Health Industry Advisor, llc

"Strategic Advice in an Era of Unprecedented Change"

Covid-19 "Vital Signs"

Issue # 266

January 21, 2021

Covid-19 "Vital Signs"

Highlights

- **Concerns are rising about the inability of many states to meet the demand for vaccinations**. Reports are circulating of vaccination centers canceling appointments for lack of adequate vaccines:
  - Several of you have communicated with me - sharing these reports and asking how we are in this situation;
  - **There seems to be a major disconnect - the CDC reports about 20 million distributed but unadministered doses. Where are they**?
    - we can surmise that this is partially an artifact of delays in reporting administered dose totals; this may account for about 3 million of these doses;
    - further, a portion of the distributed doses are reserved for nursing homes and other federally-designated administration efforts;
    - still, this cannot explain the entirety of the discrepancy.
- **Over the past week, an average of 910,000 doses has been administered per day in the US**;
  - This rate is getting close to the 1 million daily doses we had assumed in our model, given the availability of two vaccines (Pfizer and Moderna);
  - If the AstraZeneca and JNJ vaccines are approved - in the next few weeks? - we would presume that we should increase our target to 2 million daily doses;
  - Contrast this to the President's pledge of 100 million doses in the first 100 days of his Administration. This target seems low, particularly given the misalignment of supply-and-demand we currently experience.
- Estimated new infections, as well as new case rates, continue to decline in the US:
  - **Gu's model now indicates that new infections peaked on December 24 (no post-holiday surge?);**
  - **The Yale/Harvard model places the peak on January 6;**
  - **The 7-day average of new daily cases peaked on January 11; excluding the recent holiday period, this rate is lower than it has been since December 5** (the holidays were marred by reporting interruptions)
  - Gu's estimate of the Reproduction Rate (R_t) declined from December 22 through January 6 (the most recent estimate), and below 1.0 since December 29;
  - **Gu's most recent R_t estimate, for January 6, is lower than it has been since the end of August;**
  - **The Yale/Harvard model shows R_t below 1.0 in most states; the exceptions are Delaware, Idaho, New Hampshire, South Carolina, and Vermont.**
- Testing continues to improve in the US:
  - The 7-day test volume remains near record levels;
  - **The 7-day test-positive rate yesterday was as low as it has been since November 13.**
- **Covid-19 hospital census has now declined on twelve of the past fourteen days;**
  - Each week, the CDC publishes an ensemble forecast of hospital admissions by state:
    - **Hospital admissions are projected to drop significantly over the next four weeks in Alabama, Alaska, Arkansas, Idaho, Illinois, Indiana, Kansas, Iowa, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, Ohio, New Mexico, North Dakota, Pennsylvania, and Rhode Island;**
    - **Admissions are projected to increase in Arizona, California, Hawaii, Maine, Mississippi, North Carolina, New York, and South Carolina.**

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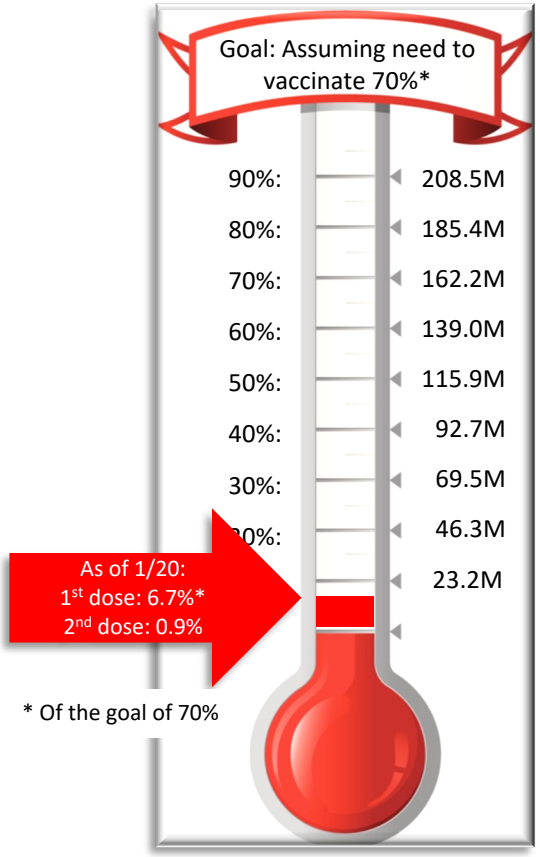
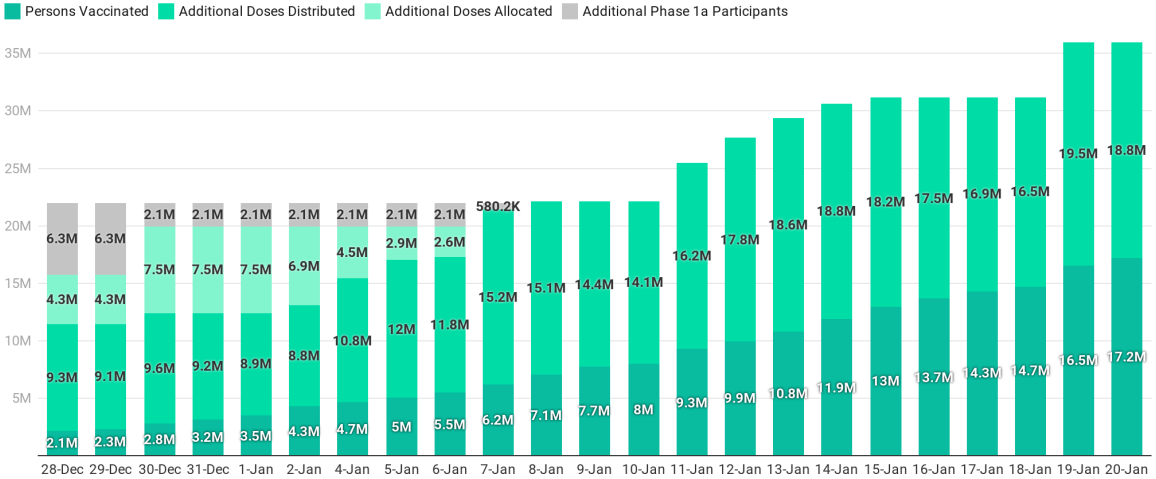
Vaccine Tracking

The US vaccination effort continues to be plagued by distribution challenges. As of yesterday, about 17.2 million doses were reportedly administered; over the past week, an average of 910,000 doses have been administered per day





From the CDC vaccine webpage: "Healthcare providers report doses to state, territorial, and local public health agencies up to 72 hours after administration. There may be additional reporting lag for data to be transmitted from the state, territorial, or local public health agency to CDC."

Vaccine data from: Centers for Disease Control and Prevention and Bloomberg Vaccine Tracker

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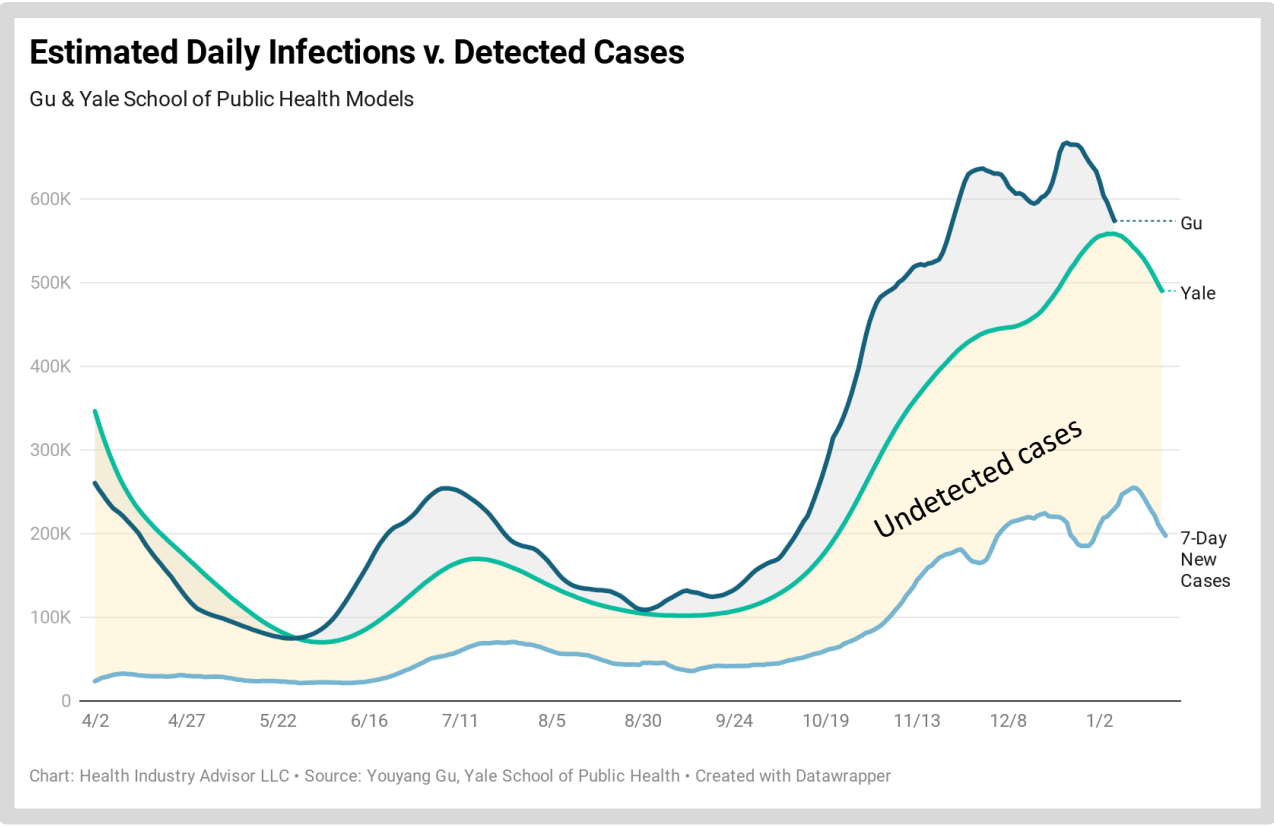
Two Models of Estimated Daily Infections

Models from both Youyang Gu and the Yale School of Public Health suggest that new infections may have peaked, following nearly three-month surge. Gu estimates these peaked on December 24; Yale on January 6. By comparison, the 7-day new case rate peaked on January 11

