



VIRGINIA

COVID-19 Update January 7th, 2021

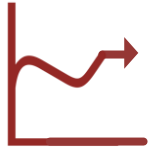
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A team of RAND researchers was asked by the Commonwealth of Virginia to review available information on COVID-19 models of the Commonwealth to determine the strengths and weaknesses of each model and their relevance to decisionmaking. The information 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 remain very high and are rising

- Hospitalizations continue to rise rapidly
- Testing has risen but not fully kept up



Key triggers are likely to continue to drive high case levels for the coming months

- Seasonal changes
- COVID-fatigue
- New COVID variants

Cheaper, faster testing or a vaccine could reduce the spread upon widespread deployment



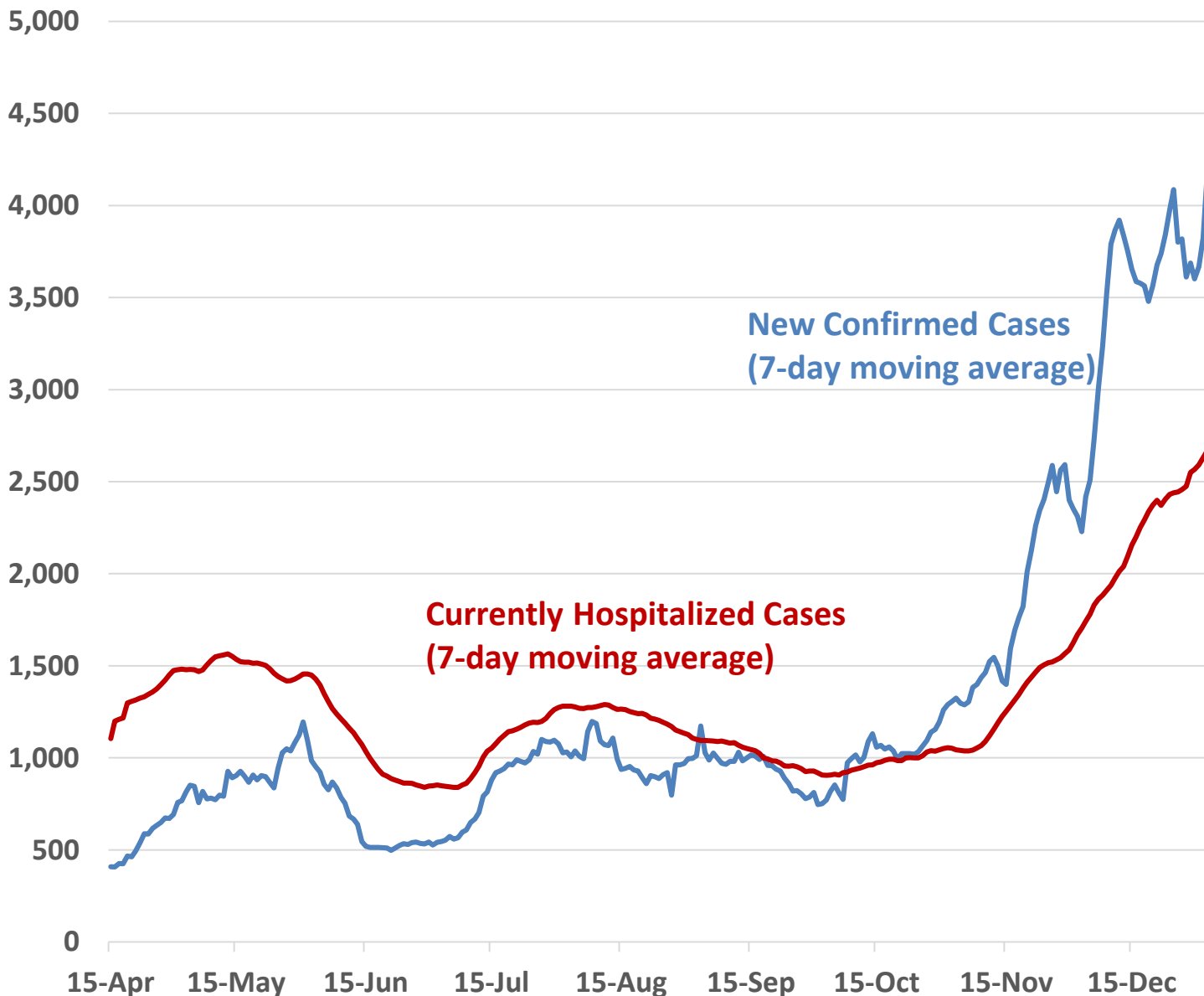
Model forecasts may be less accurate because behavior is driving growth

