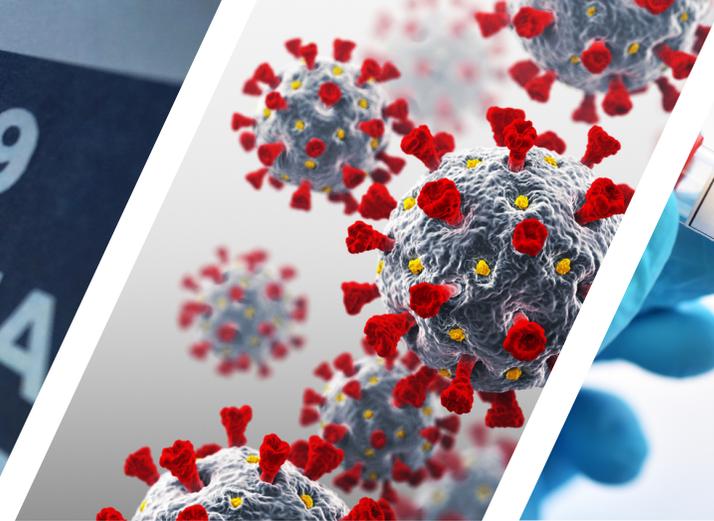
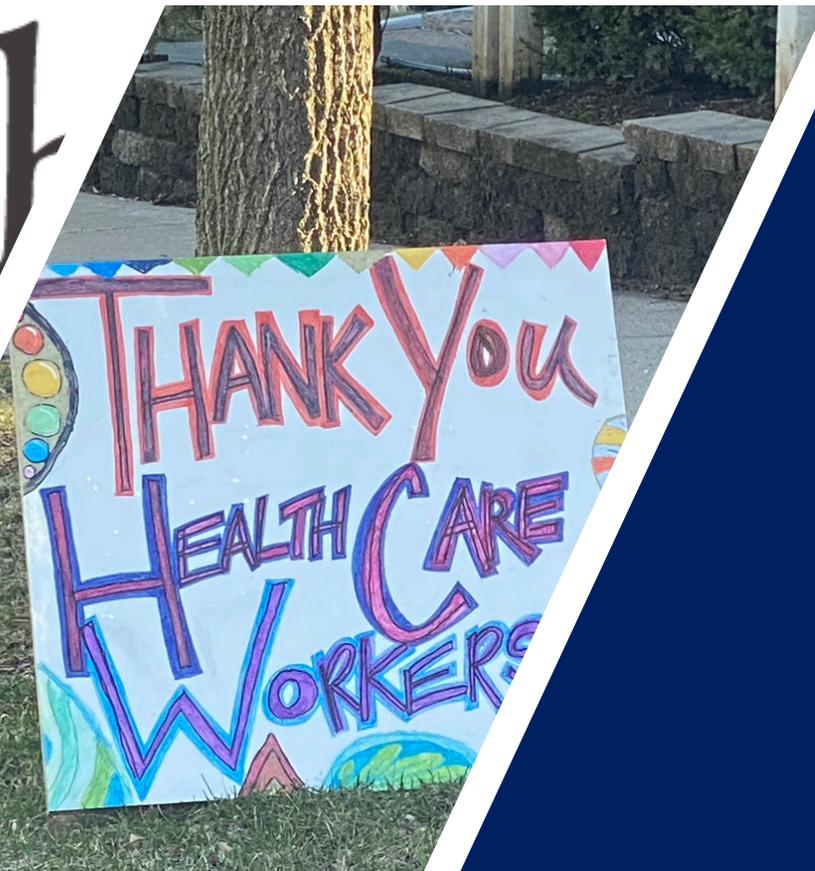


