October 8th, 2021

KEY TAKEAWAYS

- Case rates across Virginia continue to fall, and most health districts are in "Decline", with zero districts in "Surge" this week.

- Overall case rates remain high, and the risk of infection is still significant. We may have made it over the crest of the Delta wave, but we still have a long way to go.

- Hospitalizations and deaths typically lag reported cases, and we may still see small increases in both in the next few weeks.

- Models predict a continued slow decline, but the possibility for another surge caused by winter weather and travel remains.

33 per 100k
Average Daily Cases Week Ending Oct. 3, 2021

(43 per 100k)
*Adaptive Scenario Forecast Average Daily Cases **Already Peaked** on September 19, 2021*

4,624
Average Daily 1st Doses Oct. 3, 2021
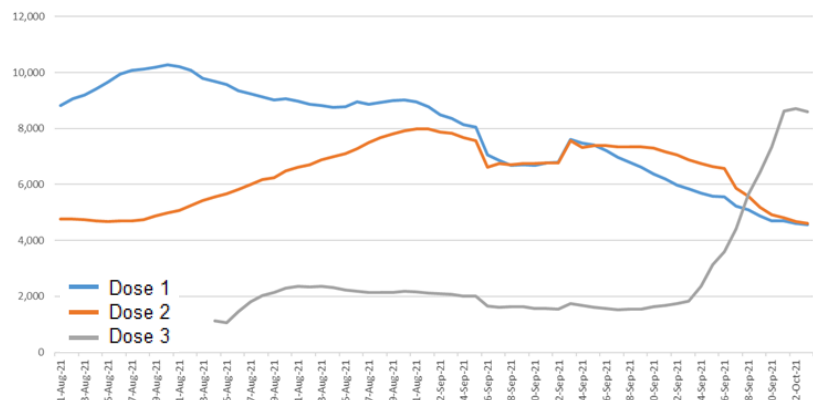
4,804
Average Daily 2nd Doses Oct. 3, 2021

KEY FIGURES

Reproduction Rate
(Based on Confirmation Date)

| Region	R_e Oct 4th	Weekly Change
State-wide	1.015	0.037
Central	1.041	0.063
Eastern	1.007	0.013
Far SW	0.988	0.024
Near SW	0.983	0.042
Northern	0.989	-0.023
Northwest	1.019	0.069

Vaccine Administrations

COVID-19 Vaccine Administration Moving Average by Dose Number

Growth Trajectories: No Health Districts in Surge

Status	# Districts (prev week)
Declining	31 (20)
Plateau	3 (5)
Slow Growth	1 (8)
In Surge	0 (2)

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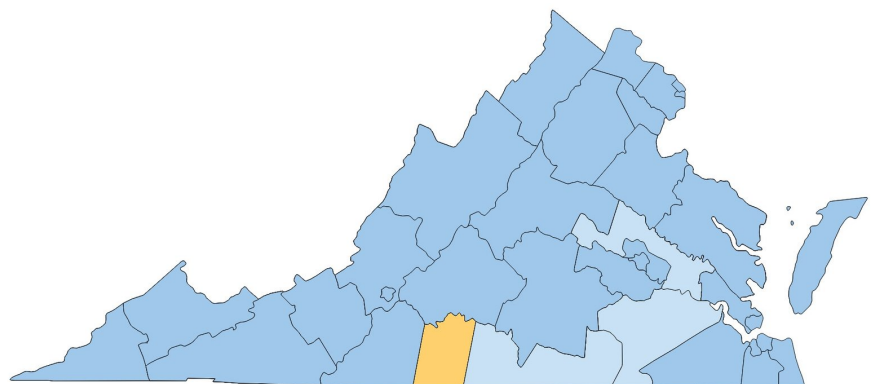
THE MODEL

