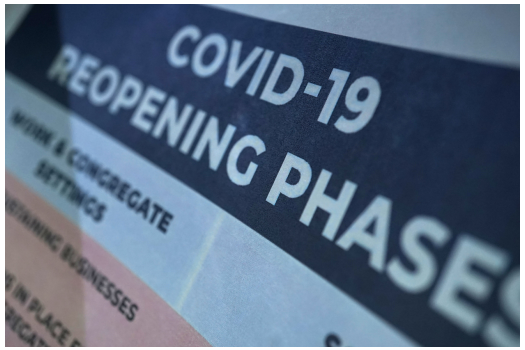
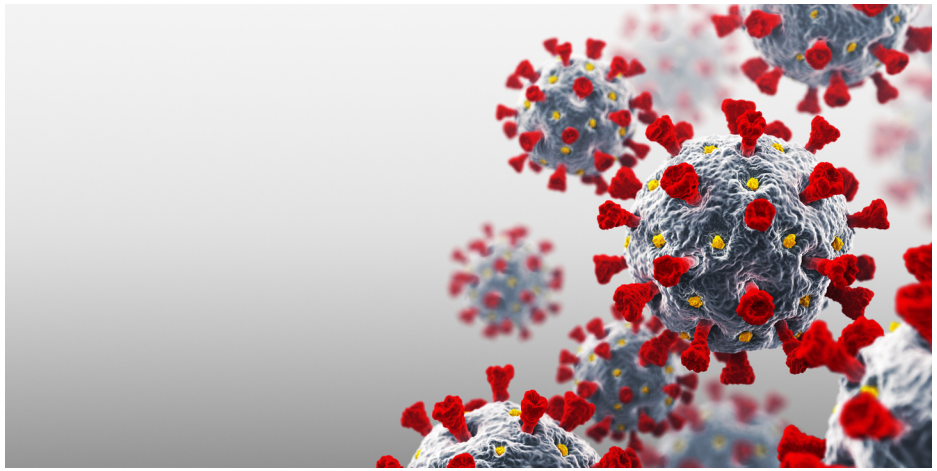
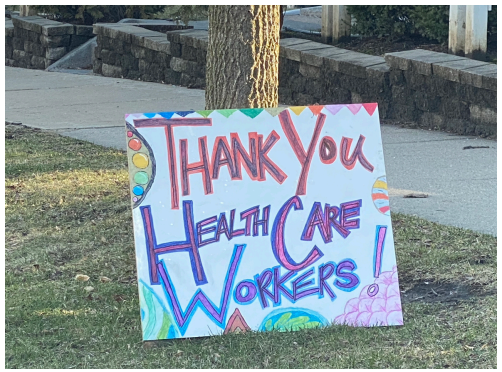






Health Industry Advisor, llc

COVID-19 Report

Issue # 129

Saturday, August 8, 2020

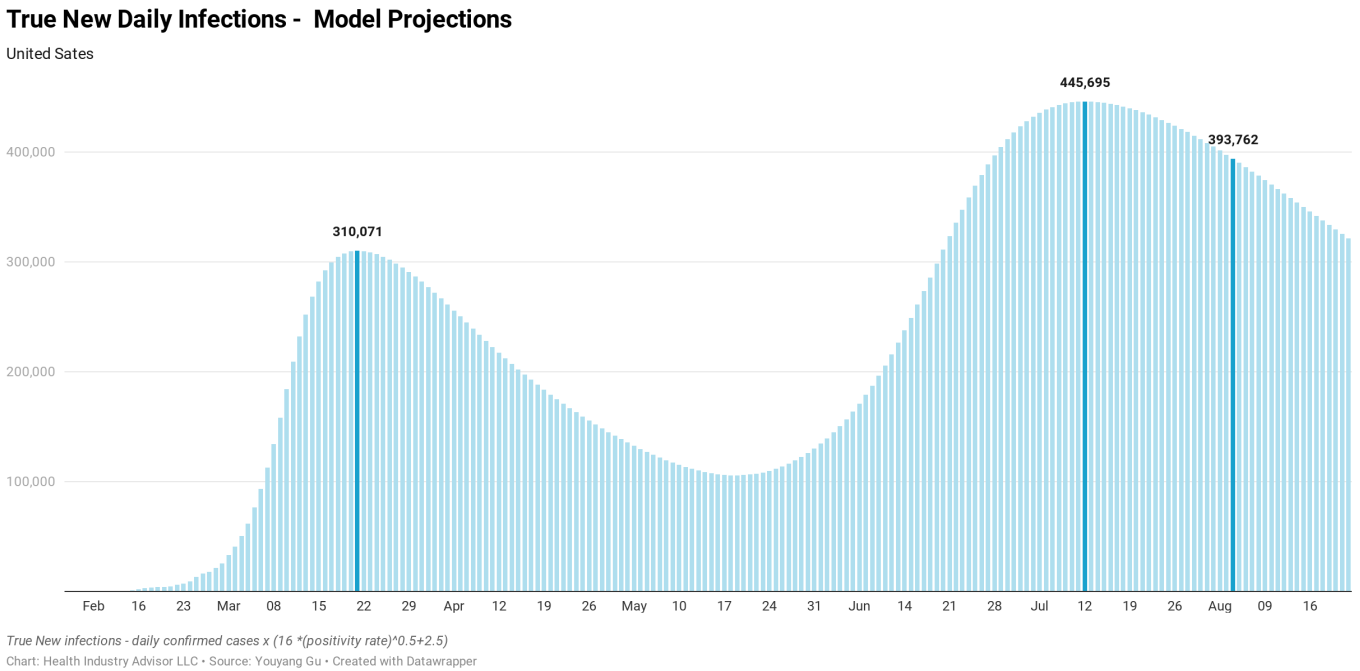
Today's Highlights

- Infection Prevalence:
  - Based on reported cases, 1.5% of the U.S. population has been infected by the coronavirus, placing it 4th worldwide behind Peru, Panama and Kuwait.
  - Using Gu's projection model, we calculate the mean estimated infection prevalence in the U.S. to be 12.6%, with a range of 9.2-16.7%. Sweden, which some suggest may have achieved herd immunity, has a mean estimated infection prevalence of 12.1%, with a range of 7.9-16.5%
  - Twenty-one states (plus, the District of Columbia) have a mean estimated infection prevalence in Gu's 10-35% range necessary (but, not sufficient) for slowing infection spread:
    - Eight, plus the District of Columbia, have already experienced slowing infections: Connecticut, Delaware, Illinois, Maryland, Massachusetts, New Jersey, New York and Rhode Island
    - Thirteen are currently experiencing high infection rates but, could take (or, are taking) advantage of the combination of high infection prevalence and prevention measures to see a slowdown: Alabama, Arizona, Arkansas, California, Florida, Georgia, Idaho, Louisiana, Mississippi, Nevada, South Carolina, Tennessee and Texas
  - At least five states - Iowa, Missouri, Nebraska, Oklahoma and North Dakota - are experiencing high infection rates but, do not have sufficient infection prevalence yet to effect a slowdown. if Gu's theory holds, these states could anticipate prolonged infection growth
- Testing:
  - Test volume, which has been trending down for two weeks, picked up on Friday
  - The test-positive rate fell yesterday; it has been trending downward since July 11
- New Cases in the U.S.:
  - New cases on Friday were the highest of any day this past week. Still, only twice from July 5-31 were there fewer new cases than yesterday. As a result, new cases are down 15% on a week-over-week basis
  - New infections per capita, on a 7-day moving average basis, declined for the 13th consecutive day. This rate is now lower than it has been since July 9
  - New cases fell in thirty-one states on a week-over-week basis. The most significant exception was Hawaii, where new cases are up >75% week-over-week
  - Hawaii and Indiana set new records yesterday for this rate. Arkansas, Minnesota and Virginia are near peak rates. Several states, however, have gone more than 100 days since setting their peak rate
  - There is an interesting pattern of metro areas with >200 new infection per million per day (highly concentrated in the Southeast) versus those with <100 (observed elsewhere across the country)
- Stress on the system:
  - There are now 16 recovered persons for each death reported and 13% more recovered persons than active cases
  - Hospital COVID-19 census was its lowest yesterday since July 10, when Florida first started reporting these data; This census is down 14% since its peak on July 23
  - Similarly, ICU census is down 8.5% from nine days ago
  - Although yesterday marked the 4th consecutive day of ~1,300 deaths, the 7-day moving average has trended down for the past 3 days,; deaths should start declining, following the recent slowdown in cases

United States

CDC report suggests that infection rate is higher than reported: How many true infections are there in the United States?

