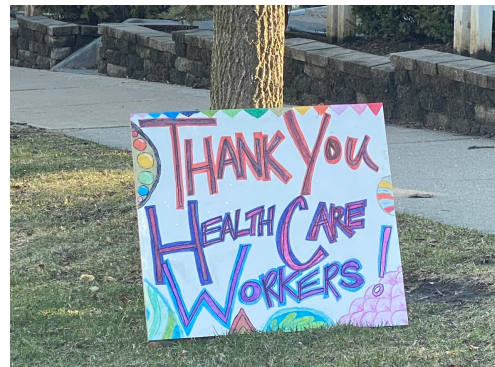
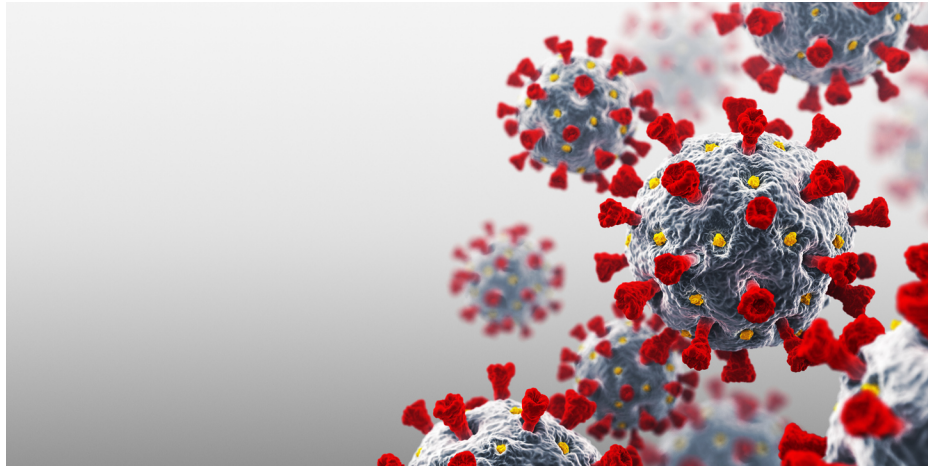
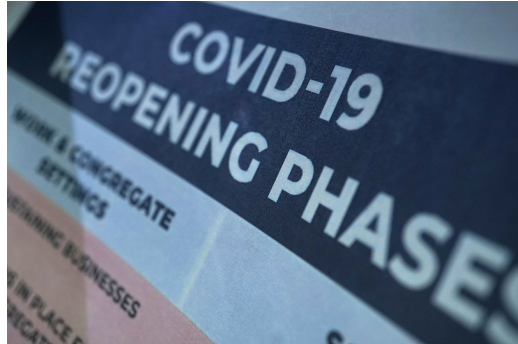




COVID-19 Report

Issue # 136

Saturday, August 15, 2020

- Although less than 2% of the U.S. population has been infected with the virus (according to reported figures), seroprevalence testing has suggested that it could be 10x higher. MIT data scientist Youyang Gu, recognized as one of the leading experts on modeling the virus progression, **estimates that 13% of the U.S. population has been infected already and this will grow to 19% by November 1.** Compare this to the estimated 25% that were infected with the Spanish Flu of 1918
- **Deaths in the U.S. with the coronavirus are ~51 per 100,000. Gu projects this to grow to ~69 by November 1 (mean estimate of 228k deaths, with a range of 204-260k).** The Institute of Health Metrics and Evaluation (IHME) is more dire, estimating 250k deaths by that date, with a range of 219-288k
- **The Spanish Flu resulted in a significantly higher death rate - estimated to be ~650 per 100,000,** and impacted working-age persons most significantly (this epidemic resulted in a lowering of the life expectancy by 12 years, in a single year).
- **Gu projects that infections could increase another 45% by November 1.** Note that he estimates YTD infections at 44 million - far higher than the reported 5.5 million
- According to CDC data, **the risk of hospitalization is 5x - 13x higher for senior citizens than for persons 18-29 years old;** this risk is 4x-9x lower for those 17 & younger. Indeed, the % of hospital patients under 18 is very low. Persons 18-49 years old, however, now represent about 1/3 of inpatients; in April, these represented about 1/5 of inpatients
- From this same source, **the risk of death is 90x - 630x higher for seniors and 9-16x lower for the young**
- Among adults, **a majority of hospitalized patients reported hypertension as an underlying medical condition.** Obesity and metabolic diseases were present in the near-majority of hospitalized patients
- We are finally seeing some overall progress in our "scorecard", a multi-factor model of the current state of virus progression (considers rates of new infections, case growth, test-positive% and hospitalizations). Although more than 1/2 of population resides in a state we list as of "high concern", eight states have improved their grade this month; only Illinois and South Dakota have digressed
- Testing continues to improve: On a 7-day average basis, volume is at its highest since August 2; **the weekly test-positive rate is at its lowest since June 27**
- **New cases are down 2.4% on a week-over-week basis; yesterday's new cases were the lowest of any Friday in the past 5 weeks** (there is a clear day-of-week pattern to new cases: lowest on weekends then increasing each day until peaking on Thursday or Friday)
- **New daily infections per capita, although declining slightly the past few days, have essentiality plateaued at a relatively high level**
- Of the sixteen states reporting the highest new infection rates for the past week, ten saw this rate decline on a week-over-week basis. Alabama, Arizona, Arkansas, Louisiana, Mississippi, Nevada and South Carolina reported significant declines in this rate; California's rate increased significantly
- **Hospital and ICU census and ER visits related to COVID-19 continued to decline yesterday** - trends that have been in place for days, if not weeks. These rates are each far lower than were they were in March/April
- **Deaths, although declining on each of the past three days, remained above 1,000 per day**

United States - What are the odds?

Reported infections are less than 2% of the population; Gu* estimates that it's closer to 13% and will grow to 19% by November

Deaths are just more than 50 per 100,000; Gu projects 69 per 100k by November. For Spanish Flu in 1918: ~650 per 100k

Of having contracted SARS-CoV-2

Using Gu's Estimated Mean projection

As reported, as of 8/43



As of 8/14

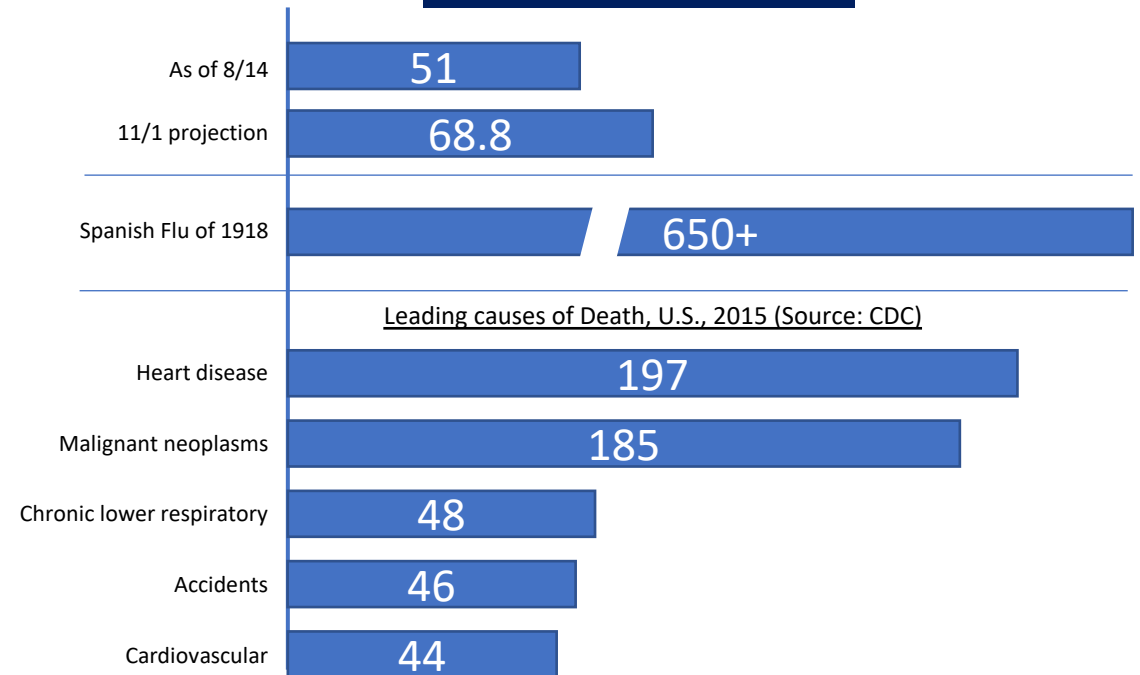


Projected, As of 11/1



By comparison, estimates are that 1-in-4 Americans were infected by Spanish Flu

Of dying (per 100,000)



Annual U.S. deaths from the flu (2010-2019): 12,000 – 61,000

* "Estimating True Infections: A Simple Heuristic to Measure Implied Infection Fatality Rate", Youyang Gu, July 29, 2020 (Updated August 14)

United States - How many more infections and deaths are projected?

