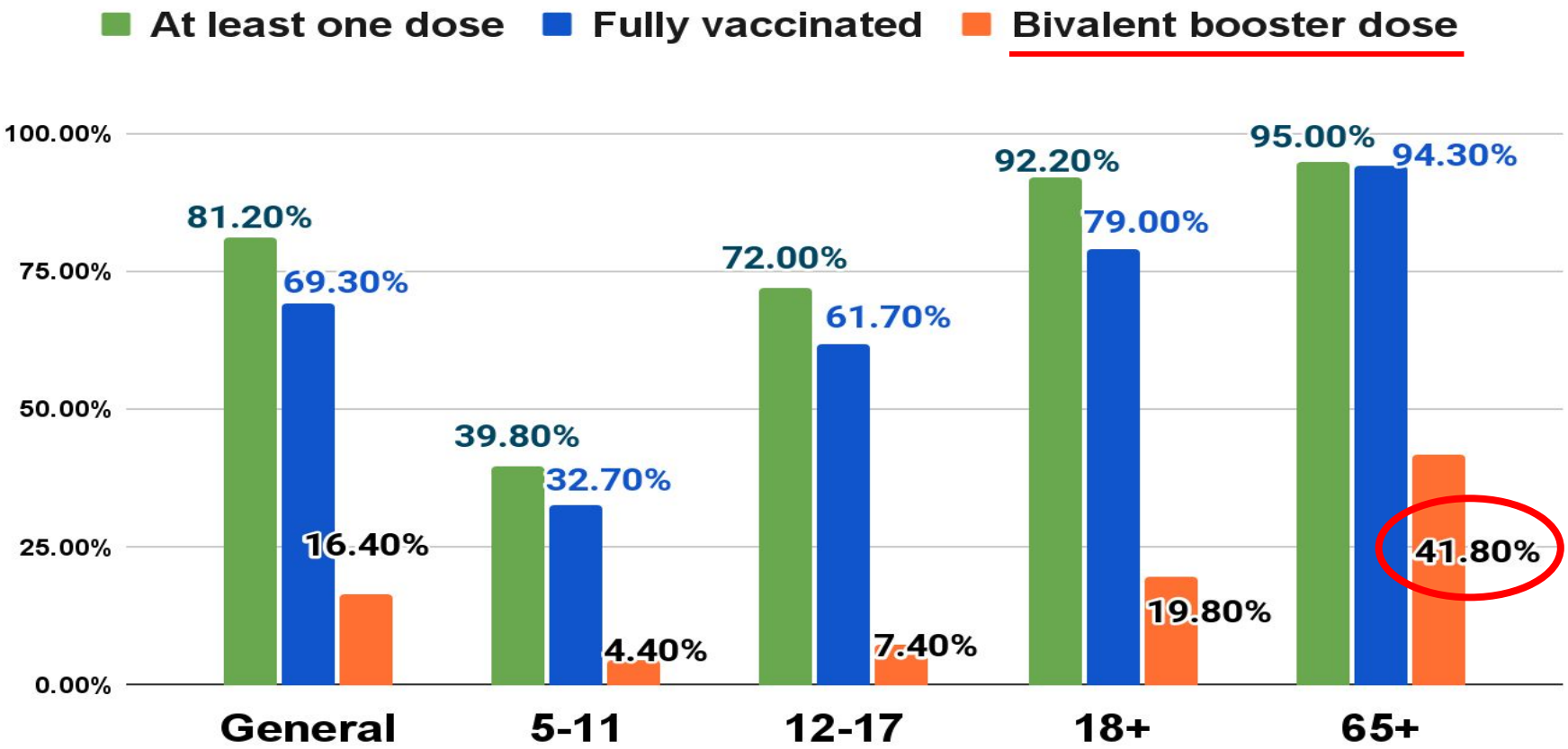
COVID-19 Vaccinations in the US

- 69.3% are fully vaccinated

- 54 million people (16.4%) have gotten bivalent boosters

- 41.8% of 65+ y/o received bivalent boosters

(CDC, 3/20/2023)