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



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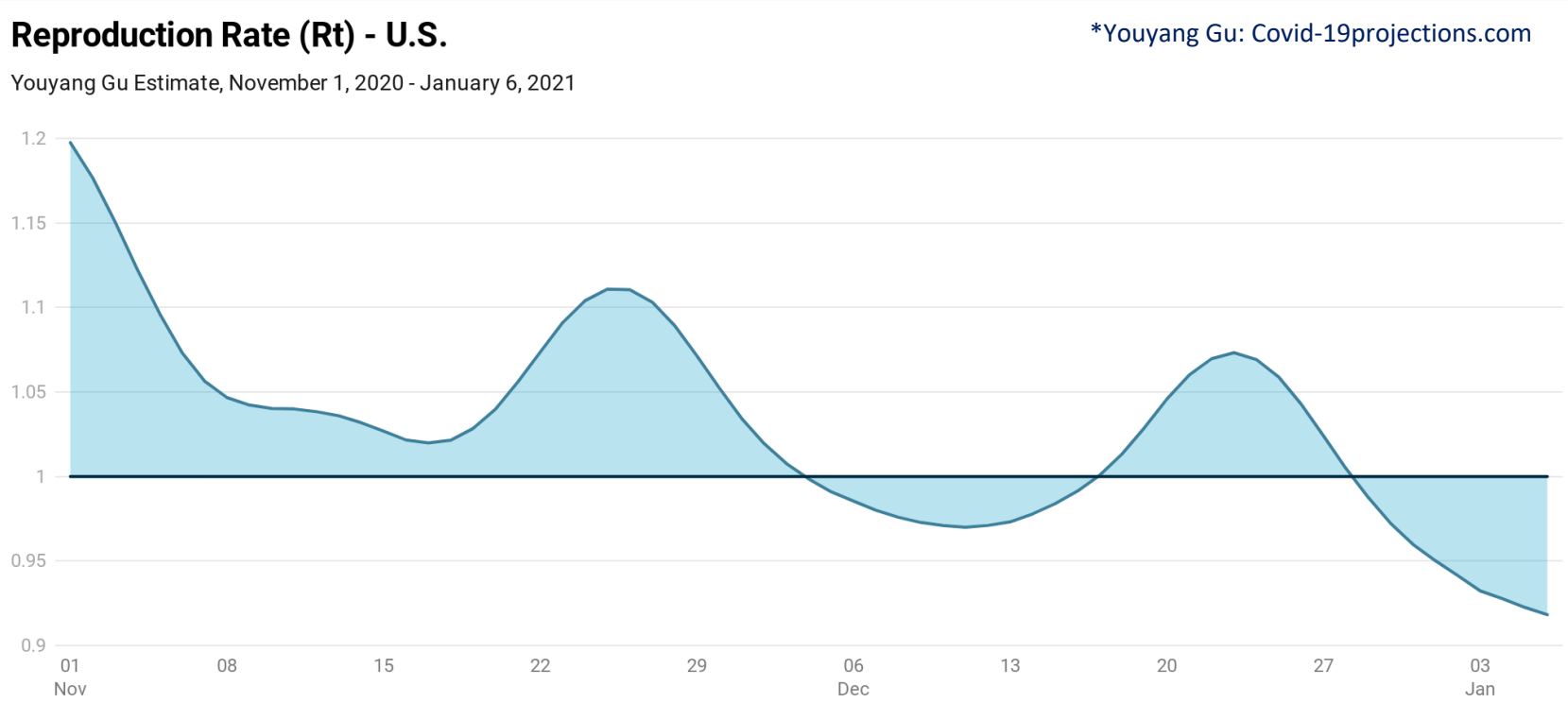
Reproduction Rate (R_t) – Gu* Model

Gu's estimate of R_t reached an intermediate peak on December 22 before declining the next fifteen days; it has been below 1.0 for eight successive days. The most-recent estimate is lower than it has been since the end of August



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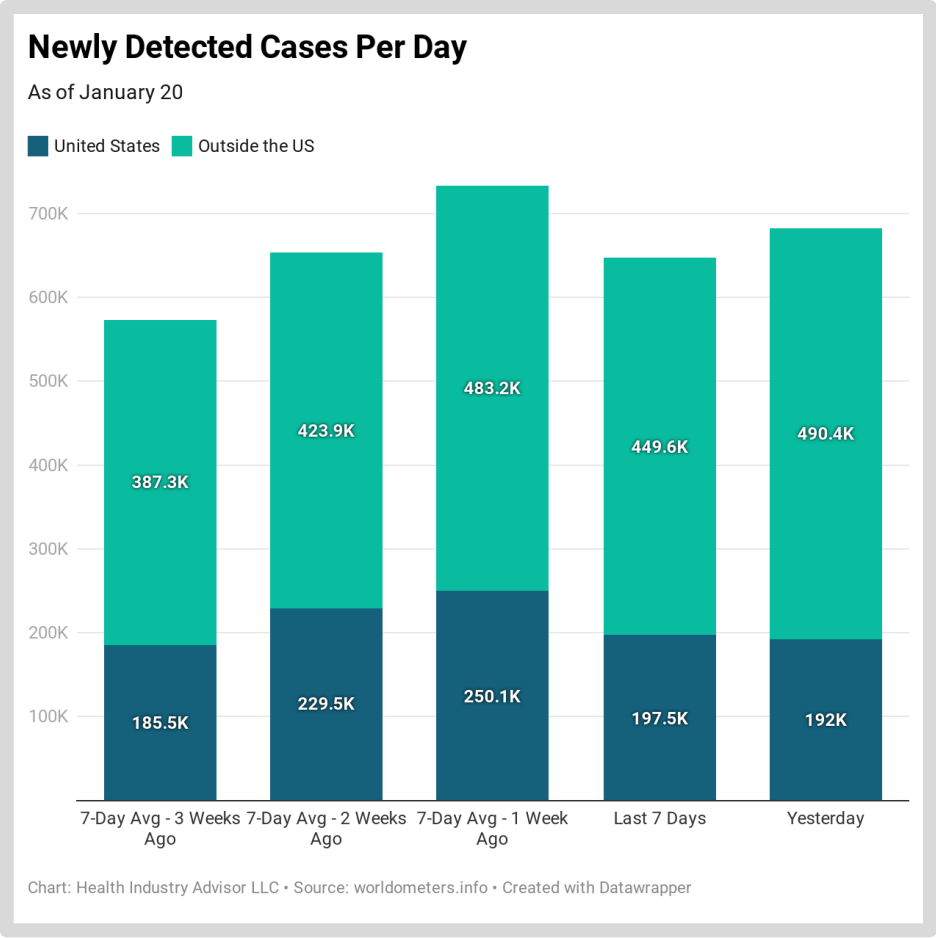
Newly Detected Cases Per Day

New cases in the US last week are lower than both the past two weeks and are comparable to the level reported three weeks ago – a period that included Christmas. Outside the US, new cases dropped the past week compared to the prior seven-day period



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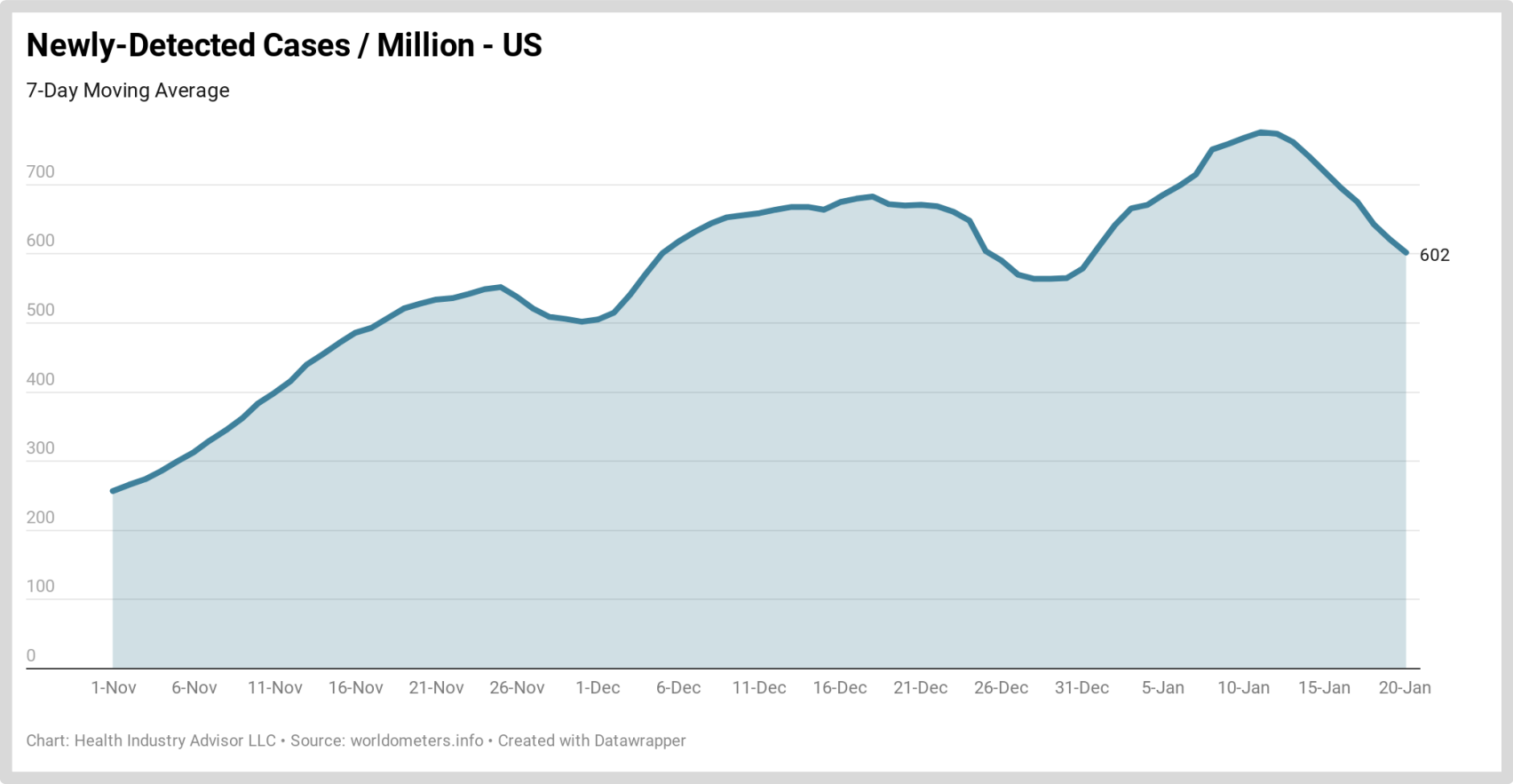
Newly Detected Cases / Million - US

