October 2, 2020

KEY TAKEAWAYS

- Models are designed to project what **could** happen based on current trends but do not forecast what **will** happen. Behavioral responses drive changes in current trends.
- The reproduction rate is below 1.0 in Virginia for the third consecutive week, and incidence declined to 9.2/100K. Nationally, weekly incidence increased to 15/100K, fueled by growth in the Midwest.
- 28 of 35 health districts are seeing declining or flat new case growth, 6 are seeing slow growth, and 1 is in surge.
- If current trends persist the model projects case growth will not exceed August peaks. However, risks abound, including fall & flu season.

183,951

Cases Expected by Thanksgiving

0.868

Reproduction Rate

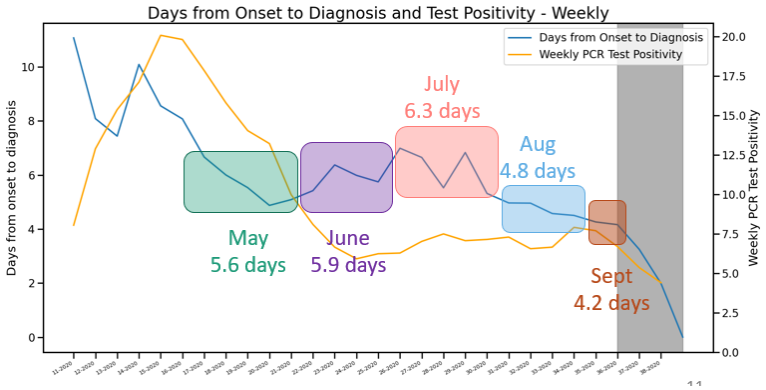
Based on onset date
7 days ending Sept 19

KEY FIGURES

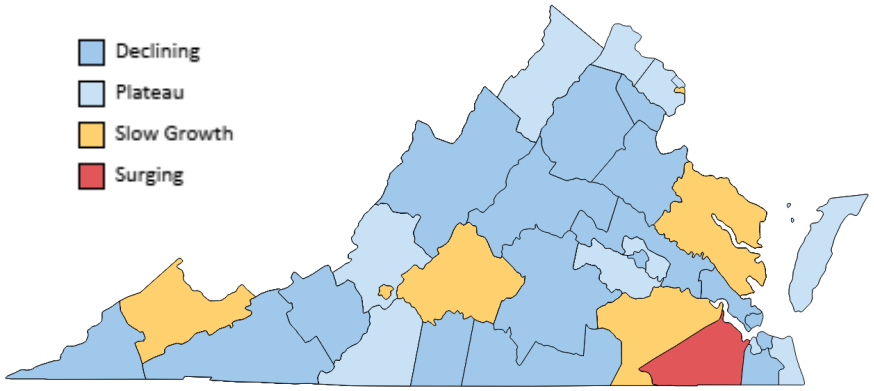
Reproduction Rate

Region	R_e Sep 19	Weekly Change
State-wide	**0.868**	**-0.015**
Central	0.724	-0.175
Eastern	1.088	0.167
Far SW	1.184	0.415
Near SW	0.858	0.094
Northern	0.824	-0.105
Northwest	0.813	-0.135

Case Detection



In Surge: 1 Health Districts



UNIVERSITY of VIRGINIA
BIOCOMPLEXITY INSTITUTE

UVA COVID-19 MODEL WEEKLY UPDATE

VDH VIRGINIA DEPARTMENT OF HEALTH

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.

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

THE PROJECTIONS

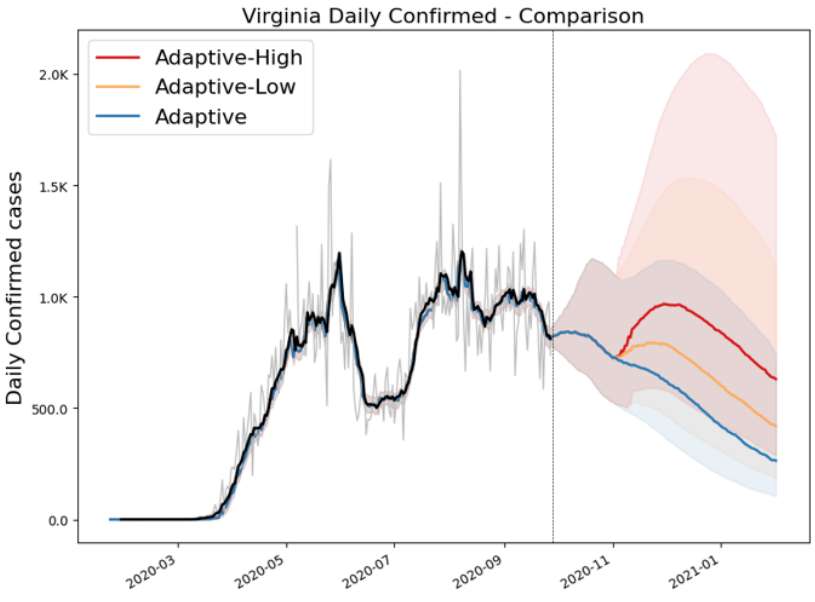
The UVA team continues to improve the model weekly. The UVA model now uses an "adaptive fitting" methodology, where the model precisely traces past and current trends and uses that information to predict future cases. These new projections are based on recent trends the model learns through its precise fitting of each individual county's cases.

