



# OHSU COVID Forecast

Edition: 1/13/2022

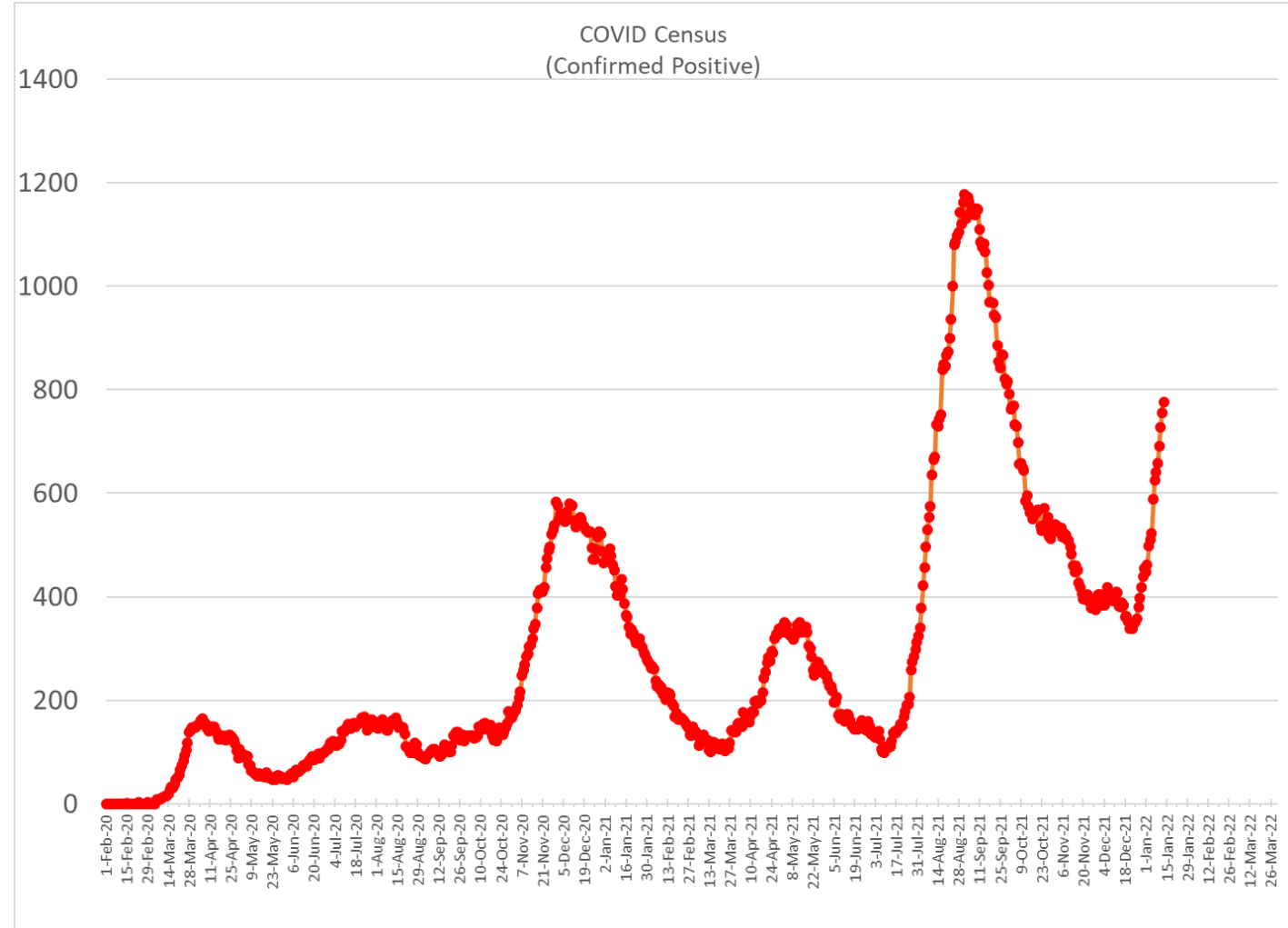
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# Key Outcomes

