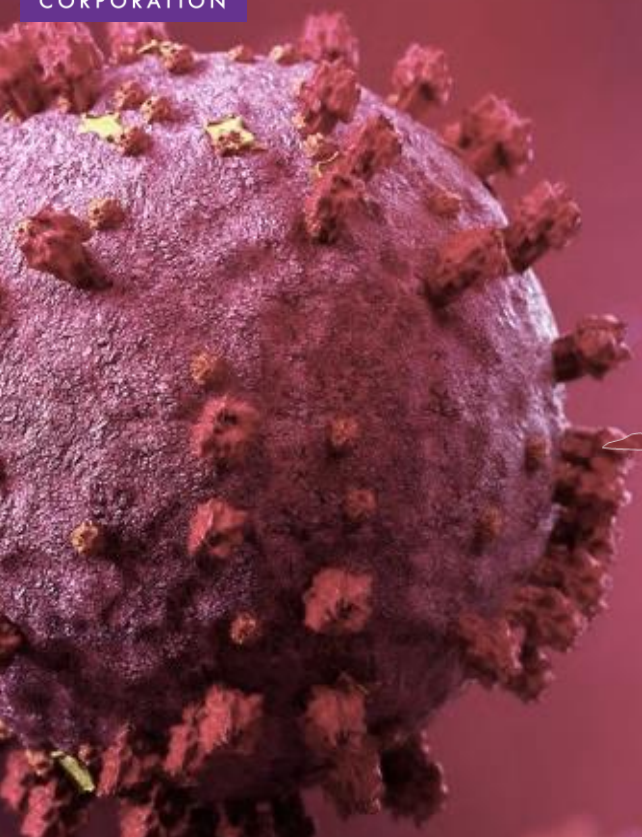


VIRGINIA

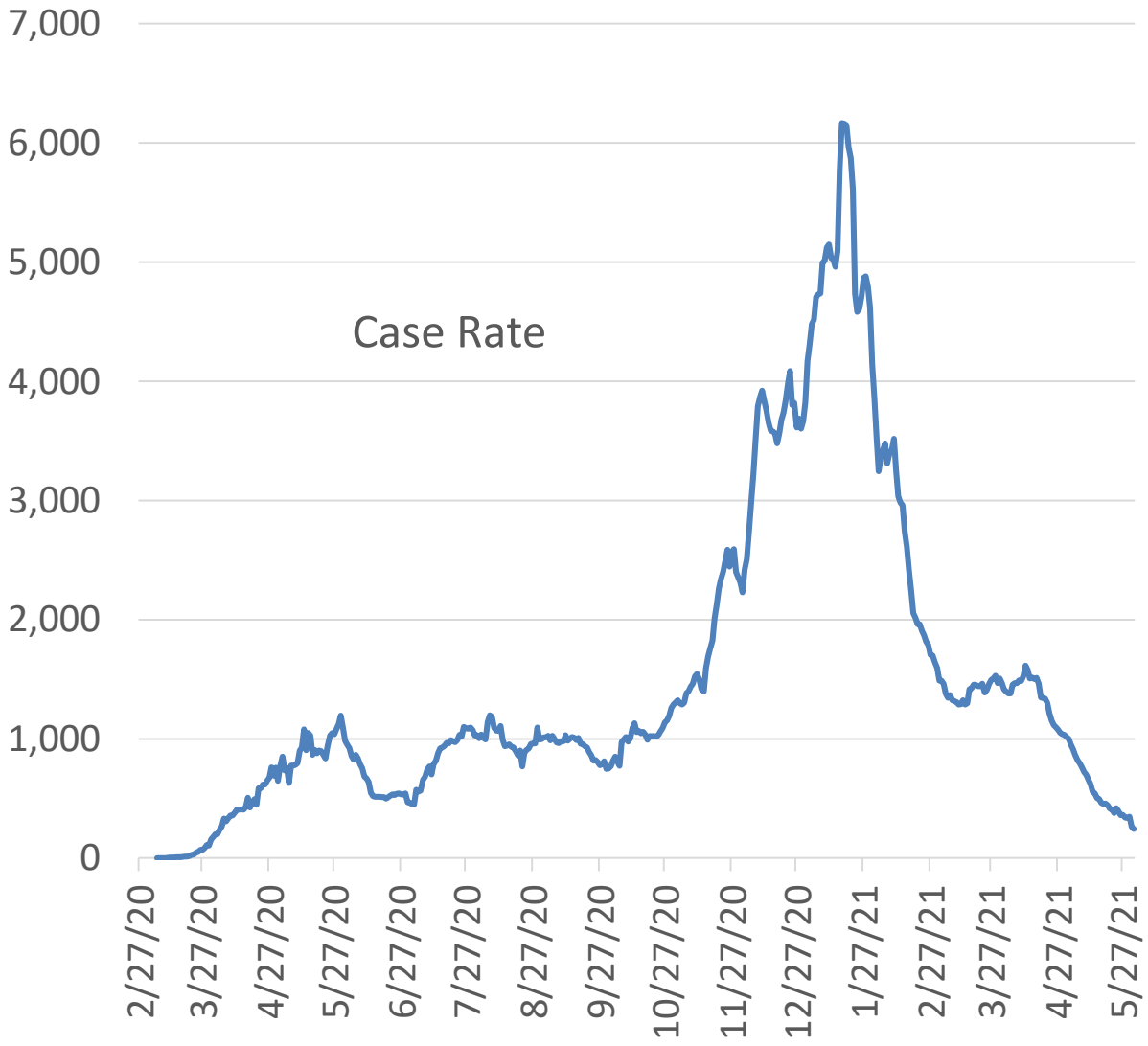
COVID-19 Update June 3rd, 2021

Carter C. Price, Ph.D.

