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**THE COVID STATES PROJECT:
A 50-STATE COVID-19 SURVEY
REPORT #100: ESTIMATING CURRENT
VACCINATION RATES**

USA, March 2023

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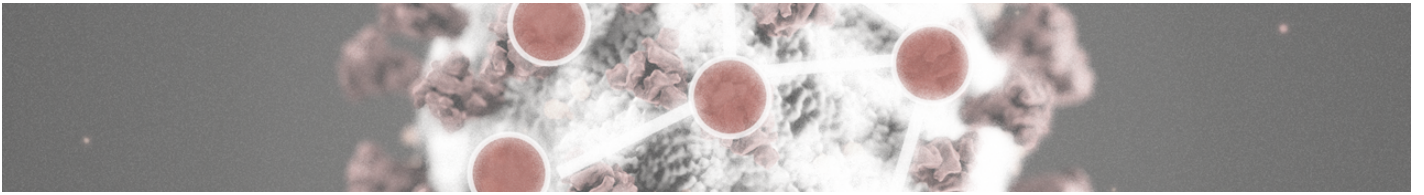
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Report of March 22, 2023, v.1

The COVID States Project

From: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States

A joint project of:

Northeastern University, Harvard University, Rutgers University, and Northwestern University

Authors: David Lazer (Northeastern University); Alexi Quintana (Northeastern University); Ata Uslu (Northeastern University); Roy H. Perlis (Harvard Medical School); Matthew A. Baum (Harvard University); James Druckman (Northwestern University); Kristin Lunz Trujillo (Northeastern University); Jon Green (Northeastern University); Katherine Ognyanova (Rutgers University); Hong Qu (Northeastern University); Alauna C. Safarpour (Harvard University); Mauricio Santillana (Harvard Medical School), and Jonathan Schulman, (Northwestern University)

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Northeastern University
Network Science Institute



COVER MEMO

Summary Memo — March 22, 2023

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Note on methods:

Between December 22, 2022 and January 17, 2022, we surveyed 24,948 individuals age 18 and older across all 50 states plus the District of Columbia. The survey was conducted by PureSpectrum via an online, nonprobability sample, with state-level representative quotas for race/ethnicity, age, and gender (for additional details, see covidstates.org). In addition to balancing on these dimensions, we reweighted our data using demographic characteristics to match the U.S. population with respect to 2020 vote choice and turnout, race/ethnicity, age, gender, education, and living in urban, suburban, or rural areas. This was the latest in a series of surveys we have been conducting since April 2020, examining attitudes and behaviors regarding COVID-19 in the United States.

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Estimating current vaccination rates

This report summarizes vaccination rates in the United States and compares estimates of vaccination rates from the COVID States Project (CSP), the Kaiser Family Foundation (KFF), and the Centers for Disease Control (CDC).