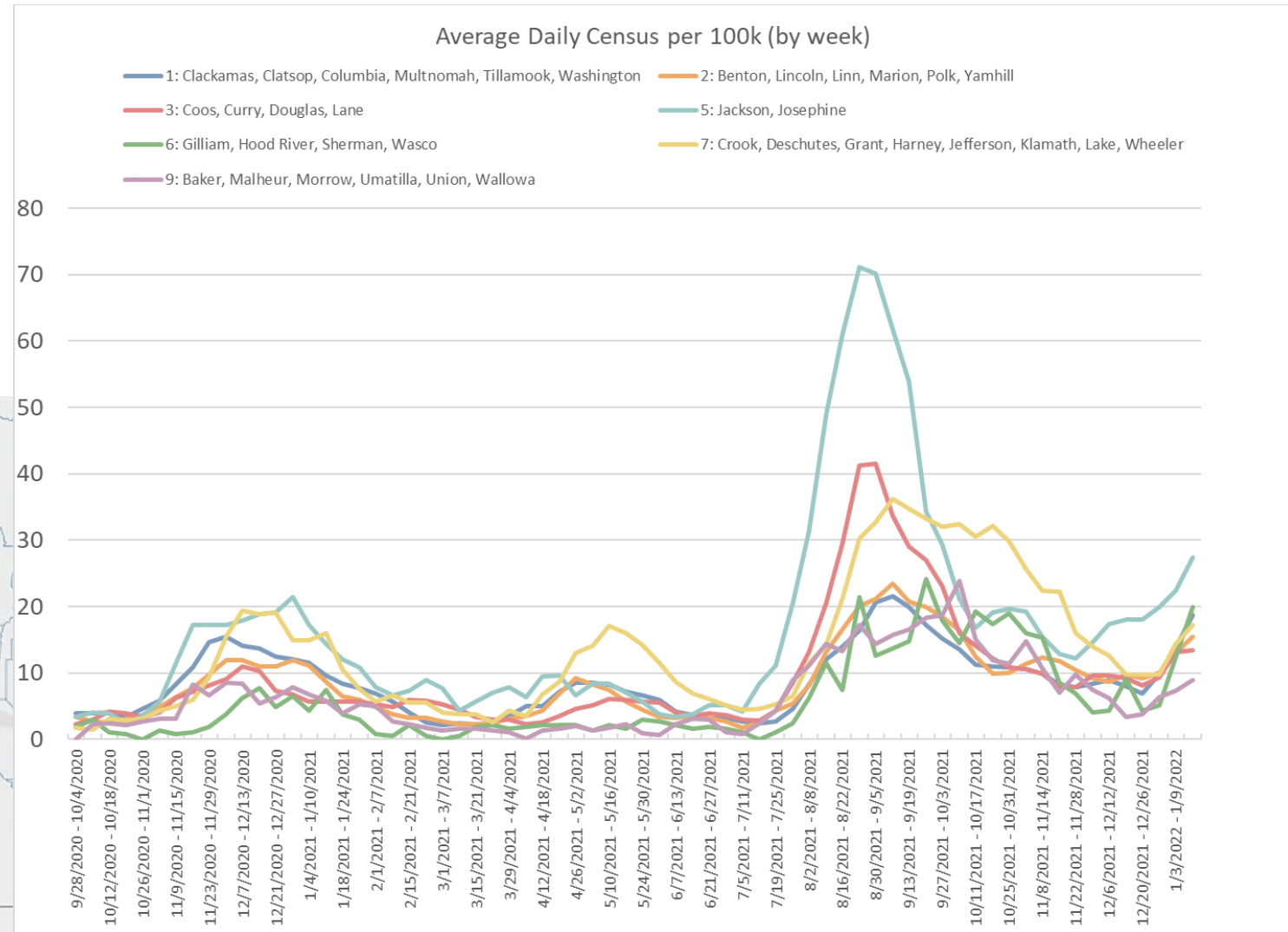
