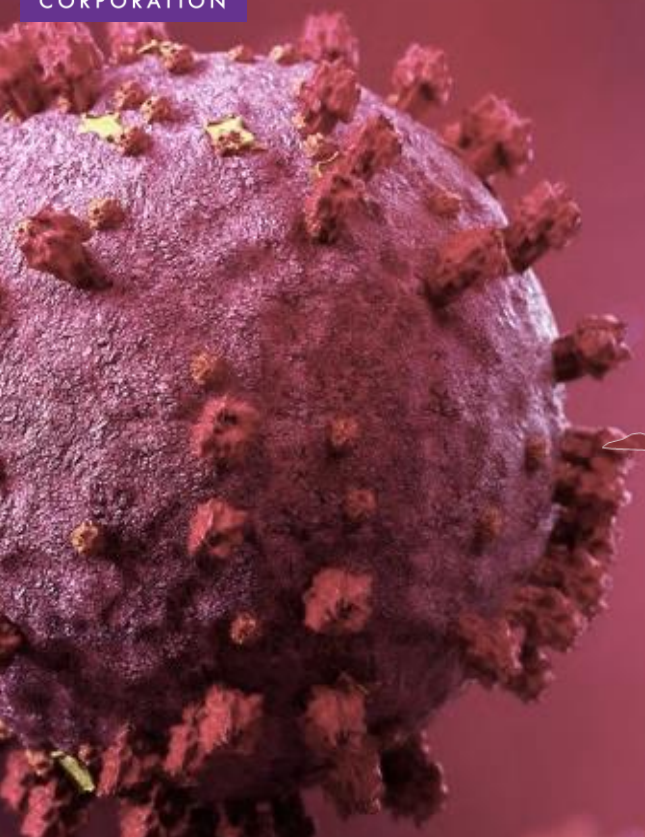


VIRGINIA

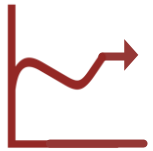
COVID-19 Update October 29th, 2020

Carter C. Price, Ph.D.

A team of RAND researchers was asked by the Commonwealth of Virginia to review available information on COVID-19 models of the commonwealth to determine the strengths and weaknesses of each model and their relevance to decisionmaking. The work of the research team will be documented in a forthcoming RAND research report. The information in this presentation is intended to keep policymakers abreast of the latest findings of the research team.

This research was sponsored by the Commonwealth of Virginia and conducted by the RAND Corporation. RAND is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. For more information, visit www.rand.org.

Bottom-Line Up Front



Virginia's total case levels rose slightly

- Counties in the southwest still have the highest case loads
- Hospitalizations also continued to rise slowly
- Testing levels remain relatively high