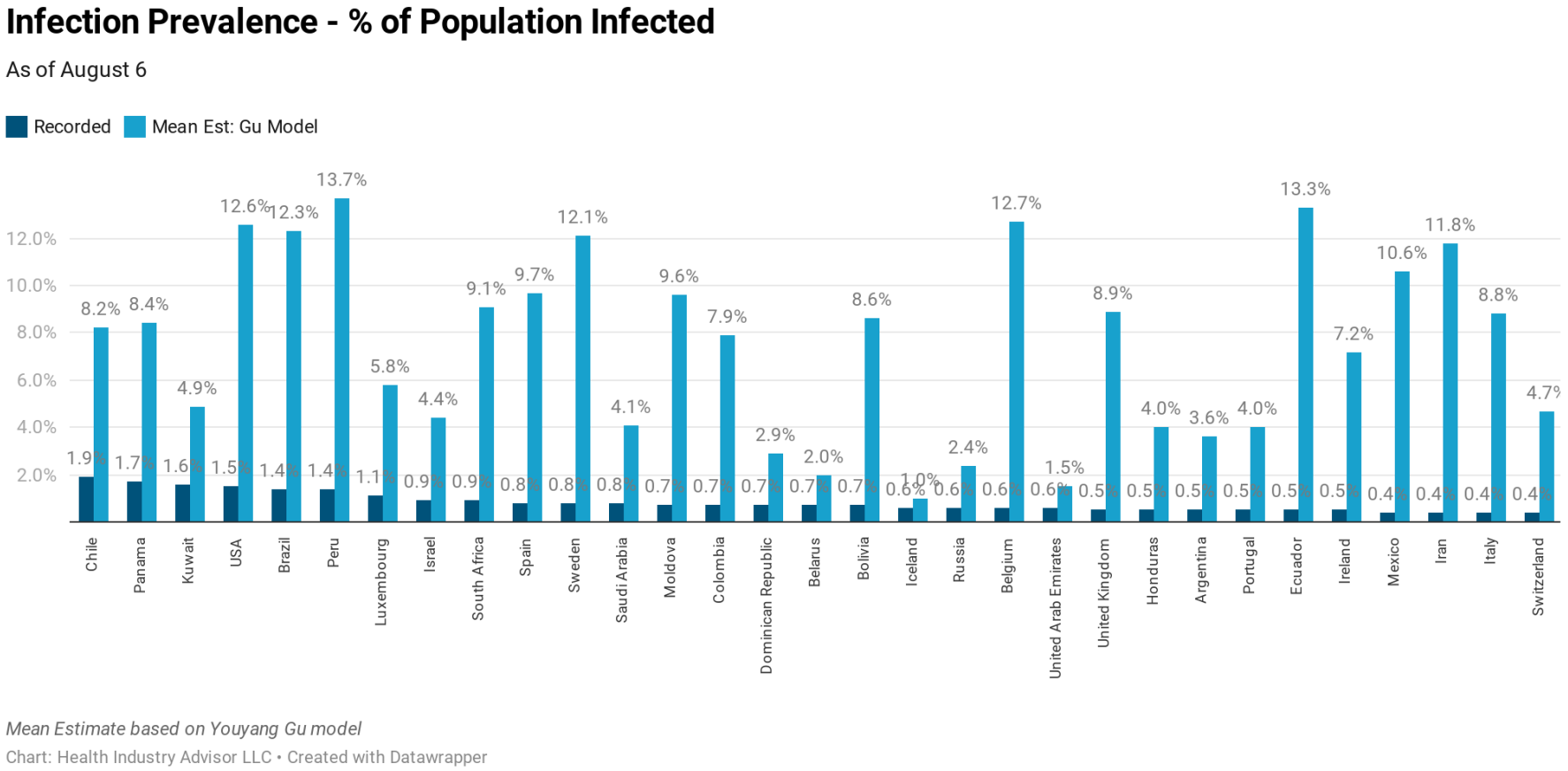
- True infection rates are unknown, due to poor availability of testing; low and asymptomatic cases, etc.
- Gu* hypothesizes a model that incorporates test-positive rates
- Gu concludes:
  - Infection rate in US peaked on July 12 at ~450,000 new daily cases – higher than ~300,000 mini-peak in March
  - Implied infection fatality rate dropped from 1% in March to 0.6% in May to 0.25% in July, due to:
    - Lower median age
    - Improved treatments
    - Better protection of vulnerable persons
    - Earlier detection
  - Infections slow after reaching 10-35% population prevalence – *presuming that effective infection mitigation efforts are maintained*. Effective herd immunity is lower now than in March/April



*Source: "Estimating True Infections: A Simple Heuristic to Measure Implied Infection Fatality Rate", Youyang Gu, July 29, 2020 (Updated August 5)

Worldwide

How prevalent are virus infections in various countries?
Chile has the highest recorded rate; U.S is 4th
Using the Gu model, Peru and Ecuador may be 1st & 2nd; U.S. and Sweden 4th and 5th

