



The COVID-19 Crisis

Update September 24, 2020

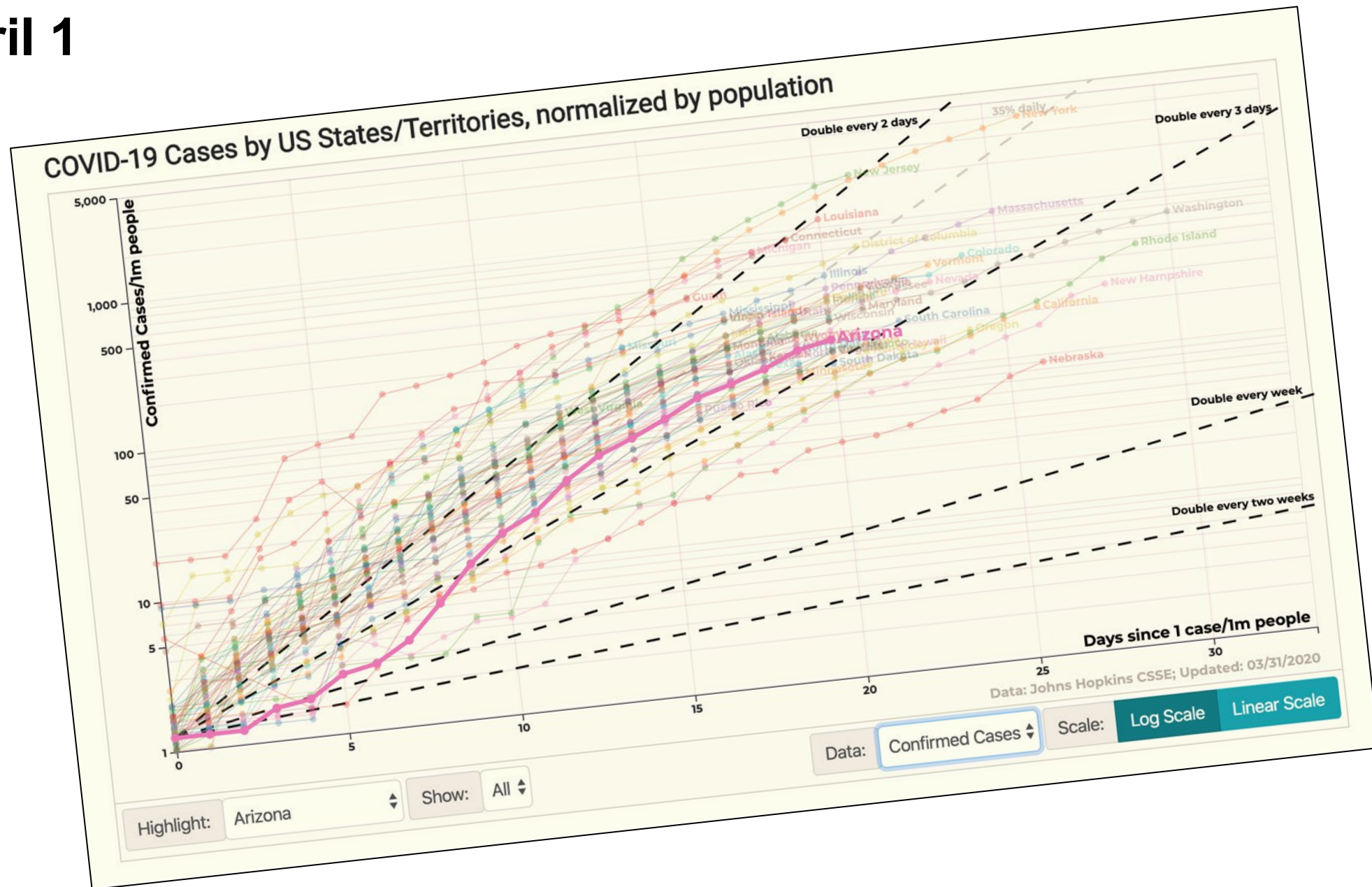
A photograph of a man with grey hair, glasses, and a beard, wearing a green button-down shirt. He is smiling and pointing his right hand towards a rock formation. The background is a layered rock wall with various shades of tan, brown, and grey.

CAVEAT!

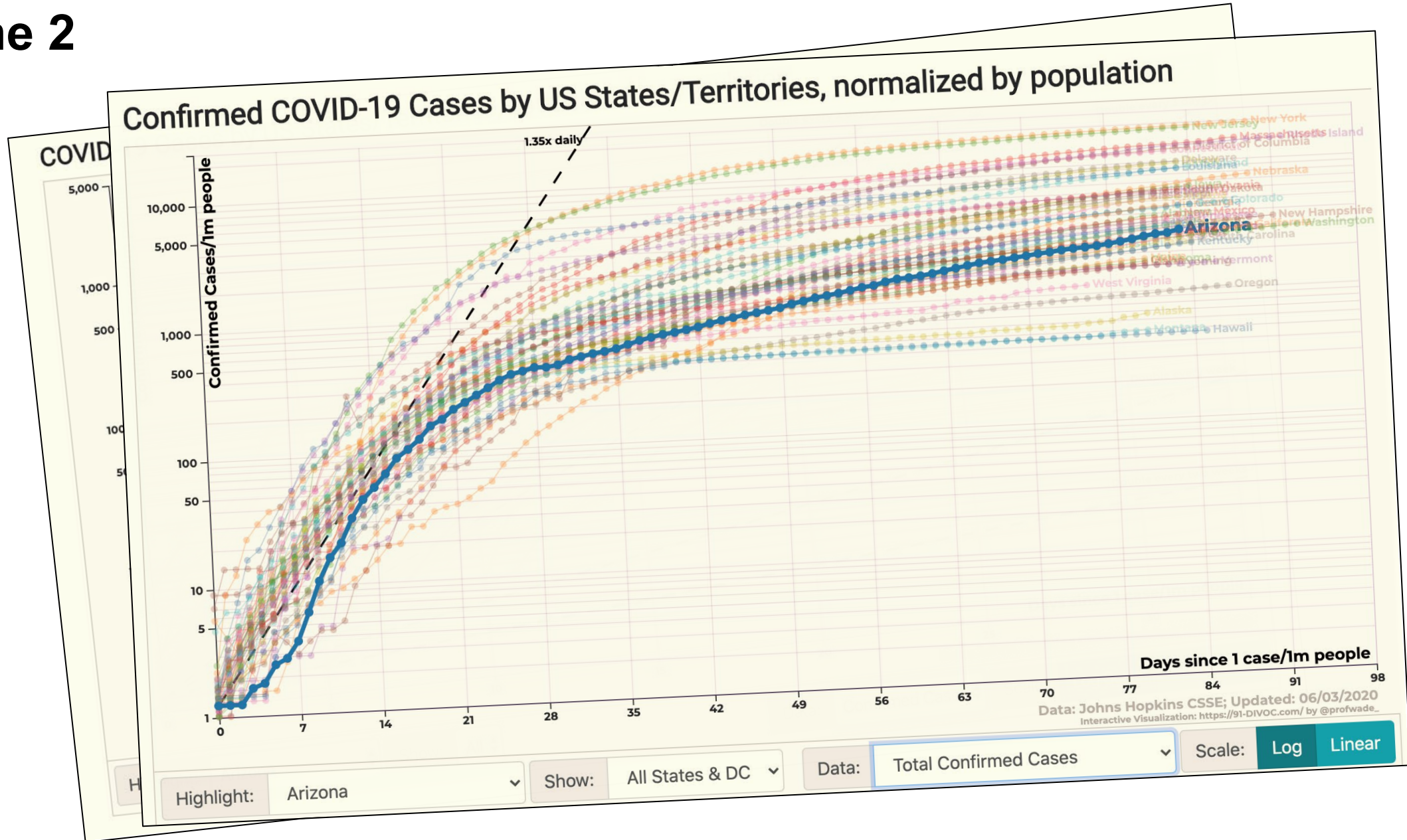
**I am not THAT kind of doctor.
I study rocks.**

