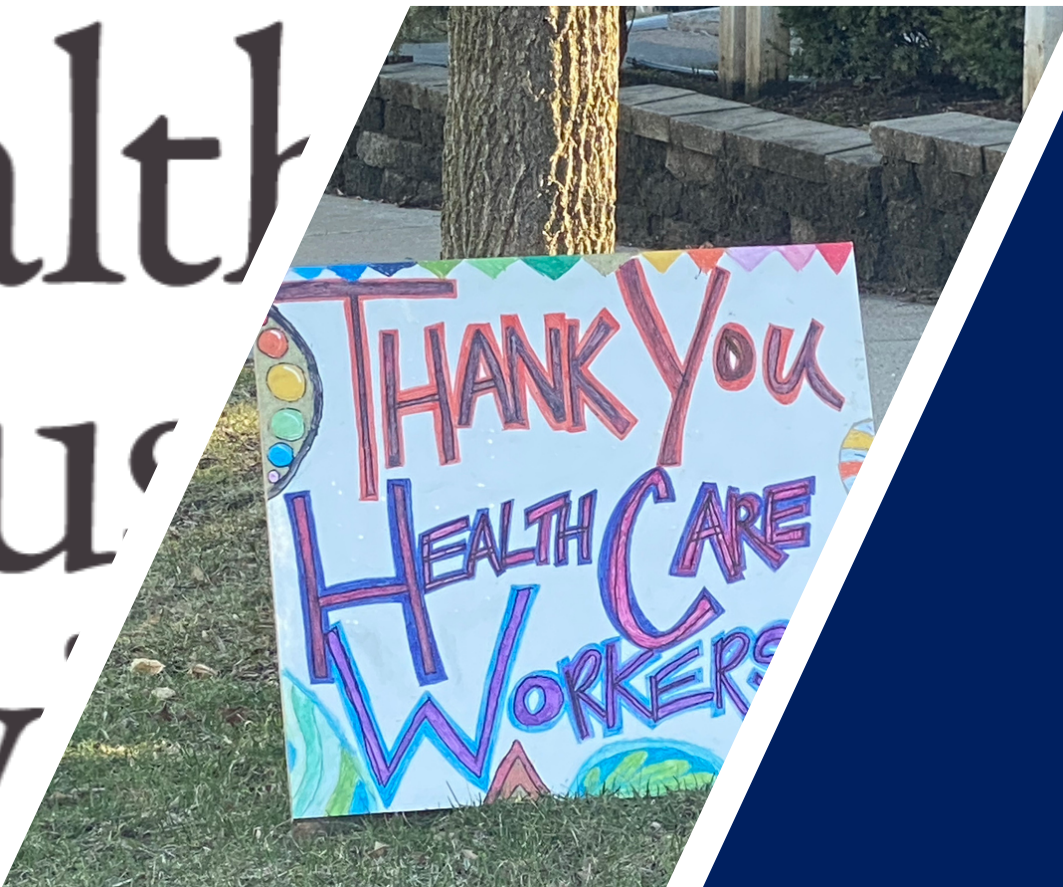




Health
Industry
Adv



Issue # 161
Monday, September 14, 2020

COVID-19 Report

Highlights

- Estimated and Projected Actual Infections
 - The CDC has reported that the actual infection rate could be more than 10x what is reported using current testing methods
 - Youyang Gu, an MIT-trained data scientist has developed a well-regarded, machine learning-based and open-source model to forecast *implied infection rates* and *infection fatality rates* - <https://covid19-projections.com>
 - Applying Gu's model, **16% of the U.S. population has been infected with the SARS-Cov-2 virus as of Friday, versus the 2% that has been reported**
 - **Louisiana, Mississippi, Texas, Florida, Georgia and Arizona, in order, have the highest implied infection rates in the U.S. (24-29%); Vermont, Maine, Wyoming, New Hampshire, Hawaii and Oregon each have implied infection rates of 5% or less**
 - Based on Gu's projections, **the implied infection rate in the U.S. could increase to 18.6% by November 1**. Arkansas, Idaho, Iowa, North Carolina and North Dakota could experience the most new-infections per capita from September 11 - November 1; Colorado, Maine, Michigan, New Hampshire, Pennsylvania, the fewest
 - **Given the expectations for the eleven most heavily-populated states, infection rate growth for the U.S. between now and November may be tempered:** Infection rates in Michigan, New Jersey, New York, Ohio and Pennsylvania may be at or near a plateau; Florida, Georgia, Illinois and Texas could see a slowing rate of infection growth. California and North Carolina are the two heavily-populated states for which Gu projects the growth in the rate of new infections to be similar to their recent experience
- Testing
 - **Testing remains above minimum level suggested by Harvard scientists . . . Yet, is 10% lower than last week**
 - **Test-positive rate continued to decline and is just above WHO-targeted level**
 - Eleven states reported test-positive rates for the past 7 days higher than the CDC-target for Phase 3 re-openings; Another seventeen states reported rates above the stricter WHO-target
- New Cases and Infection Rates
 - After spiking from mid-June to mid-July, new cases per week have not increased in six weeks; **Through Sunday, new cases declined 11.5% week-over-week**
 - **A reason for concern? New daily cases on Sunday were higher than 2 of the past 4 weeks;** New cases for the day remain lower than on Sundays in late-June to early-August; higher than on Sundays in June (It must be noted that Sunday is typically a "slow" day for reporting (i.e., relatively few reported new cases))
 - **New infections per capita in the U.S. continued to decline over the weekend; The current rate is ~1/2 that reported July 16-22**
 - North and South Dakota reported the highest rates of new infections per capita over the past 7 days, followed by Arkansas, Oklahoma, Iowa and Wisconsin; Vermont reported the lowest rate, followed by Maine, New Hampshire, Connecticut, New York and New Jersey
 - Aruba reported the highest rate of new infections per capita worldwide over the past 7 days, followed by Guadeloupe, Bahrain, Israel, Montenegro and Argentina; Spain ranked 9th and France, 22nd; The United States ranked 26th
- Healthcare Resource Demand
 - COVID-19's demand on healthcare resources has been easing for months: **Inpatient COVID-19 census has declined 46 of the past 52 days and is ½ its July 25 level**
 - ICU COVID-19 census is down 40% since late-June
 - Ventilator use among hospitalized patients is ½ its level from the Spring
 - **ER visits for COVID-19-like illness are ½ the July rate; flu visits have not yet picked up**
- COVID-19 Case Status
 - **There were relatively few deaths reported yesterday, typical for a Sunday;** the daily average reported deaths are lower than late-July to early-August, but higher than early-July
 - There are 20 persons recovered from the virus for each death; There are ~60% more recovered persons than active cases

Youyang Gu* publishes a model that estimates actual infections and forecasts infections and deaths through November 1

Louisiana is estimated to have the highest rate of infections – 29% of its population, followed by Mississippi, Texas, Florida, Georgia and Arizona