COVID-19
REOPENING PHA
CONGREGATE
SETTINGS
BUSINESSES



Health Industry Adv



Issue # 247

Monday, December 28, 2020

COVID-19 Report

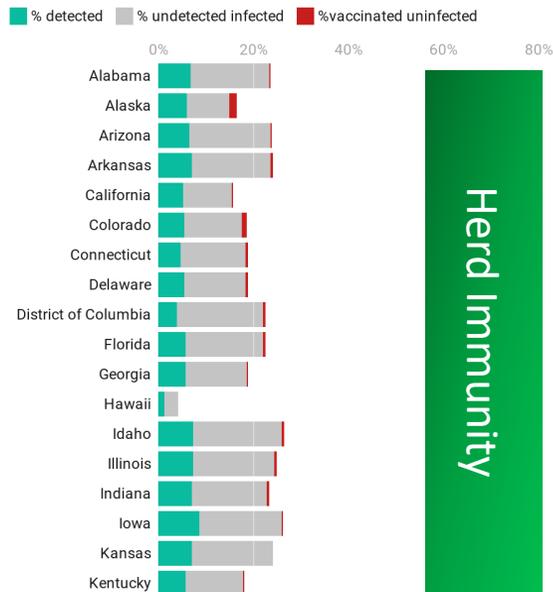
Highlights

- **Today, we begin week three of the Pfizer vaccine administration in the U.S., and week two of administration of the Moderna vaccine. There have been reports of distribution delays with the Pfizer vaccine. Nevertheless, vaccinations of healthcare personnel and long-term care facility (LTCF) residents continues ("Phase 1a" of the federal plan)**
 - This phase is expected to vaccinate 20-22 million people, with the initial doses expected by the end of the first week of January
 - **The CDC and Bloomberg, perhaps among others, are providing near-daily updates of these vaccinations. Even these are subject to reporting delays: for instance, the latest data from California are from one week ago (the first day the Moderna vaccine was available)**
 - Using the most-recent data (again, ranging from December 21-26), 11 million doses have been allocated to the states, 1.94 million have been administered
- **In today's report, we introduce a new visualization of the path to herd immunity - a state-by-state assessment of our proximity to the 60-80% rate (infection + vaccination) necessary for reaching herd immunity**
 - Our visualization starts with reported case detection rates, adds estimates of undetected infections (using Gu's model) and, finally, adds reported vaccination rates
 - Since vaccinations are encouraged for persons already infected, we discount the vaccination rate to adjust against potential double-counting
 - Because the vaccination effort is still in a nascent stage, its impact thus far toward herd immunity is minimal; this should increase steadily over time. We will update our visualization at least weekly, in order to track this development
 - **The U.S., overall, may be quarter to a third of the way to herd immunity as of late last week, driven largely by relatively high estimated infection prevalence (~20%)**
- **South Dakota may be the furthest along – half to two-thirds of the way to herd immunity; followed by North Dakota, 45-60% of the way**
- **Other states that may be at least one-third of the way to herd immunity are Idaho, Illinois, Iowa, Mississippi, Montana, New Jersey, New York, Tennessee and Wisconsin**
- Hospitalizations of Covid-19 patients declined slightly on Christmas Day and again on Saturday, before increasing again yesterday
 - **Nationwide, just under 38% of inpatient beds are in use for Covid-19 patients; this rate is up from 36% a week ago**
 - **Arizona, California, Connecticut and Nevada are each using more than two-thirds of their inpatient beds for Covid-19 patients. Of these, only Nevada experienced a week-over-week decline in Covid-19 hospital census**
 - In all, half of the states experienced an increase in Covid-19 census week-over-week; half experienced a decline
- Despite the reporting interruptions with detected cases, we still can ascertain the direction of the virus spread in the U.S.:
 - Youyang Gu's model uses deaths to estimate actual infections two weeks earlier. **According to Gu's model, actual infections may have peaked on December 1, falling 13% in the subsequent two weeks**
 - Gu's December 1 estimate pre-dates that of Oliver Wyman, which suggested that the 7-day average new cases peaked on December 18 and the Institute for Health Metrics and Evaluation, which suggested that new infections peaked on December 24
 - Gu also estimates the Reproduction Rate (R_t). An $R_t > 1$ indicates an increasing virus spread; under 1.0, a declining spread. **In Gu's model, R_t has declined since November 23 and has been < 1 since December 3**

Public health officials estimate we need to reach 60-80% of the population infected or vaccinated, in order to achieve herd immunity
 In this graphic, we illustrate the % of each state's population that has had a detected infection, an estimated undetected infection¹ or a vaccination²