Additional triggers could lead to a rapid rise in the coming months

- Seasonal changes
- Holiday interactions

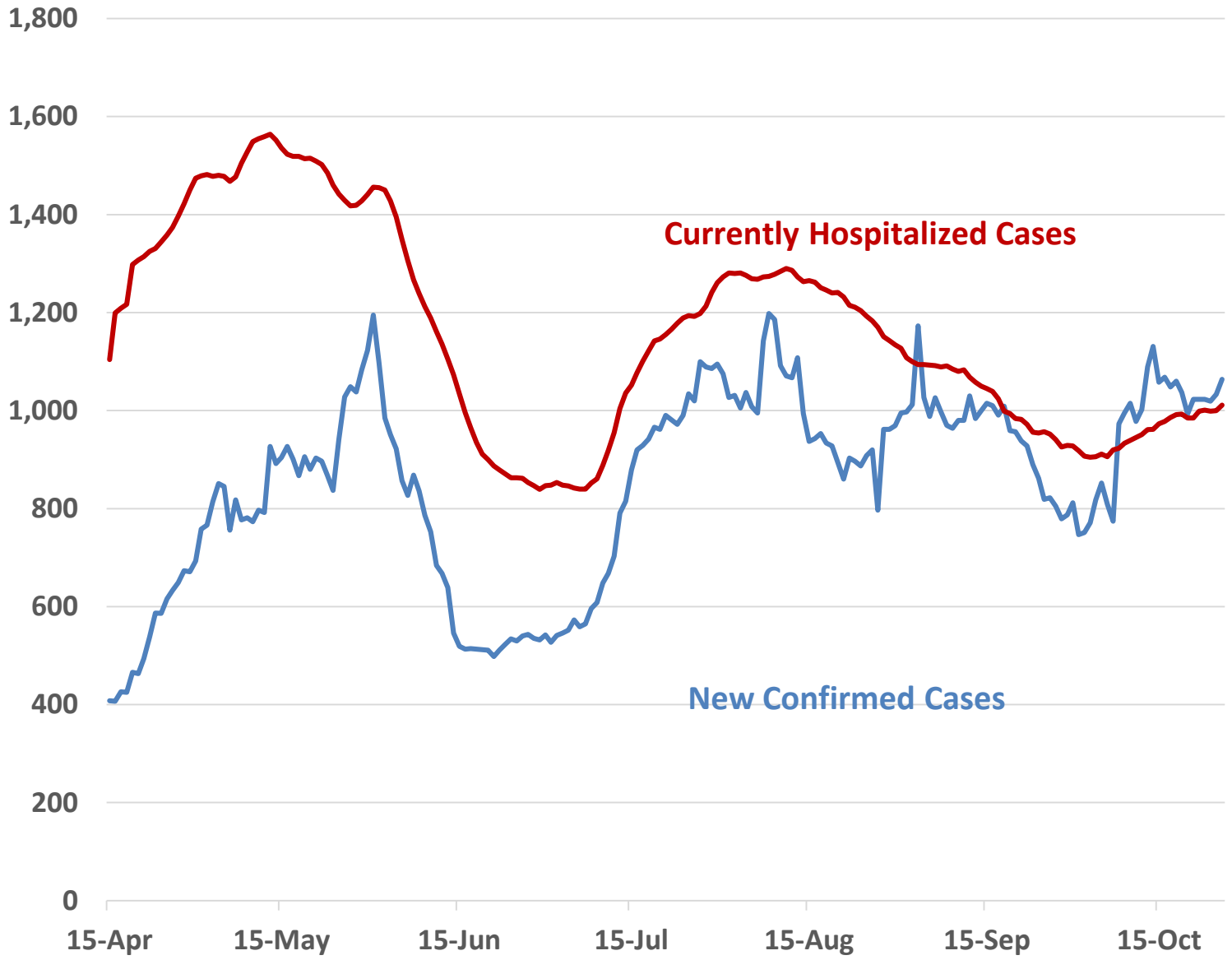
Cheaper, faster testing or a vaccine could reduce the spread if widely deployed

Modeling is less useful for forecasting because behavioral responses are driving current trends

- Models will continue to be very useful for comparing policies and exploring scenarios

Changes in testing practices may change data quality in ways that make it difficult to produce consistent data series