A team of RAND researchers was asked by the Commonwealth of Virginia to review available information on COVID-19 models of the Commonwealth to determine the strengths and weaknesses of each model and their relevance to decisionmaking. The information in this presentation is intended to keep policymakers abreast of the latest findings of the research team.

This research was sponsored by the Commonwealth of Virginia and conducted by the RAND Corporation. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. For more information, visit www.rand.org.

Bottom Line Up Front



Confirmed cases have declined from last week to 243 per day (-38%)

- This is 81 percent lower than the mid-March low of 2021 and 46 percent below the summer lows of 2020

COVID hospitalizations have decreased to 476 (-10%)

Vaccination is continuing to increase with at least 45 percent of the population fully vaccinated

- With the current trends, community immunity will not be reached statewide before the fall

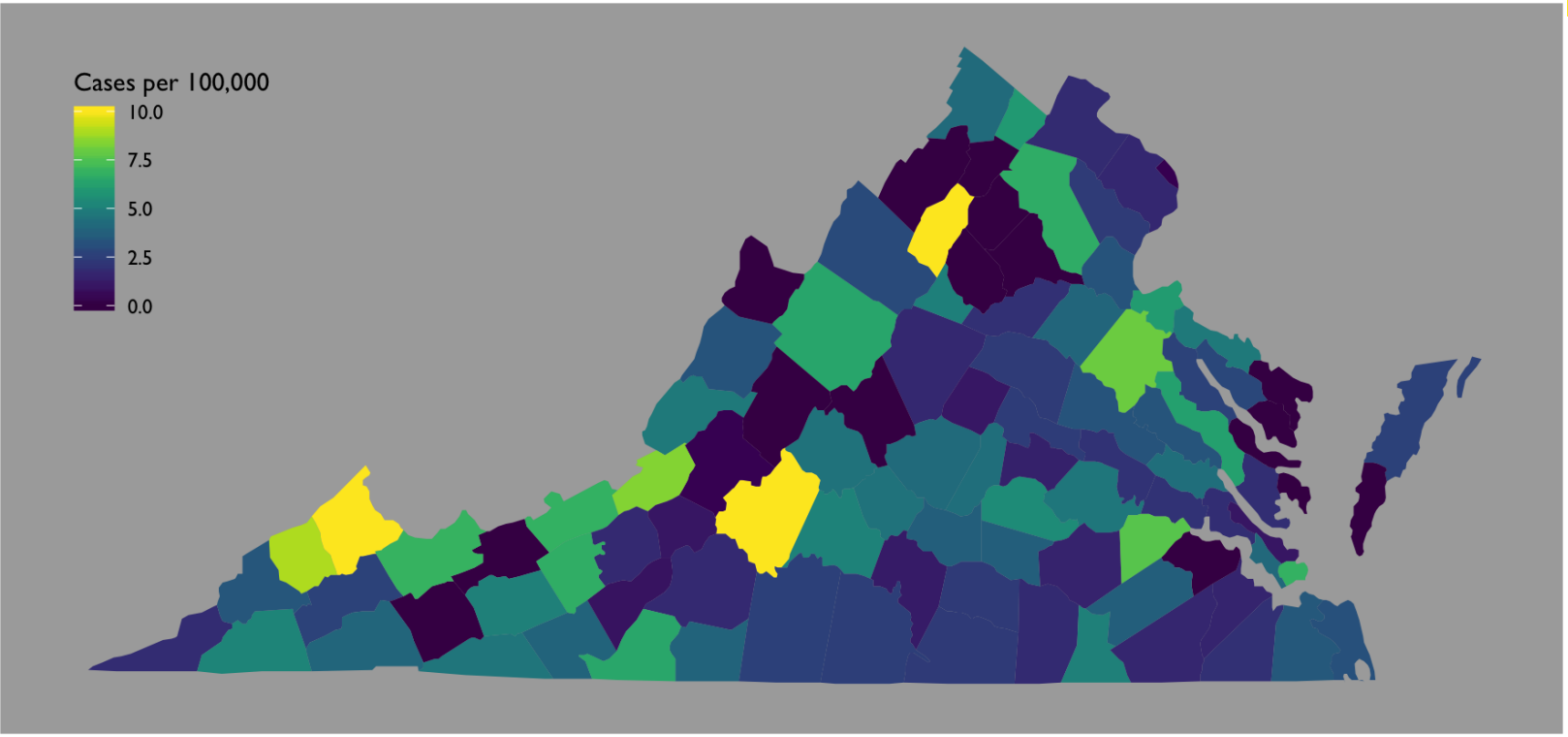
Case rates are below the lows of 2020, and the trend is for a sustained decline