**Ariel D. Anbar
Professor
School of Earth and Space Exploration
School of Molecular Sciences
Arizona State University**

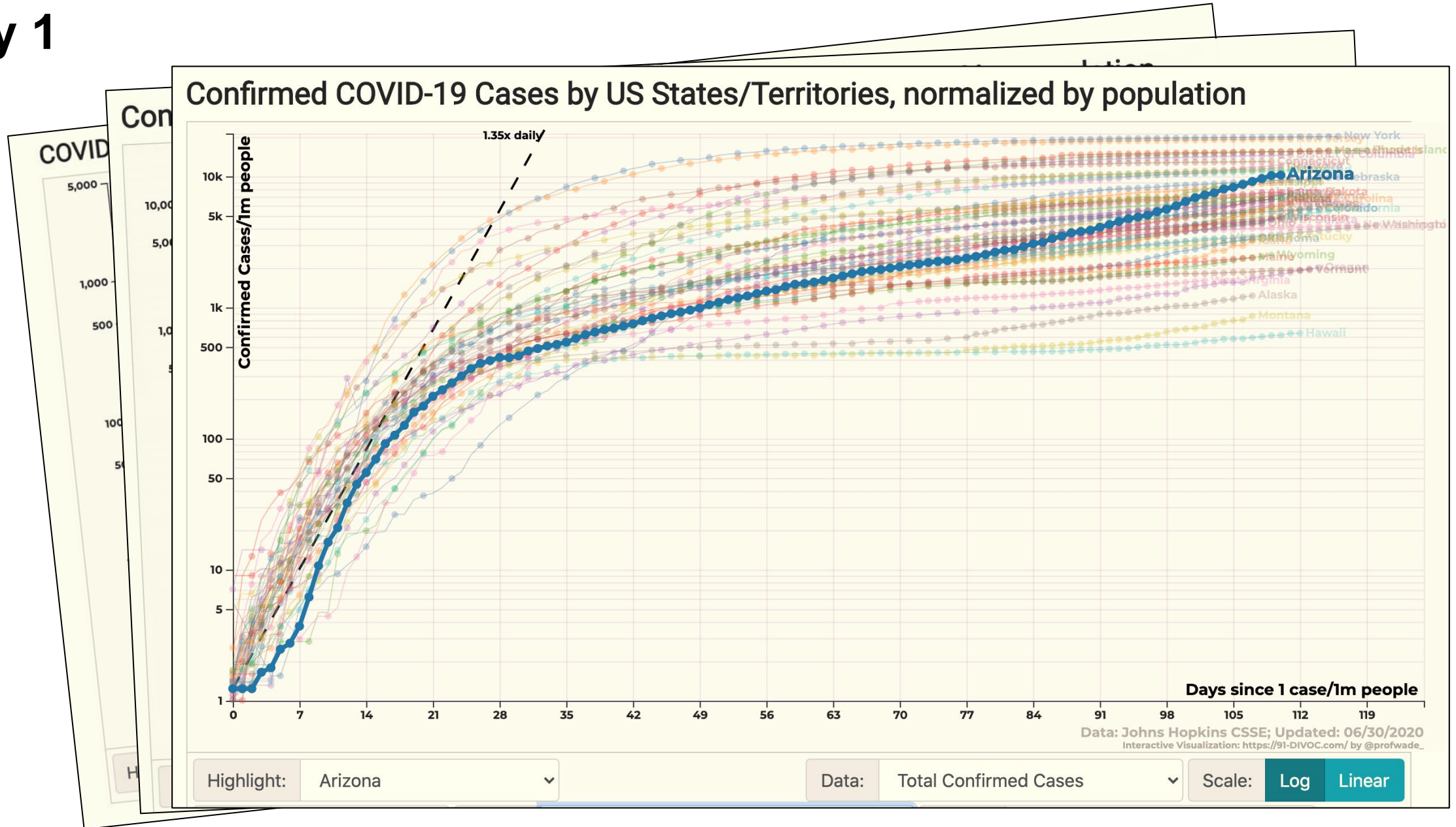
April 1



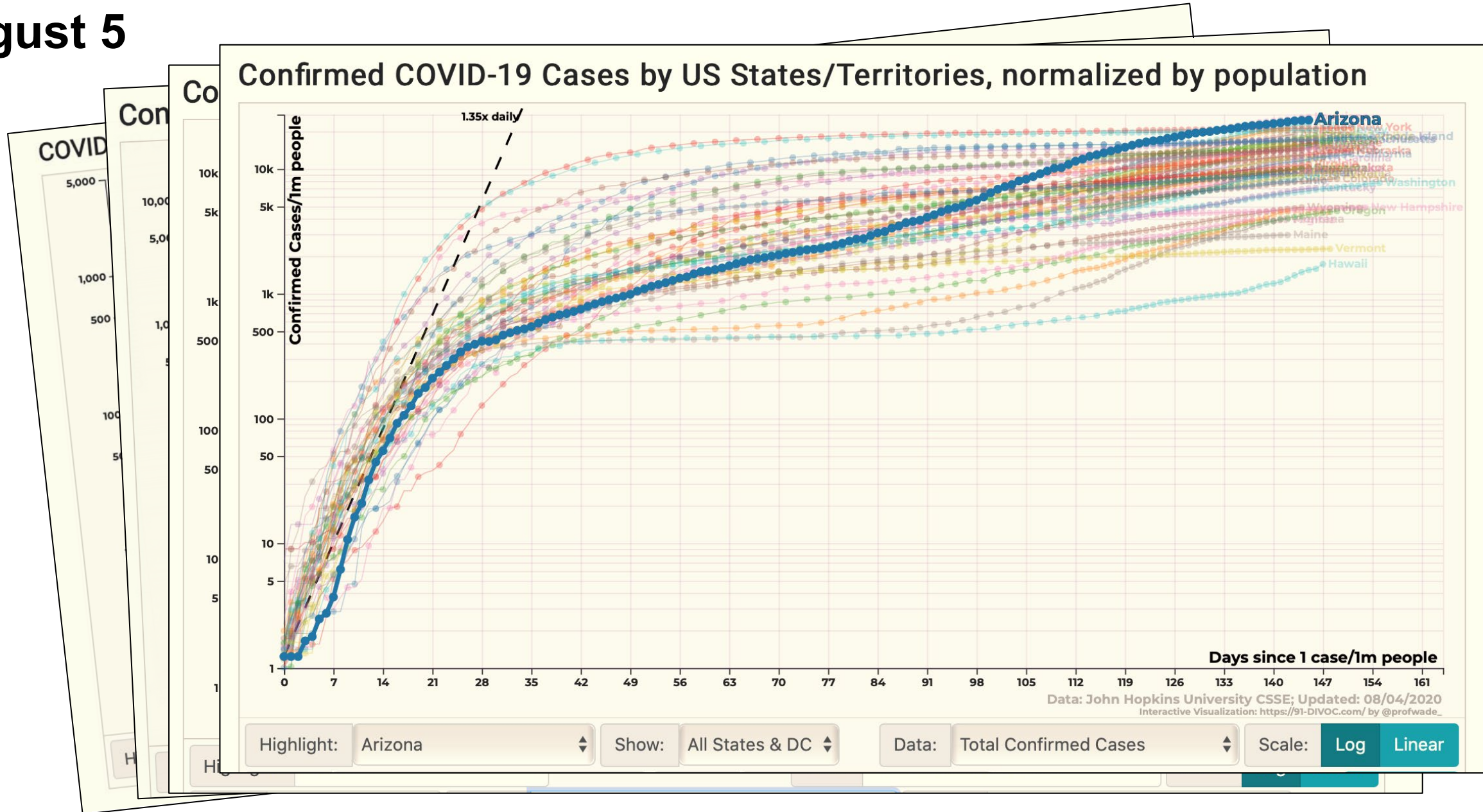
June 2



July 1

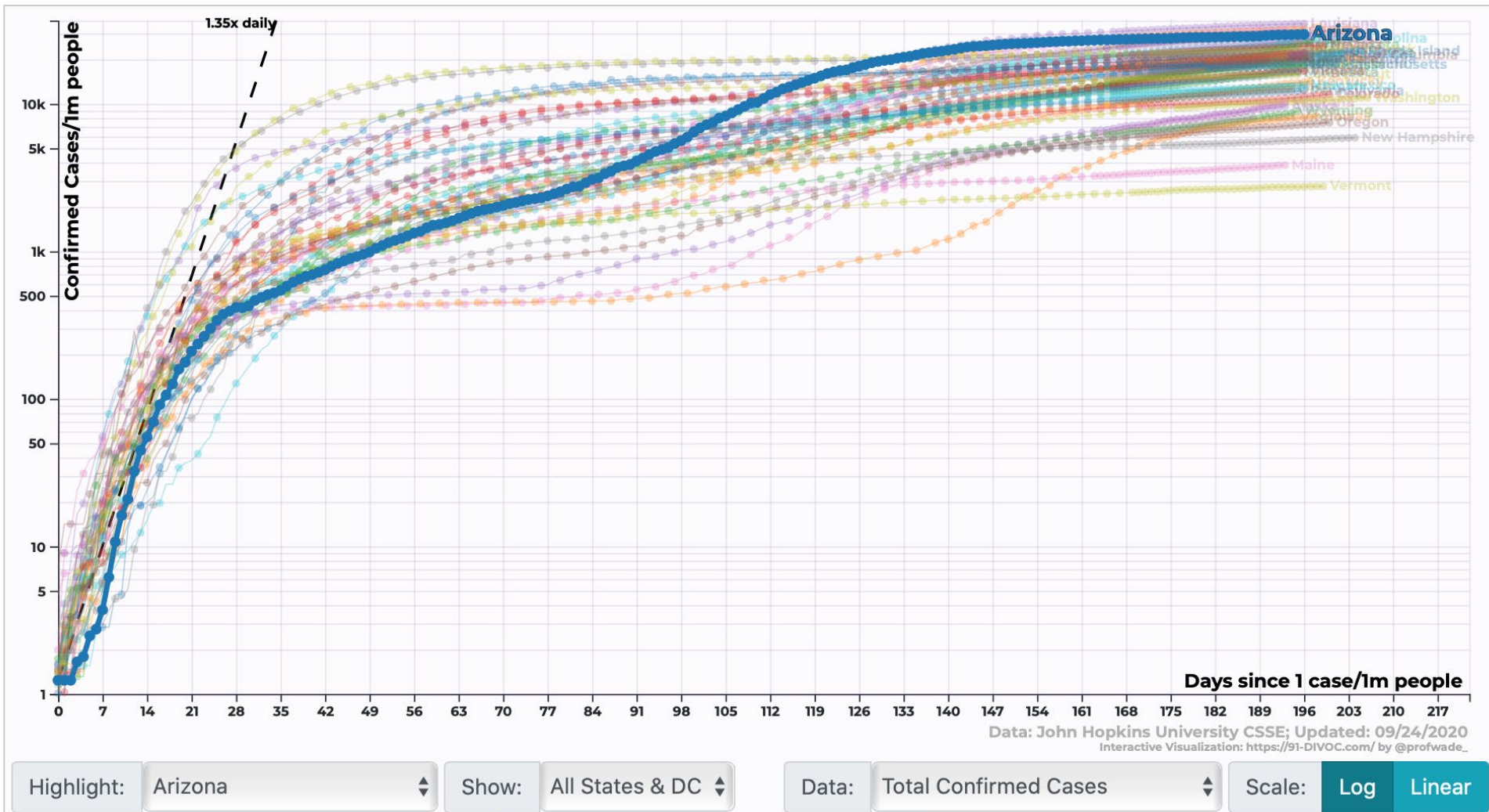


August 5



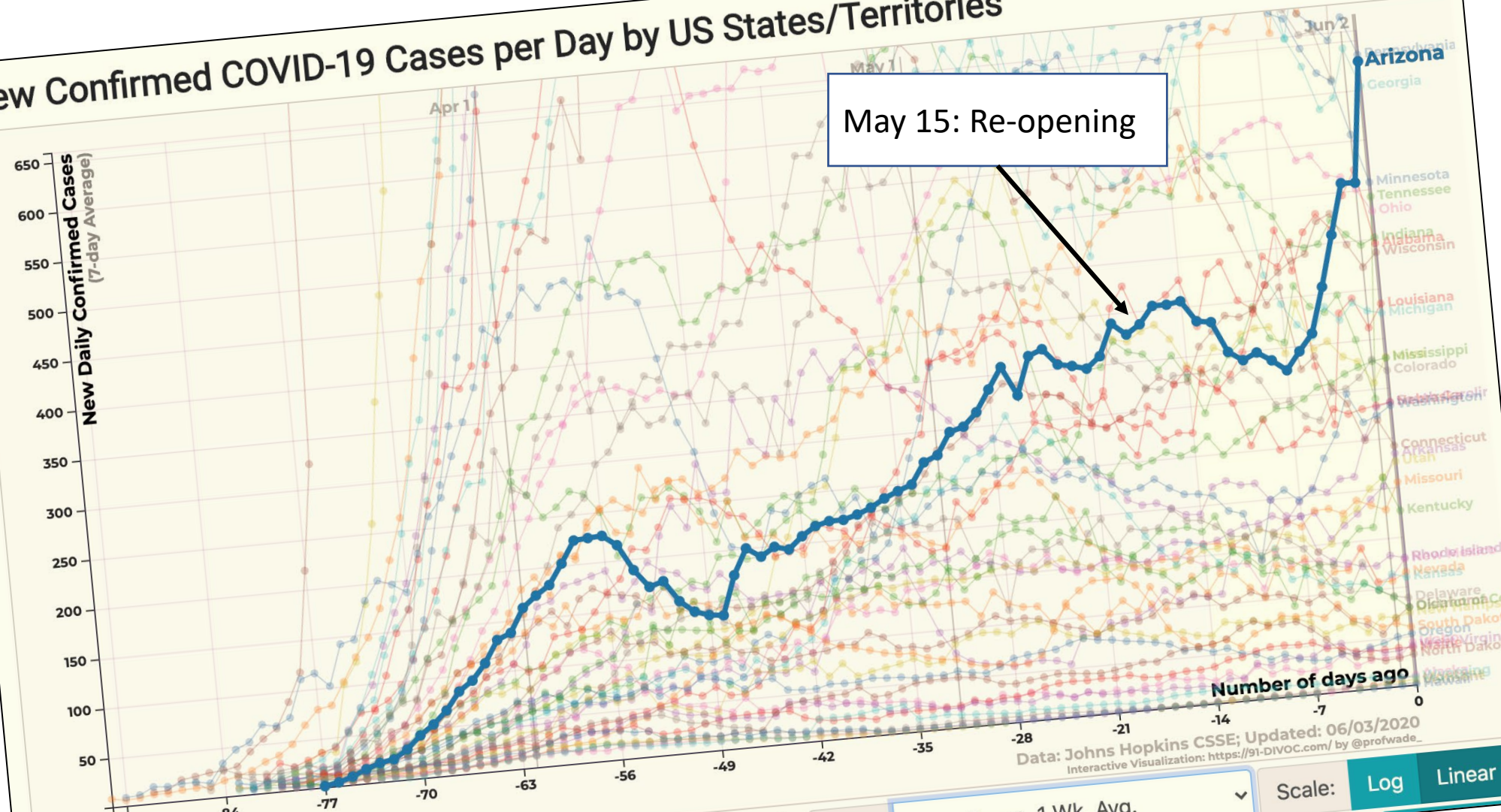