Gu projects a 45% increase in infections by November 1

Gu projects 228k deaths by 11/1; IHME projects 295k (Current: 175k)

Projected Infection Rate - United States

Based on Youyang Gu's Model, As of August 14

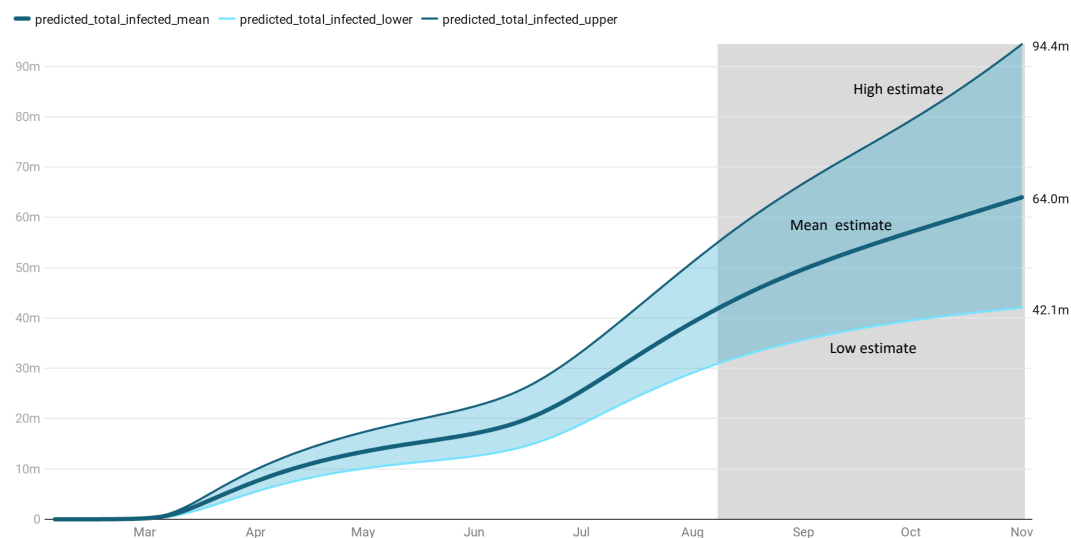
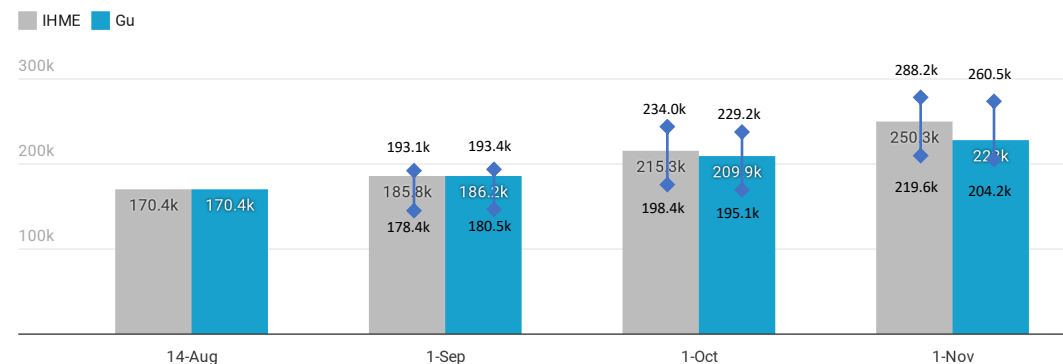


Chart: Health Industry Advisor LLC • Source: Youyang Gu • Created with Datawrapper

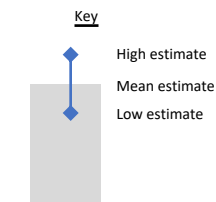
Projected Deaths

Institute of Health Metrics and Evaluation v. Youyang Gu



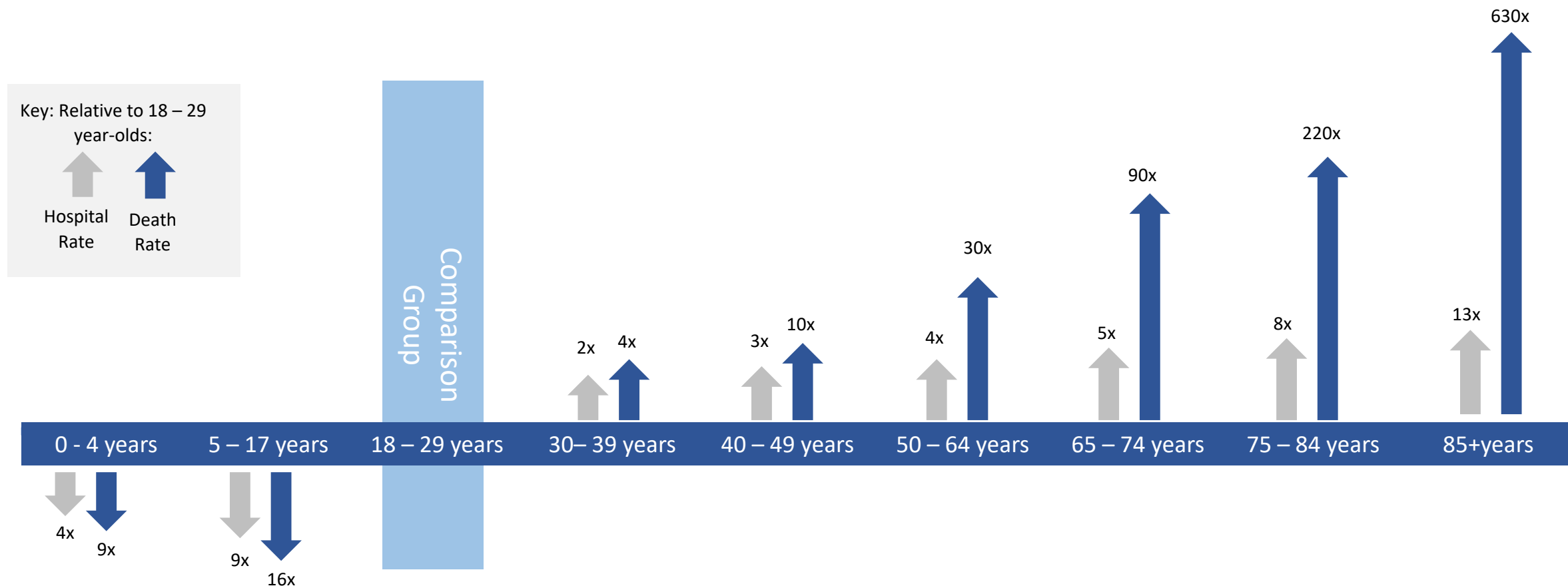
Using mean or expected value, as of August 14

Chart: Health Industry Advisor LLC • Created with Datawrapper



United States - How does age factor into hospitalizations and deaths?