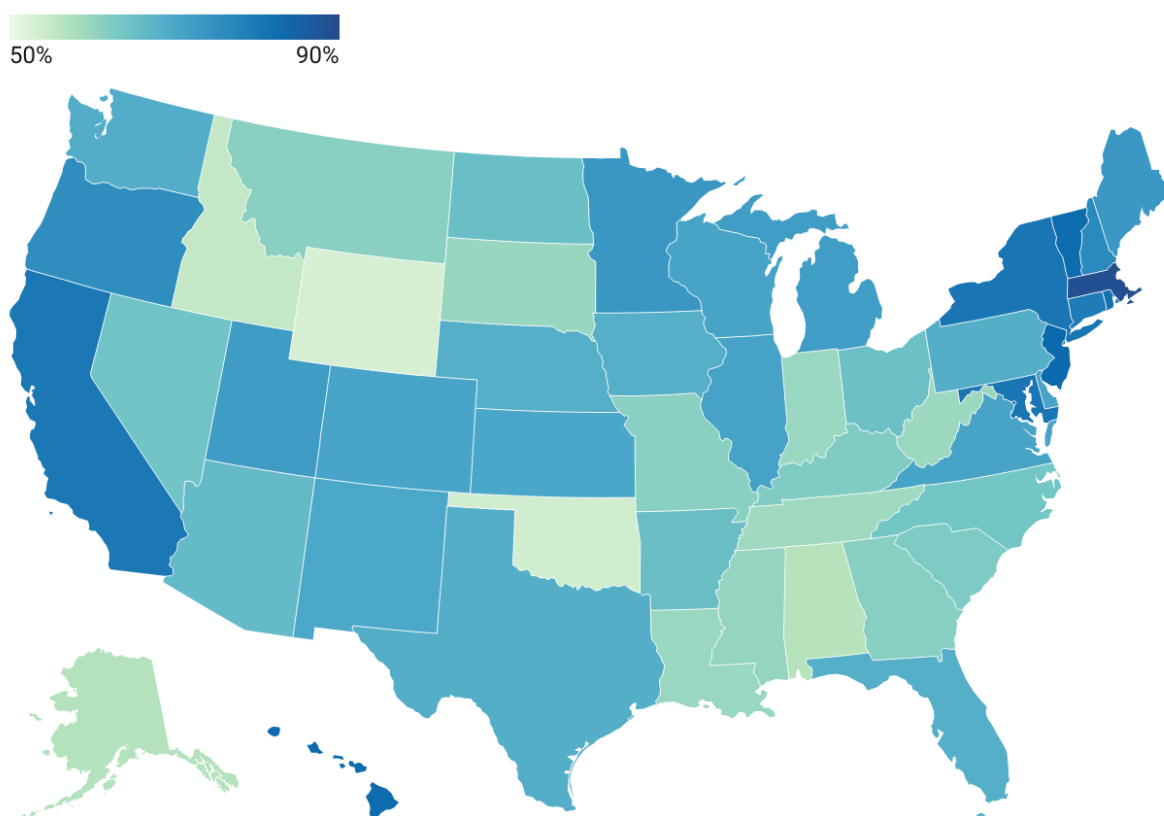
KEY FINDINGS

- Vaccination rates for the primary series of vaccinations have plateaued since the Fall of 2021.
- The regions with the highest vaccination rates are the Northeast and the West Coast plus Hawaii. The regions with the lowest rates are the South, and a block of adjacent states in the upper West/Midwest (the Dakotas, Montana, Wyoming, and Idaho)
- Less than a third of respondents report getting the bivalent booster, with majorities in every state reporting not getting the bivalent booster.
- CDC data deviate quite substantially from survey-based measures (CSP and KFF) of vaccination rates. These deviations almost certainly reflect errors in the underlying official records used by the CDC, driven by the inability of states to link records of multiple shots to a given individual. Official data thus offer a distorted picture of the trends in vaccination rates in the country, and where those distortions have grown over time.

Regional variations in current vaccination rates

This report summarizes the current state of vaccination in the United States. The most recent COVID States Project (CSP) survey data (survey conducted from 12/22/2022 to 01/17/2023) indicate that the current national vaccination rates for the “primary series” (either 2 shots of Pfizer and/or Moderna, or 1 shot of Johnson & Johnson) is 73%. The regions with the highest vaccination rates are the Northeast (led by Massachusetts, at 89% of the population with the primary series) and the West Coast + Hawaii. The regions with the lowest rates are the South, and a bloc of adjacent states in the upper West/Midwest (the Dakotas, Montana, Wyoming, and Idaho). Every state in these two regions is below the national average for vaccination rates, with Wyoming at the lowest level of vaccination rates, at 53%. See Figures 1 and 2 and Table 1 for estimates of vaccination rates at the state level.

