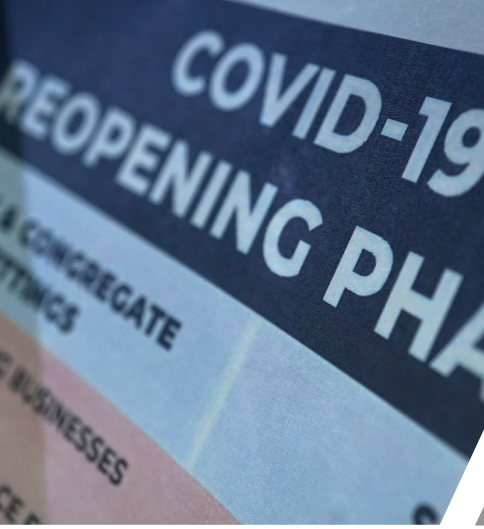


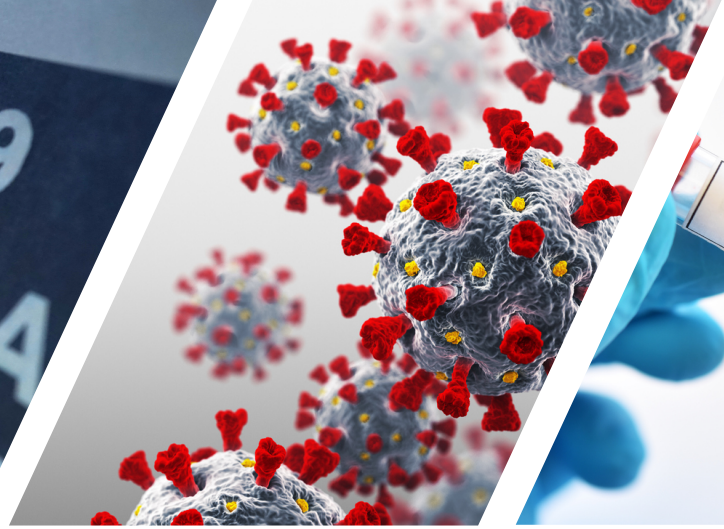


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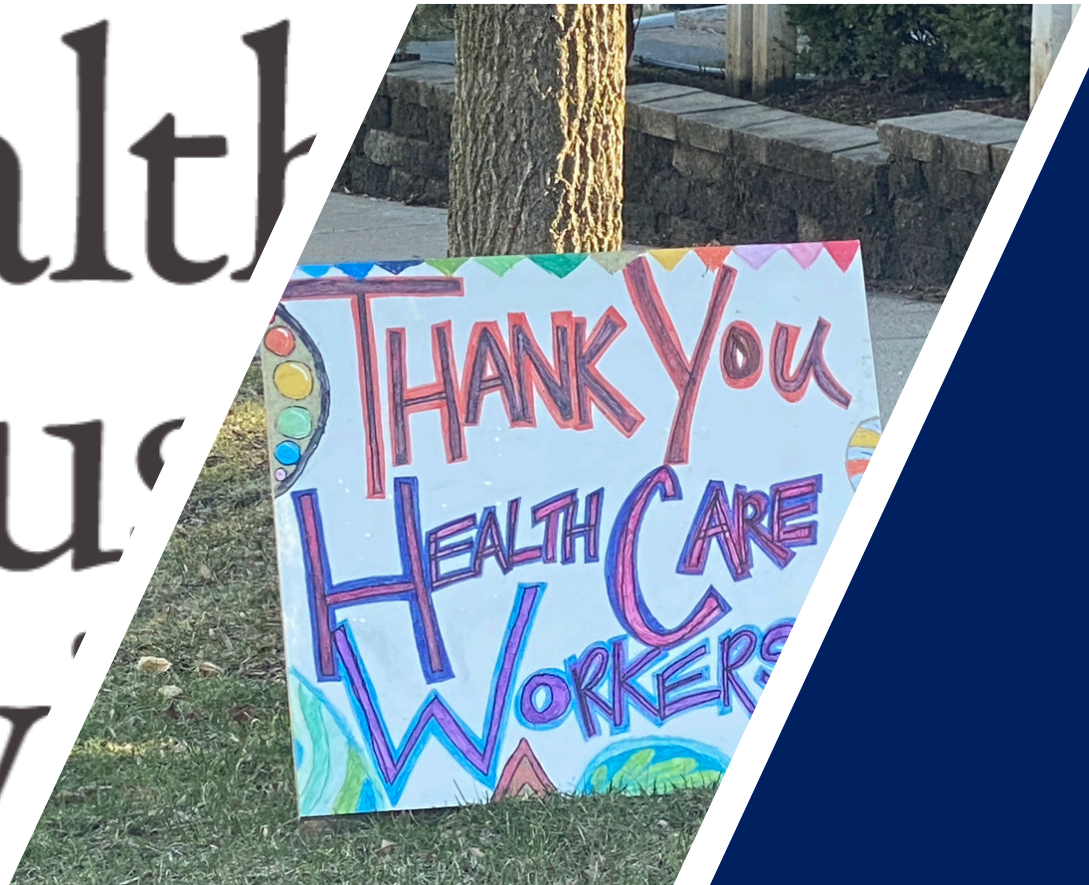



Issue # 172

Monday, September 28, 2020

# COVID-19 Report

# Highlights

- Implied infection rates
  - One of the most-widely followed models for estimating actual (or, implied) infection rates is from Youyang Gu, an MIT-trained data scientist. Gu uses machine learning to estimate and project both infections and deaths; he updates his models daily
  - **Gu estimates that 16% of the U.S. population has been infected with the virus as of Saturday; contrast this with the 2.2% included in current reported totals; currently, new infections in the U.S. are estimated at ~229k per daily versus the reported 30k-50k** Among large countries included in Gu's model, Peru has the highest implied infection rate, 22.6% of the population, followed by South Africa with 21.4%
  - **Among heavily-populated counties included in Gu's model, Nassau County (NY) 36.9% of the population has been infected, followed by Westchester (NY), 34.3%; Miami-Dade (FL), 34.0%; and New York City, 29.8%**
  - Among states, in Arizona 26% of the population is estimated to be infected; Mississippi and Louisiana, 25%. Vermont, Maine, Wyoming and Alaska are all estimated to be under 5%
  - **Using Gu's projections through November 1, North and South Dakota, Missouri, Montana, Arkansas and Alabama have the highest estimated new infections per capita for the upcoming five-week period; Vermont, Massachusetts, New Hampshire, New Jersey, New York and Connecticut, the lowest**
  - Gu estimates that new daily infections in the U.S. peaked on July 12 and declined until last Wednesday; **his model projects that new daily infections will steadily increase through his projection period (November 1)**
  - **Estimated new daily infections in Israel, which has the highest reported new daily infections per capita in the world, peaked on September 5 per Gu's model**

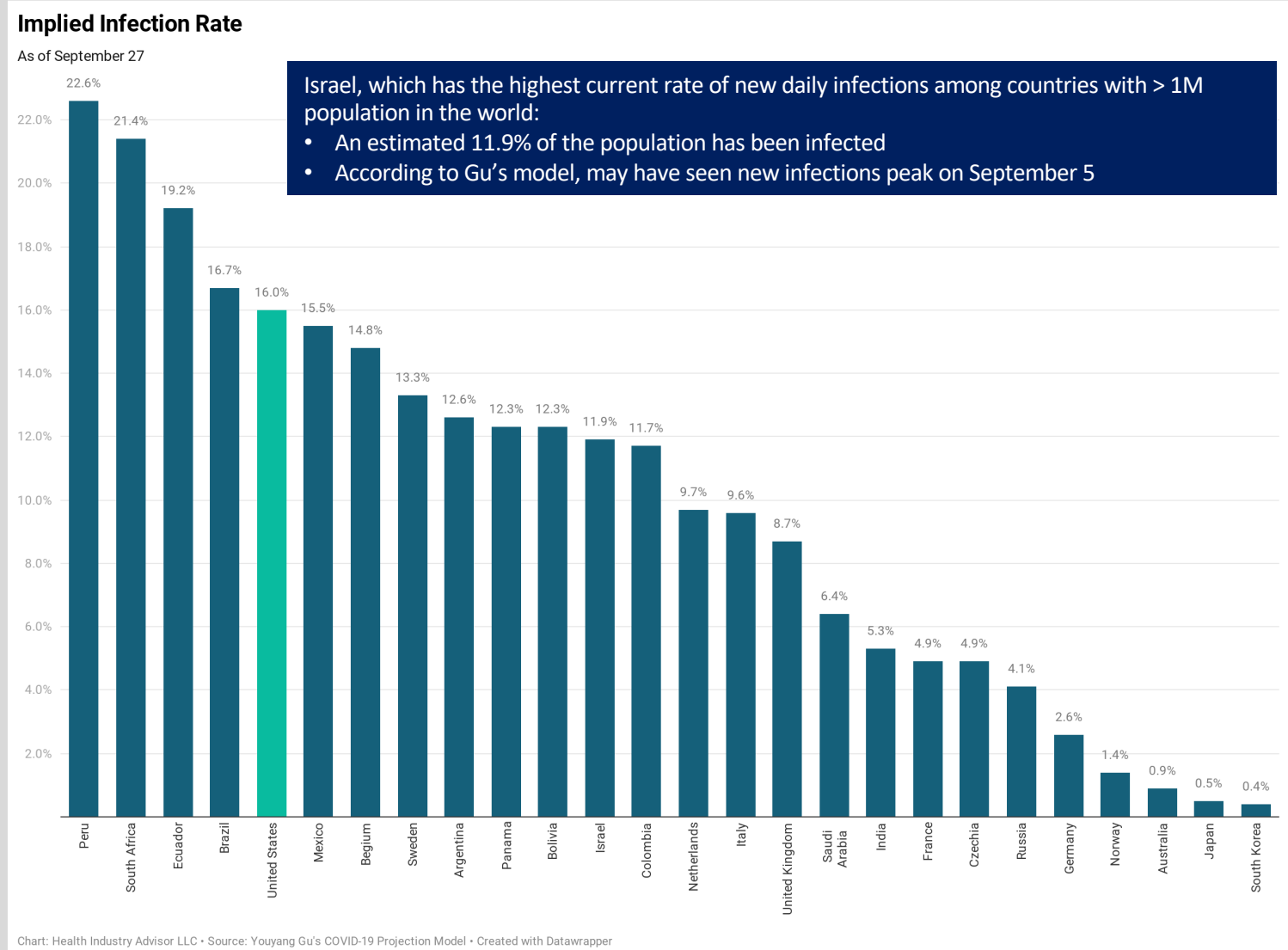
- Reported New Cases and Infection Rates Per Capita
  - **While Israel has the highest rate of new reported cases per capita over the, led by Aruba past week, island nations represent five of the eight countries with the highest rates**
  - **Among countries with > 1 million population, Argentina, Costa Rica, Spain and Czechia join Israel at the top of the ranking of new infections per capita**
  - In the U.S., North and South Dakota, Wisconsin, Utah and Iowa have the highest current rates of new infections per capita; Vermont, Maine and New Hampshire, the lowest
  - Nebraska, North Carolina and Colorado each are approaching highs they set months ago: Nebraska's high was set on May 5; North Carolina, July 18; and Colorado, July 28
  - **Overall, the new infection rate per capita in the U.S. has increased slightly over the past eight days**
- Testing in the U.S.
  - **Test volume is up 8% on a week-over-week basis**; **The test-positive rate for the weekend was 5.0-5.1%; for the past 7 days it was 5.5%**
  - Sixteen states reported test-positive rates > 10% for the past week (the target set by the CDC for Phase 3 re-opening); Eleven of these saw these rates increase by a full percentage point or more during the past two weeks; North and South Dakota, Idaho and Wisconsin sit atop this undesirable list
- Healthcare Resource Use in the U.S. Due to COVID-19
  - **Both inpatient and ICU census of COVID-19 patients declined over the past few days, after briefly (and, slightly) increasing last week. The trends in both measures have been sharply down since peaking in mid-July**
  - Ventilator use for hospitalized COVID-19 patients continued its long and substantial decline

Comparing implied infection rates* around the world

Youyang Gu** uses a machine learning model to estimate infection rates (as opposed to reported cases)