Newly detected cases (7-day average) in the US have now declined on nine successive days. Other the the recent holiday period – with its reporting interruptions – this rate is as low as it has been since December 5



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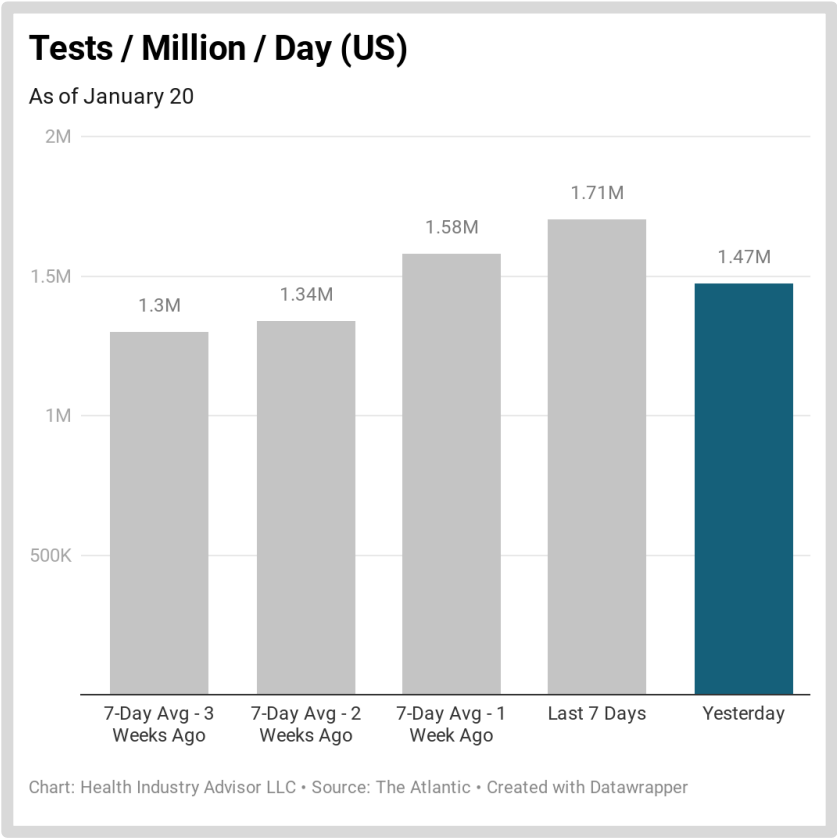
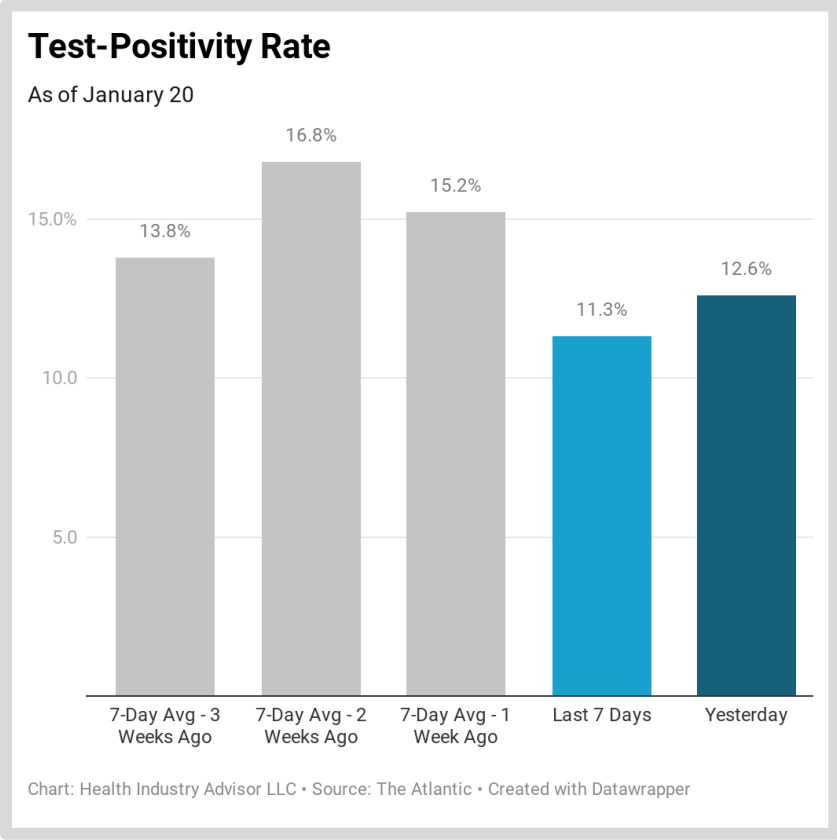
Testing Results - US

The 7-day average test volume remains at near-record levels. With this high volume, the test-positive rate for the day and the past week showed solid improvement – the 7-day rate was as low as it has been since November 13





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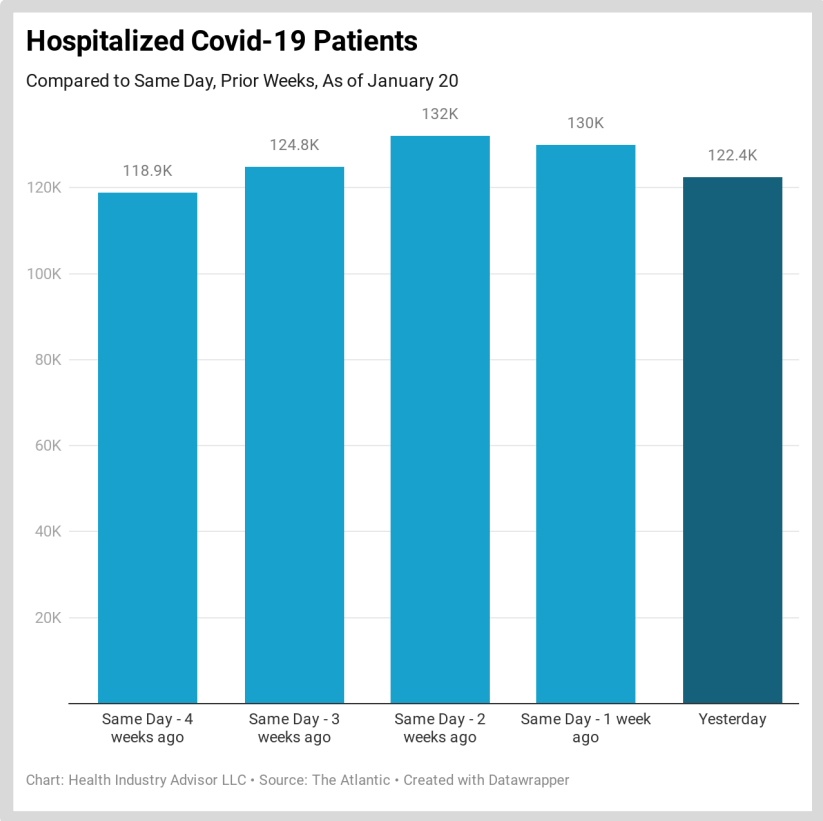
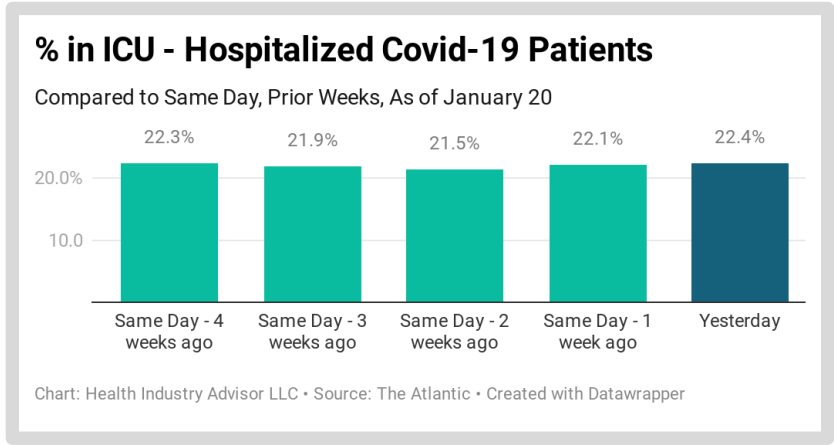
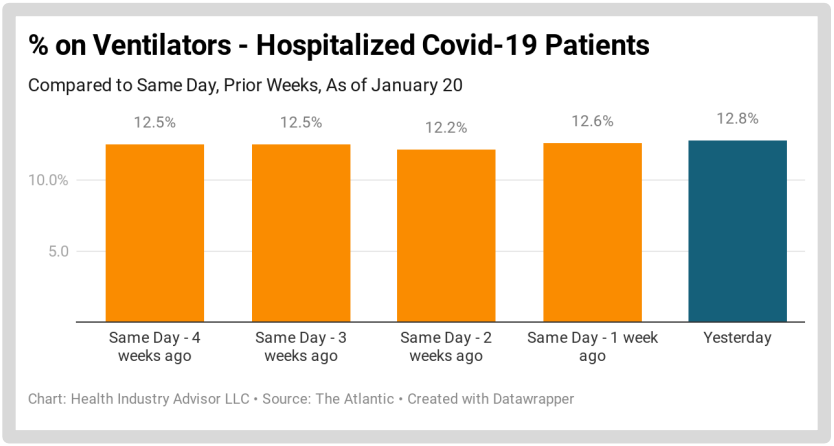
Covid-19 Hospitalizations

Hospitalizations have declined twelve of the past fourteen days. Yesterday's Covid-19 census lower than the Tuesday census each of the past three weeks