Percentage with a Complete Vaccination Series



National sample, N=24,948, Time period: 12/22/2022-01/17/2023

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of Northeastern University, Harvard University, Rutgers University and Northwestern University) www.covidstates.org • Created with Datawrapper

Figure 1: Rates of vaccination for the primary series of shots

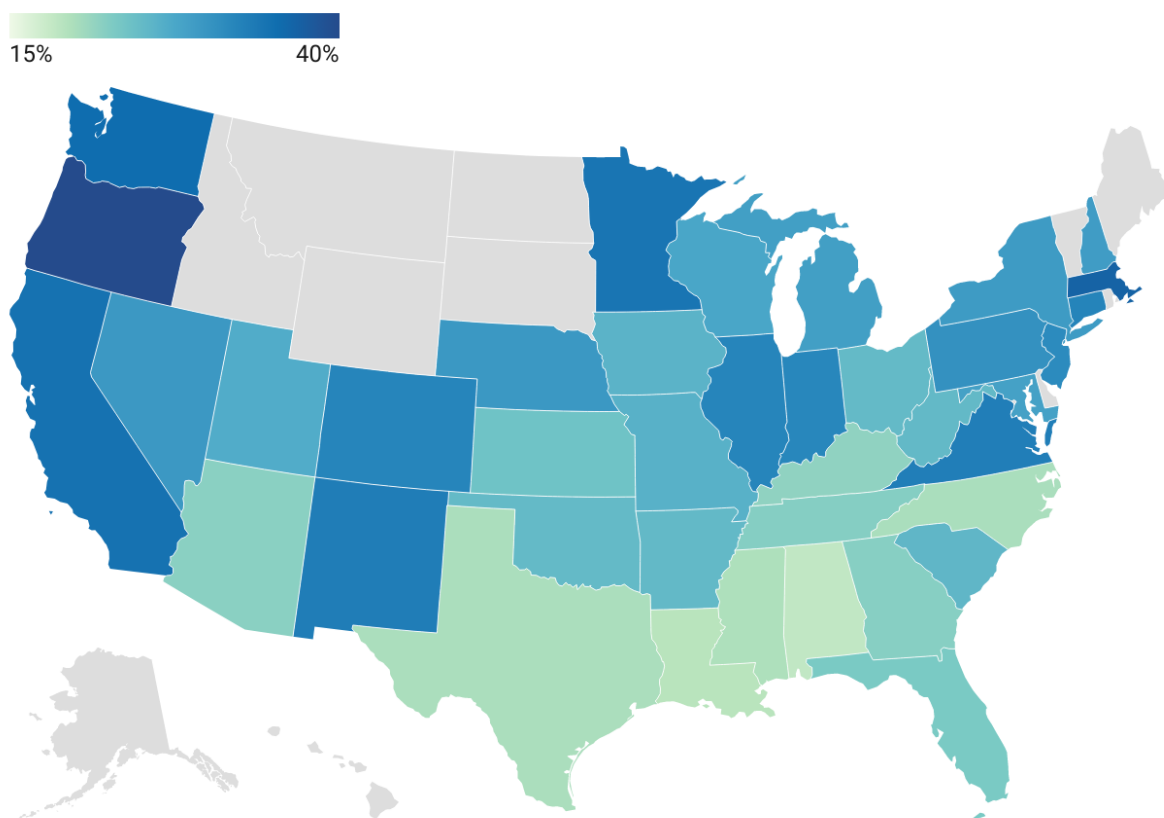
The COVID States Project (CSP) estimates that 29% of adults have received the bivalent booster, with a very similar rank ordering of vaccination levels among states compared to the primary series (see Figure 2).

As a point of comparison, the Kaiser Family Foundation (KFF) estimates that (as of January, 2023) 28% of adults have received a bivalent booster, while the Centers for Disease Control (CDC) estimates 19.8% (as of March 15, 2023).

See discussion below for the likely reason that the CDC data undershoot the survey-based estimates.

Percentage with a bivalent booster shot

States in grey are states with samples sizes too small to provide a reliable estimate.



