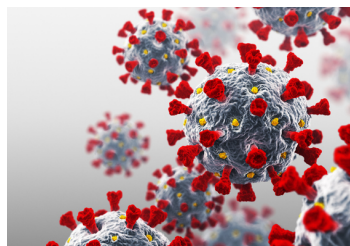


Covid-19 "Vital Signs"

Issue # 272

January 28, 2021



Highlights – Vaccine & Herd Immunity Model

- Covid-19 hospitalizations:
 - **Covid-19 hospital census has now declined on nineteen days in the past three weeks. There were 25,000 fewer Covid-19 patients in our nation's hospitals yesterday than there were at the beginning of the month;**
 - California and Nevada have experienced marked improvement during this time; still, Covid-19 hospital occupancy remains of concern in these two states as well as Arizona, Connecticut, Georgia, and New York;
 - **Yesterday's Covid-19 census was as low as it has been since December 11;**
 - The outlook for Covid-19 hospital admissions for this and the next three weeks is very encouraging, based on the updated [ensemble forecast published yesterday by the CDC](#). **Projected Covid-19 hospital admissions in the US drop 25% by the third week of February;** projections for most states follow a similar pattern.
- Vaccinations and Immunity Levels:
 - This effort continues to plod along - at least relative to what the US needs to protect its citizens; **yesterday, 1.1 million Americans received a vaccine shot.** To date, the US has administered 25.4 million doses;
 - **An estimated 3.5 million Americans have now received both doses of either the Pfizer/BioNTech or Moderna vaccine;**
 - From our modeling, we estimate herd immunity could be realized by mid-summer if vaccinations ramp-up to about 1.8 million per day once the JNJ vaccine is available and about 2.5-3 million per day once the second round of Pfizer/BioNTech and Moderna vaccines become available;
- An estimated 27% of Americans already could be immune at this point, given estimates of actual infections, vaccinations to-date, and the lag from vaccinations or infections to immunity. Most of this immunity thus far is via infection, as few people had received both doses and had enough time transpire to realize full immunity;
- South Dakota and North Dakota may be the furthest along toward herd immunity, with 44% and 39% estimated immunity at this time.
- Newly detected cases, estimated actual infections, and the reproduction rate:
 - Each of these measures has been dropping sharply throughout the month, highlighting the rapidly-improving situation in the US;
 - **The 7-day new case rate is now as low as it has been since November 17;**
 - **Estimated actual infections have dropped by nearly 50% since the beginning of the year, according to the [Yale/Harvard model](#),** and by one-third from Christmas Eve thorough two weeks ago (the latest available estimate), according to the [Gu model](#);
 - The reproduction rate (R_t) remains significantly below 1.0 for the US (Gu model) and is below 1.0 for every state except Massachusetts (Yale/Harvard model).
- **More than 4,000 deaths were reported with coronavirus again yesterday; the 7-day average is only slightly lower than its high from two weeks ago. With the now-sustained drop in new infections of-late, we could see the number of deaths begin to taper off soon.**

Covid-19 "Vital Signs"

Covid-19 Hospitalizations

Hospitalizations have declined nineteen of the past twenty-one days, dropping more by 25k (19%) in that time. Yesterday's Covid-19 census was its lowest since December 11 (despite being mid-week when census tends to peak)

Hospitalized Covid-19 Patients

Compared to Same Day, Prior Weeks, As of January 27

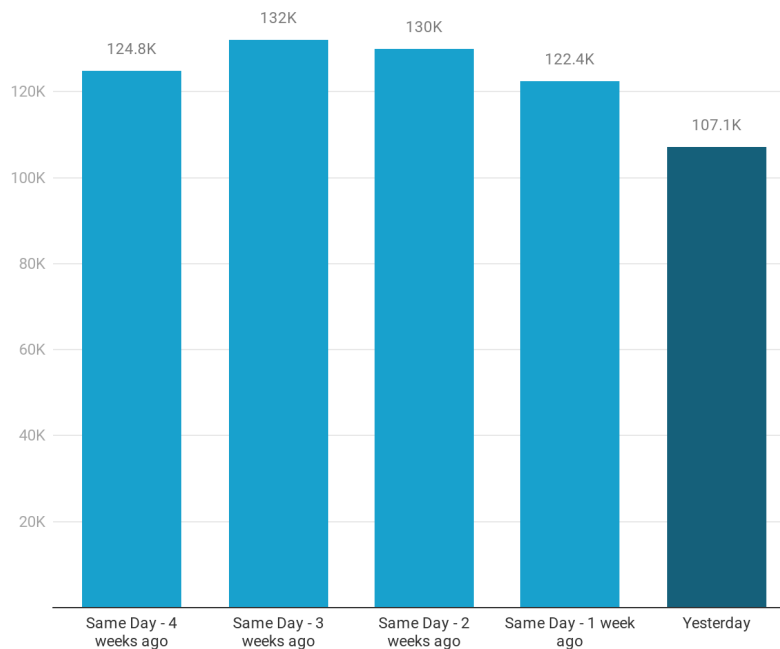


Chart: Health Industry Advisor LLC • Source: The Atlantic • Created with Datawrapper

% in ICU - Hospitalized Covid-19 Patients

Compared to Same Day, Prior Weeks, As of January 27

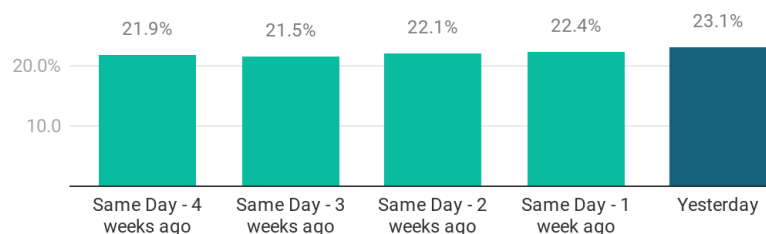


Chart: Health Industry Advisor LLC • Source: The Atlantic • Created with Datawrapper

% on Ventilators - Hospitalized Covid-19 Patients

Compared to Same Day, Prior Weeks, As of January 27

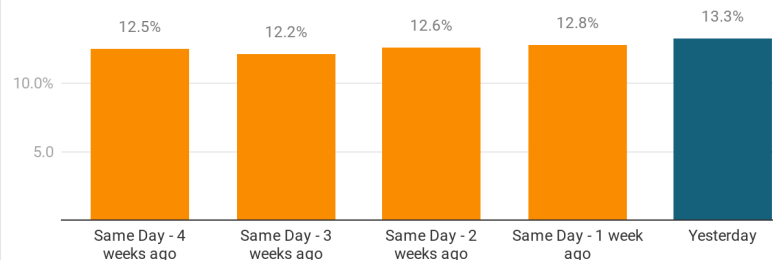


Chart: Health Industry Advisor LLC • Source: The Atlantic • Created with Datawrapper

Covid-19 "Vital Signs"

Covid-19 Hospitalizations

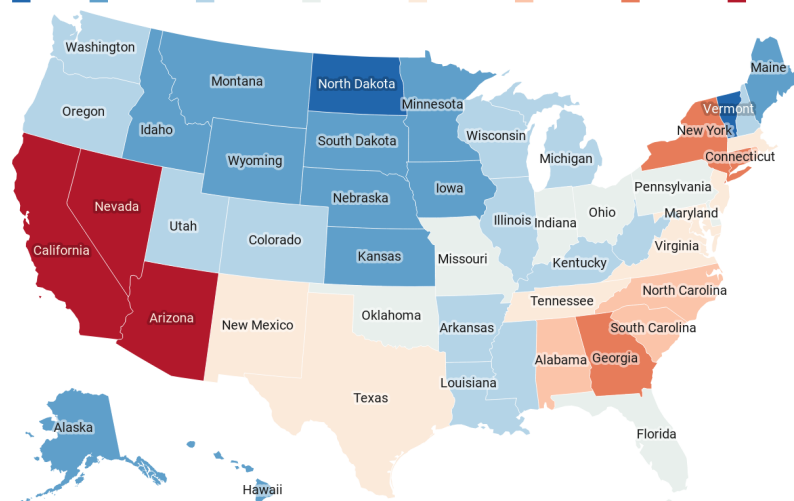
Covid-19 hospital census remains too high in Arizona, California, Connecticut, Nevada and New York. Nonetheless, the picture has vastly improved over the past three weeks