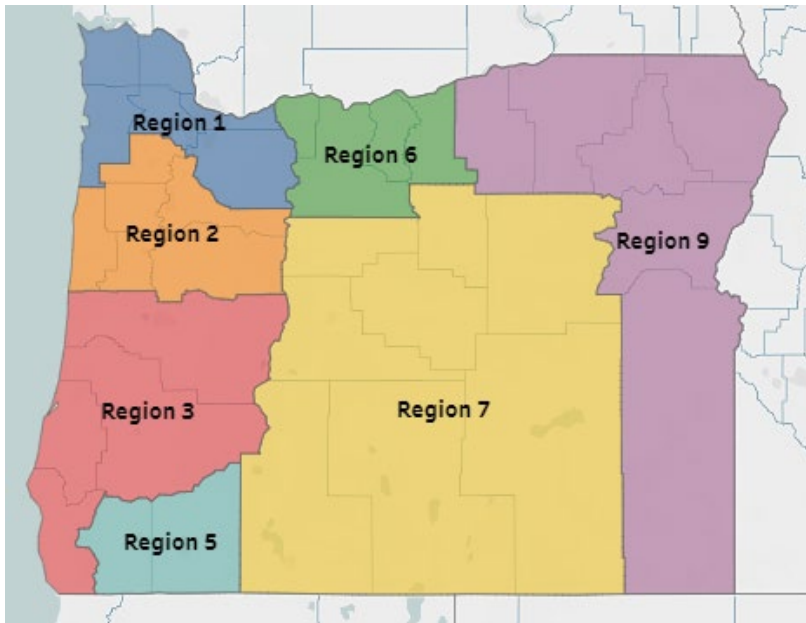
# Hospitalized Patients in Oregon