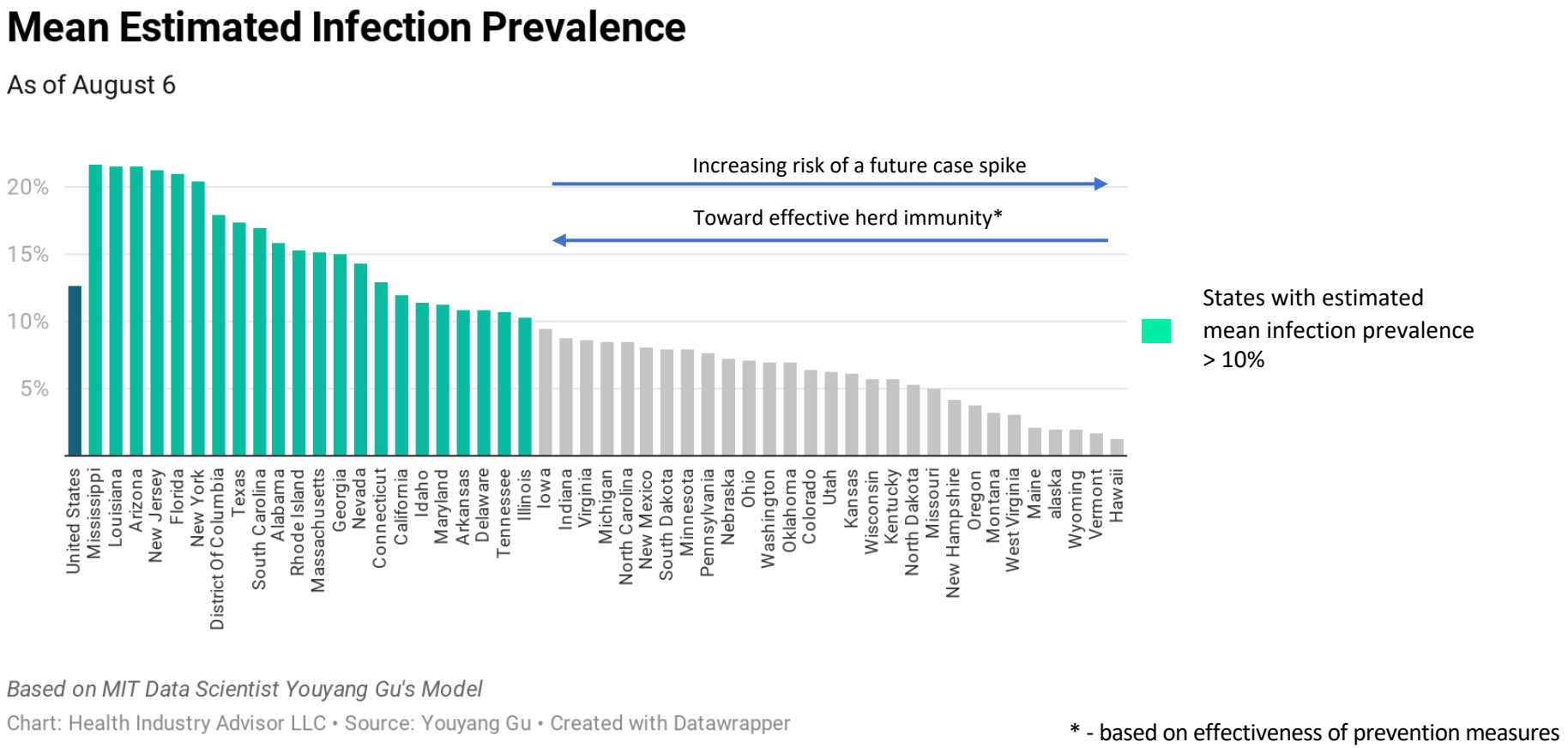


:rue-infections/

Applying the Gu Model to the United States

Twenty-two states have moved into the range of infection prevalence that Gu suggests could slow virus spread*

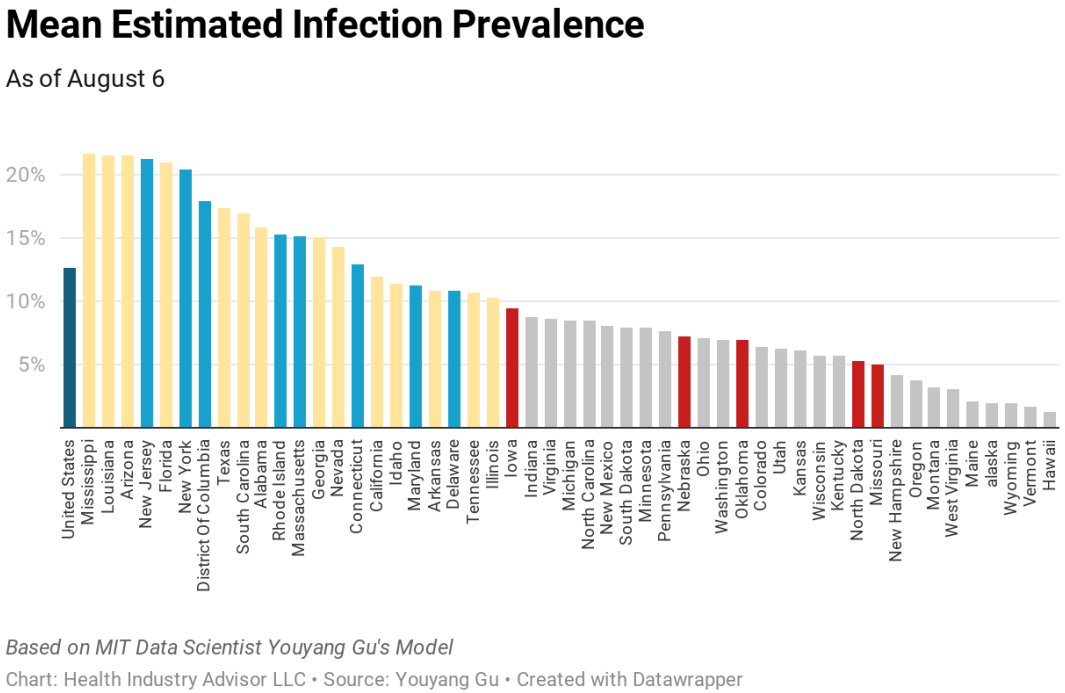
Gu hypothesizes that infection rates slow after infection prevalence reaches 10-35% - *assuming that effective prevention measures are taken, including social spacing, mask-wearing, avoiding crowded indoor spaces, etc.*



* - based on effectiveness of prevention measures

Applying the Gu Model to the United States

Eight states (and DC) have already slowed infection rates, consistent with the Gu model; Thirteen are or could see slowing*; At least five are at risk of a prolonged current spike



If Gu's model holds true - *assuming that effective infection spread mitigation measures are maintained*:

- States that have relatively high infection prevalence and have moved past prior peak infection rates could be experiencing effective herd immunity – Connecticut, Delaware, Illinois, Maryland, Massachusetts, New Jersey, New York, Rhode Island, and the District of Columbia
- States that have high infection prevalence and high new infection rates may be nearing a point where effective prevention measures could establish effective herd immunity – Alabama, Arizona, Arkansas, California, Florida, Georgia, Idaho, Louisiana, Mississippi, Nevada, South Carolina, Tennessee and Texas
- States that have low infection prevalence and high current rates of new infections are at risk of a prolonged on-going infection spikes – Iowa, Missouri, Nebraska, Oklahoma and North Dakota
- States that have low infection prevalence and low current rates of new infections could see an infection spike in the future without adequate prevention measures (Note: Hawaii is experiencing a spike; its infection rate is relatively low at this point

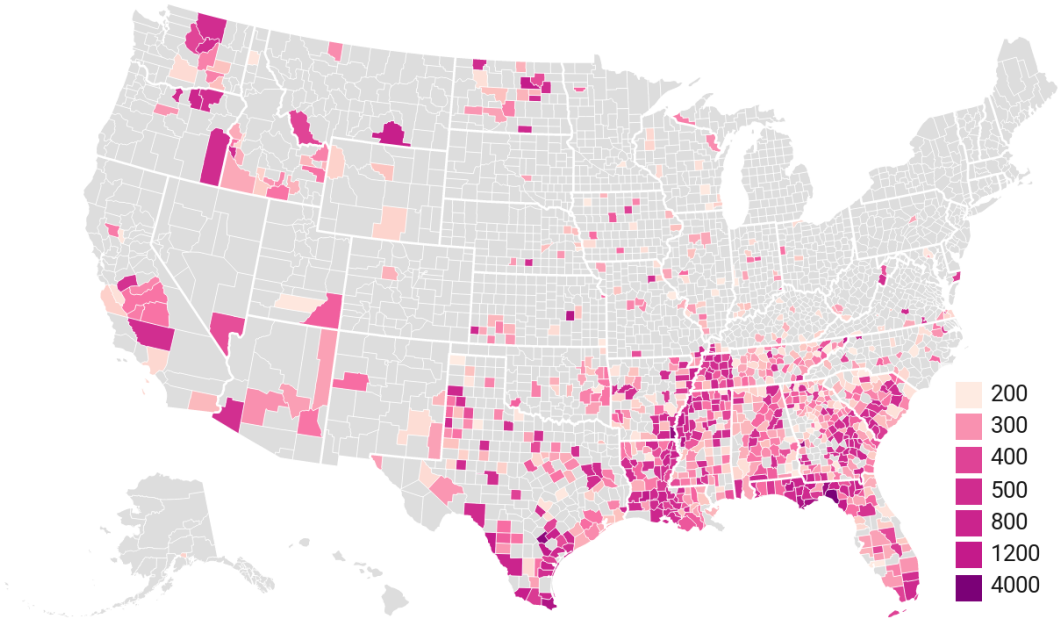
* - based on effectiveness of prevention measures

United States

A tale of two countries? Metro areas with high infection rates v. those with low rates