Implied Infection Rate

Using Youyang Gu's Projection Model, As of September 11

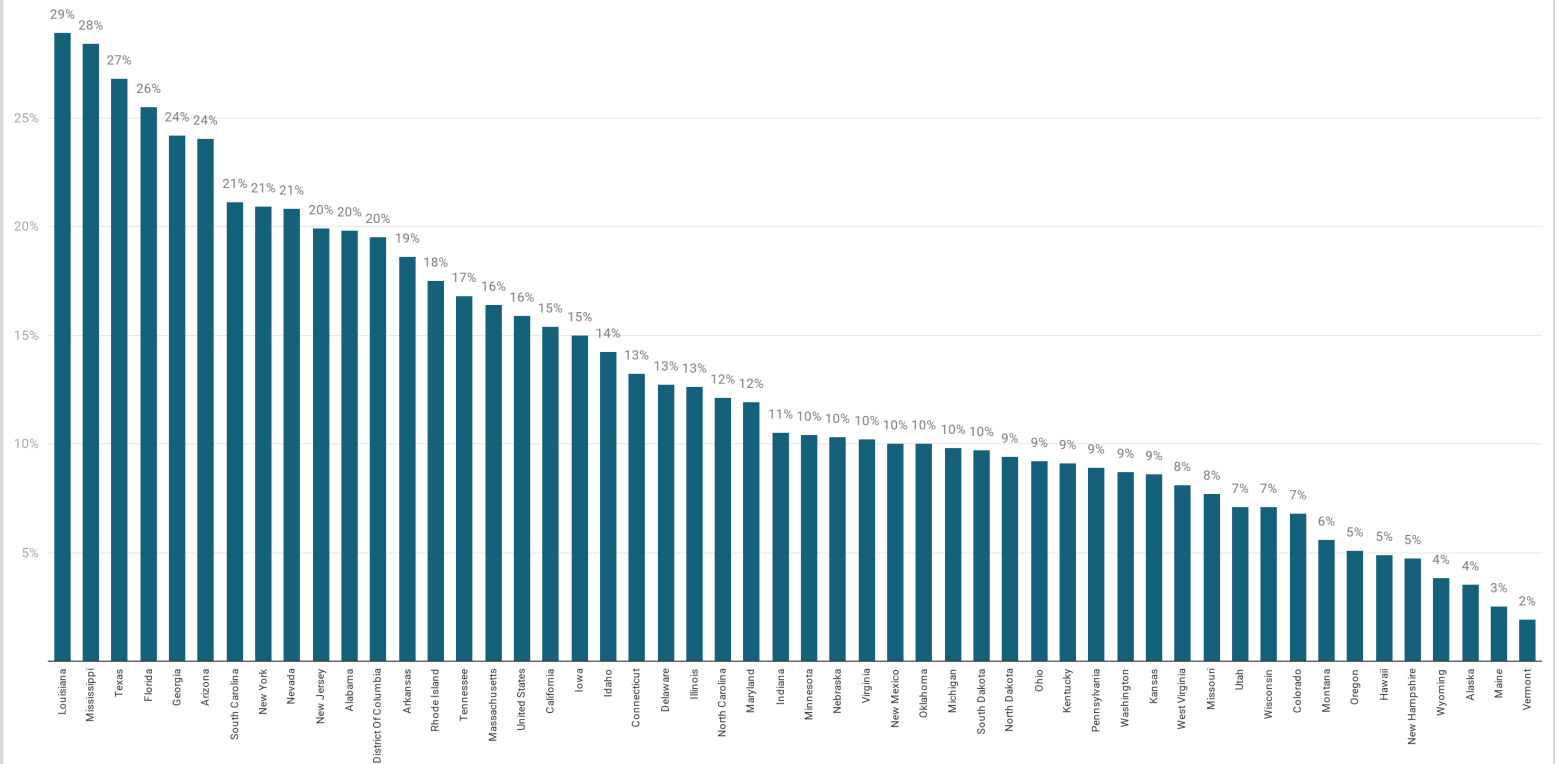


Chart: Health Industry Advisor LLC • Created with Datawrapper

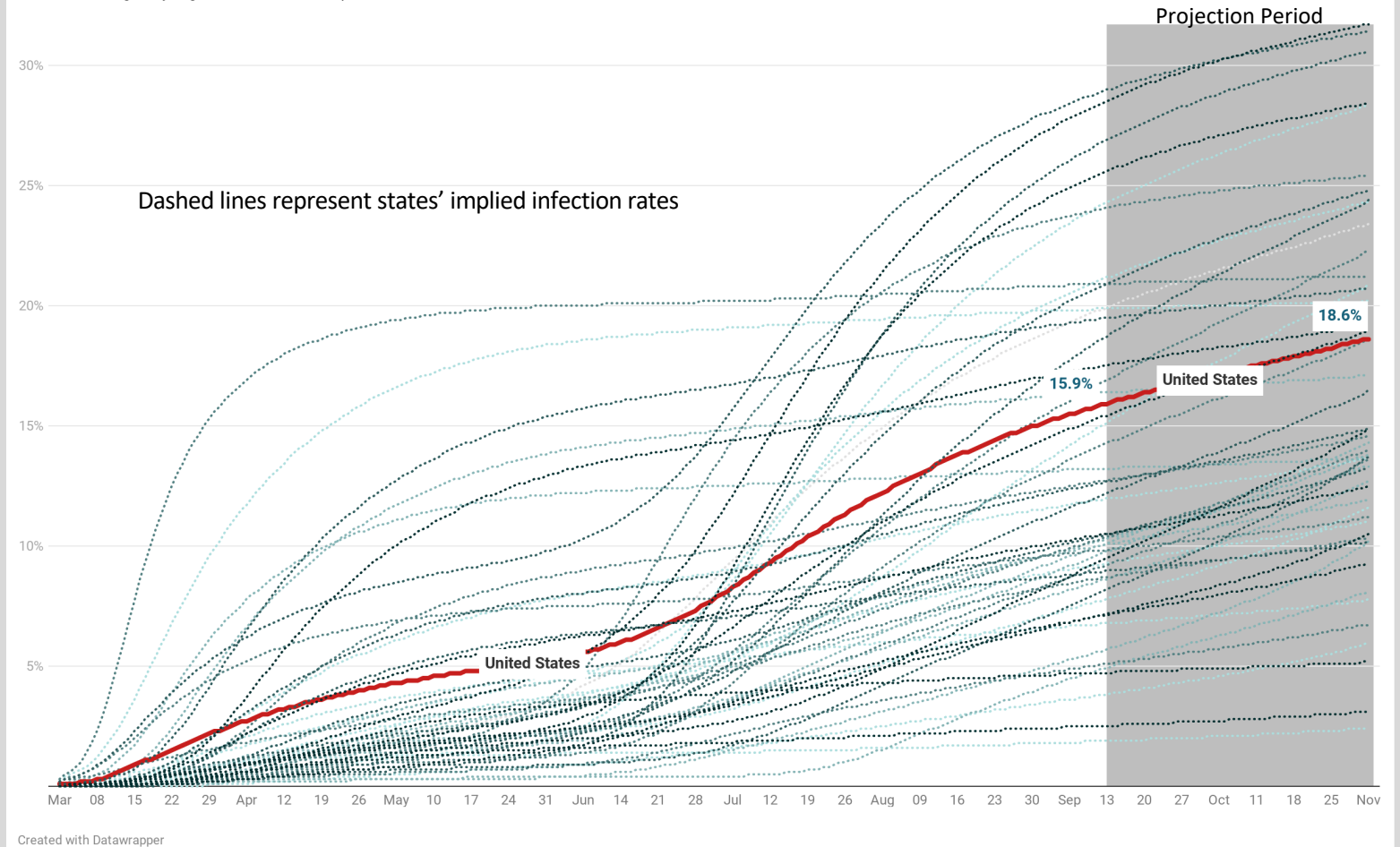
[*Source: "Estimating True Infections: A Simple Heuristic to Measure Implied Infection Fatality Rate", Youyang Gu, July 29, 2020 \(Updated September 12\)](#)

Gu estimates that 16% of U.S. population has been infected with SARS-CoV-2

By November 1, he projects it to be 18.6%

Implied Infection Rate

Estimates Using Youyang Gu's Model, As of September 11



*Source: "Estimating True Infections: A Simple Heuristic to Measure Implied Infection Fatality Rate", Youyang Gu, July 29, 2020 (Updated September 12)

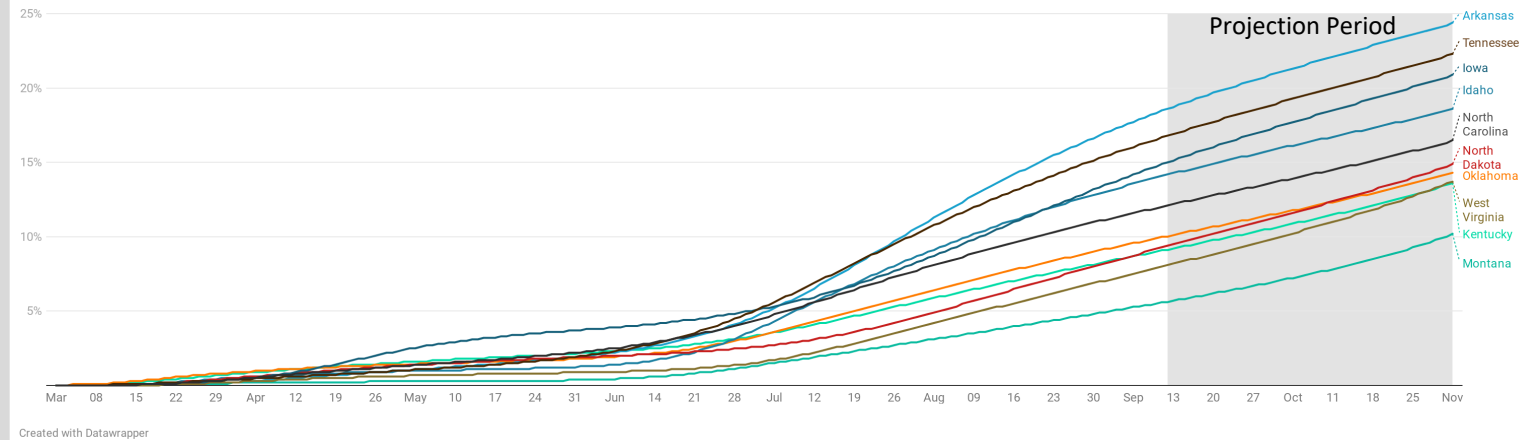
Between now and November 1, Gu projects . .