- The pandemic is not over, but many parts of Virginia are ready to enter the recovery phase, which entails activities to promote the return to normal
- However, given the continued threat of COVID variants, preparation activities for future phases should be ongoing

Cases are relatively low across the Commonwealth

CASE COUNT

Source: VDH



Yellow indicates at least 10 cases per 100,000

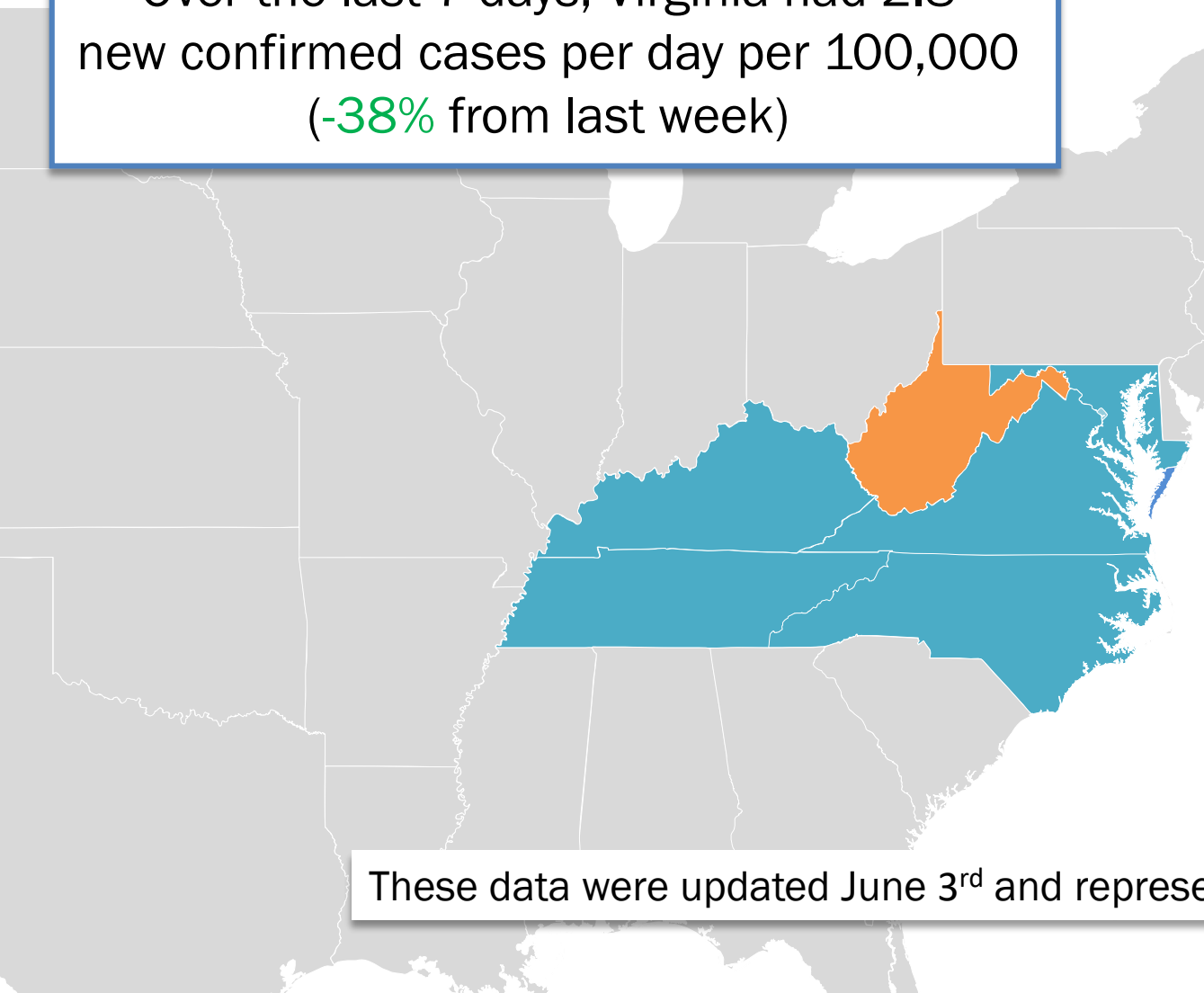
Case levels have drifted lower across the Commonwealth

- 99 percent of counties have fewer than 20 cases per 100,000 (98 percent last week)
- 95 percent of counties have fewer than 10 cases per 100,000 (83 percent last week)

These data were updated June 3rd and represent a seven-day average of the previous week

Case level trends for neighboring states were mostly down last week

Over the last 7 days, Virginia had 2.8 new confirmed cases per day per 100,000 (-38% from last week)



Very high case loads (>20):

High case loads (10-20):

- West Virginia (10.1 new cases per 100k, -25% from last week)

Lower case loads (<10): None

- Kentucky (6.7, -34%)
- North Carolina (4.2, -45%)
- District of Columbia (4.0, +5%)
- Tennessee (3.2, -50%)
- Maryland (2.6, -48%)