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

Disruptions in testing from the holidays are likely to make it difficult to accurately track case rates until early January



Cases remain high and hospitalization is growing rapidly



New confirmed cases are around 4,500/day on average

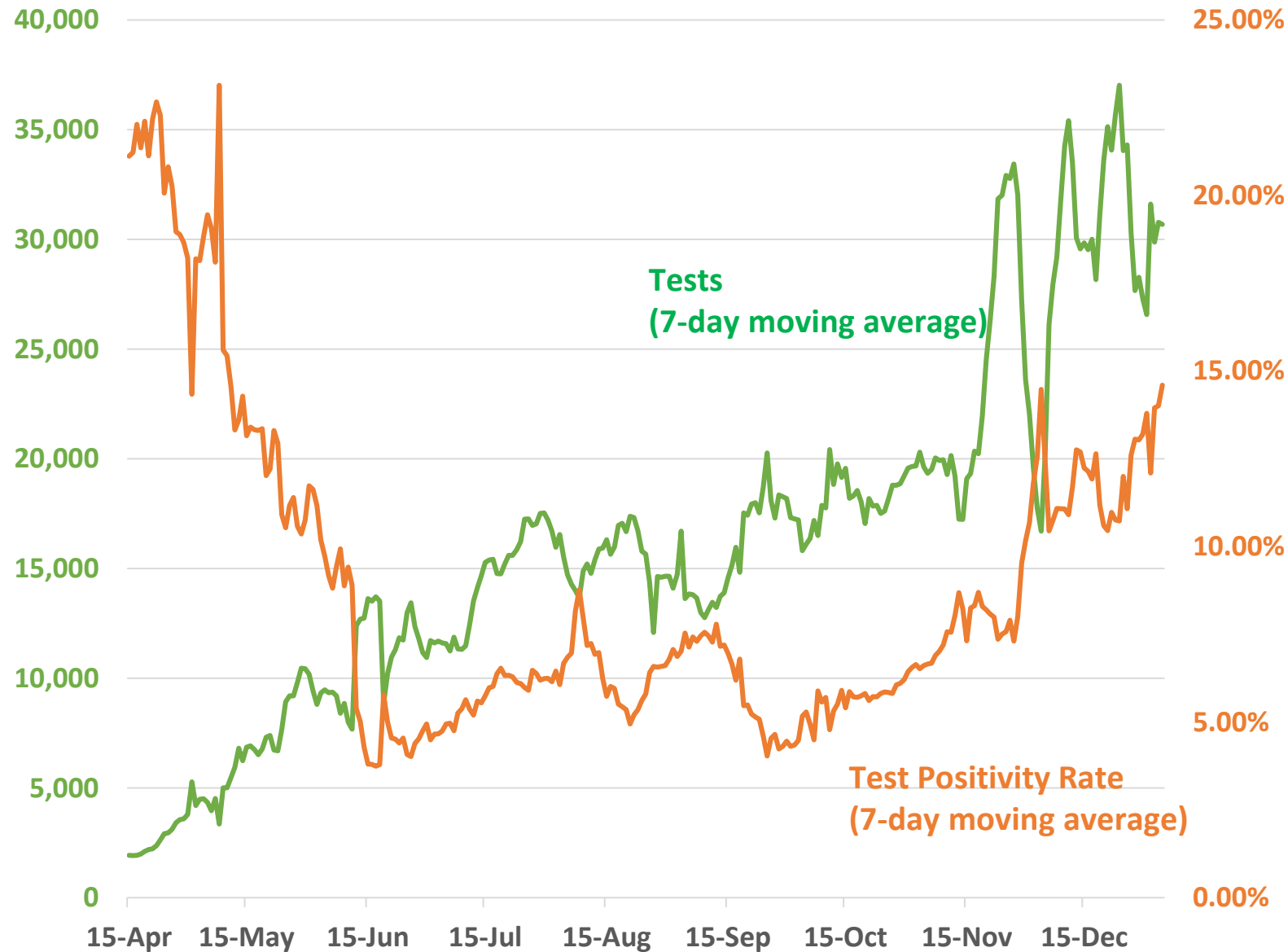
- Confirmed cases may be artificially lower for a couple of weeks because testing levels declined over the holidays