New Daily Infections / Million Population

Trailing 7-Day Moving Average, As of August 6

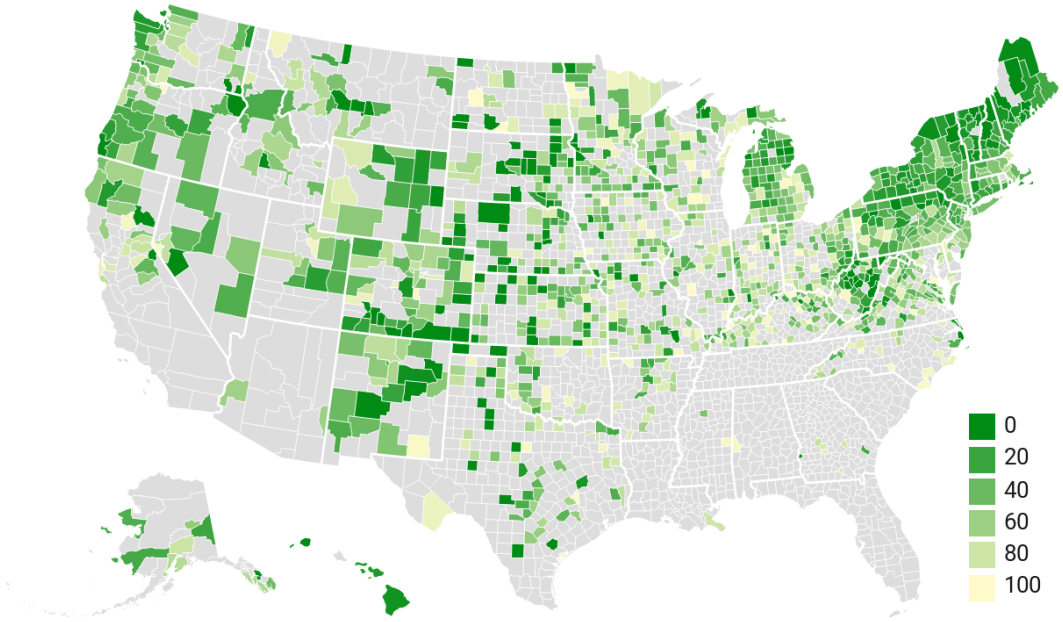


Map: Health Industry Advisor LLC • Created with Datawrapper

Areas where current infection rate > 200

New Daily Infections / Million Population

Trailing 7-Day Moving Average, As of August 6



Map: Health Industry Advisor LLC • Created with Datawrapper

Areas where current infection rate < 100

United States

New cases rose for the 2nd consecutive day & were most in a week; Still, only 2 other days July 5-31 had fewer cases; On a week-over-week basis, new cases are now down 15.1%

New Cases

Through August 7

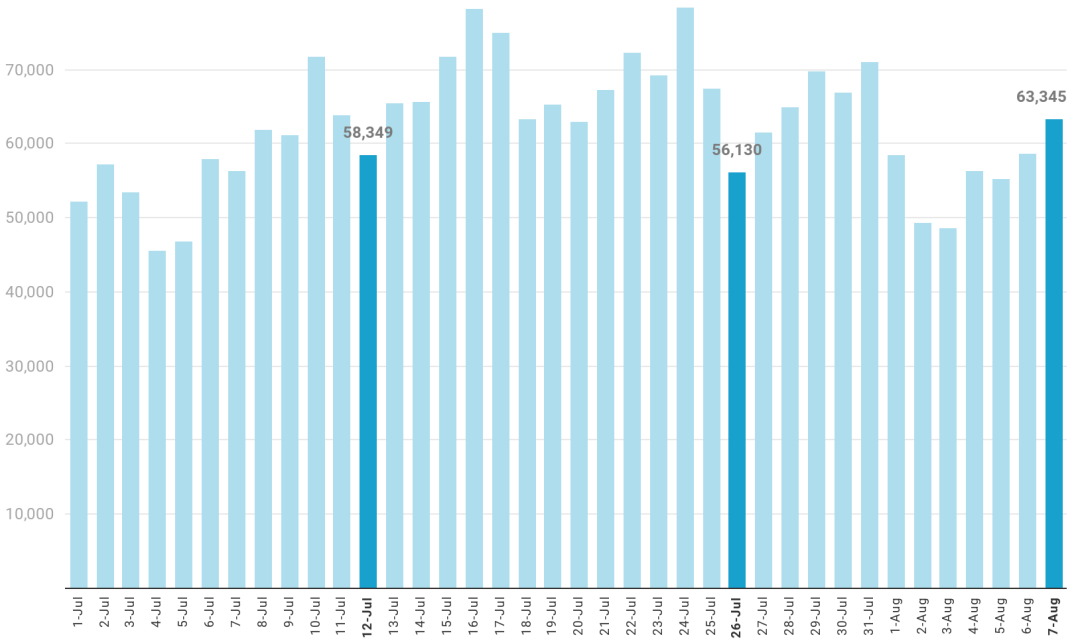
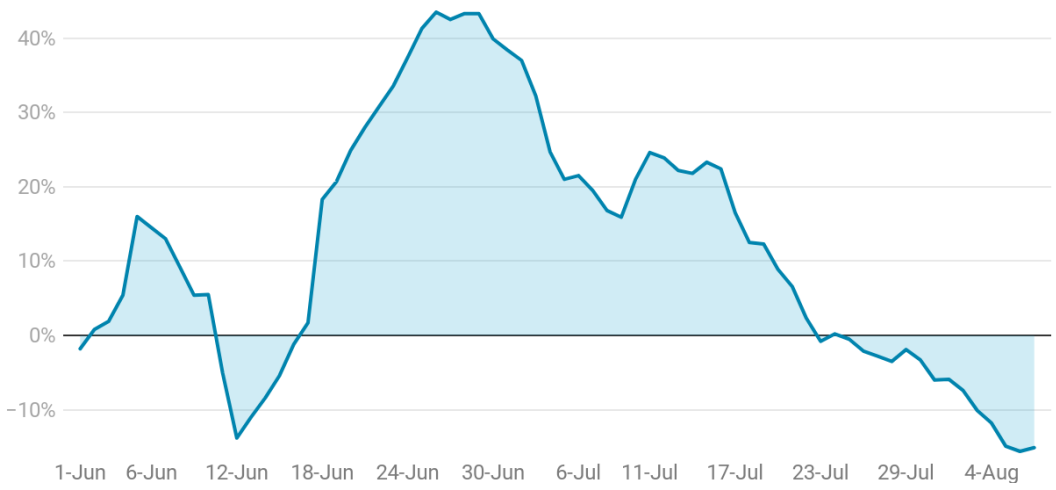


Chart: Health Industry Advisor LLC • Source: eorldometers.info • Created with Datawrapper