As of 1/13/2022, 777 people are hospitalized with COVID-19 in Oregon.



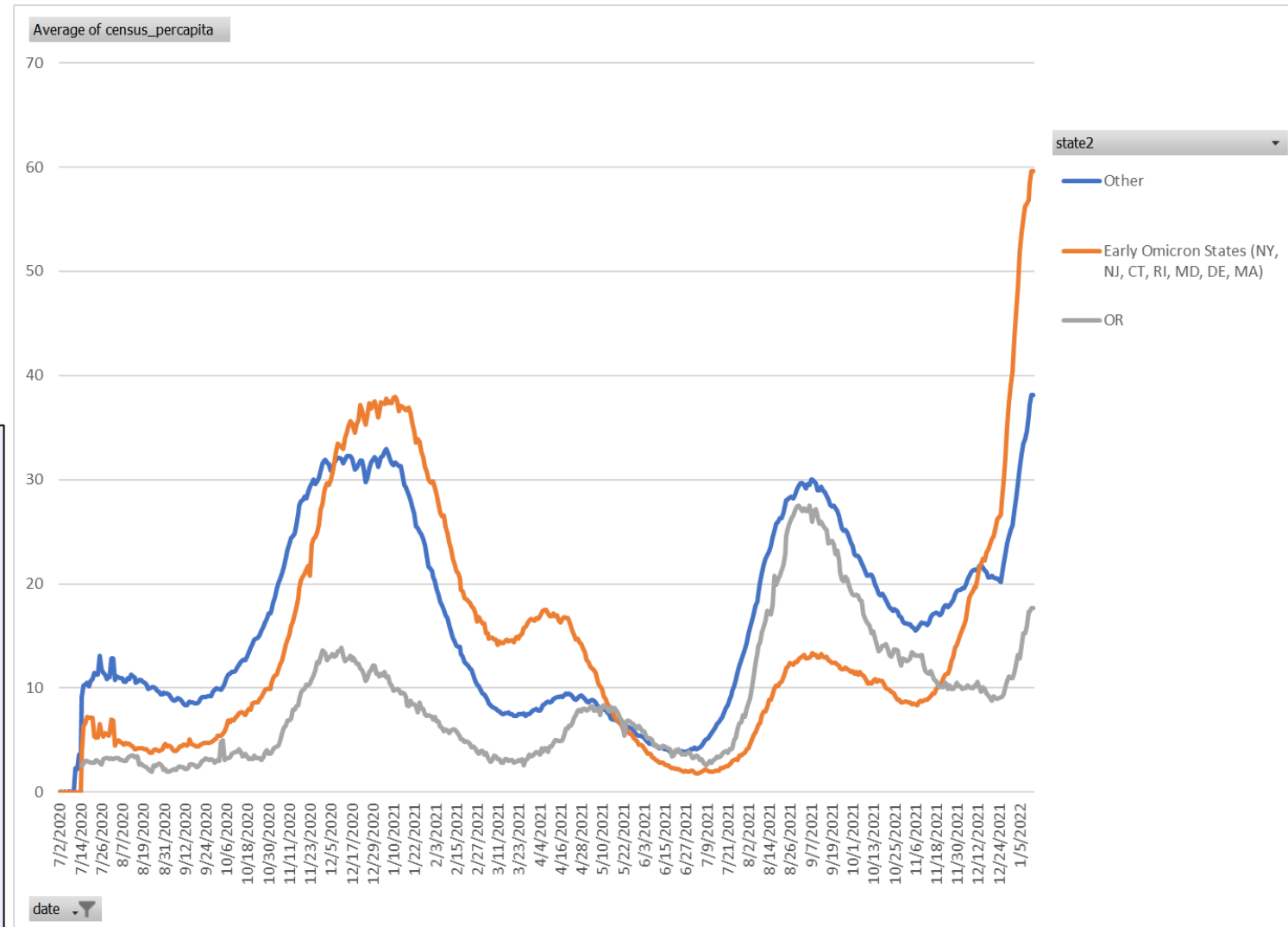
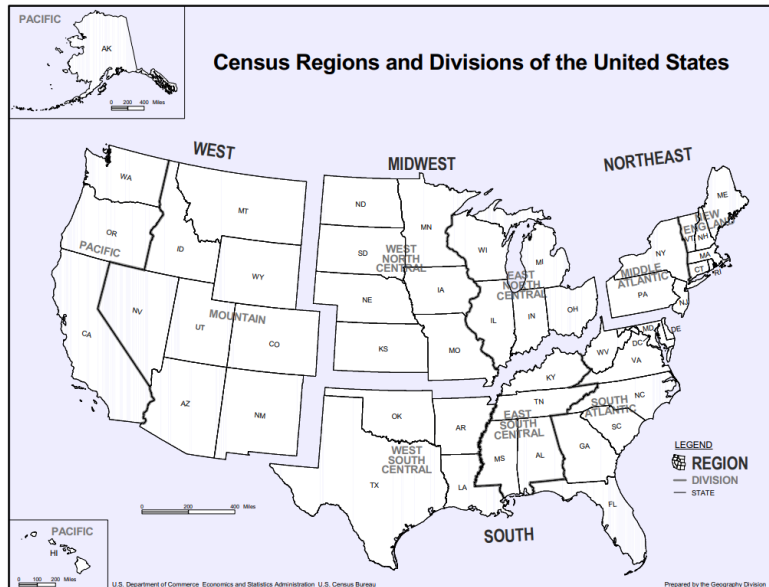
# Regional Hospital Census