The UVA COVID-19 Model and these 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 county-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 constantly. The model improves as we learn more.
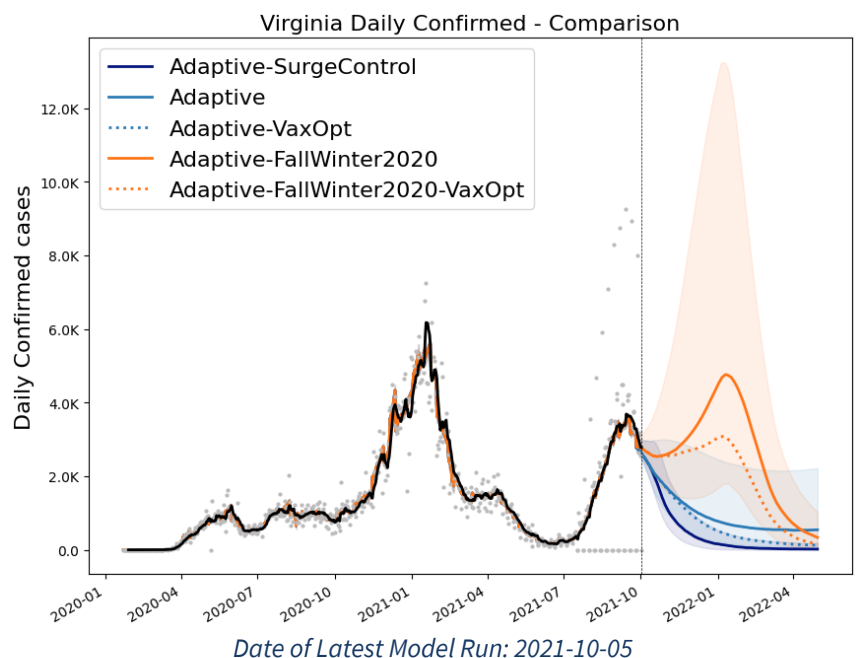
THE SCENARIOS

Scenarios remain unchanged from last week. The models use various scenarios to explore the path the pandemic is likely to take under differing conditions. The **Adaptive** scenario takes the current course of the pandemic at the county level, including the impact of the Delta variant and vaccines, and projects it forward. The **SurgeControl** scenario shows the likely impact of prevention and mitigation efforts (masking, social distancing, testing and isolating, etc.) by employing a 25% reduction in transmission rates. The "**FallWinter2020**" captures the transmission drivers of the entire 2020 holiday season and project them forward. In this scenario, transmission rates from October 2021 to February 2022 are manually set to reflect the transmission rates from the same time period last year, but boosted by Delta's enhanced transmissibility.

As usual, all of these scenarios can be augmented by the **VaxOpt** (optimistic vaccine) modifier that adds to the existing scenario a hypothetical increase in vaccinations among adults and assumes vaccine eligibility for children ages 5-11 years in November. Specifically, this modifier assumes that we reach an average of 85% coverage among adults, with a minimum of 65% in each county. Note that all scenarios also include the effects of natural immunity.

MODEL RESULTS

As with last week, the "present course" Adaptive scenario (blue), suggests that **cases have peaked and are now in a gradual decline**. The SurgeControl scenario (shown in indigo) again forecasts a much faster drop-off of case rates, reaching Summer 2021 lows by early December. Conversely, the FallWinter2020 (shown here in orange), continues to forecast a consistent rise in case rates possibly exceeding last January's peak.

The VaxOpt (dashed lines) scenarios, show that in the long-run, increased vaccination coverage could prevent thousands of cases in any scenario. Please do your part to stop the spread and continue to **practice good prevention**, including indoor masking, social distancing, and self-isolating when sick, and **get vaccinated** as soon as possible.

Virginia Daily Confirmed - Comparison

—— Adaptive-SurgeControl
—— Adaptive
······ Adaptive-VaxOpt
—— Adaptive-FallWinter2020
······ Adaptive-FallWinter2020-VaxOpt

Date of Latest Model Run: 2021-10-05

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TEMPERED OPTIMISM

We are happy to report some good news this week. For the first time since June 30th, no health district is in surge. Most districts (31 of 35) are in decline. Last week even saw the state-wide Reproductive Number dip below one, indicating we may have crested the Delta Wave. The models suggest we could see this decline continue for months. These findings are cause for celebration, but we are not out of the woods yet. Case rates and hospitalizations remain high. This is particularly true in Southwest Virginia which is still


Point Prevalence by Zip Code Tabulation Area

2000+
1500
1000
500
0

Units: Cases / 100,000

Spatial Empirical Bayes smoothed point prevalence for the week ending 2021-10-02.