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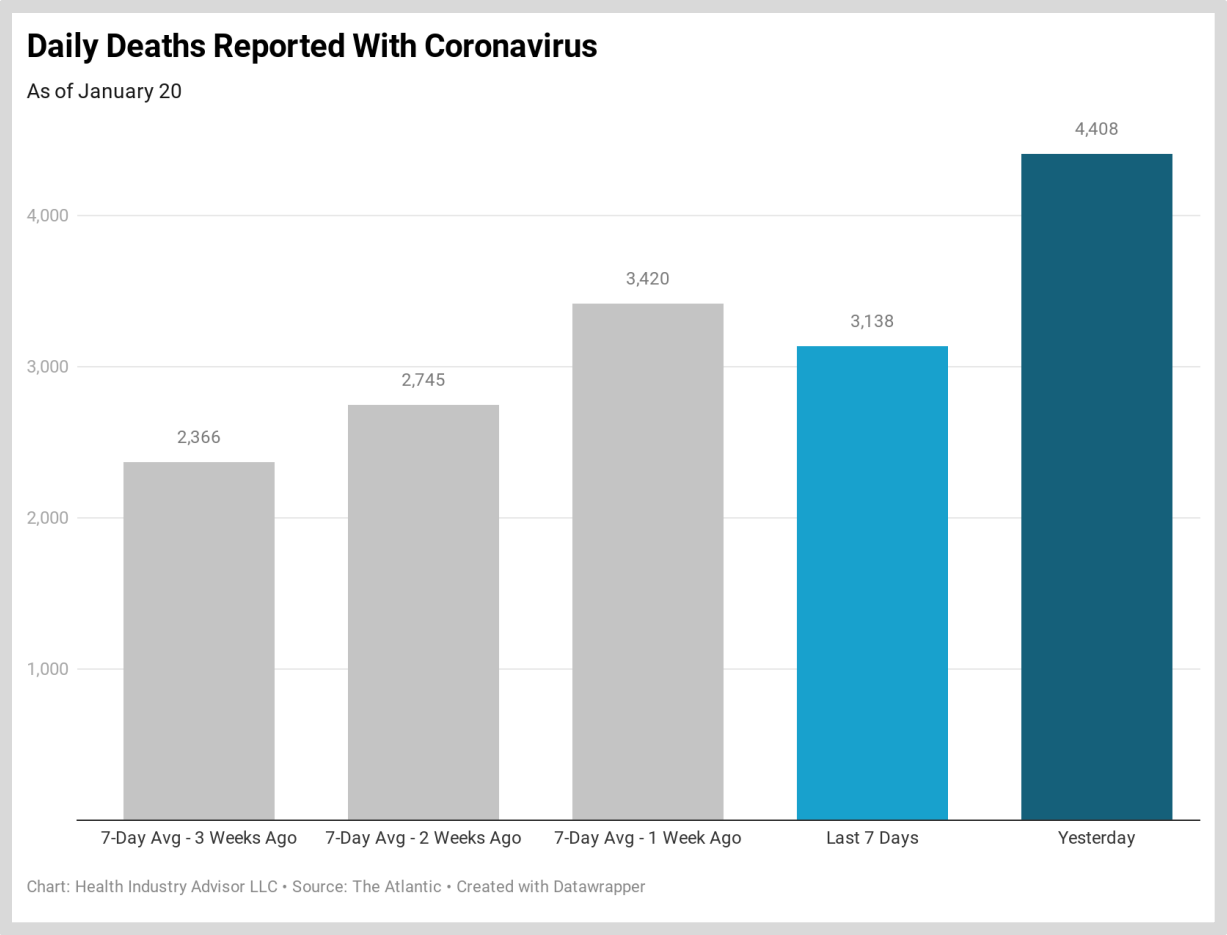
Deaths Reported With Coronavirus

Tragically, there were more deaths with coronavirus yesterday than on any other day during the pandemic. Still, the 7-day average deaths remained lower than the than the previous seven day-period



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State-By-State Scorecard: Scoring Grid

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

Worse ← → Better

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

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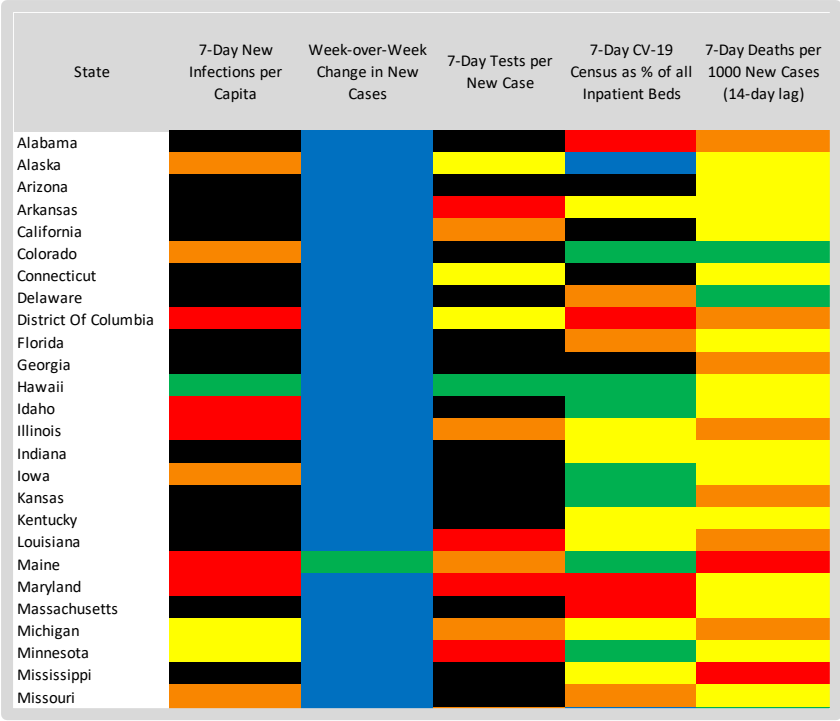
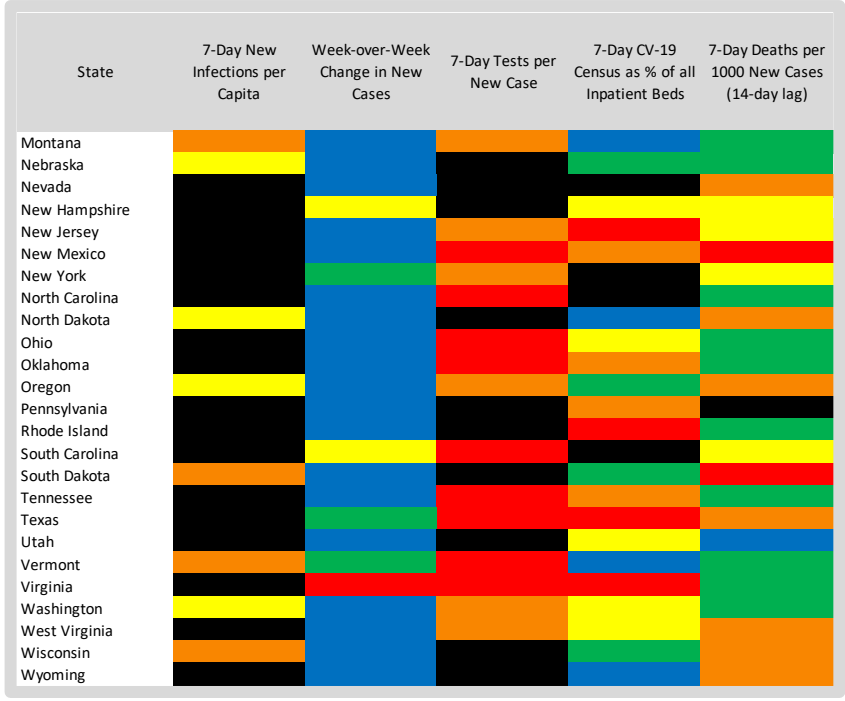
State-By-State Scorecard:

Overall, new case rates are too high across the country; however, the week-over-week changes in new cases is 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					

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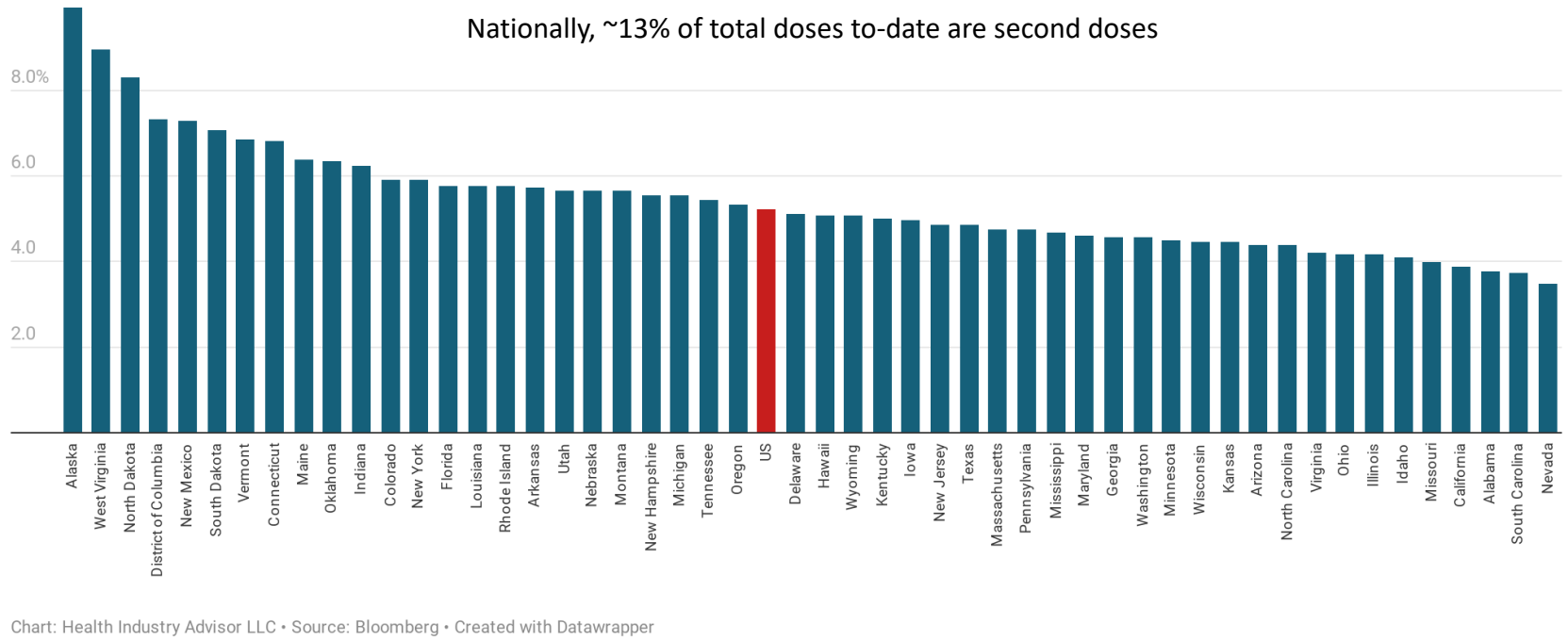
Vaccination Progress By State

Alaska, North Dakota, and West Virginia have administered the highest number of doses per capita; Alabama, Nevada, and South Carolina, the lowest.