National sample, N=24,948, Time period: 12/22/2022-01/17/2023

Source: The COVID-19 Consortium for Understanding the Public's Policy Preferences Across States (A joint project of Northeastern University, Harvard University, Rutgers University and Northwestern University) www.covidstates.org • Created with Datawrapper

Figure 2: Rates of vaccination for the bivalent booster shot

Increased error rates in CDC estimates

At the national level, the CSP estimates for vaccination rates align closely with the KFF estimates, but both are increasingly out of alignment with the CDC data. Figure 3 shows the temporal trajectory of percentage of adults with a single shot for the CSP, KFF, and CDC data; and Figure 4 the trajectory of the primary series. Notably, unlike the CSP and KFF data, the CDC data shows a continued trend upwards in vaccination rates.

The CDC data starts to overshoot the CSP and KFF data for “at least one shot” beginning in July, 2021, with a gap that increases to this day. There is currently a gap between CSP and CDC estimates of 17 percentage points (92% for the CDC, versus 75% for CSP). That is, CSP estimates indicate that there are about 3 times as many people who are completely unvaccinated than the CDC estimates.

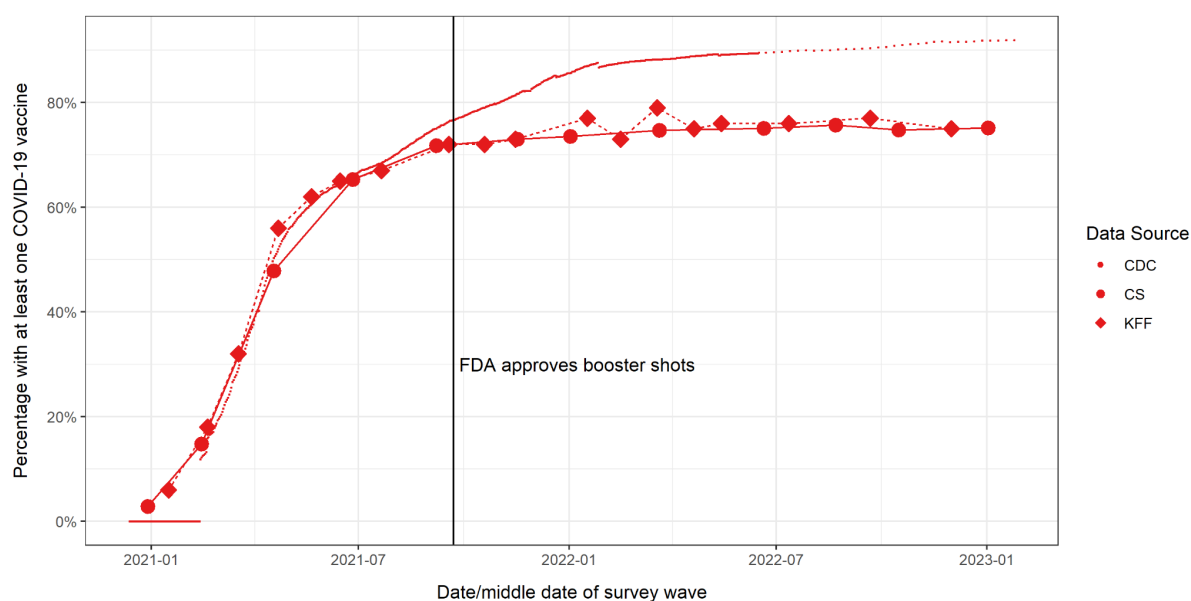


Figure 3: Temporal trajectory of percentage of adults with at least a single shot of vaccine

There is a similar, if less dramatic, dynamic for the estimates of completed primary series, where the CDC shows a slow but steady increase in completed primary series, whereas the CSP and KFF data suggest a plateauing by January 2022. The current gap in estimated vaccination rates between the CDC and CSP is about 6 points (73% versus 79%).