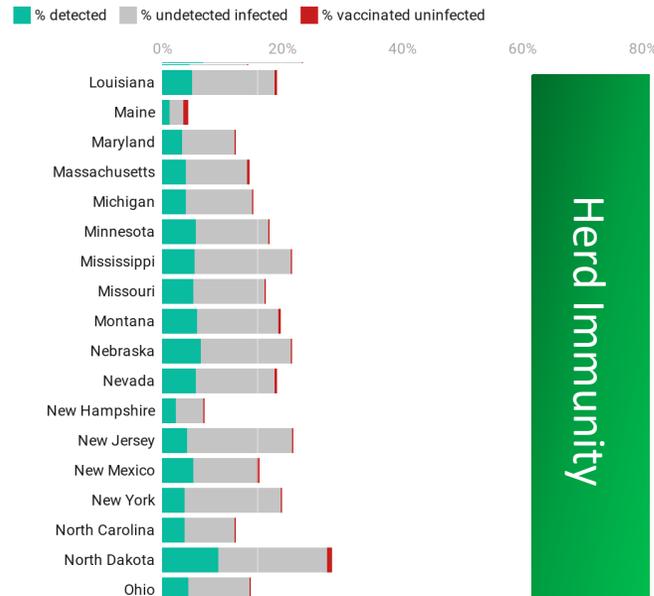
Road to Herd Immunity

Infection & Vaccine (First Dose) Prevalence, As of December 26



Road to Herd Immunity

Infection & Vaccine (First Dose) Prevalence, As of December 26



Road to Herd Immunity

Infection & Vaccine (First Dose) Prevalence, As of December 26

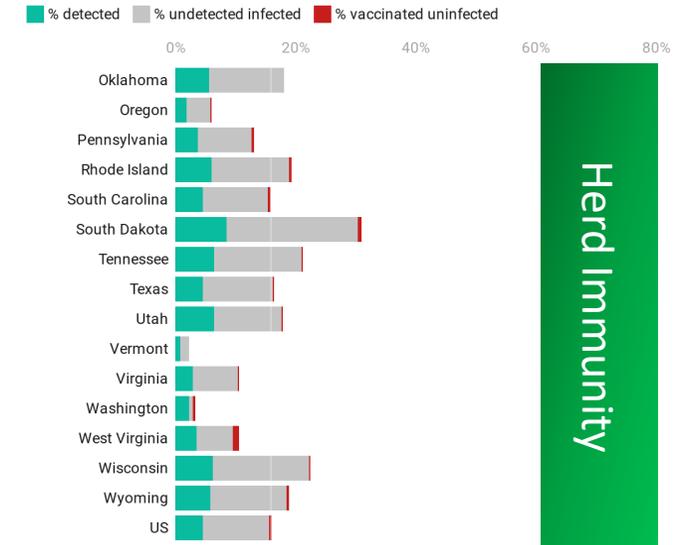


Chart: Health Industry Advisor LLC • Source: Youyang Gu; Bloomberg • Created with Datawrapper

Note: vaccination rates are low, as the process is in its nascent stage

1 – Source Youyang Gu <https://covid19-projections.com>

2 – Assuming that those vaccinated have the same rate of detected and undetected infections as the state in total

According to Gu's model, the reproduction rate been declined twenty consecutive days . . . And has been below 1.0 for eleven consecutive days

This suggests that the virus spread slowed through and since the Thanksgiving holiday

The most-recent rate is as low as it has been since August 28

Notes:

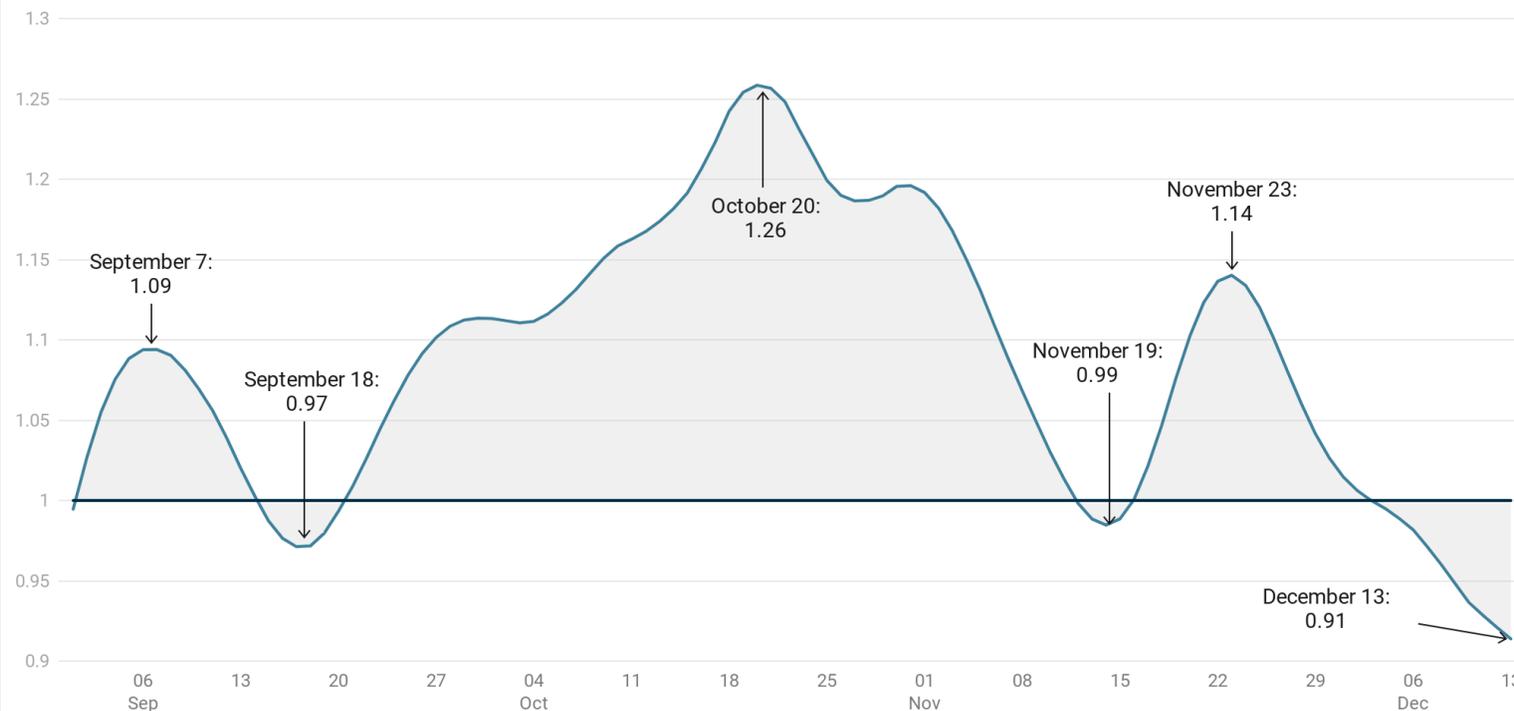
- Gu uses deaths to estimate actual infections and the reproduction rate (R_t), using a machine learning model