Week-Over-Week Change In New Cases

Through August 7

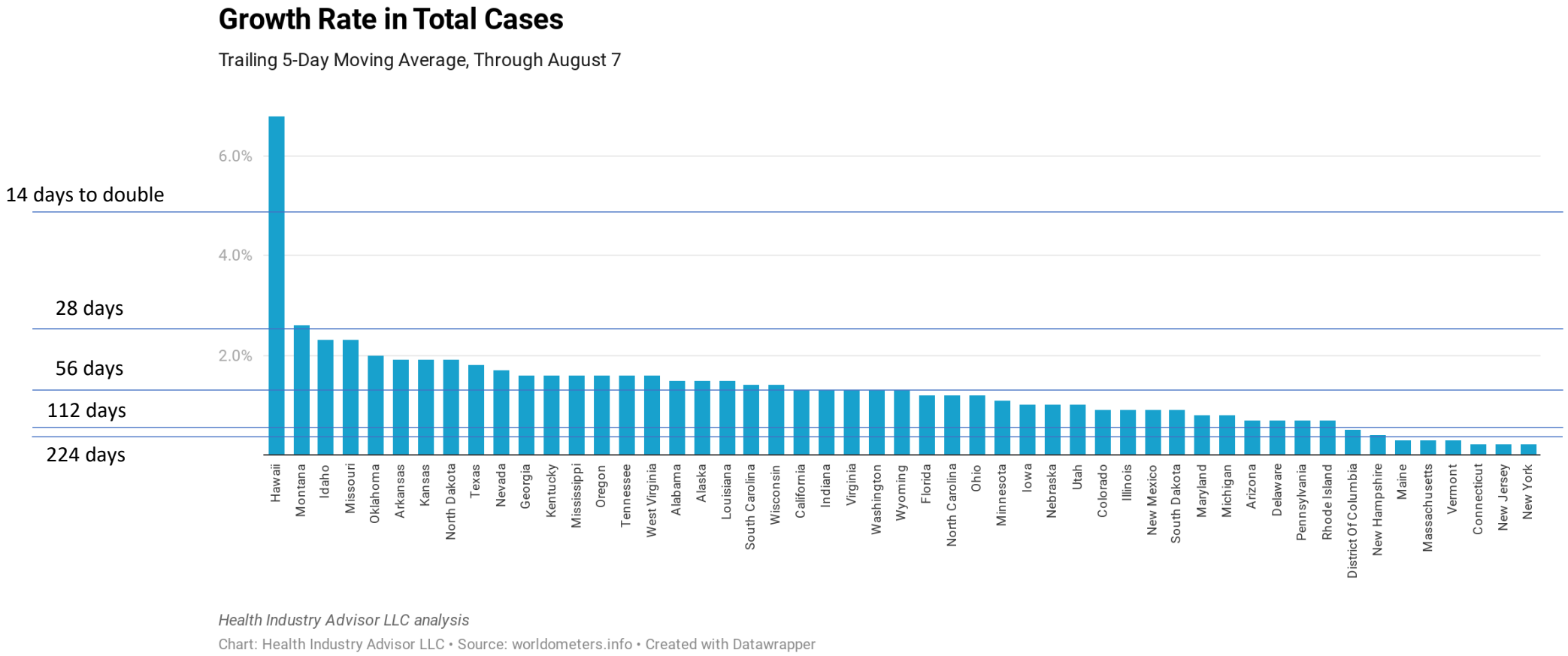


Health Industry Advisor LLC analysis

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

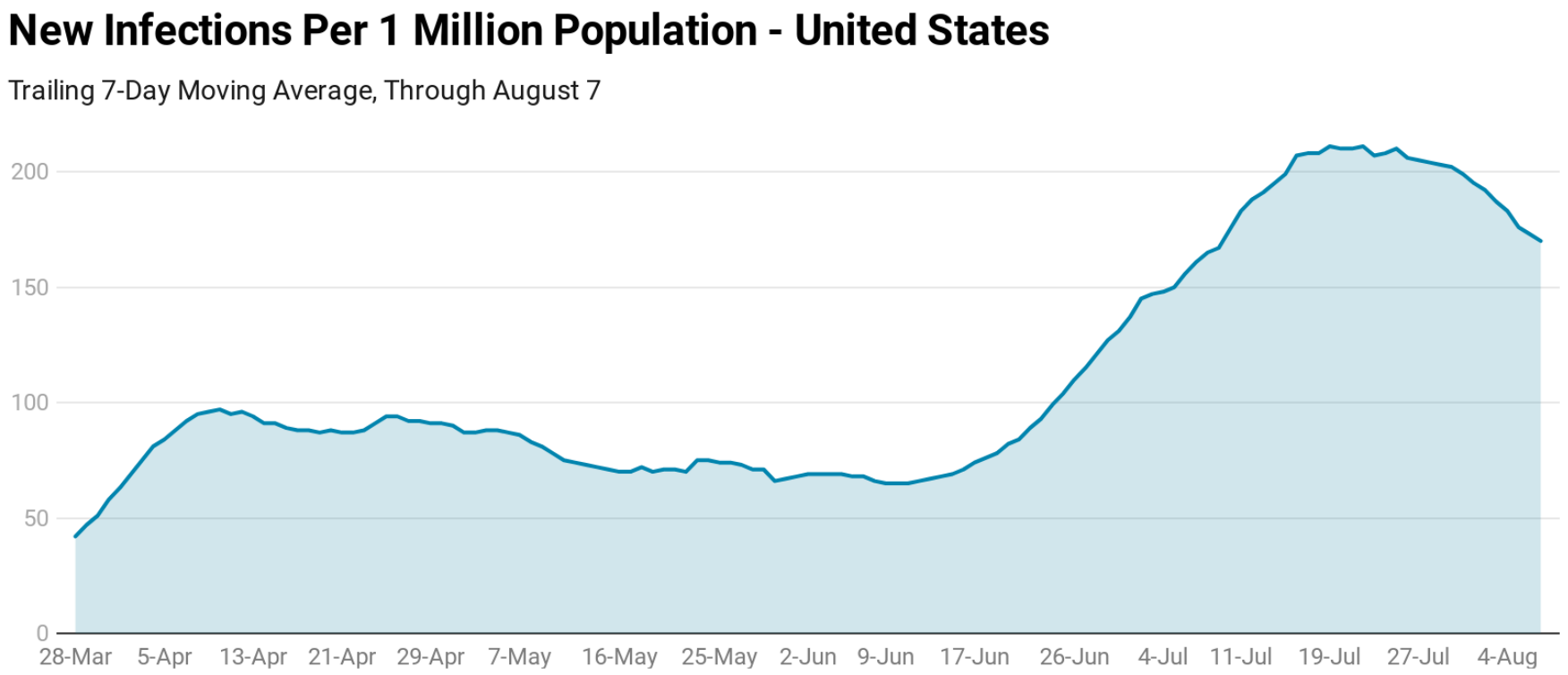
State-By-State

Case growth is slowing but, Hawaii remains the outlier. At current rates, cases are doubling every 120-11 days in Hawaii; every 403 days in New York; 48 days for the United States overall



United States

New infections per capita* declined for the 13th consecutive day on Friday; At its lowest level since July 9th



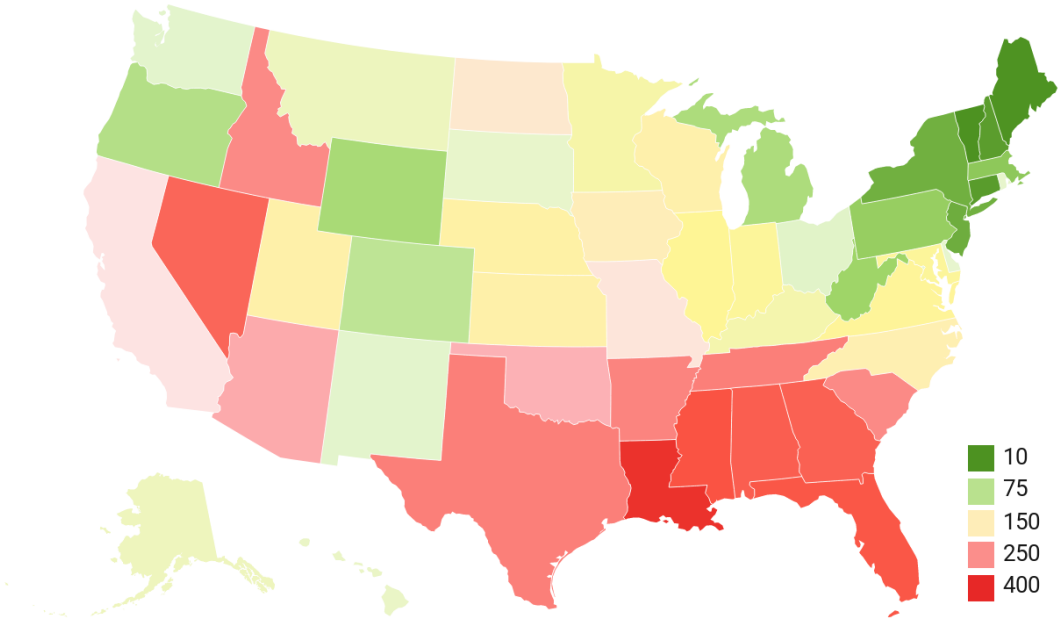
ng average

State-By-State

New daily infection rates declined week-over-week in most states, including Arizona, California, Florida and Texas; Hawaii saw largest increase