These data were updated June 3rd and represent a seven-day average of the previous week

Variants could increase the rate of spread

The CDC has Identified five variants of concern that spread more rapidly than the baseline variant and may lead to more reinfection

- All five variants of concern have been detected in Virginia

The CDC has projections of the May 22nd prevalence for HHS Region 3 (DE, DC, MD, PA, VA, and WV) based on genomic testing from April 25th to May 8th

- B.1.1.7 (“U.K. variant”) is estimated to be 75.5 percent of cases in the region
- P.1 (“Brazilian variant”) is estimated to be 3.7 percent of cases
- B.1.351 (“South African variant”) is estimated to be 1.1 percent of cases
- B.1.427/B.1.429 (“California variants”) are estimated to be 0.4 percent taken together

Additionally, there are several variants of interest that have been detected in the region

- B.1.526/B.1.526.1 /B.1.526.2 (“New York variants”) are estimated to total 15.6 percent
- B.1.617.1-3 (”Indian variants”) are estimated to be 1.8 percent of the cases in the region

45 percent of Virginians are fully vaccinated, and an additional 10 percent are partially vaccinated

Age	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total*
Fully Vaccinated	0	139,555	425,660	503,708	541,070	645,238	673,825	467,618	222,895	3,808,074
% Full	0.0%	12.7%	36.9%	42.9%	50.3%	57.3%	69.0%	76.2%	71.6%	44.6%
Partially Vaccinated	0	173,384	123,500	125,422	118,502	122,795	103,850	58,697	31,768	887,517
% with Partial	0.0%	15.8%	10.7%	10.7%	11.0%	10.9%	10.6%	9.6%	10.2%	10.4%
Confirmed Cases	32,332	73,752	129,717	109,427	98,264	96,174	65,407	35,065	24,903	665,041
% Confirmed Cases	3.2%	6.7%	11.2%	9.3%	9.1%	8.5%	6.7%	5.7%	8.0%	7.8%

*The total includes those without reported age information

Source: VDH, June 3rd

Vaccinations are slowing

- Over the last seven days, Virginia has averaged 33,079 doses per day (-32% from last week and -57% from April)
- At this pace, the vaccination levels needed for community immunity will not be reached across the Commonwealth before September of 2021

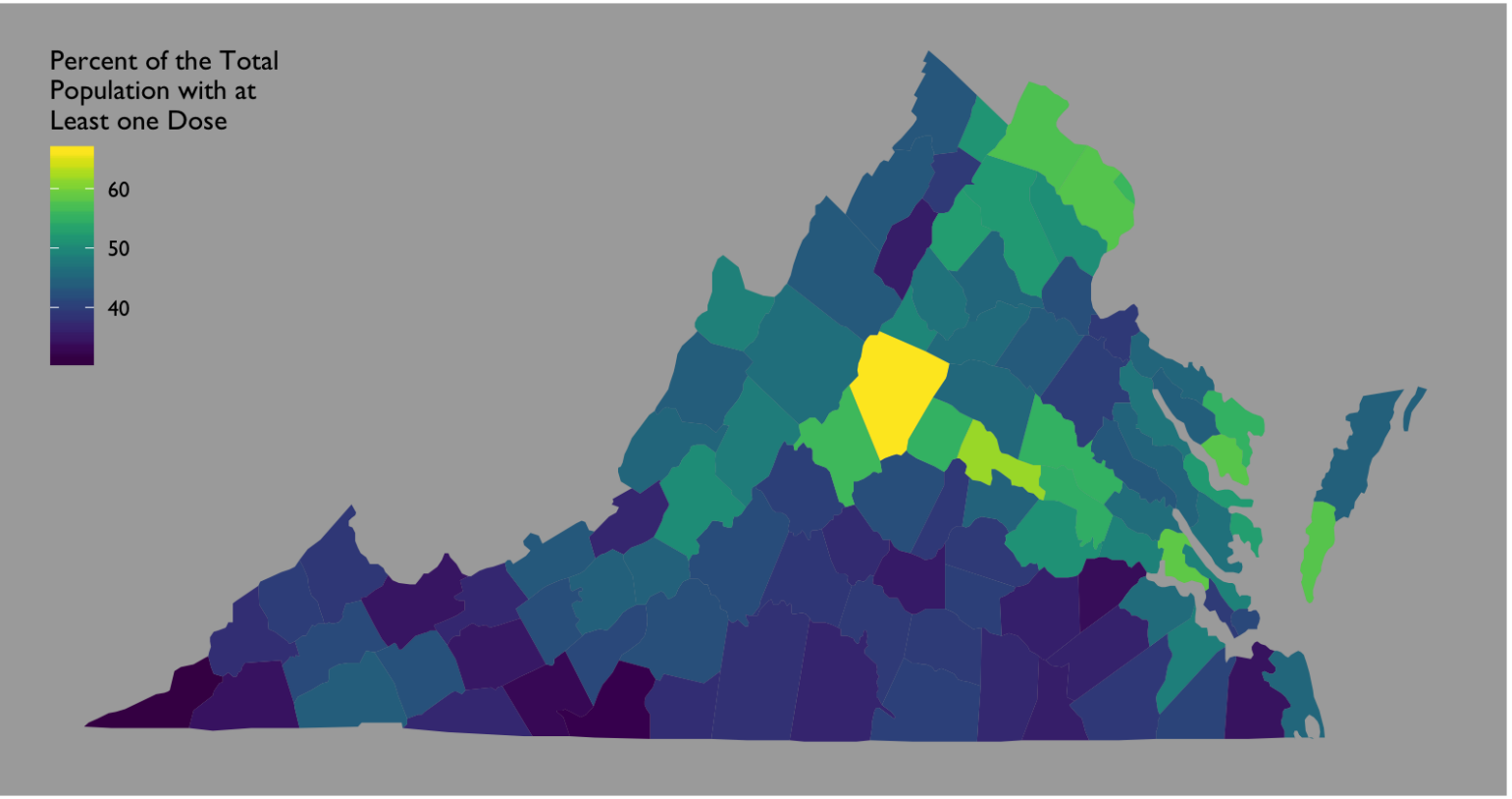
A Kaiser Family Foundation poll from April indicated hesitancy has declined