Source: CDC

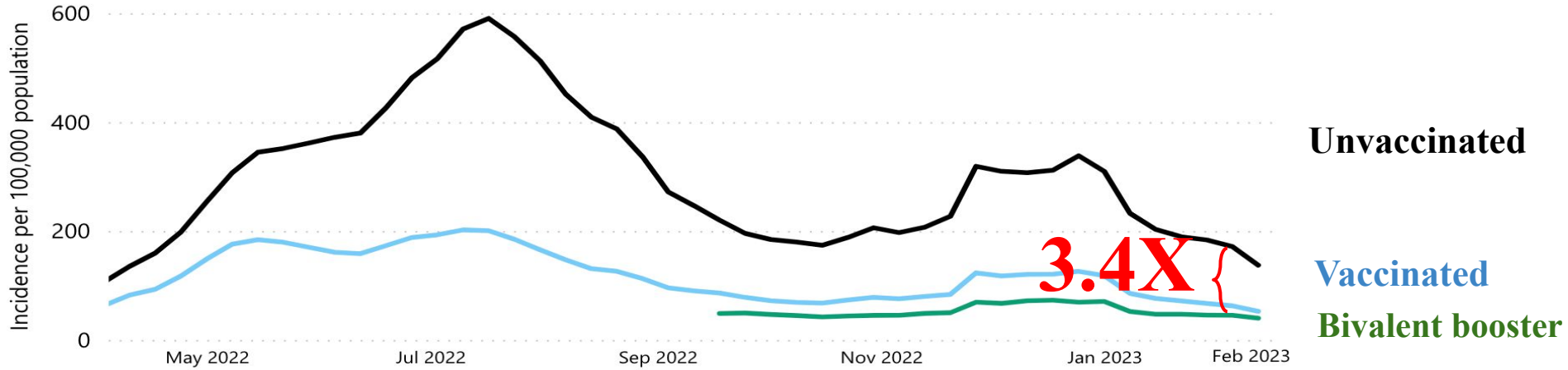
Source: CDC

Cases and Deaths by Vaccination Status

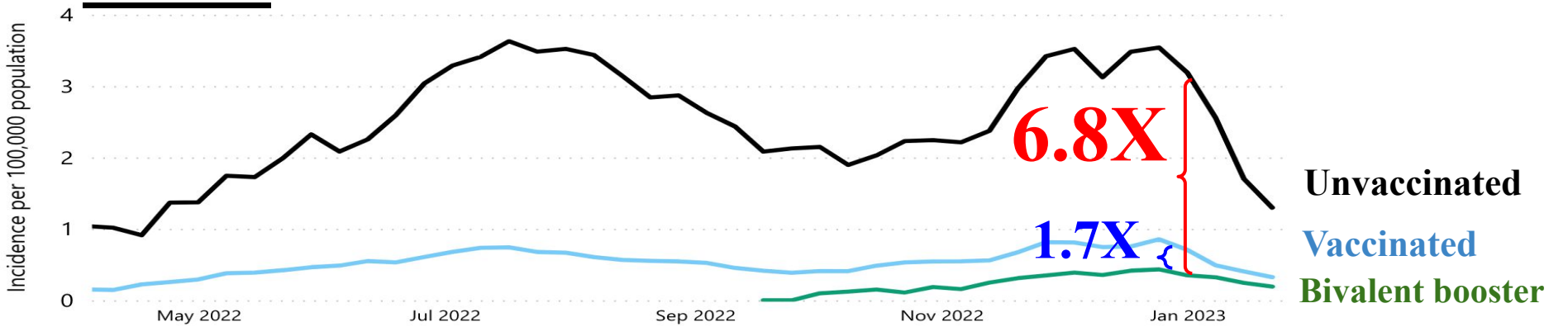
- Deaths for unvaccinated vs. bivalent booster: 6.8X
- Deaths for monovalent vs. bivalent booster: 1.7X

(CDC, 3/20/2023)

Cases



Deaths



COVID-19 Vaccines Approved or Authorized for EUA by the FDA
- Important guidelines for physicians to administer COVID vaccines

