September 11, 2020

KEY TAKEAWAYS

- Models are designed to project what **could** happen based on current trends but do not forecast of what **will** happen. Behavioral responses drive changes in current trends. This is increasingly important as we enter the fall season.
- Growth in cases has plateaued overall. However, 2 health districts are currently in a surge trajectory and an additional 10 are showing slow growth.
- Students returning to college and university campuses appear to be driving surges in some areas.
- The statewide reproduction rate is above 1.0 for a second week. The Northwest region saw a significant rise, to 1.648.
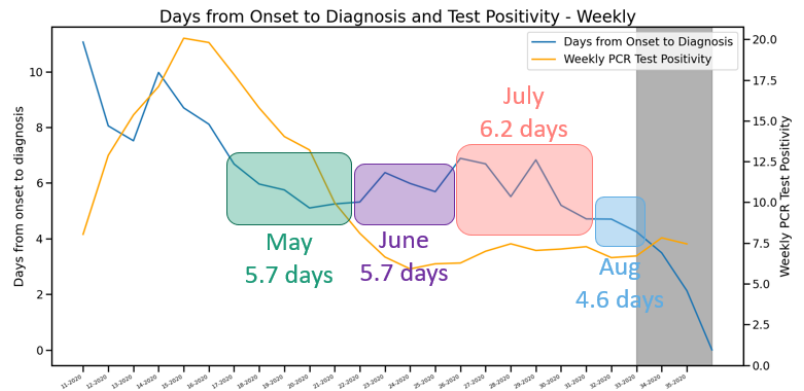
208,237

Cases Expected by Thanksgiving

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1.027

Reproduction Rate
Based on onset date
7 days ending Aug 29

KEY FIGURES
Reproduction Rate

Region	R_e Aug 29	Weekly Change
State-wide	**1.027**	**0.023**
Central	0.982	-0.005
Eastern	0.925	-0.004
Far SW	1.203	0.239
Near SW	1.073	-0.348
Northern	0.921	0.028
Northwest	1.649	0.538

Case Detection

Days from Onset to Diagnosis and Test Positivity - Weekly

May 5.7 days — June 5.7 days — July 6.2 days — Aug 4.6 days

In Surge: 2 Health Districts

- Declining
- Plateau
- Slow Growth
- Surging

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VIRGINIA'S HEALTH IS IN OUR HANDS. Do your part, stop the spread.

COVID-19 is a novel virus causing an unprecedented global pandemic and response. The model improves as we learn more about it.
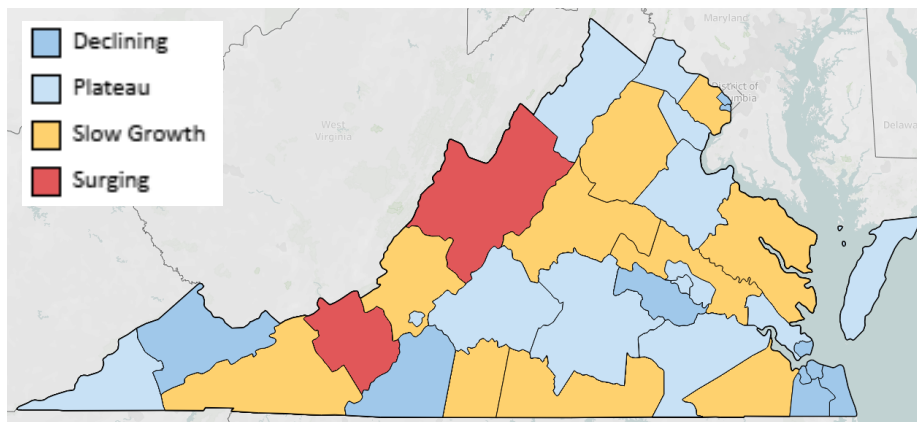
THE MODEL

The UVA COVID-19 Model and the 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 (S)usceptible, (E)xposed, (I)nfected, (R)ecovered epidemiologic model designed to evaluate policy options and provide projections of future cases based on the current course of the pandemic.