An estimated 22.6% of Peru's population has been infected, as of Saturday;
- South Africa: 21.4%
- Ecuador: 19.2%
- Brazil: 16.7%
- United States: 16.0%

* - Implied infection rate = % of population infected
** -Source: https://covid19-projections.com





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Estimated infection rates among selected U.S. counties: of

- Nassau, NY: 36.9% of the population has been infected

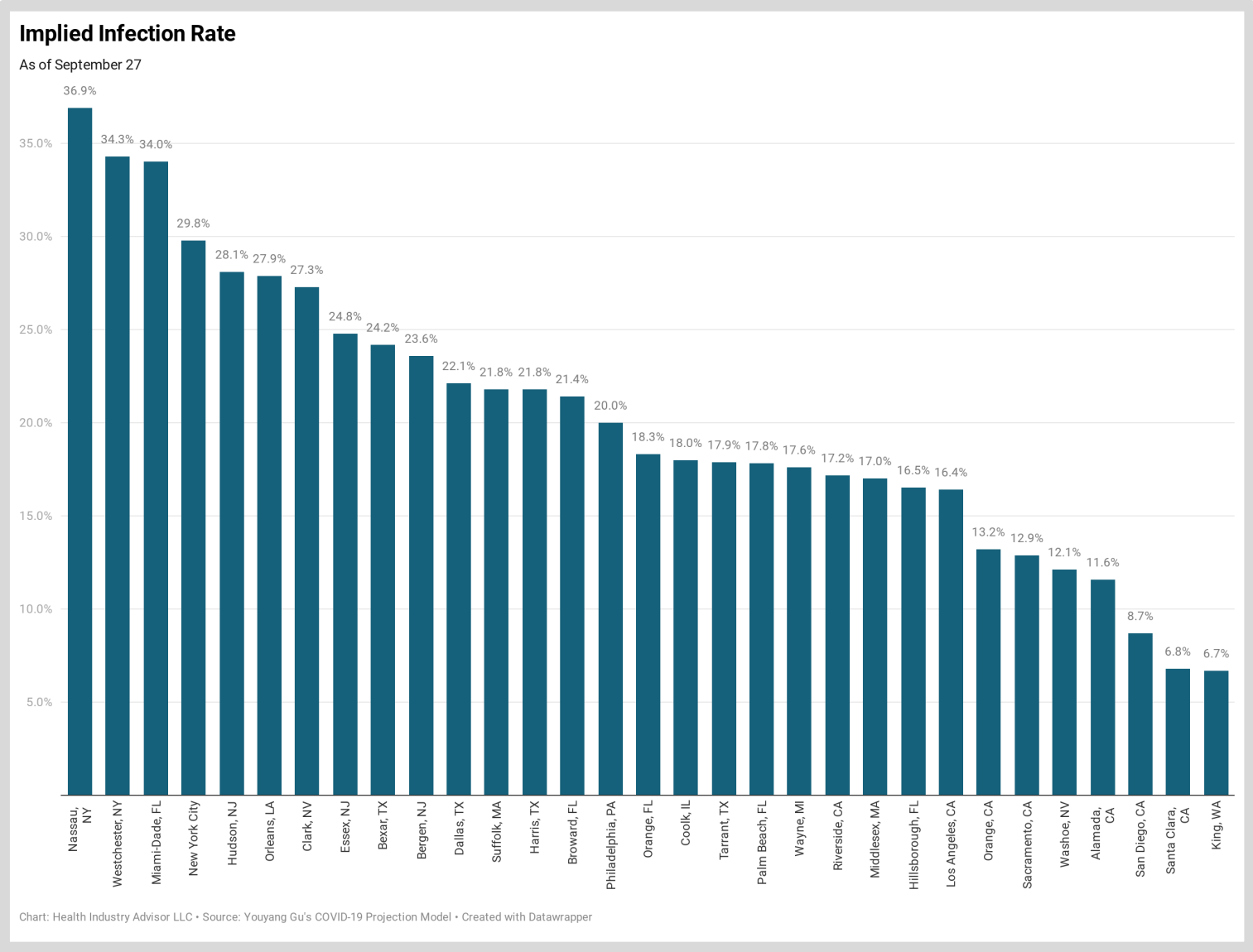
- Westchester, NY: 34.3%

- Miami-Dade, FL: 34.0%

- New York City, 29.8%

- Hudson, NJ: 28.1%

* Source: https://covid19-projections.com





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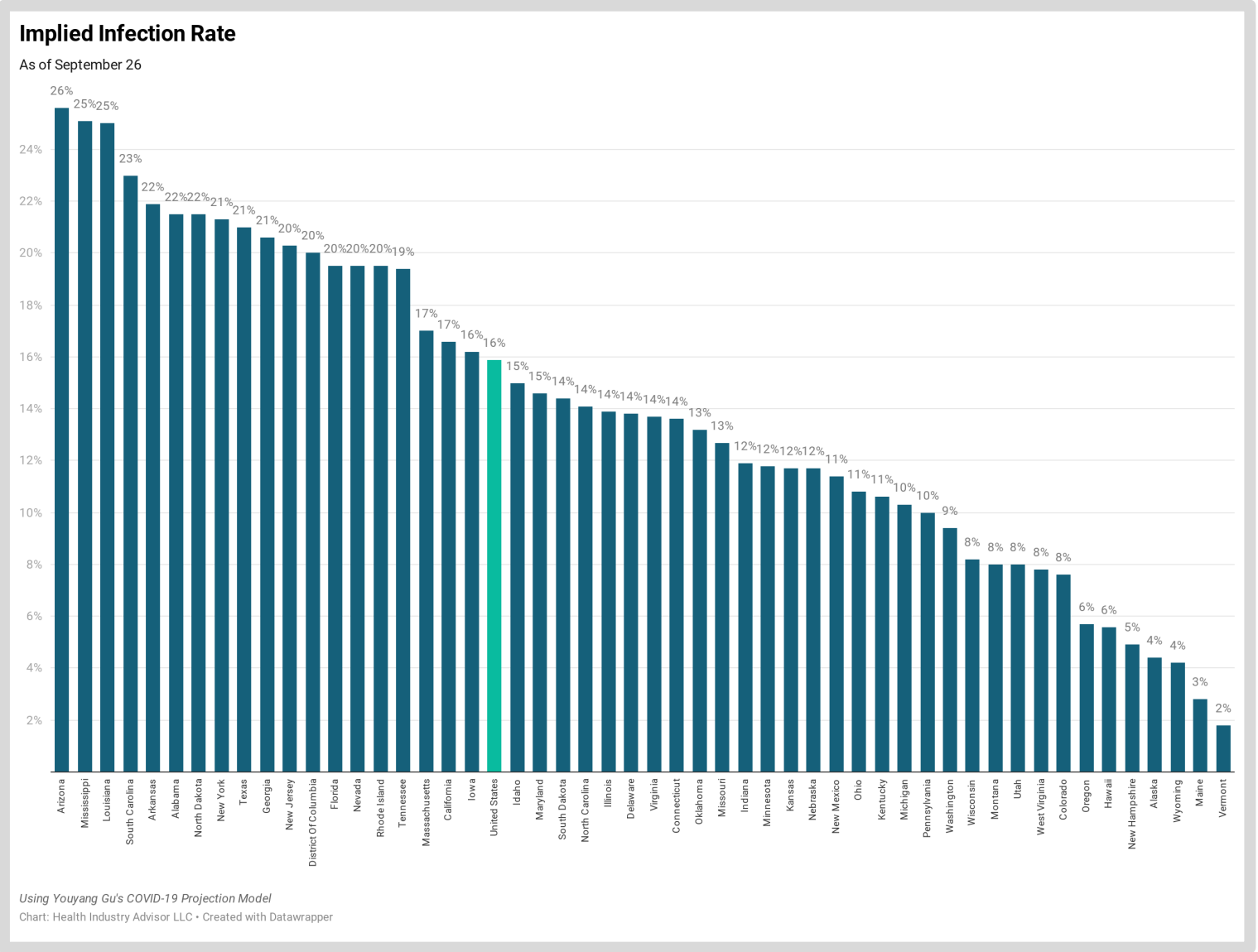
Estimated infection rates among the states:

- Arizona: 26%
- Mississippi: 25%
- Louisiana: 25%
- South Carolina: 23%
- Arkansas: 22%
- Alabama: 22%
- North Dakota: 22%
- New York: 21%
- Texas: 21%

- Vermont: 2%
- Maine: 3%
- Wyoming: 4%
- Alaska: 4%
- Hawaii: 6%
- Oregon: 6%

* Source: https://covid19-projections.com





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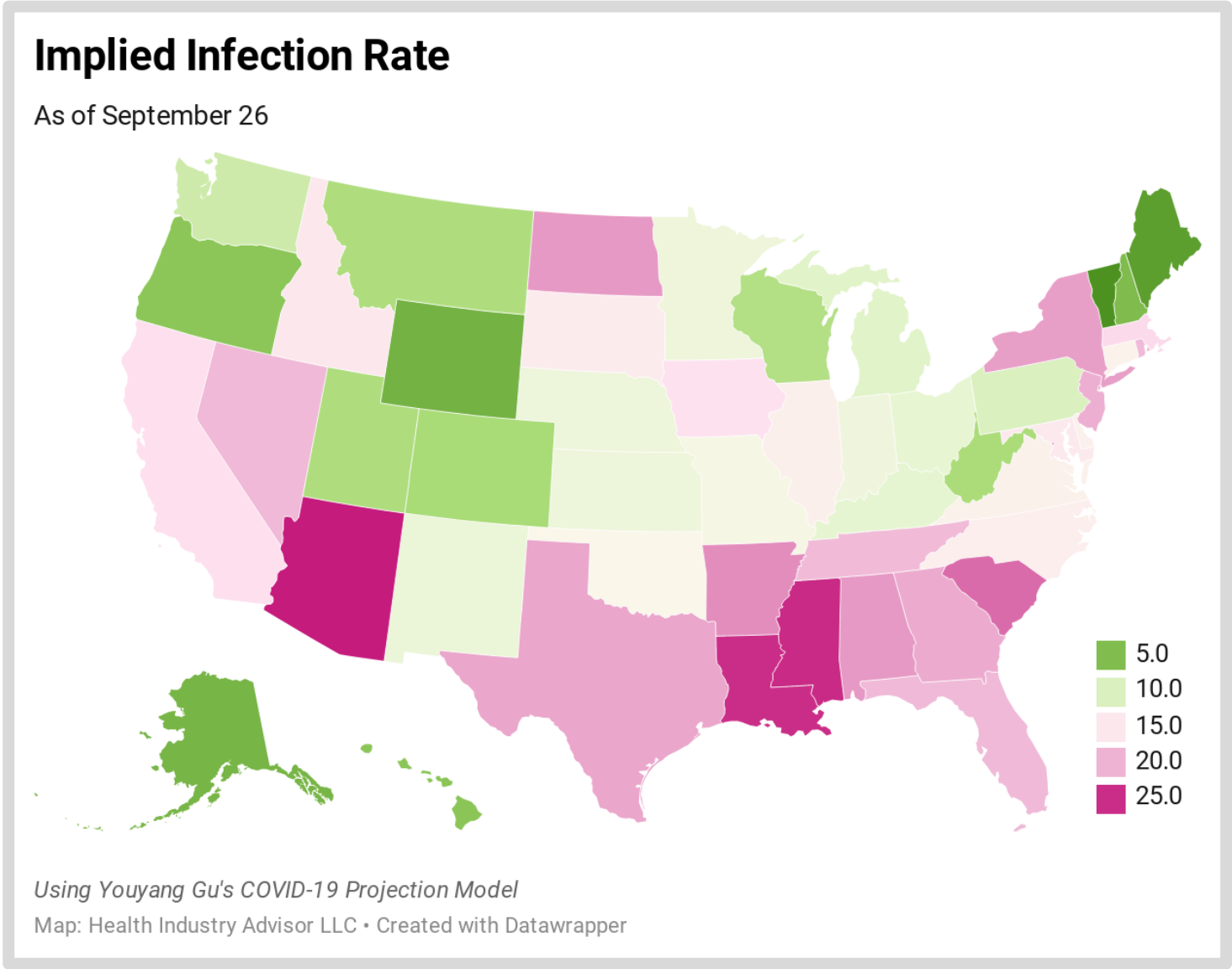
Looking at the implied infection rate on the map:

Interestingly, many states in the currently hard-hit central part of the country have relatively low implied infection rates

Several northeast states that were part of the first wave of infections and southern states that were part of the second wave have relatively high implied infection rates

* Source: https://covid19-projections.com





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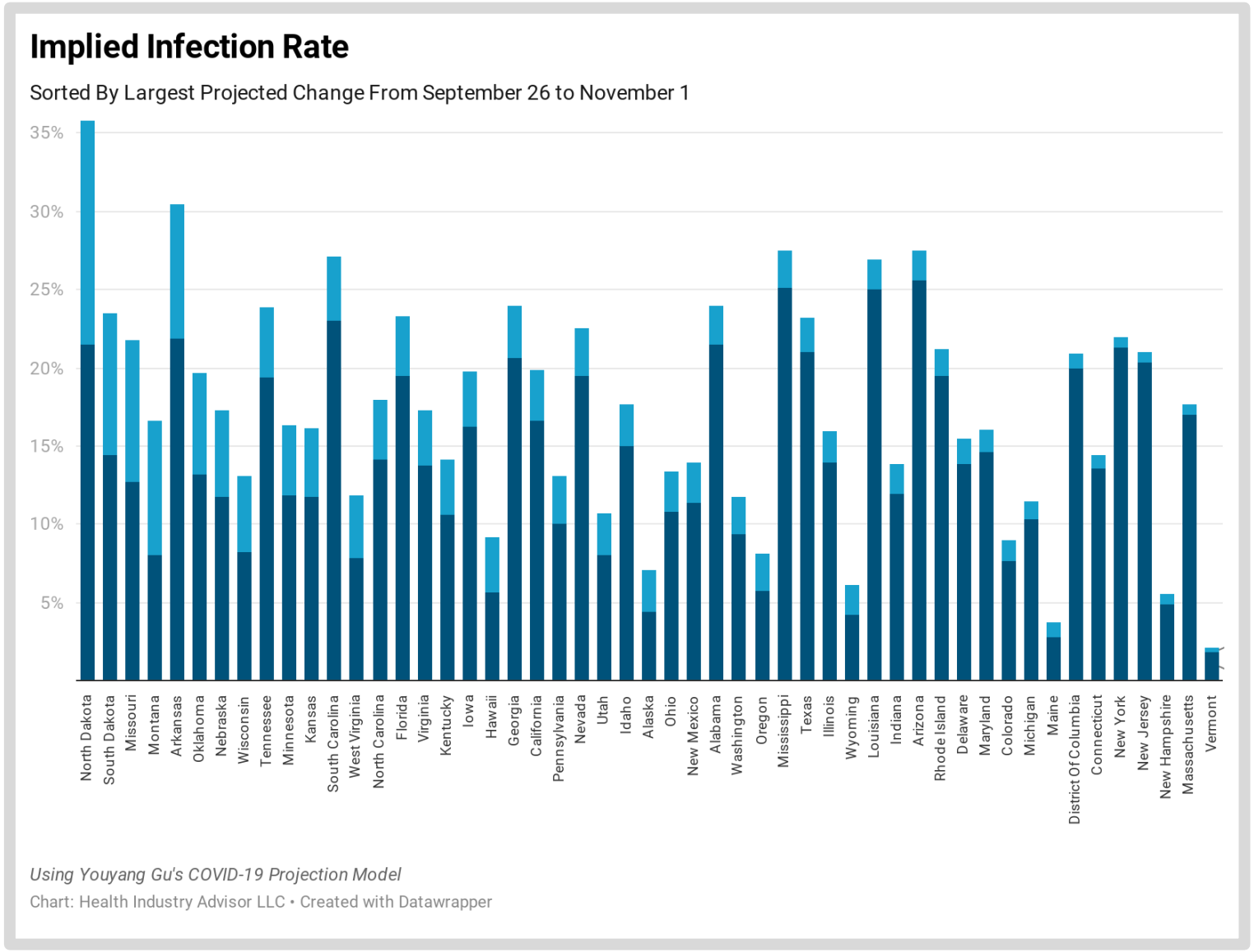
Between now and November 1, the largest increases in implied infection rates could be in:

- North Dakota
- South Dakota
- Missouri
- Montana
- Arkansas
- Alabama

the smallest in:

- Vermont
- Massachusetts
- New Hampshire
- New Jersey
- New York
- Connecticut

* Source: https://covid19-projections.com





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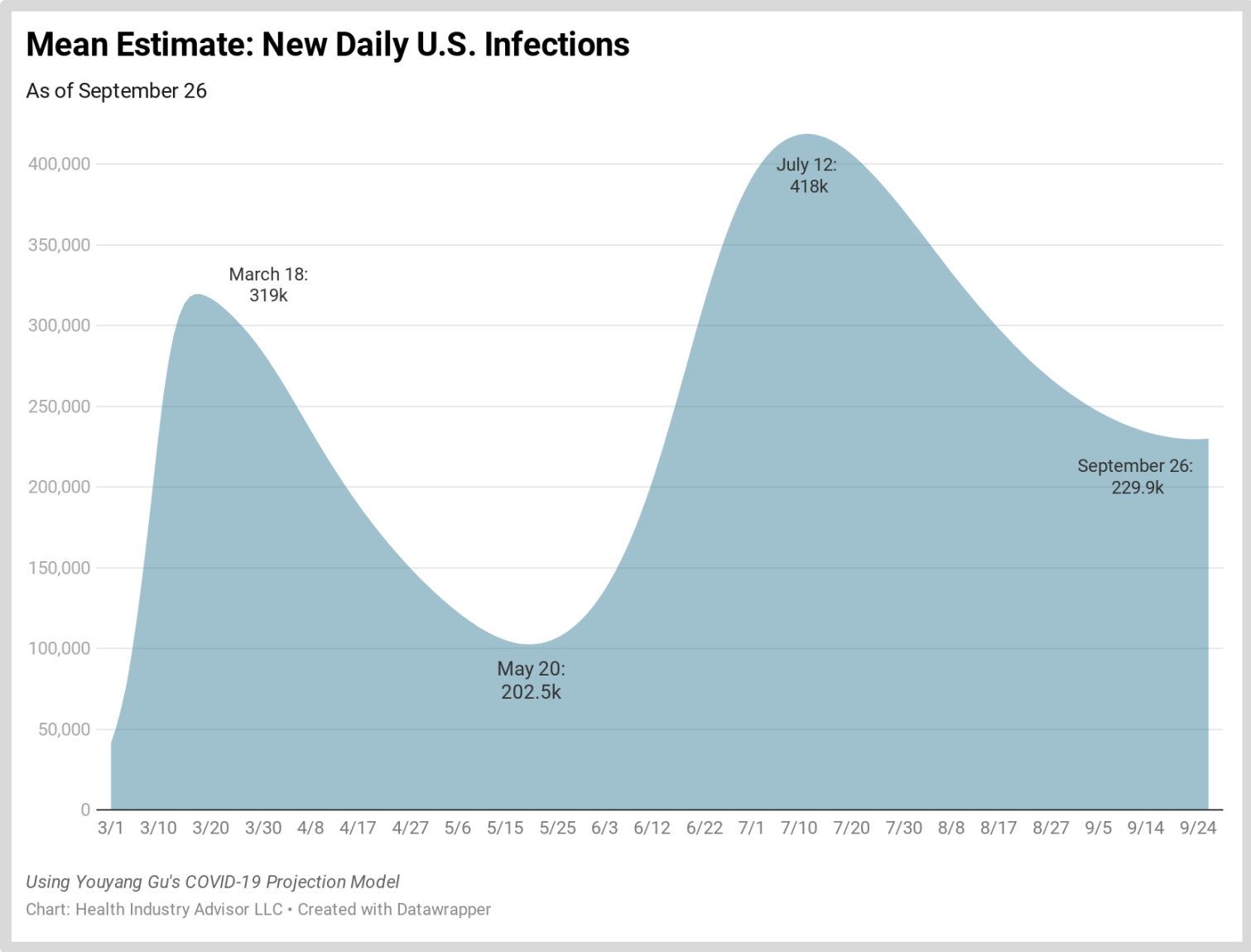
Using Gu's projection model, new daily infections peaked on July 12, then declined until bottoming-out last Wednesday

He estimates that daily infections are ~229k versus, 30-50k reported via testing

Gu projects infections to increase through November 1 (the end of his projections)

Unlike reported cases, Gu aims to capture all infections; his model also strives to capture infection date v tested date, which often lags several days

* Source: https://covid19-projections.com





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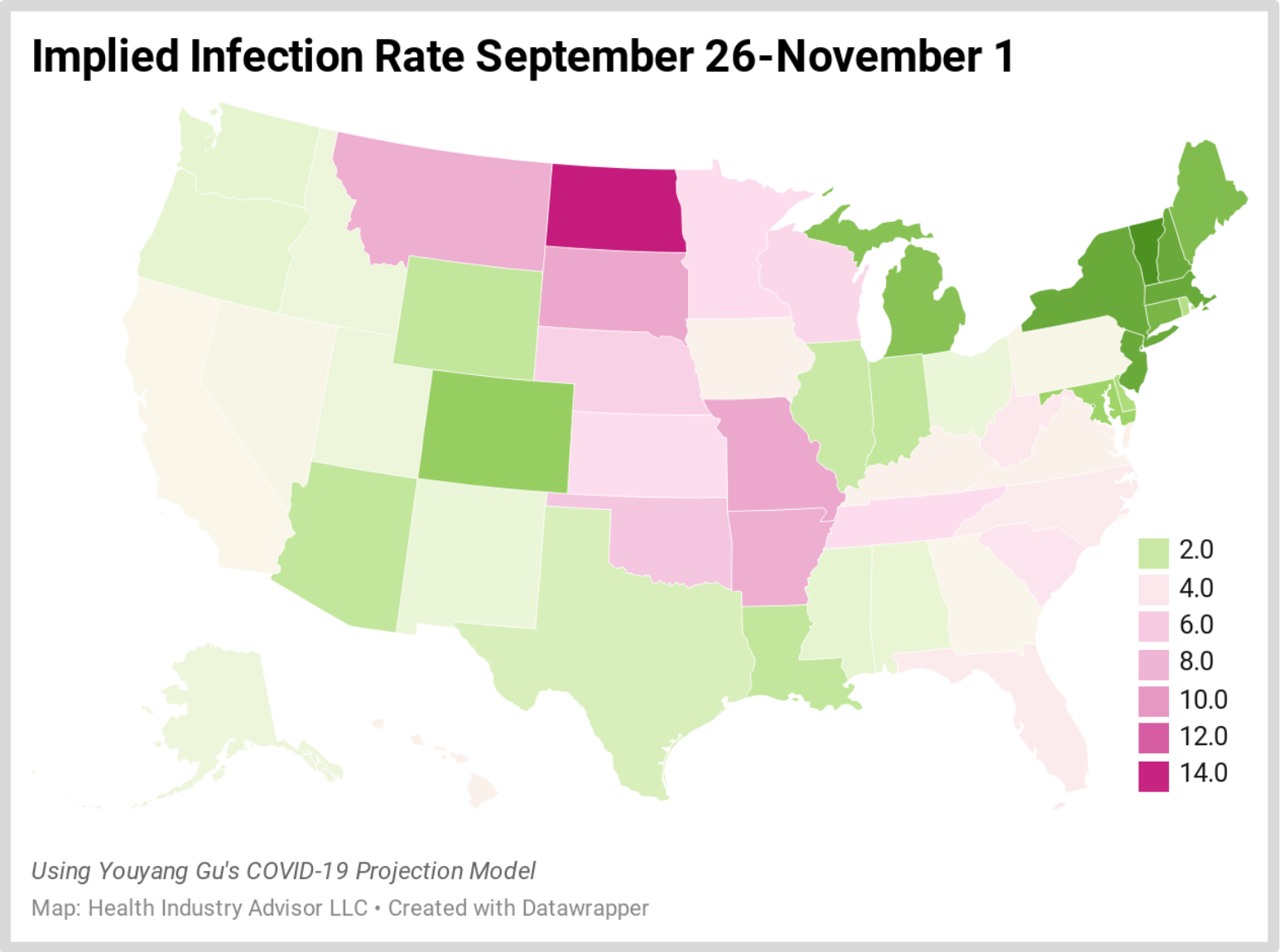
Twenty-two states may not have experience their worst day yet:

States projected to experience at least one day with higher new infections than any time to-date: Alaska, Arkansas, Hawaii, Kansas, Kentucky, Maine, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Utah, Virginia, West Virginia, Wisconsin and Wyoming

* Source: https://covid19-projections.com





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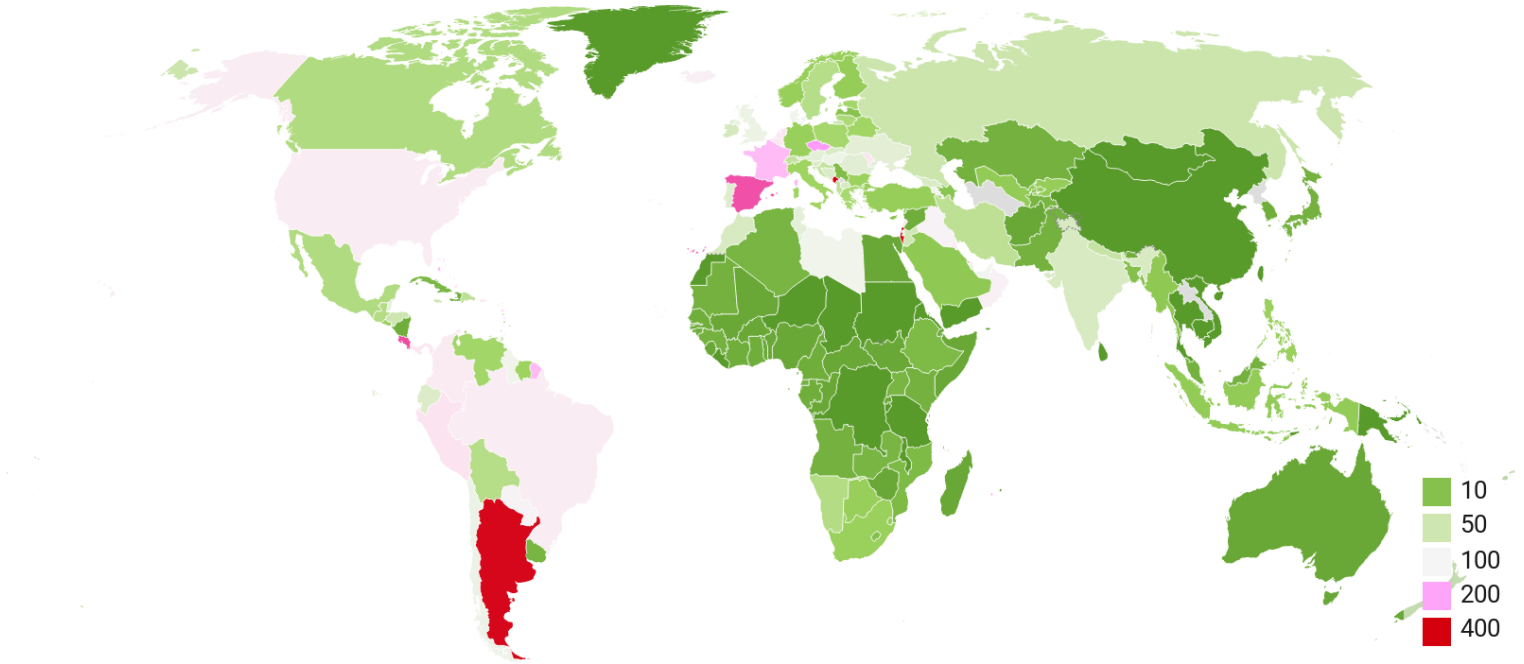
While many countries are experiencing relatively low infection rates*, South American and parts of Europe and the Middle East continue to be challenged

* - 7-day moving average basis

## New Daily Infections / 1 Million Population

Trailing 7-Day Moving Average, As of September 27




*Health Industry Advisor LLC analysis*

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





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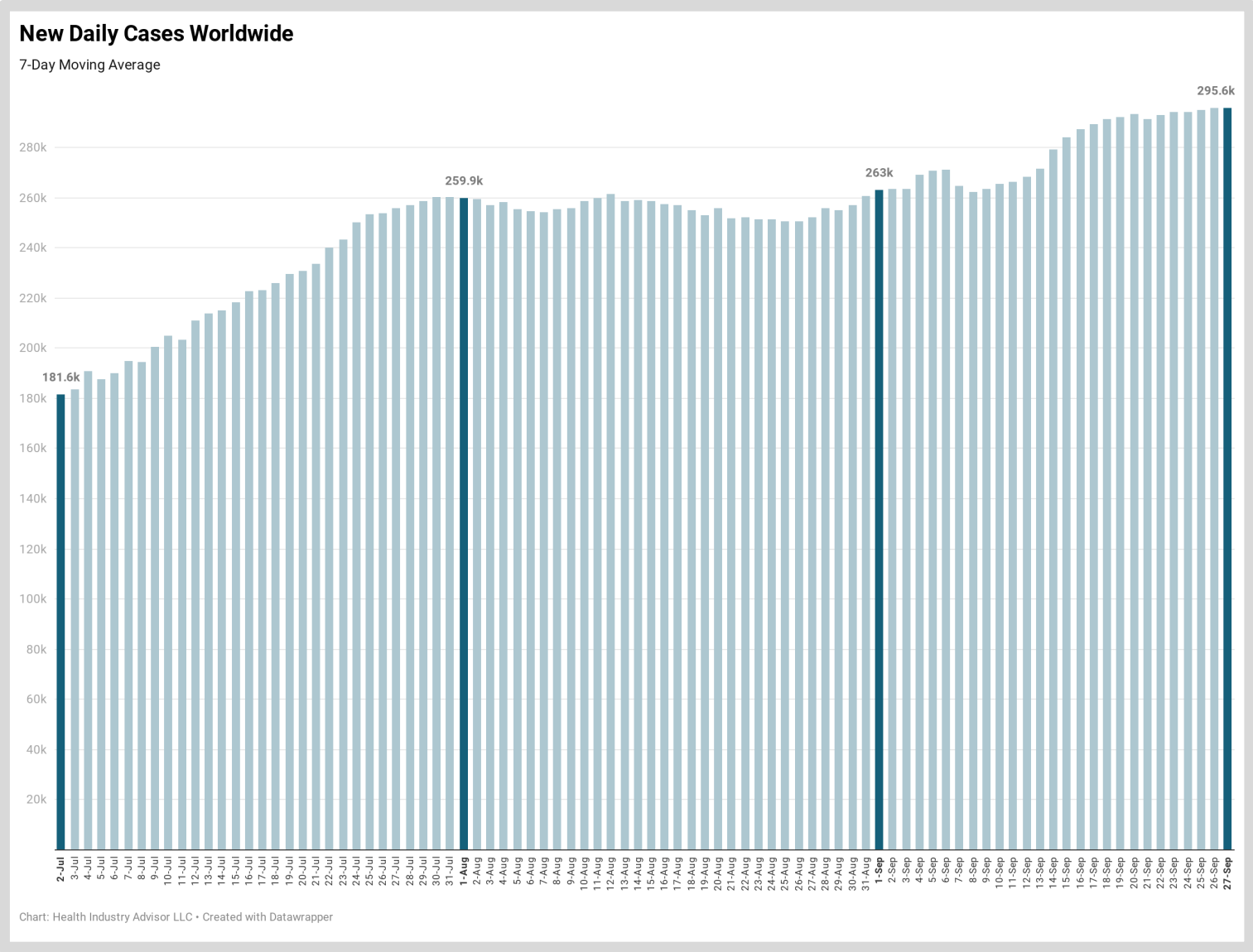
After leveling in August, new daily cases worldwide* increased throughout September

New daily cases are up 12% since the beginning of September

62% since the beginning of July

Now averaging nearly 300k new cases each day

* - 7-day moving average basis





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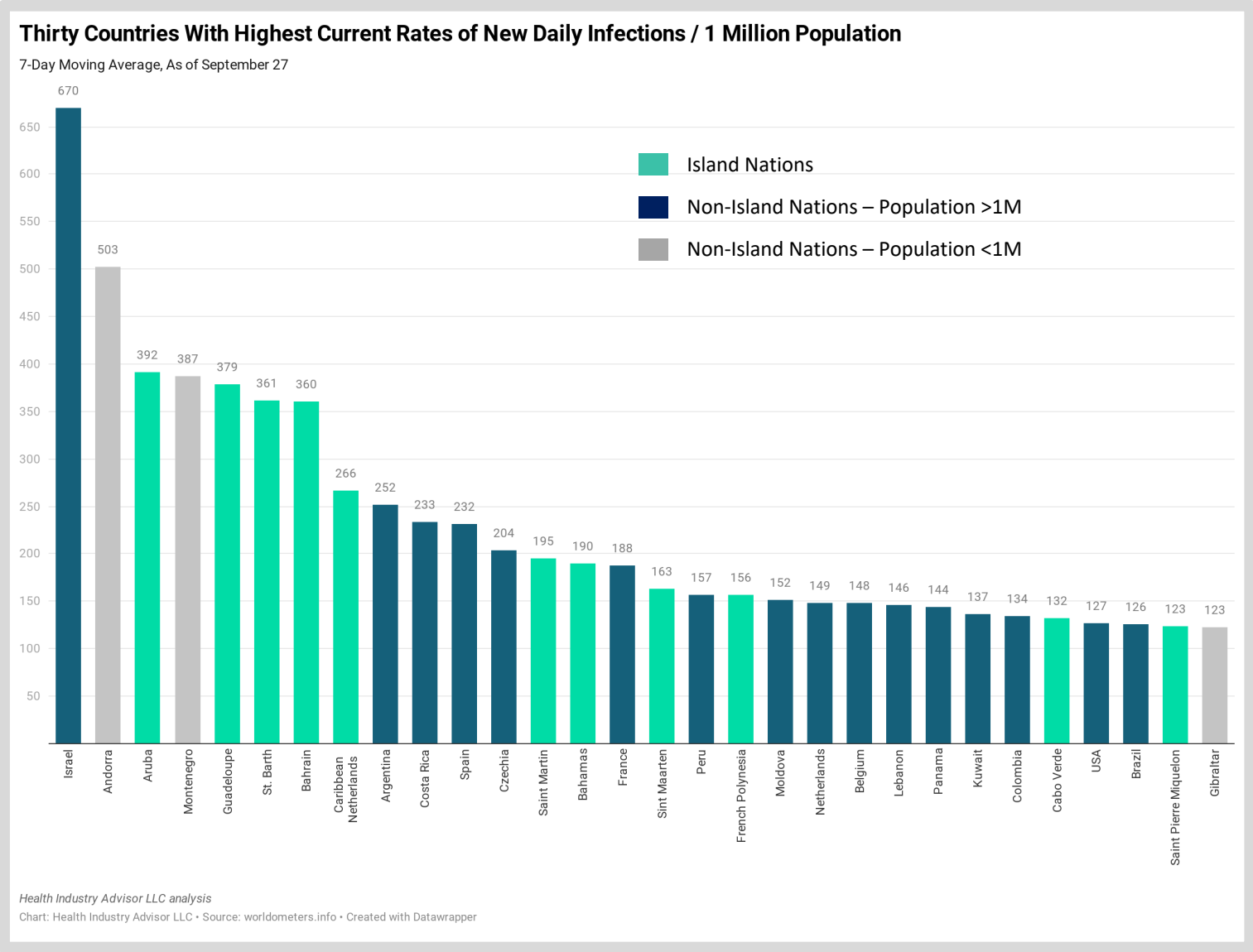
Thirty countries currently have new infection rates/1M > 120

Island nations are seeing some of the highest new daily infection rates per capita, with Aruba, Guadeloupe, St. Barth, Bahrain and Caribbean Netherlands each >250

Israel, Argentina, Costa Rica, Spain ND Czechia lead large countries, with rates > 200





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Countries with >1M population:

Eight large* countries have experienced increases in new daily infection rates / 1 million** > ~50 over the past two weeks

Israel has both the highest current infection rate and the largest increase in this rate over the past two weeks

* - Population >1 million
** - 7-day average

## Eight Countries (Plus USA) With Largest Increases in Rates of New Daily Infections / Million Past Two Weeks: Countries > 1M Population