Currently hospitalized cases are rising rapidly

- The seven-day average is 2,700 hospitalizations
- If the confirmed case trend is accurate, hospitalizations are likely to increase 10-20% over the next couple of weeks



Testing remains high



Tests per day have averaged over 30,000

- The dip at the end of December indicates the case data will be less reliable until the first week of January at the earliest

The test positivity rate is nearly 15 percent

- Five percent is a suggested target
- At this rate, the case count levels are likely to be slightly less reliable



Vaccinations are reaching the Health Care Professionals

| Age | 0-9 | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | Total |
|-------------------------|---------|-----------|-----------|-----------|---------|-----------|---------|---------|---------|-----------|
| Vaccinations (Dose 1) | 0 | 474 | 15,194 | 23,635 | 21,820 | 22,082 | 14,504 | 3,560 | 2,814 | 104,083 |
| Percent Vaccinated | 0.0% | 0.0% | 1.3% | 2.0% | 2.0% | 2.0% | 1.5% | 0.6% | 0.9% | 1.2% |
| Cases | 14,948 | 36,634 | 72,598 | 61,955 | 55,898 | 54,389 | 36,931 | 20,649 | 15,659 | 369,661 |
| Susceptible | 989,023 | 1,062,382 | 1,066,699 | 1,087,254 | 998,790 | 1,049,585 | 925,387 | 589,865 | 292,790 | 8,061,775 |
| Percent with Antibodies | 1.5% | 3.4% | 7.6% | 7.3% | 7.2% | 6.8% | 5.3% | 3.9% | 5.9% | 5.6% |

Source: VDH, January 5th

Vaccinations are being rolled out in Virginia

- 481,550 doses have been distributed, which is enough for 240,775 people (2.8% of Virginians) assuming no spoilage
- 104,083 (22% of the doses distributed to Virginia thus far) have been administered as of January 5th and, per FDA guidance, the second dose will need to be administered in 21 days

Nationally, the federal government has purchased 400 million doses from Pfizer and Moderna (enough for roughly 60 percent of Americans assuming no spoilage)

- 400 million doses have been purchased in advance from other suppliers as part of Operation Warp Speed, but these vaccines have not been approved at this point



Case levels have continued to rise statewide

CASE COUNT

Source: VDH



Yellow indicates at least 80 cases per 100,000

- The scale has changed from last week where yellow indicated at least 60 cases per 100,000

Case levels across the Commonwealth rose substantially

- 77% of counties have more than 40 cases per 100,000
- 11% have more than 100 cases per 100,000

These data were updated January 5th and represent a seven-day average of the previous week

The spread has risen substantially in most neighboring states

Over the last 7 days, Virginia had 52.5 (+24% from last week) new confirmed cases per day per 100,000

Very high case loads (>20):

- Tennessee (93.0 new cases per 100k, +16% from last week)*
- West Virginia (83.3, +29%)*
- North Carolina (67.3, +33%)*
- Kentucky (66.0, +45%)*
- Maryland (44.0, +35%)
- District of Columbia (31.6, -2%)

*Test positivity rates above 10%

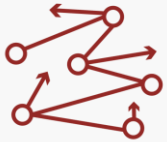
High case loads (10-20): None

Lower case loads (<10): None

These data were updated January 5th and represent a seven-day average of the previous week



We've been monitoring recent, relevant literature (1/2)



Volz et al. examined the B.1.1.7 Variant of Concern (VOC) of COVID recently identified in the U.K.