THE PROJECTIONS

The UVA team continues to improve the model weekly. The UVA model now uses an "adaptive fitting" methodology, where the model precisely traces past and current trends and uses that information to predict future cases. These new projections are based on recent trends the model learns through its precise fitting of each individual county's cases. This model replaces the 8 scenarios reported in prior weeks. Each health district now has its own unique scenario.

The new model also includes two "what-if" scenarios to predict what we might see if cases increase in response to seasonal effects in the Fall, such as schools re-opening and changing weather patterns. It is still too early to know the impact that these seasonal effects will have. For now, the model assumes a 10-20% increase in transmissibility beginning on Labor Day. The model will be updated regularly to incorporate new information.
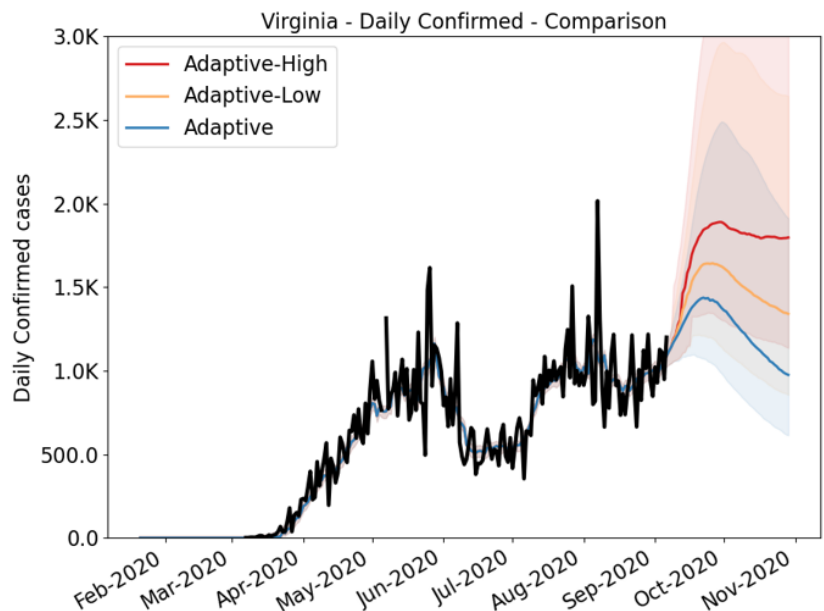
Low impact of seasonal effects: 10% increase in transmission starting September 8, 2020
High impact of seasonal effects: 20% increase in transmission starting September 8, 2020

MODEL RESULTS

With the adaptive modeling approach, the current course predicts that confirmed cases will peak during the week ending **September 27th** with **9,980 weekly cases**. If cases continue on this trajectory, we would expect **208,237** total confirmed cases by Thanksgiving. These projections show an increase in weekly cases, likely due to schools reopening. Upcoming seasonal changes, including schools reopening, flu season, and changing weather patterns, transmission could increase even more. With a 10% increase in transmissibility beginning on Labor Day, we would expect weekly cases to peak at 11,380 the week of ending October 4th. A 20% increase in transmissibility beginning on Labor Day would lead to a higher peak that same week with 13,170 weekly cases. These scenarios result in 20,000 and 45,000 more confirmed cases by Thanksgiving, respectively.

Virginia - Daily Confirmed - Comparison

— Adaptive-High
— Adaptive-Low
— Adaptive

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HIGHER EDUCATION DURING COVID-19

August is traditionally the time when students return to campus at colleges and universities throughout Virginia. This year, the COVID-19 pandemic has made this event anything but traditional. Virginia's colleges and universities have pursued a number of strategies to preserve as much of the college experience as possible while protecting students, employees, and communities from the risks of COVID-19. The online journal *Dogwood* maintains a running list of updates to campus plans. A quick review shows the diversity of plans. Among the array of strategies, several stand out, including testing regimens, online or hybrid classes, isolation strategies, student conduct codes, and opening delays, all in various combinations.