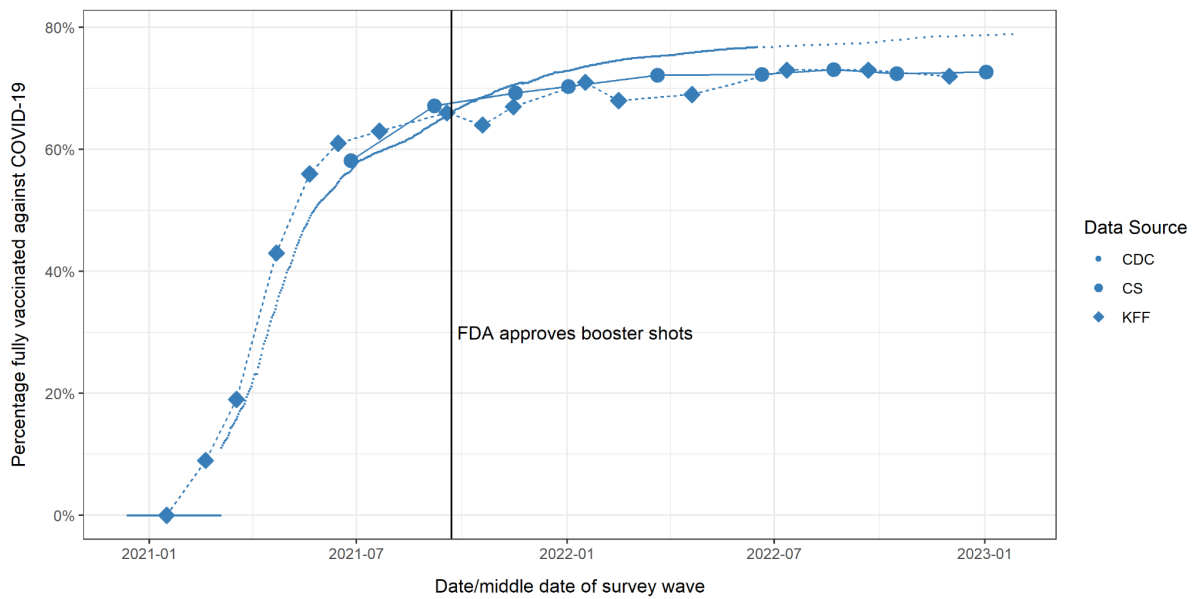


Figure 4: temporal trajectory of percentage of adults with primary series of vaccines

These overestimates by the CDC are further illuminated by comparing CDC and CSP estimates of state level vaccination rates with at least a single shot compared to CSP estimates (Figure 5), or the primary series (Figure 6). The 45 degree line indicates where the dots would cluster if CDC and CSP estimates were the same. Early in the vaccination campaign, the dots do cluster around the line; later, however, the dots are increasingly above the line, indicating that the CDC estimates for states are above those from CSP data.

The straight line of dots at the top of Figure 5, at 95% for CDC estimates, is a reflection of a manual capping of reporting. In the absence of capping the numbers at 95%, the CDC would be reporting that many states have well more than 100% of inhabitants with at least a single shot of vaccine.

For example, the CDC reports that [7.37 million adults](#) have received at least one shot of the vaccine in Massachusetts; there are, however, [only 5.6 million adults](#) in the state. That is, according to official data, 131% of Massachusetts adults have received at least one shot of the vaccine (versus an estimate of 89% from CSP). The CDC, however, reports that “only” 95% of Massachusetts adults have received a single shot, because they cap what they report at 95%.