- Based on more than 50,000 whole genomes collected in October, November, and part of December, the authors estimate the VOC has a reproduction number 40 to 80 percent higher than the non-VOC strains
- The authors note that because these data were collected during a period of “high levels of social distancing”, the reproduction number in other locations or conditions could be substantially different



Pray et al. looked at the efficacy of antigen tests by comparing antigen and PCR test results for 1,102 people, both with and without symptoms, on two university campuses in Wisconsin

- The sensitivity was 80% for symptomatic cases, but only 40% for asymptomatic, though the specificity for both was over 98%
- This means that a negative antigen test of a symptomatic individual should be verified by PCR



Romero et al. studied the symptom onset timing among 185 people exposed to COVID by a member of their household in Tennessee and Wisconsin

- Of those household members who were asymptomatic 7 days after symptom onset of the index patient, 19% either tested positive or had symptoms within 14 days of symptom onset of the index patient
- For those who were asymptomatic 10 days after symptom onset of the index patient, 7% either tested positive or had symptoms within 14 days of the symptom onset of the index patient
- This means a 7-day quarantine may miss a sizeable share of secondary infections



We've been monitoring recent, relevant literature (2/2)



Selden and Berdahl used several different surveys to assess details about the essential worker population

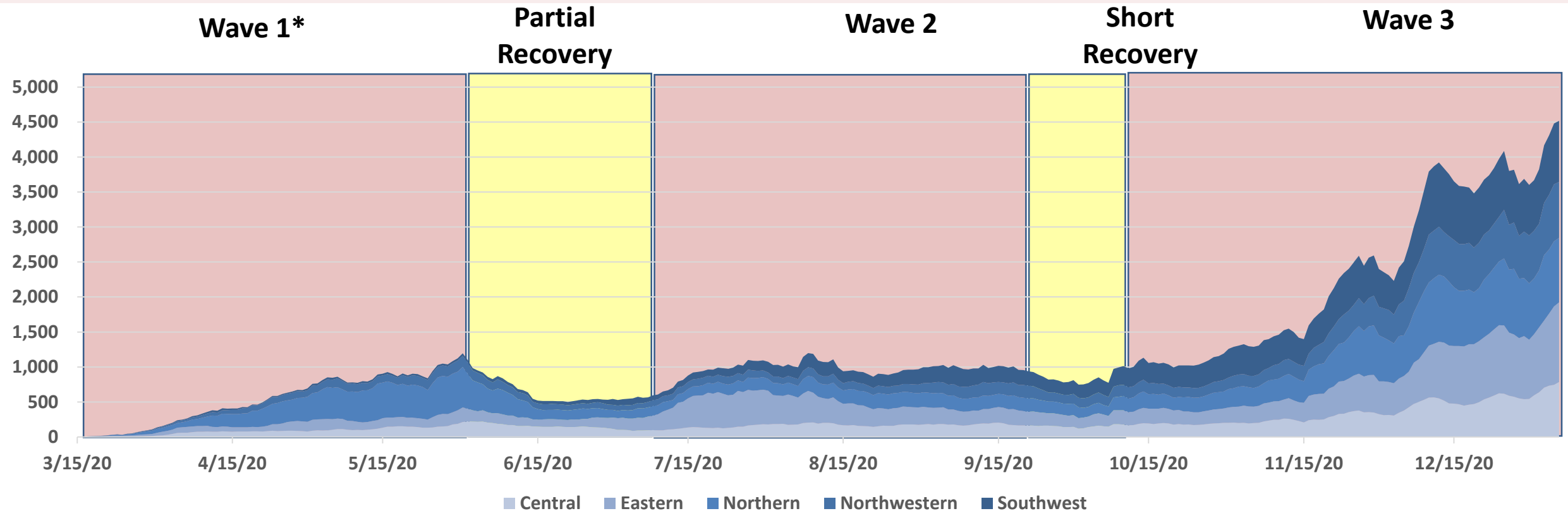
- Of the 157 million workers, 72% are in essential fields and only 28% of essential workers can work from home
- Between 57 and 74 million adults have an elevated risk of adverse outcomes from COVID and are either essential workers or in a household with an essential worker