- There is a small but consistent portion of the population resistant to receiving a vaccine (roughly 19 percent)
- The gaps in vaccination rates and hesitancy have closed between white, Black, and Hispanic populations
- If access to vaccinations is a barrier, targeted vaccination sites with extended hours and no requirement for an appointment may be more useful than mass vaccination sites

Vaccination rates are uneven across the Commonwealth

Vaccination Rate for the Total Population

Source: VDH



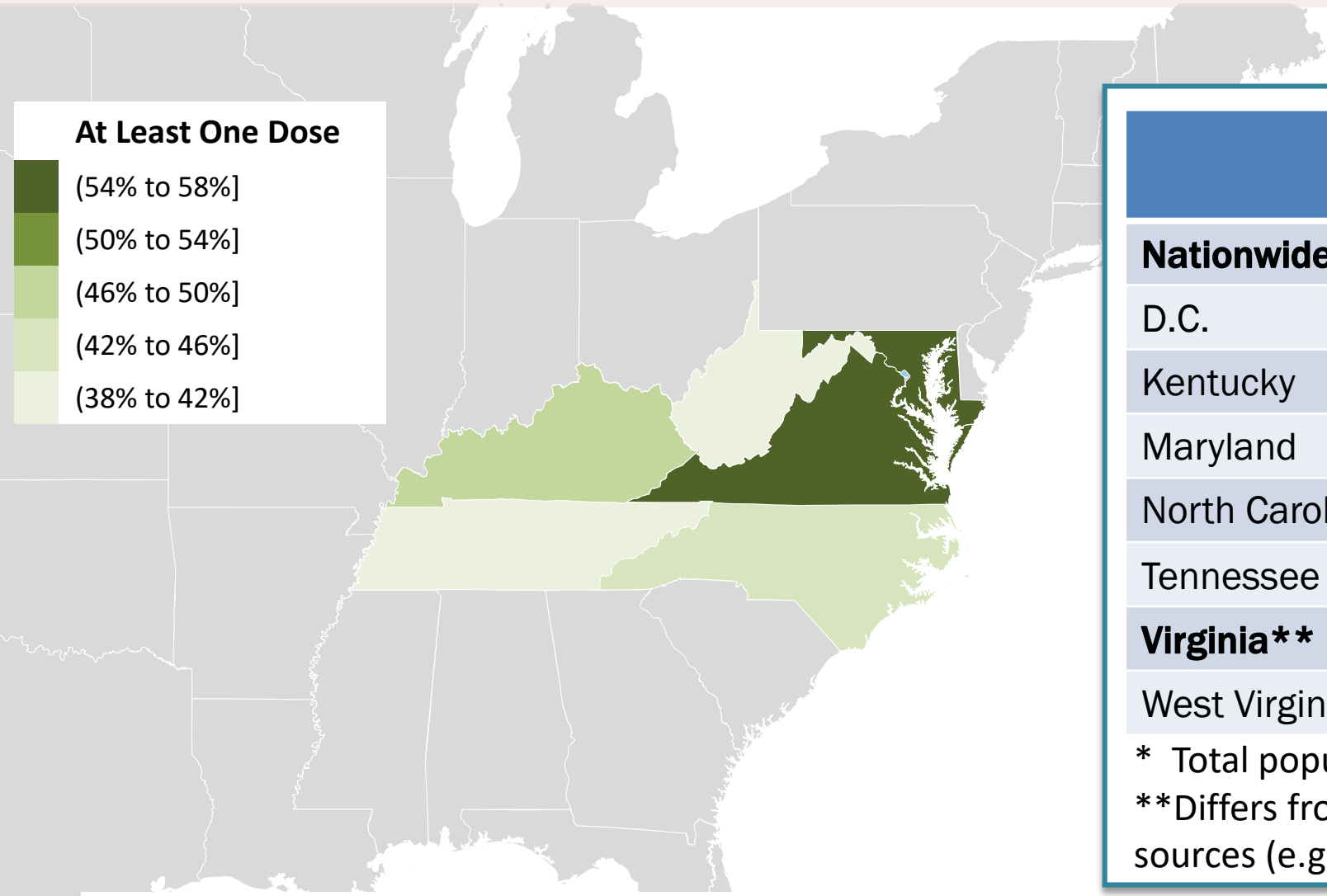
The vaccination rate varies by county

- 32 counties (3.9 million Virginians) have more than 50 percent of their total population vaccinated (up from 26 counties and 3.0 million Virginians)
- 44 counties (1.5 million Virginians) have less than 40 percent of their total population vaccinated (down from 49 counties and 1.9 million Virginians)