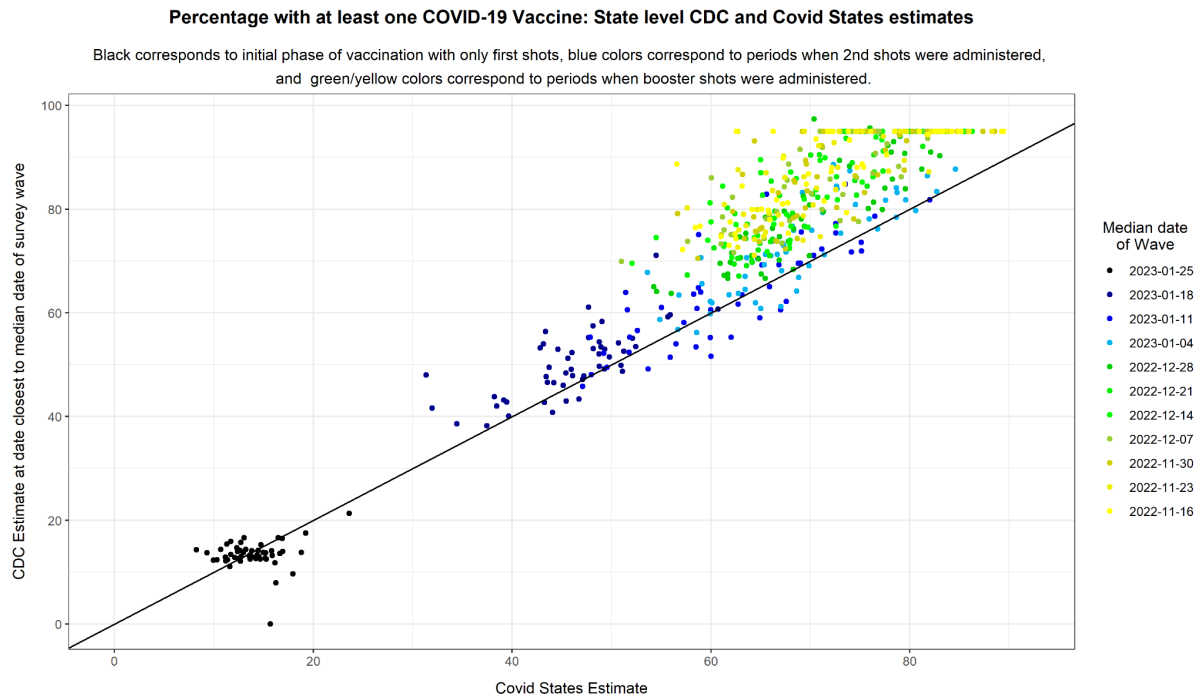


Figure 5: Percentage of population with at least one vaccine shot, CDC estimates versus COVID States Project estimates