Cases and hospitalizations rose last week



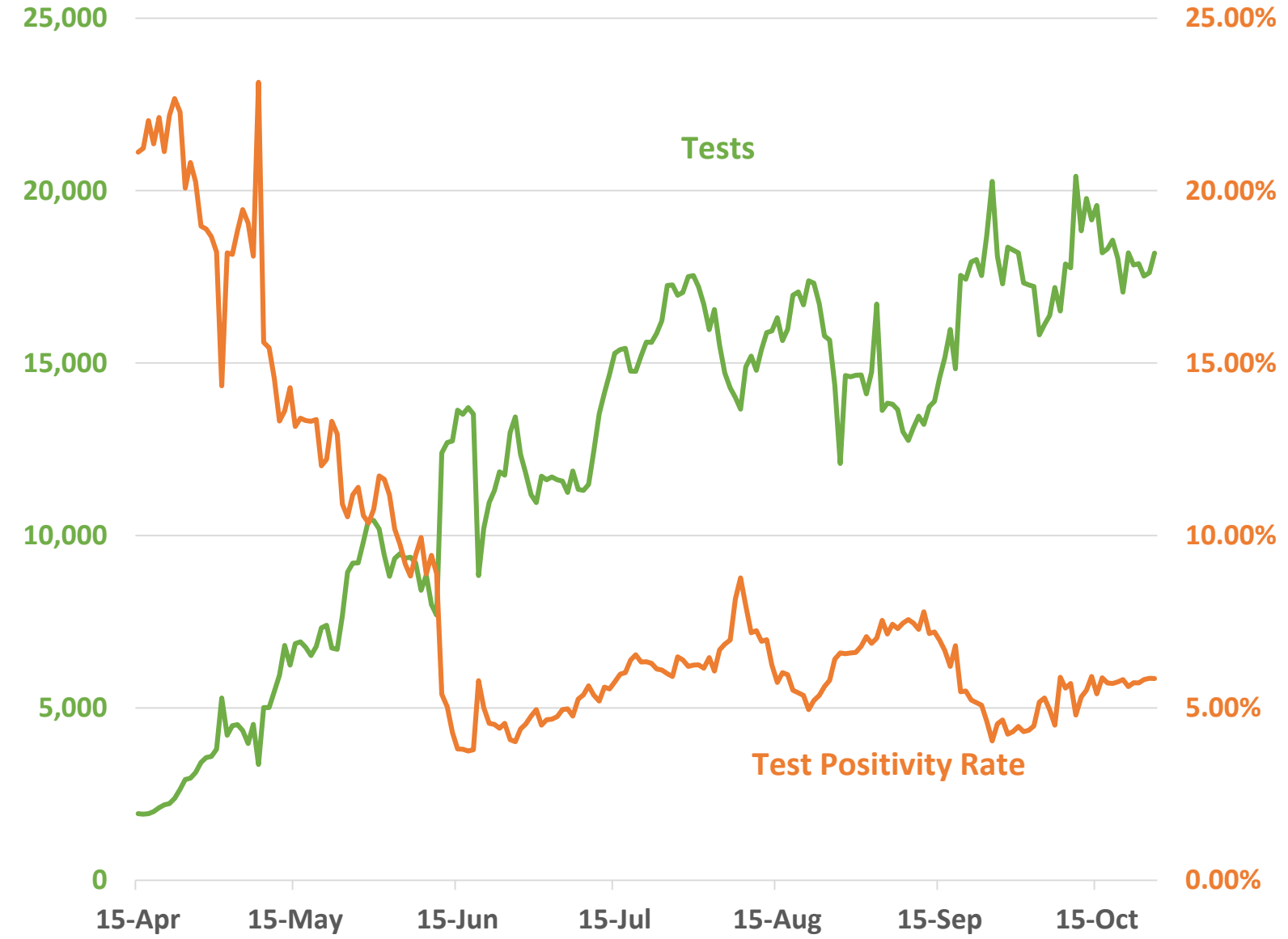
New confirmed cases rose slightly and have been over 1,000/day on average

- The latest dip in cases ended the first week in October

Currently hospitalized cases have increased to around 1,000

- This is a lagging indicator and so there may be a continued reversal from the recent declines

Testing levels are at the target range for a test-and-trace strategy



Tests per day are roughly 18,000

- Testing levels are appropriate for a test-and-trace strategy
- Further reopening is estimated to require four to five times more testing along with lower case rates (See Rockefeller Foundation)