New Daily Infections Per 1 Million Population

Trailing 7-Day Moving Average, As of August 7



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

Week-Over-Week Change in New Daily Infections / Million

Trailing 7-Day Moving Average, August 7 v. July 31

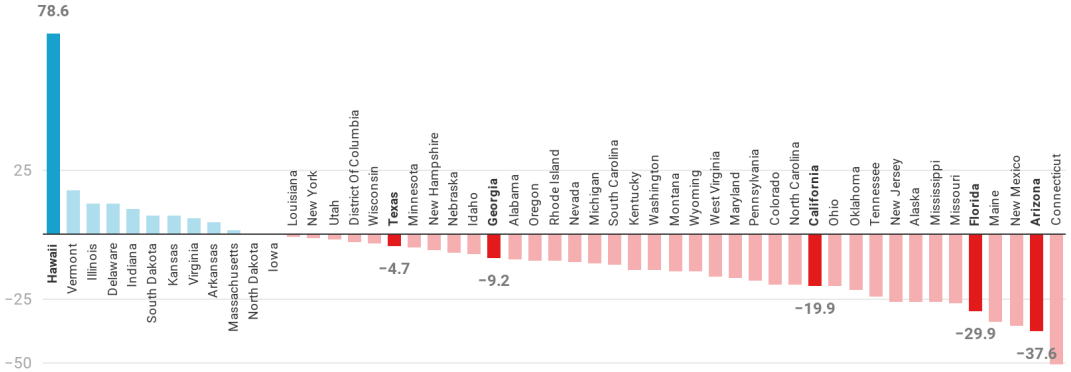
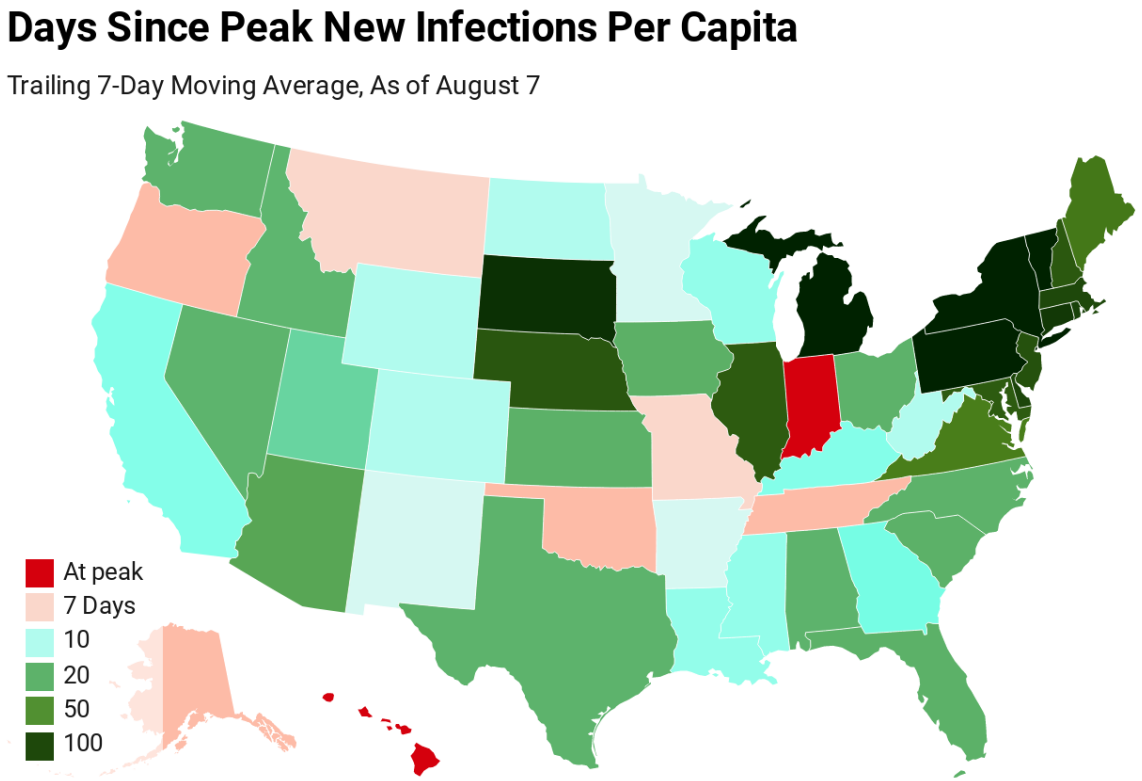


Chart: Health Industry Advisor LLC • Created with Datawrapper

State-By-State

Indiana and Hawaii set highs in new infections per capita on Friday; Arkansas, Minnesota and Virginia are near peak rates



Health Industry Advisor LLC analysis

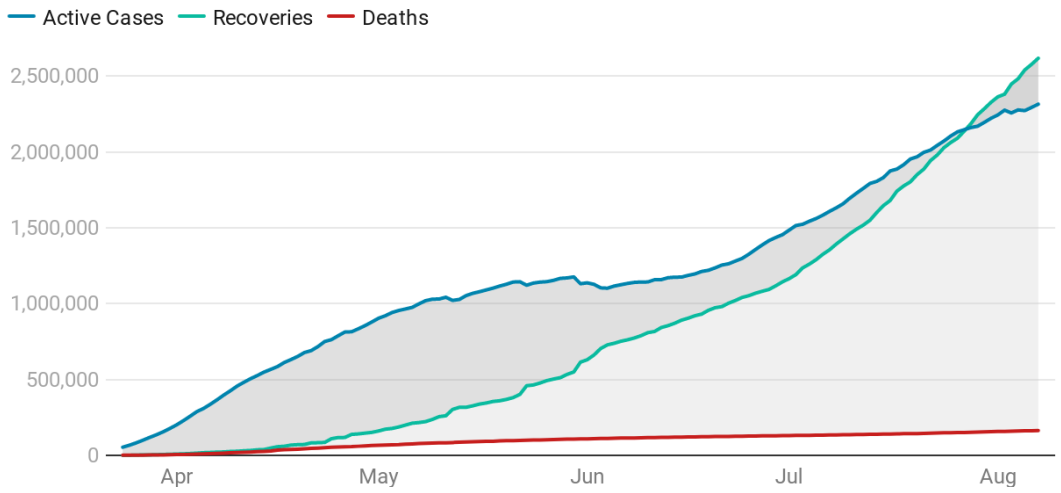
Map: Health Industry Advisor LLC • Source: worldometers.info • Created with Datawrapper

United States

Recoveries accelerating, now exceed active cases in the United States by 13%; Nearly 16 recovered persons for each death