Community immunity is estimated to require a vaccination rate around 70 to 80 percent for the total population

These data were updated June 3rd

Vaccination rates among neighboring states vary substantially



	Partially Vaccinated*	Fully Vaccinated*
Nationwide	**9.8%**	**41.0%**
D.C.	10.7%	46.5%
Kentucky	7.9%	38.6%
Maryland	9.4%	48.2%
North Carolina	7.3%	36.2%
Tennessee	7.4%	31.9%
Virginia**	**10.0%**	**45.5%**
West Virginia	6.8%	34.1%

* Total population, includes out-of-state vaccinations
**Differs from previous slide because all vaccination sources (e.g., federal) are included

Source: https://covid.cdc.gov/covid-data-tracker/#vaccinations
These data were updated June 3rd

We've been monitoring recent, relevant literature

Chernyavskiy et al. examined county level vaccine uptake data up to mid-May and estimated the trajectory towards herd immunity

- Using an auto-regressive model with health and demographic characteristics, the authors produced estimates for when 70 percent of the county population is expected to be vaccinated
- Higher take-up was correlated with a higher share of college educated, Hispanics, and elderly
- Based on these trends, they expect counties with typical uptake rates will reach herd immunity August 2021
- However, in this case, AR models may not be appropriate for projections of more than a week or two

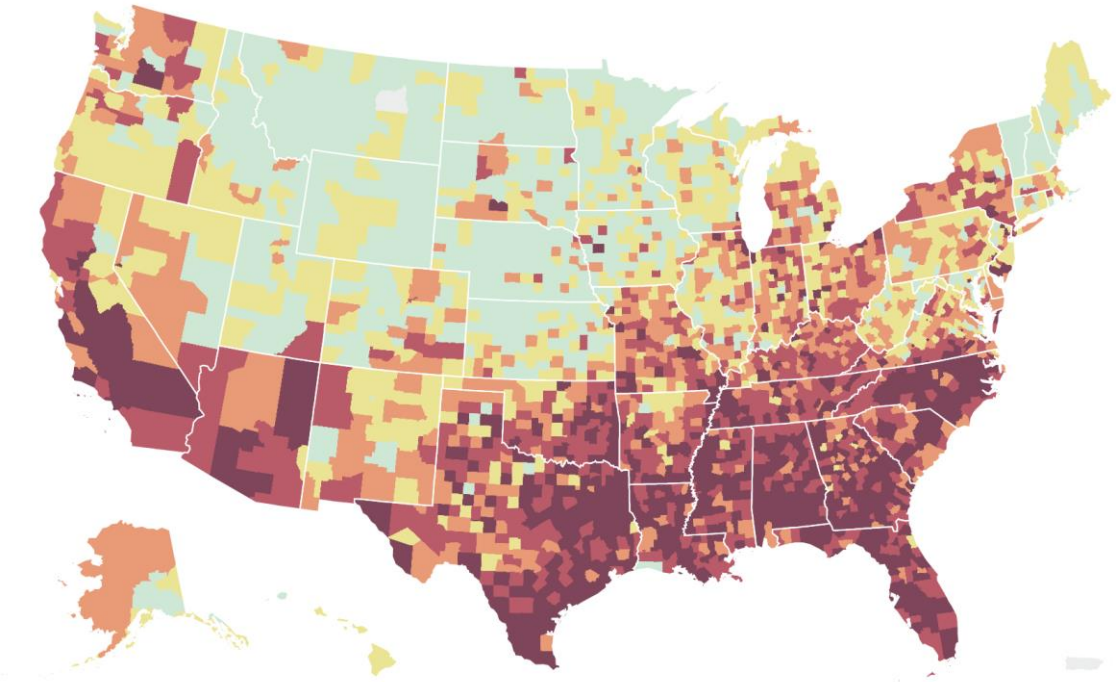
Jeon et al. used data from 14 jurisdictions in the U.S. to assess the effectiveness of case investigation and contact tracing (CICT)

