UVA COVID-19 MODEL WEEKLY UPDATE

July 29, 2022

KEY TAKEAWAYS

- Although plateauing, case rates remain high. Current rates are 5.5 times higher than the mean rates of Summer 2021. Infections are likely much higher due to lower case ascertainment rates.
- Hospitalizations have grown slowly but consistently for the past few weeks, even as cases have remained relatively stable.
- According to the CDC's Nowcast, the BA.5 subvariant now accounts for 4 out of every 5 new cases in the region.
- A total of 55 localities are now at High community levels. At these levels, the CDC recommends masking in public indoor places for all residents. A further 60 are at Medium community levels. High risk individuals in these communities should also consider masking.

37.0 per 100k
Average Daily Cases Week Ending July 25, 2022

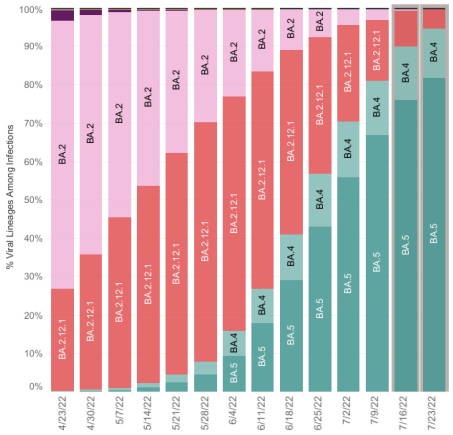
0.979
Statewide Reproductive Number as of July 25, 2022

55
*Virginia Localities at **High** CDC Community Levels as of July 28, 2022*

60
*Virginia Localities at **Medium** CDC Community Levels as of July 28, 2022*

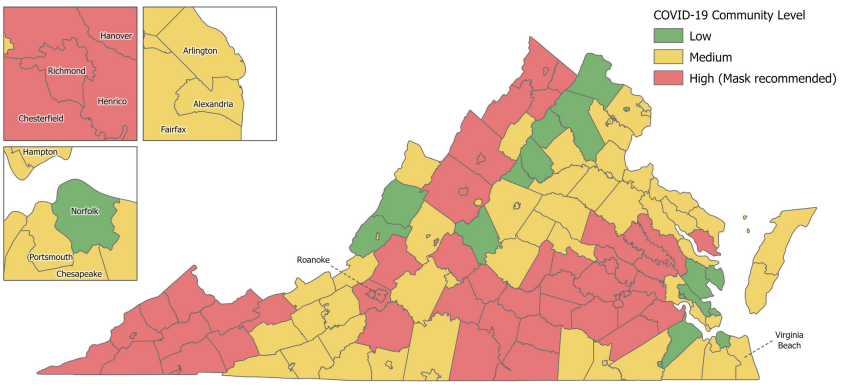
KEY FIGURES

Variant Mix -HHS Region 3



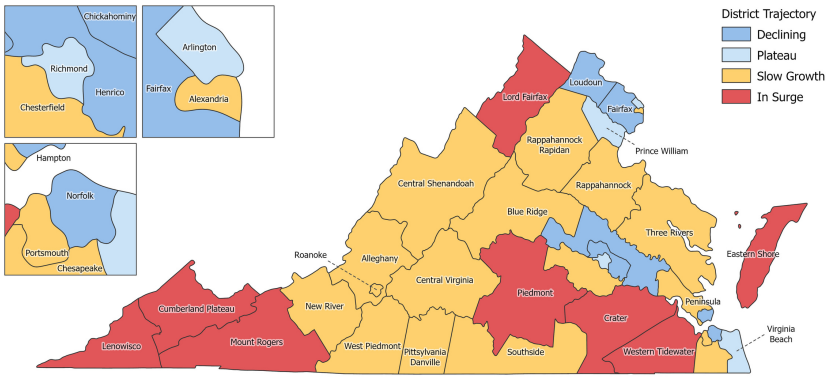
CDC Community Levels

As of July 28, 2022



Growth Trajectories: Eight Health Districts in Surge

Status	# Districts (prev week)
Declining	6 (4)
Plateau	4 (3)
Slow Growth	17 (20)
In Surge	8 (8)