Active Cases v. Recoveries & Deaths

Through August 7

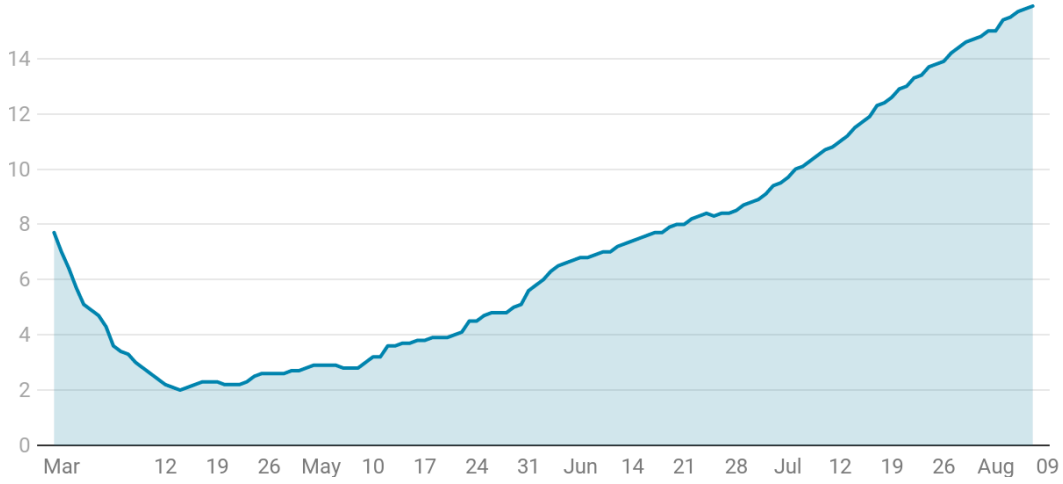


Health Industry Advisor LLC analysis

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

Recoveries: Deaths - United States

As of August 7



Health Industry Advisor LLC analysis

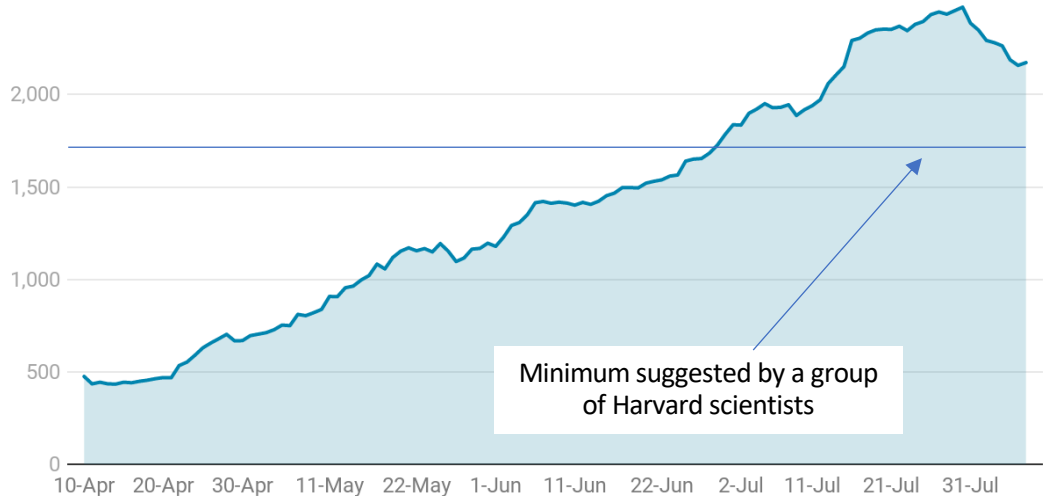
Chart: Health Industry Advisor LLC • Source: worldometers.info • Created with Datawrapper

United States

Test volume picked up slightly on Friday
Test-positive rate improved; showing downward trend since July 11

Daily Tests Per 1 Million - United States

Trailing 7-Day Moving Average, As of August 7

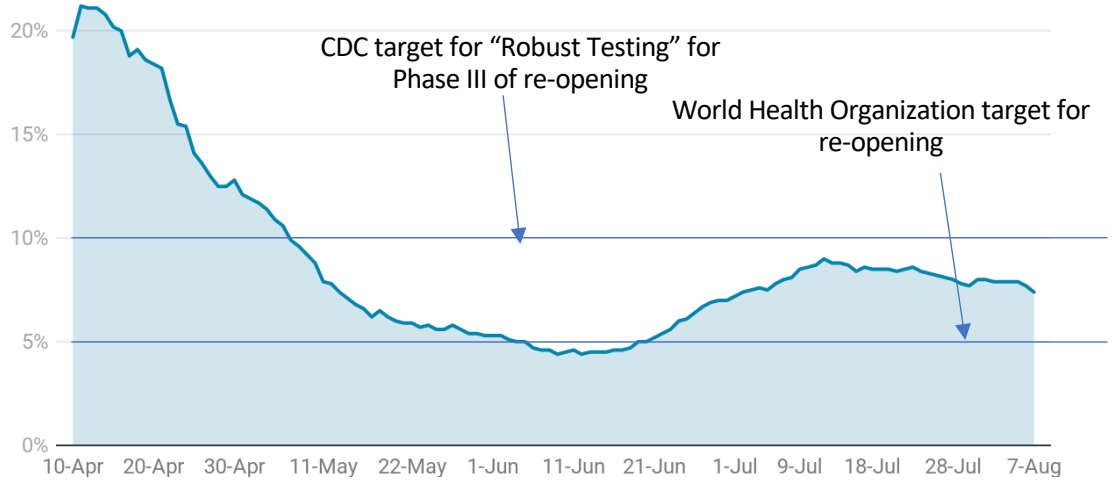


Health Industry Advisor LLC analysis

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 7



Health Industry Advisor LLC analysis

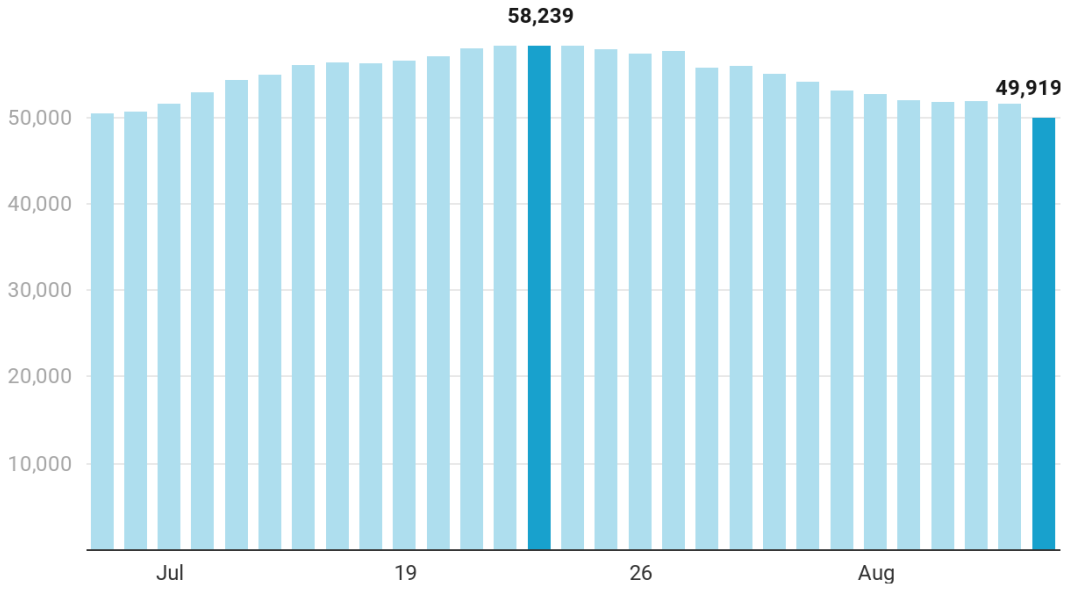
Chart: Health Industry Advisor LLC • Source: The Atlantic's Covid Tracking Project • Created with Datawrapper

United States

COVID-19 census was lowest since Florida started reporting on July 10. Census down in Arizona, California, Florida, Georgia and Texas; Up 2x in Hawaii; 50+% in Wisconsin and Montana since July 23 (US Peak)