January 6

Covid-19 Patients As % of All Inpatient Beds

6As of January 6

■ < 10% ■ 10%-20% ■ 20%-30% ■ 30%-40% ■ 40%-50% ■ 50%-60% ■ 60%-70% ■ ≥ 70%



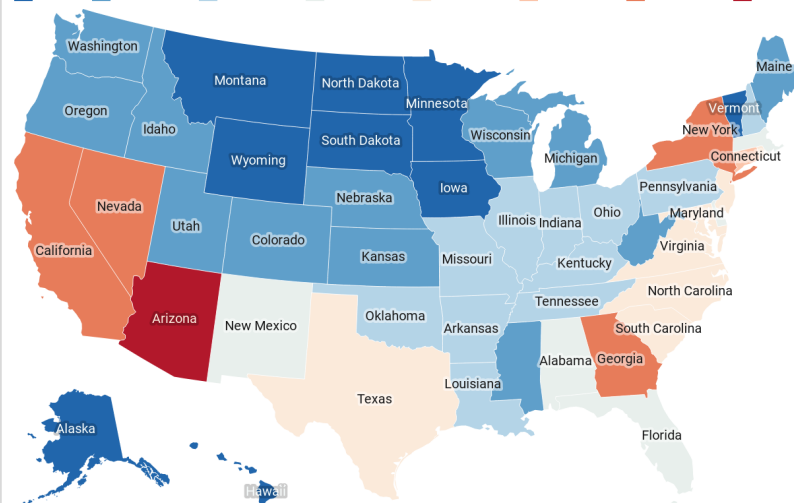
Map: Health Industry Advisor LLC • Source: The Atlantic's Covid Tracking Project • Created with Datawrapper

January 27

Covid-19 Patients As % of All Inpatient Beds

As of January 27

■ < 10% ■ 10%-20% ■ 20%-30% ■ 30%-40% ■ 40%-50% ■ 50%-60% ■ 60%-70% ■ ≥ 70%



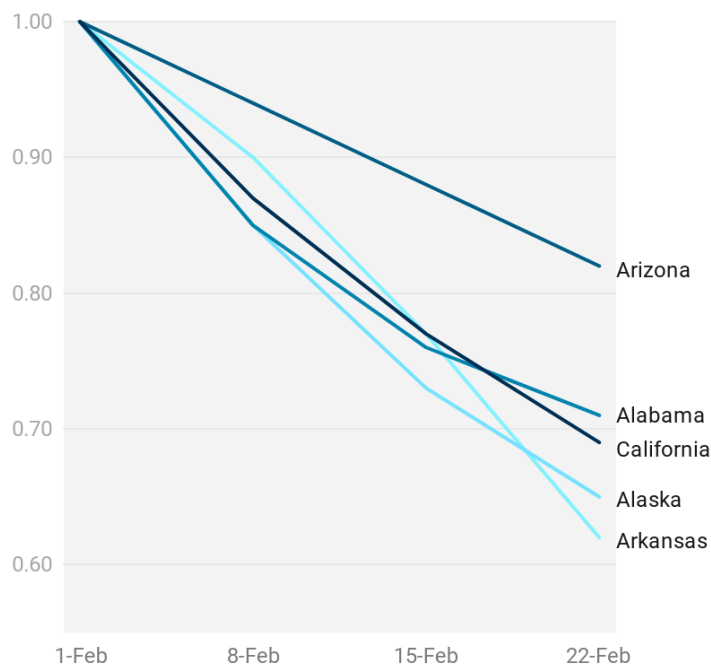
Map: Health Industry Advisor LLC • Source: The Atlantic's Covid Tracking Project • Created with Datawrapper

Projections of Hospital Admissions (US) – 1 of 5

Hospital admissions are projected to decline over the next few weeks across most of the country

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week

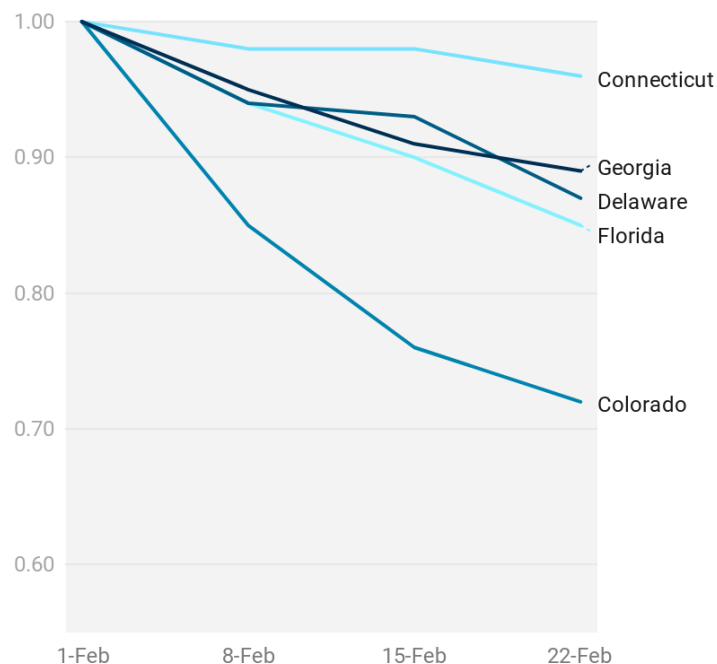


Updated January 27, 2021. Accessed January 27, 2021

Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week



Updated January 27, 2021. Accessed January 27, 2021

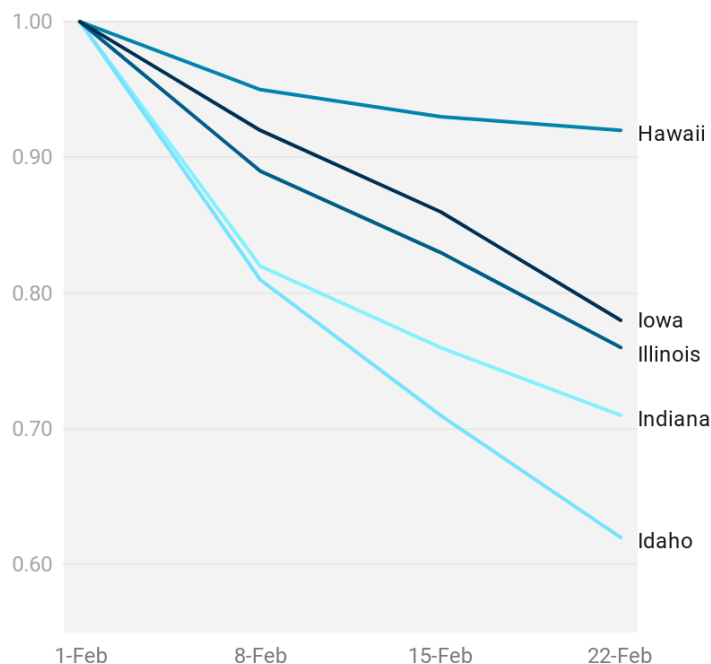
Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projections of Hospital Admissions (US) – 2 of 5

Hospital admissions are projected to decline over the next few weeks across most of the country

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week

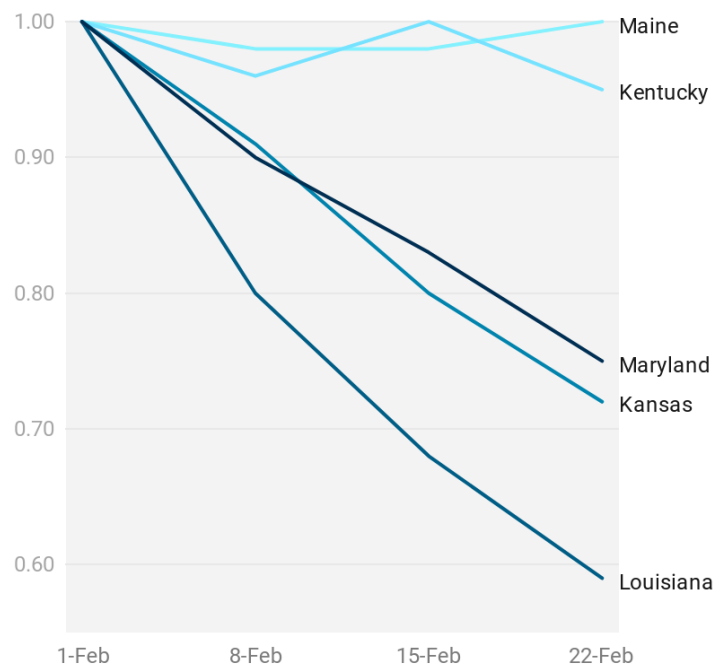


Updated January 27, 2021. Accessed January 27, 2021

Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week



Updated January 27, 2021. Accessed January 27, 2021

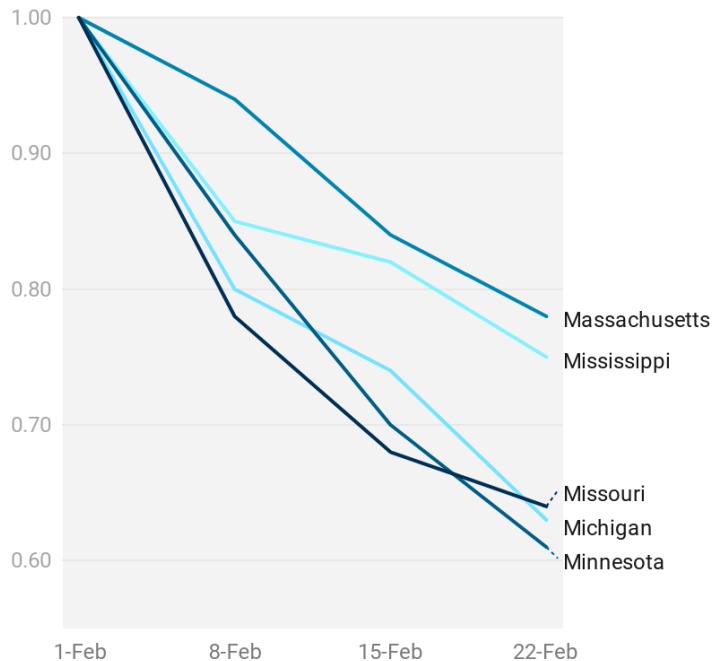
Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projections of Hospital Admissions (US) – 3 of 5