All regions showing rapid increase in hospitalized patients.



# U.S. Hospital Census

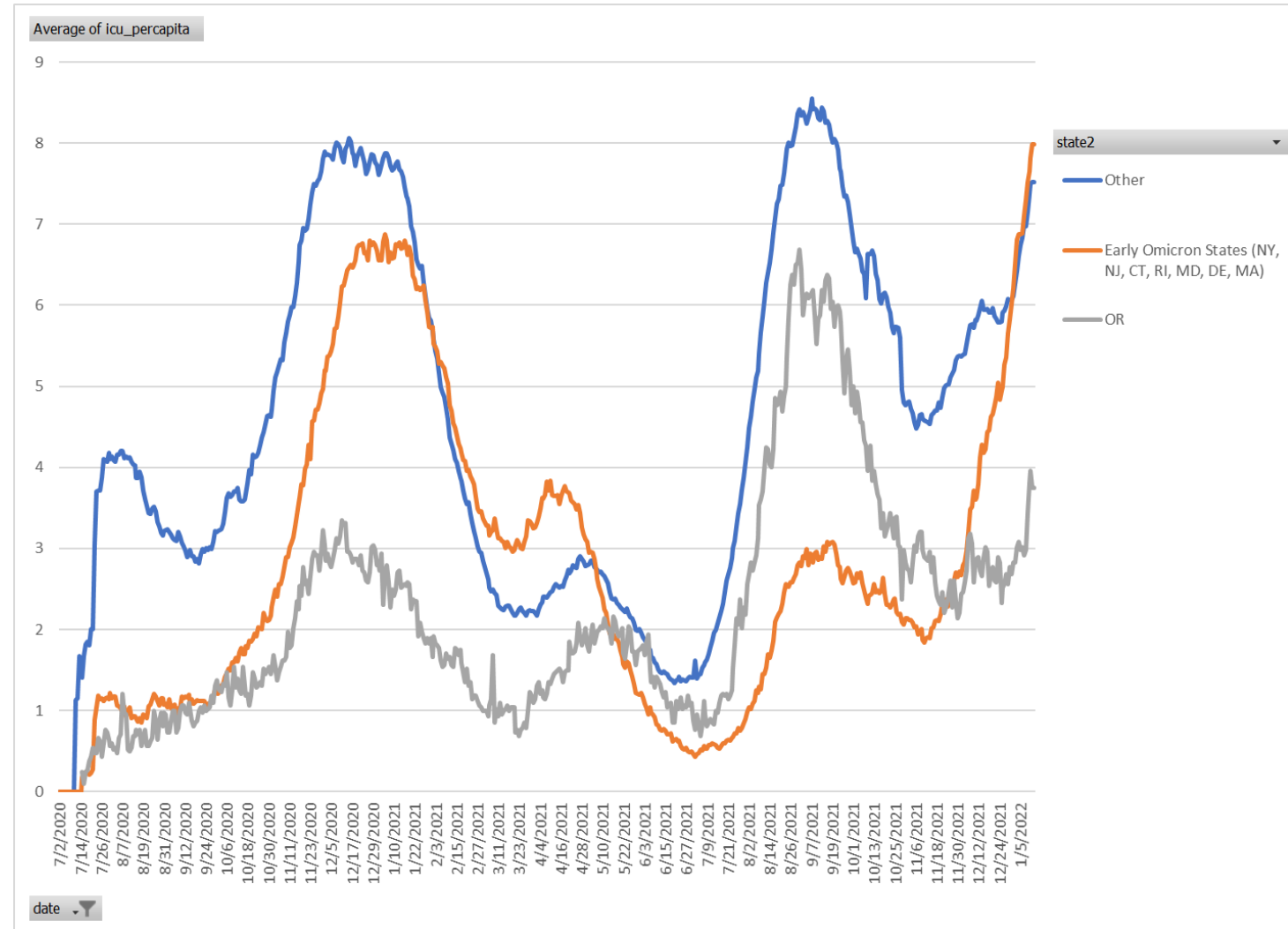
States that identified Omicron presence early, are showing sharp increases in hospitalization rates. These rates are higher than the Delta peak in Oregon.





