

October 7, 2022

KEY TAKEAWAYS

- Case rates continue to decline. Thirty-one of Virginia's thirty-five health districts are in declining trajectories, with only one (Mount Rogers) in a slow growth trajectory. The transmission rate (R_e) is below 1.0 in all regions, and only above 0.9 in the Northern region.
- Only five localities in the Commonwealth are still reporting "High" community levels. Masking in indoor public places is still recommended for everyone in these communities. A further 25 localities are reporting "Medium" community levels. High-risk individuals in these communities should continue masking as well.
- Variant proportions continue to evolve as expected. BA.4.6 and BF7 are making slow progress against BA.5 which remains dominant. There is no significant growth by any novel variant in the Commonwealth.
- Models suggest the possibility of a winter surge. If the Commonwealth follows the same trajectory it did in 2020 and 2021, transmission rates will begin increasing in the next few weeks. It is critical that Virginians get boosted this fall. Models suggest that a bivalent booster campaign could prevent 150,000 cases by March.

246,086
Total Bivalent Booster Doses Administered

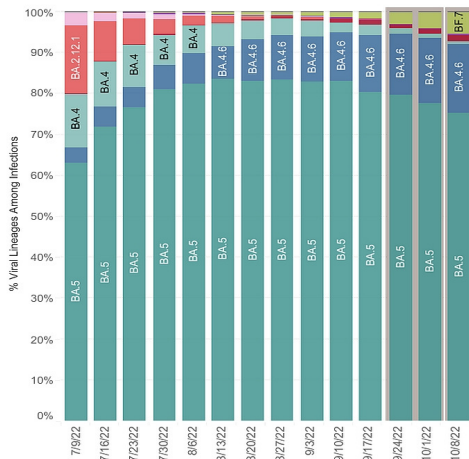
13.4 per 100k
Average Daily Cases Week Ending October 3, 2022

0.865
Statewide Reproduction Number as of October 3, 2022

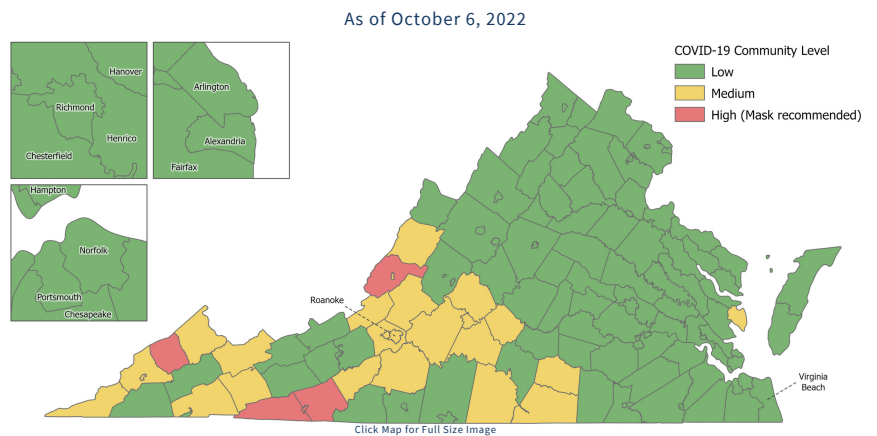
5
Virginia Localities at High CDC Community Levels as of October 6, 2022

KEY FIGURES

Variant Mix - HHS Region 3

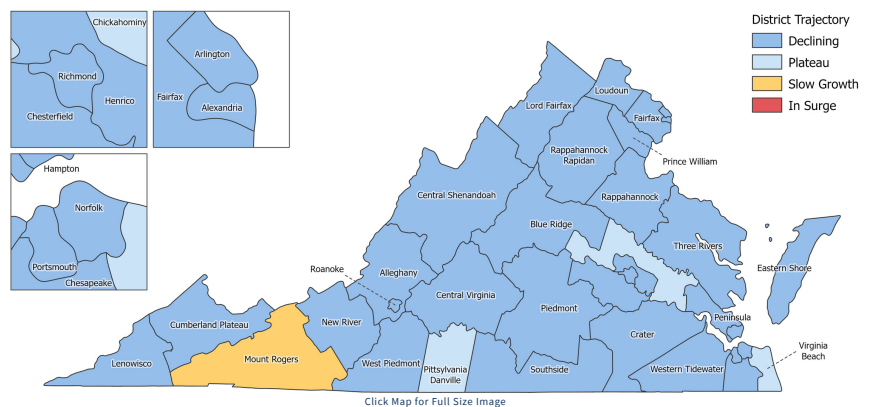


CDC Community Levels



Growth Trajectories: No Health Districts in Surge

Status	# Districts (prev week)
Declining	31 (22)
Plateau	3 (1)
Slow Growth	1 (12)
In Surge	0 (0)