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

Unchanged: The model uses scenarios to explore the potential paths the pandemic may take under future 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. It now includes the impact of the BA.4 and BA.5 Omicron subvariants which together are dominant in Virginia. As such, the old BA.4_BA.5 scenario has been retired. The new "**Adaptive-VariantX**" is a *speculative* scenario to explore the potential impact of a new variant emerging in three months. This hypothetical variant is imagined as having the same immune escape and transmissibility advantages over BA.4/5 that BA.4/5 did over the earlier BA.2. See page three of the July 15 report for details. Both scenarios have an associated "**FallWinter"** modifier like the one used last year. This modifier layers seasonal increases associated with colder weather, indoor gatherings, and holiday travel on top of the base scenarios. It does this by artificially adjusting transmissibility between September and January to match transmissibility from the same time last year.

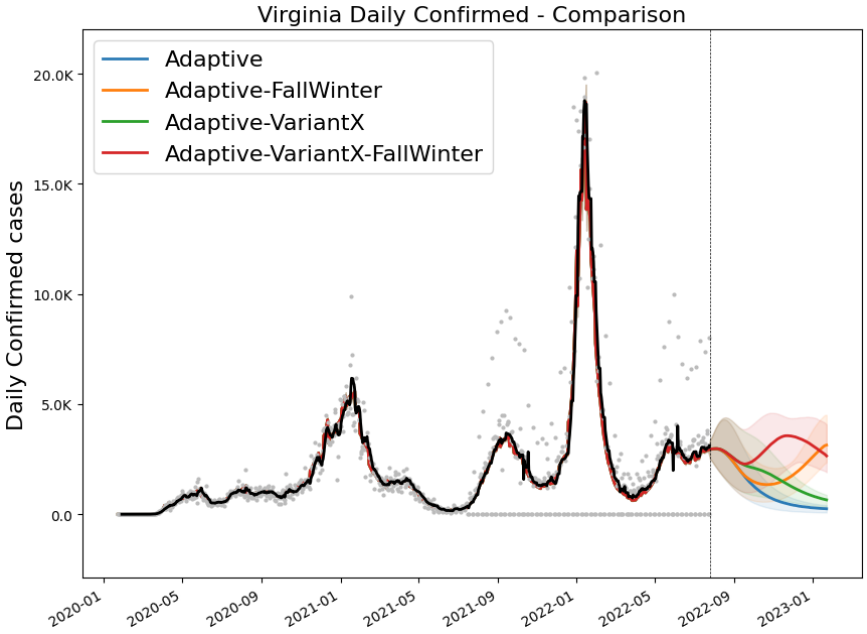
MODEL RESULTS

Updated: As always, the current course "**Adaptive**" scenario is shown in blue. If the current course persists, this scenario projects a flattening of cases, followed by a slow but steady decline. In this scenario, Virginia just peaked, and will fall below 1,000 daily cases by October.

The new "**Adaptive-FallWinter**" scenario, shown here in orange, follows the same course until September. From there it bottoms out in October and begins to grow again, peaking in January 2023.

The new *hypothetical* "**Adaptive-VariantX**" scenario, shown in green, is also identical until September. From there it projects a much slower decline, not reaching fewer than 1,000 daily cases until mid-December.

The "**Adaptive-VariantX-FallWinter**" (red) follows the same course until September. From there it projects another rise, peaking at 3,500 daily cases in late November.



Date of Latest Model Run: July 27, 2022
Date of Next Model Run: August 10, 2022

Please note: The data and projections shown here reflect reported cases. During the Omicron wave, testing shortages resulted in far fewer infections being reported as cases. This suggests fewer total infections than experienced in January. Please see page three of the May 13th modeling report for more details.