Arkansas, Idaho, Iowa, North Carolina and North Dakota will experience the most new-infections per capita

Colorado, Maine, Michigan, New Hampshire, Pennsylvania may have plateaued

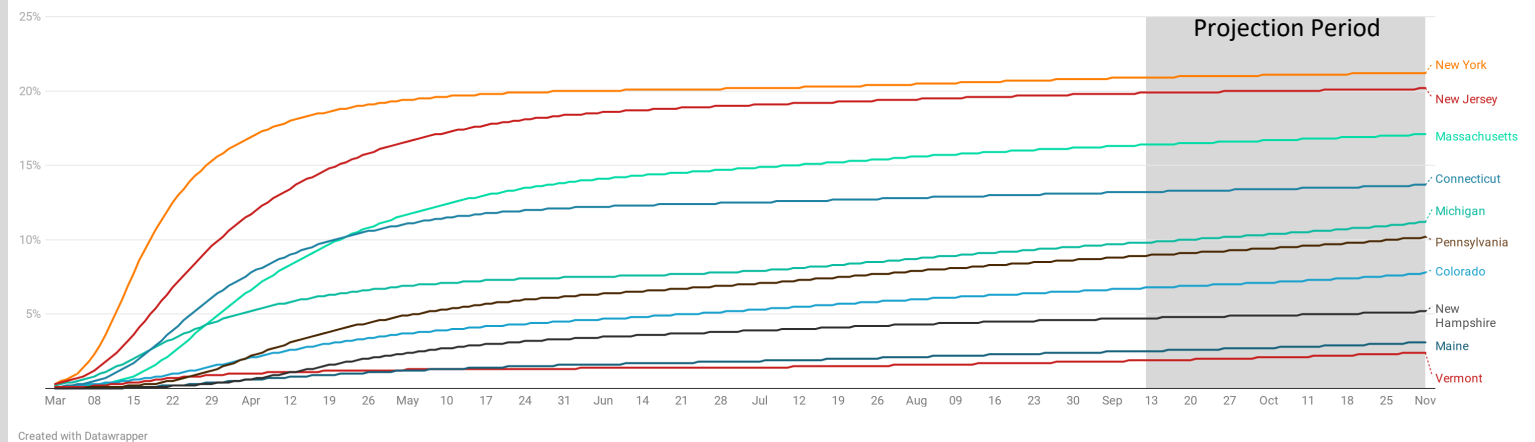
Implied Infection Rate - States With Largest Expected Increase by 11/1

Estimates Using Youyang Gu's Model, As of September 11



Implied Infection Rate - States With Smallest Increase By 11/1

Estimates Using Youyang Gu's Model, As of September 11



Given the expectations for heavily-populated states, infection rate growth for the U.S. may be tempered: somewhat:

Michigan, New Jersey, New York, Ohio and Pennsylvania may have plateaued

California, Florida, Georgia, Illinois and Texas could see a slowing rate of infection growth