- Gu backdates two weeks from the death date to estimate when an infection likely occurred

* - Youyang Gu: [Covid-19projections.com](https://www.covid-19projections.com)

Reproduction Rate (R_t) - U.S.

Youyang Gu Estimate, September 1 - December 13



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

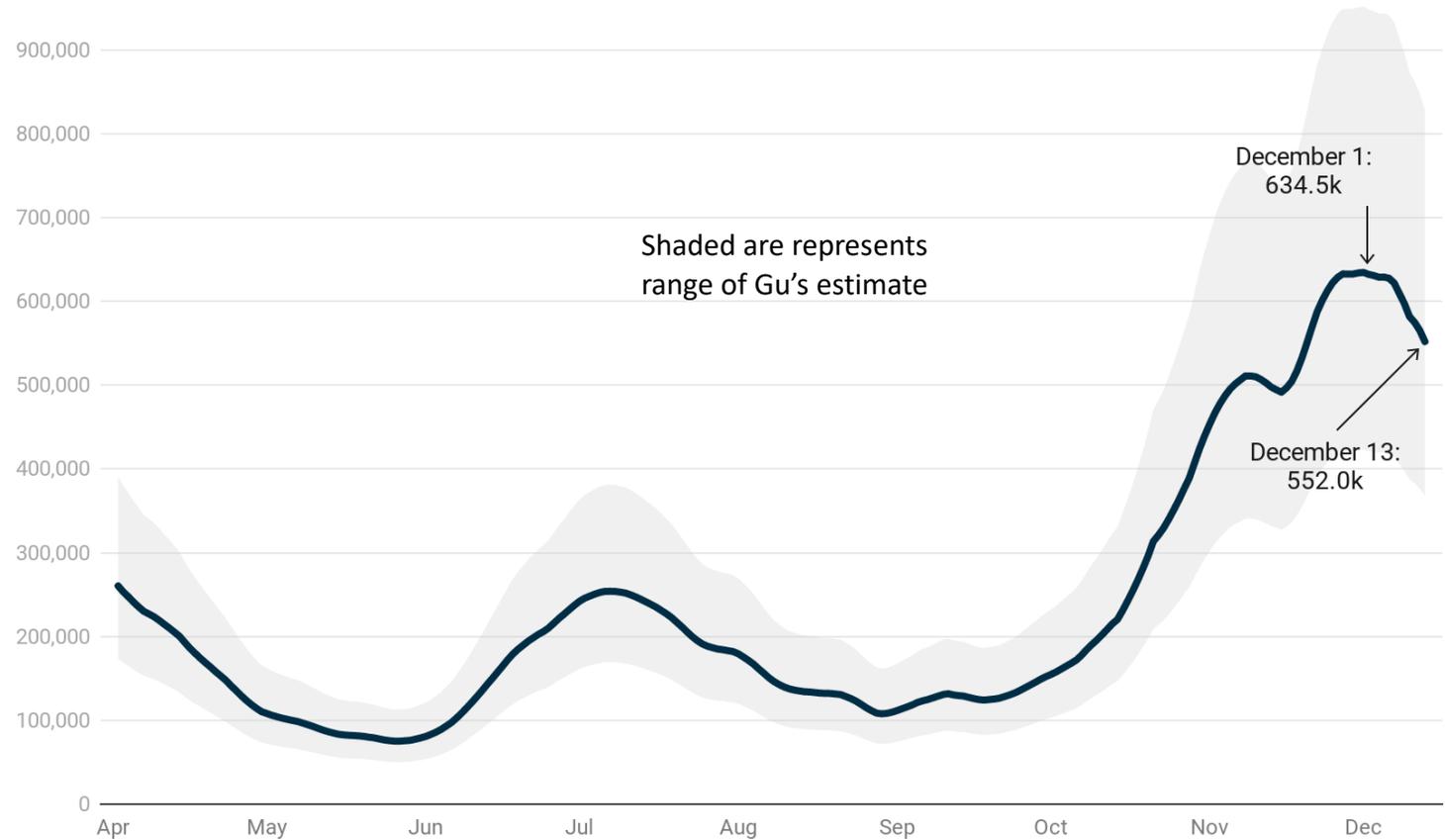
According to Gu's estimates, new infections in the U.S. peaked on December 1 and have declined ~13% since