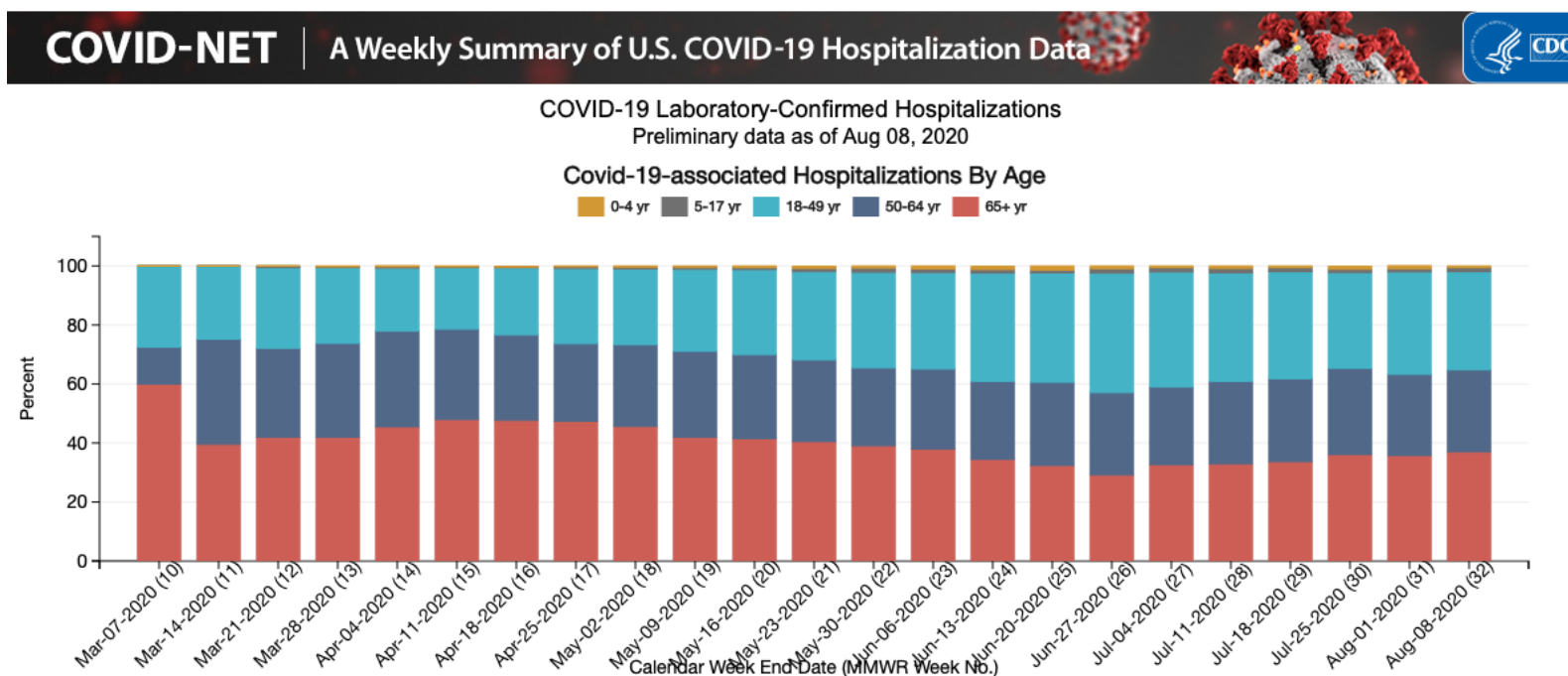
Hospitalization rates range from 4x lower to 13x higher than for 18-29 year-olds; Death rates ranges from 9x lower to 630x higher



Source: Centers for Disease Control and Prevention, "COVID-19 Hospitalization and Death by Age", Update August 10, 2020. Accessed August 14, 2020

United States - How has the distribution of patients by age changed over time?

Persons 18-49 years-old make up a larger share of hospitalized patients now (1:3) than in March & April (1:5). Very few patients <18



The Coronavirus Disease 2019 (COVID-19)-Associated Hospitalization Surveillance Network (COVID-NET) hospitalization data are preliminary and subject to change as more data become available. In particular, case counts and rates for recent hospital admissions are subject to lag. As data are received each week, prior case counts and rates are updated accordingly.

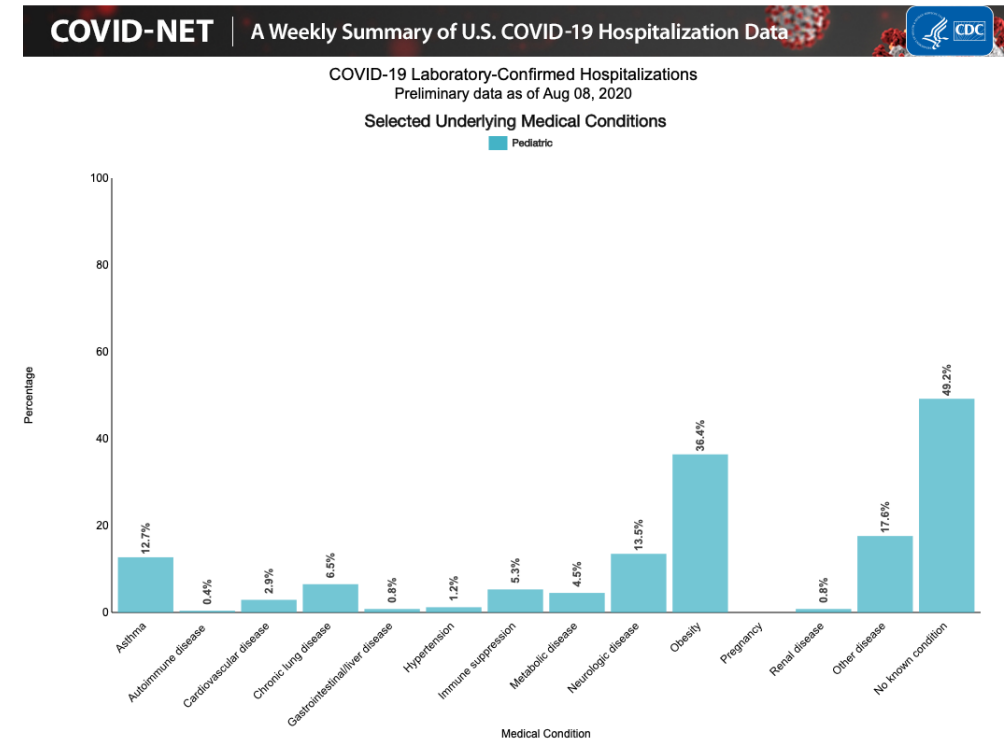
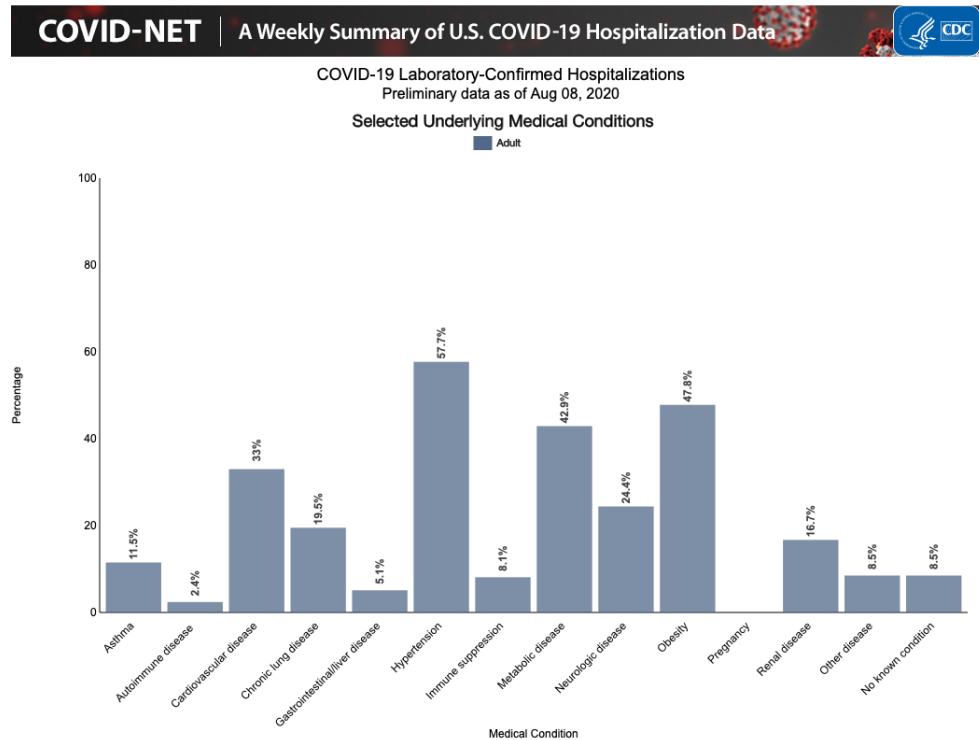
Source: Centers for Disease Control and prevention "COVID-NET", accessed August 14, 2020

United States - What underlying conditions are associated with COVID-19 hospital stays?