Sept 23

Confirmed COVID-19 Cases by US States/Territories, normalized by population



June 2

New Confirmed COVID-19 Cases per Day by US States/Territories



May 15: Re-opening

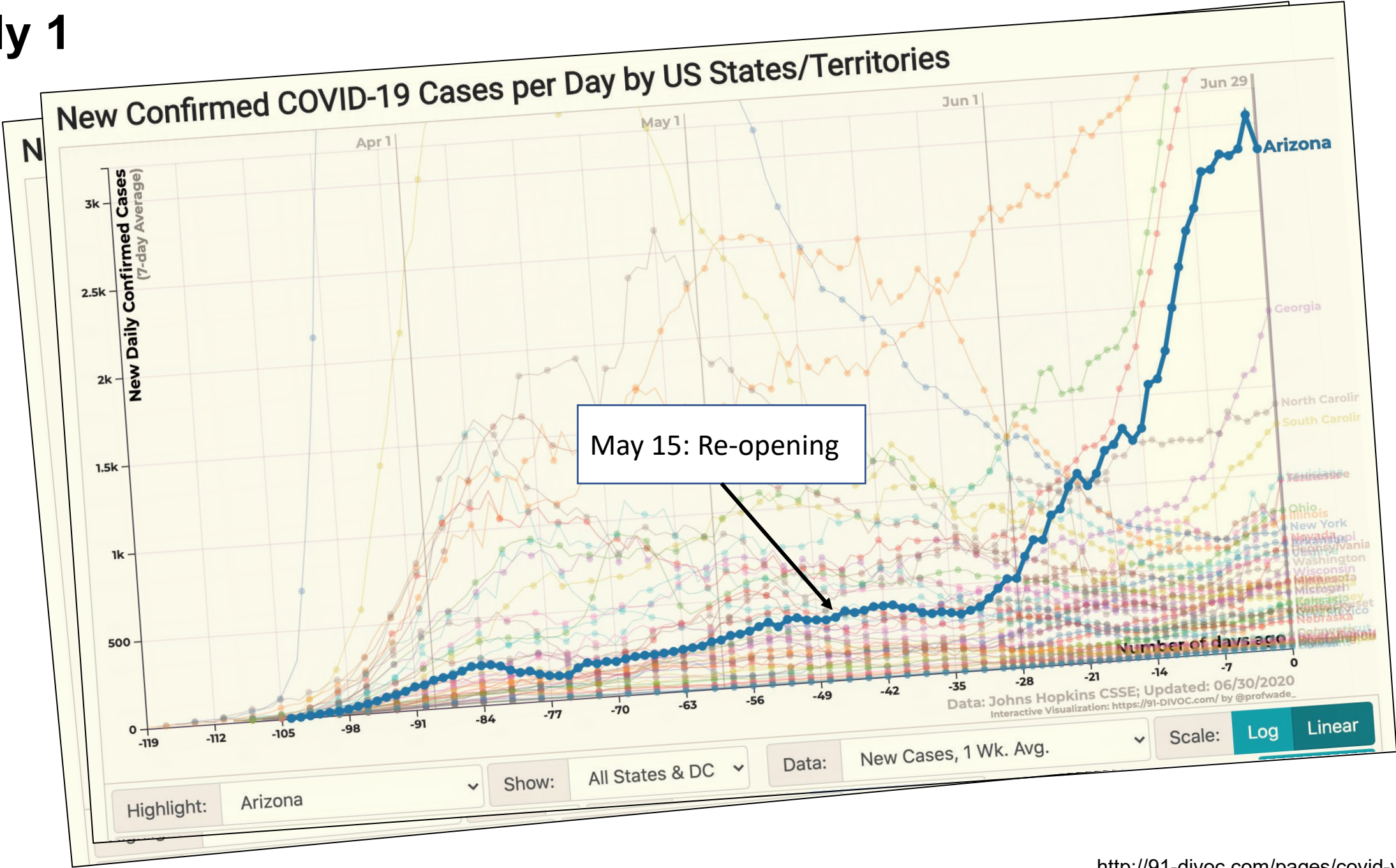
Highlight: Arizona

Show: All States & DC

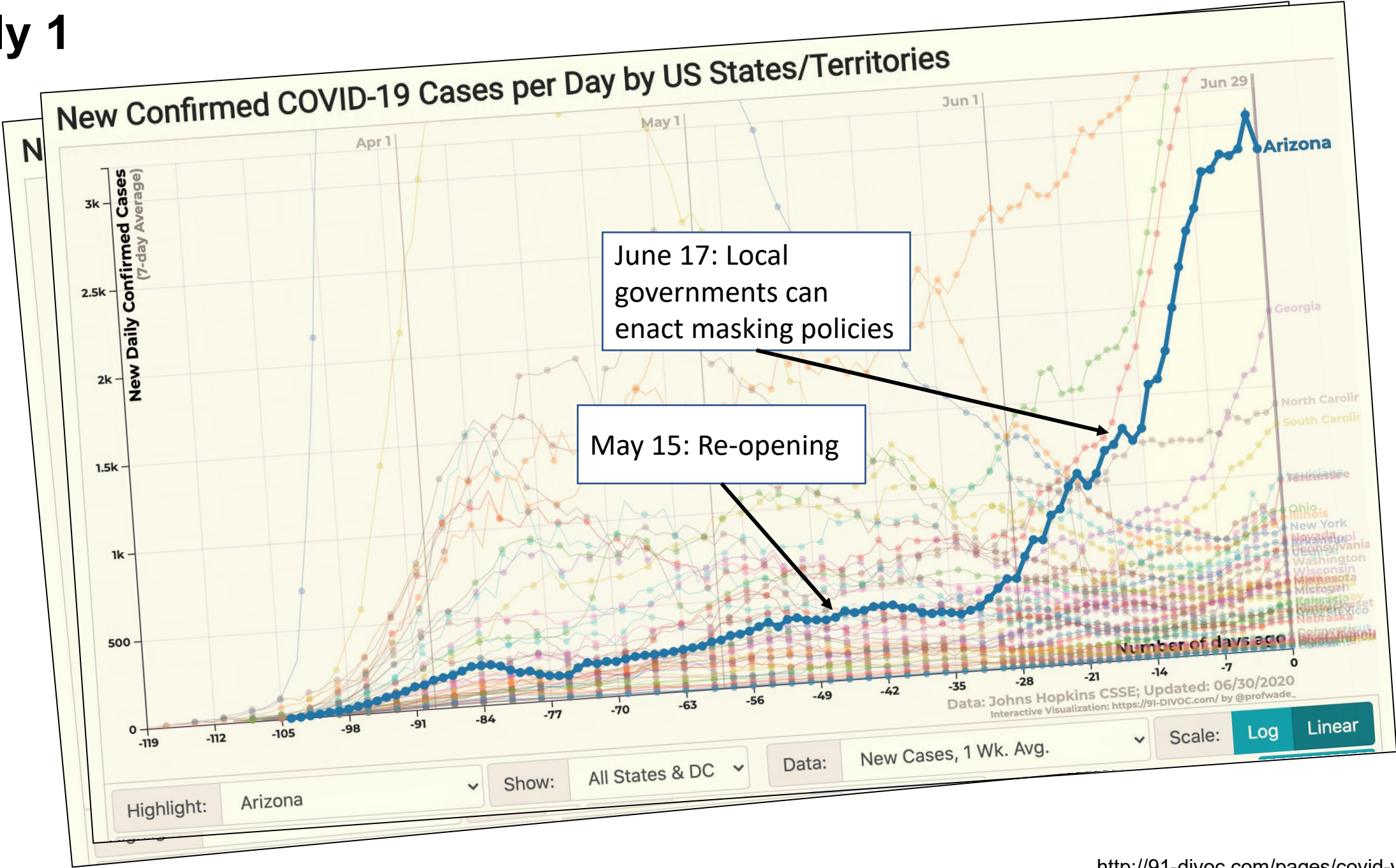
Data: New Cases, 1 Wk. Avg.