Gu estimates that 19.9% of the U.S. population has been infected by the SARS-CoV-2 virus (range of 13-30%)

*<https://pandemicnavigator.oliverwyman.com/forecast?mode=country®ion=United%20States&panel=baseline>

Estimated New Daily U.S. Infections

Youyang Gu Model, Through December 13



Using Youyang Gu's COVID-19 Projection Model

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

The impact of holiday reporting interruptions is evident in this time-series:

We averaged ~567k new cases worldwide each day, over the pas week

The United States averaged 184k new cases each day

* - 7-day moving average basis

Newly Detected Daily Cases - U.S. & Worldwide

7-Day Moving Average, As of December 27

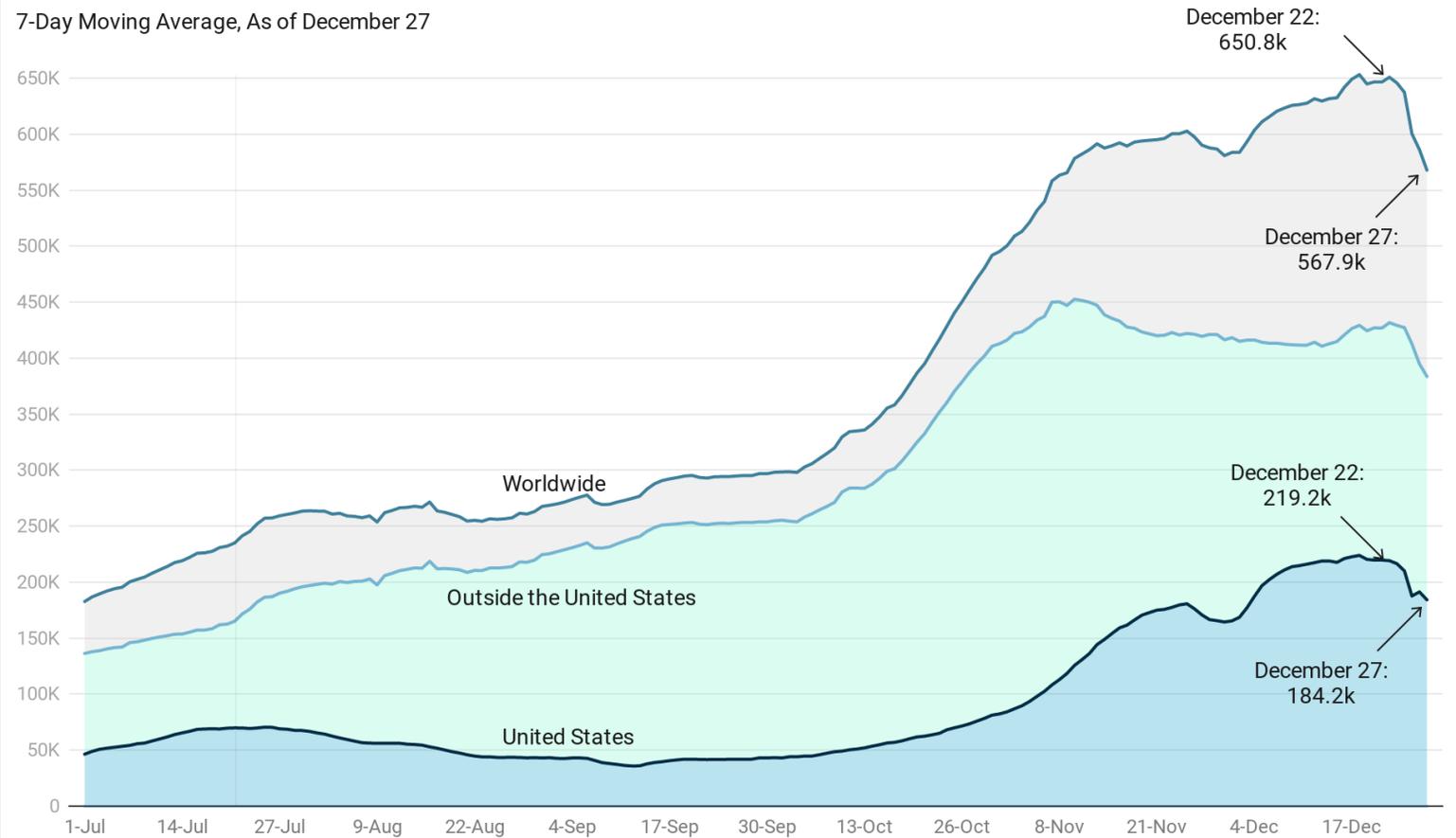


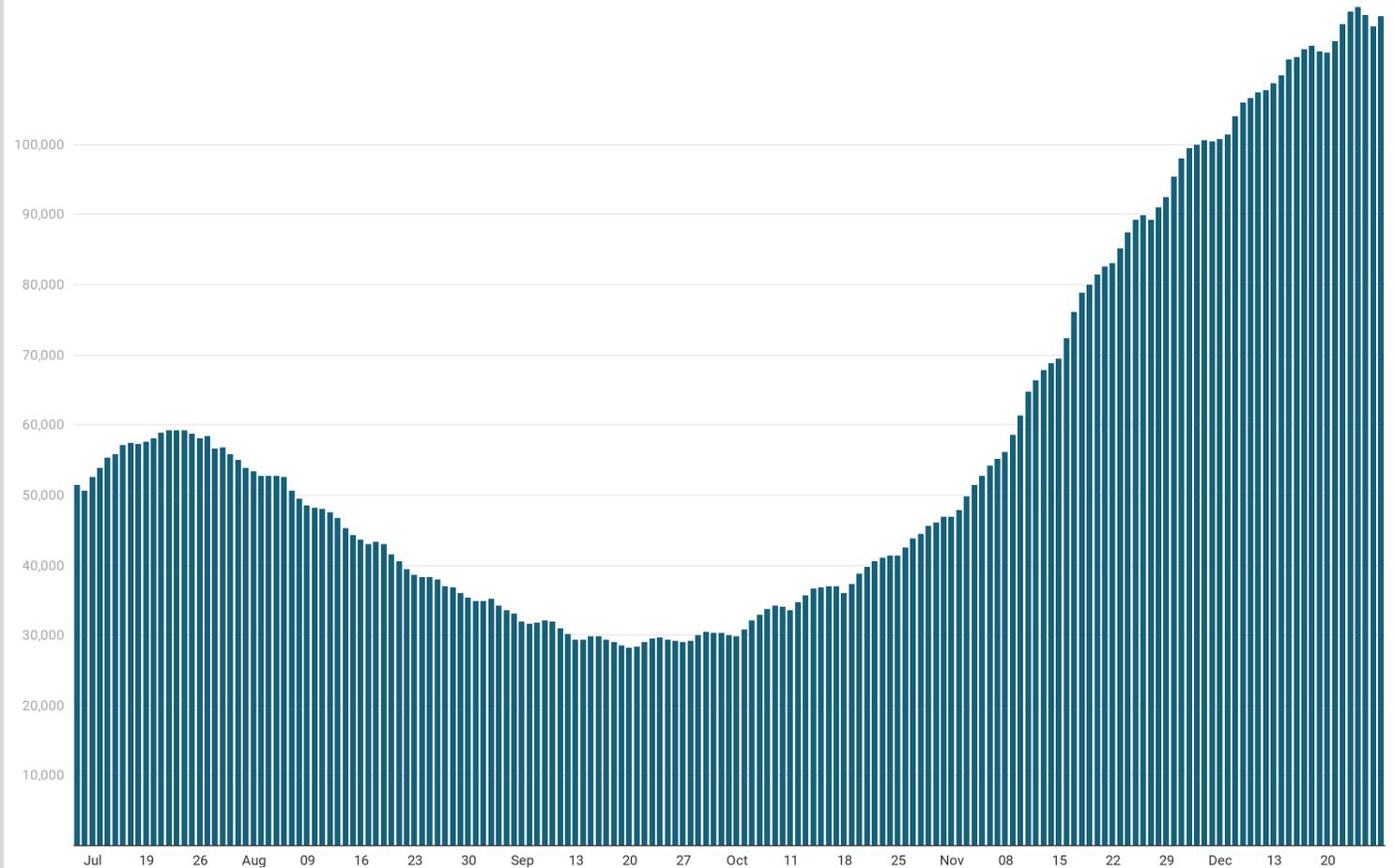
Chart: Health Industry Advisor LLC • Source: worldometers.info • Created with Datawrapper

The number of Covid-19 patients in the hospital declined on Christmas Day and the following day, before increasing again yesterday