For adults: hypertension, obesity and metabolic conditions are most common; For pediatrics: 'no known condition' and obesity are most common

Adults

Pediatrics

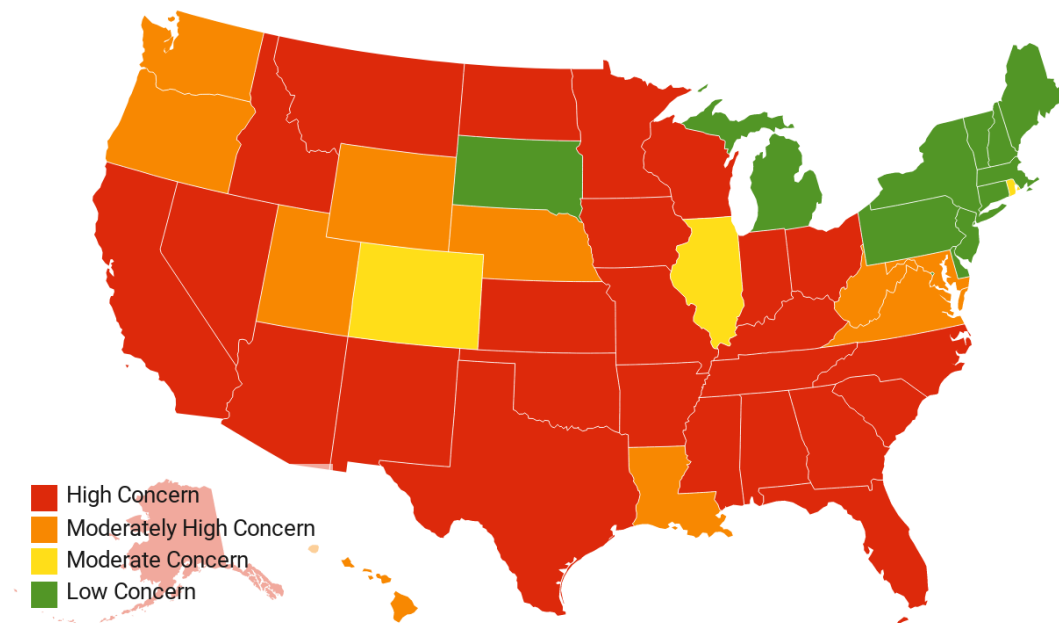


Source: Centers for Disease Control and prevention "COVID-NET", accessed August 14, 2020

Finally, some very modest improvement – Iowa, New Mexico, Ohio, Oregon, Tennessee, Virginia, Wisconsin and Wyoming improve; Illinois and South Dakota fall back since July 31

Scorecard

As of July 31

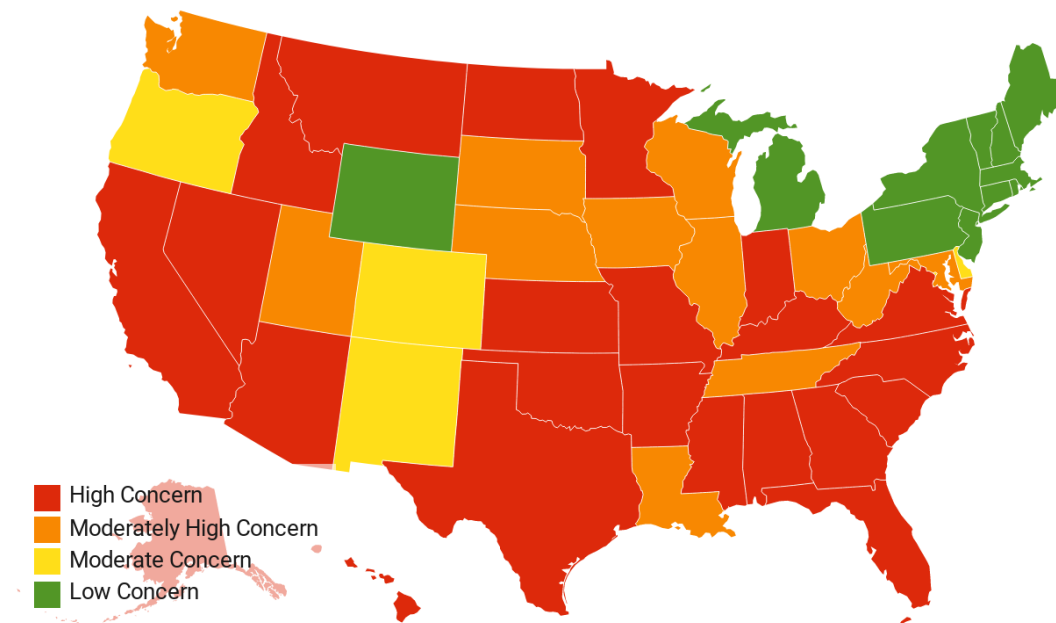


Scoring based on new infection, test-positive, hospitalization and case growth rates

Map: Health Industry Advisor LLC • Created with Datawrapper

Scorecard

As of August 14



Scoring based on new infection, test-positive, hospitalization and case growth rates

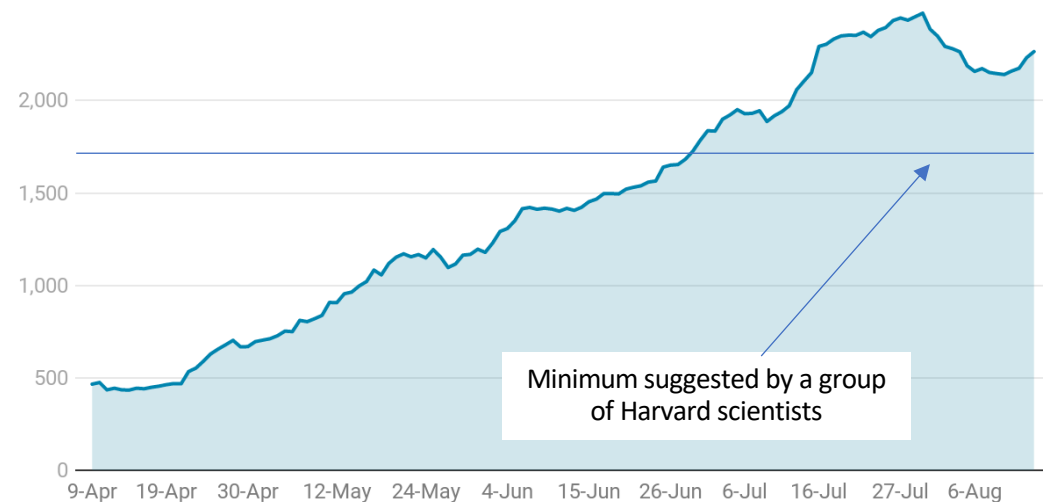
Map: Health Industry Advisor LLC • Created with Datawrapper

Test volume on Friday showed evidence of continued acceleration; Week-over-week rate was highest since August 2

Test-positive rate was low again on Friday; Weekly rate was lowest since June 27

Daily Tests Per 1 Million - United States

Trailing 7-Day Moving Average, As of August 14

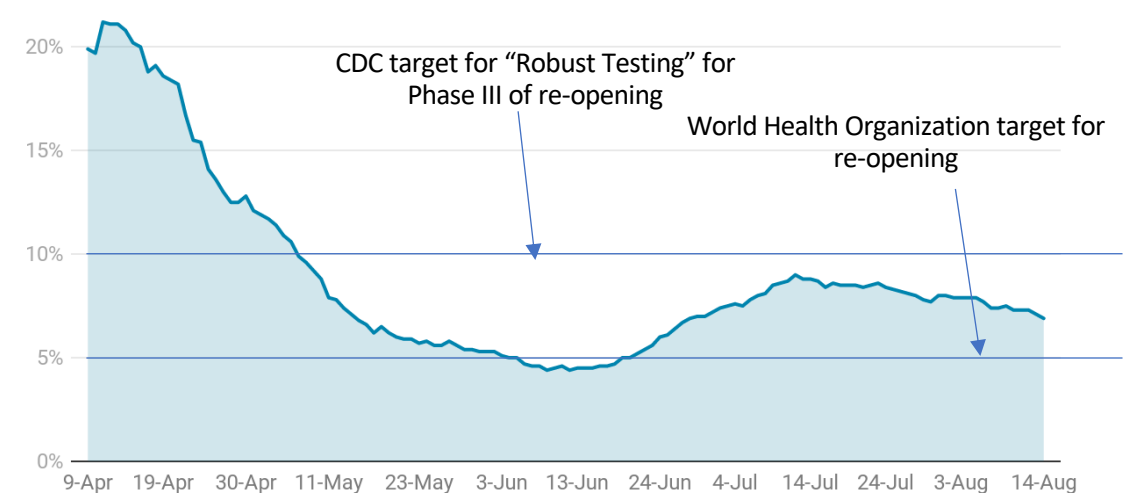


Health Industry Advisor LLC analysis

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

Test-Positive Rate - United States

Trailing 7-Day Moving Average, As of August 14



Health Industry Advisor LLC analysis

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

Note: On August 11, North Carolina made a significant adjustment, removing 220,000 tests from their YTD totals. We manually removed this negative adjustment from the August 11 data to better reflect actual testing for that date