Implied Infection Rate - 11 Most Populous States

Estimates Using Youyang Gu's Model, As of September 11

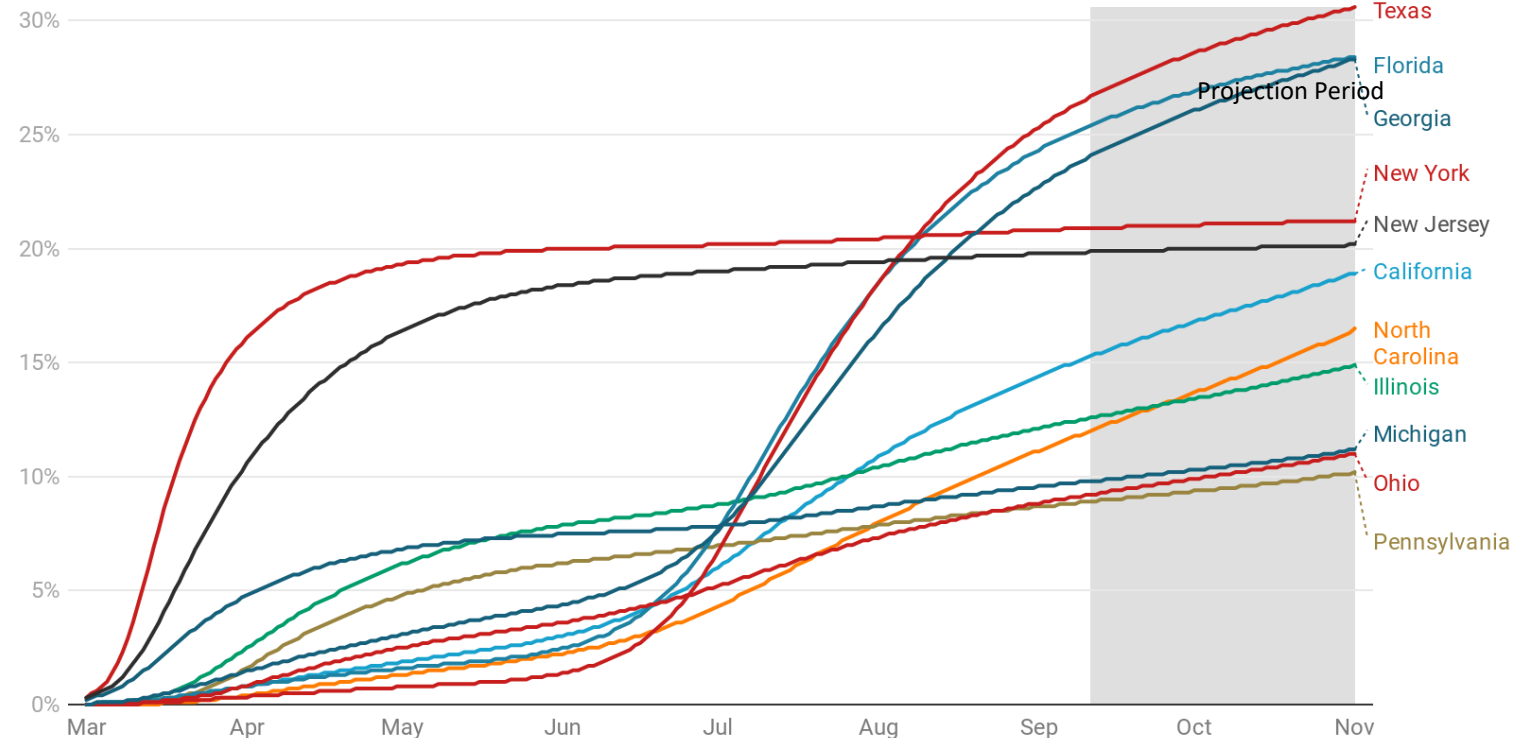


Chart: Health Industry Advisor LLC • Created with Datawrapper

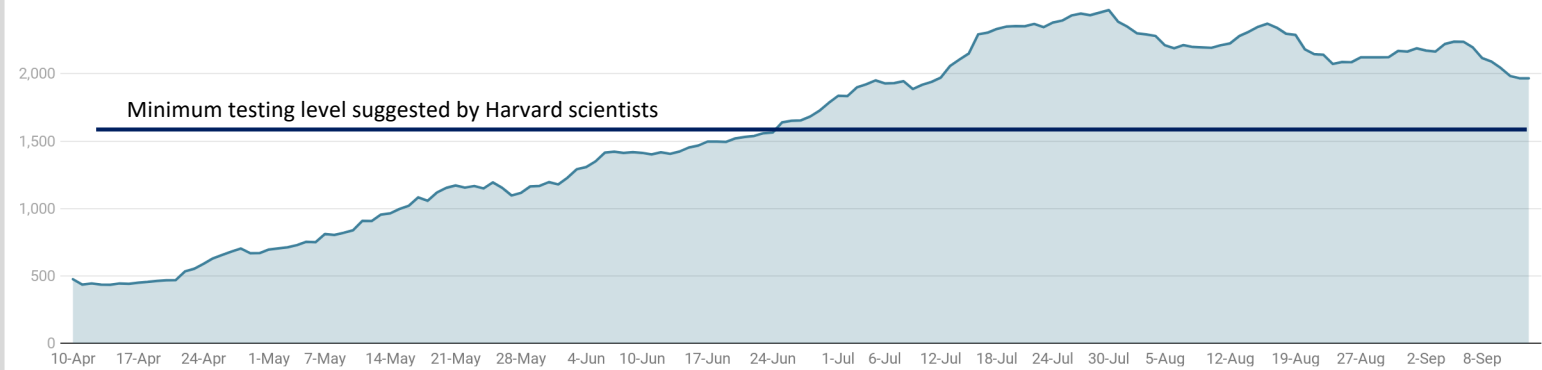
[*Source: "Estimating True Infections: A Simple Heuristic to Measure Implied Infection Fatality Rate", Youyang Gu, July 29, 2020 \(Updated September 2\)](#)

Testing remains above minimum level suggested by Harvard scientists . . . Yet, is 10% lower than last week

Test-positive rate continued to decline and is just above WHO-targeted level

Daily Tests Per 1 Million - United States

Trailing 7-Day Moving Average, As of September 13

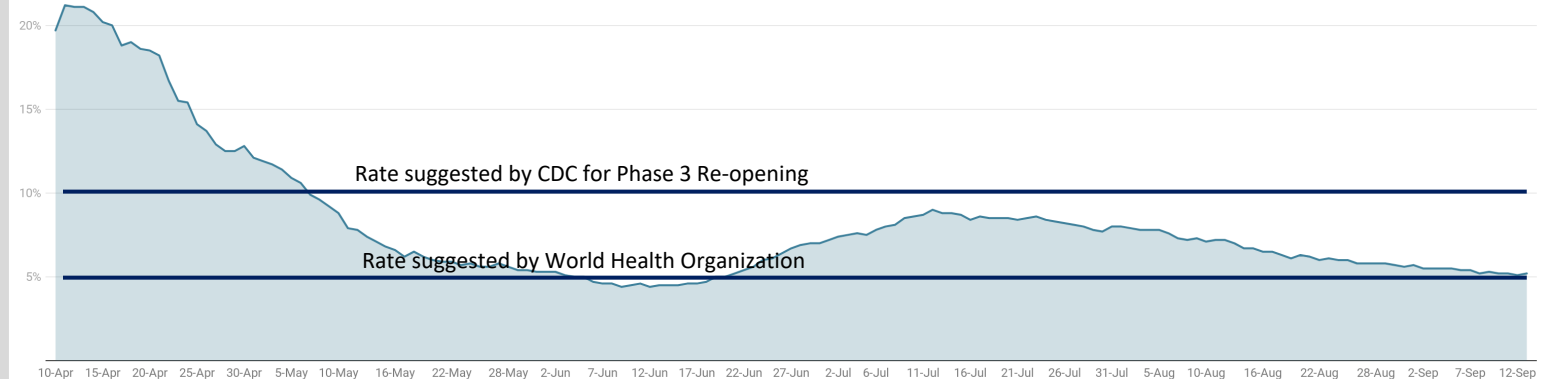


Health Industry Advisor LLC analysis

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 September 13



Health Industry Advisor LLC analysis

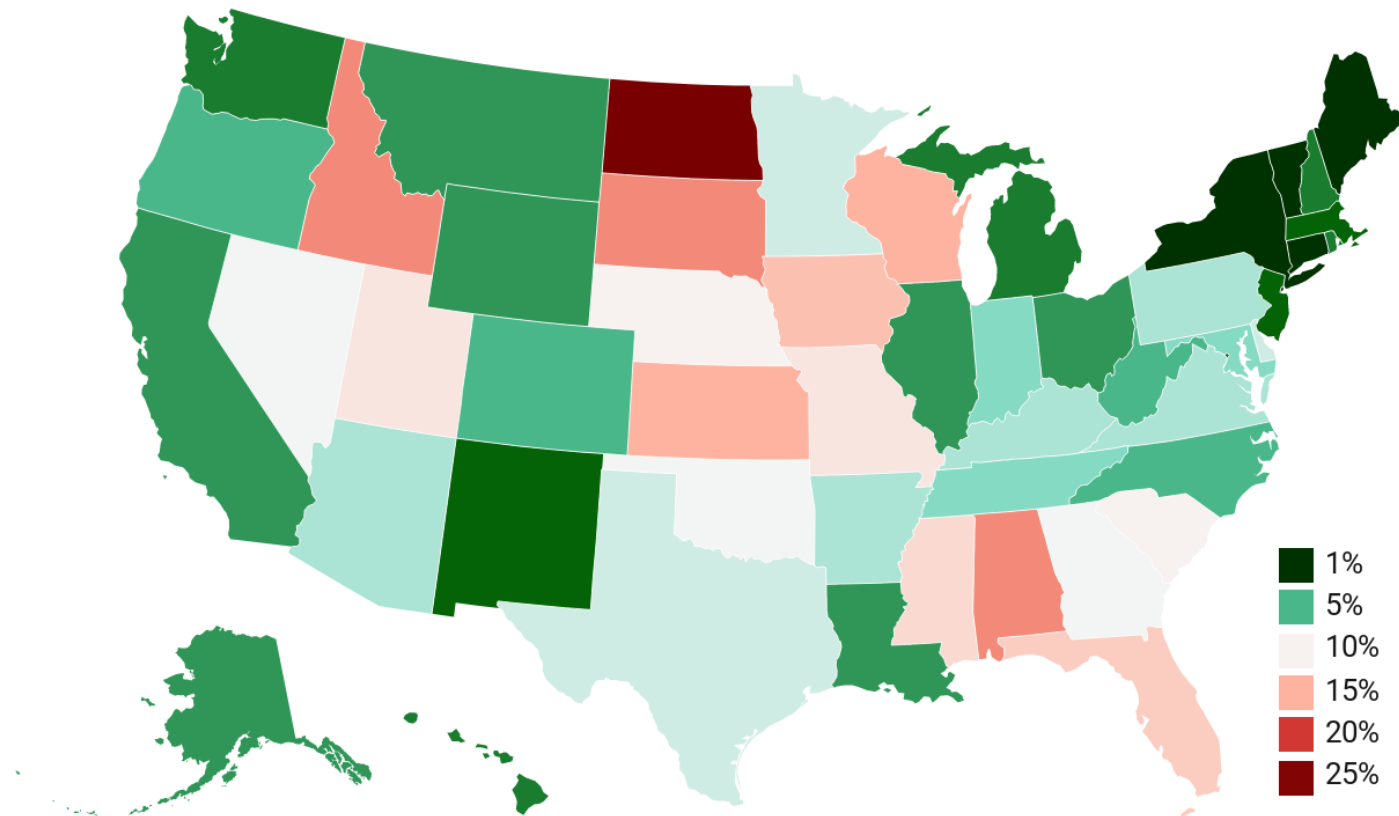
Chart: Health Industry Advisor LLC • Source: The Atlantic's Covid Tracking Project • Created with Datawrapper

Eleven states reported test-positive rates for the past 7 days higher than the CDC-target for Phase 3 re-openings