There are currently ~ 118,000 Covid-19 patients in the hospital

Hospital Census: COVID-19 Patients

As of December 27



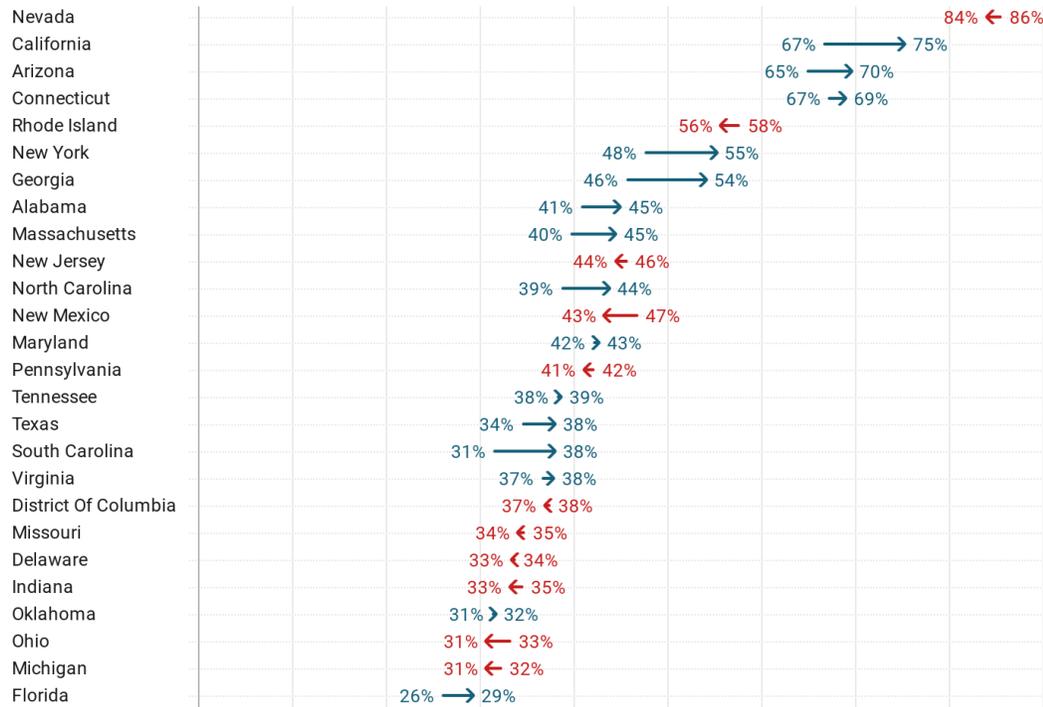
Florida data first available on July 10

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

Overall, Covid-19 patients occupied 37.9% of inpatient beds yesterday, up from 36.2% a week ago
 Nevada, California, Arizona and Connecticut have the highest rates, each with more than 2/3 of beds in use for Covid-19 patients; Hawaii, Vermont and North Dakota are each using less than 10% of beds for these patients
 Covid-19 occupancy increased in exactly ½ of the states during the past week – with California, Arizona and Connecticut being concerning