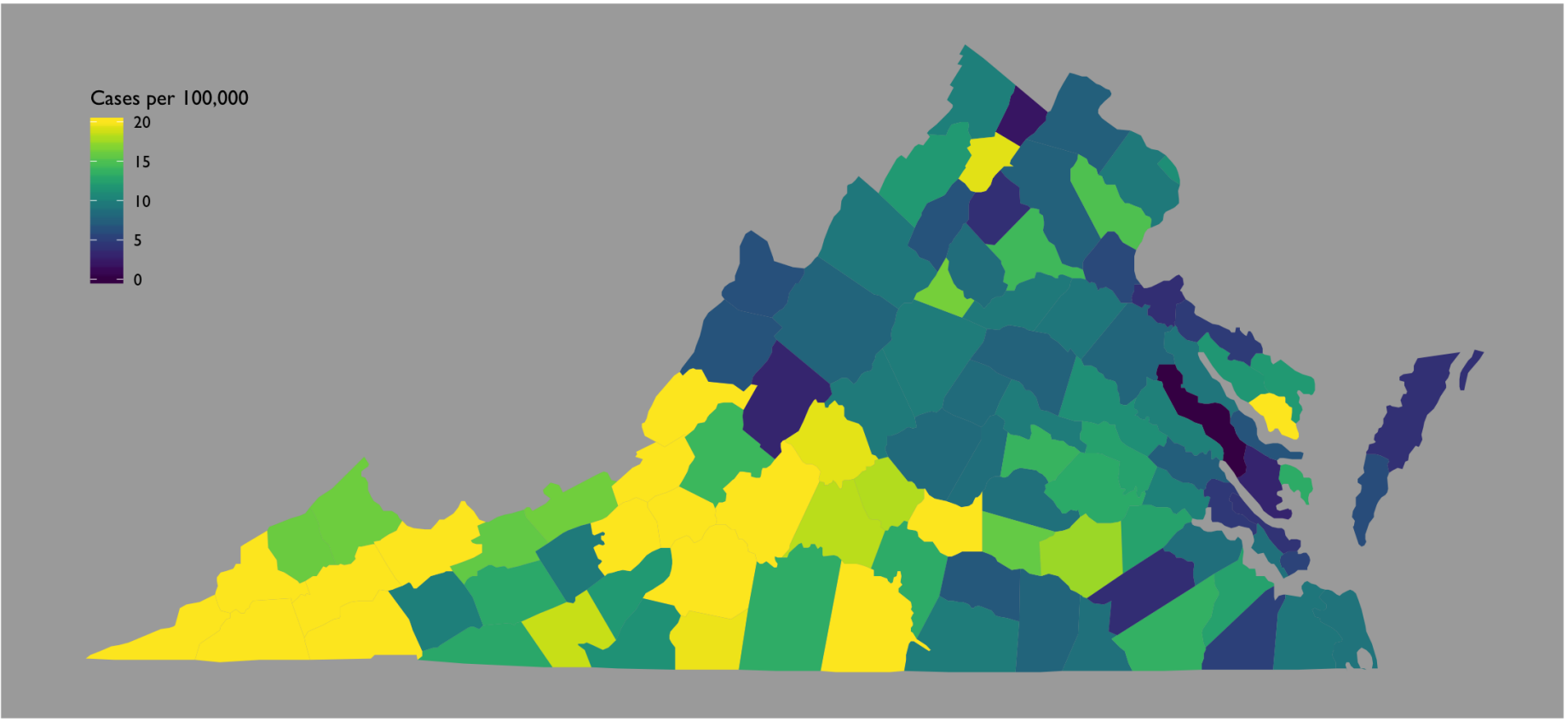
The test positivity rate has leveled off at around five percent

- Five percent is a suggested target

Case rates have continued to grow in the Southwest

CASE COUNT

Source: VDH



Yellow indicates at least 20 cases per 100,000

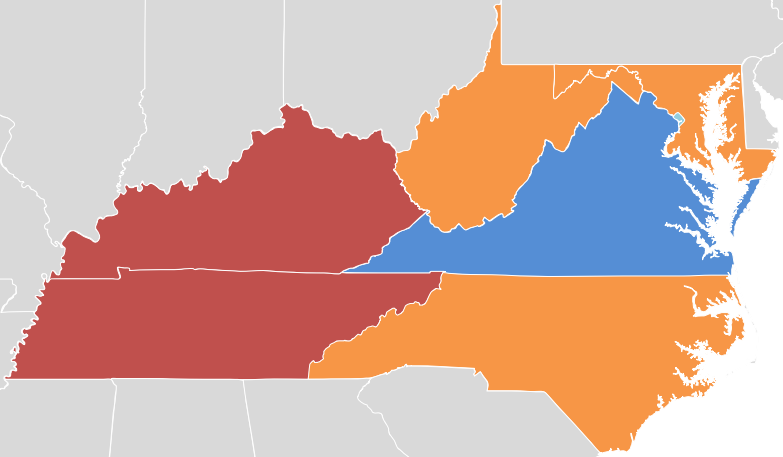
Virginia's southern counties continue to see high case levels