Another seventeen states reported rates above the stricter WHO-target

Test-Positive Rate

Trailing 7-Day Moving Average, As of September 13



Health Industry Advisor LLC analysis

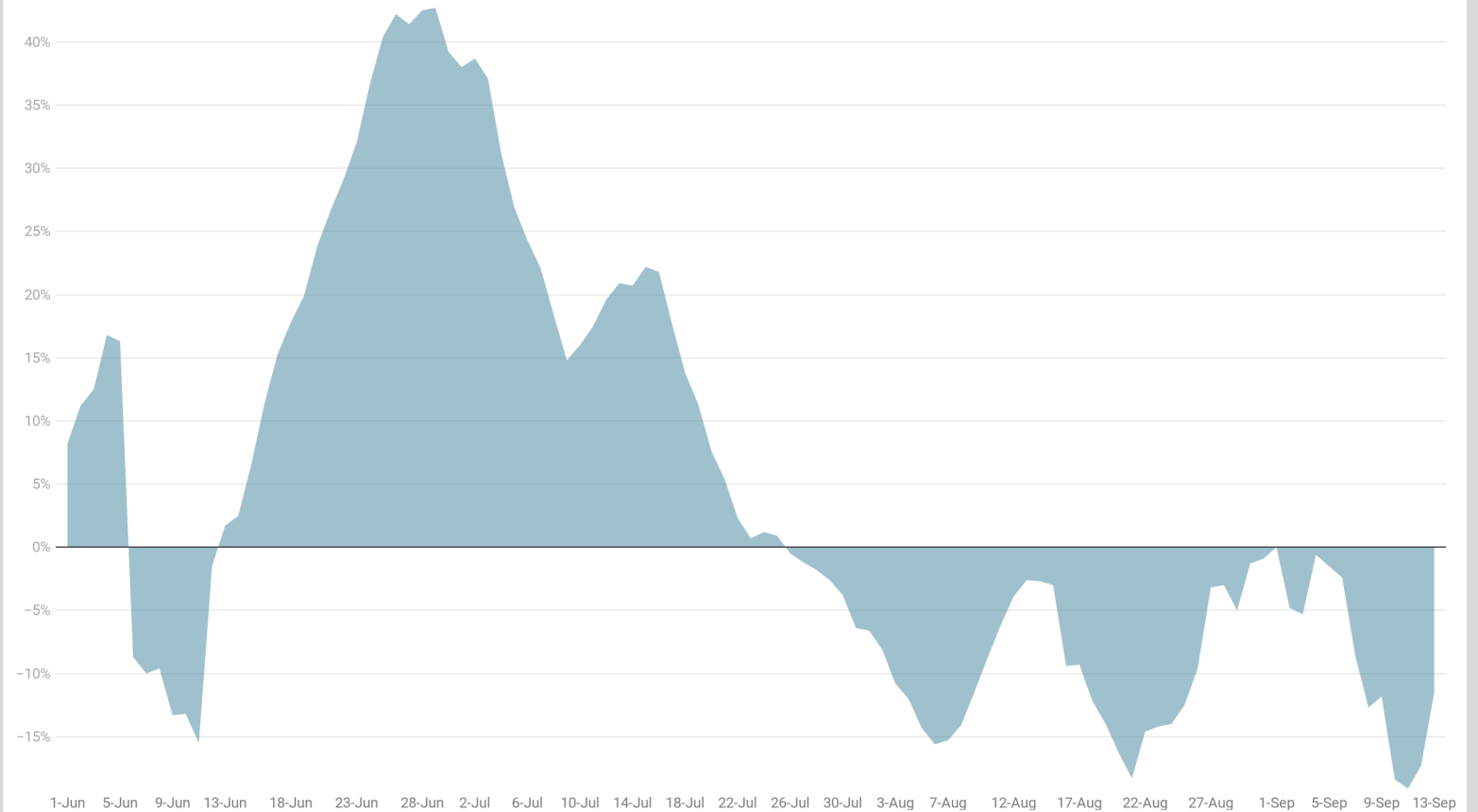
Map: Health Industry Advisor LLC • Source: The Atlantic's Covid Tracking Project • Created with Datawrapper

After spiking from mid-June to mid-July, new cases per week have not increased in six weeks

Through Sunday, new cases declined 11.5% week-over-week

Week-Over-Week Change In New Cases

Through September 13



Health Industry Advisor LLC analysis

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

Case growth is slowing:

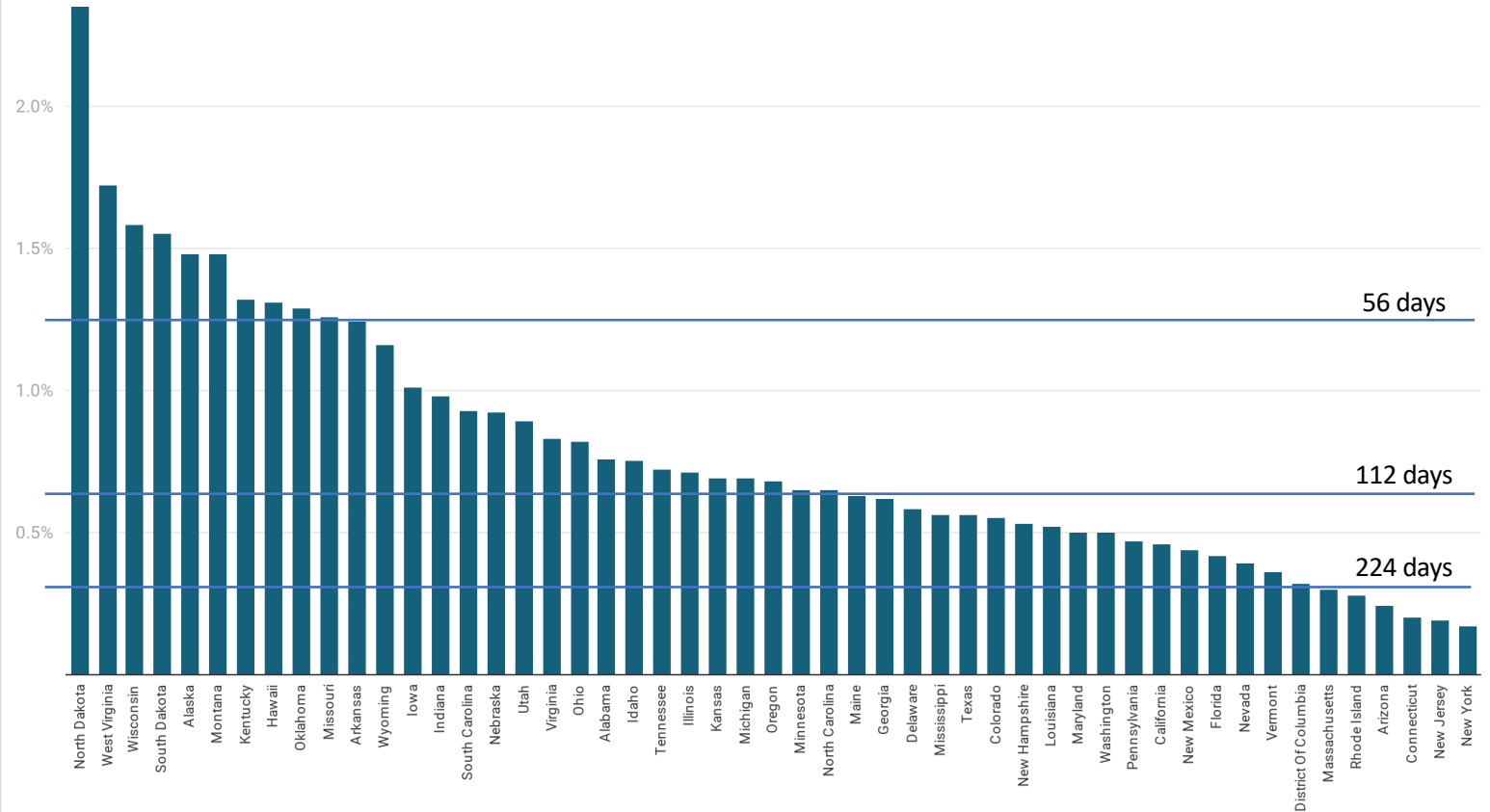
At current rates, cases are doubling every 30 days in North Dakota

Every 409 days in Arizona

Every 118 days for the United States overall

Growth Rate in Total Cases

Trailing 5-Day Moving Average, Through September 13



Health Industry Advisor LLC analysis

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

A reason for concern?