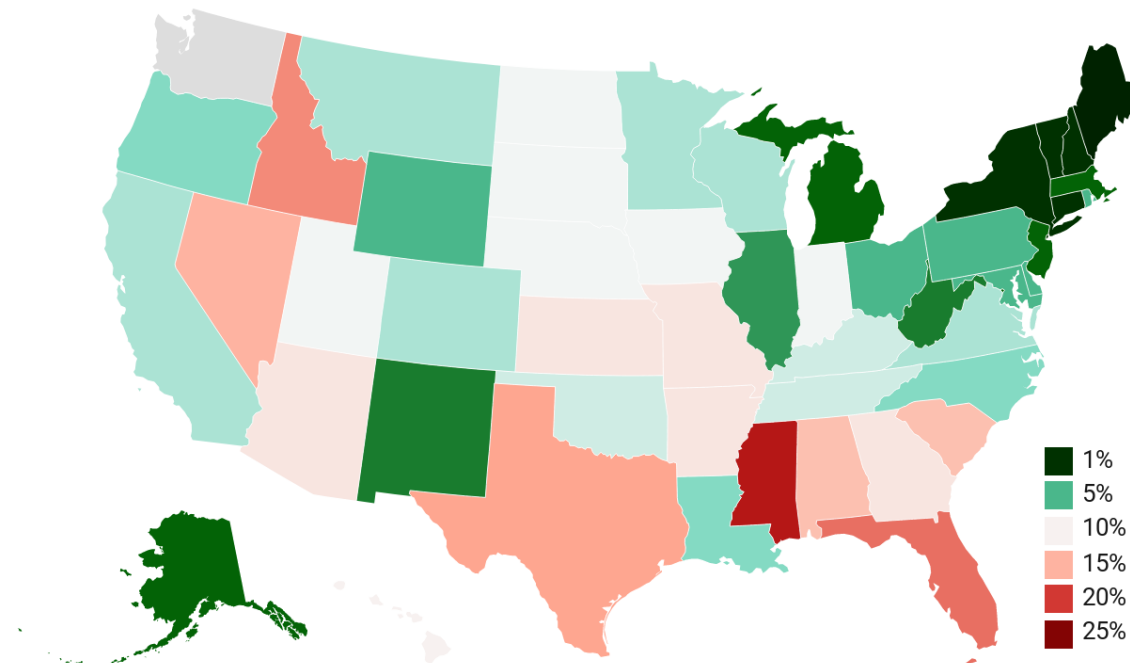
Note: Due to a computer glitch, Washington has only reported positive results since August 1. Therefore, test-positive rates from that point forward are slightly overstated by ~0.1%

State-By-State

Test-Positive Rates continue to be too high in Mississippi; Improving in Texas; Low in the Northeast, Alaska, Illinois, Michigan, New Mexico, Ohio and Wyoming

Test-Positive Rate

Trailing 7-Day Moving Average, As of August 14



Health Industry Advisor LLC analysis

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

New cases were up yesterday; were the fewest new cases on a Friday in five weeks; Week-over-week, new cases are down 2.4% – slightly better than yesterday's 2.3%

New Cases

Through August 14

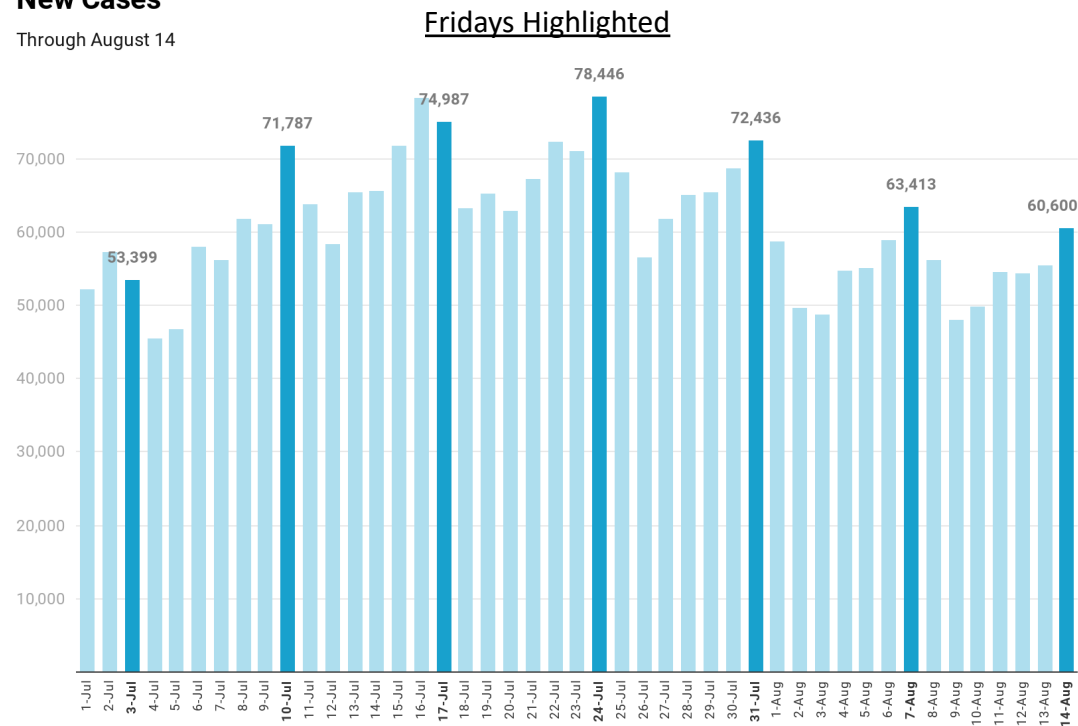
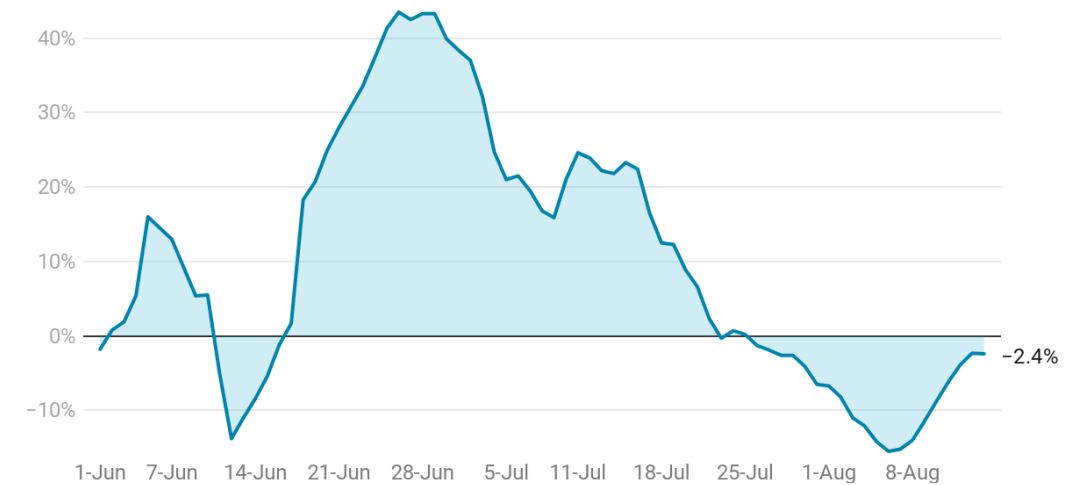


