UNIVERSITY of VIRGINIA
BIOCOMPLEXITY INSTITUTE

UVA COVID-19 MODEL WEEKLY UPDATE

VDH VIRGINIA DEPARTMENT OF HEALTH

May 13th, 2022

KEY TAKEAWAYS

- Most health districts (22 of 35) are now in surge, with another 11 in slow growth. Other states are having surges of their own. Most of the Northeastern states are seeing rapid case increases.
- The basic reproduction number (R_e) is above one for all regions of the Commonwealth. This implies that case rates will continue to grow.
- The CDC estimates that the BA.2.12.1 subvariant represents almost 50% of new cases in HHS Region 3, which includes Virginia. It will likely become dominant in the next few weeks. The subvariant is more transmissible than the ancestral BA.2.
- Models forecast a significant surge of cases in the coming weeks. Case rates are not expected to reach levels seen during the January wave. But they will likely exceed those seen in pre-Omicron waves.

26.9 per 100k
Average Daily Cases
Week Ending May 9th, 2022

(187 per 100k)
Adaptive Scenario Forecast Average Daily Cases, ***Already Peaked*** *on January 16th, 2022*

836 / 982
Average Daily 1st / 2nd Doses
Week ending May 6th, 2022

1,614 / 5,160
Average 1st / 2nd Boosters
Week ending May 6th, 2022

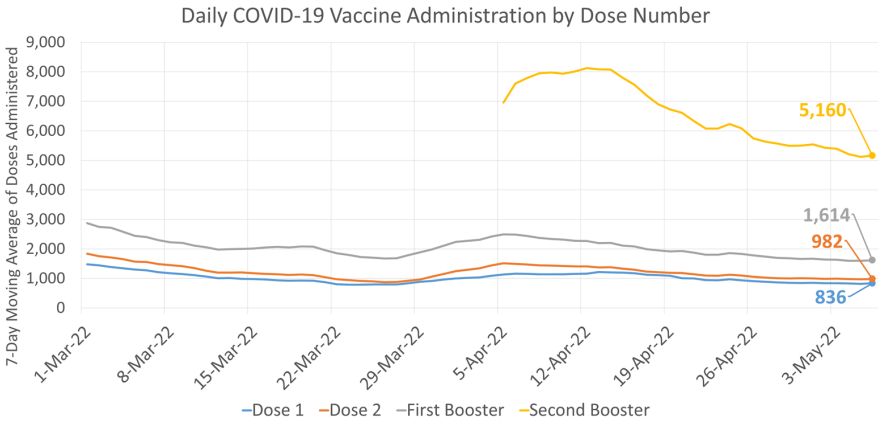
(Vaccine estimates are preliminary)

KEY FIGURES

Reproduction Rate
(Based on Confirmation Date)

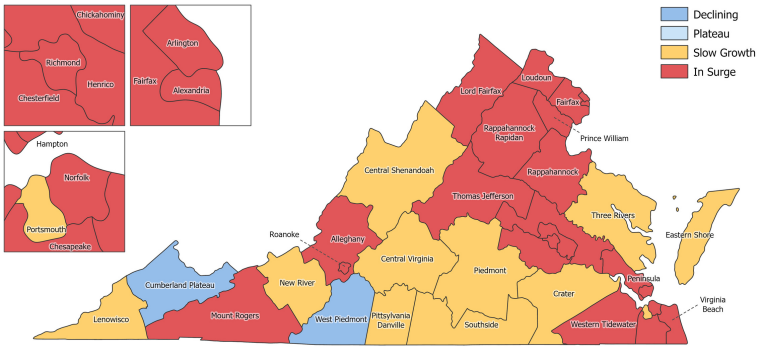
Region	R_e May 9th	Weekly Change
Statewide	**1.081**	**0.057**
Central	1.116	0.096
Eastern	1.026	-0.083
Far SW	1.009	0.177
Near SW	1.040	0.049
Northern	1.090	0.039
Northwest	1.107	0.268

Vaccine Administrations
Note: This week's vaccination estimates are preliminary and subject to change.