7-Day Moving Average, As of September 27

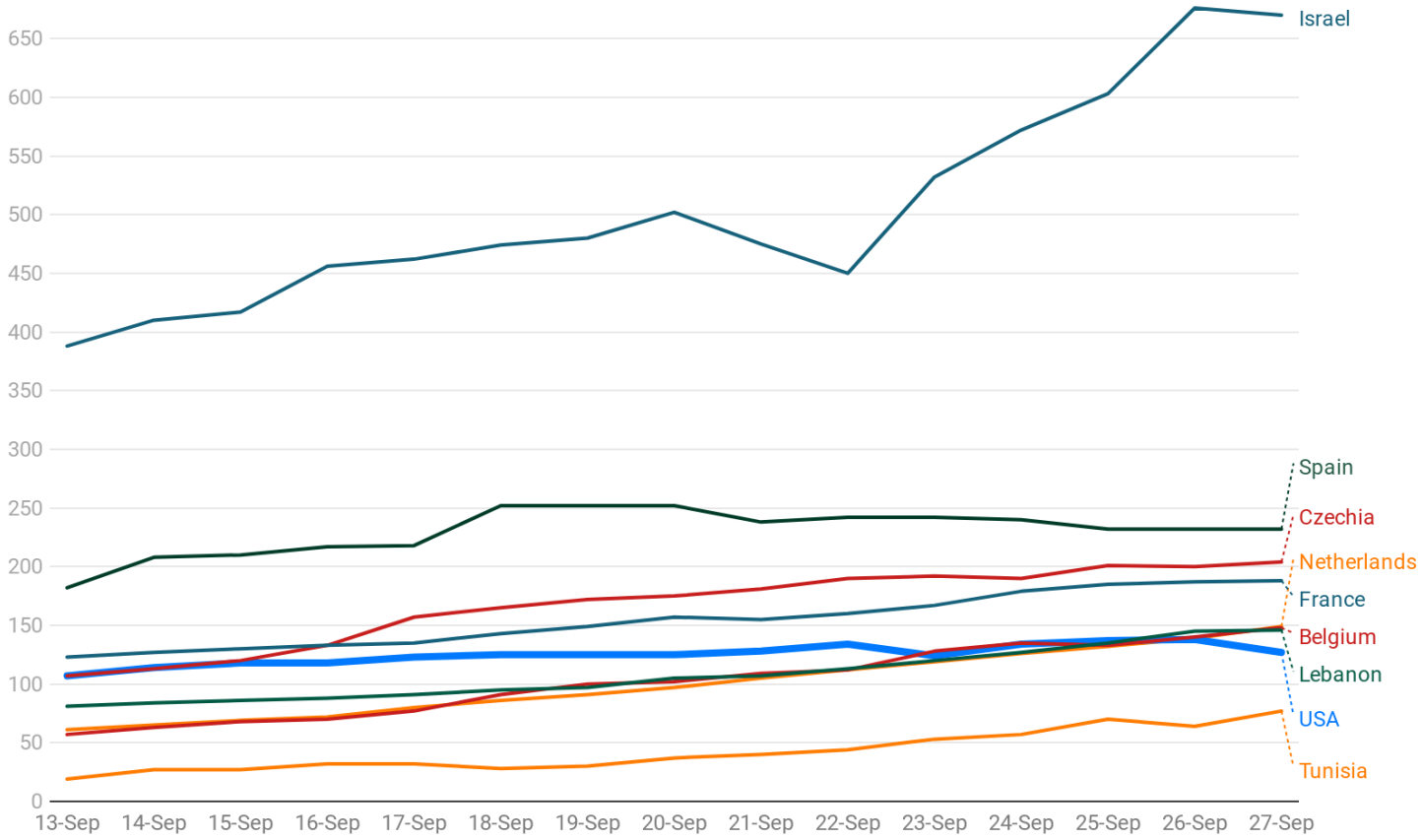


Chart: Health Industry Advisor LLC • Created with Datawrapper







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Infection rates* are highest in the North and South Dakota, Wisconsin, Utah and Iowa (each >275/M per day

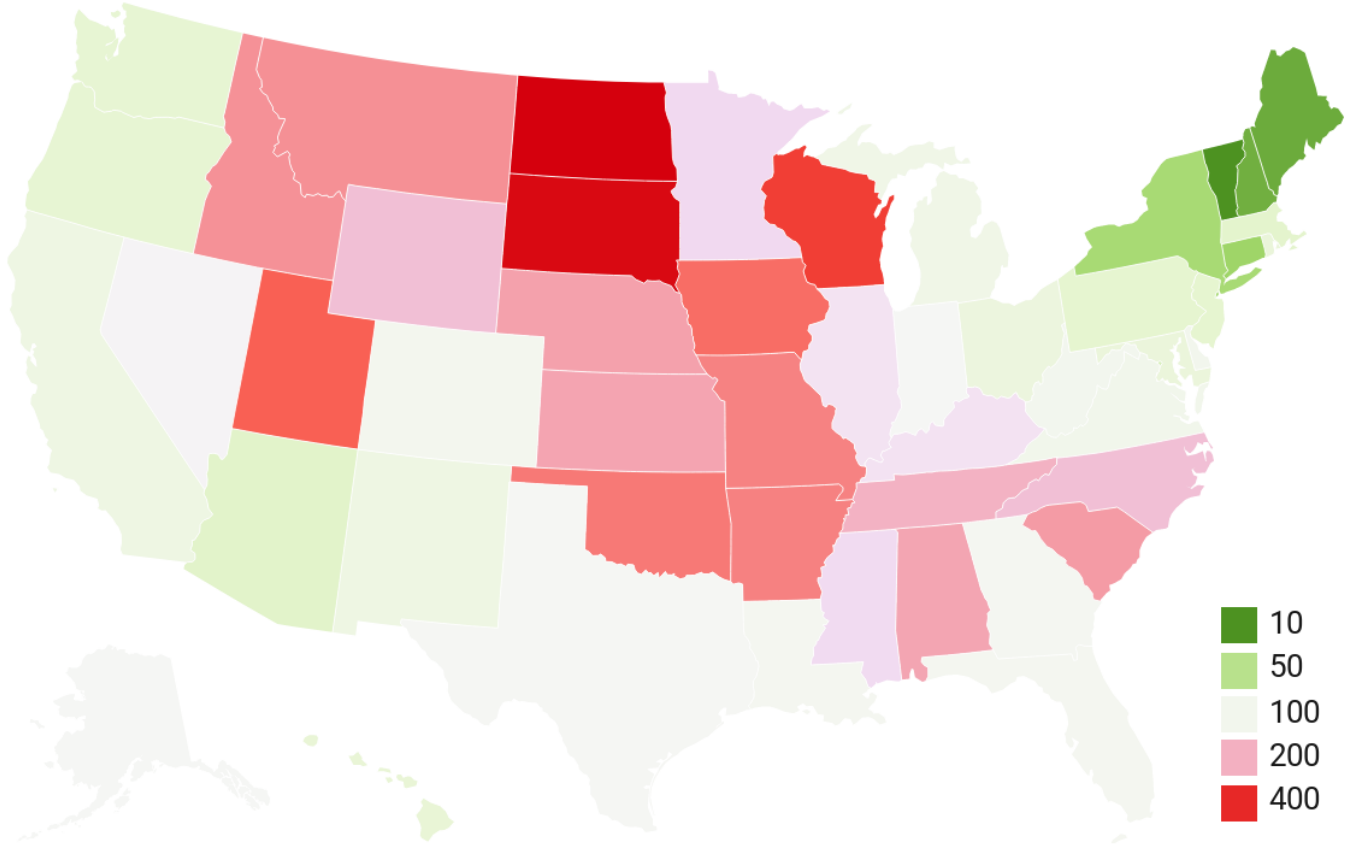
Nineteen states and the District of Columbia experienced rates < 100

Vermont's rate has the lowest rate: 6 new daily infections per million; Maine and New Hampshire are the next lowest, at 22 and 24 respectively

* - 7-day moving average basis

## New Daily Infections Per 1 Million Population

Trailing 7-Day Moving Average, As of September 27




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





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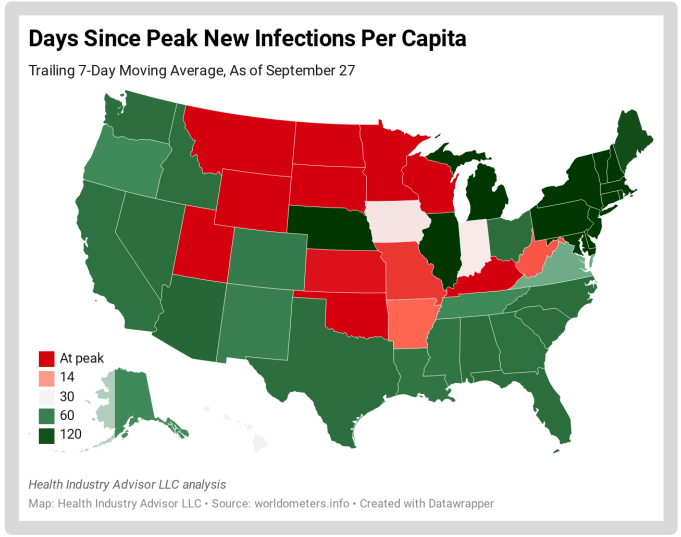
Several states in the Central and Mountain time zones are at or near their highest new infection rates* – in terms of both % of peak and days since peak

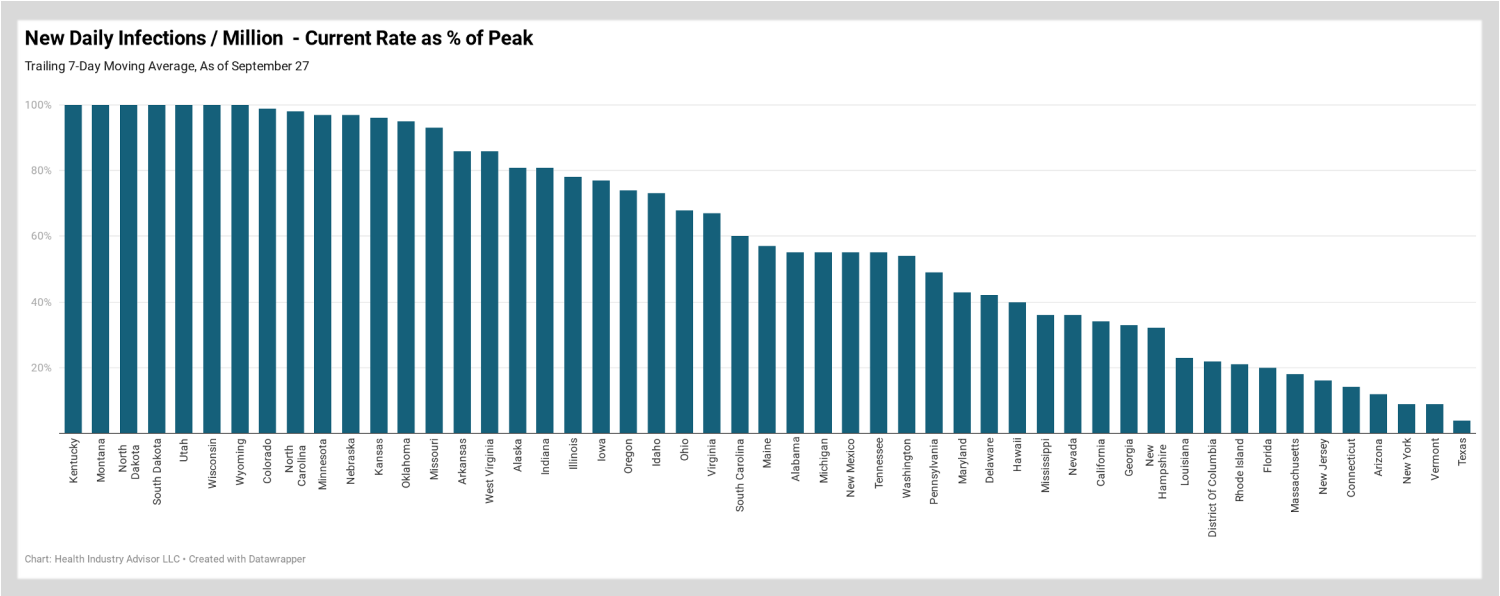
Nebraska's current rate is close to its high set on May 5