Counties in the Southwest saw the largest increases compared to last week

These data were updated October 27th and represent a seven-day average of the previous week

Case rate trends in neighboring states have been mixed

Over the last 7 days, Virginia had 12.2 (+3% from last week) new confirmed cases per day per 100,000



Very high case loads:

- Tennessee (42.6 new cases per 100k, +32% from last week)
- Kentucky (29.9, +17%)

High case loads:

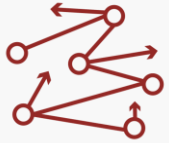
- North Carolina (16.2, -4%)
- West Virginia (14.6, -5%)
- Maryland (10.9, +7%)

Lower case loads:

- District of Columbia (8.0, +8%)

These data were updated October 27th and represent a seven-day average of the previous week

We've been monitoring recent, relevant literature



Richmond et al. sequenced 111 COVID-19 genomes in LaCrosse County, Wisconsin to study the spread of COVID-19 after an outbreak among college students

- Following the reopening of in-person instruction, there was an outbreak with 2,002 cases in the county in the month of September
- The strains infecting college students were linked to two spreading events that led to COVID-19 infections in skilled nursing facilities, resulting in two fatalities

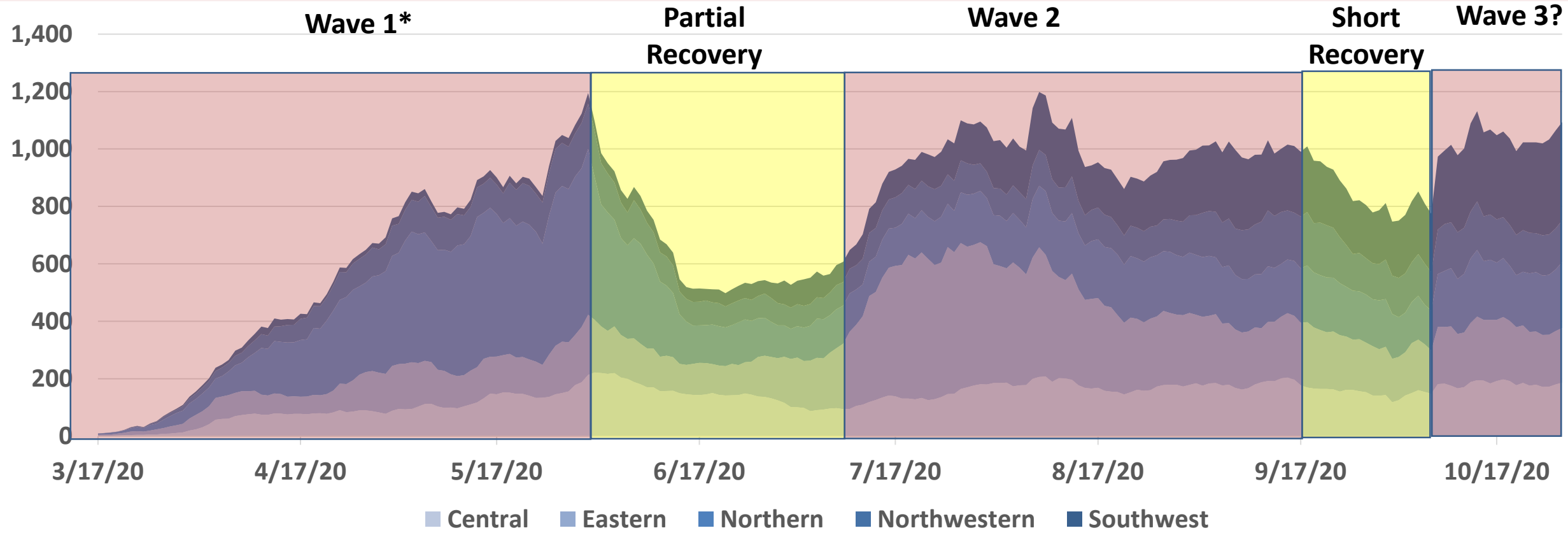
Pichler et al. assessed the role of emergency sick leave from the Families First Coronavirus Response Act (FFRCA) on the spread of COVID-19