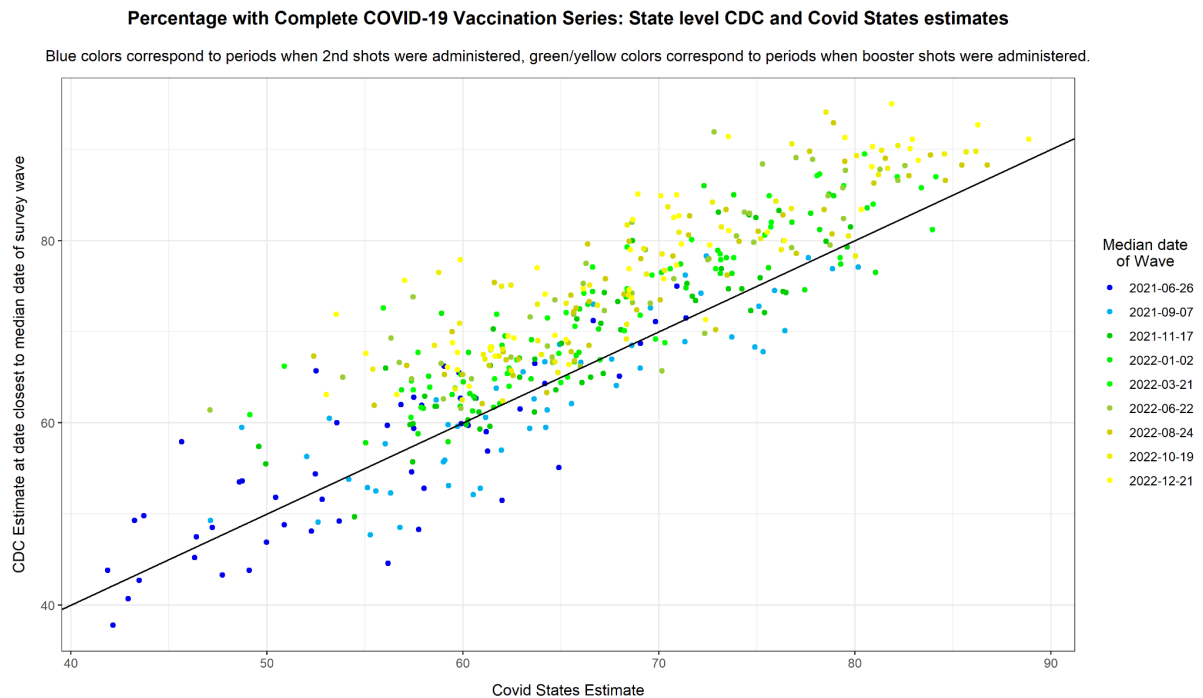


Figure 6: Percentage of population with primary series, CDC estimates versus COVID States Project estimates

The reason for these substantial deviations between CDC data and CSP/KFF data is that the CDC data records do not necessarily link the multiple shots that an individual receives to that individual, especially if that individual does not bring their vaccination card. As the CDC notes on its [website](#):

When possible, CDC links a person's first, second, and booster doses together. However, linking is sometimes not possible because CDC does not receive personally identifiable information about vaccine doses. This can lead to over-estimates of first doses and under-estimates of subsequent doses. CDC encourages people to bring their CDC COVID-19 Vaccination Record card with them to their appointment for another COVID-19 vaccine shot because having the card will help ensure the doses are linked.

The result is that the CDC data offer an increasingly inaccurate view of vaccination rates with each round of booster shots, with potentially important policy implications. Most obviously, there is a systematic overestimate of the population that has received a single shot/primary series, and an underestimate of the population that has received boosters (which is likely why CDC data undershoot CSP and KFF data with respect to bivalent boosters). For example, while the CDC data suggest that there is a gradual conversion of people towards vaccination, the CSP and KFF indicate a long standing plateau. The CDC data indicate a very large number of people who have received only a single shot (13%) of the vaccine, while the CSP data indicate that only 2% of the population has received only a single shot. There may well be other distortions driven by differential rates of subpopulations bringing their vaccination cards with them to get boosters. For example, we find that men are significantly more likely to not know where their vaccination card for their first COVID-19 vaccine dose is than women (8% versus 5%). These distortions in the CDC data are amplified by their wide re-use (see trackers from [New York Times](#), [US News and World Report](#), [NPR](#)), and thus are ramified through public discussion.

Appendix A: Vaccination Rates

Table 1: State level Covid States and CDC vaccination rates^{1,2}

Margins of error in parentheses

State	CSP: At least one shot	CSP: Complete Series	CDC: At least one shot	CDC: Complete Series	N
National	75 (1)	73 (1)	92	79	24943
AK	63 (7)	57 (7)	84	76	321
AL	59 (6)	57 (6)	77	63	415
AR	68 (6)	65 (6)	81	66	377
AZ	70 (5)	66 (5)	87	75	488
CA	82 (3)	80 (3)	94	83	1423
CO	74 (5)	71 (5)	93	82	456
CT	81 (5)	79 (5)	95	91	423
DC	89 (5)	86 (5)	95	93	272
DE	72 (6)	71 (6)	95	83	400
FL	71 (4)	69 (4)	94	79	699
GA	66 (5)	62 (5)	80	67	567
HI	85 (4)	83 (5)	95	90	435
IA	71 (6)	68 (6)	82	75	413
ID	58 (6)	55 (6)	76	68	454
IL	75 (5)	71 (5)	88	80	576
IN	61 (6)	60 (6)	75	68	463
KS	72 (6)	70 (6)	88	76	402

¹ The full time series data for vaccination rates for every state is available at <https://www.covidstates.org/vaccination-rates>.