WINTER FORECASTS

The United States is emerging from a heat wave that drove high temperatures above 100° F in much of the country and leaving many broken records in its wake. So it may seem like an odd time - or a great time - to start thinking about winter weather. For COVID-19 forecasters, however, mid-summer is the right time to begin thinking about the impact the return to school, holiday travel, and cooler weather may have on the course of the COVID-19 pandemic. Much like last week's heat wave, winter is the season when Virginia's weekly COVID-19 case rates have been driven above 100 per 100k residents, with winter surges smashing previous records in successive years.

The weather can change drastically from day-to day, or even hour-to-hour. By contrast, the ebbs and flows of COVID-19 occur over weeks and months. Nevertheless, both the weather and COVID-19 are influenced by changes in their environments. While climate change is leading to more extreme weather events, the overall COVID-19 environment may be leading to less severe disease. However, just as climate change is making the day-to-day weather more difficult to forecast, COVID-19s changing environment is creating more questions than certainty about this winter's forecast.

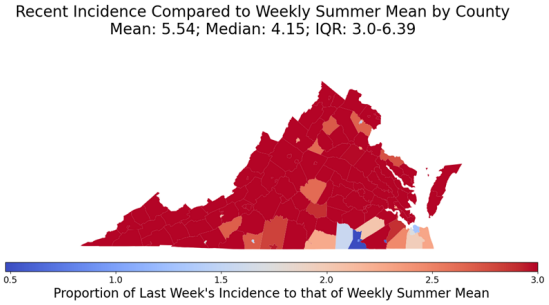
What Drives COVID-19 Surges?

COVID-19 case surges are often associated with particular Variants of Concern: the Delta wave, the Omicron wave, the current BA.5 wave. However, it is unclear to what extent each variant drives surges, or simply takes advantage of conditions. The Alpha variant became dominant in Virginia, for instance, just as a winter surge was ebbing, vaccinations were taking off, and temperatures were rising. Alpha hit some countries earlier, and is associated with notable surges. In the United States, however, it fizzled out and coincided with the lowest case levels of the pandemic during the summer of 2021. On the flip side, Delta arrived in the US as public health restrictions were lifted, fall weather was approaching, and schools were reopening. Delta became associated with a major surge.

Variants certainly influence surges but the extent can vary widely. Human behavior, seasonality, and the immunity profile of the population also play major roles. A population's immunity profile is influenced by a variety of factors as well, including the extent and timing of new vaccines and booster campaigns, the timing of previous waves and waning rates, and the dominant variant during previous waves. It is difficult to assess each of these factors, but the UVA model includes in model scenarios.

The COVID-19 Environment this Winter

At the moment, Virginia's COVID-19 case rates are very high, approaching those seen during the height of the Delta wave in September 2021. As noted in previous reports, however, the case ascertainment rate is much lower now. Prior to Omicron, the UVA team estimated there were 2-6 infections per reported case. During the Omicron wave, that may have soared to 25 infections per case. Currently, they expect 16 infections per case. This means the actual infection rate may rival levels seen during the Omicron wave. If no new VoCs arise, the Adaptive-FallWinter scenario projects cases will decline through the fall. As waning immunity sets in, however, cases will begin to rise again in early winter, just a seasonality and holiday travel are expected to increase transmission rates.



Current case rates compared to weekly summer means in 2021. Case counts this summer have been much higher than last summer.

However, if a new VoC emerges that partially escapes immunity provided by previous BA.5 infection, cases could rebound earlier in the fall, as shown in the Adaptive-VariantX-FallWinter Scenario. If this happens immunity provided by a "Variant X" could last into January, exactly when case rates have peaked in previous winters. This could "flatten the curve", spreading out the disease burden and leading to lower spikes in hospital occupancy and test demand.

Though based on previous winter surges and variants, these scenarios remain highly speculative. They illustrate what *could* happen under likely scenarios, and help us to think about the future. The future of COVID-19 is uncertain, but the actions we can take to prepare for it are not. Keep track of CDC community levels and prevention recommendations. Vaccination is the best defense against severe outcomes. Get vaccinated and boosted when eligible.