Covid-19 Patients / Total Inpatient Beds

7-Day Moving Average, As of December 20 & 27



Covid-19 Patients / Total Inpatient Beds

7-Day Moving Average, As of December 20 & 27

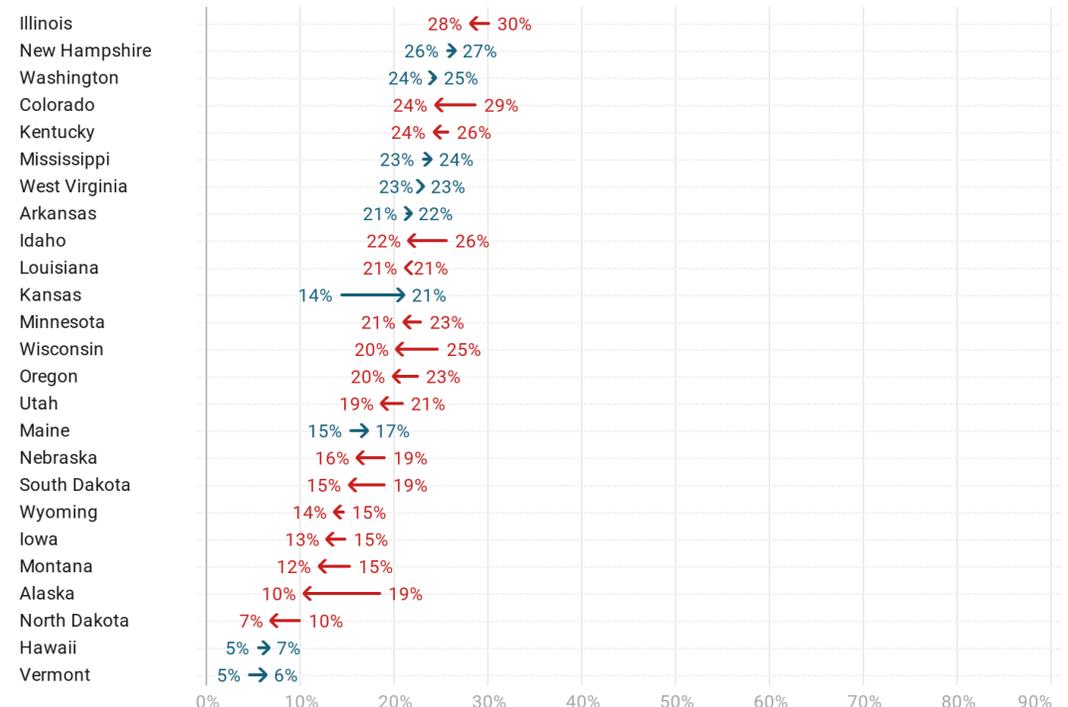
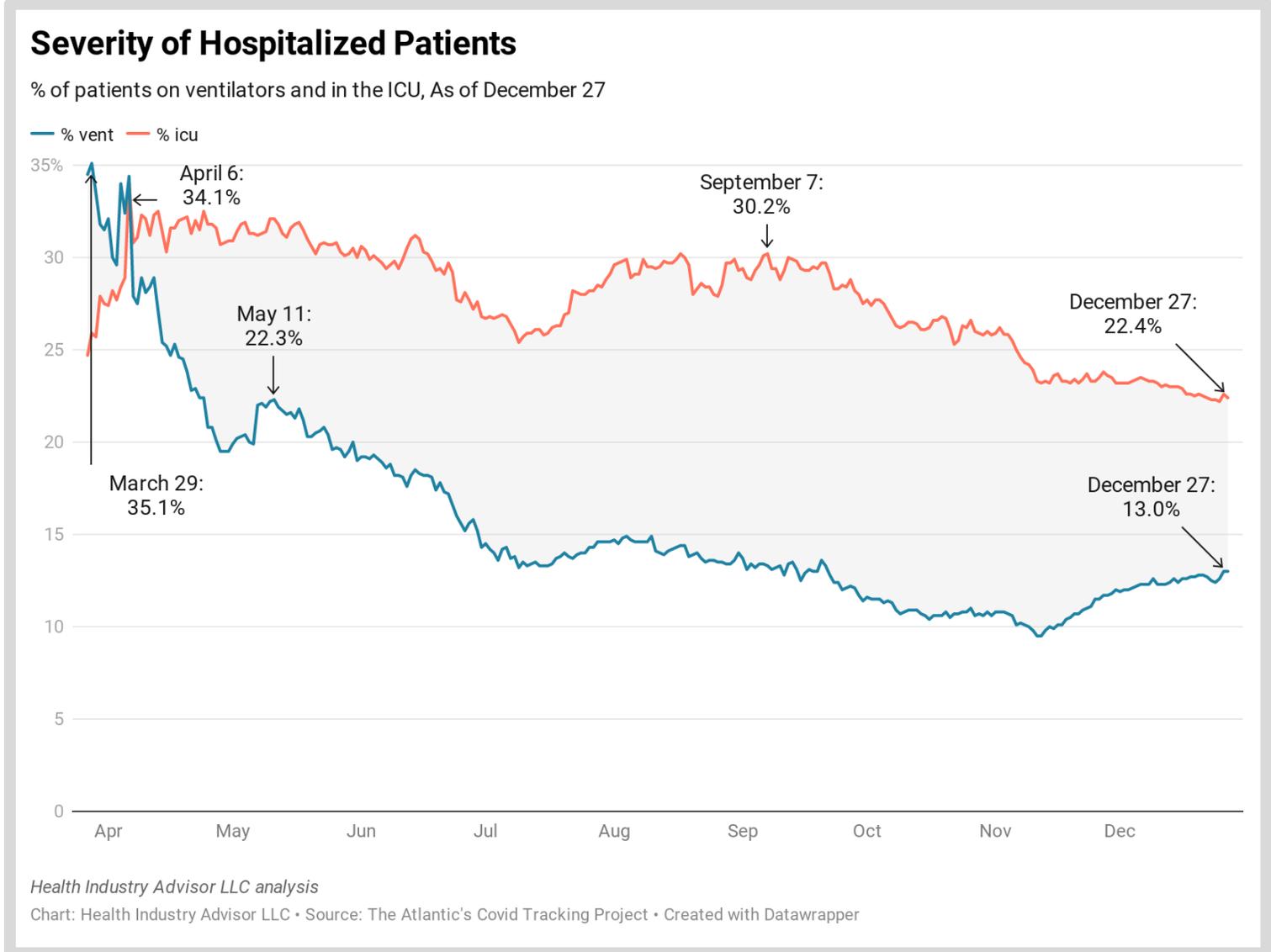


Chart: Health Industry Advisor LLC • Source: The Atlantic's Covid Tracking project & worldometers.info • Created with Datawrapper



Over the past 4-6 weeks:

- the likelihood of a Covid-19 inpatient would require ICU care has declined
- the likelihood a Covid-19 inpatient would require ventilator care has increased



Data 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>
- Oliver Wyman Pandemic Navigator,
<https://pandemicnavigator.oliverwyman.com/forecast?mode=country®ion=United%20States&panel=mortality>
- Bloomberg Vaccine Trackers, <https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/?sref=Z0b6TmHW>