Hospital admissions are projected to decline over the next few weeks across most of the country

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week

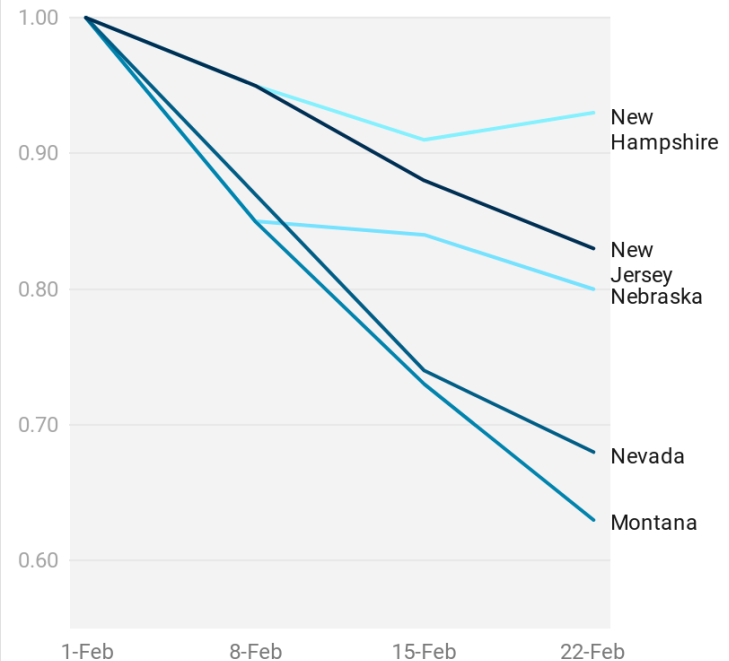


Updated January 27, 2021. Accessed January 27, 2021

Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week



Updated January 27, 2021. Accessed January 27, 2021

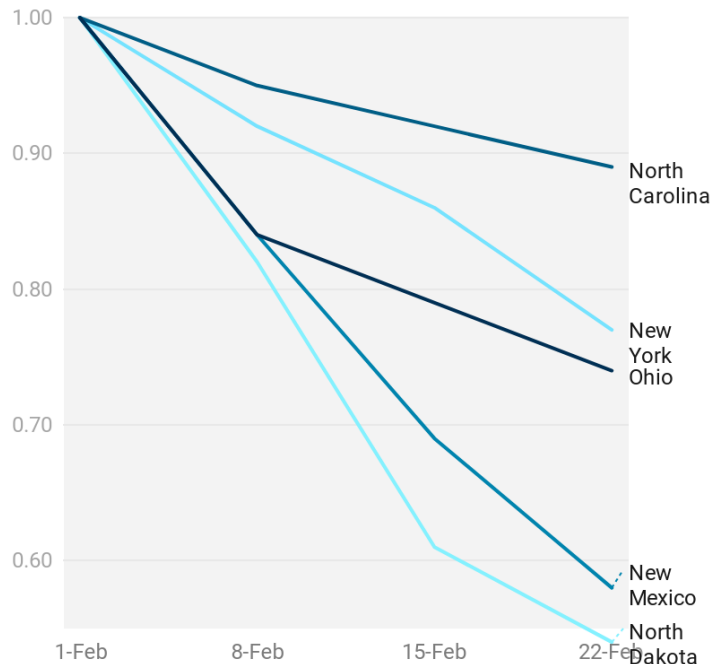
Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projections of Hospital Admissions (US) - 4 of 5

Hospital admissions are projected to decline over the next few weeks across most of the country

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week

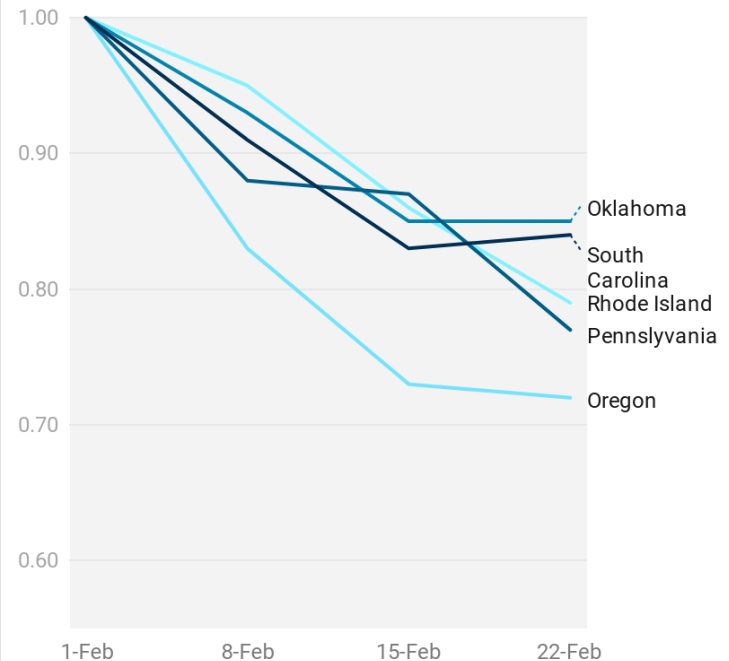


Updated January 27, 2021. Accessed January 27, 2021

Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week



Updated January 27, 2021. Accessed January 27, 2021

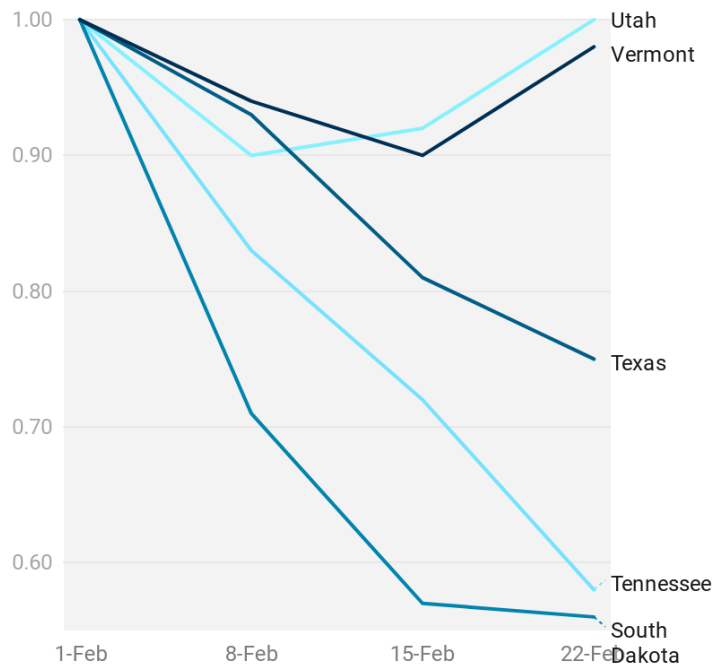
Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projections of Hospital Admissions (US) – 5 of 5

Hospital admissions are projected to decline over the next few weeks across most of the country