(CDC, 3/16/2023)

Age	Primary series (timing of vaccination)		Bivalent booster dose†
	For most persons	For moderately or severely immunocompromised persons	
6 mos–4 yrs	2-dose Moderna (0, 4–8 wks) or	3-dose Moderna (0, 4, 8 wks) or	Moderna or Pfizer-BioNTech
	3-dose Pfizer-BioNTech (0, 3–8, 11–16 wks)	3-dose Pfizer-BioNTech (0, 3, 11 wks)	
5 yrs	2-dose Moderna (0, 4–8 wks) or	3-dose Moderna (0, 4, 8 wks) or	Pfizer-BioNTech
	2-dose Pfizer-BioNTech (0, 3–8 wks)	3-dose Pfizer-BioNTech (0, 3, 7 wks)	
6–11 yrs	2-dose Moderna (0, 4–8 wks) or	3-dose Moderna (0, 4, 8 wks) or	Moderna or Pfizer-BioNTech
	2-dose Pfizer-BioNTech (0, 3–8 wks)	3-dose Pfizer-BioNTech (0, 3, 7 wks)	
12–17 yrs	2-dose Moderna (0, 4–8 wks) or	3-dose Moderna (0, 4, 8 wks) or	Moderna or Pfizer-BioNTech
	2-dose Novavax (0, 3–8 wks) or	2-dose Novavax (0, 3 wks) or	
	2-dose Pfizer-BioNTech (0, 3–8 wks)	3-dose Pfizer-BioNTech (0, 3, 7 wks)	
≥18 yrs§	2-dose Moderna (0, 4–8 wks) or	3-dose Moderna (0, 4, 8 wks) or	Moderna or Pfizer-BioNTech Novavax monovalent booster may be used in limited situations¶
	2-dose Novavax (0, 3–8 wks) or	2-dose Novavax (0, 3 wks) or	
	2-dose Pfizer-BioNTech (0, 3–8 wks)	3-dose Pfizer-BioNTech (0, 3, 7 wks)	

COVID-19 Vaccination Schedule for Moderately or Severely Immunocompromise Who Are Unable or Unwilling to Get a Bivalent mRNA Booster

(CDC, 11/7/2022)

Adult Schedule

Ages 18 years and older (Primary Series: Moderna or Pfizer-BioNTech)

Primary → 3 or 4 weeks* → Primary → At least 4 weeks → Primary → At least 6 months → Novavax Booster†

Only WITHOUT receipt of previous booster(s)

If unable or unwilling to get a bivalent mRNA

Ages 18 years and older (Primary Series: Novavax)

Primary → 3 weeks → Primary → At least 6 months → Novavax Booster†

Only WITHOUT receipt of previous booster(s)

If unable or unwilling to get a bivalent mRNA

Ages 18 years and older (Primary Series: Janssen)

Primary → At least 4 weeks → Additional dose → At least 6 months → Novavax Booster†

Only WITHOUT receipt of previous booster(s)

If unable or unwilling to get a bivalent mRNA

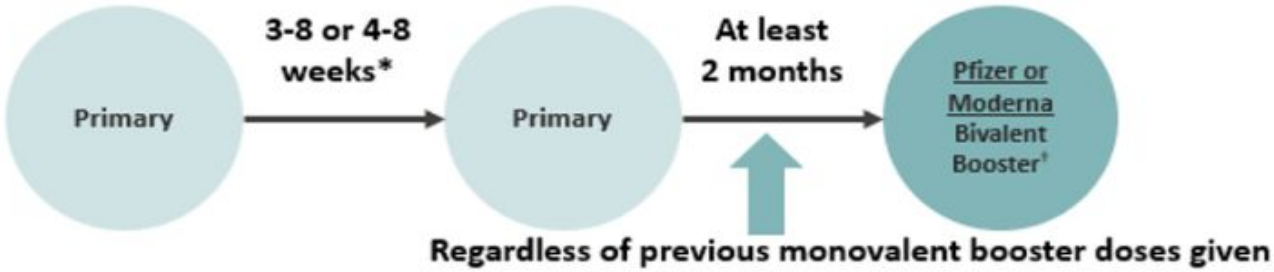
CDC

COVID-19 Vaccination Schedule for Adults who are NOT Moderately or Severely Immunocompromised