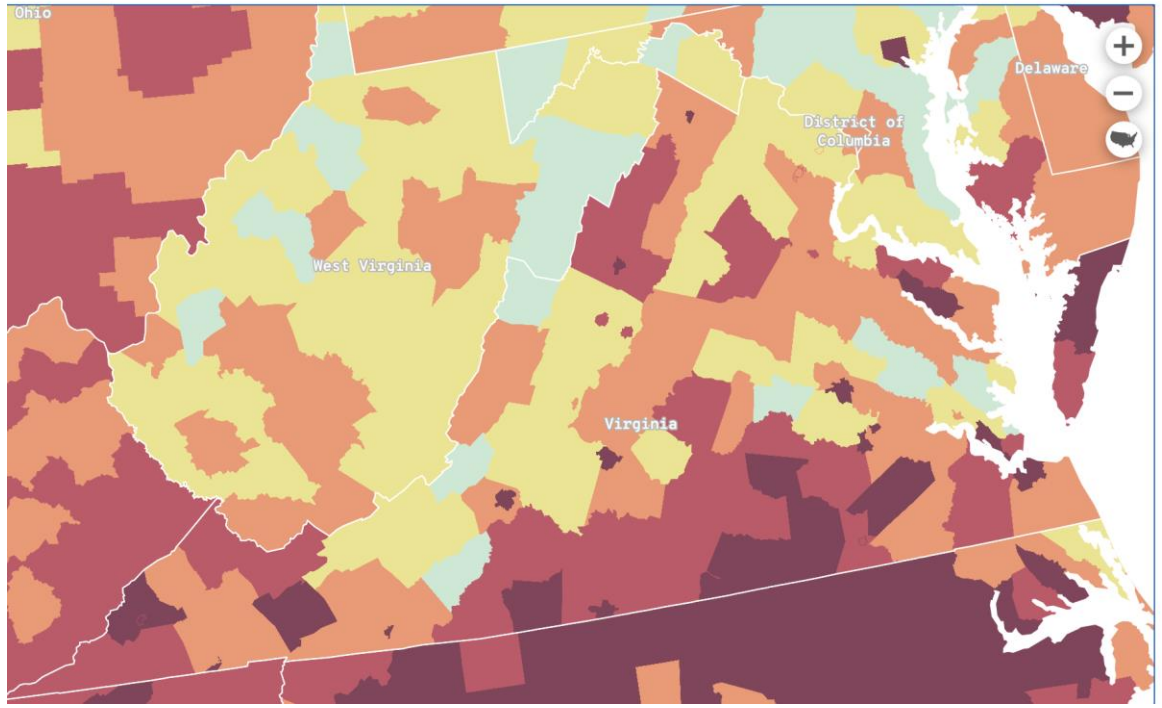
- The authors used the CDC's COVIDTracer Advanced modeling tool with county level details on hospitalizations, cases, and details on CICT efforts to estimate their efficacy
- They noted that the performance varied widely but that, on average, reducing the time to isolate a case by one day resulted in a 15 percent increase in averted cases

Smittenaar et al. have updated their measure of COVID-19 community vulnerability (CCVI) to better capture the evolution of the pandemic

- The vulnerability measure produced by the research team includes factors related to socioeconomic status, minority status and language, household and transportation, epidemiology, health care systems, high-risk environments, and population density
- The updated measure captures how testing resources were deployed and updates the data to November 2020

The COVID-19 Community Vulnerability Index varies substantially across the Commonwealth