Scale: Log Linear

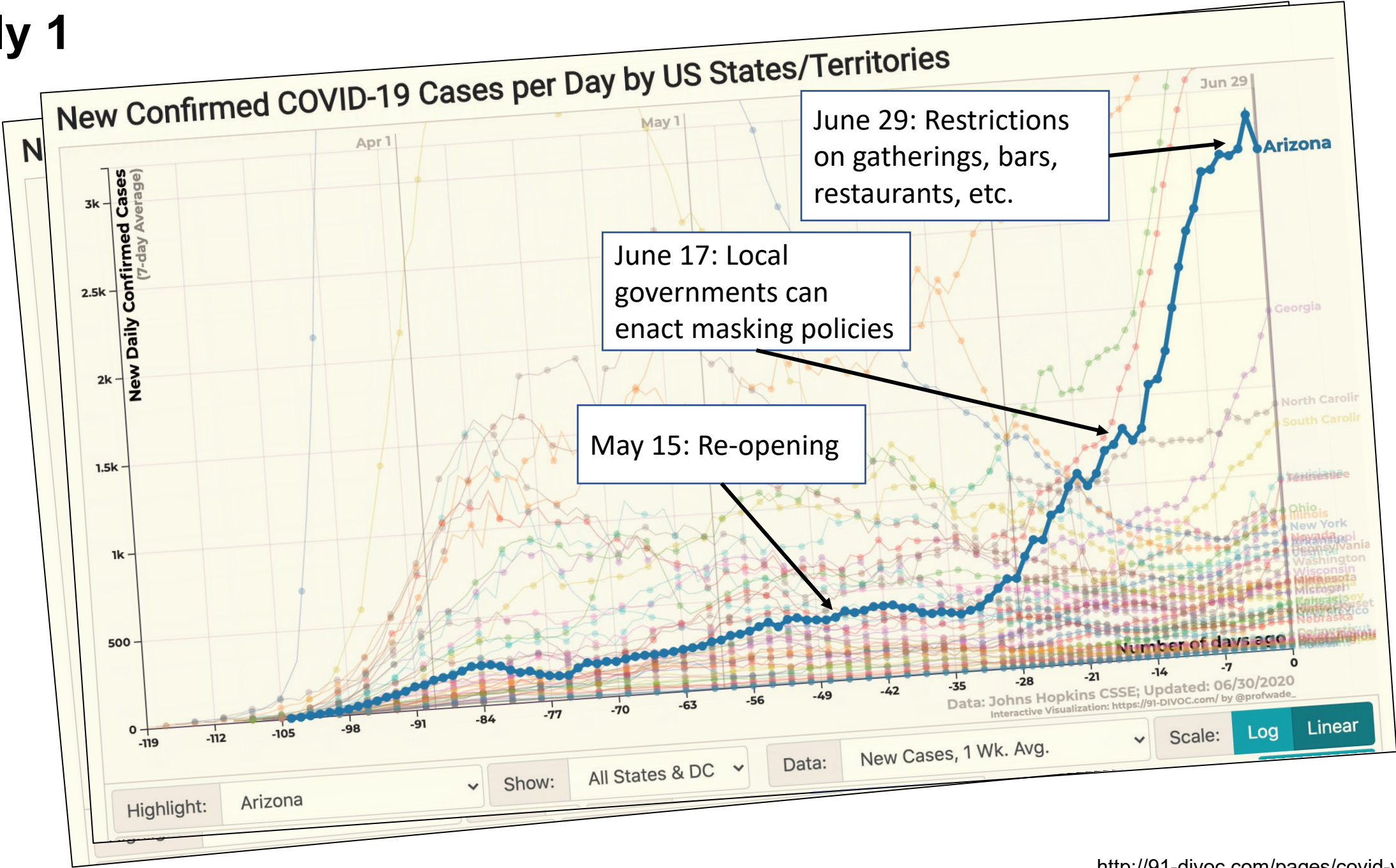
July 1



July 1

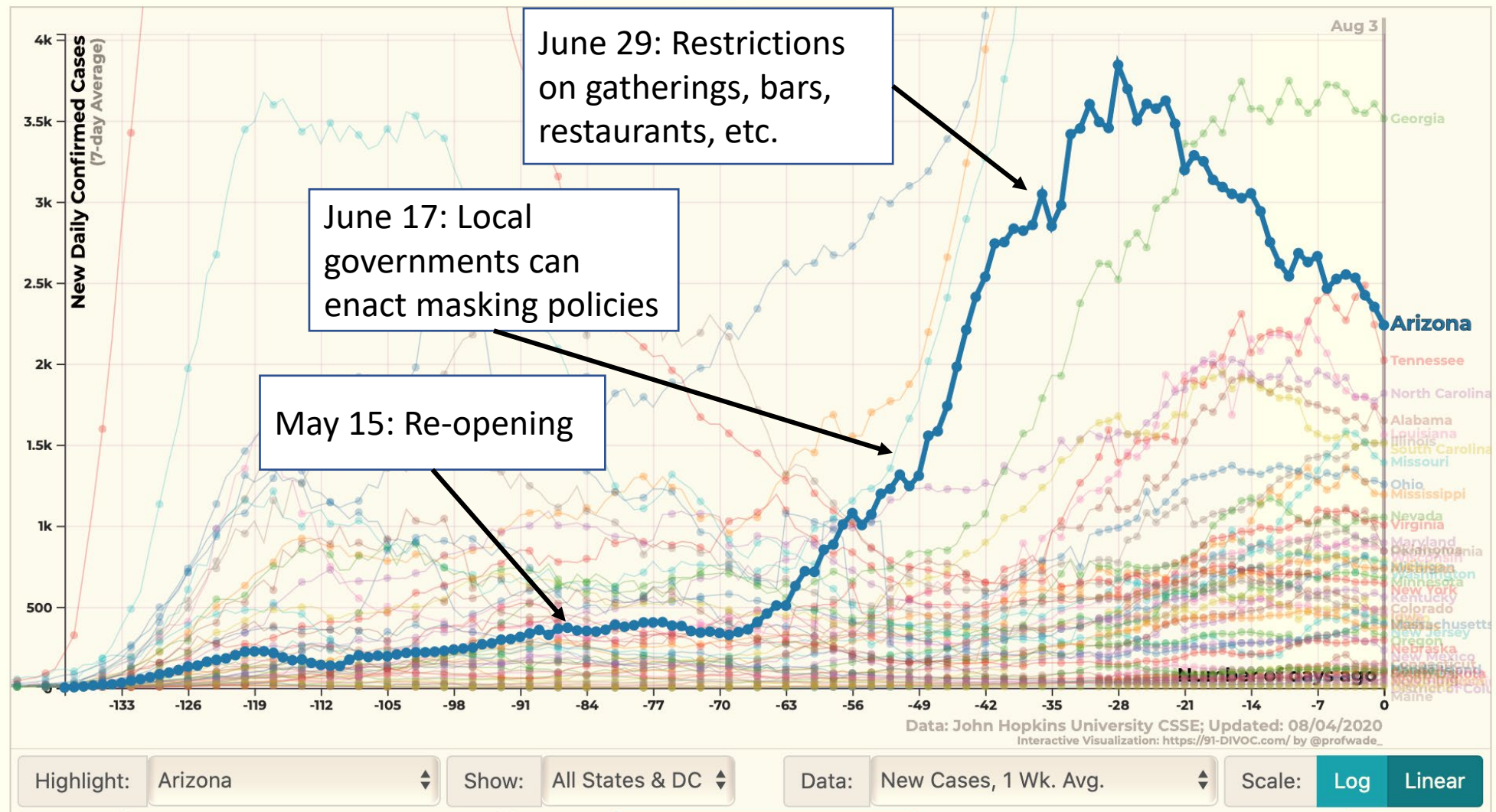


July 1



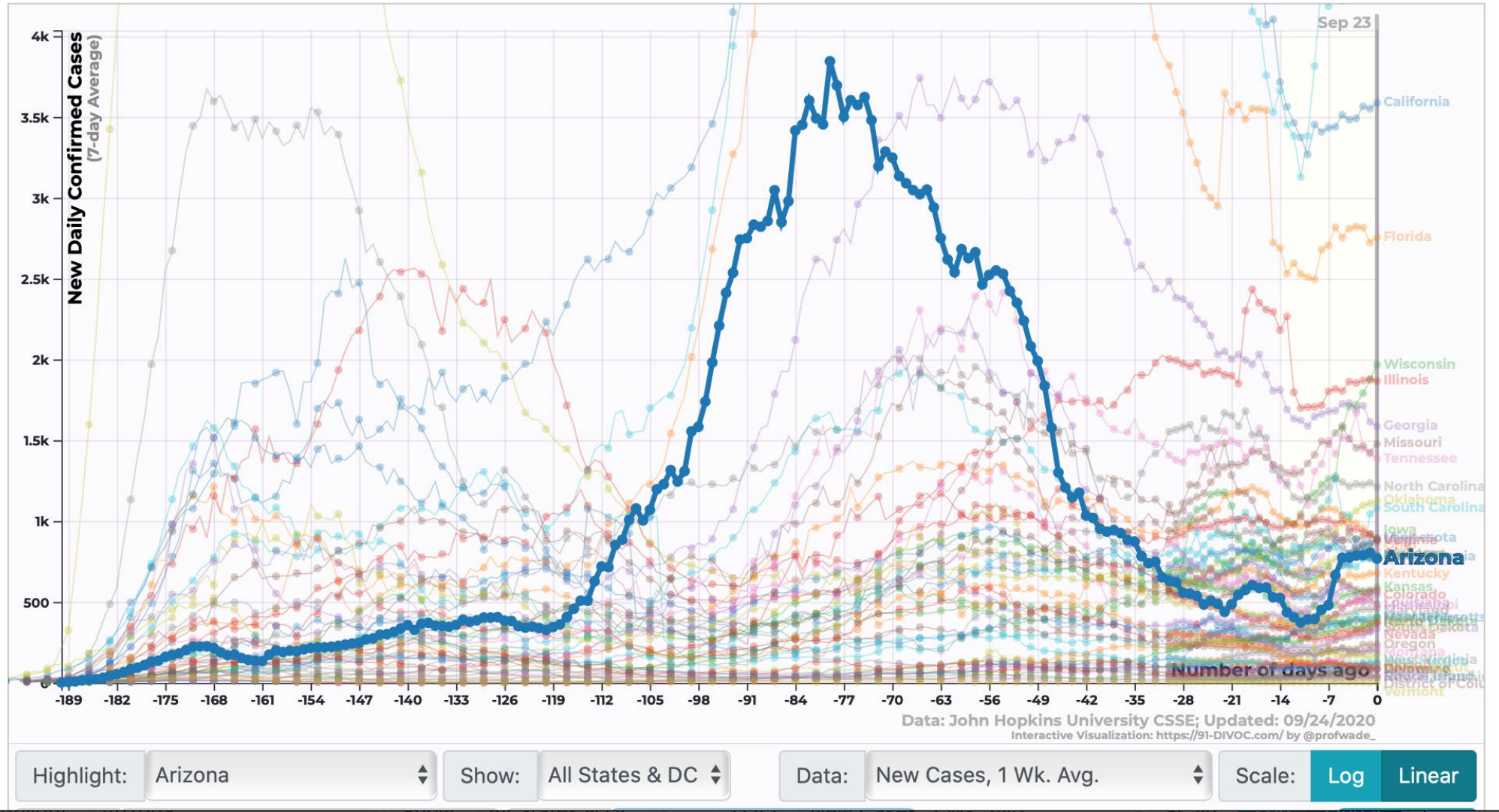
August 5

New Confirmed COVID-19 Cases per Day by US States/Territories



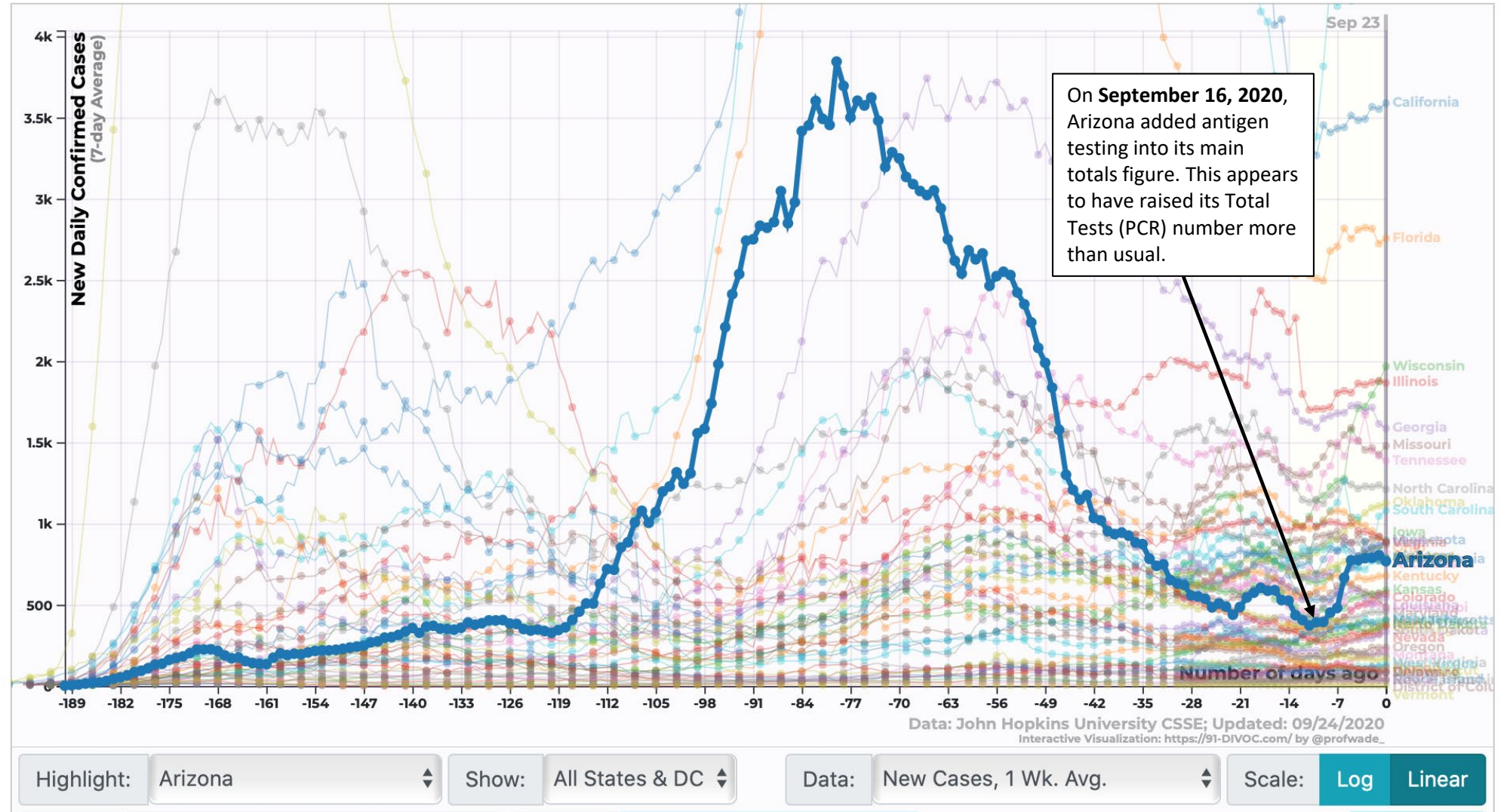
Sept 23

New Confirmed COVID-19 Cases per Day by US States/Territories

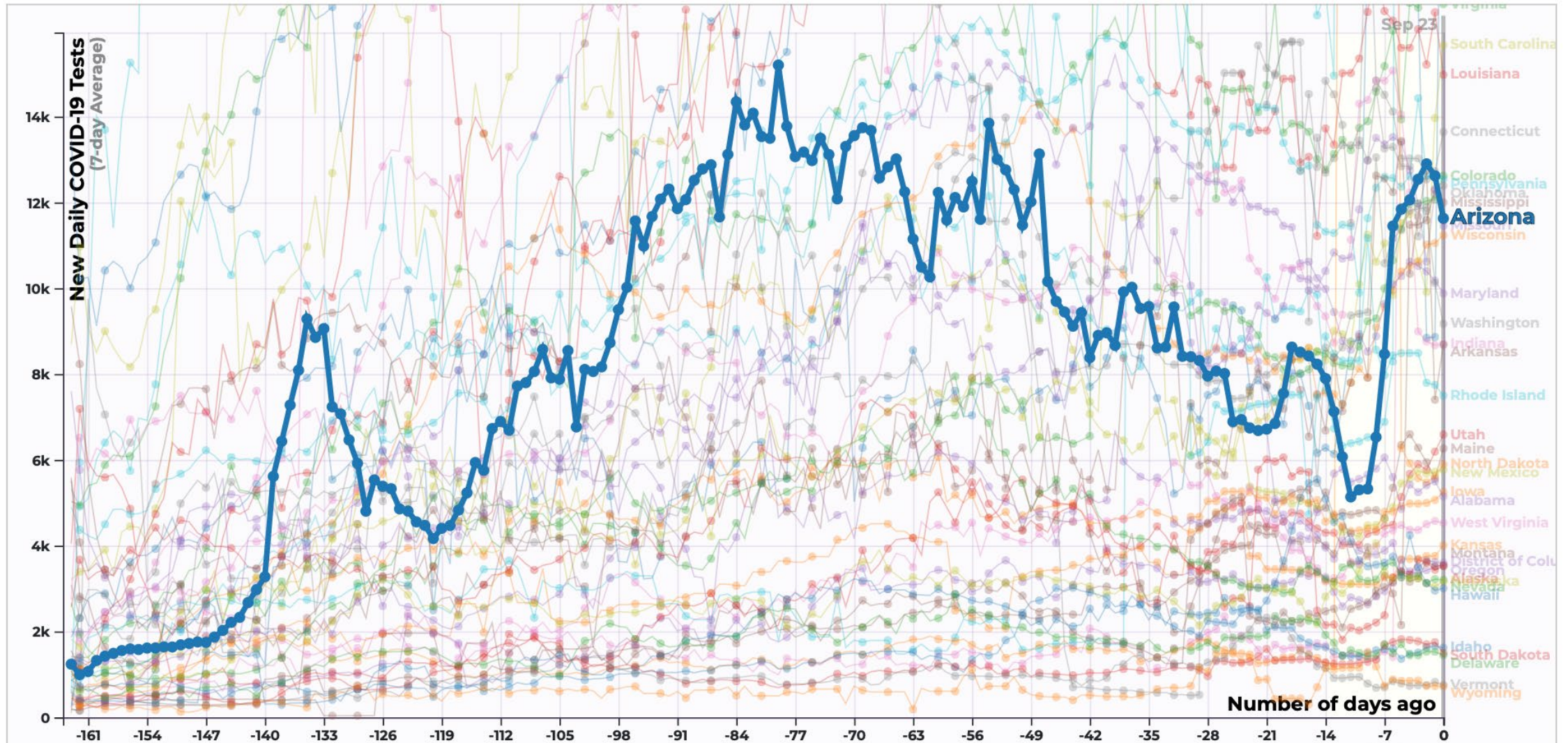


Sept 23

New Confirmed COVID-19 Cases per Day by US States/Territories



New COVID-19 Tests Performed per Day by US States/Territories



Data: John Hopkins University CSSE; Updated: 09/24/2020
Interactive Visualization: <https://91-DIVOC.com/> by @profwade_

Highlight:

Arizona



Show:

All States & DC



Data:

New Tests, 1 Wk. Avg.