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/boosting rates, previous infection, waning immunity, weather, and behavioral responses. The **"Adaptive"** scenario represents the current course of the pandemic, projecting it forward with no major changes. The **"VariantX"** modifier explores the potential impact of a new variant emerging in the next few 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. The **"FallWinter"** modifier layers seasonal increases associated with colder weather, holiday gatherings, and 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. The new **"OptBooster"** (optimistic) and **"PessBooster"** (pessimistic) modifiers assume that a bivalent vaccine booster campaign will begin in September. The optimistic scenario assumes that 90% of those getting a Flu vaccine will also get a bivalent COVID19 booster. The pessimistic scenario assumes that 45% will.

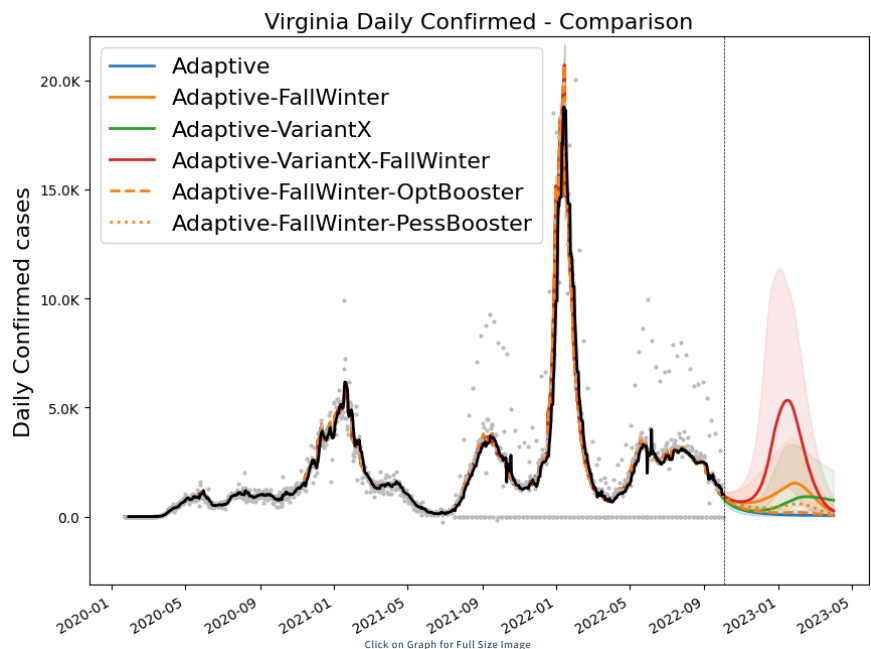
MODEL RESULTS

Updated: As always, the current course **"Adaptive"** scenario is shown in blue. This scenario projects a continued decline of cases. In this scenario, Virginia will fall below 500 daily cases by late-October.

Both the **"Adaptive-FallWinter"** (orange) and **"Adaptive-VariantX"** (shown in green) scenarios project mild surges. The former peaks at 1,500 daily cases in late January, the latter at 1,000 daily cases in February.

The **"Adaptive-VariantX-FallWinter"** (red) combines both a hypothetical new variant with the seasonal forcing of Fall / Winter. The combination allows for a significant surge, peaking at almost 5,300 daily cases in mid-January before quickly declining.

The **"Adaptive-FallWinter-OptBooster"** and **"Adaptive-FallWinter-PessBooster"** scenarios (dashed orange lines) show that a booster campaign can severely curtail a Fall/Winter surge. The optimistic booster scenario cuts total cases by over 65%. The pessimistic scenario cuts them by 45%.



Date of Latest Model Run: October 5, 2022

Date of Next Model Run: October 19, 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.