² Covid State values correspond to the December 2022 - January 2023 wave, and CDC values correspond to 04/01/2023, the CDC release date closest to the middle date of the survey wave.

KY	65 (6)	62 (6)	80	70	413
LA	63 (6)	60 (6)	74	66	447
MA	89 (3)	89 (3)	95	91	604
MD	83 (4)	81 (4)	95	88	540
ME	76 (5)	74 (5)	95	91	435
MI	74 (4)	72 (4)	79	71	640
MN	75 (5)	74 (5)	88	81	482
MO	64 (5)	61 (5)	80	68	516
MS	62 (6)	60 (6)	73	64	434
MT	66 (6)	61 (6)	78	68	426
NC	66 (5)	64 (5)	95	77	500
ND	67 (6)	65 (6)	81	69	388
NE	70 (6)	68 (6)	85	77	384
NH	79 (5)	76 (6)	95	80	360
NJ	85 (4)	83 (4)	95	89	506
NM	72 (6)	70 (6)	95	85	379
NV	67 (6)	64 (6)	90	74	434
NY	83 (3)	81 (4)	95	90	725
OH	68 (5)	65 (5)	75	70	540
OK	57 (6)	54 (6)	89	72	418
OR	78 (4)	76 (4)	90	81	595
PA	72 (5)	69 (5)	95	82	582
RI	84 (4)	82 (5)	95	95	436
SC	67 (6)	63 (6)	82	69	431
SD	63 (6)	60 (6)	95	78	418
TN	62 (5)	59 (6)	75	66	502
TX	72 (4)	69 (4)	87	74	804
UT	75 (5)	73 (6)	89	80	410

VA	74 (5)	71 (5)	95	85	512
VT	83 (5)	83 (5)	95	91	305
WA	72 (5)	69 (5)	95	85	552
WI	73 (5)	71 (5)	85	77	482
WV	62 (6)	59 (6)	78	69	425
WY	57 (7)	53 (7)	72	63	334

Table 2: Percentage with a Bivalent booster

Margins of error in parentheses

State	% Bivalent booster	N
National	29 (1)	15655
AK	52 (45)	9
AL	18 (6)	261
AR	25 (7)	277
AZ	22 (6)	359
CA	35 (3)	1249
CO	32 (6)	341
CT	32 (6)	367
DC	55 (35)	14
DE	29 (23)	26
FL	23 (5)	523
GA	22 (5)	406
HI	53 (18)	48
IA	26 (6)	308
ID	51 (25)	26
IL	32 (6)	458

IN	32 (7)	299
KS	24 (6)	300
KY	22 (6)	271
LA	19 (6)	304
MA	37 (5)	551
MD	28 (5)	450
ME	51 (26)	24
MI	29 (5)	492
MN	34 (6)	384
MO	26 (6)	363
MS	20 (6)	274
MT	49 (27)	23
NC	20 (5)	349
ND	71 (47)	7
NE	30 (7)	281
NH	29 (7)	285
NJ	31 (6)	441
NM	33 (7)	290
NV	30 (6)	319
NY	29 (5)	623
OH	25 (6)	385
OK	25 (7)	268
OR	41 (6)	490
PA	31 (6)	435
RI	59 (31)	17
SC	26 (6)	305
SD	61 (44)	9
TN	22 (6)	318

TX	20 (4)	606
UT	27 (6)	310
VA	33 (6)	397
VT	33 (36)	12
WA	35 (6)	430
WI	28 (6)	376
WV	25 (7)	285
WY	52 (42)	10