- For the two months of FFCRA, they estimate that one case was avoided per day per 1,300 workers gaining sick leave
- They attribute this to "contagious presenteeism" where sick workers show up to work and spread COVID
- Enhancing paid leave options may reduce spread among the most economically vulnerable

Kambhampati et al. collected COVID hospitalization details among health care personnel from 3/1 to 5/31

- The authors used data from the COVID-19 Associated Hospitalization Surveillance Network, which contains some details about individual characteristics from 13 sites
- Six percent of the hospitalized population were health care professionals
- About 2/3 had direct patient contact and 1/3 were nurses
- They were disproportionately female (71%), Black (52%), and had an underlying condition (89%)

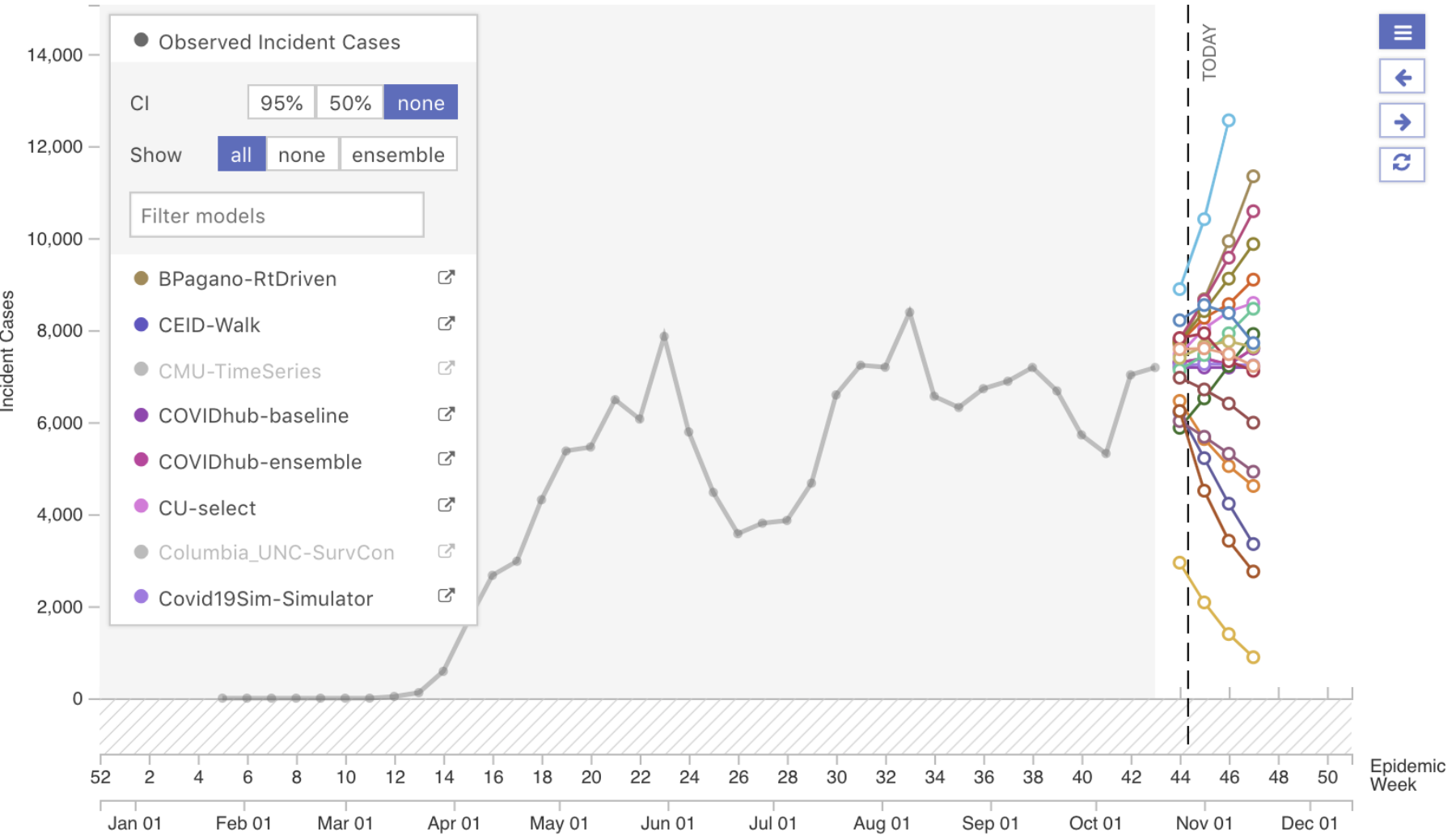
Each wave of cases has been centered in different parts of the Commonwealth