North Carolina is close to its high set on July 18

Colorado is close to its high set on July 28

* - 7-day moving average basis





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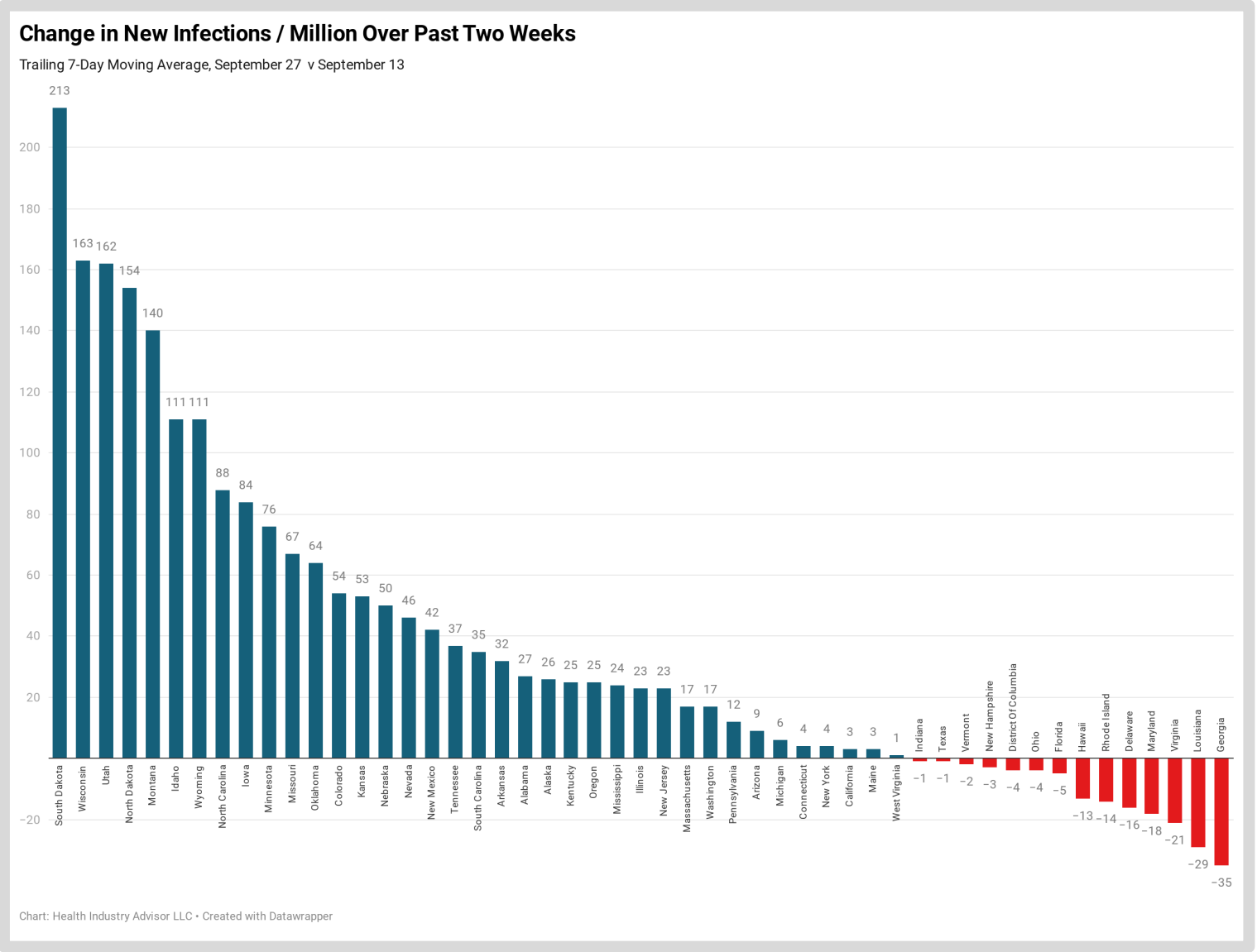
South Dakota, Wisconsin Utah, North Dakota and Montana have experienced sharp increases in new infections per capita* over the past two weeks,

Georgi, Louisiana and Virginia experienced the steepest declines in this rate

* - 7-day moving average basis





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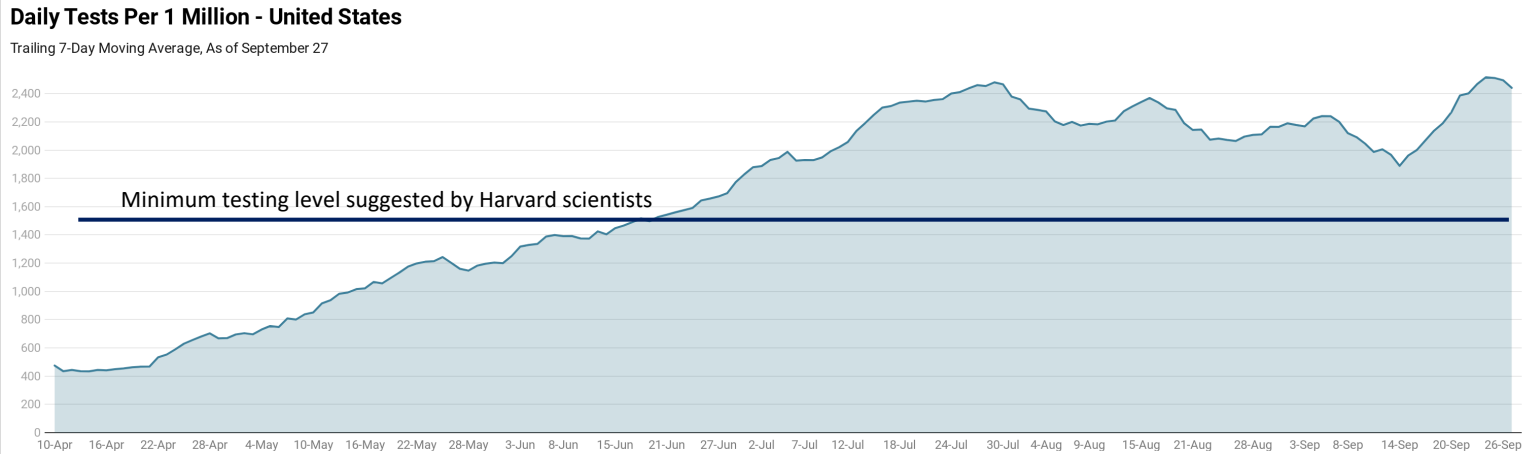
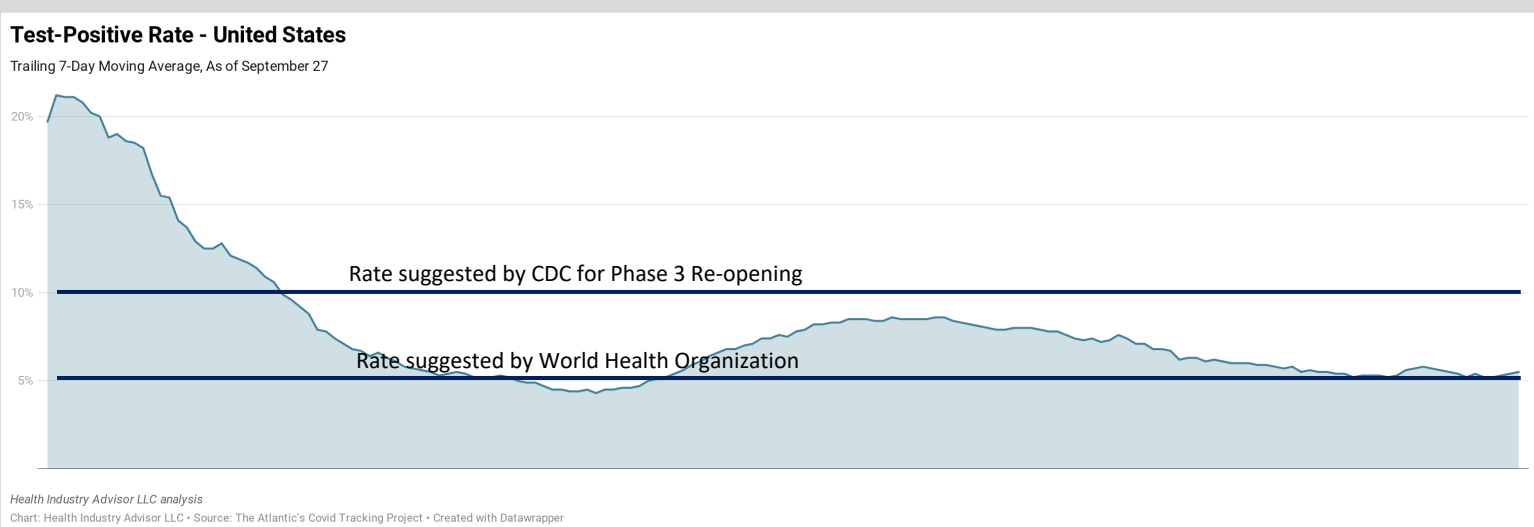
7-day average daily test volume as of yesterday was up ~8% week-over-week

The test-positive rate was 5.1% on Saturday and 5.0% on Sunday; the 7-day average test-positive rate stands at 5.5%



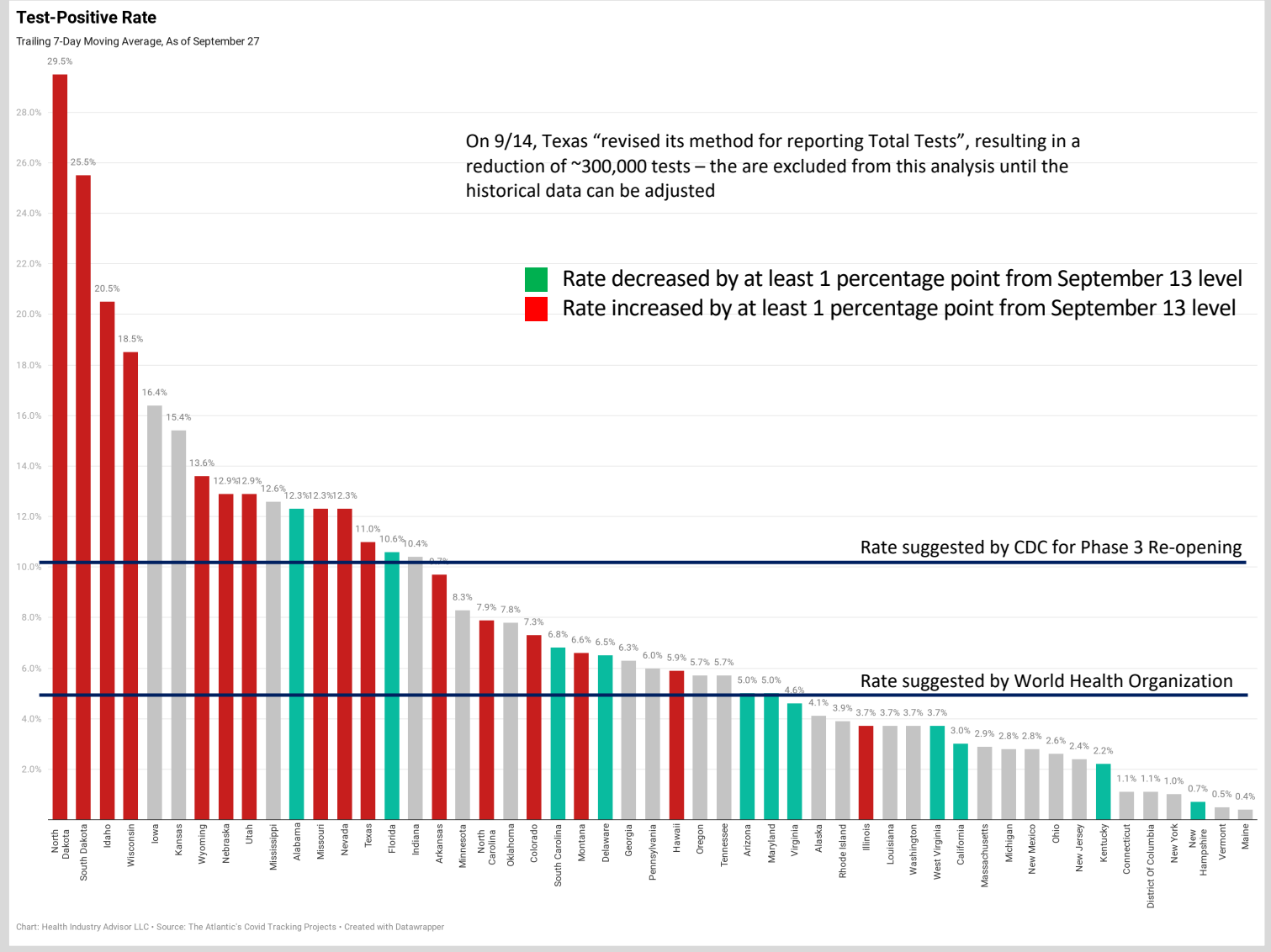



Sixteen states reported test-positive rates* for the past 7 days higher than the CDC-target for Phase 3 re-openings; of these, eleven experienced rate increases of >1% dung the past two weeks