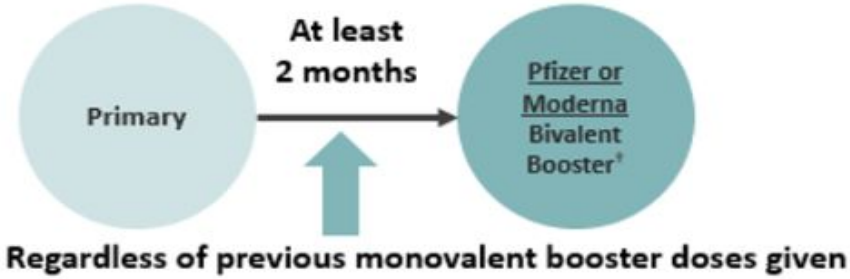
- Those unable to get a bivalent mRNA booster, a monovalent Novavax booster is recommended

(CDC, 11/7/2022)

Ages 18 years and older
(Primary Series: Moderna, Novavax, or Pfizer-BioNTech)



Ages 18 years and older
(Primary Series: Janssen)

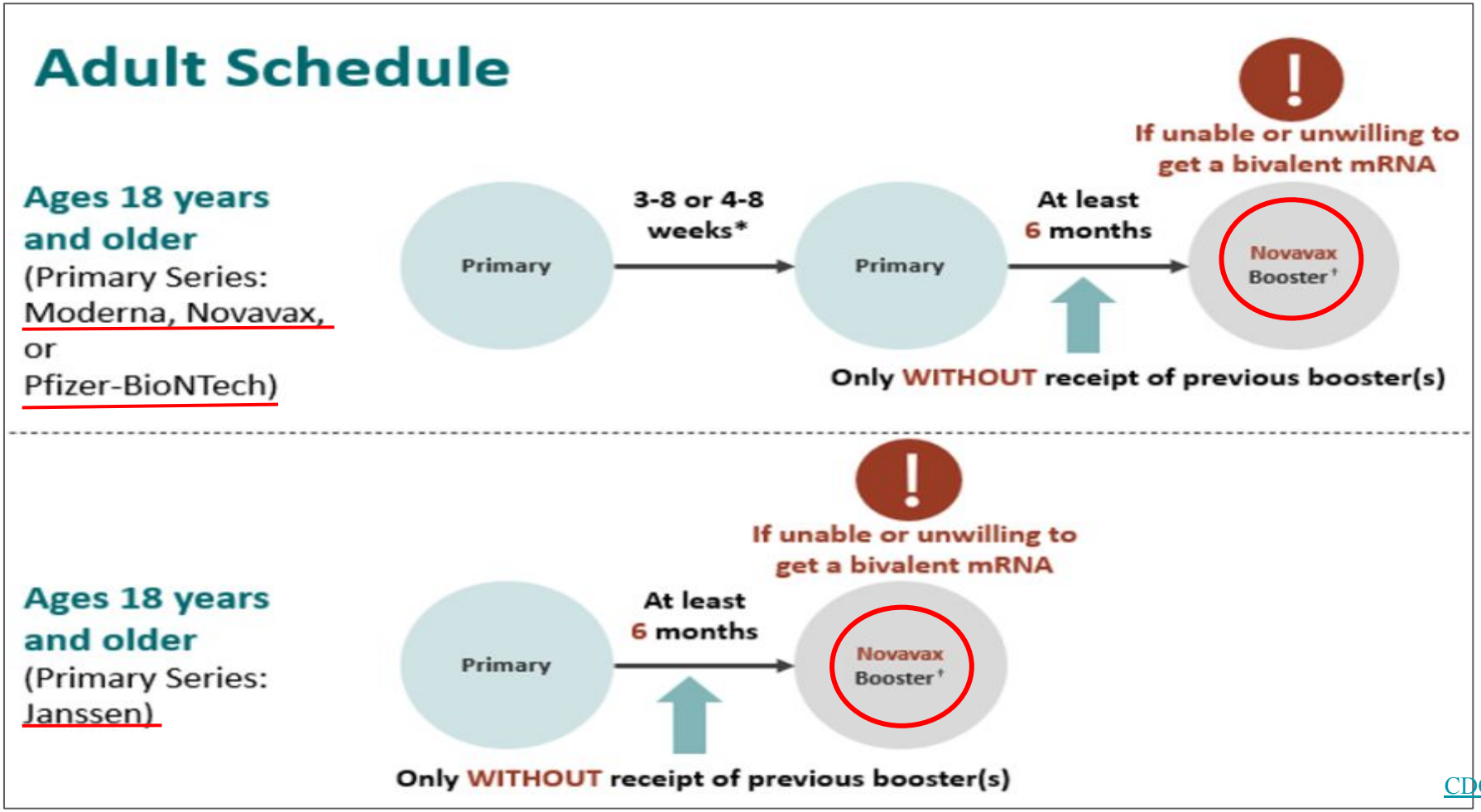