Growth Trajectories: 22 Health Districts in Surge

Status	# Districts (prev week)
Declining	2 (5)
Plateau	0 (2)
Slow Growth	11 (17)
In Surge	22 (11)



UNIVERSITY of VIRGINIA
BIOCOMPLEXITY INSTITUTE

UVA COVID-19 MODEL WEEKLY UPDATE

VDH VIRGINIA DEPARTMENT OF HEALTH

THE MODEL

The UVA COVID-19 Model and weekly results are provided by the UVA Biocomplexity Institute, which has over 20 years of experience crafting and analyzing infectious disease models. It is a health district-level **S**usceptible, **E**xposed, **I**nfected, **R**ecovered (SEIR) model designed to evaluate policy options and provide projections of future cases based on the current course of the pandemic. The Institute is also able to model alternative scenarios to estimate the impact of changing health behaviors and state policy.

COVID-19 is a novel virus, and the variant mix changes periodically. These models improve as we learn more.

THE SCENARIOS

Updated: The model uses scenarios to explore the potential paths the pandemic may take under different conditions. Model projections take a variety of factors into account, including current variants, vaccine uptake, vaccination rates (including boosters), previous infection, waning immunity, weather, and behavioral responses (e.g., mask-wearing, social distancing). The "**Adaptive**" scenario represents the current course of the pandemic, projecting it forward with no major changes. The "**Adaptive-VariantBA2**" scenario adjusts for the Omicron BA.2 subvariant's enhanced transmissibility (30% more than BA.1), assuming that BA.2 will reach 95% prevalence by mid-May. The new "**Adaptive-VariantBA2_12**" scenario adjusts for the BA.2.12.1 subvariant's even greater transmissibility (30% more than BA.2). It assumes BA.2.12.1 becomes dominant by June and reaches 95% prevalence by July, taking over from BA.2. The new "**Adaptive-VariantBA2_12-IncreasedControl**" scenario adds increased prevention and seasonality to the "Adaptive-VariantBA2_12" scenario. These include increased home testing, masking, and self-isolation when sick. This scenario is meant to model the potential public response to a new summer surge. It assumes that these interventions will have a 25% reduction in community transmission and start in June.

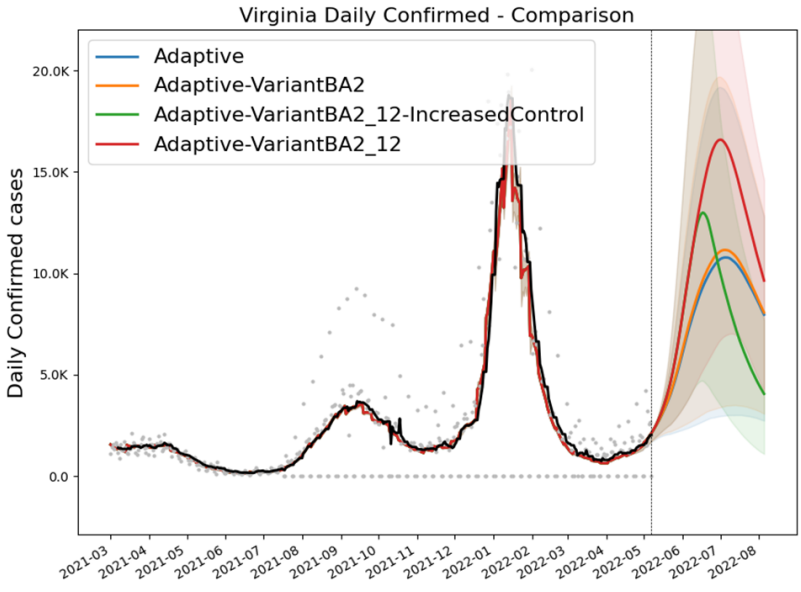
MODEL RESULTS

Updated: The current course "**Adaptive**" scenario is shown in blue. It projects a slow but steady rise, reaching 20,000 weekly cases by June and peaking at 75,000 weekly cases in early-July.

The "**Adaptive-VariantBA2**" scenario (orange) shows a slightly faster and larger surge. It peaks at 78,000 weekly cases in early July.

The "**Adaptive-VariantBA2_12**" scenario, shown in red, projects a large surge. It reaches 40,000 weekly cases by June and peaks at nearly 115,000 in the first week of July. The new "**Adaptive-VariantBA2_12-IncreasedControl**" scenario is shown in green. It is identical to "Adaptive-VariantBA2_12" until June 1st. From there, rates quickly peak at 90,000 weekly cases in mid-June, before falling back below 40,000 by August.

Please do your part to drive down cases. Always practice good prevention. Consider masking in indoor public areas and self-isolating when sick. Also please get vaccinated and boosted.