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week

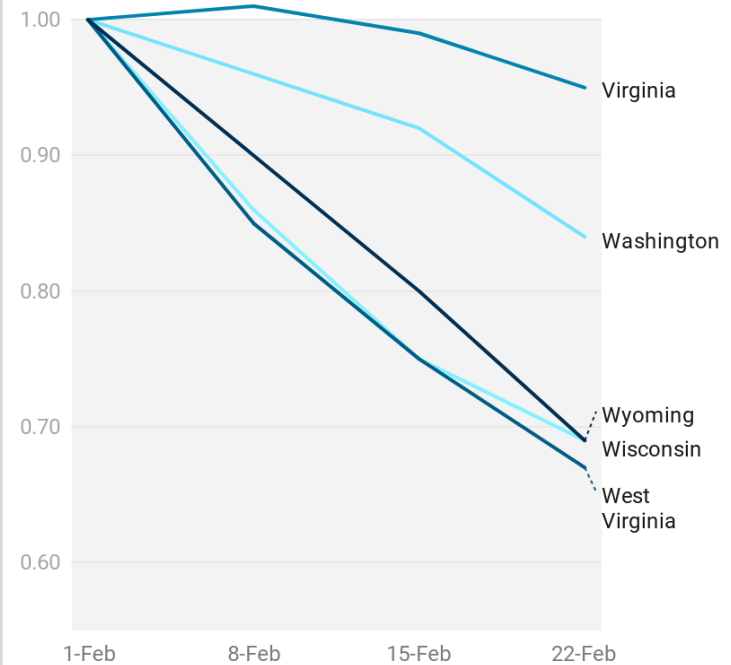


Updated January 27, 2021. Accessed January 27, 2021

Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Projected Hospital Admissions - US

Next Three Weeks, Indexed To This Week



Updated January 27, 2021. Accessed January 27, 2021

Chart: Health Industry Advisor LLC • Source: CDC • Created with Datawrapper

Covid-19 "Vital Signs"

Vaccine Tracking

As of yesterday, about 25.6 million doses were reportedly administered. There were 1.1 million doses administered yesterday and an average of 1.2 million daily over the past seven days. An estimated 3.5 million people have received two doses

Vaccination Progress

As of January 27

■ First Doses Administered ■ Second Doses Administered

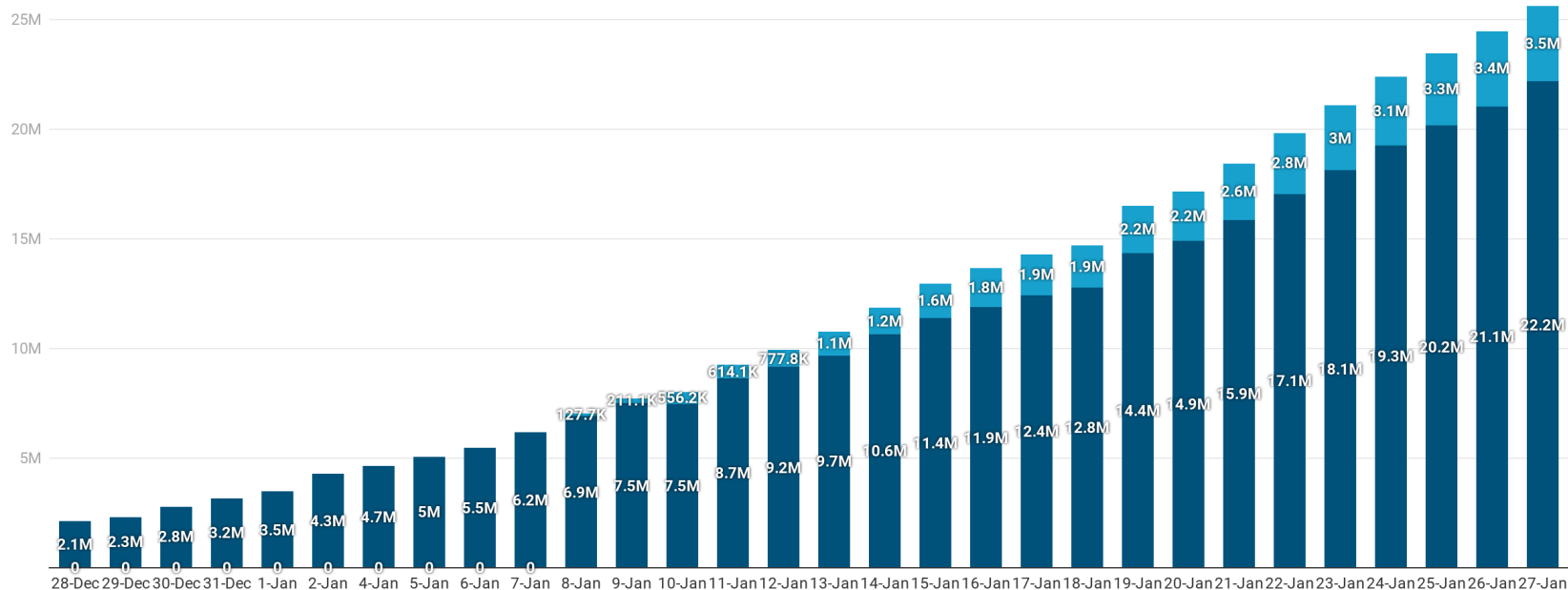


Chart: Health Industry Advisor LLC • Source: CDC, Bloomberg • Created with Datawrapper

Vaccine data from: [Centers for Disease Control and Prevention](#) and [Bloomberg Vaccine Tracker](#)

Covid-19 "Vital Signs"

Vaccination Progress By State

Alaska, North Dakota, and West Virginia have administered the highest number of doses per capita; Idaho, Illinois and Missouri, the lowest.

Vaccination Progress

Total Doses Administered / Population, As of January 27

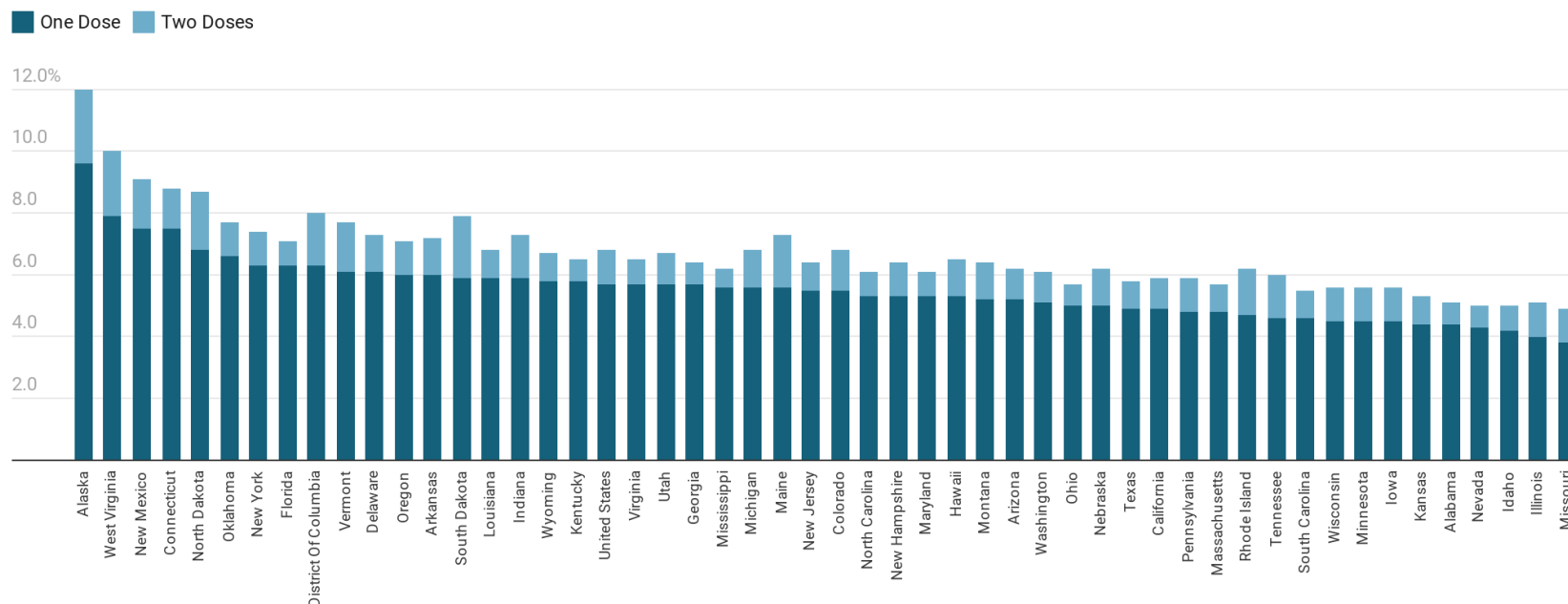


Chart: Health Industry Advisor LLC • Source: Bloomberg • Created with Datawrapper