- The initial wave was concentrated in the Northern region*
- There was a partial recovery when cases in the Northern region dropped
- In mid-July, cases grew first in the Eastern region and then, beginning in August, statewide
- Statewide levels declined slightly, with a in dip the Eastern region
- A new wave, concentrated in the Southwest region, may have begun at the beginning of October

*Testing was insufficient for accurate counts during the first wave

Forecasts of cases are diverging, but average to a small rise



There is substantial variation in the case forecasts

- The model "average" is a small increase for the coming weeks

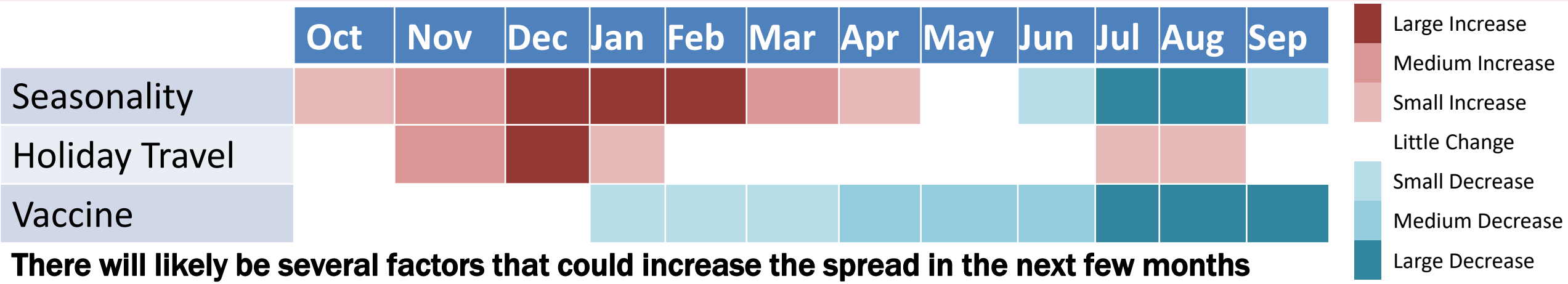
The mechanisms driving the spread at this stage are very different than in the early stage

- Initially, people did not change their behavior, so COVID spread exponentially
- Increased tele-work, changing weather, the return of In-person instruction, and other factors changed the pattern of spread
- These new patterns require the models to evolve

For short-term forecasts, assuming last week's level is a good estimate

Source: COVID-19 Forecast Hub, https://viz.covid19forecasthub.org/
Accessed October 27th

There are several triggers that could lead to increased spread



There will likely be several factors that could increase the spread in the next few months

- Seasonal effects for COVID-19 could lead to more spread during the colder months
- Holiday travel could lead to increased spread, particularly from the mixing of age cohorts

There are policy responses that might mitigate these triggers

- Mandatory testing at airports and other transit points could reduce the spread from out-of-state travelers
- A shutdown of at least two-weeks in mid-November could reduce levels prior to Thanksgiving
- A similar shutdown might be needed after Thanksgiving, as well

A vaccine may become available around the turn of the year

- It is unlikely that there will initially be sufficient supply to significantly reduce the spread
- People may scale back preventative behaviors (such as distancing and mask wearing) too soon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