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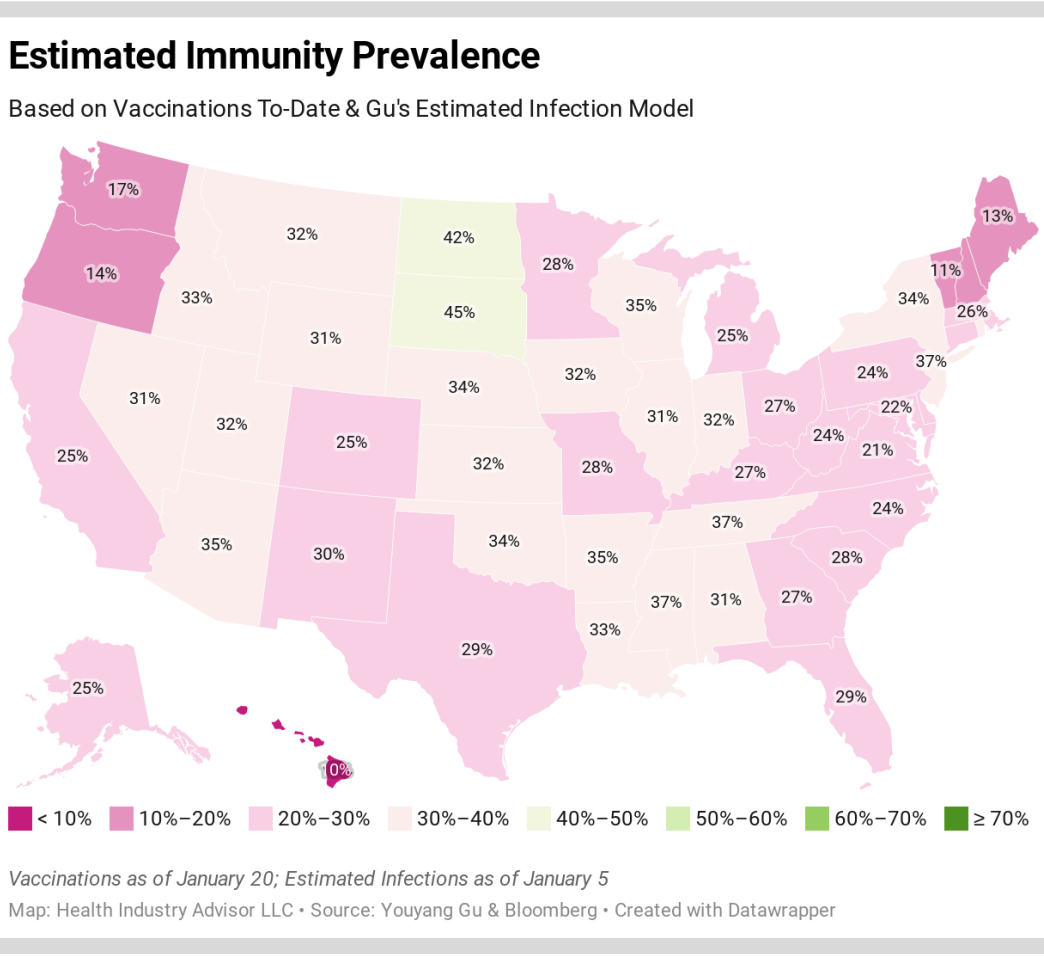
Estimated Immunity By State

South Dakota and North Dakota may be furthest along toward herd immunity levels – still, no state is yet on the brink of herd immunity

- Public health experts have suggested that 60-80% of the population would need immunity, for herd immunity to be reached
- Immunity could result from an infection or via vaccination
- It is not established how long immunity, from either infection of vaccination, will last
- For purposes of this illustration, we use both reported vaccination rates and Youyang Gu's* mean estimates of true infections

* https://covid19-projections.com



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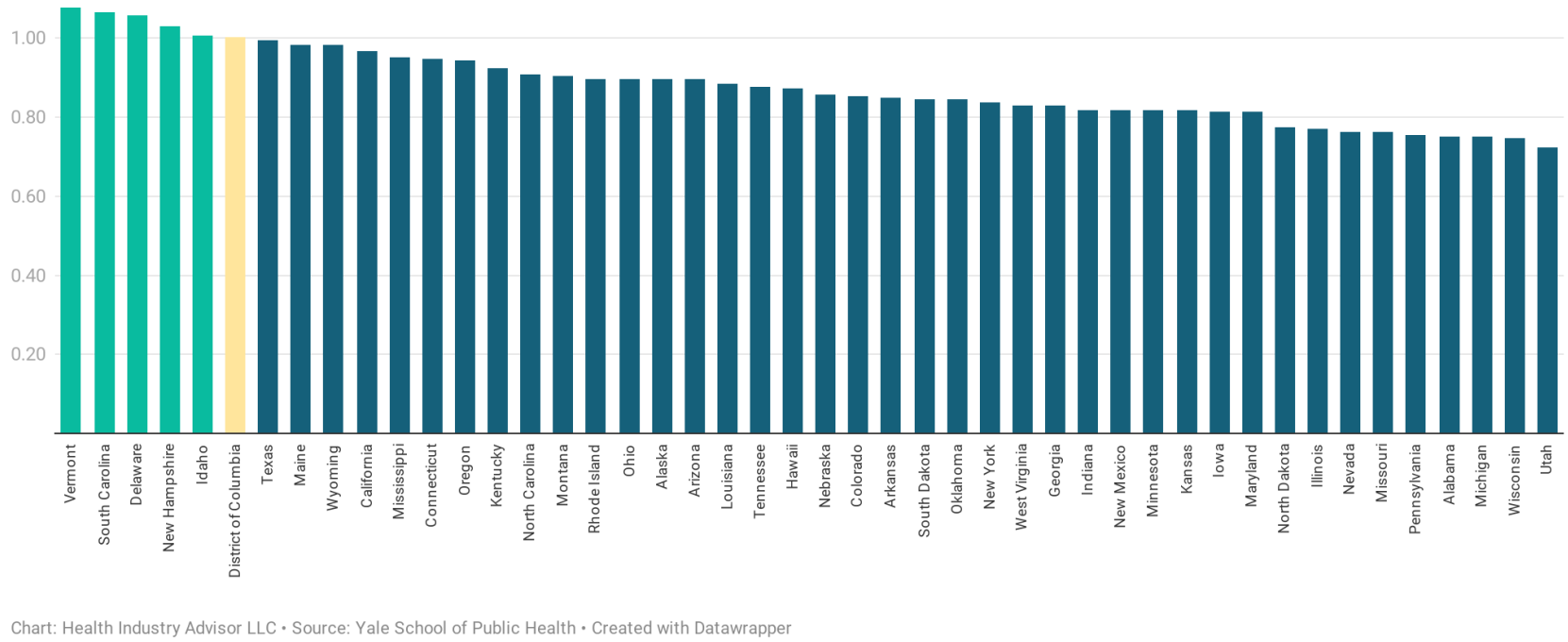
Reproduction Rate (R_t) – Yale* Model

The Reproduction Rate (R_t) may be below 1.0 in most states; the exceptions are Delaware, Idaho, New Hampshire, South Carolina and Vermont



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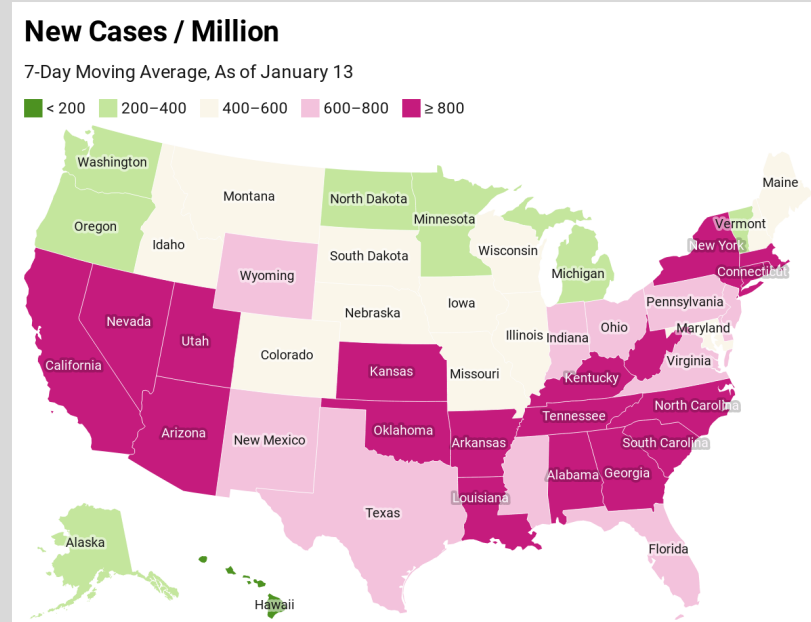
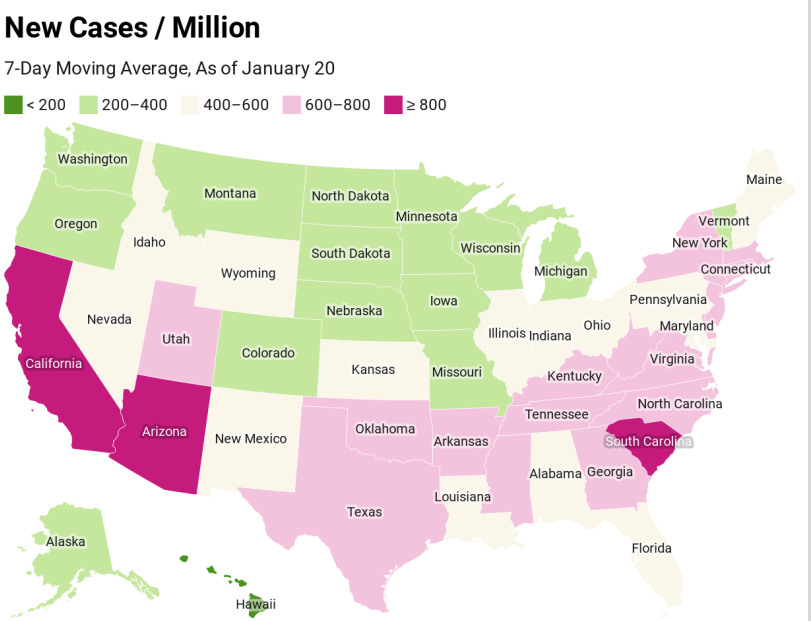
New Cases / Million