New daily cases on Sunday were higher than 2 of the past 4 weeks

New cases for the day remain lower than on Sundays in late-June to early-August; higher than on Sundays in June

New Daily Cases

Through September 13

Sundays Highlighted

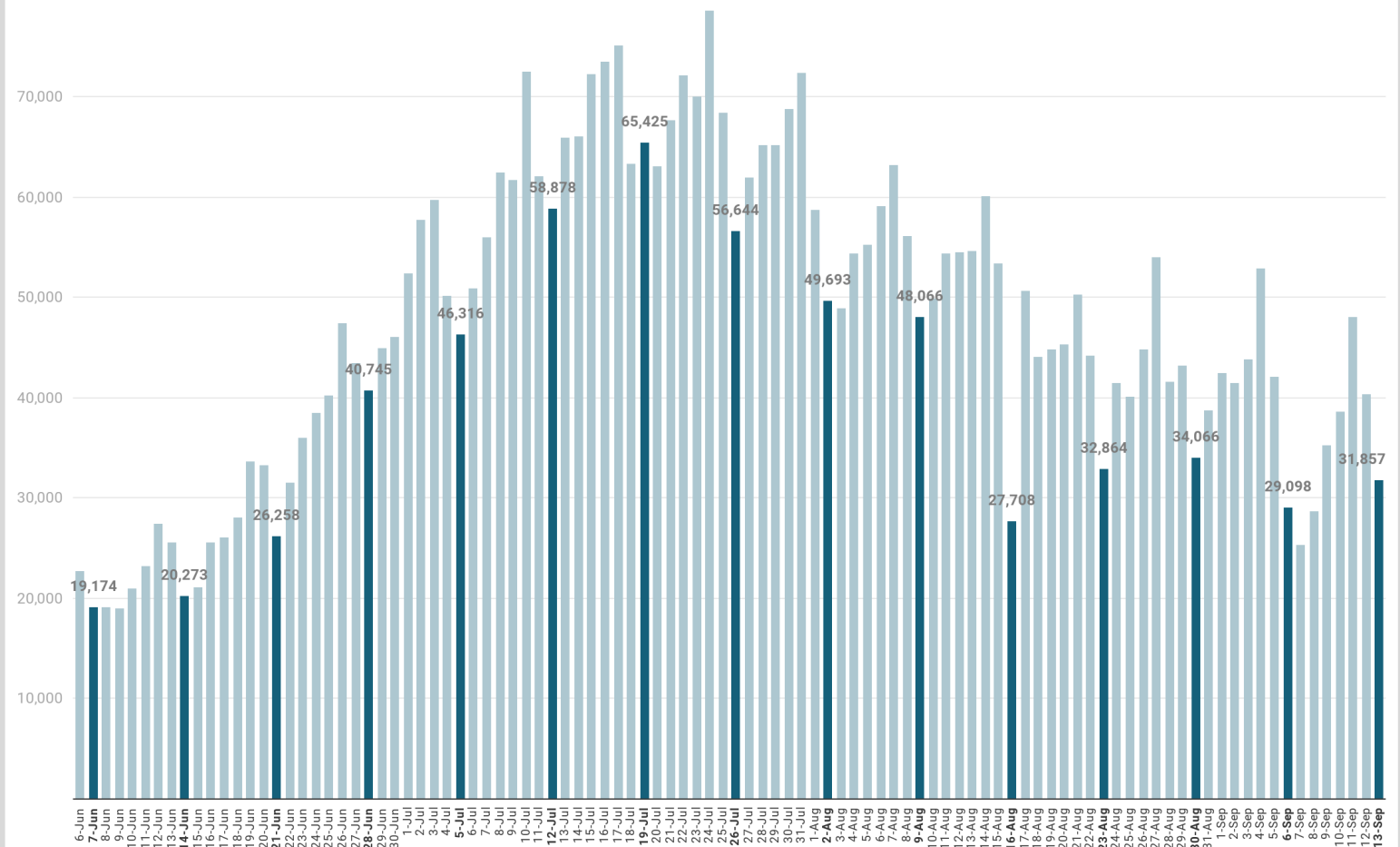


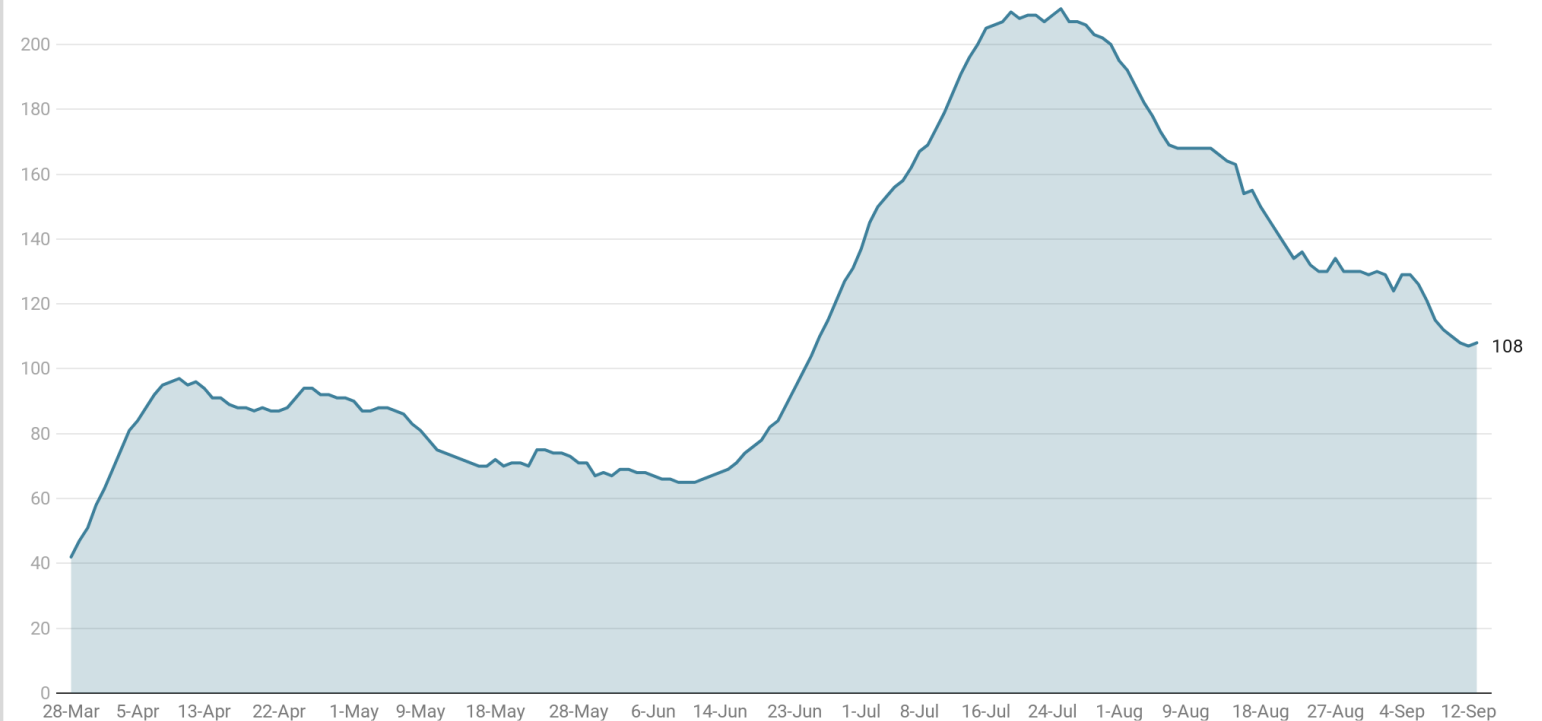
Chart: Health Industry Advisor LLC • Source: eoridometers.info • Created with Datawrapper