Another thirteen states reported rates above the stricter WHO-target; five of these experienced rate increases >1% in the past two weeks

North and South Dakota, Idaho and Wisconsin have the highest rates, and they increased over the past two weeks

* - 7-day moving average basis





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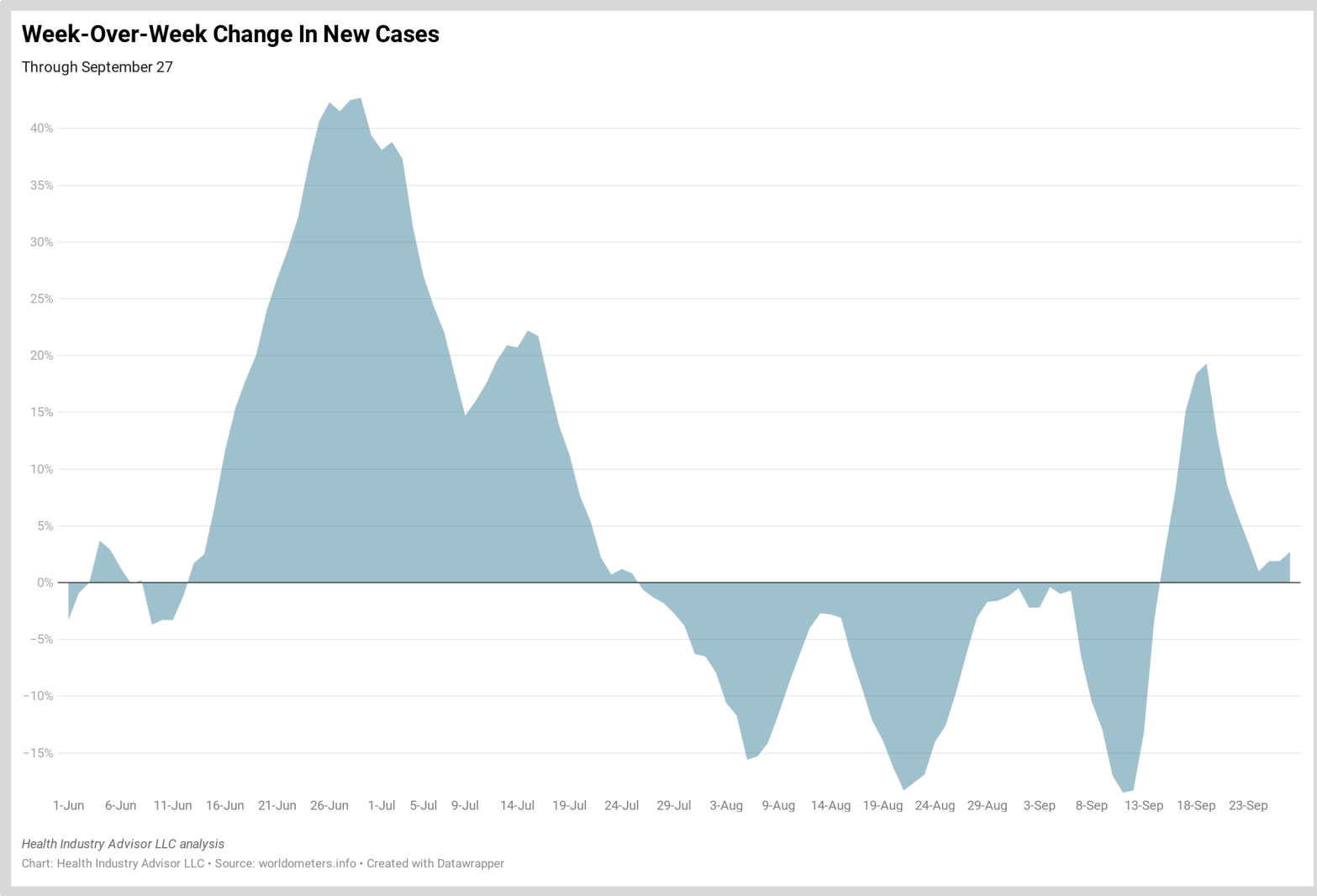
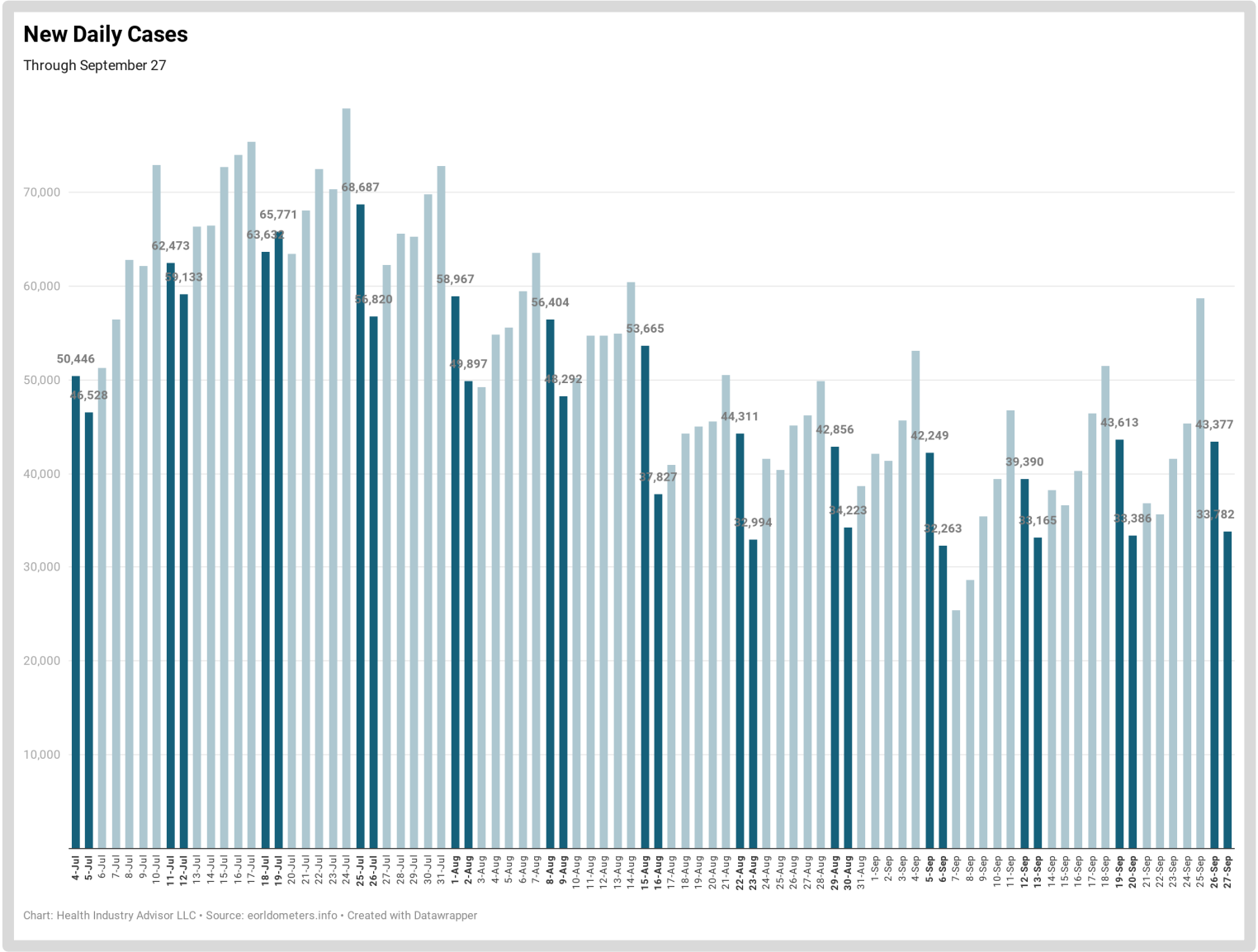
Following a seven-week period of decline, new cases began increasing on a week-over-week basis on September 15

Yesterday, this rate was up 2.7% on a week-over-week basis



There were slightly more new cases this past weekend each of the past four weekends – although the margin is small relative to last weekend and versus four weeks ago

These new cases remain sharply lower than each weekend from June 27-28 to August 15-16





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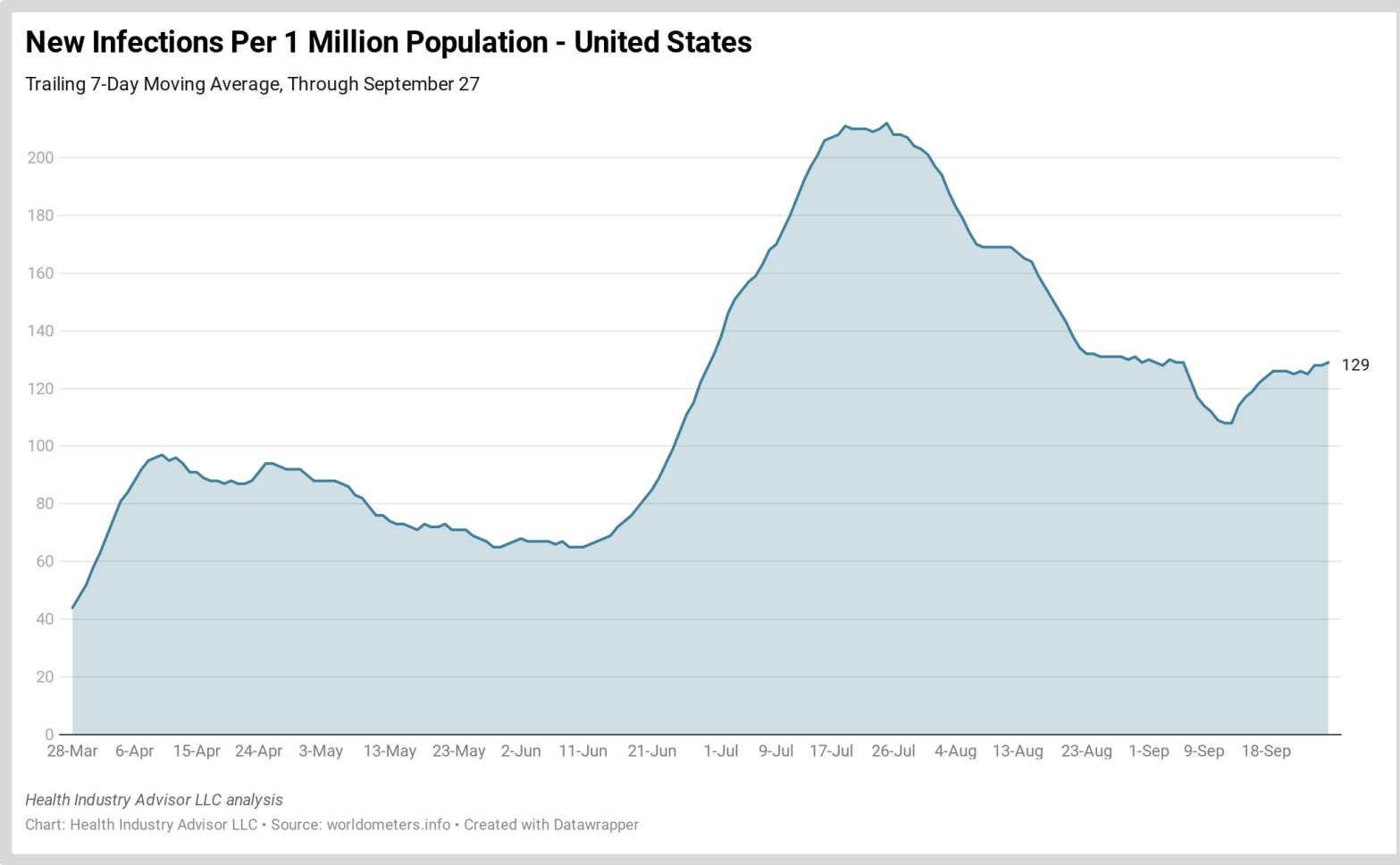
New infections per capita in the U.S.* bottomed-out on September 12