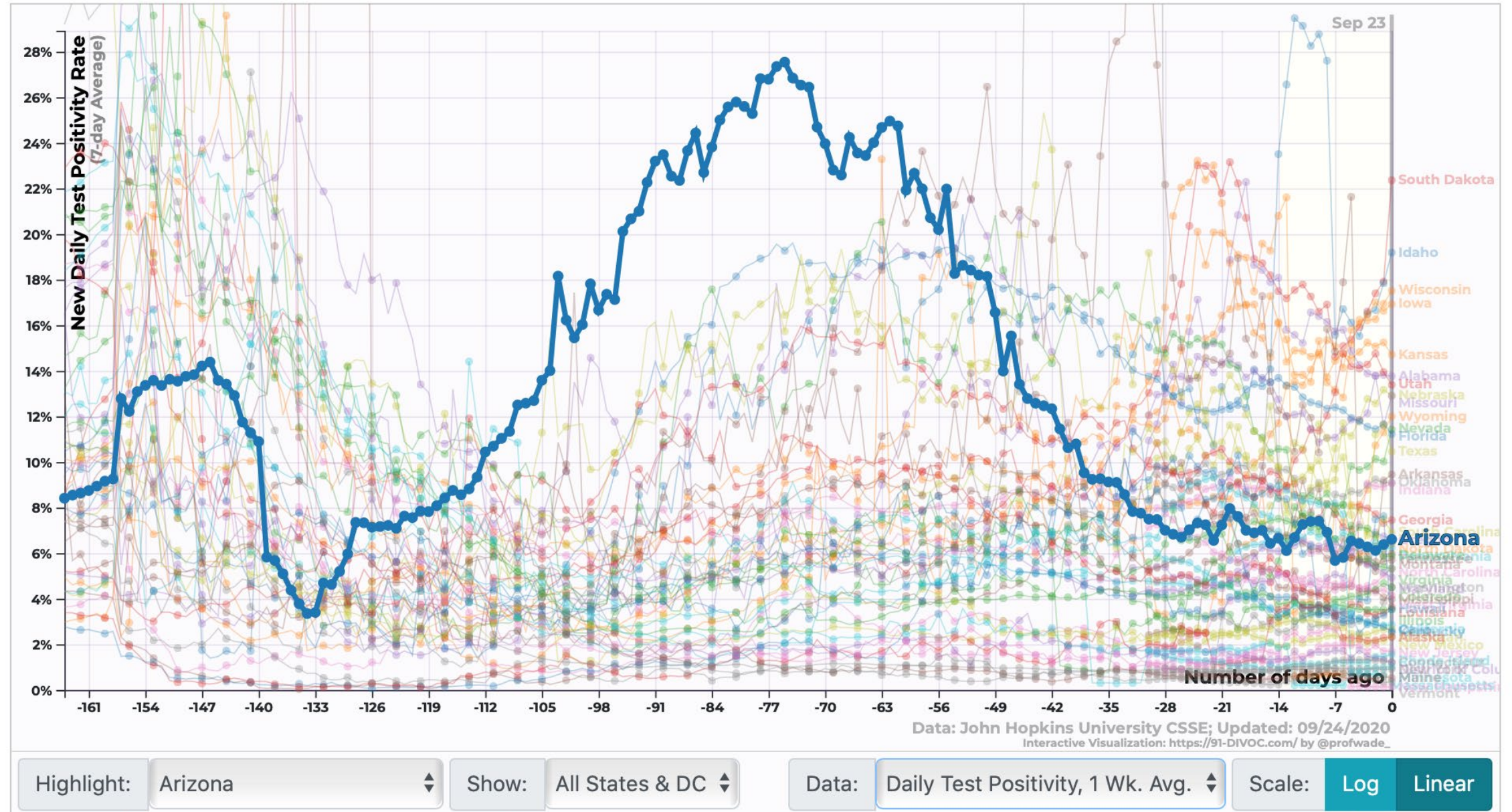


Scale:

Log

Linear

Daily COVID-19 Test Positivity Rate by US States/Territories



Current R_t
0.94

Cases
214,844

Tests
1,400,625

Effective Reproduction Rate • R_t

R_t is the average number of people who become infected by an infectious person. If it's above 1.0, COVID-19 will spread quickly. If it's below 1.0, infections will slow. [Learn More](#).



ICU headroom used

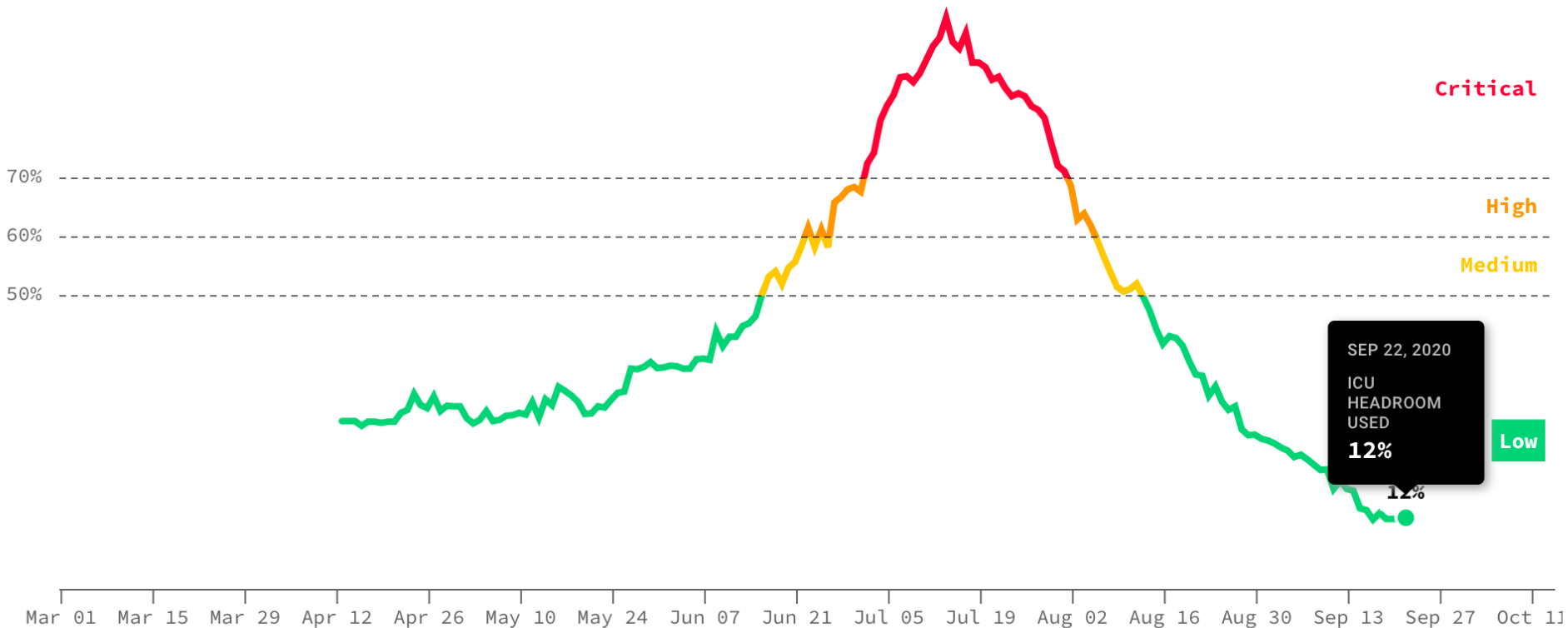
Beta

Save

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ARIZONA

Arizona has about 1,657 ICU beds. Based on best available data, we estimate that 40% (660) are currently occupied by non-COVID patients. Of the 997 ICU beds remaining, 122 are needed by COVID cases, or 12% of available beds. This suggests there is likely enough capacity to absorb a wave of new COVID infections.

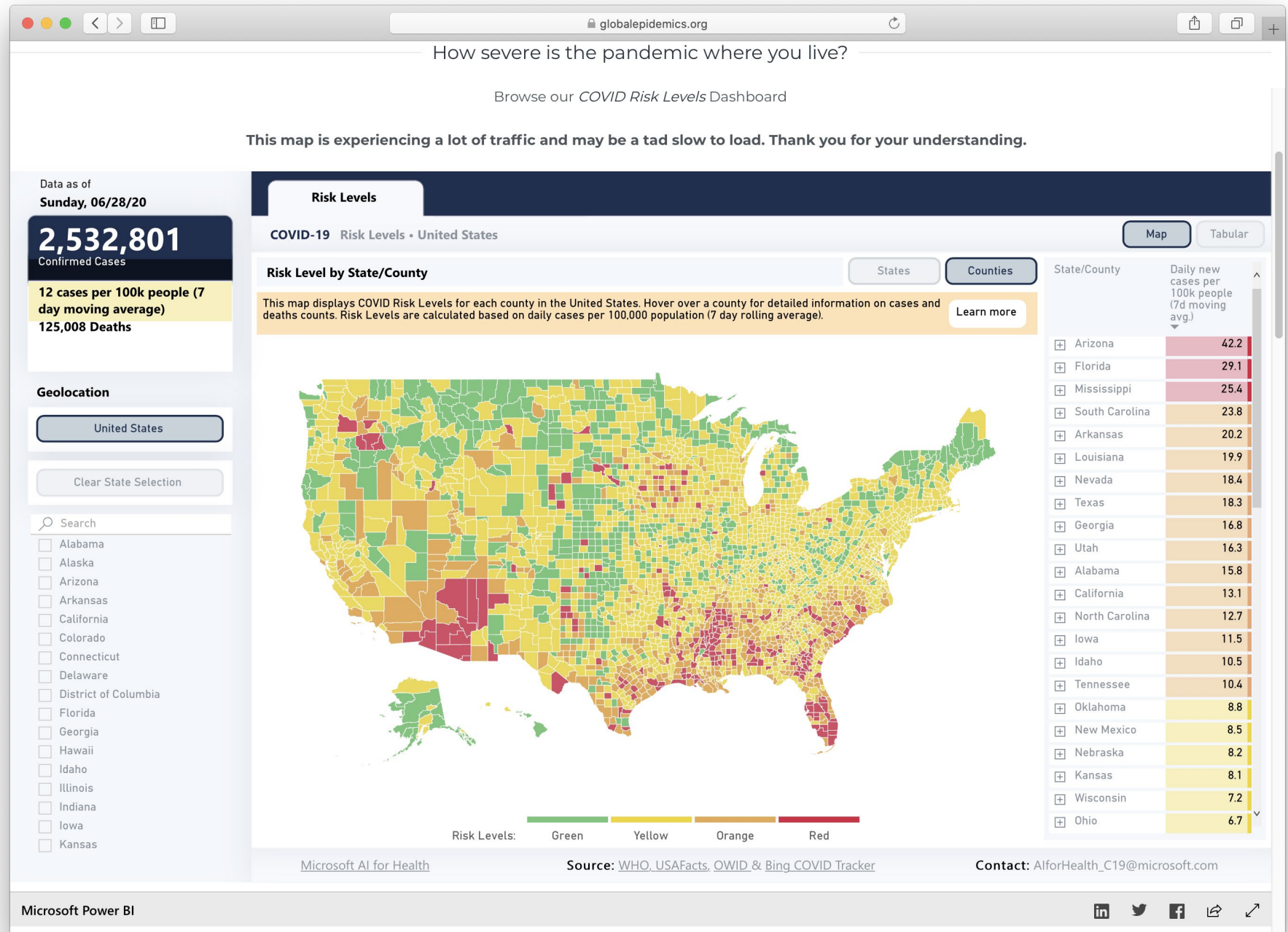


Last updated 9/23/2020. [Resolve to Save Lives](#), a pandemic think tank, recommends that hospitals maintain enough ICU capacity to double the number of COVID patients hospitalized. Learn more about [our methodology](#) and [our data sources](#).

<http://covidactnow.org/us/az>

July 1:

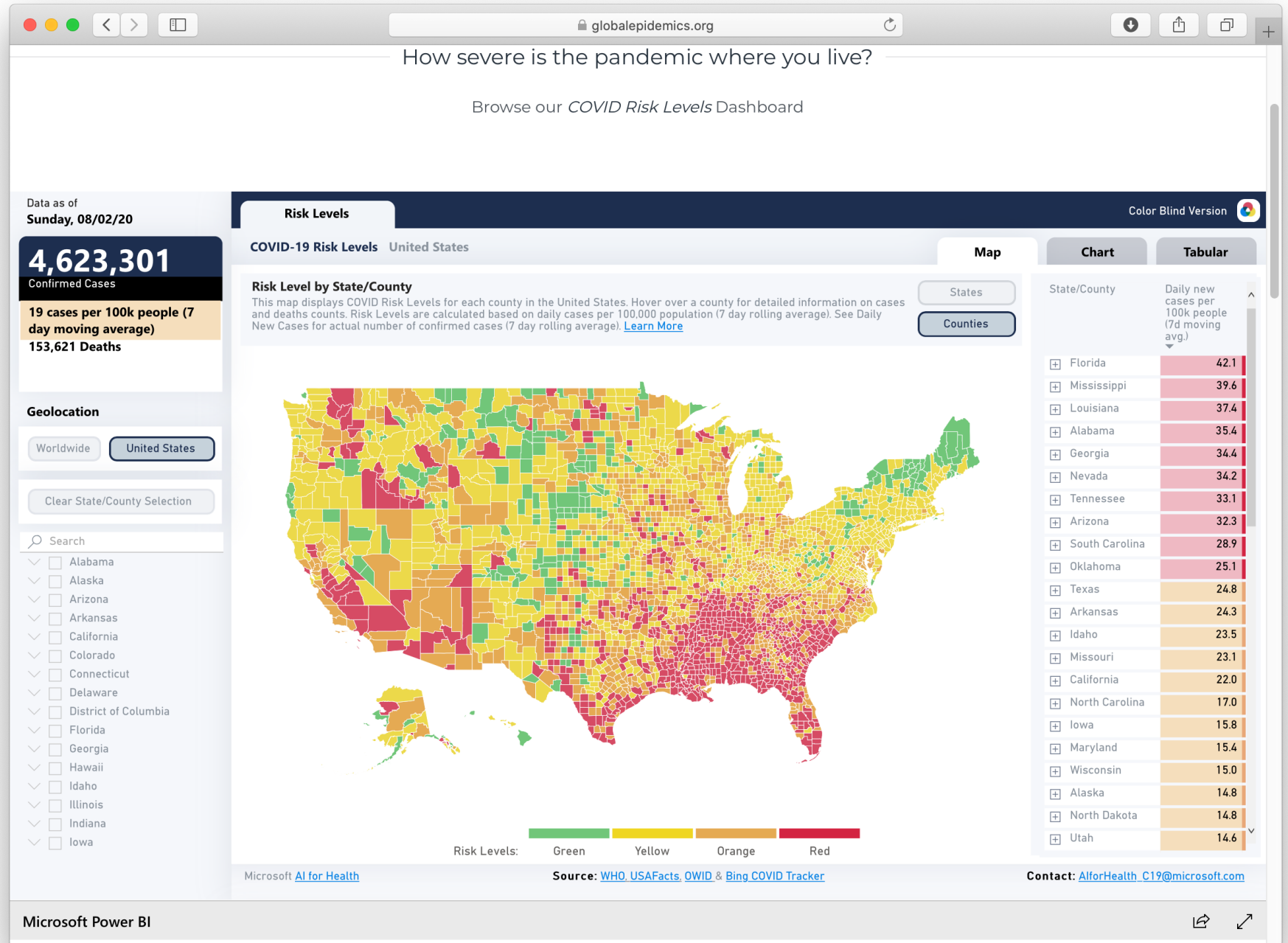
Arizona is #1 (but not for innovation)