Hospital Census: COVID-19 Patients

As of August 7

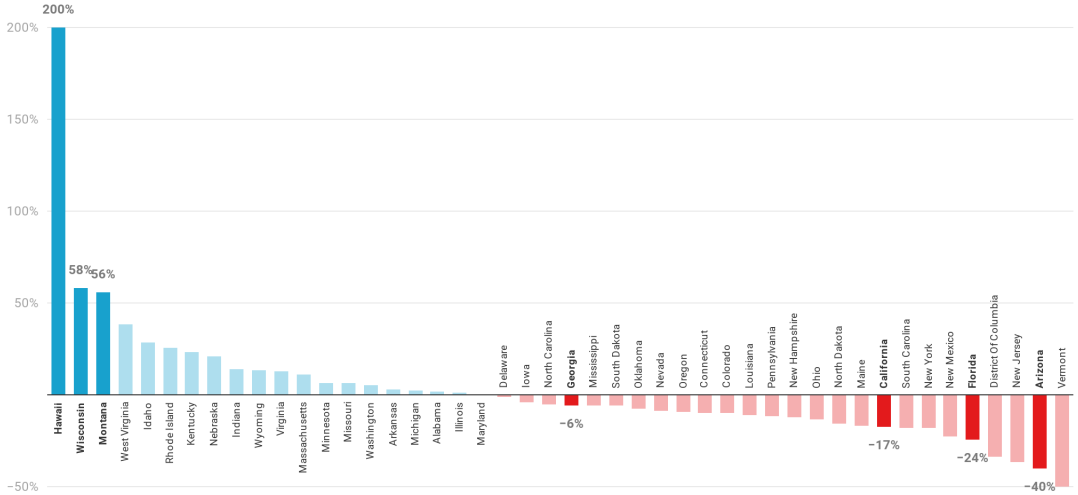


Florida data first available on July 10

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

Change COVID-19 Census

July 23 to August 7



Health Industry Advisor LLC analysis

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

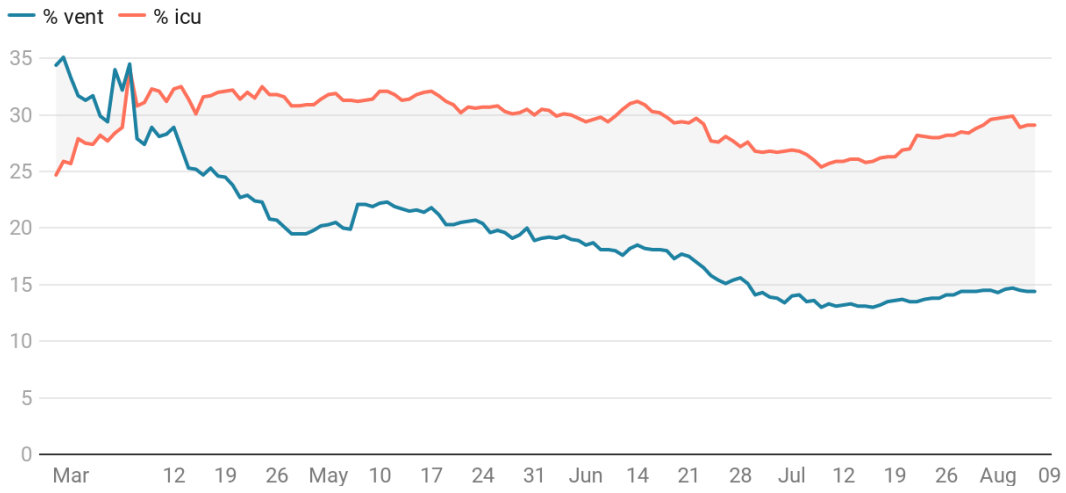
United States

Stress on ICU beds also easing 8.5% fewer patients than nine days ago

A greater % of patients are in the ICU

Severity of Hospitalized Patients

% of patients on ventilators and in the ICU, As of August 7

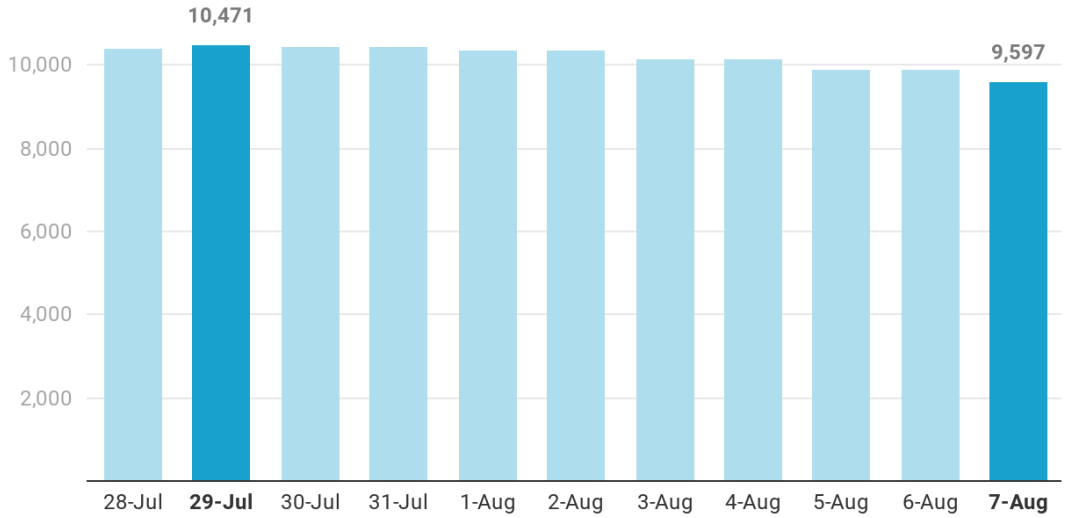


Health Industry Advisor LLC analysis

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

United States

~1,300 deaths reported for 4th consecutive day
7-day moving average declined, however, for 3rd consecutive day.
Deaths per case down to 3.22%

Deaths Recorded With Coronavirus in the U.S.

Trailing 7-Day Moving Average, As of August 7

Health Industry Advisor LLC analysis

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

Deaths per Case

As of August 7

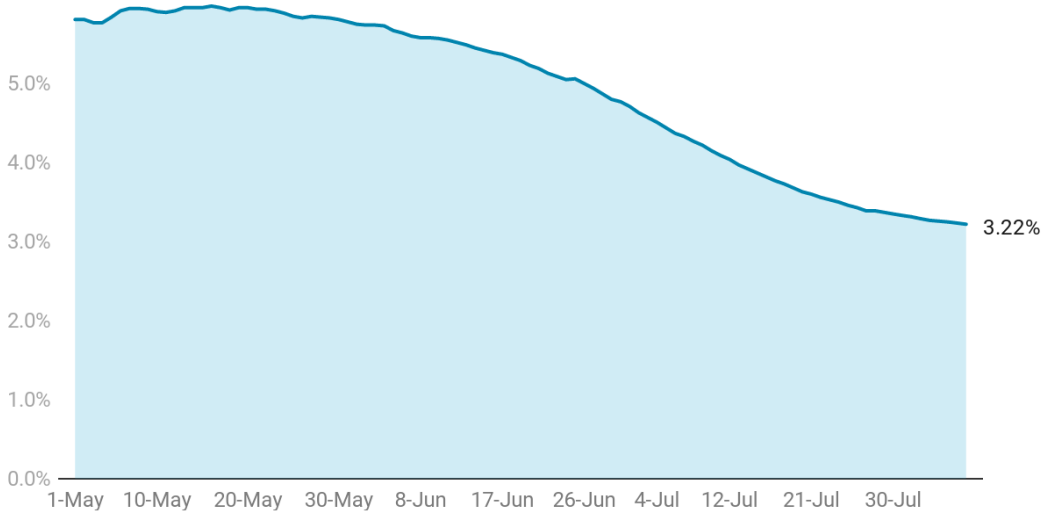


Chart: Health Industry Advisor LLC • Created with Datawrapper

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, 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