The current rate has narrowly increased over the past eight days

* - 7-day moving average basis

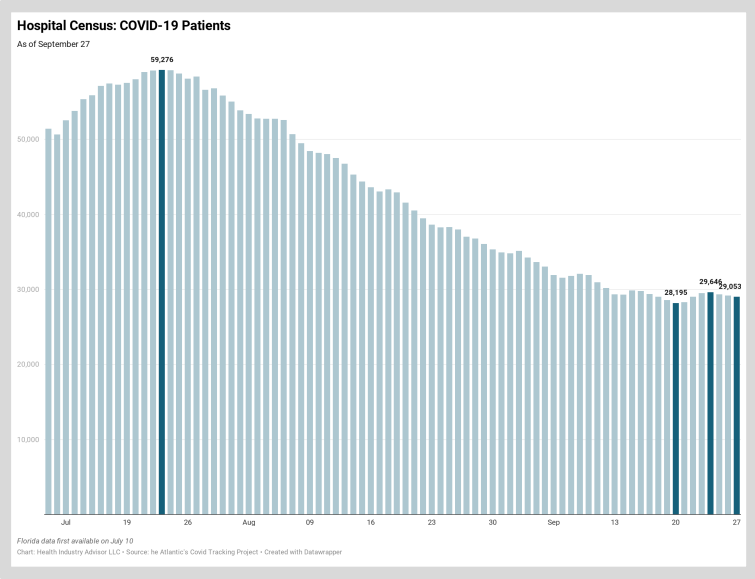


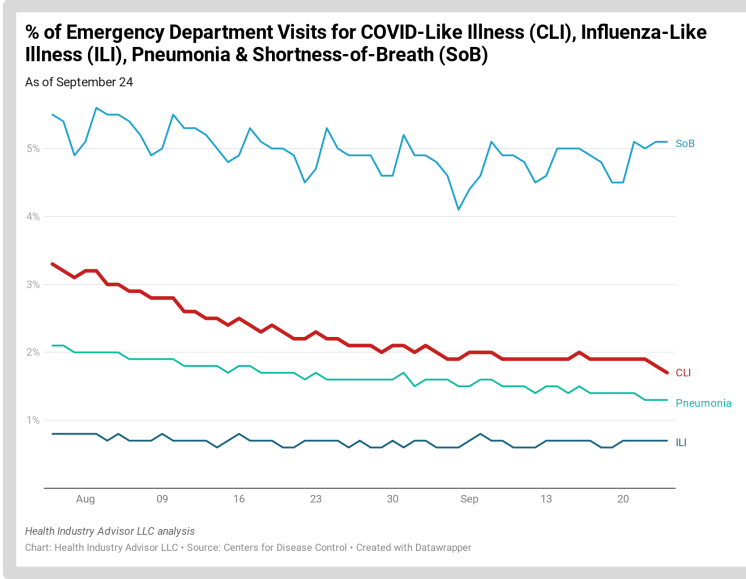
Inpatient and ICU COVID-19 census resumed their declines, after briefly increasing late last week

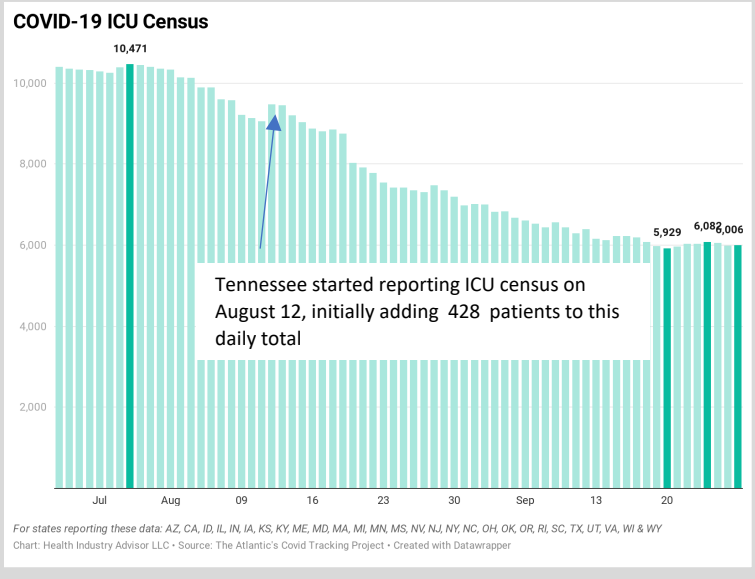
Ventilator use continued to decline as a % of patients

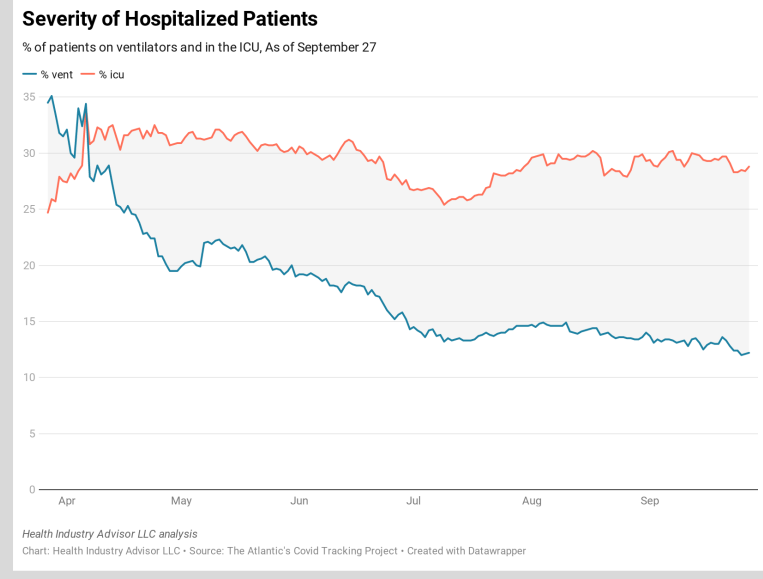
ER visits for COVID-19-like illness, pneumonia and shortness-of-breath as a % of all ER visits each have declined since early July

No discernable start yet to the impact of flu season



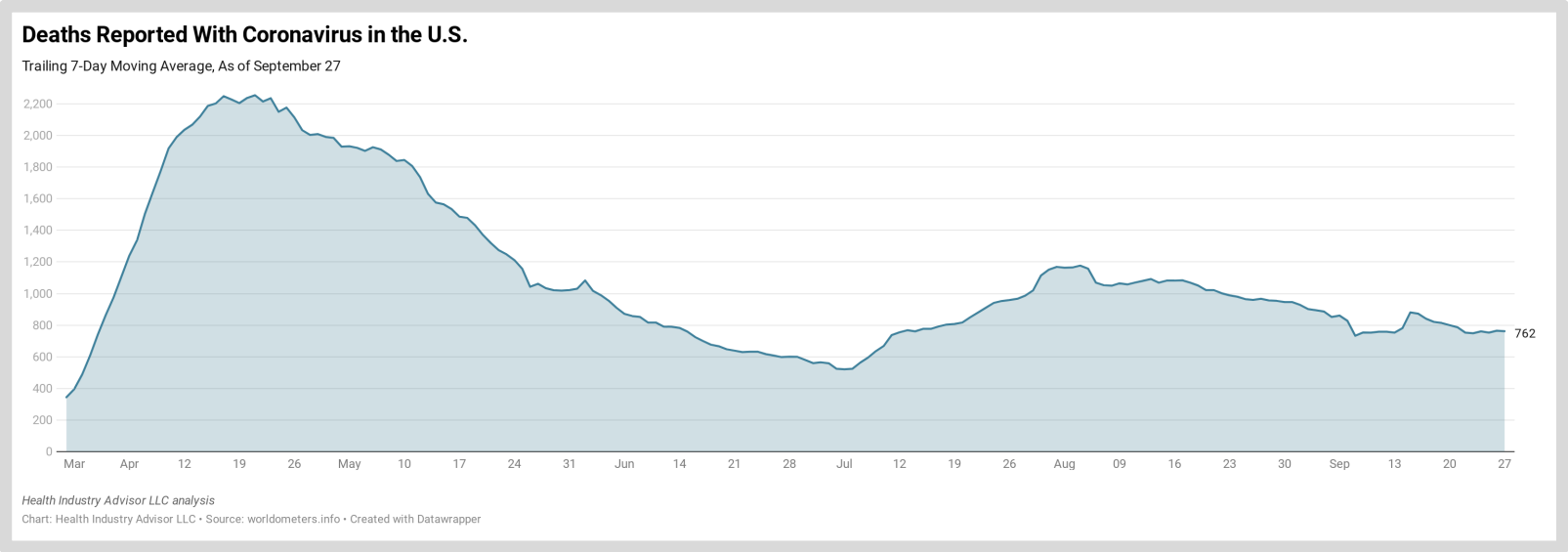



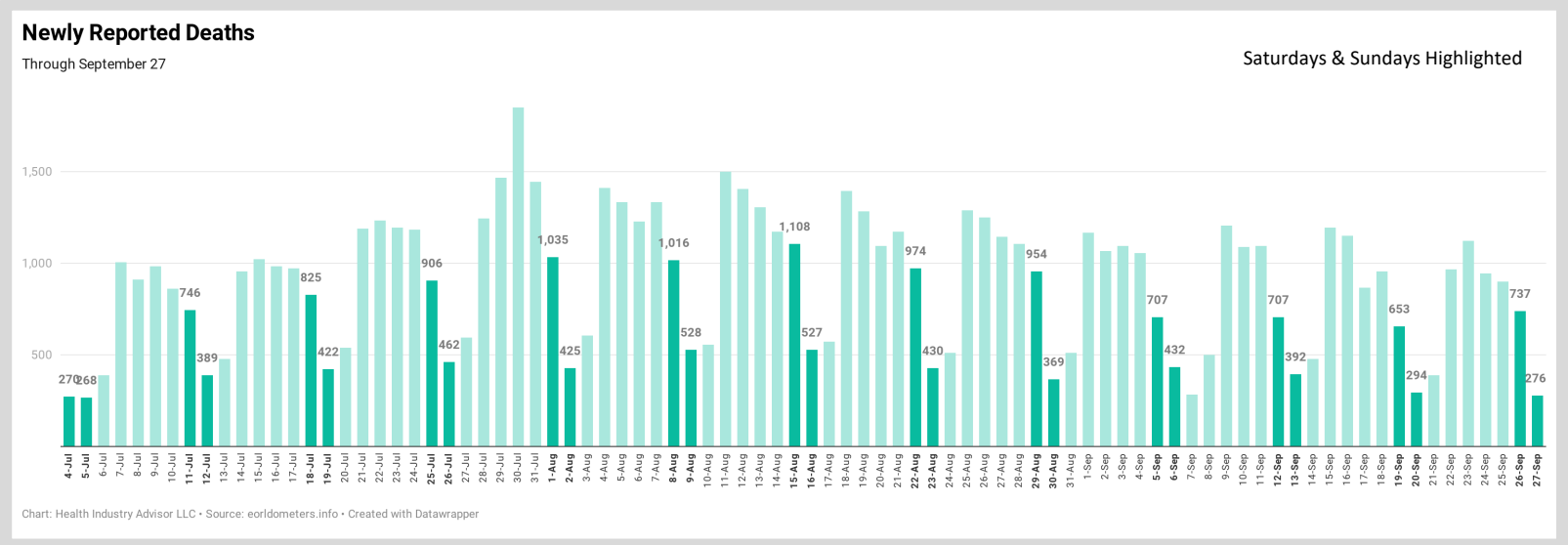



7-day average daily deaths has been stable over the past week

Although there were more deaths reported this past weekend than the prior weekend, it has been since the Independence Day weekend that there were as few deaths reported as these past two weekends



# 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