# ICU Census in Early Omicron States

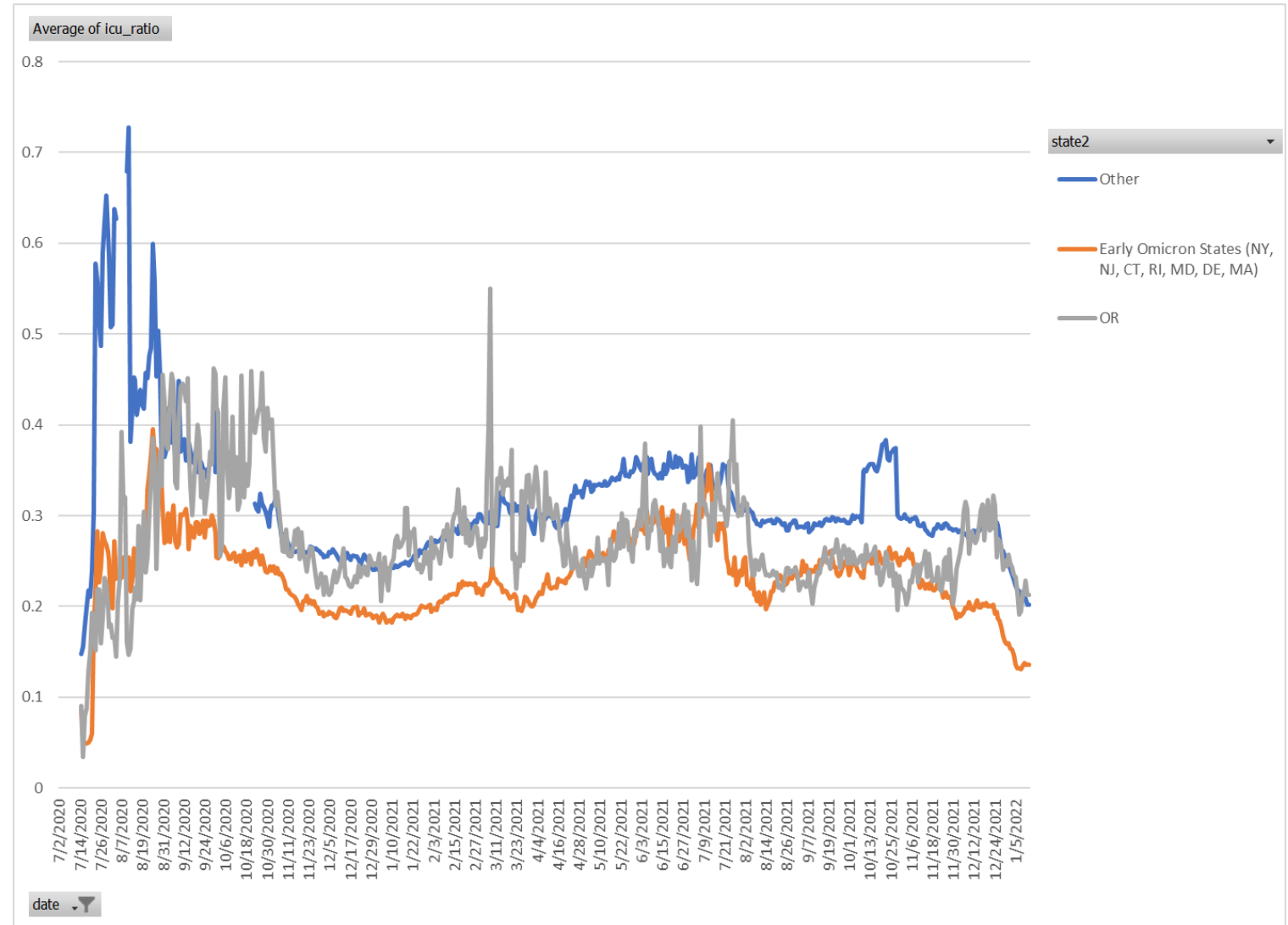
The Early Omicron states are showing sharp increases in ICU utilization rising to the levels of the Delta surge in Oregon.



# ICU Rate in Early Omicron States

The states that saw Omicron early, are showing decline in the percentage of COVID in the ICU.