seeing high prevalence rates and having hospital capacity issues. Moreover, statewide weekly average COVID19 deaths topped 45 per day on October 4th, the highest they've been since March 15th. With the news of declining case rates, it is important to remember that at this very moment we are still in a period of high transmission, and we should not relax our guard just yet.
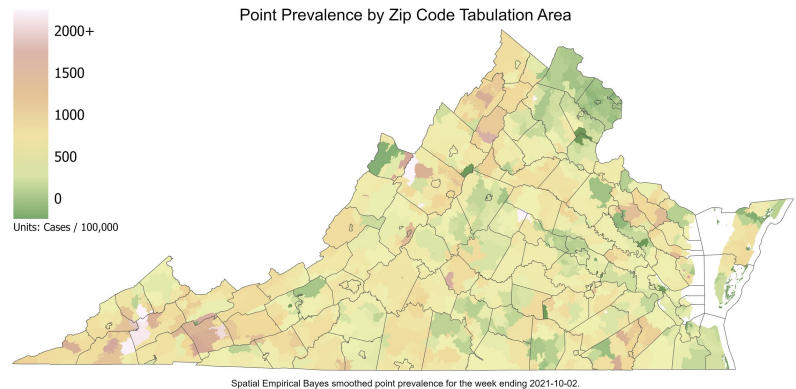
The Continued Case for Vaccinations

The subject of natural immunity is the center of some debate these days. Natural immunity is acquired by clearing an active infection, and there is some evidence that it may be as protective against COVID19 as vaccination. As such, the obvious question becomes: why do the CDC and state health departments advocate vaccinating everyone who is eligible, especially if natural immunity is just as good? There are myriad good reasons for this:

1. **Vaccination is far safer** than getting COVID19 itself. Though young and healthy Virginians are unlikely to die from COVID19, over 14% of recent hospitalizations were among people under 40. Moreover, a study in Nature found that 80% of infected individuals developed at least one symptom of "long-COVID". Trying to reach herd immunity by natural means will cause significant morbidity and mortality across the Commonwealth.

2. The vaccine immune response is **more predictable** than natural immunity. Not everyone responds similarly to infection, and the severity of that infection can affect a patient's immune response. A CDC study found that over 1/3rd of patients who tested positive with mild disease produced so few antibodies that they were undetectable. Conversely, the vaccines are highly standardized with very carefully controlled dosing and timing, and produce more consistent and reliable results.

3. Vaccine induced immunity may be **more effective against future variants**. The antibodies produced by someone with natural immunity target slightly different regions on the virus' outer surface. An NIH funded study examined 3,800 possible mutations to determine if a hypothetical new variant might escape existing immunity. They found that the antibodies generated by vaccinations are more protective against potential future variants than those generated by natural immunity.

Daily Infections and Vaccinations

First dose vaccinations
Confirmed cases
Undetected infections
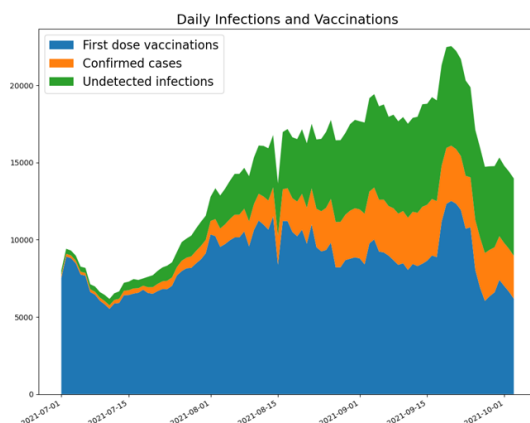
UVA models account for population immunity from both natural infections and vaccinations.

4. If you have not had COVID19, vaccination could prevent future illness. And even if you suffered a breakthrough case, you would still have a drastically lower risk of death or hospitalization. Moreover, the chances of you developing long-term side-effects would be cut in half.

5. If you have already had COVID19, post-infection **vaccination could "supercharge" your natural immunity**. A recent CDC study showed that vaccination after infection cut the rate of reinfection by nearly 60%. Vaccination may also alleviate symptoms of long-COVID from that infection.

6. The UVA model does take into account the effects of natural immunity. But even assuming that most cases go undetected, **vaccinations are still responsible for protecting more Virginians** than natural immunity (left). As seen in the VaxOpt scenarios on page two, increasing vaccination coverage could still prevent thousands of cases across Virginia.

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