New infections per capita in the U.S.* continued to decline over the weekend

Current rate is ~1/2 that reported July 16-22

New Infections Per 1 Million Population - United States

Trailing 7-Day Moving Average, Through September 13



Health Industry Advisor LLC analysis

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

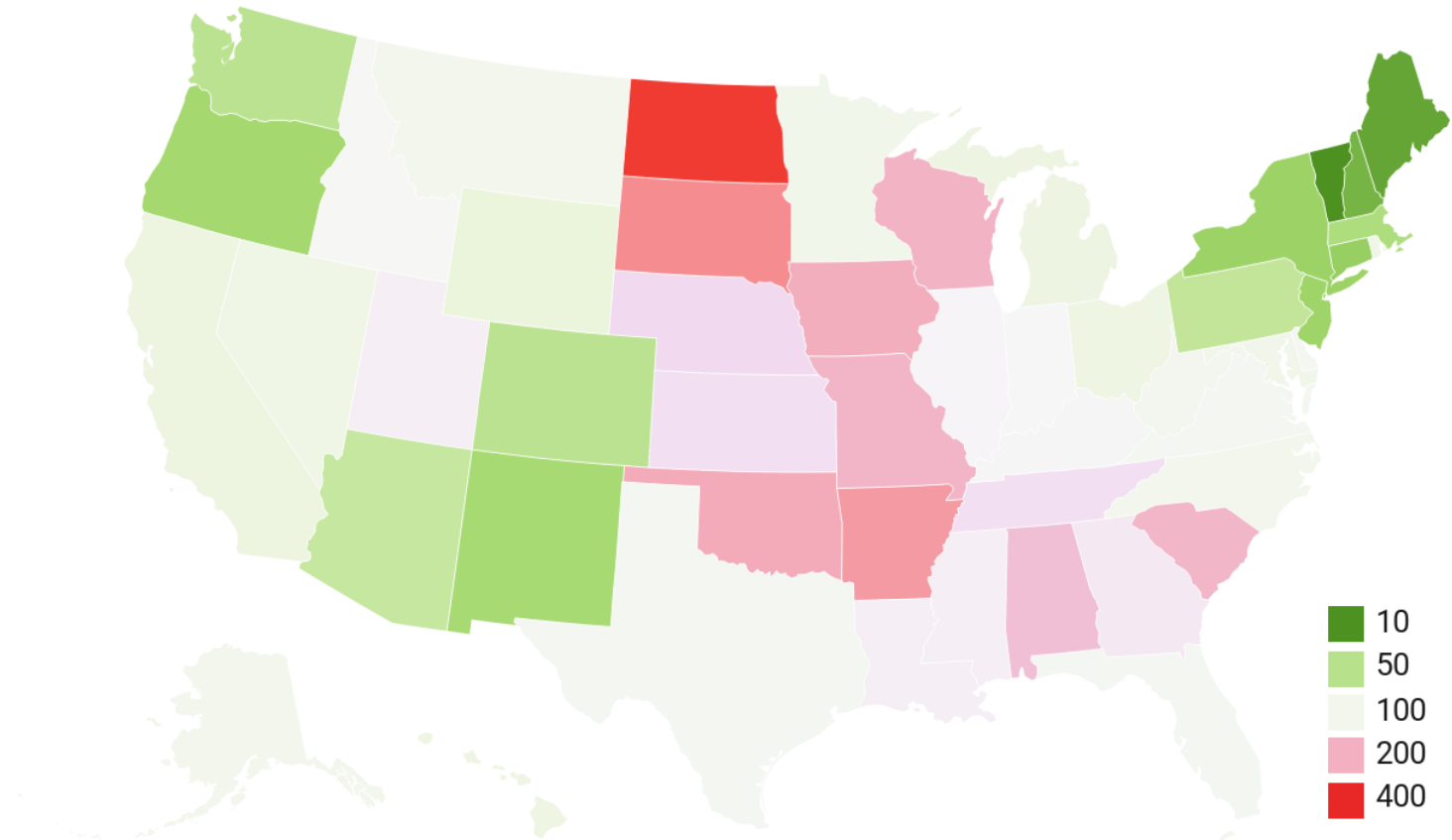
* - 7-day moving average basis

North and South Dakota reported the highest rates of new infections per capita* over the past 7 days, followed by Arkansas, Oklahoma, Iowa and Wisconsin

Vermont reported the lowest rate, followed by Maine, New Hampshire, Connecticut, New York and New Jersey

New Daily Infections Per 1 Million Population

Trailing 7-Day Moving Average, As of September 13



* - 7-day moving average basis

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

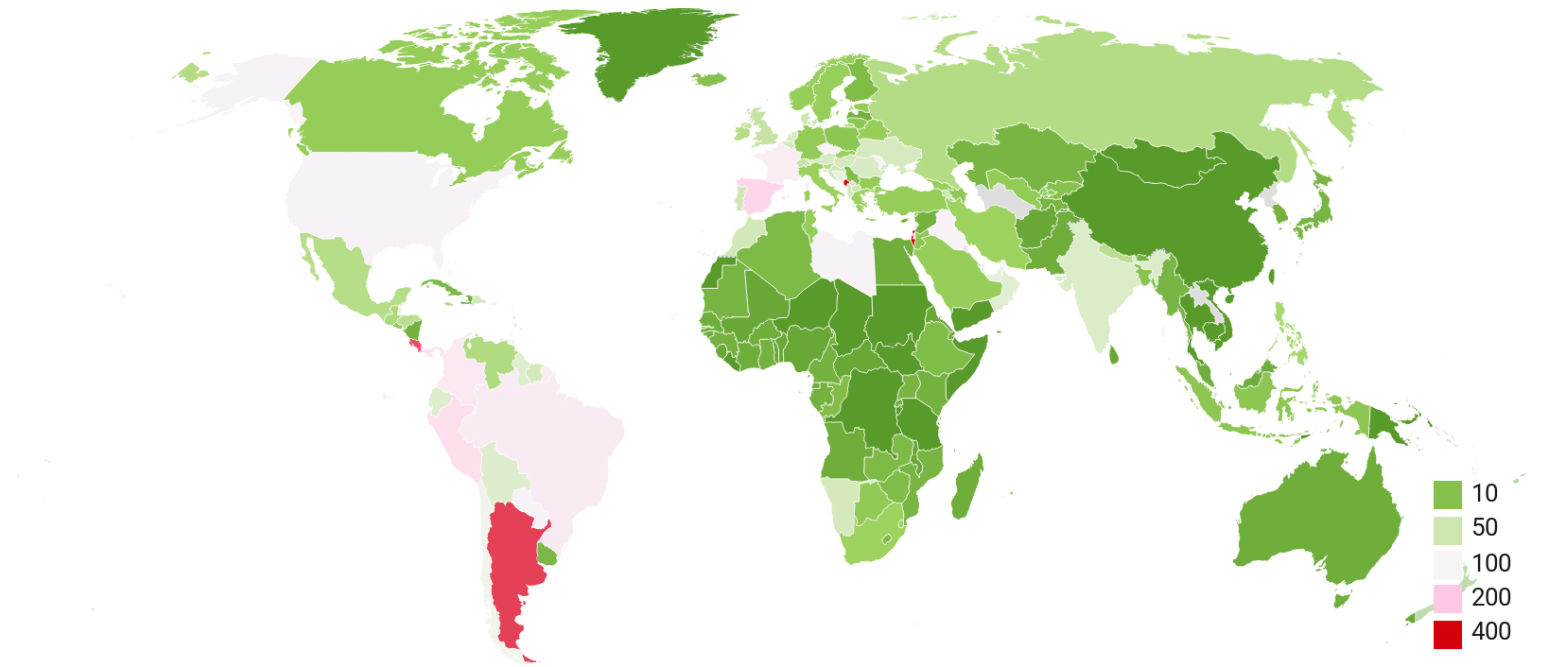
Aruba reported the highest rate of new infections per capita* worldwide over the past 7 days, followed by Guadeloupe, Bahrain, Israel, Montenegro and Argentina

Spain ranked 9th and France, 22nd

The United States ranked 26th worldwide

New Daily Infections / 1 Million Population

Trailing 7-Day Moving Average, As of September 13



Health Industry Advisor LLC analysis

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

* - 7-day moving average basis

COVID-19's demand on healthcare resources has been easing for months:

Inpatient COVID-19 census has declined 46 of the past 52 days and is ½ its July 25 level

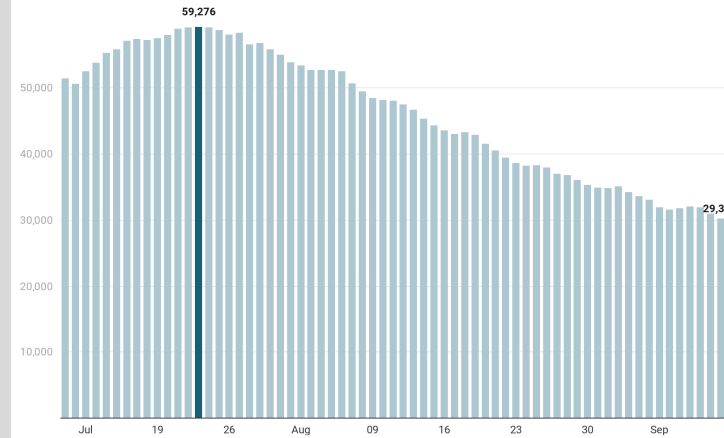
ICU COVID-19 census is down 40% since late-June