In the past week, new case rates have eased in many of the "hot-spot" states; still, rates Arizona, California and South Carolina remain too high

January 13



January 20



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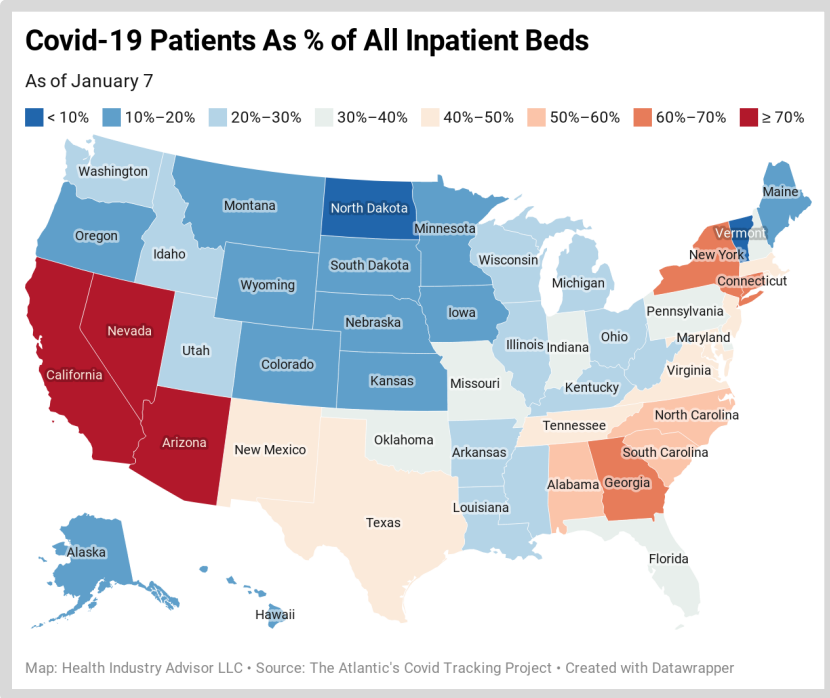
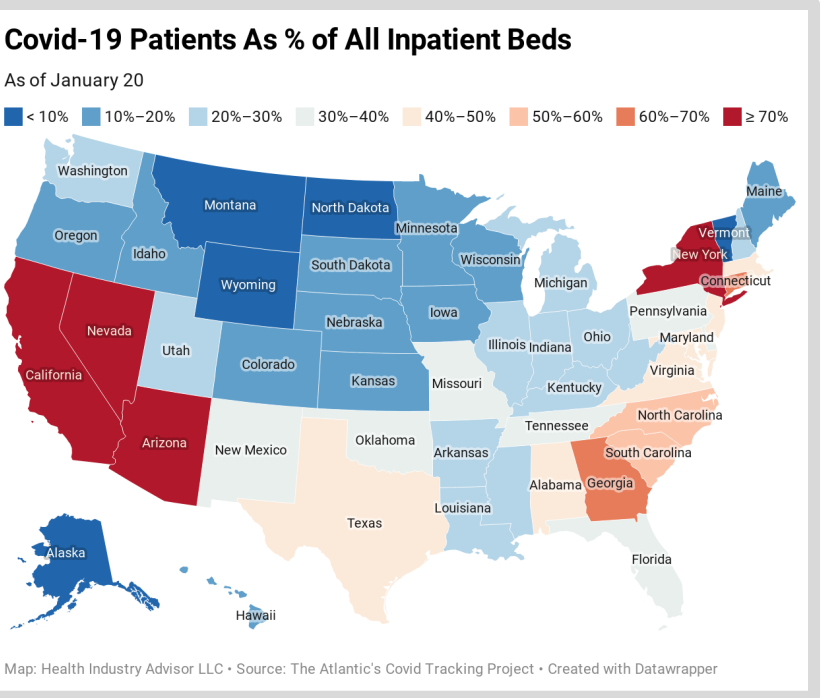
Covid-19 Hospitalizations

Covid-19 hospital census remains too high in Arizona, California, Nevada and New York

January 7



January 20



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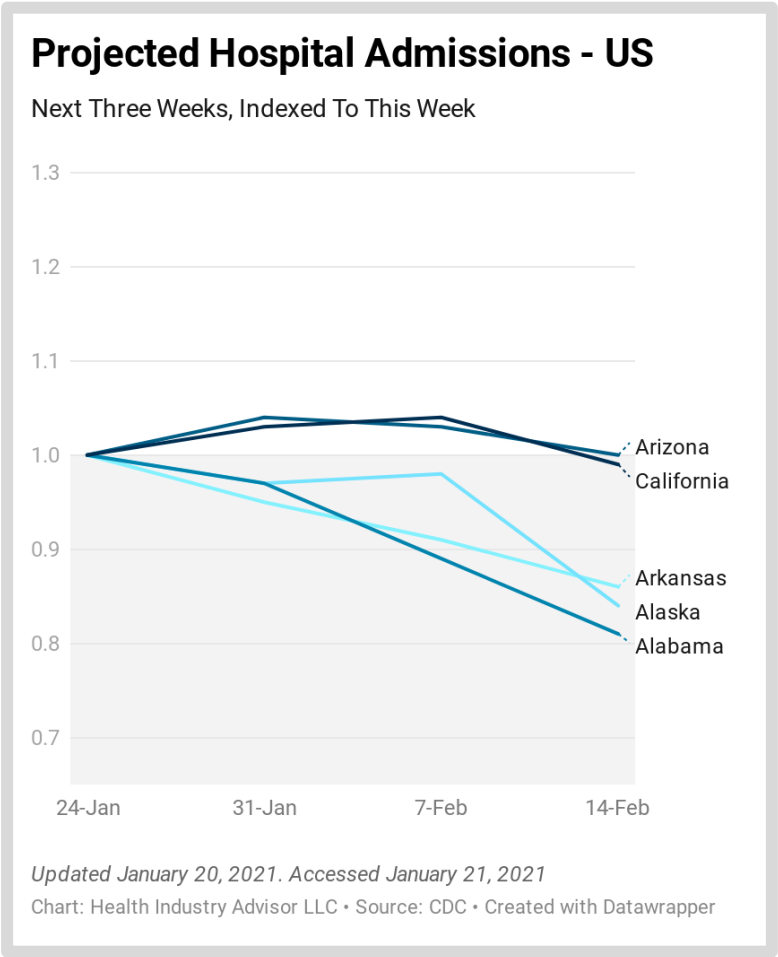
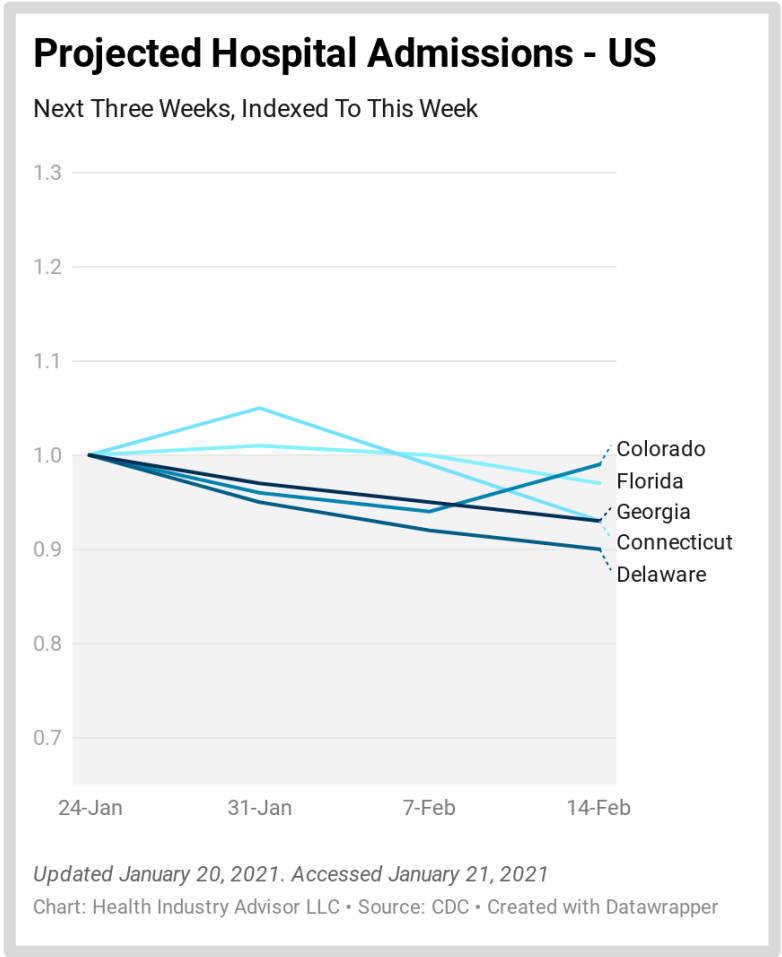
Projections of Hospital Admissions (US)

Hospital admissions in Arizona and California may increase in the next few weeks then, revert to current levels; Admissions in Alabama, Alaska and Arkansas are projected to drop significantly