<https://globalepidemics.org/key-metrics-for-covid-suppression/>

August 5:

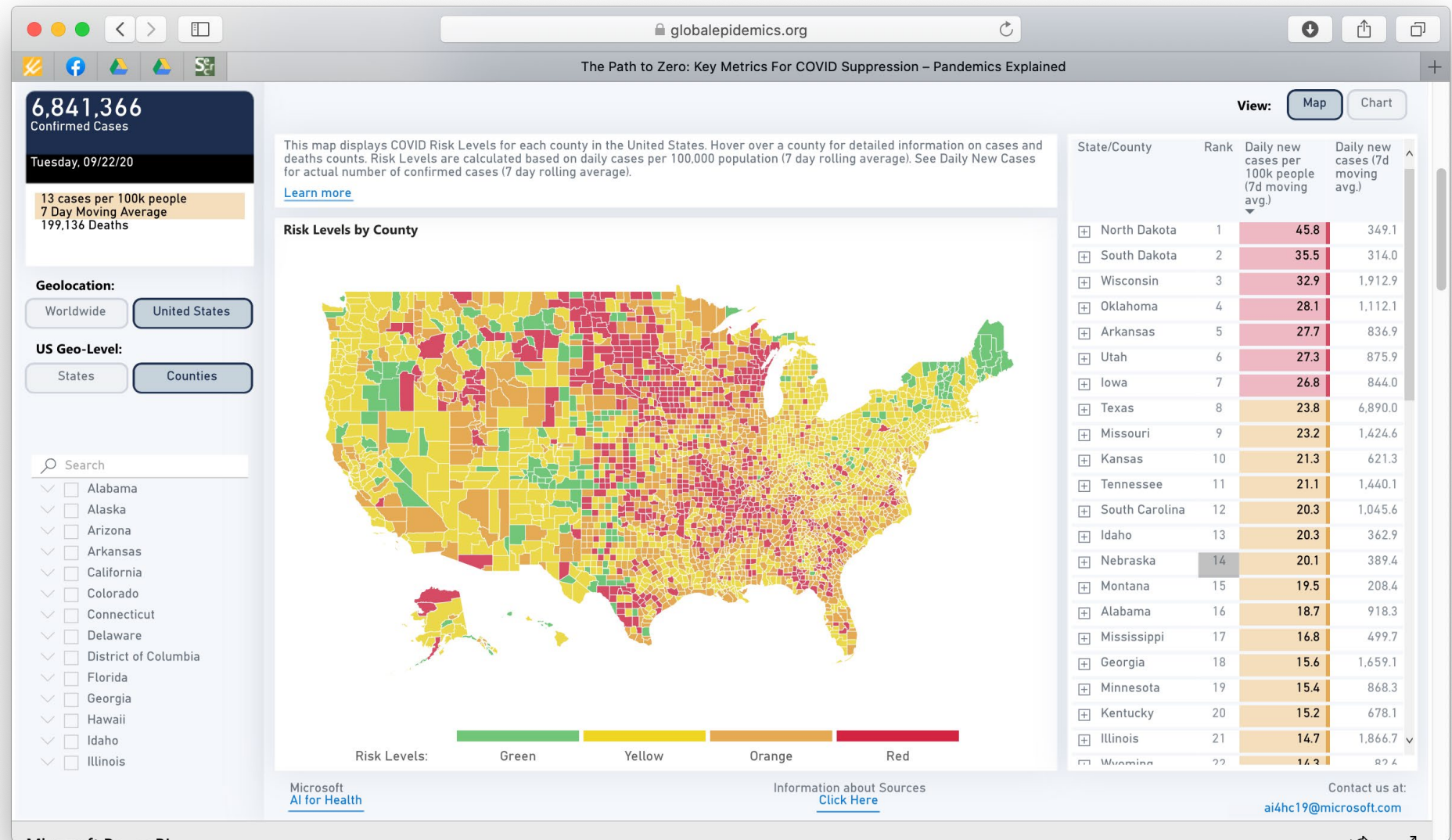
Arizona is #8



<https://globalepidemics.org/key-metrics-for-covid-suppression/>

Sep. 23:

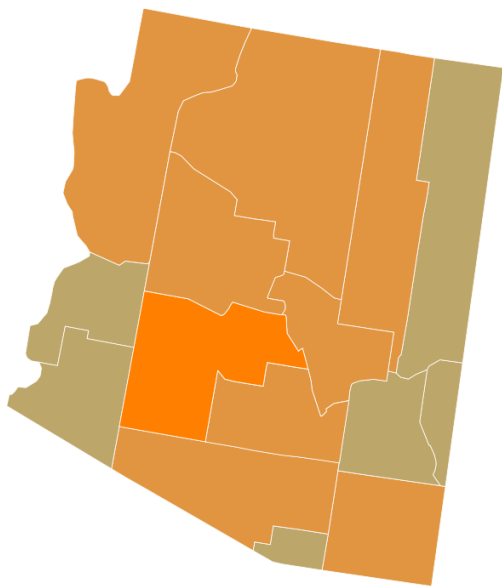
Arizona is #28



<https://globalepidemics.org/key-metrics-for-covid-suppression/>



**MY MASK PROTECTS YOU, AND
YOUR MASK PROTECTS ME.**

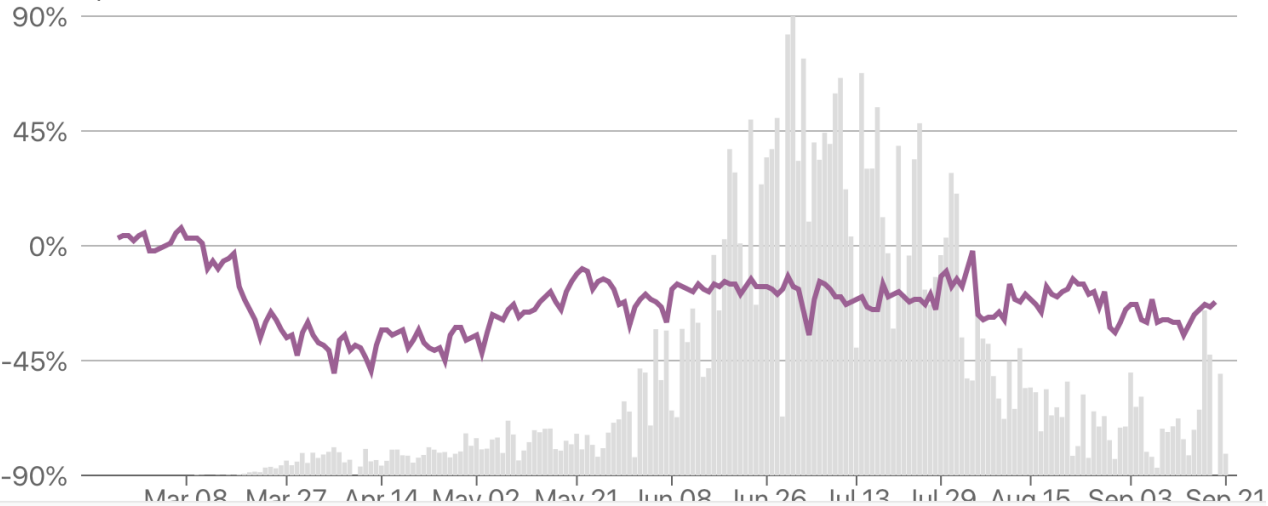


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Change in Average Mobility (Based on Distance Traveled) Change in Non-Essential Visits Difference in Encounter Density

Reported COVID-19 Cases COVID-19 Events



SARS-CoV-2 is Likely Airborne (as we've been saying)



The New York Times

PLAY THE CROSSWORD Account ▾

Yes, the Coronavirus Is in the Air

Transmission through aerosols matters — and probably a lot more than we've been able to prove yet.

By Linsey C. Marr
Dr. Marr is a professor of engineering.

July 30, 2020





A sneeze. And what it spreads. Just how much does the new coronavirus circulate in the tiny airborne aerosols we spew out simply by breathing? Bettmann, via Getty Images

Plus



nature



NEWS FEATURE · 08 JULY 2020

UPDATE 23 JULY 2020

Mounting evidence suggests coronavirus is airborne — but health advice has not caught up

Governments are starting to change policies amid concerns that tiny droplets can carry SARS-CoV-2. And after months of denying the importance of this, the World Health Organization is reconsidering its stance.

Dyani Lewis



 PDF version

<https://www.nytimes.com/2020/07/30/opinion/coronavirus-aerosols.html>


<https://www.nature.com/articles/d41586-020-02058-1>

cdc.gov

How Coronavirus Spreads | CDC

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Coronavirus Disease 2019 (COVID-19) MENU >



WEAR A MASK. PROTECT OTHERS.

YOUR HEALTH

How COVID-19 Spreads

Updated Sept. 21, 2020 Languages Print

A draft version of proposed changes to these recommendations was posted in error to the agency's official website. CDC is currently updating its recommendations regarding airborne transmission of SARS-CoV-2 (the virus that causes COVID-19). Once this process has been completed, the update language will be posted.

COVID-19 is thought to spread mainly through close contact from person-to-person. Some people without symptoms may be able to spread the virus. We are still learning about how the virus spreads and the severity of illness it causes.

Person-to-person spread

The virus is thought to spread mainly from person-to-person.

- Between people who are in close contact with one another (within about 6 feet).
- Through respiratory droplets produced when an infected person coughs, sneezes, or talks.
- These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.
- COVID-19 may be spread by people who are not showing symptoms.

Sept. 20



Updated CDC guidance acknowledges coronavirus can spread through the air

Sept. 21

Los Angeles Times

CDC acknowledges risk of coronavirus aerosols in new guidelines, then reverses course

The Washington Post

CDC reverses statement on airborne transmission of coronavirus, says draft accidentally published



CDC deletes coronavirus airborne transmission guidance, says update was 'draft version'

Transmission of SARS-CoV-2: A Review of Viral, Host, and Environmental Factors | Annals of Internal Medicine

17 matches < > Q~ aerosol Done

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Reviews | 17 September 2020

Transmission of SARS-CoV-2: A Review of Viral, Host, and Environmental Factors FREE

Eric A. Meyerowitz, MD, Aaron Richterman, MD, MPH, Rajesh T. Gandhi, MD, Paul E. Sax, MD

[Author, Article and Disclosure Information](#)

<https://doi.org/10.7326/M20-5008> Eligible for CME Point-of-Care

Sections Abstract PDF Tools Share

Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the etiologic agent of coronavirus disease 2019 (COVID-19), has spread globally in a few short months. Substantial evidence now supports preliminary conclusions about transmission that can inform rational, evidence-based policies and reduce misinformation on this critical topic. This article presents a comprehensive review of the evidence on transmission of this virus. Although several experimental studies have cultured live virus from aerosols and surfaces hours after inoculation, the real-world studies that detect viral RNA in the environment report very low levels, and few have isolated viable virus. Strong evidence from case and cluster reports indicates that respiratory transmission is dominant, with proximity and ventilation being key determinants of transmission risk. In the few cases where direct contact or fomite transmission is presumed, respiratory transmission has not been completely excluded. Infectiousness peaks around a day before symptom onset and declines within a week of symptom onset, and no late linked transmissions (after a patient has had symptoms for about a week) have been documented. The virus has heterogeneous transmission dynamics: Most persons do not transmit virus, whereas some cause many secondary cases in transmission clusters called “superspreading events.” Evidence-based policies and practices should incorporate the accumulating knowledge about transmission of SARS-CoV-2 to help educate the public and slow the spread of this virus.