Mulligan estimated the change in the “deaths of despair” associated with COVID and the recession by comparing local data on deaths from drug overdoses, suicide, and alcohol for 2017 and 2018 to 2020

- These deaths of despair have increased 45% above the 2017-2018 levels, which were already much higher than historic averages
- In a related study, Bianchi et al. estimated the long-term effects of the unemployment shock due to COVID on mortality and life expectancy using a statistical analysis of these factors from 1972 to 2017
- They estimate there will be 890,000 additional deaths in the U.S. over the next 15 years due to the elevated unemployment levels associated with COVID

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

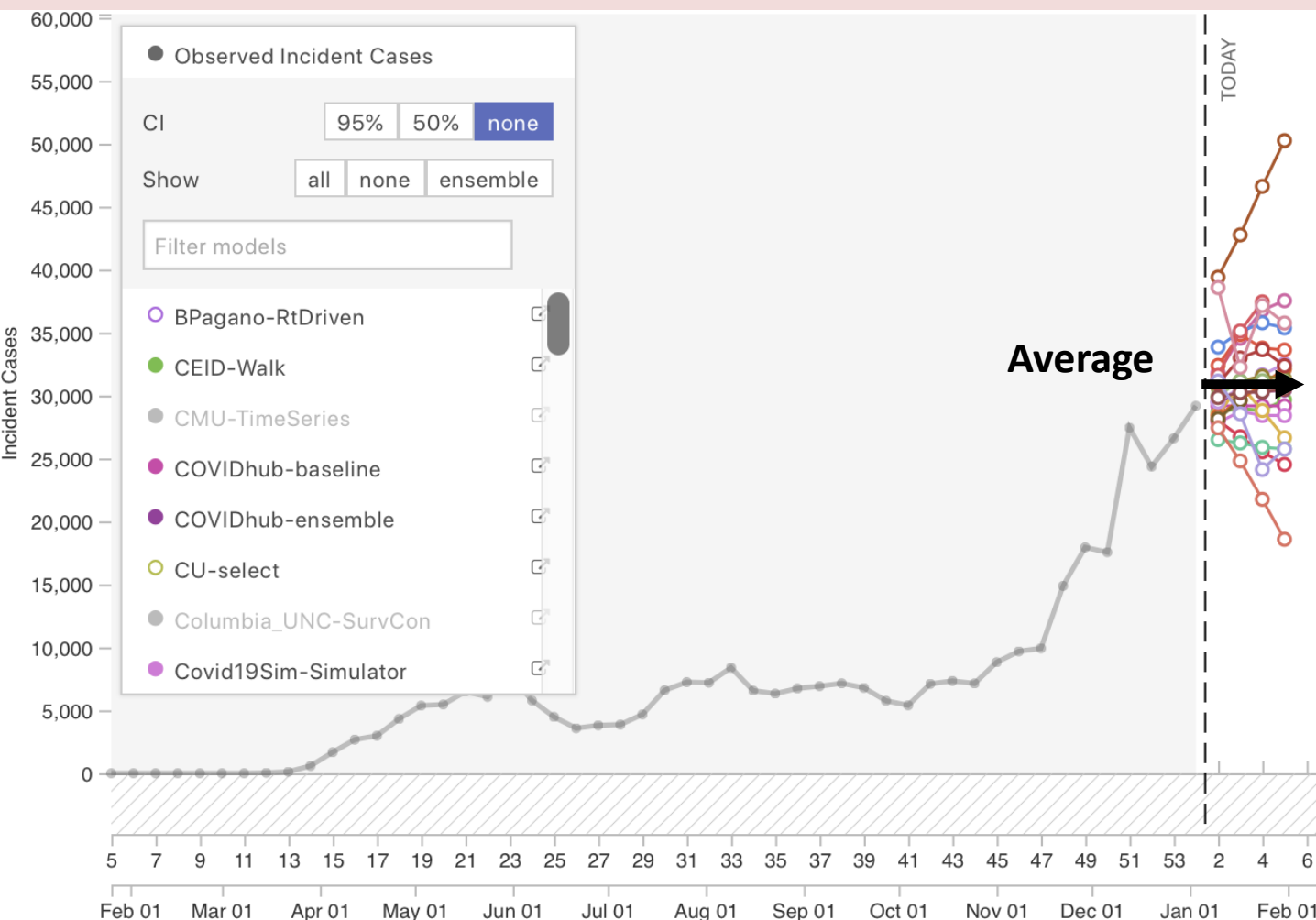


- The initial wave was concentrated in the Northern region*
- There was a partial recovery when cases in the Northern region dropped
- In mid-July, cases grew first in the Eastern region and then, beginning in August, statewide
- Statewide levels declined slightly, with a dip in the Eastern region in late September
- A new wave began in the Southwest region early in October, and previous highs have been surpassed in each region

*Testing was insufficient for accurate counts during the first wave



Forecasts for cases vary but average to little change



Note: SEIR-type models have been cut from this figure due to poor fit