The new model also includes two "what-if" scenarios to predict what we might see if cases increase in response to seasonal effects, such as schools re-opening and changing weather patterns. These "what-if" scenarios assume a 10-20% increase in transmissibility beginning with the onset of flu season. The model will be updated regularly to incorporate new information.

Low impact of seasonal effects: 10% increase in transmission starting November 1, 2020
High impact of seasonal effects: 20% increase in transmission starting November 1, 2020

MODEL RESULTS

With the adaptive modeling approach, the current course predicts that confirmed cases peaked during the week ending **August 9th** with **7,583 weekly cases**. If we continue on this trajectory, we would expect 183,951 total confirmed cases by Thanksgiving. Statewide, the reproduction rate is below 1.0 for the third week and new cases appear to be declining. Currently, 28 of 35 health districts are seeing declining or flat numbers of new cases, while only seven are seeing increasing numbers. Last week, 16 health districts had increasing cases. Even with a 20% increase in reproduction rate, the model projects that we have already seen weekly cases peak statewide. Risks, such as the onset of fall weather, continue to cloud the horizon however. Virginia residents should continue with social distancing and infection control, and follow Forward Virginia guidelines.



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

MODEL PRODUCT UPDATES

Every week, the Virginia Department of Health makes several products available through blog posts on the COVID-19 Data Insights page. These include this weekly update and a slide deck provided by the team at the University of Virginia Biocomplexity Institute. Recently, we added a slide deck provided by RAND Corporation, which provides insight into national models and research, and a benchmark for the UVA modeling efforts. Finally, VDH staff have created the UVA COVID-19 Model dashboard to provide model projections down to the local level, and to provide information on the structure and use of models during a pandemic. This week, we moved the dashboard update up two days from Friday to Wednesday and added Confidence Intervals to the dashboard.

Confidence Intervals

Like most forecast models, the UVA COVID-19 Model does not produce a single projection. The UVA COVID-19 Model is a simulation model, which means the model is run thousands of times, each time following a different, potential path. We use the median (middle) path as the projection. The Confidence Intervals show where the projections of 95% of potential paths lie. As you can see in the dashboard, there can be wide variation. If case numbers dip early, and stay that way, the paths may dip very low. However, if they jump, they can grow quickly.

As shown on the bottom of the previous page, model projections are simple, smooth lines. The real world, however, is messy. Actual cases, shown by the light gray line in the same graph, are chaotic and jump around. Even the smoothed moving average, represented by the black line, is jagged. Confidence Intervals provide form to that chaos. I often think of the rock formations and mountains of Shenandoah and Appalachia when thinking about forecasts and real data. Mountains, like forecasts, look hazy but smooth in the distance. Up close, they become a jumble of rocks, ridges, and life.

The Devil's Marbleyard near Lexington Virginia. *While model projections appear smooth, like the Shenandoah Mountains in the background, real world data is usually jumbled and cluttered, like the boulders in the foreground.*

Scenarios

Confidence Intervals show potential paths given what we know, including past case information. However, model projections, do not, and cannot, include things we do not know. For instance, it was difficult to predict the impact of schools reopening over the past month. Since COVID-19 is a novel virus, and the response unprecedented, it is difficult to forecast how people will react and its impact on case growth. To manage this uncertainty, the UVA Model includes scenarios. Currently, the model includes two scenarios, described on the previous page, to show what may happen with onset of fall weather and flu season. We previously display these, along with the actual projections, when the dashboards open. Now users can select these scenarios to see the associated projections and confidence intervals.

RESEARCH HIGHLIGHTS FROM RAND CORPORATION

- A Canadian study finds that mandatory face mask orders in Ontario reduce new case count by about 25%, slightly higher than some estimates. This highlights the importance of compliance in mask use.
- Time variation, testing and other factors may cause ambiguity when communicating COVID-19 trends. Reproduction number may be a more effective means to communicate local risk.