Chart: Health Industry Advisor LLC • Source: eorlometers.info • Created with Datawrapper

Note the daily pattern: new cases are typically low on Sunday, then increase each day through the week

Week-Over-Week Change In New Cases

Through August 14



Health Industry Advisor LLC analysis

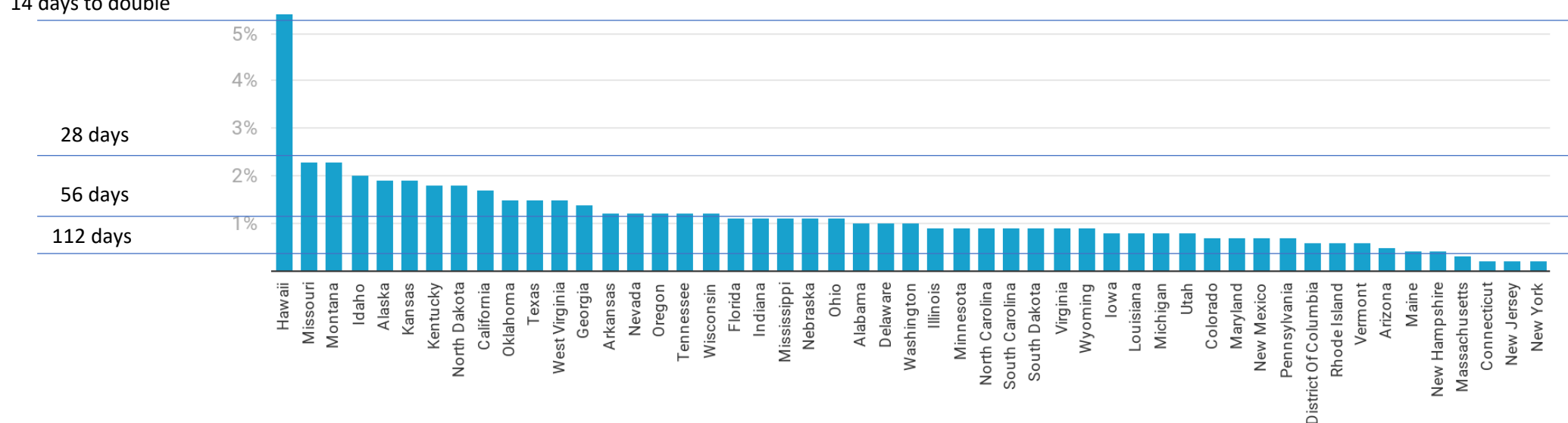
Chart: Health Industry Advisor LLC • Source: worldometers.info • Created with Datawrapper

Case growth is slowing but, Hawaii remains the outlier. At current rates, cases are doubling every 13-14 days in Hawaii; every 422 days in New York; 67 days for the United States overall

Week-Over-Week Change In New Cases

Through August 14

14 days to double

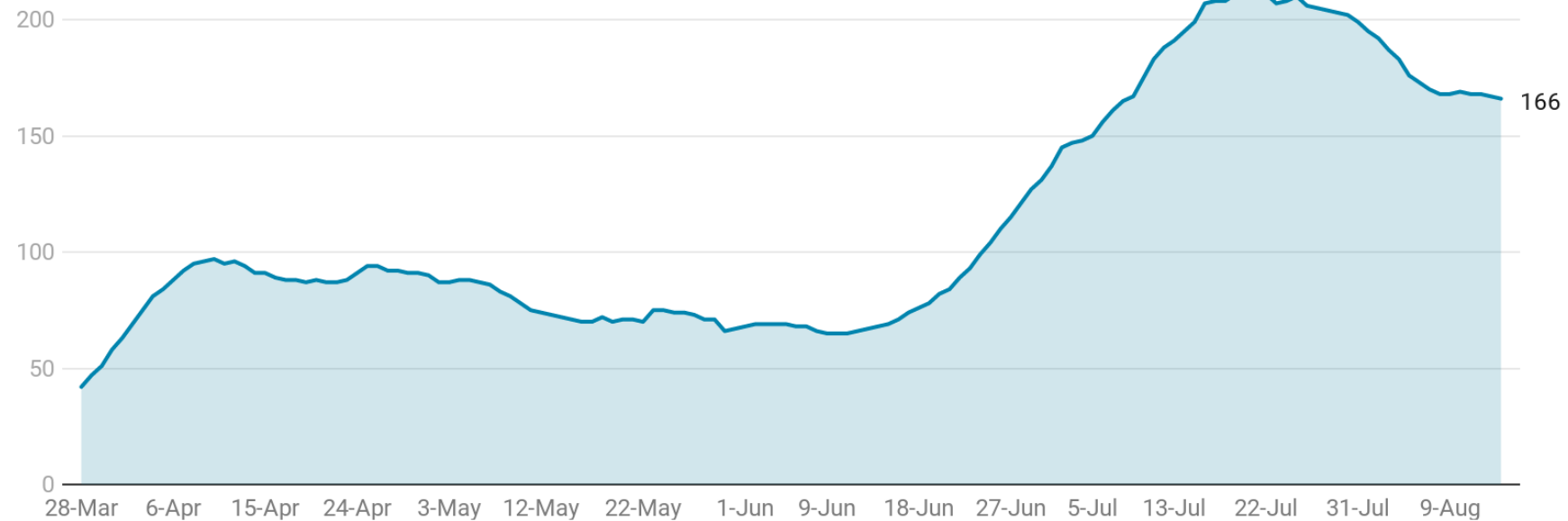


Health Industry Advisor LLC analysis

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

New Infections Per 1 Million Population - United States

Trailing 7-Day Moving Average, Through August 14



Health Industry Advisor LLC analysis

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

* - per million per day, trailing 7-day moving average

State-By-State

Eleven states had new daily infection rates* >200 for the past week; Of these, only California, Georgia and Idaho had increasing rates v. the prior week. Note the significant rate declines in Alabama, Arizona, Arkansas, Louisiana, Mississippi, Nevada and South Carolina