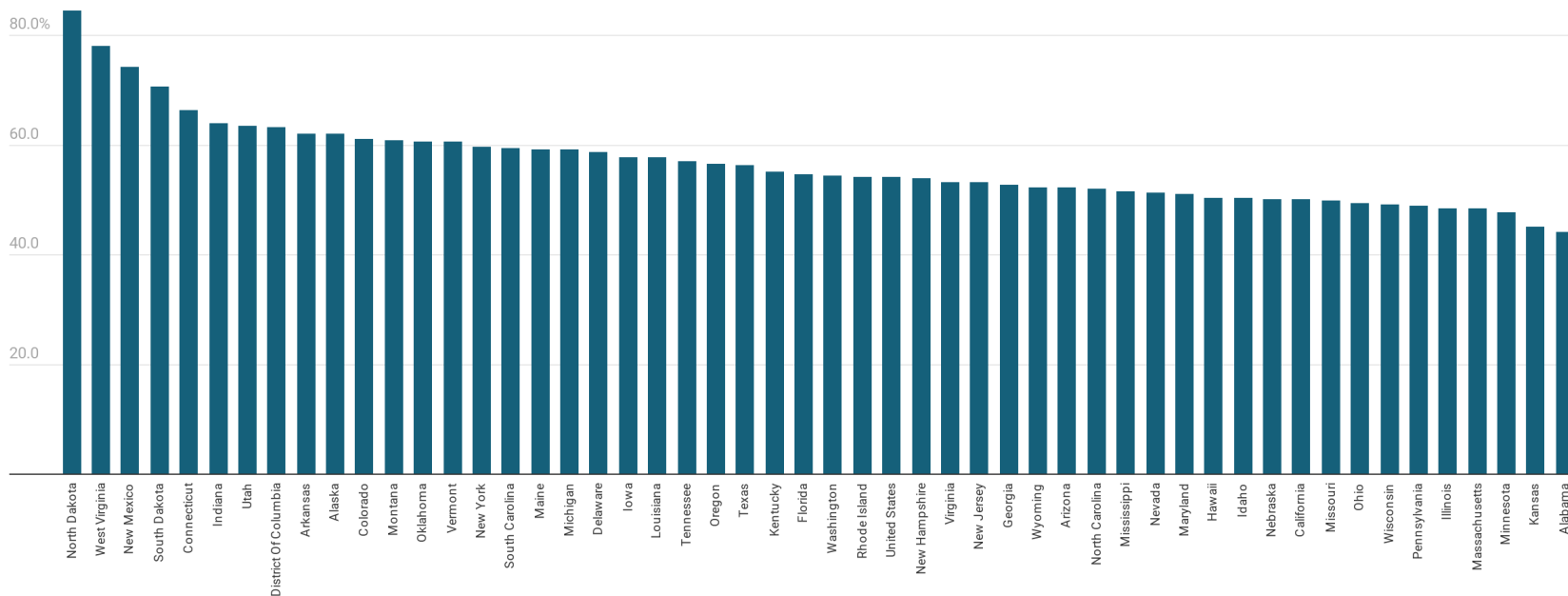
Covid-19 "Vital Signs"

% of Allocated Supply That Has Been Administered

New Mexico, North Dakota and West Virginia have administered the highest % of distributed doses; Alabama, Kansas and Minnesota, the lowest %

% of Allocated Supply Used

As of January 27



Doses include both first and second doses; Second doses represent about 12% of all doses nationally

Chart: Health Industry Advisor LLC • Source: Bloomberg • Created with Datawrapper

Covid-19 "Vital Signs"

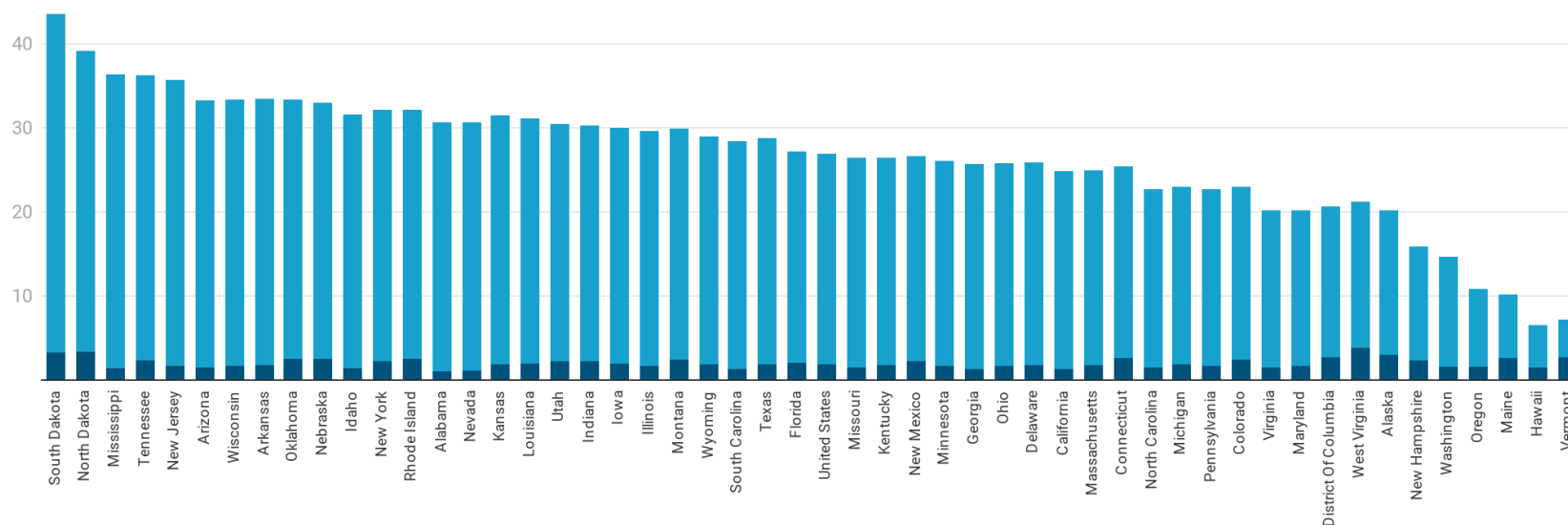
Estimated Immunity Levels By State

North and South Dakota continue to set the pace toward herd immunity. To-date, immunity is largely driven by prior infection rather than vaccinations. Vermont is an exception, with immunity via vaccinations nearly equaling those via infection

Estimated Immunity Levels

As of January 27

■ Via Vaccine ■ Via Infection



2-week lag from infection or vaccination to immunity. Based on Gu's mean infection estimates

Chart: Health Industry Advisor LLC • Created with Datawrapper

Covid-19 "Vital Signs"

Two Models of Estimated Daily Infections

Newly detected cases and estimates of actual infections continue downward trajectories. The 7-day new case rate is lower than it has been since November 17

- Two models:
- Youyang Gu: <https://covid19-projections.com>
- Yale School of Public Health: <https://covidestim.org>
- Gu model lags by two weeks

Estimated Daily Infections v. Detected Cases

Gu & Yale School of Public Health Models

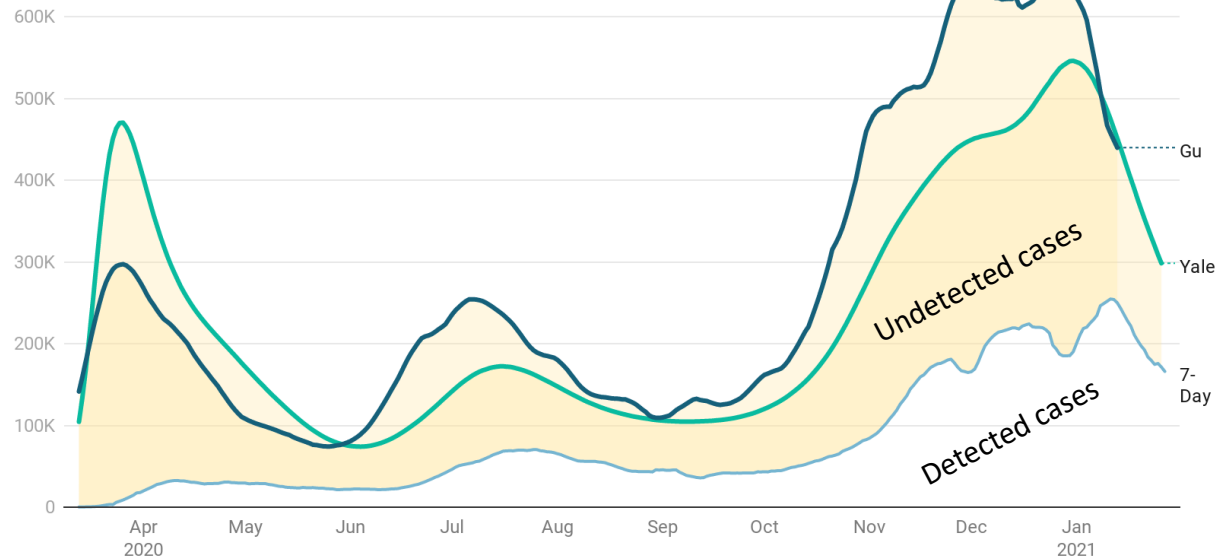


Chart: Health Industry Advisor LLC • Source: Youyang Gu, Yale School of Public Health • Created with Datawrapper