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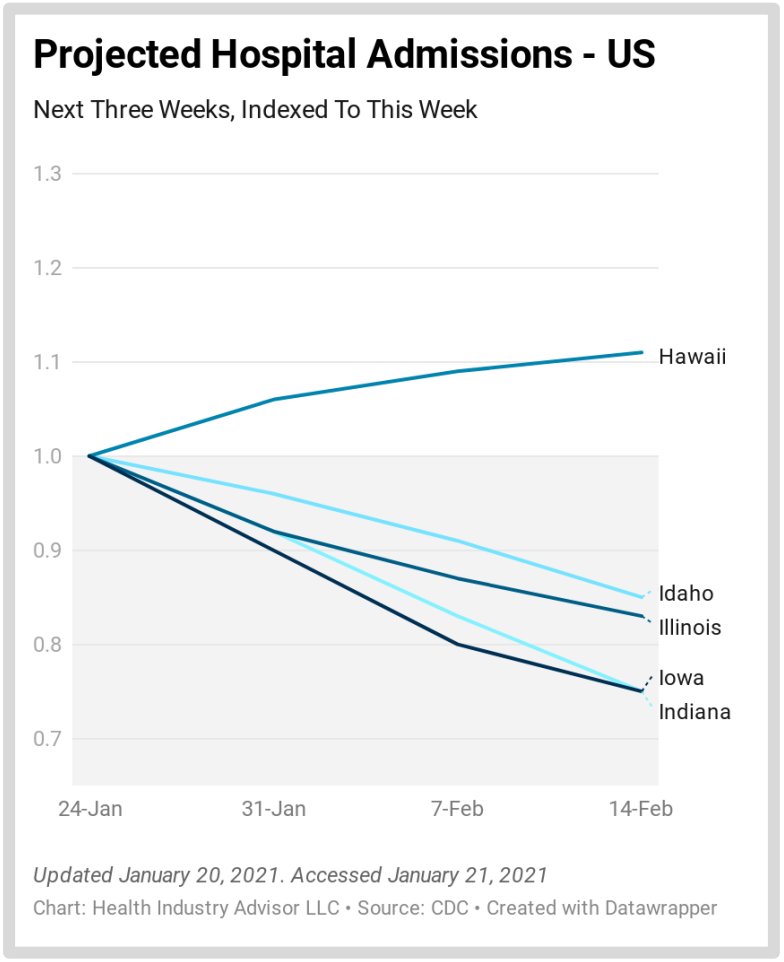
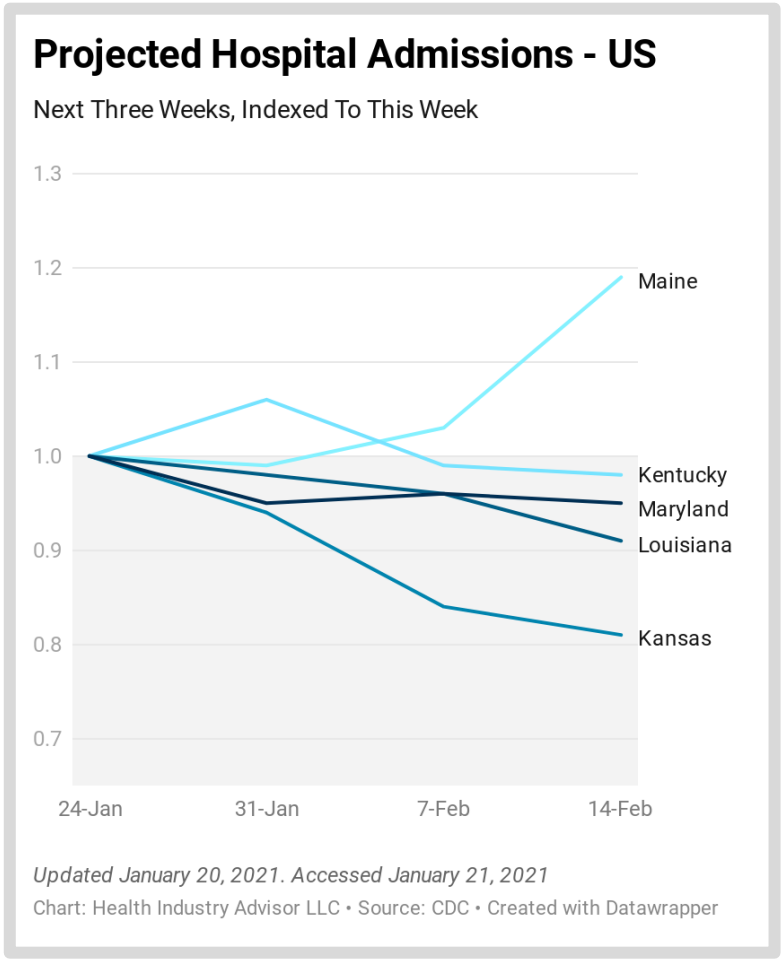
Projections of Hospital Admissions (US)

Hospital admissions in Hawaii and Maine are projected to increase throughout the next four weeks (albeit from relatively low levels); Admissions in Idaho, Illinois, Indiana, Kansas and Iowa are projected to drop significantly





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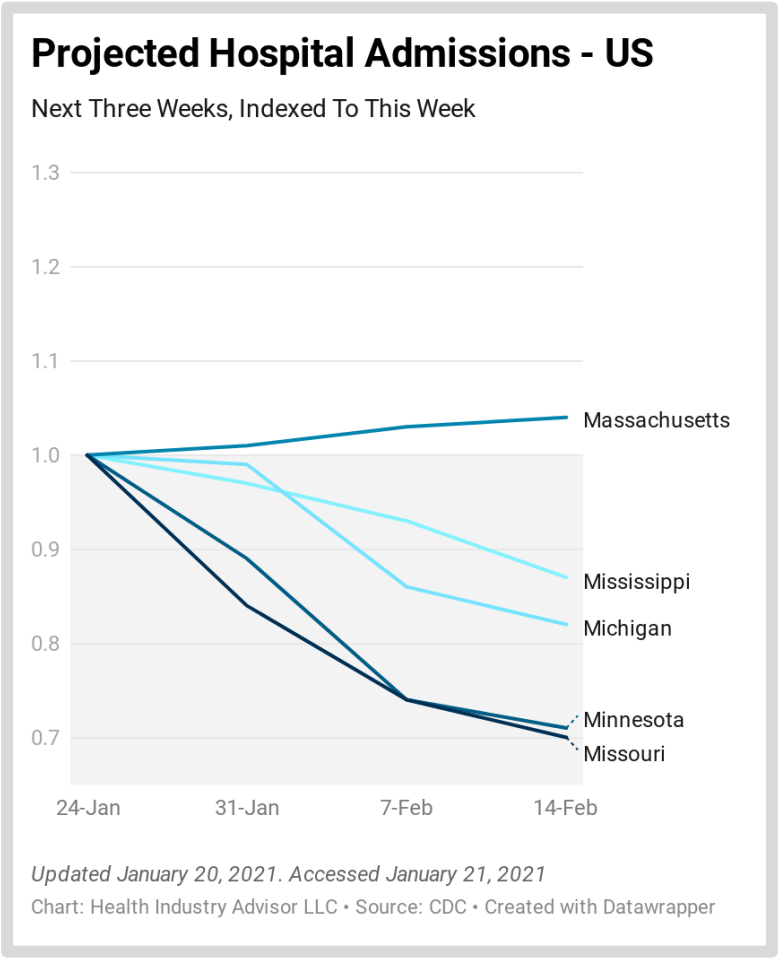
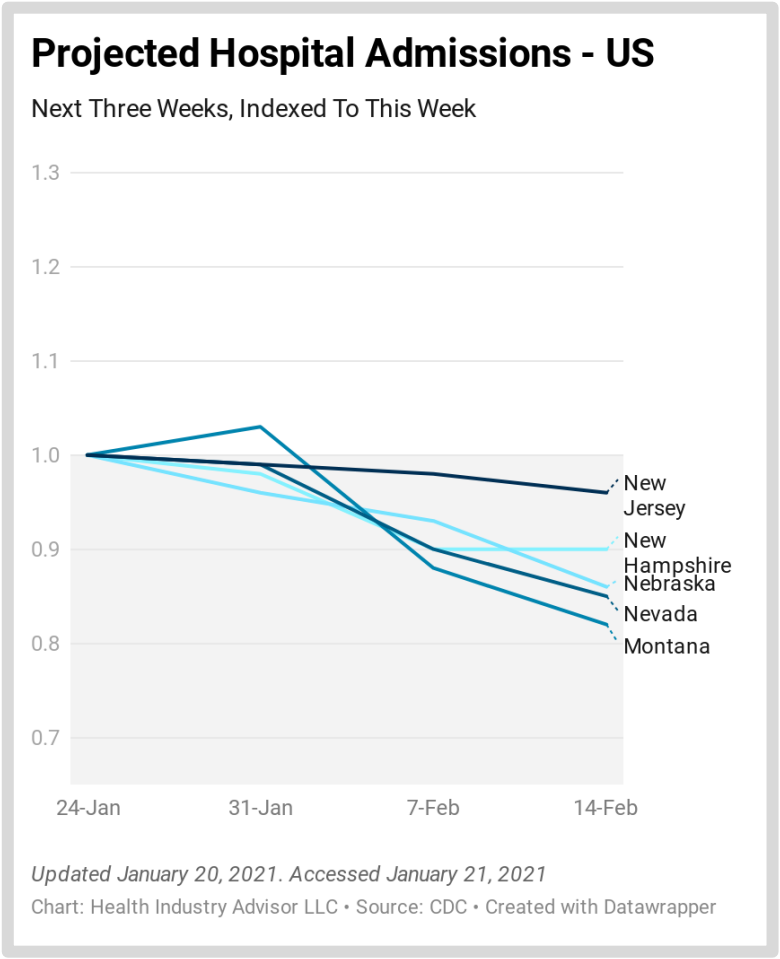
Projections of Hospital Admissions (US)

Hospital admissions in Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska and Nevada are projected to drop over the next four weeks; Admissions in Massachusetts are projected to increase