Advertisement

Add Tdap to your vaccination protocol [Learn more](#)

FIGURES REFERENCES RELATED DETAILS

Latest

KEYWORDS

Pulmonary diseases
Upper respiratory tract infections
COVID-19 Epidemiology Lungs
Patients SARS coronavirus
Health care providers Infectious diseases

METRICS

732 Picked up by 16 news outlets
Blogged by 3
Tweeted by 794
On 2 Facebook pages
Reddited by 3

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“The dominant route of transmission of SARS-CoV-2 is respiratory.”

“Direct contact and fomite transmission are presumed but are likely only an unusual mode of transmission.”

“Growing evidence indicates that infectious virus can be found in aerosols and in exhaled breath samples and it is likely that under certain circumstances, including during aerosol-generating procedures, while singing, or in indoor environments with poor ventilation, the virus may be transmitted at a distance through aerosols.”

“Nevertheless, there is abundant evidence that proximity is a key determinant of transmission risk... That proximity so clearly increases risk for infection suggests that classic droplet transmission is more important than aerosol transmission.”

“The accumulated evidence suggests that most transmission is respiratory, with virus suspended either on droplets or, less commonly, on aerosols. ”

Where are we headed?



Comment | [Published: 09 September 2020](#)

COVID-19 herd immunity: where are we?

[Arnaud Fontanet](#)  & [Simon Cauchemez](#) 

[Nature Reviews Immunology](#) **20**, 583–584(2020) | [Cite this article](#)

84k Accesses | **1900** Altmetric | [Metrics](#)

Herd immunity is a key concept for epidemic control. It states that only a proportion of a population needs to be immune (through overcoming natural infection or through vaccination) to an infectious agent for it to stop generating large outbreaks. A key question in the current COVID-19 pandemic is how and when herd immunity can be achieved and at what cost.

<https://www.nature.com/articles/s41577-020-00451-5>

“Assuming an optimistic herd immunity threshold of 50%, for countries such as France and the USA, this would translate into 100,000–450,000 and 500,000–2,100,000 deaths, respectively...”

In the US we are now at 200,000 deaths

“An effective vaccine presents the safest way to reach herd immunity.”

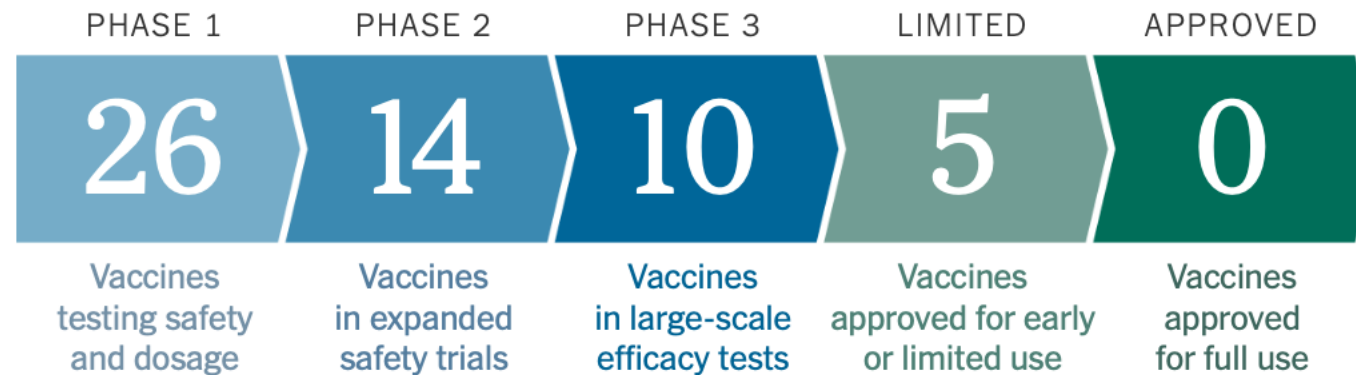
“For countries in the Northern hemisphere, the coming autumn and winter seasons will be challenging with the likely intensification of viral circulation.”

“At this stage, only non-pharmaceutical interventions, such as social distancing, patient isolation, face masks and hand hygiene, have proven effective in controlling the circulation of the virus and should therefore be strictly enforced.”

The New York Times

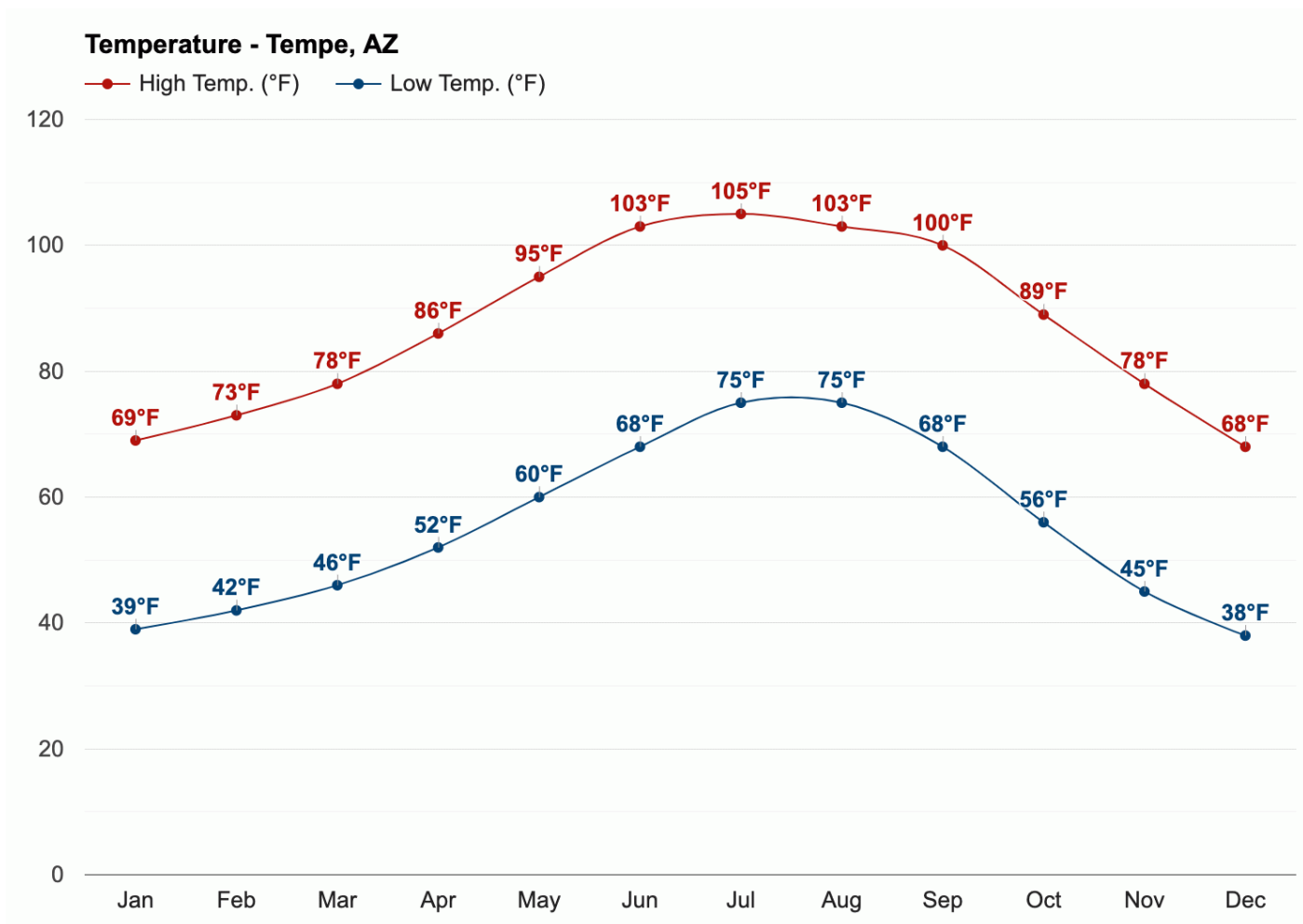
Coronavirus Vaccine Tracker

By Jonathan Corum, Sui-Lee Wee and Carl Zimmer Updated September 23, 2020



Vaccines typically require years of research and testing before reaching the clinic, but scientists are racing to produce a safe and effective coronavirus vaccine by [next year](#). Researchers are testing **40 vaccines** in clinical trials on humans, and at least 92 preclinical vaccines are [under active investigation](#) in animals.

Arizona's Winter Weapon: Ventilation!



Comment | Published: 07 July 2020

Pre-existing immunity to SARS-CoV-2: the knowns and unknowns

Alessandro Sette  & Shane Crotty 

Nature Reviews Immunology **20**, 457–458(2020) | [Cite this article](#)

145k Accesses | **1** Citations | **2932** Altmetric | [Metrics](#)

T cell reactivity against SARS-CoV-2 was observed in unexposed people; however, the source and clinical relevance of the reactivity remains unknown. It is speculated that this reflects T cell memory to circulating ‘common cold’ coronaviruses. It will be important to define specificities of these T cells and assess their association with COVID-19 disease severity and vaccine responses.

If true, some possible implications:

- May explain diverse disease outcomes
- Good news for vaccine development
- Closer to “herd immunity”?