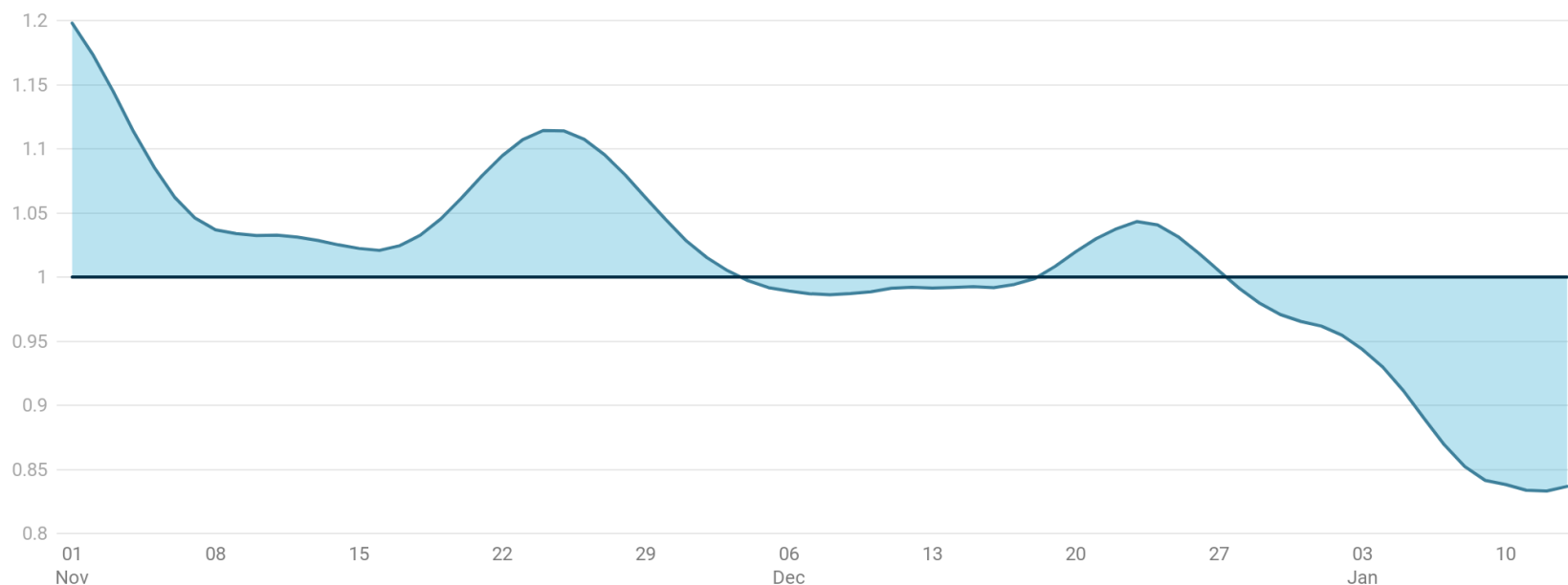
Reproduction Rate (R_t) – Gu* Model

Gu's estimate of R_t continues to decline and has been below 1.0 for seventeen successive days. The most-recent estimates are lower than R_t has been since May 2. Notably, the recent peaks occurred two days before Thanksgiving and Christmas

Reproduction Rate (R_t) - US

*Youyang Gu: Covid-19projections.com

Youyang Gu Estimate, November 1, 2020 - January 13, 2021



R_t is an estimate of how many additional people a single person will infect

Chart: Health Industry Advisor LLC • Source: Youyang Gu • Created with Datawrapper

Reproduction Rate (R_t) – Yale* Model

The Reproduction Rate (R_t) may be below 1.0 in every state except Massachusetts

Reproduction Rate (R_t)

Source: Yale/Harvard Model, As of January 26

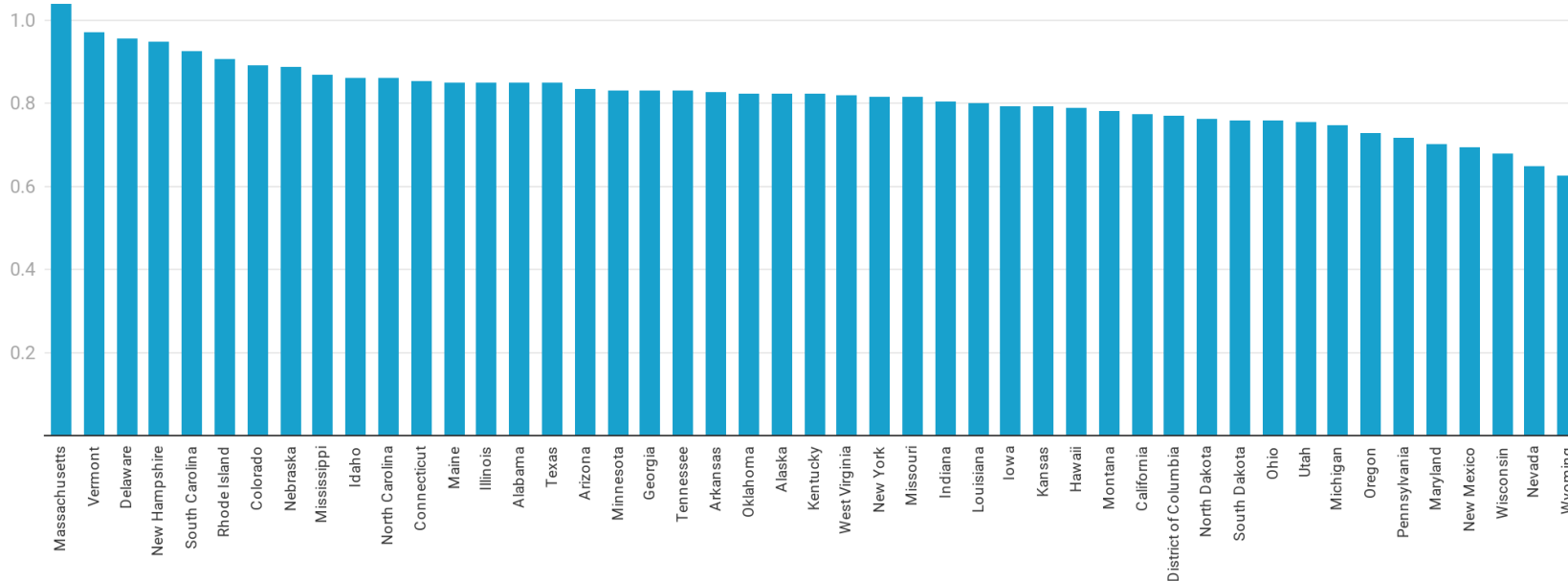


Chart: Health Industry Advisor LLC • Source: Yale & Harvard Schools of Public Health • Created with Datawrapper

Covid-19 "Vital Signs"

Newly Detected Cases Per Day

The 7-day new case rate has dropped sharply from its peak two weeks ago. Reported new cases in the US yesterday were lower than the 7-day average - atypical for a Wednesday.