New Daily Infections / Million Population

Trailing 7-Day Moving Average

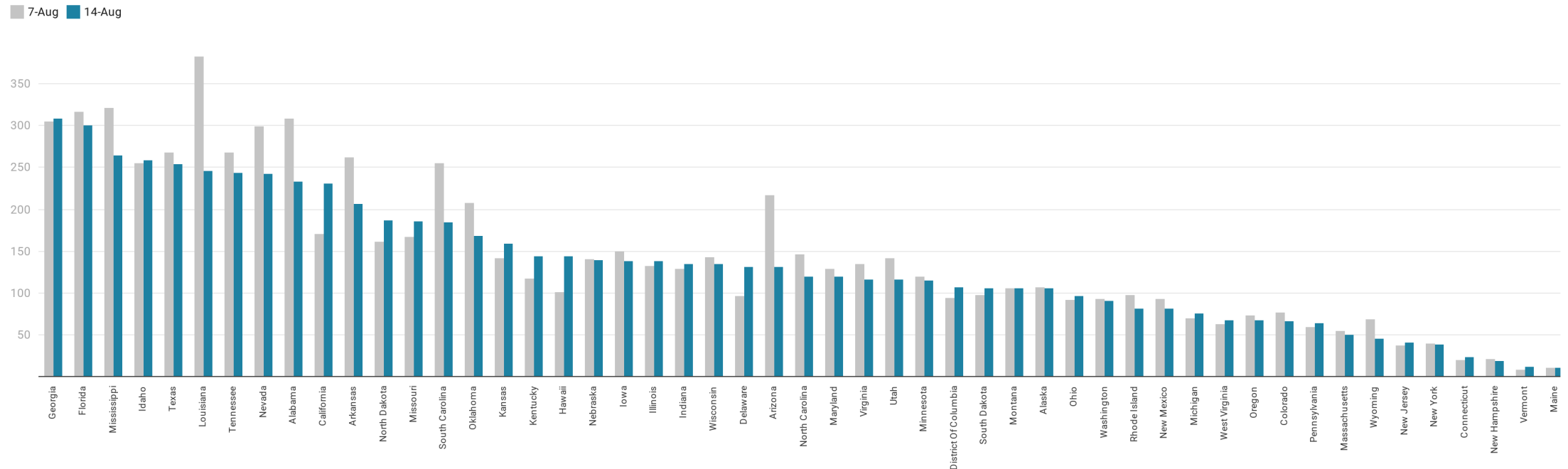


Chart: Health Industry Advisor LLC • Created with Datawrapper

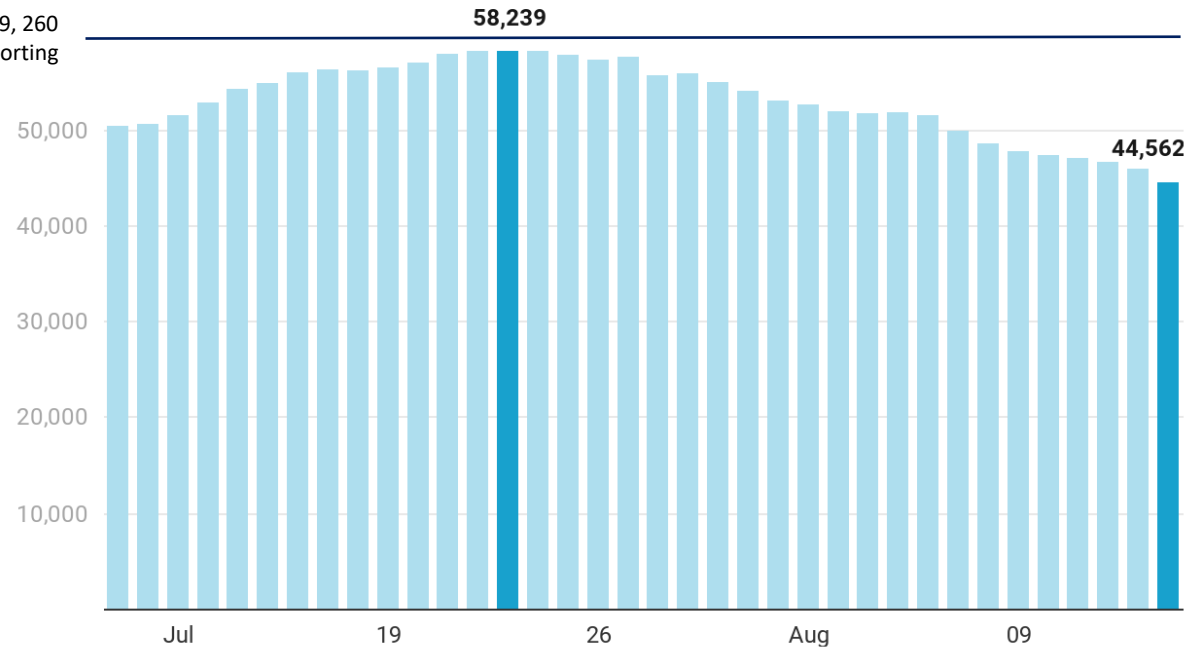
* - per million per day, trailing 7-day moving average

COVID-19 census has been declining since July 24; Now, down 25% from mid-April peak