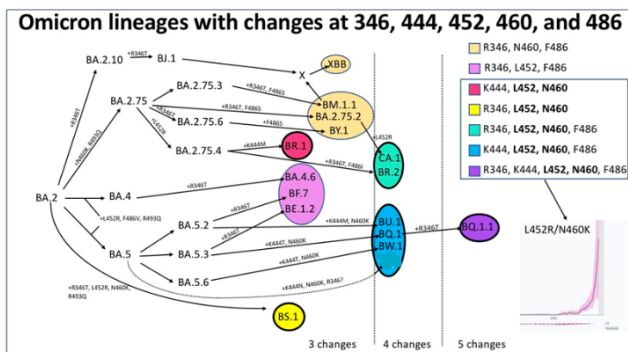
[\(Explore the model results in detail on this dashboard\)](#)

CONVERGENT EVOLUTION

When you hear the word "predator" any number of animals may come to mind. But whether wolf, lion, or bear, hawk, alligator, or even the mighty *Tyrannosaurus rex*, a number of common characteristics stand out. Sharp claws or talons for grabbing prey. Sharp teeth or beaks for tearing and chewing meat. The ability to move and strike quickly. Most predators have both eyes on the front of their heads, linked to specialized areas of the brain that can do trigonometry on the fly. This allows them to quickly and accurately measure the distance to their prey. This tendency to evolve similar solutions to similar problems across a diverse array of species is known as convergent evolution.



You do not need to be a paleontologist to know this theropod was a predator. Large sharp teeth and claws make that very clear. Source: "Suchomimus tenerensis theropod dinosaur (Elrhaz Formation, Lower Cretaceous; Gadoufaoua, Tenere Desert, central Niger, northwest-central Africa) 1" by James St. John is licensed under CC BY 2.0.



Successful new variants are converging on similar spike protein mutations
Source: twitter.com/dfocosi/status/1574319177602670592?s=12&t=myre59DuQ1H31TI_yd7DQ

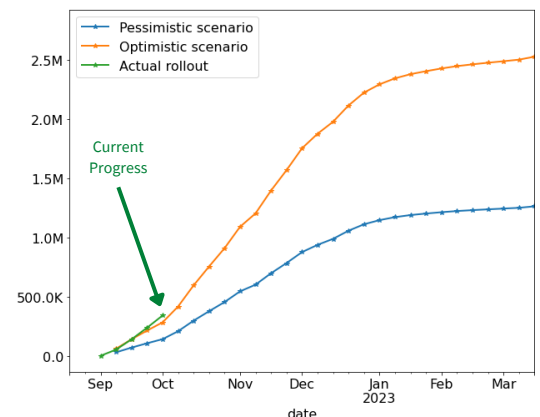
These same evolutionary pressures are affecting COVID-19. Early in the pandemic COVID-19 faced little resistance. It evolved slowly, and new variants varied widely. Today, however, most people have some immunity from prior infection or vaccination. New variants have to find a way around this protection, and regardless of the strain they emerge from, are displaying various levels of convergence around five unique mutations to the spike protein. Several variants now circulating have three or more of these mutations, but only one, BQ.1.1, has all five.

Not all predators rely on the same, convergent solutions, however. Spiders build webs, snakes use venom, and human have large brains that allow them to create tools, along with opposable thumbs to manipulate them. One new variant, XBB, seems to have developed its own unique solutions. XBB is a recombinant variant, meaning it is composed of two separate strains of COVID-19. Although still early, both BQ.1.1 and XBB appear to show substantial immune escape and, importantly, appear to be less affected by therapeutics such as Paxlovid. XBB, in particular, appears to be particularly good at evading immunity. One pre-print paper (under review) noted that XBB's immune escape might be as high as that of SARS-CoV-1, an entirely different virus.

Vaccination is Our Best Protection

Both BQ.1.1 and XBB are very new and it remains to be seen what impact they may have. However, COVID-19 continues to evolve, and some experts suggest new variants may already be driving COVID-19 surges in both Europe and Asia. Importantly, the protection against severe disease and death afforded by previous infection and vaccines has held up even COVID-19 has evolved. Vaccination and booster shots stimulate your immune system, ensuring this protection remains robust, decreasing the chance of infection and severe disease. The new bivalent vaccines train your immune system to counter two strains of the virus, which may increase its ability to neutralize new variants.

In just a few short weeks, almost 250,000 Virginians have chosen to get the new bivalent vaccine, often in conjunction with a flu shot. Getting vaccinated and boosted when eligible is the best way to protect your family and your community in the upcoming holiday season.



So far, Virginia's bivalent booster uptake is matching the "Optimistic" scenario. A strong bivalent booster uptake could significantly reduce the total number of COVID-19 cases, hospitalizations and deaths this holiday season, regardless of strain. (Click on image for full size.)