Newly Detected Cases

As of January 27

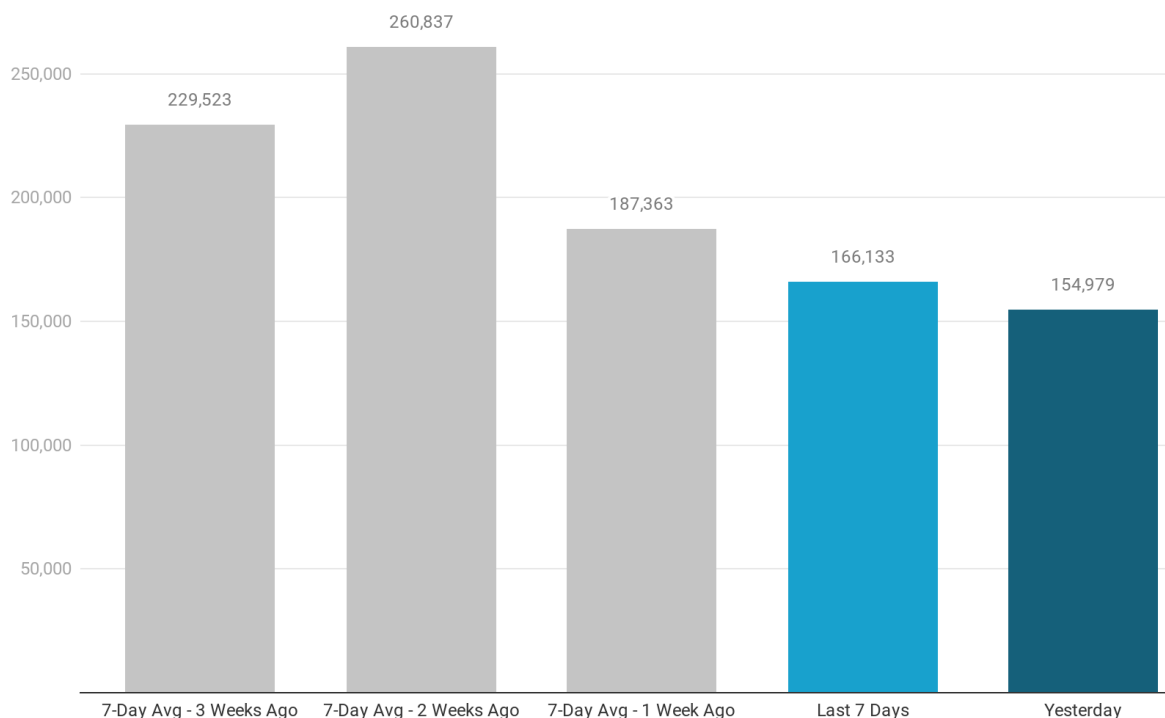


Chart: Health Industry Advisor LLC • Source: The Atlantic • Created with Datawrapper

Deaths Reported With Coronavirus

There were a more than 4,000 deaths reported with coronavirus again yesterday. This raised the 7-day average death rate above the prior week's rate and comparable to the rate from two week's ago

Daily Deaths Reported With Coronavirus

As of January 27

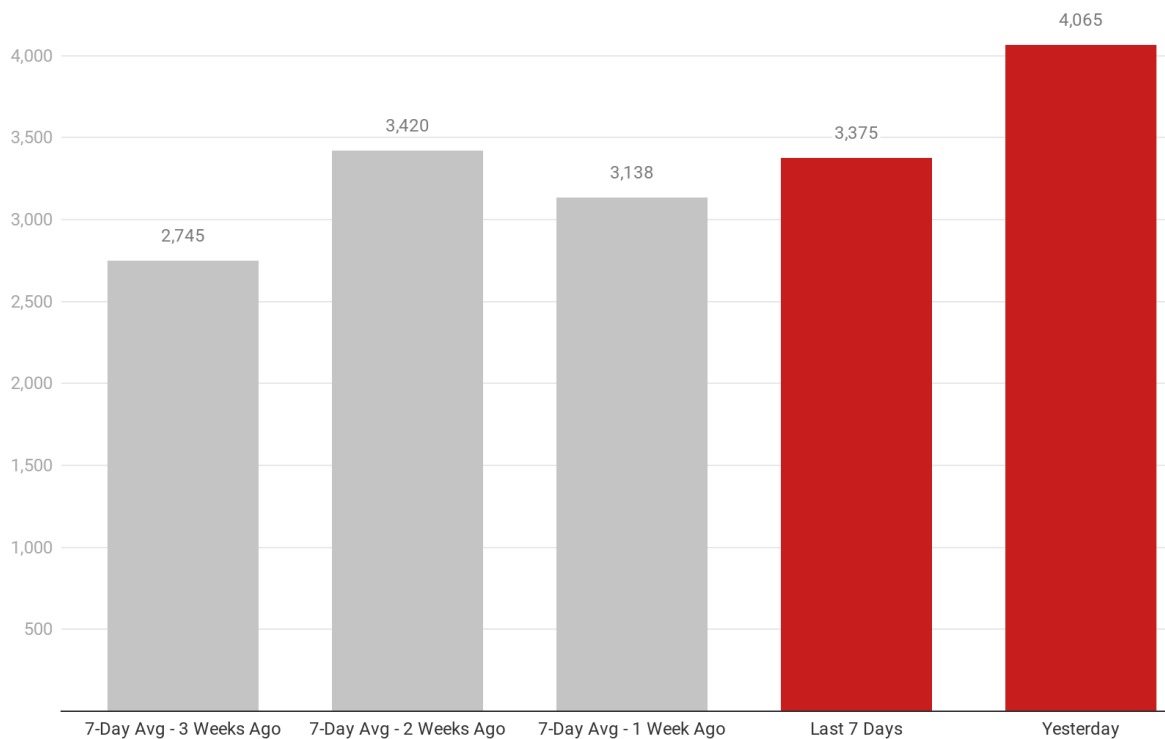


Chart: Health Industry Advisor LLC • Source: The Atlantic • Created with Datawrapper

Covid-19 "Vital Signs"

State-By-State Scorecard: Scoring Grid

Designed to reflect five critical measures of a state's current experience with Covid-19



Metric		Black	Red	Orange	Yellow	Green	Blue
7-Day Average New Daily Reported Infections per Capita	Greater than	450	350	250	150	50	0
Week-over-Week Change in Newly Reported Cases	Greater than	30%	20%	10%	0%	-10%	N/A
7-Day Average Viral Tests per 7-Day Average Newly Reported Cases	Less than	5	10	25	50	75	N/A
Covid-19 Inpatient Census as % of All Inpatient Beds	Greater than	50%	40%	30%	20%	10%	0%
7-Day Deaths per 1000 New Cases (14-day lag)	Greater than	25	20	15	10	5	0

Covid-19 "Vital Signs"

State-By-State Scorecard:

Overall, new case rates remain too high across many parts of the country; however, the week-over-week changes in new cases are encouraging. The hospital crisis may be concentrated in a handful of states

State	7-Day New Infections per Capita	Week-over-Week Change in New Cases	7-Day Tests per New Case	7-Day CV-19 Census as % of all Inpatient Beds	7-Day Deaths per 1000 New Cases (14-day lag)
Alabama					
Alaska					
Arizona					
Arkansas					
California					
Colorado					
Connecticut					
Delaware					
District Of Columbia					
Florida					
Georgia					
Hawaii					
Idaho					
Illinois					
Indiana					
Iowa					
Kansas					
Kentucky					
Louisiana					
Maine					
Maryland					
Massachusetts					
Michigan					
Minnesota					
Mississippi					
Missouri					

State	7-Day New Infections per Capita	Week-over-Week Change in New Cases	7-Day Tests per New Case	7-Day CV-19 Census as % of all Inpatient Beds	7-Day Deaths per 1000 New Cases (14-day lag)
Montana					
Nebraska					
Nevada					
New Hampshire					
New Jersey					
New Mexico					
New York					
North Carolina					
North Dakota					
Ohio					
Oklahoma					
Oregon					
Pennsylvania					
Rhode Island					
South Carolina					
South Dakota					
Tennessee					
Texas					
Utah					
Vermont					
Virginia					
Washington					
West Virginia					
Wisconsin					
Wyoming					

Covid-19
"Vital Signs"

New Cases / Million

The picture of new cases per capita is substantially improved from three weeks ago

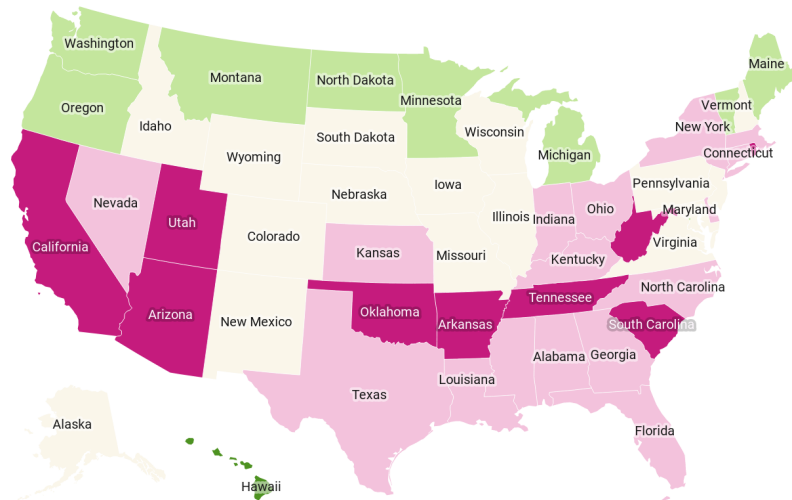
January 6

January 27

New Cases / Million

7-Day Moving Average, As of January 6

< 200 200-400 400-600 600-800 ≥ 800

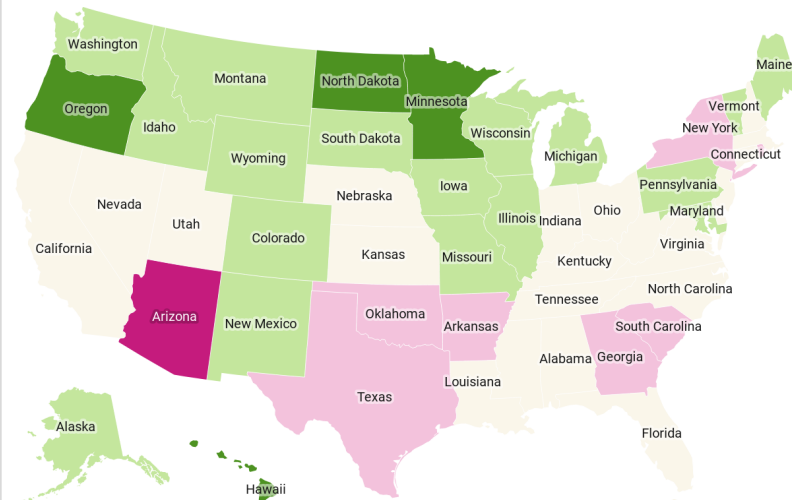


Map: Health Industry Advisor LLC • Created with Datawrapper

New Cases / Million

7-Day Moving Average, As of January 27

< 200 200-400 400-600 600-800 ≥ 800



Map: Health Industry Advisor LLC • Created with Datawrapper

State-By-State Data Table (1 of 3)