CDC

COVID-19 Vaccination Schedule for Healthy Adults Who Are Unable or Unwilling to Get a Bivalent mRNA Booster

- A monovalent Novavax booster dose is recommended at least 6 months after the primary series only without receipt of a previous booster(s)

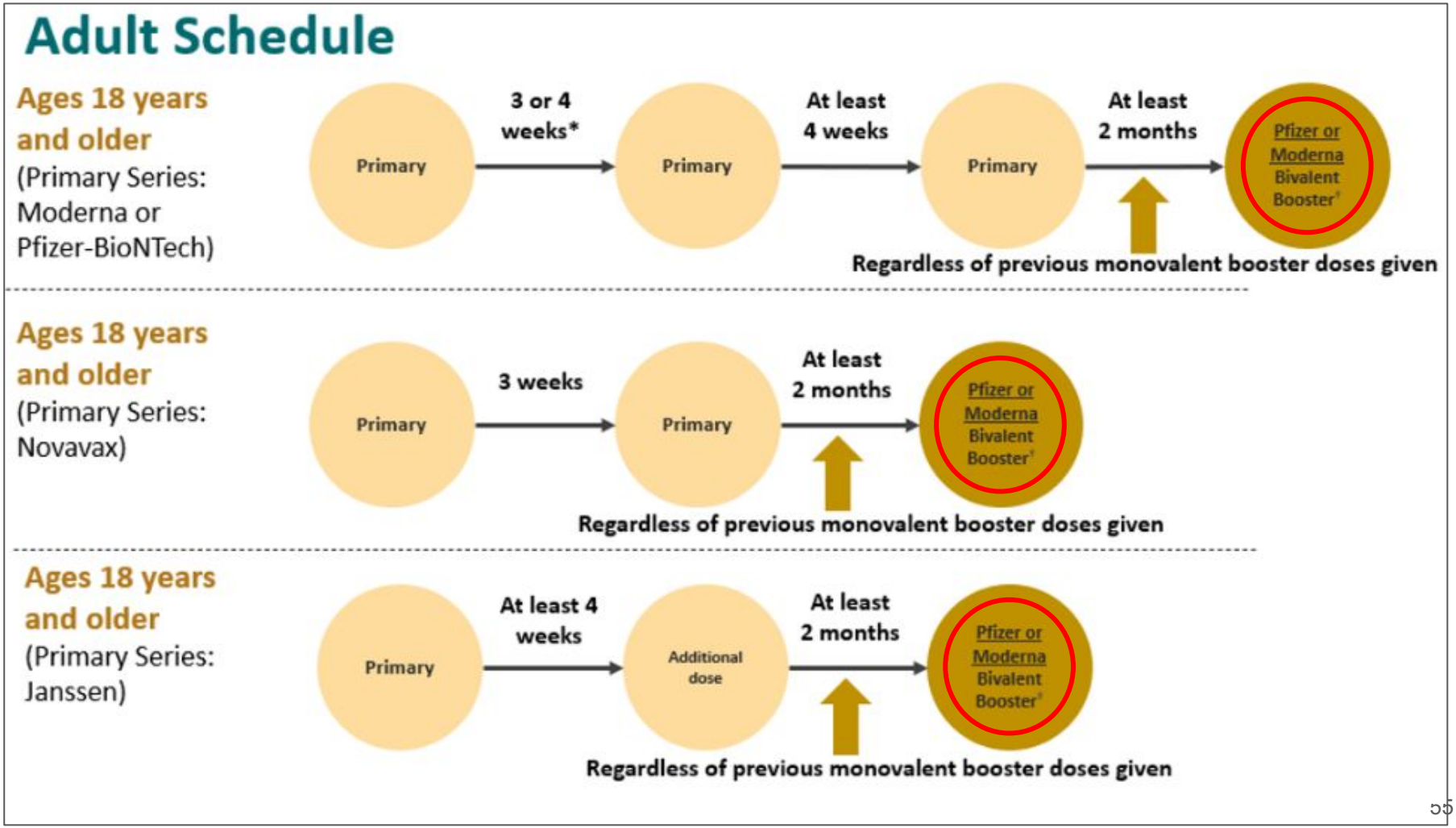
(CDC, 11/7/2022)