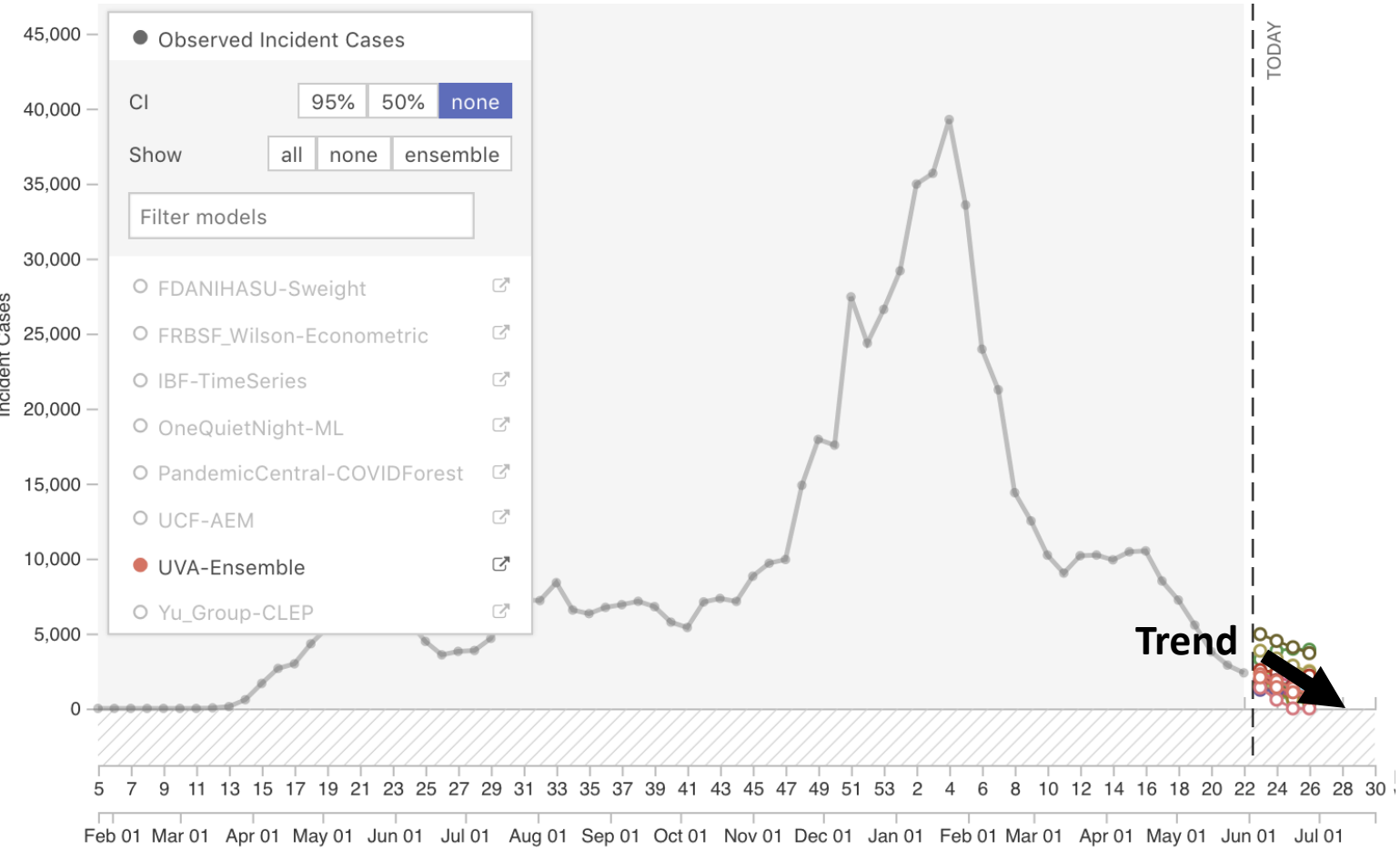


The Surgo Foundation's CCVI indicates that the southern counties in Virginia are the most vulnerable to COVID

- These counties may need additional resources to respond to and recover from the pandemic

These data were updated May 26th

The model forecasts broadly agree on a sustained decline in cases



The model estimates forecast a substantial decline in cases over the coming weeks, with a few exceptions

Many of the model predictions lag the data

- This means that they match the trends in retrospect but not as forecasts

Modeling will be less useful for forecasts with the current decline in cases

- Surveillance efforts will be key to the early identification of potential outbreaks
- Contact tracing efforts have proven effective in containing low levels of spread
- Modeling can support both surveillance and test-and-trace

Source: COVID-19 Forecast Hub, https://viz.covid19forecasthub.org/
Accessed June 3rd

The pandemic characteristics will change over the summer and fall

The state of the pandemic in Virginia this summer and fall will depend on vaccination take up

- The number of hospitalizations and deaths will likely not surpass last year's levels because the elderly, the most vulnerable population, have a vaccination rate near 80 percent
- The rate of take up is not currently on track for community immunity targets to be reached before the fall

Previous infection offers some protection, but it does not appear to be as effective as vaccination

- Several studies (e.g., Hansen, 2021 and Letizia, 2021) indicate that prior infection is about 80 percent effective in preventing future infection versus 94 percent or higher for Pfizer and Moderna (Tenforde, 2021)
- The durability of naturally acquired antibodies is not yet known, but they may wane (Hansen, 2021)
- Further, the efficacy of naturally acquired antibodies may be lower against the new variants

In this environment, there will be occasional waves of COVID cases, potentially tied to super-spreader events and seasonal changes/events (e.g., holidays or school calendars), but deaths and hospitalizations are not likely to spike

- Activities that increase vaccination take up (Bogart, 2021) make community immunity more attainable
- It will be important to maintain the capacity to vaccinate large populations in the fall because foreign students may not have access to the vaccine now in their home country
- Decisionmakers should monitor variants that might break out of the immune protection in case a new strategy is needed
- If the durability of naturally acquired antibodies is only a few months, long-run cases could be reduced by encouraging those who have recovered from COVID to get vaccinated
- <u>Preparation can mitigate the harms of future waves</u>

There will be long-term consequences from COVID

As of June 2nd, 675,783 Virginians had been diagnosed with COVID, and 56,765 had been hospitalized for it

- Based on the Mishra et al. study, we would expect 200,000 Virginians to have had neurological issues associated with their case and more than 1,100 strokes to have occurred due to COVID
- Many of these people will have lingering physical and mental health consequences from their infections
- As many as one third of cases (225,000) result in “long COVID” with a range of physical effects

Beyond those who survived COVID infections, there will be long-term repercussions from the pandemic

- Patients with chronic conditions may suffer long-term consequences due to delayed care
- Stress among health care providers has substantially lowered morale and may lead to additional attrition
- Further, distress and mental illness have risen substantially in the broader public and may require additional capacity to treat appropriately

Efforts to ensure adequate capacity for timely care could mitigate the effects of these consequences

- Access to telemedicine could be improved by additional training for providers and family members and expanding broadband access in rural areas (Cantor, 2021)
- Increased investment in mental health care and substance abuse programs may be necessary to meet demand

Discussion and Questions