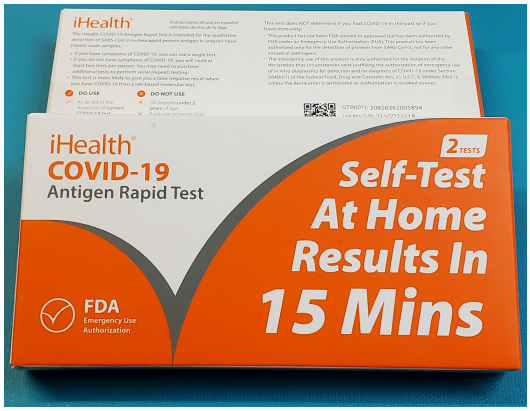
Date of Latest Model Run: 2022-05-11
Date of Next Model Run: 2022-05-25

ANOTHER WAVE

Another variant, Omicron subvariant BA.2.12.1, is likely to become dominant in Virginia in the next could of weeks. Several signals suggest that BA.2.12.1 is causing surge in cases across Virginia. Modeling suggests cases could continue to surge into July and August. There is uncertainty regarding the severity and duration of this wave, but it seems likely that the Commonwealth will experience another wave of elevated COVID-19 cases and hospitalizations.

In an earlier report we discussed some of the tools VDH uses to watch for coming waves. The computational modeling done by UVA is a large component of this. But VDH also monitors viral loads in the sewage at 25 treatment plants around Virginia. Wastewater monitoring is not affected by reporting biases or the popularity of at-home testing. VDH is also tracking the epidemic trajectories of our neighboring states. Several more heavily populated states, such as New York and Florida, often lead Virginia by a few weeks when it comes to COVID surges. All of these warning systems are reporting the same: a new wave is coming.

The Problem of Ascertainment



The results of home testing kits are rarely reported. This affects the COVID19 ascertainment rate in Virginia.

No surveillance system will catch 100% of infections. In fact, it is common for infections of many diseases to go unreported. For example, the CDC estimates that they detect and catalog fewer than 15% of all Lyme disease cases per year. Epidemiologists even have a special term for this. We call the ratio of detected cases to total infections the "**Ascertainment Ratio**". The smaller the ratio, the better, as that means we are detecting more cases.

The ascertainment ratio for a disease like COVID-19, which has a large number of asymptomatic and mild infections, is difficult to determine. Moreover, the ascertainment rate varies across populations, across regions, and over time. The only surefire way to measure the ascertainment is by systematically screening a sample of the population to understand the true infection rate.

Recently, at home testing has affected COVID-19's ascertainment rate. While they are an essential tool to protect families and communities, at-home test results are only occasionally reported to public health departments. This means many cases that would have previously been reported are missed. In addition to case counts, at-home testing may also affect test positivity rates, especially if people only feel obligated to report positive results. Adding to the uncertainty, the protection afforded by vaccination and boosters, and, to a lesser extent, previous infection is resulting in milder cases overall. Asymptomatic people, or people with only mild symptoms, are less likely to seek out a test.

The Silver Lining

The graph on page two may cause concern. It shows a peak in June that is as high as that of the last wave in January. But this may be misleading. While the UVA model provides projections for *cases,* the model is actually based on *infections*. For most of the pandemic, ascertainment rates have been fairly stable, at about 2.5 infections per identified case. During Omicron, however, this broke down. Demand for tests surged, but supplies did not. Test positivity rates in Virginia were over 30% for several weeks, indicating a shortage of testing. Case ascertainment rates also plunged. During the height of the Omicron wave, there were likely more than 10 infections for each identified case. To put it simply, the Omicron wave was much, much larger than even the record-shattering number of identified cases suggests. The projections for the BA.2.12.1 wave do not include this breakdown of the ascertainment rate. So while the model projects a similar number of identified *cases* to the Omicron wave, it expects far fewer *infections*. And that is the important factor.

In light of this new environment, the UVA team is working to improve how we communicate the significance of any wave. Regardless, BA.2.12.1 is projected to cause a summer wave in Virginia. Pay attention to CDC Community Levels in your community and follow the appropriate guidance, including masking in indoor public settings when levels are high or it is otherwise advised. Vaccination is the best defense against severe outcomes, and reduces the risk of transmission. Get vaccinated and boosted when eligible.