CDC

COVID-19 Vaccination Schedule for Adults Who are Moderately or Severely Immunocompromised

(CDC, 11/7/2022)



CDC

CDPH: Updated Health Care Worker Vaccine Requirement

(CDPH, 3/3/2023)

COVID-19 Vaccine	Primary Series	When to get the vaccine booster dose	Which vaccine booster dose to receive
Moderna, Pfizer, Novavax, or vaccines authorized by WHO	1st & 2nd doses	Booster: at least 2 months; no more than 6 months after 2nd dose	Moderna or Pfizer are preferred. Novavax is not authorized for use as a booster dose at this time.
Janssen	1st dose	Booster: at least 2 months; no more than 6 months after 2nd dose	Moderna or Pfizer are preferred. Novavax is not authorized for use as a booster dose at this time.
WHO emergency use listing COVID vaccine	All recommended doses	Booster: at least 2 months; no more than 6 months after getting all recommended doses	Single booster of Moderna or Pfizer vaccine. Novavax is not authorized for use as a booster dose at this time.
A mix and match series composed of any combination of FDA-approved, FDA-authorized, or WHO-EUL COVID vaccines	All recommended doses	Booster: at least 2 months; no more than 6 months after getting all recommended doses	Single booster of Moderna or Pfizer vaccine. Novavax is not authorized for use as a booster dose at this time.

Source: CDPH

FDA Flags J&J's COVID Vaccine for Myocarditis, Pericarditis Risk

(FDA, 3/13/2023)

- **The FDA updated its fact sheet for healthcare providers about Johnson & Johnson's COVID vaccine to include warnings of myocarditis and pericarditis.**
- **FDA said symptoms typically happen within eight days of inoculation but the risk is very low.**
- **People who receive the vaccine and experience chest pain, shortness of breath, or feelings of having a fast-beating, fluttering or pounding heart are instructed to seek immediate medical attention.**
- **The fact sheet was revised on Mar. 13, about 10 months after the FDA limited the shot's use after worries of a blood clot risk.**

Source: FDA

6. COVID Summary Report

1. *FDA voted 16-1 to fully approve Paxlovid. No major safety concerns identified, but 137 possible drug-drug interactions were flagged.*
2. *Public health emergency ended in CA (2/28) and will end in the US (5/11). WHO expects to announce the pandemic's end in late 2023.*
3. *Healthy lifestyle factors may reduce long COVID risk by half.*
4. *COVID infection may increase cardiac complications risk by >2-fold.*
5. *Cases and deaths continue to decrease globally (and in the US).*
6. *Over 16% of the US population has received the bivalent booster. Efficacy is strong and increased booster uptake is recommended.*

Thank You!