Source: COVID-19 Forecast Hub, <https://viz.covid19forecasthub.org/>
Accessed January 5th

There is substantial variation in the case forecasts

- The model “average” has little change for the coming weeks

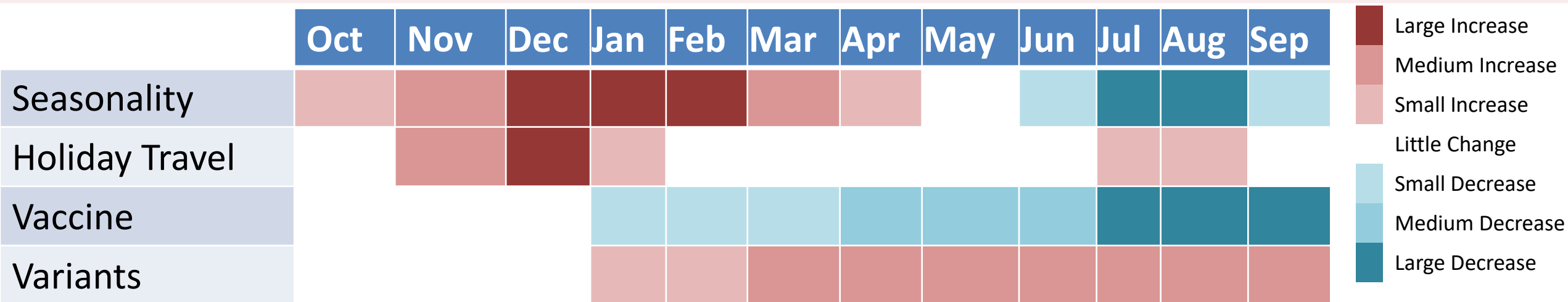
The mechanisms driving the spread at this stage are very different than in the early stage

- 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

These models don't typically account for events such as Thanksgiving, Christmas, or New Year's and the related changes to behavior patterns

- Many models are not accounting for disruptions in testing data

There are several triggers that could lead to increased spread




There are several factors that will continue to drive the spread for the next few months

- Seasonal effects for COVID-19 appear to be driving spread as it gets colder
- Holiday activities appear to have increased spread
- The vaccines are becoming available but are not being delivered in quantities sufficient to meaningfully reduce the spread for now
- The B.1.1.7 Variant of Concern or other COVID variants may increase the rate of spread or change the severity as they enter Virginia

There are likely to be long-term repercussions that need planning and preparation to mitigate

- Several studies have documented long term negative health effects associated with COVID



Discussion and Questions