Current Surges

The impact that these strategies may have on campus-related outbreaks is difficult to predict. COVID-19 is an unpredictable virus and, to some degree, these impacts are random. Even the best strategies will have leaks the virus can exploit. Luck often plays a larger role than many of us think. Researchers will spend years parsing the data to tease out the role of luck, strategy, and other factors in preventing and containing campus-related outbreaks. The diversity of approaches create a great natural experiment for this. However, the widespread movement and concentration of students is likely to have some effect, even with the best laid plans.

New River - Surging

An ongoing pandemic does not provide the luxury of years to parse data. While we cannot know why precisely, early data does suggest that returns to campus are associated with surges in some areas but not, so far, in others. Surges in cases in the Central Shenandoah and New River Health Districts - the two districts categorized as experiencing surges this week (right) - appear to coincide with campus-related surges. Notably, these surges coincide with sharp increases in the COVID-19 attack rate among those under age 30, shown by the blue line in the charts below. Importantly, other age groups in these districts appear unaffected so far.

Central Shenandoah - Surging

New River

Central Shenandoah
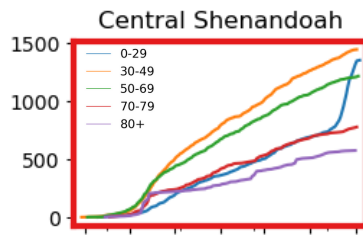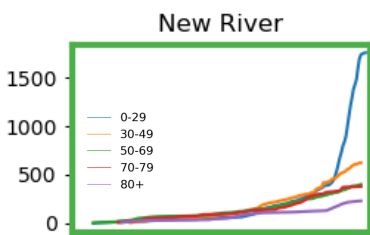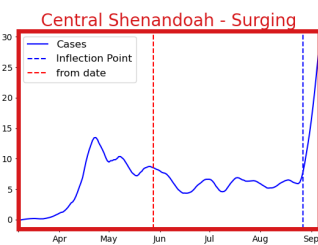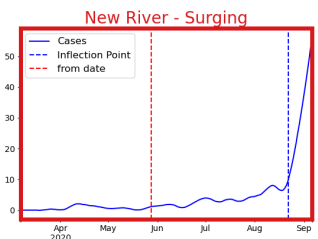
Past Surges

For Richmond Health District, we see a similar, though muted, pattern. The attack rate for those under 30 jumped, but did not spike, resulting in a small surge that abated after one week. Richmond has a much larger population than New River or Central Shenandoah. Many colleges are testing incoming students. This may lead to a short term jump in cases, but one that does not stand out compared to the population or case load, or spread to the community.
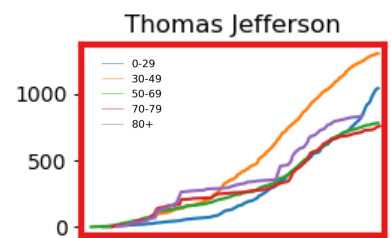
Looking Forward

Although we don't know the exact mechanism, these patterns may help us identify campus related surges early. Several Health Districts have experienced increased attack rates among those under 30, but most have been gradual or matched increases in other age groups. Thomas Jefferson Health District, however, has seen a sharp spike in the attack rate among young people. Classes at the University of Virginia, the largest school in Thomas Jefferson Health District, began on August 25, later than many other schools in Virginia. Is this a sign that a campus-related surge is beginning?

Thomas Jefferson

UVA, like most Virginia universities, is keeping a close and transparent eye on COVID-19 cases. Other universities, including James Madison, Virginia Tech, and Radford, among others, also maintain COVID-19 dashboards. Student migration coupled with testing is likely to cause some short term spikes in confirmed cases. Whether these will be contained and short term or have a broader impact on Virginia's cases is yet to be seen. With good strategy, cooperation from students, and a little luck, however, we can hope current and potential surges follow the pattern seen so far in Richmond and abate quickly.