<https://www.nature.com/articles/s41577-020-0389-z>



Optimist



Pessimist



Realist



Physicist



Surrealist



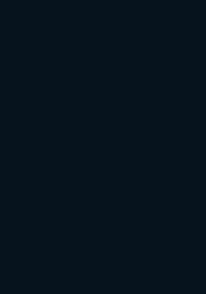
Relativist



Utopist

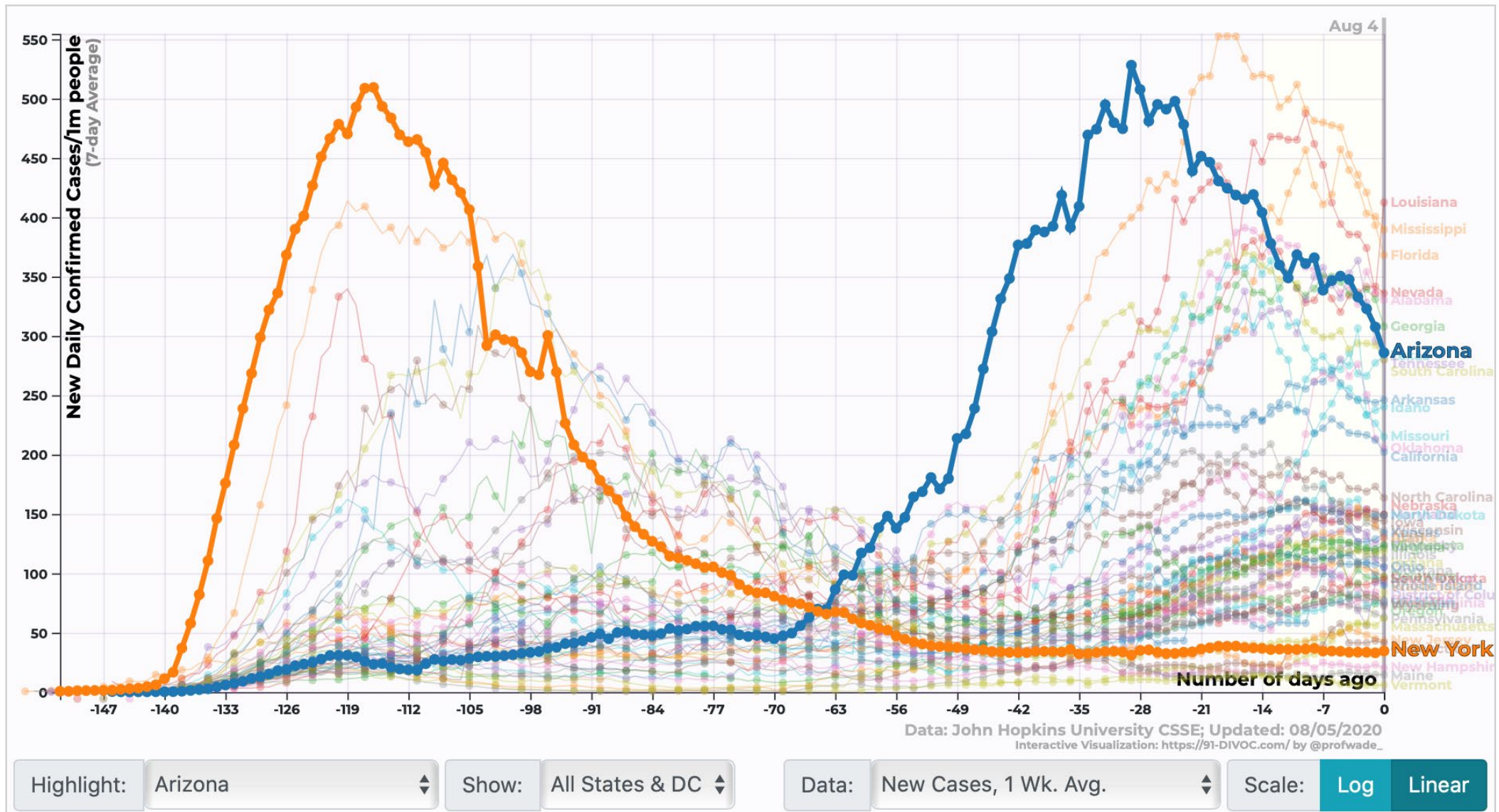


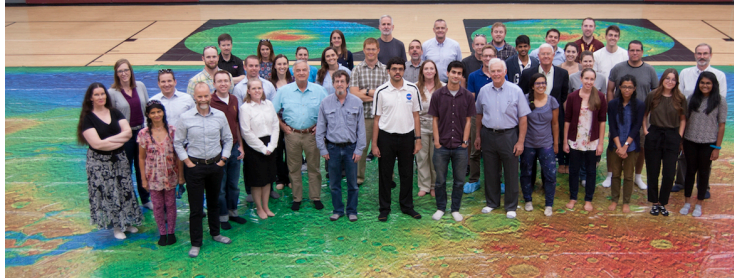
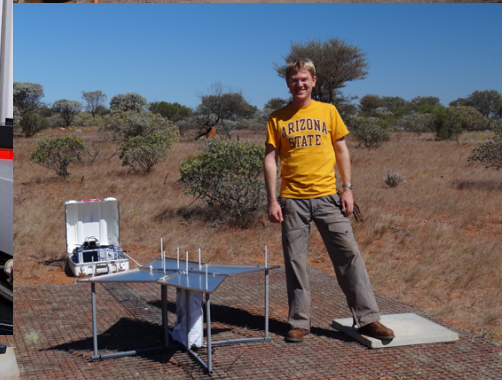
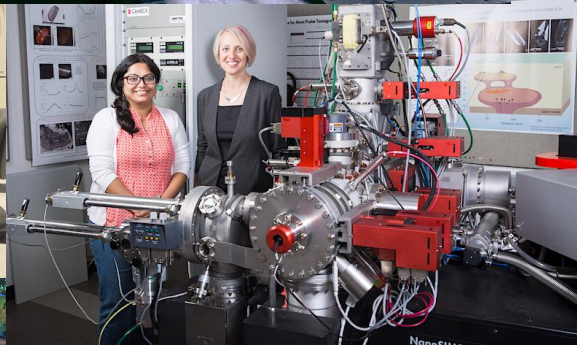
Scepticist



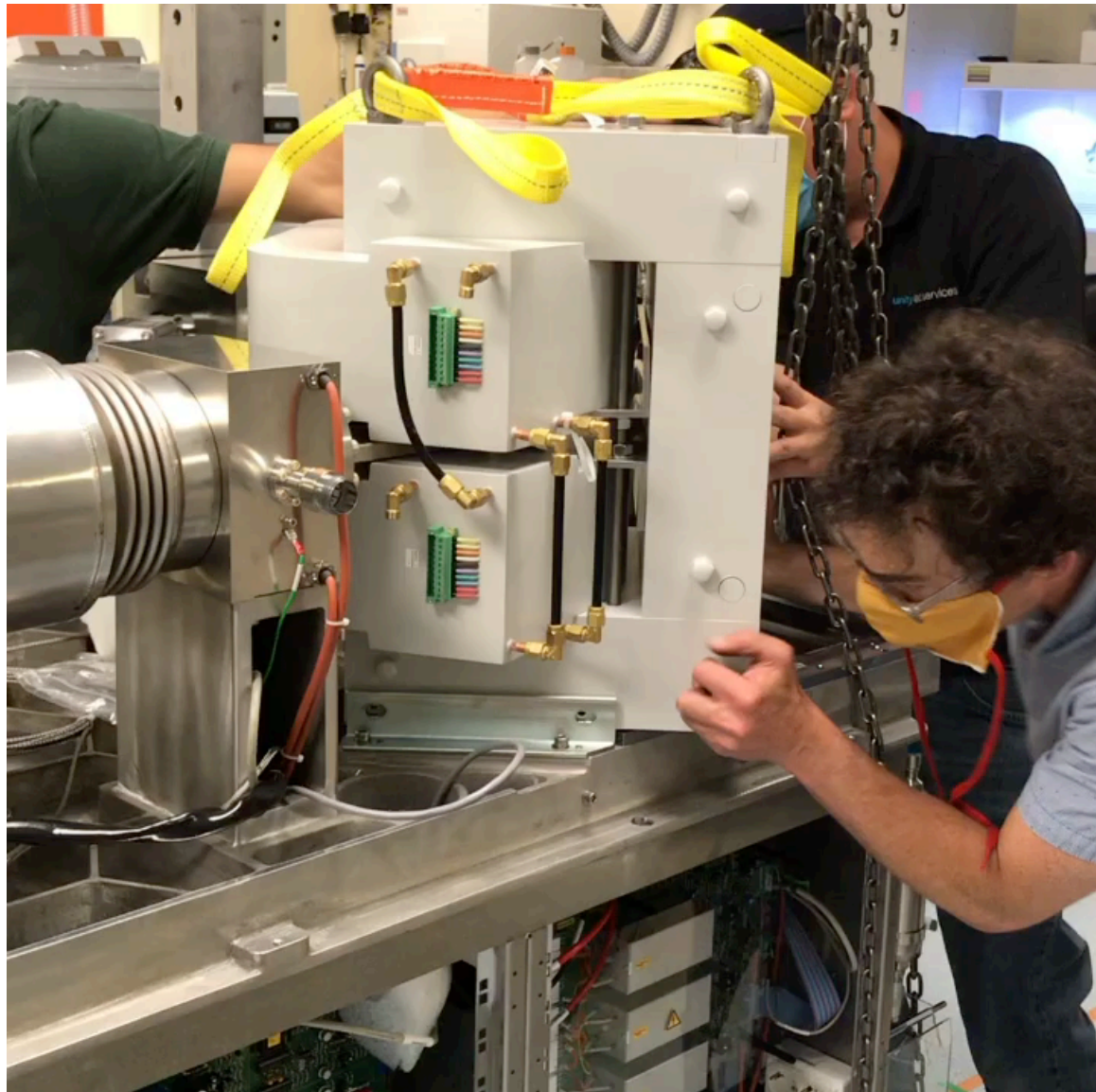
Nihilist

New Confirmed COVID-19 Cases per Day by US States/Territories, normalized by population





SESE Community Conversation: 24 September 2020





President's 25-point plan

- On September 2, President Crow outlined 25 actions that “will be undertaken with the goal of enhancing diversity, growth and opportunity for Black undergraduate and graduate students, faculty and staff, while also expanding our academic offerings, community services and collaborative relationships to the benefit of all underrepresented groups and individuals at ASU.”
- <https://president.asu.edu/statements/asus-commitment-to-black-students-faculty-and-staff>

News/Communications: On campus presence

- Up to ~30% occupancy allowed in SESE buildings; if you are on campus:
 - Mandatory COVID-19 safety training.
 - Face coverings are REQUIRED at all times on campus.
- Rapid and easy saliva testing (24-48 hr turnaround time) has been implemented; random testing of the ASU population.
- Daily health check implemented.
- ASU COVID-19 case updates provided at :

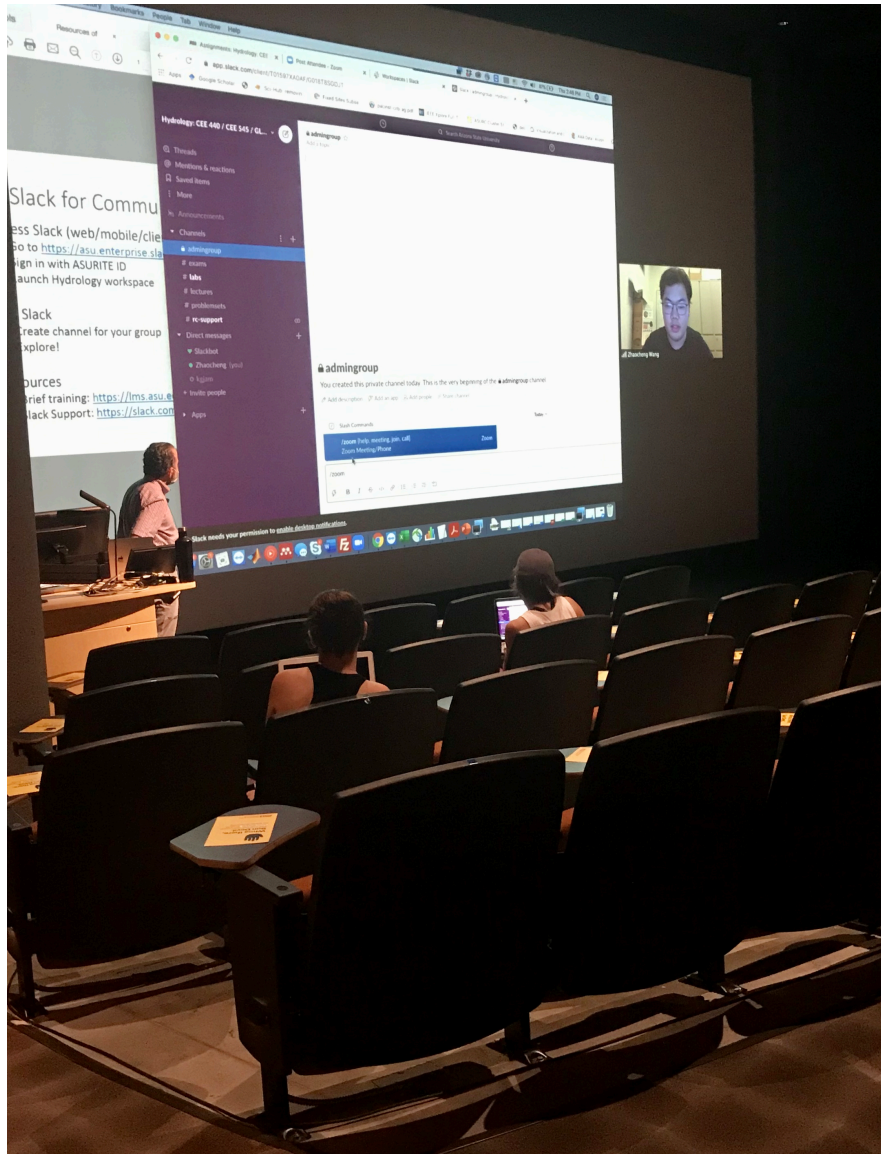
<https://eoss.asu.edu/health/announcements/coronavirus/management>

As of September 21: Cumulative number of positive tests since August 1, 2020

- Students: 1,670
- Faculty and staff: 31

News/Communications: Research and Other Ops

- Re-opening protocols implemented for a significant fraction of SESE research operations.
- HQ staff and SESE Leadership are back on campus on a staggered schedule.
 - Staff representing BO-HR-RA-AP will be in office Tuesdays-Thursdays from 8 AM to 2 PM
 - Reception and mail service on Mondays and Fridays.
 - Access is key card only in certain parts of SESE buildings.
- SESE HQ in ISTB4 is staffed as above, SESE HQ in PSF is not staffed. Both are accessible via key card/key access.



News/Communications: Teaching

- Most classes are being taught in ASU Sync mode (synchronous teaching via Zoom, allowing students to join remotely or in-person for limited numbers).
- In practical terms, a small subset of our courses have an in-person component this semester.
- Looking ahead, planning for Spring 2021 is underway; similar to this Fall, most of our courses will be taught in Sync mode.

News/Communications: Budget & Finances

- We are past the 21st day of the Fall semester, so financial picture for the university is somewhat clearer.
- Overall total enrollment for Fall 2020 at ASU is up.
 - Overall enrollment in SESE courses (6526, as of the 21st day of the semester) is down by ~4% relative to this time last year.
 - We successfully launched our fully online BS degree in Astronomical and Planetary Sciences. 95 students signed up – represents ~20% increase in our undergrad majors!
- No furloughs or salary cuts are anticipated at the current time, but also no merit increases.
- We implemented a significant and permanent cut (~\$300K) to our total annual budget.

News/Communications: Fall Activities

Fall 2020 activities **open to ALL in the SESE Community:**

- SESE Community Conversations (Noon-1 PM on Oct 29 & Nov 19)
- SESE Colloquium (Wednesdays, 3:30-4:30 PM, weekly)
- Virtual Tea (Thursdays, 3:00-4:00 PM, weekly)
- Engineering Coffee (Fridays, 2:30-3:30 PM, weekly)
- Open listening sessions with SESE leadership (weekly, 9-10 AM Tuesdays)
- One-on-one office hours with the director (weekly, 3-5 PM Thursdays) – sign up for 30 min slots on weekly basis
- Open office hours with AD Inclusive Community (3-4 PM Thursdays)

Light at the end of the COVID-19 tunnel?
Or a plasma source in a mass spec?