State-By-State Comparisons

State	Infection Prevalence	Deaths per 1 Million Population	Tests per 1M Population Past 7 days	Test-Positive % (7-Day Moving Average)	New Daily Cases Per 1M Population (7-Day M.A.)	Tests / New Case	Covid-19 Census % of All Beds	Week-Over-Week Change in New Cases	7-Day Deaths / 1000 New Cases, 14-Day Lag
Alabama	8.8%	1,281	1,918	28.4%	544	4	44%	-30%	19
Alaska	6.9%	343	9,625	3.1%	299	32	8%	-18%	11
Arizona	9.5%	1,584	2,493	38.4%	958	3	78%	-27%	14
Arkansas	9.1%	1,472	4,682	16.7%	667	7	24%	-28%	13
California	7.8%	886	8,843	9.7%	840	11	78%	-25%	12
Colorado	6.6%	942	1,360	22.7%	309	4	17%	-28%	7
Connecticut	6.6%	1,887	21,851	2.5%	543	40	65%	-36%	12
Delaware	7.4%	1,054	2,516	26.8%	675	4	38%	-16%	6
District Of Columbia	4.9%	1,223	10,315	3.5%	365	28	42%	-15%	19
Florida	7.5%	1,144	2,247	24.2%	556	4	35%	-22%	11
Georgia	7.9%	1,203	3,622	15.2%	731	5	70%	-21%	16
Hawaii	1.7%	230	6,480	1.5%	89	72	11%	-38%	12
Idaho	8.8%	912	1,336	32.8%	416	3	15%	-17%	11
Illinois	8.5%	1,601	7,272	5.5%	398	18	23%	-24%	15
Indiana	8.9%	1,415	1,613	31.8%	513	3	27%	-31%	11
Iowa	9.8%	1,393	781	32.2%	345	2	11%	-27%	15
Kansas	9.1%	1,227	2,048	27.2%	558	4	15%	-24%	15
Kentucky	7.5%	726	2,869	23.4%	673	4	27%	-21%	12

Covid-19 "Vital Signs"

State-By-State Data Table (2 of 3)

State-By-State Comparisons

State	Infection Prevalence	Deaths per 1 Million Population	Tests per 1M Population Past 7 days	Test-Positive % (7-Day Moving Average)	New Daily Cases Per 1M Population (7-Day M.A.)	Tests / New Case	Covid-19 Census % of All Beds	Week-Over-Week Change in New Cases	7-Day Deaths /1000 New Cases , 14-Day Lag
Louisiana	8.1%	1,803	5,458	10.6%	576	9	26%	-16%	16
Maine	2.6%	394	6,970	5.8%	405	17	19%	-6%	21
Maryland	5.5%	1,106	2,129	19.4%	413	5	47%	-20%	15
Massachusetts	6.9%	1,990	2,778	24.1%	670	4	46%	-27%	13
Michigan	5.9%	1,479	3,825	6.2%	237	16	21%	-24%	19
Minnesota	8.0%	1,072	1,491	15.5%	231	6	11%	-28%	14
Mississippi	8.6%	1,894	2,214	28.0%	621	4	22%	-18%	21
Missouri	7.8%	1,144	926	31.7%	333	3	30%	-39%	14
Montana	8.4%	1,024	4,386	7.9%	348	13	10%	-28%	9
Nebraska	9.4%	952	917	38.2%	220	4	14%	-56%	5
Nevada	8.6%	1,254	1,484	34.9%	518	3	77%	-33%	18
New Hampshire	4.4%	699	2,455	22.7%	558	4	25%	1%	12
New Jersey	7.2%	2,328	7,632	8.1%	619	12	45%	-11%	13
New Mexico	7.9%	1,435	4,089	11.2%	458	9	35%	-27%	23
New York	6.8%	2,139	11,896	6.3%	753	16	71%	-10%	14
North Carolina	6.6%	782	6,450	10.5%	679	10	53%	-15%	9

Covid-19 "Vital Signs"

State-By-State Data Table (3 of 3)

State-By-State Comparisons

State	Infection Prevalence	Deaths per 1 Million Population	Tests per 1M Population Past 7 days	Test-Positive % (7-Day Moving Average)	New Daily Cases Per 1M Population (7-Day M.A.)	Tests / New Case	Covid-19 Census % of All Beds	Week-Over-Week Change in New Cases	7-Day Deaths /1000 New Cases , 14-Day Lag
North Dakota	12.6%	1,820	721	28.3%	204	4	4%	-17%	18
Ohio	7.2%	891	4,097	12.8%	523	8	25%	-25%	10
Oklahoma	9.1%	780	4,497	15.2%	686	7	32%	-36%	10
Oregon	3.2%	434	4,423	5.1%	204	22	14%	-32%	16
Pennsylvania	6.2%	1,557	1,479	31.5%	466	3	34%	-28%	27
Rhode Island	10.2%	1,943	3,100	23.4%	727	4	48%	-23%	9
South Carolina	7.8%	1,229	7,995	12.0%	956	8	51%	7%	14
South Dakota	12.0%	1,884	976	30.9%	302	3	11%	-26%	21
Tennessee	10.2%	1,252	3,582	16.8%	602	6	36%	-29%	9
Texas	7.6%	1,162	4,521	15.7%	698	6	48%	-10%	16
Utah	10.2%	473	1,906	31.7%	604	3	22%	-39%	3
Vermont	1.7%	264	2,193	11.5%	253	9	9%	-9%	8
Virginia	5.3%	687	3,982	18.1%	720	6	47%	22%	9
Washington	3.9%	533	2,920	8.6%	242	12	21%	-36%	7
West Virginia	6.2%	1,027	8,764	6.6%	582	15	22%	-25%	16
Wisconsin	9.0%	955	1,245	29.8%	310	4	16%	-32%	18
Wyoming	8.7%	950	1,552	29.2%	453	3	8%	-24%	16

Table: Health Industry Advisor LLC • Created with Datawrapper

Sources

The following data sources are accessed on a daily or weekly basis

- The Atlantic's Covid Tracking Project: <https://covidtracking.com>
- Worldometers.info: <https://www.worldometers.info/coronavirus/>
- Centers for Disease Control and Prevention, National, Regional, and State Level Outpatient Illness and Viral Surveillance <https://gis.cdc.gov/grasp/fluview/fluportaldashboard.html>
- Centers for Disease Control and Prevention, COVID-19 Laboratory-Confirmed Hospitalizations https://gis.cdc.gov/grasp/COVIDNet/COVID19_5.html
- Centers for Disease Control and Prevention, COVID Data Tracker <https://www.cdc.gov/covid-data-tracker/index.html#mobility>
- Centers for Disease Control and Prevention, Vaccines, <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/index.html>
- Institute for Health Metrics and Evaluation, COVID-19 estimate downloads <http://www.healthdata.org/covid/data-downloads>
- New York Times, Covid-19 data <https://github.com/nytimes/covid-19-data>
- COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University <https://github.com/CSSEGISandData/COVID-19>
- COVID-19 Projections Using Machine Learning, <https://covid19-projections.com>
- Covid-19 Forecast Hub, <https://viz.covid19forecasthub.org>
- Oliver Wyman Pandemic Navigator, <https://pandemicnavigator.oliverwyman.com/forecast?mode=country®ion=United%20States&panel=mortality>
- [Rt.live](https://www.rti.com/live)
- Yale School of Public Health & Harvard TH Chan School of Public Health, <https://covidestim.org>
- Bloomberg Vaccine Trackers, <https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/?sref=Z0b6TmHW>