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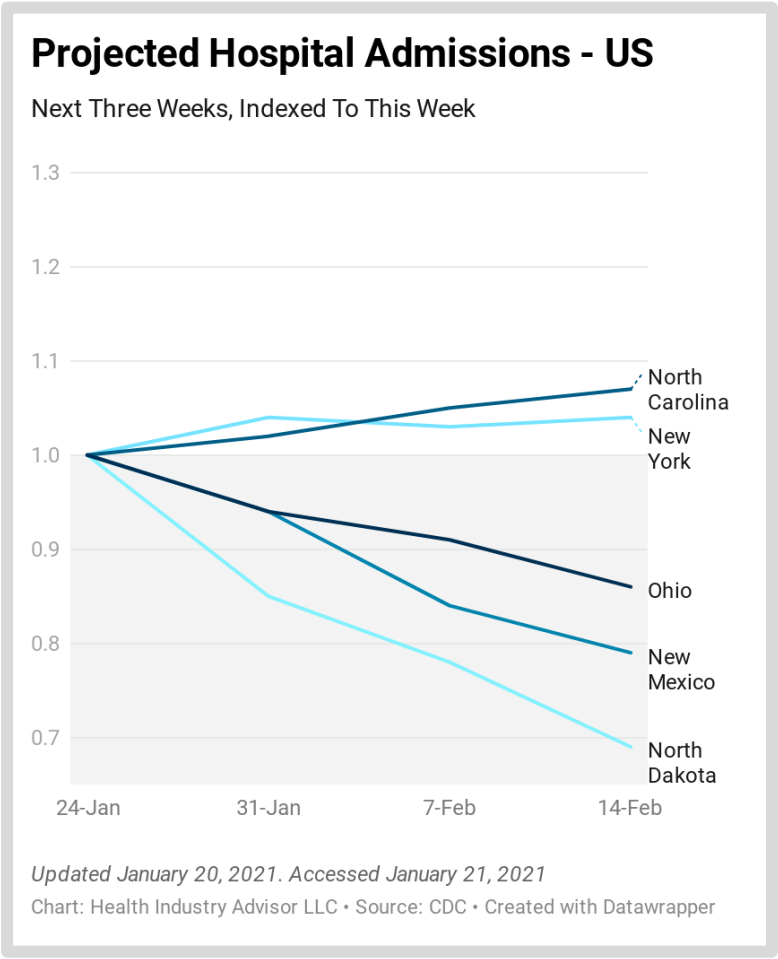
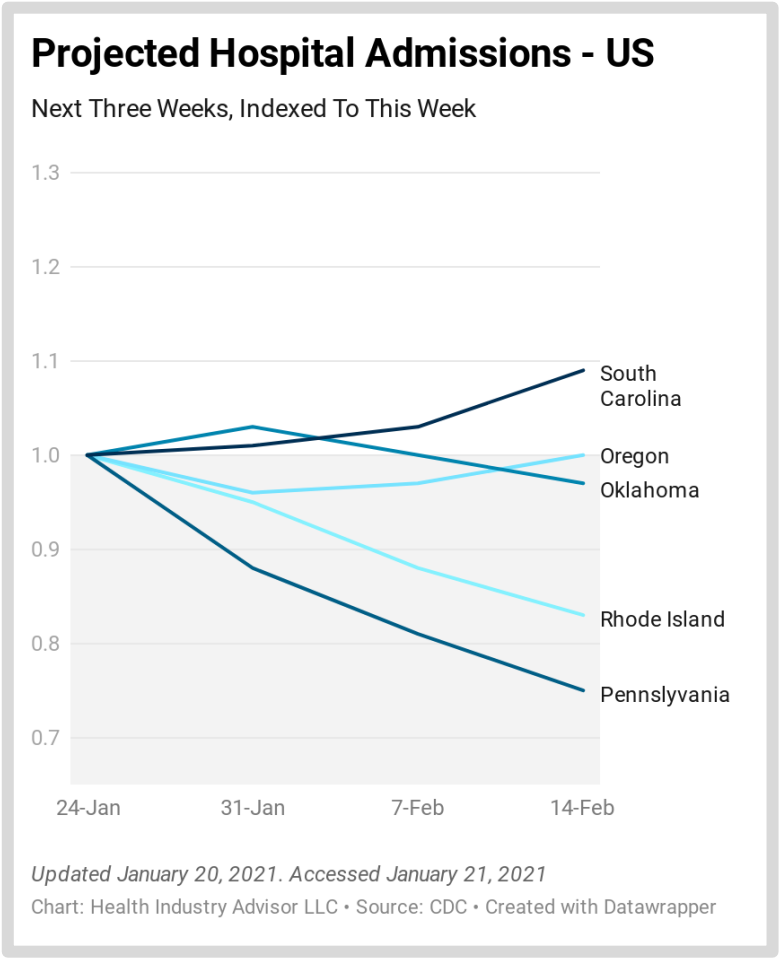
Projections of Hospital Admissions (US)

Hospital admissions in North Carolina, New York and South Carolina are projected to increase throughout the next four weeks; Admissions are projected to drop significantly in Ohio, New Mexico, North Dakota, Pennsylvania and Rhode Island





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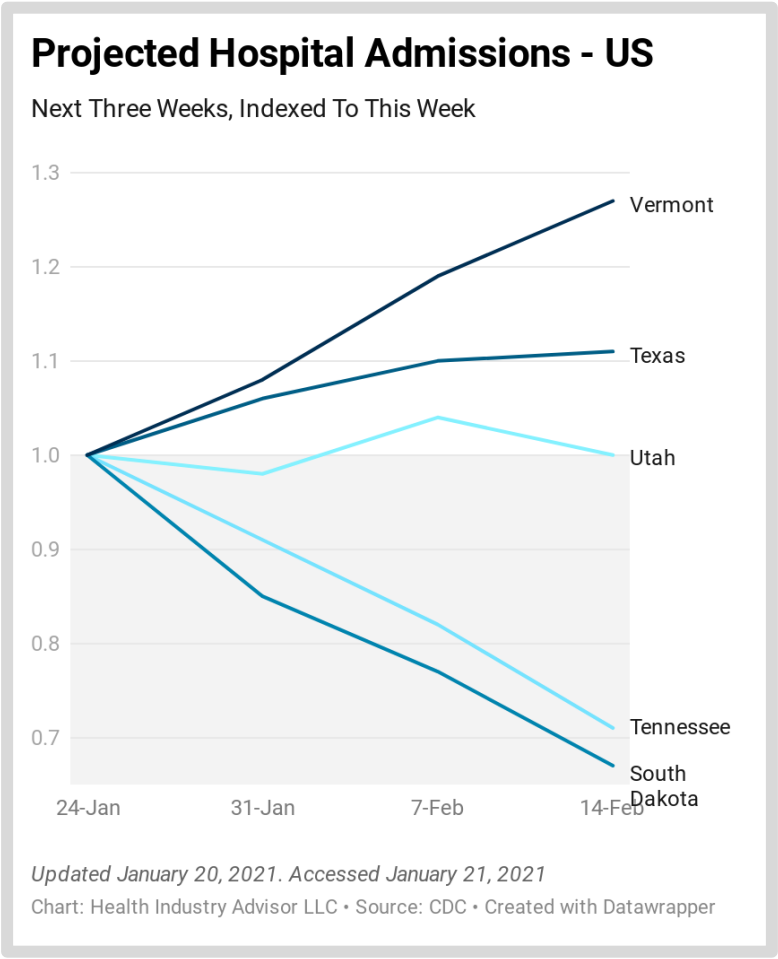
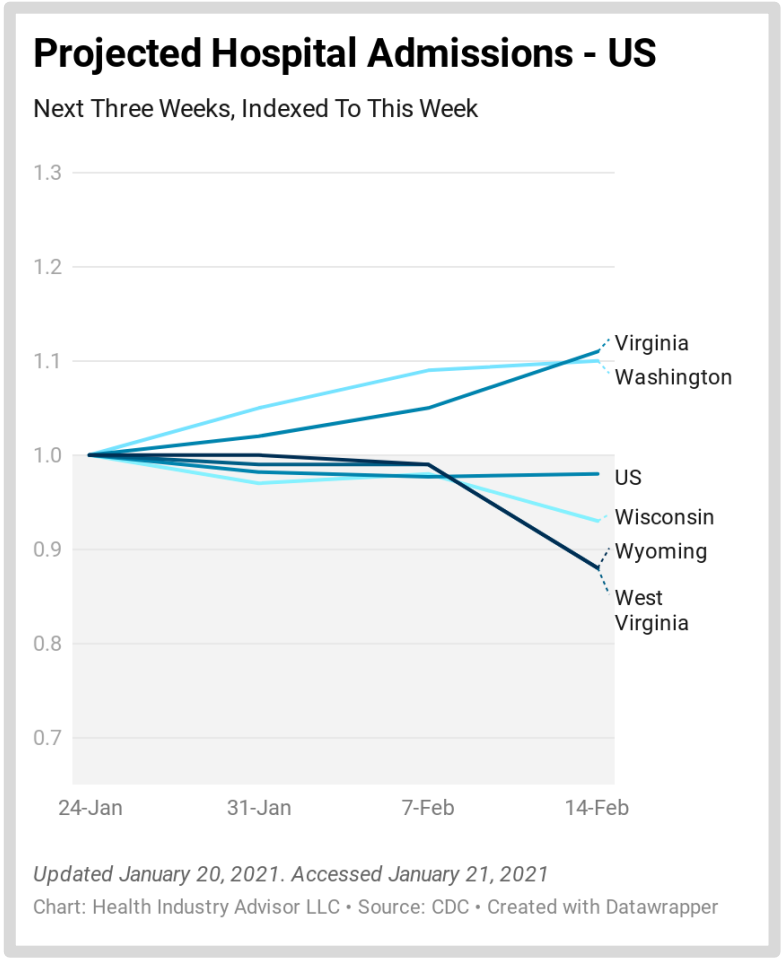
Projections of Hospital Admissions (US)

Hospital admissions in Texas, Vermont, Virginia, and Washington are projected to increase throughout the next four weeks; Admissions are projected to drop significantly in South Dakota, West Virginia and Wyoming





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

State-By-State Comparisons

As of January 20

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%	-15%	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%	-16%	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

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

State-By-State Comparisons

As of January 20

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%	-17%	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%	-26%	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

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

State-By-State Comparisons

As of January 20

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%	-9%	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%	-23%	16

Table: Health Industry Advisor LLC • Created with Datawrapper

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Covid-19
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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&region=United%20States&panel=mortality
- Rt.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