Hospital Census: COVID-19 Patients

As of August 14

April 15 Census: 59,260
8 fewer states reporting



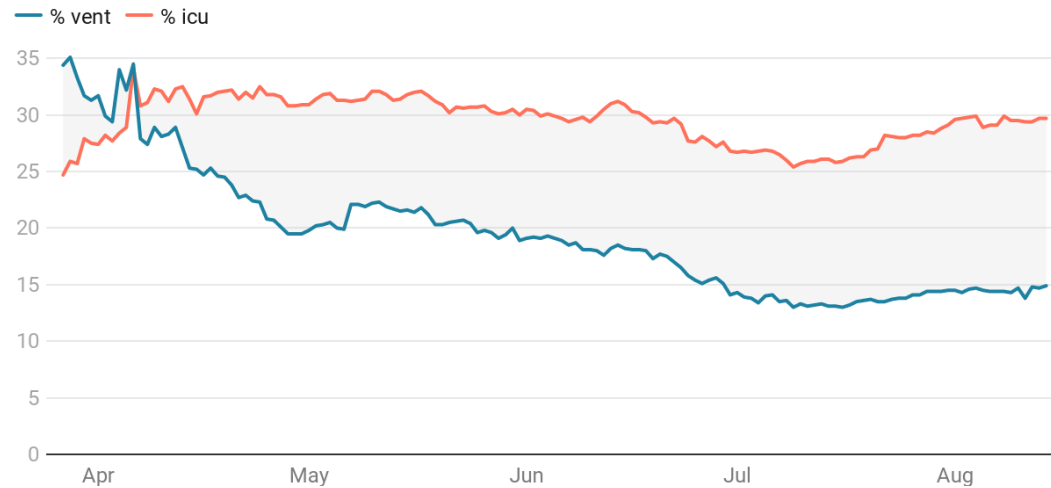
Florida data first available on July 10

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

As hospital census declines, % in ICU is stable or up slightly

Severity of Hospitalized Patients

% of patients on ventilators and in the ICU, As of August 14

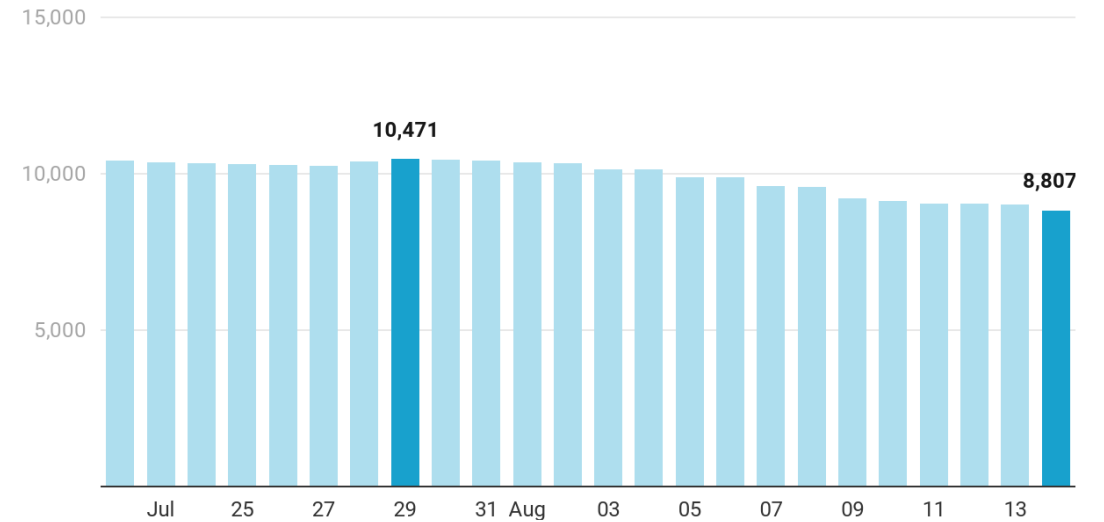


Health Industry Advisor LLC analysis

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

ICU COVID-19 Census Also Down

COVID-19 ICU Census

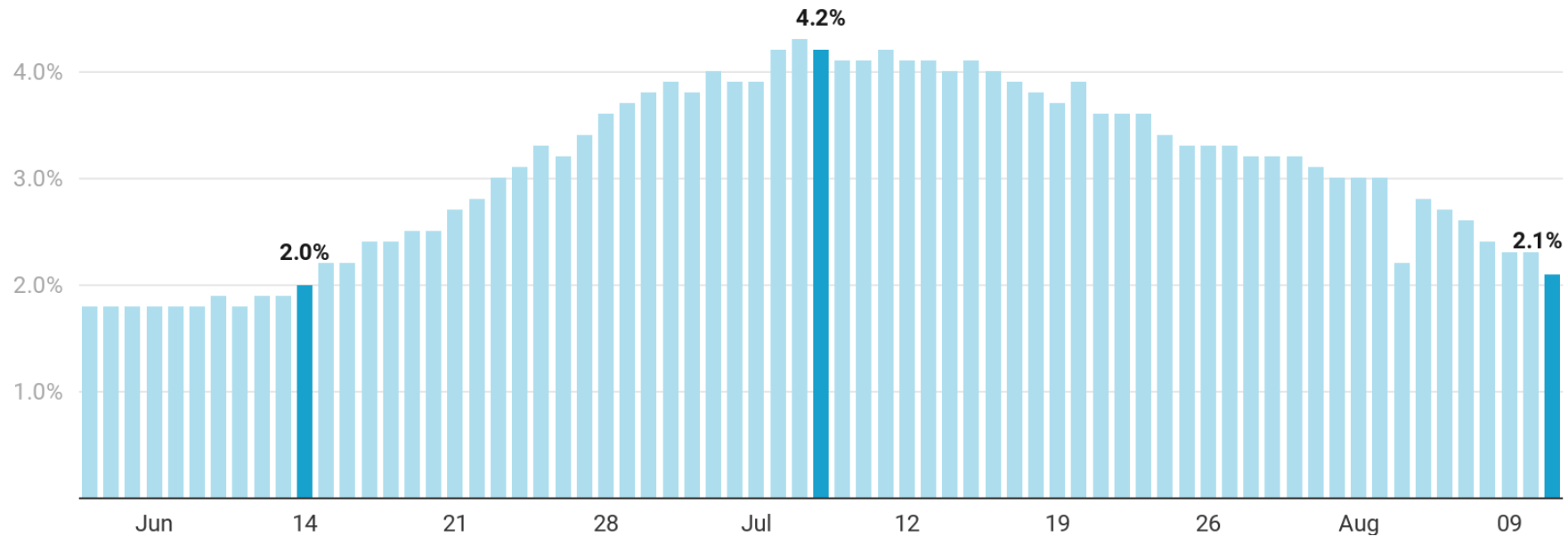


For states reporting these data: AZ, CA, ID, IL, IN, IA, KS, KY, ME, MD, MA, MI, MN, MS, NV, NJ, NY, NC, OH, OK, OR, RI, SC, TX, UT, VA, WI & WY

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

% of Emergency Department Visits for COVID-Like Illness

As of August 11



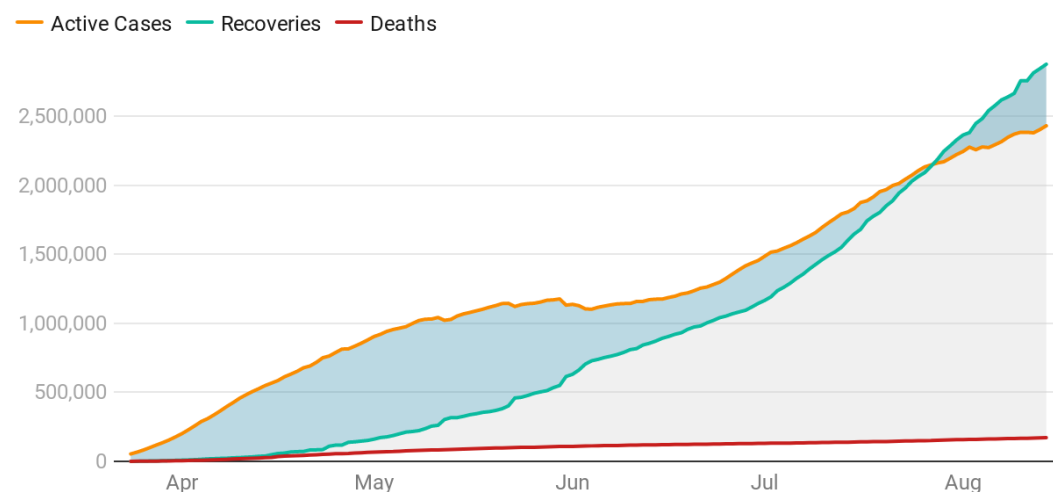
Health Industry Advisor LLC analysis

Chart: Health Industry Advisor LLC • Source: Centers for Disease Control • Created with Datawrapper

Nearly 2.9 million have recovered from the coronavirus in the U.S.; Nearly 17 recovered persons for each death

Active Cases v. Recoveries & Deaths

Through August 14

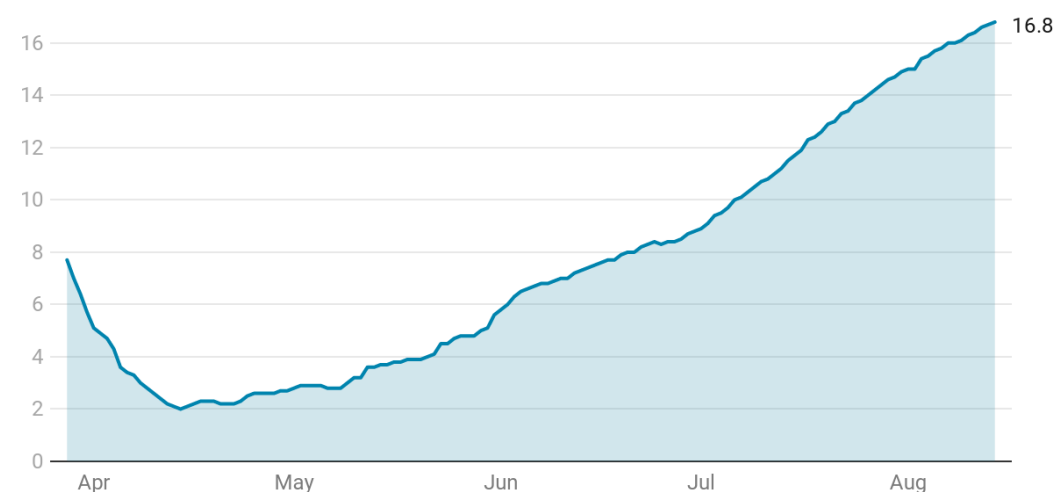


Health Industry Advisor LLC analysis

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

Recoveries: Deaths - United States

As of August 14



Health Industry Advisor LLC analysis

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

Deaths down slightly for 3rd consecutive day yet, remained high on Friday;
Week-over-week rate consistent with range during past two weeks
Deaths per case down to 3.13%

Deaths Recorded With Coronavirus in the U.S.

Trailing 7-Day Moving Average, As of August 14

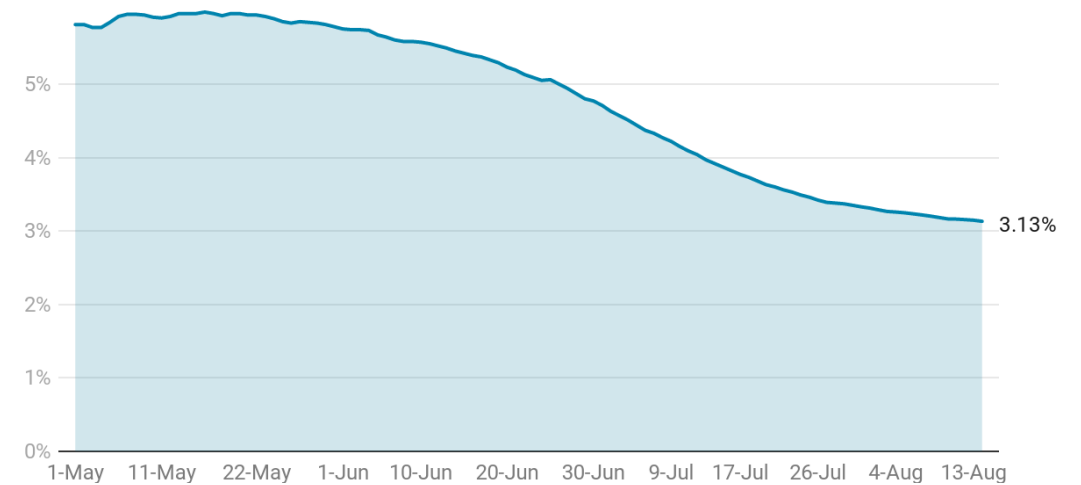


Health Industry Advisor LLC analysis

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

Deaths Per Case

As of August 14



Health Industry Advisor LLC analysis

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

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, National, Regional, and State Level Outpatient Illness and Viral Surveillance <https://gis.cdc.gov/grasp/fluview/fluportaldashboard.html>
- Centers for Disease Control, COVID-19 Laboratory-Confirmed Hospitalizations https://gis.cdc.gov/grasp/COVIDNet/COVID19_5.html
- Centers for Disease Control, COVID Data Tracker <https://www.cdc.gov/covid-data-tracker/index.html#mobility>
- 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>