Ventilator use among hospitalized patients is ½ its level from the Spring

ER visits for COVID-19- like illness are ½ their July rate; flu visits have not yet picked up

Hospital Census: COVID-19 Patients

As of September 13

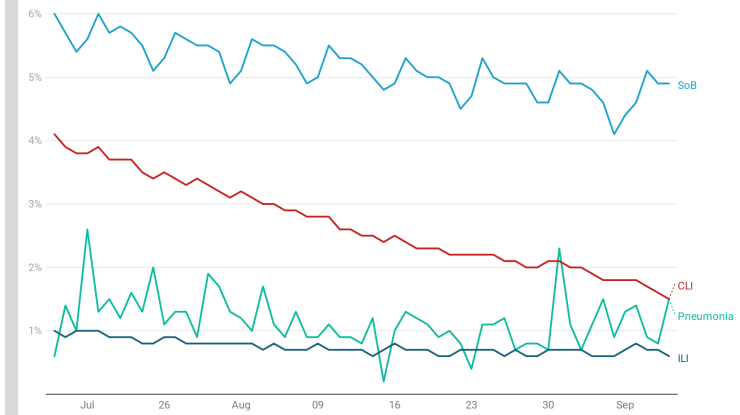


Florida data first available on July 10

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

% of Emergency Department Visits for COVID-Like Illness (CLI), Influenza-Like Illness (ILI), Pneumonia & Shortness of Breath (SoB)

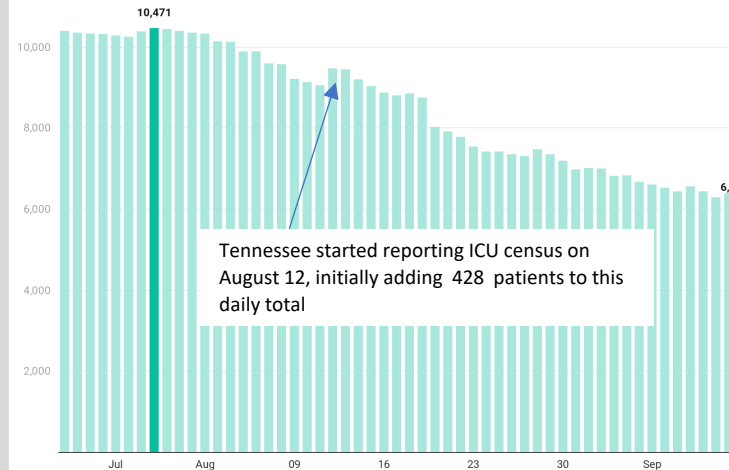
As of September 10



Health Industry Advisor LLC analysis

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

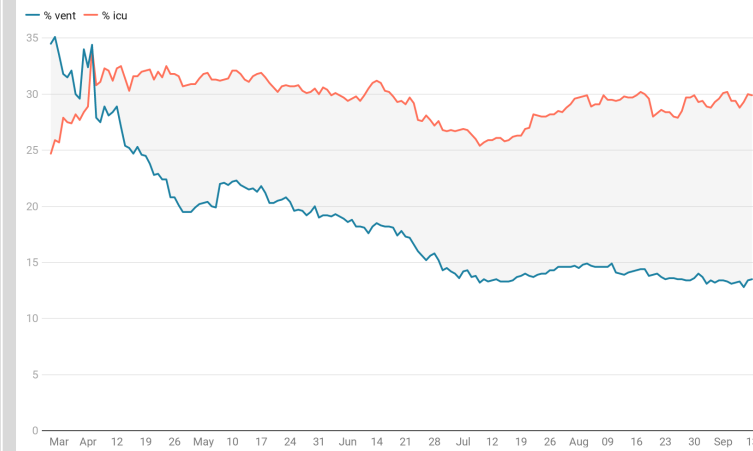
COVID-19 ICU Census



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

Severity of Hospitalized Patients

% of patients on ventilators and in the ICU, As of September 13



Health Industry Advisor LLC analysis

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

Case Status:

There were relatively few deaths reported yesterday, typical for a Sunday; the daily average reported deaths are lower than late-July to early-August, but higher than early-July

There are 20 persons recovered from the virus for each death; There are ~60% more recovered persons than active cases

Deaths Reported With Coronavirus in the U.S.

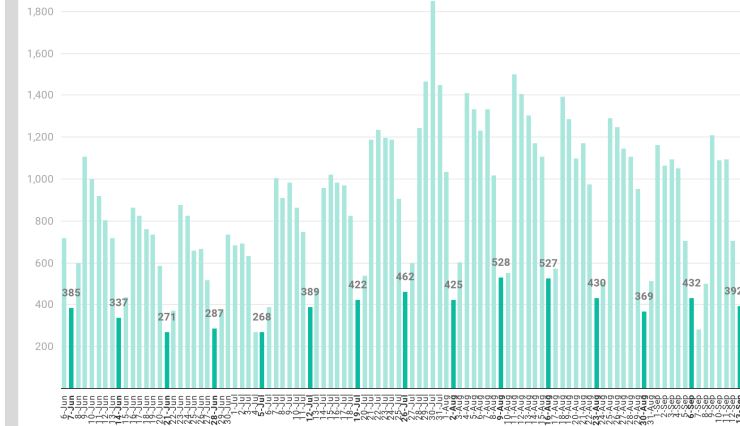
Trailing 7-Day Moving Average, As of September 13



Newly Reported Deaths

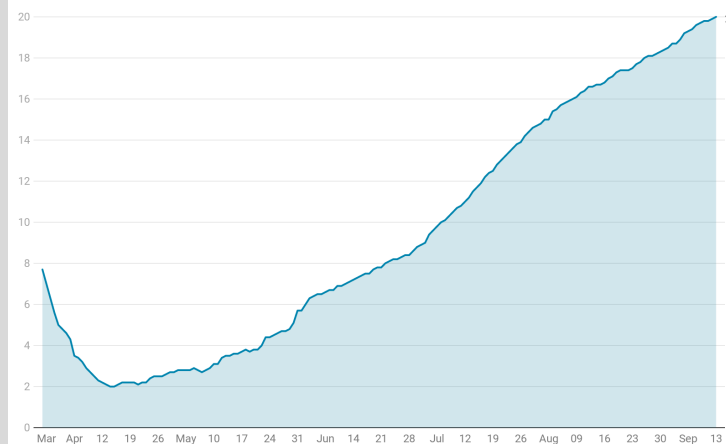
Through September 13

Sundays Highlighted



Recoveries: Deaths - United States

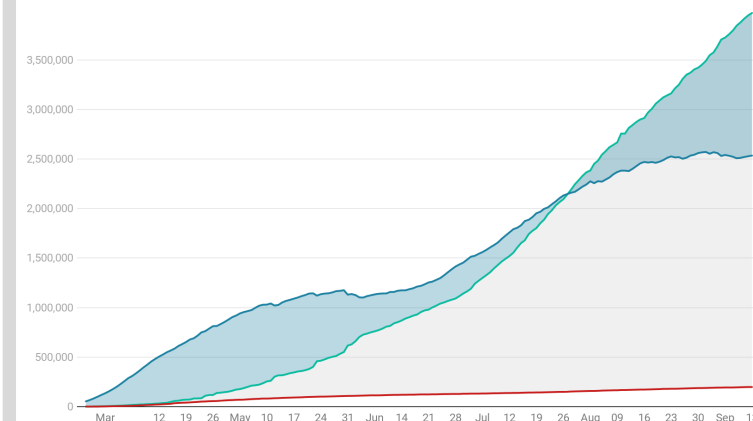
As of September 13



Active Cases v. Recoveries & Deaths

Through September 13

Active Cases Recoveries Deaths



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>
- COVID-19 Projections Using Machine Learning, <https://covid19-projections.com>