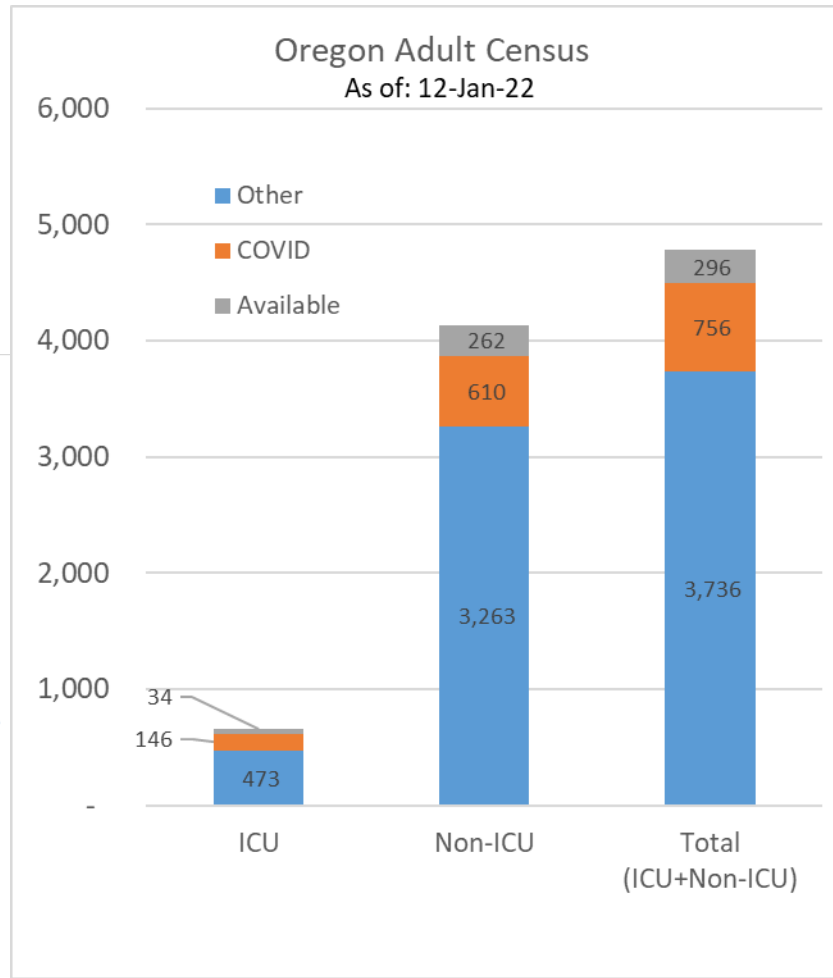
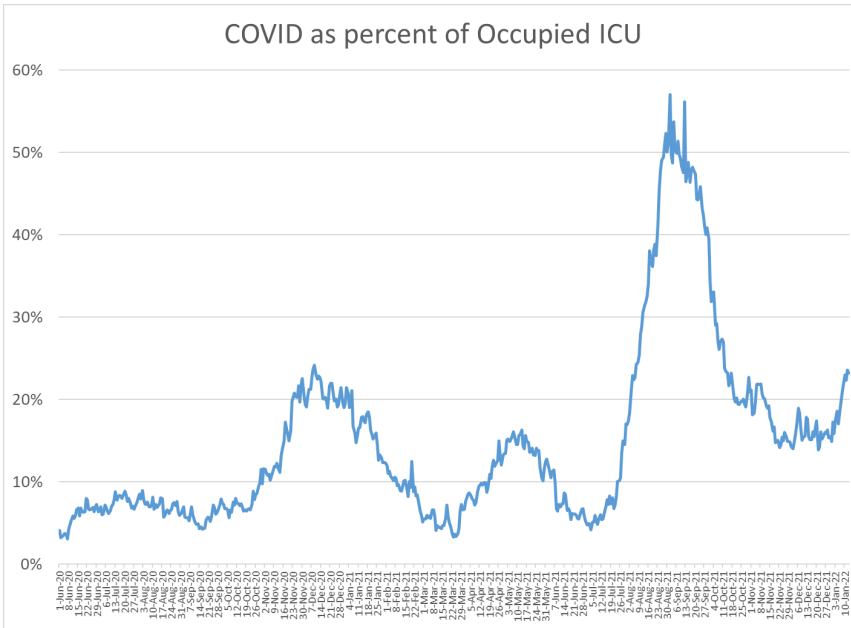
This could change over time as patients require more intensive treatment.



# Oregon Hospital Capacity

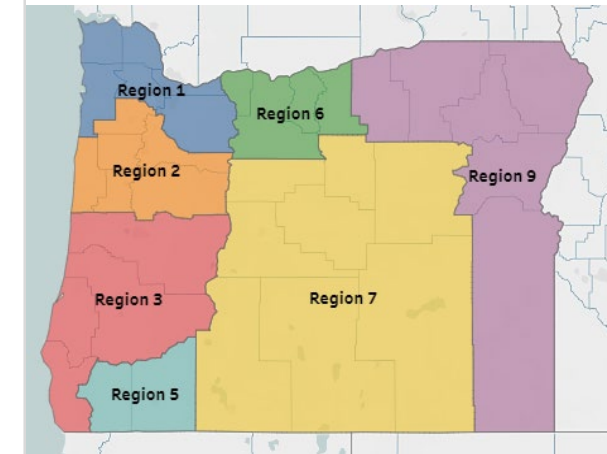
As of 1/12/22, 24% of occupied ICU beds are filled with COVID patients.

COVID as percent of Occupied ICU



Share of Occupied w/COVID

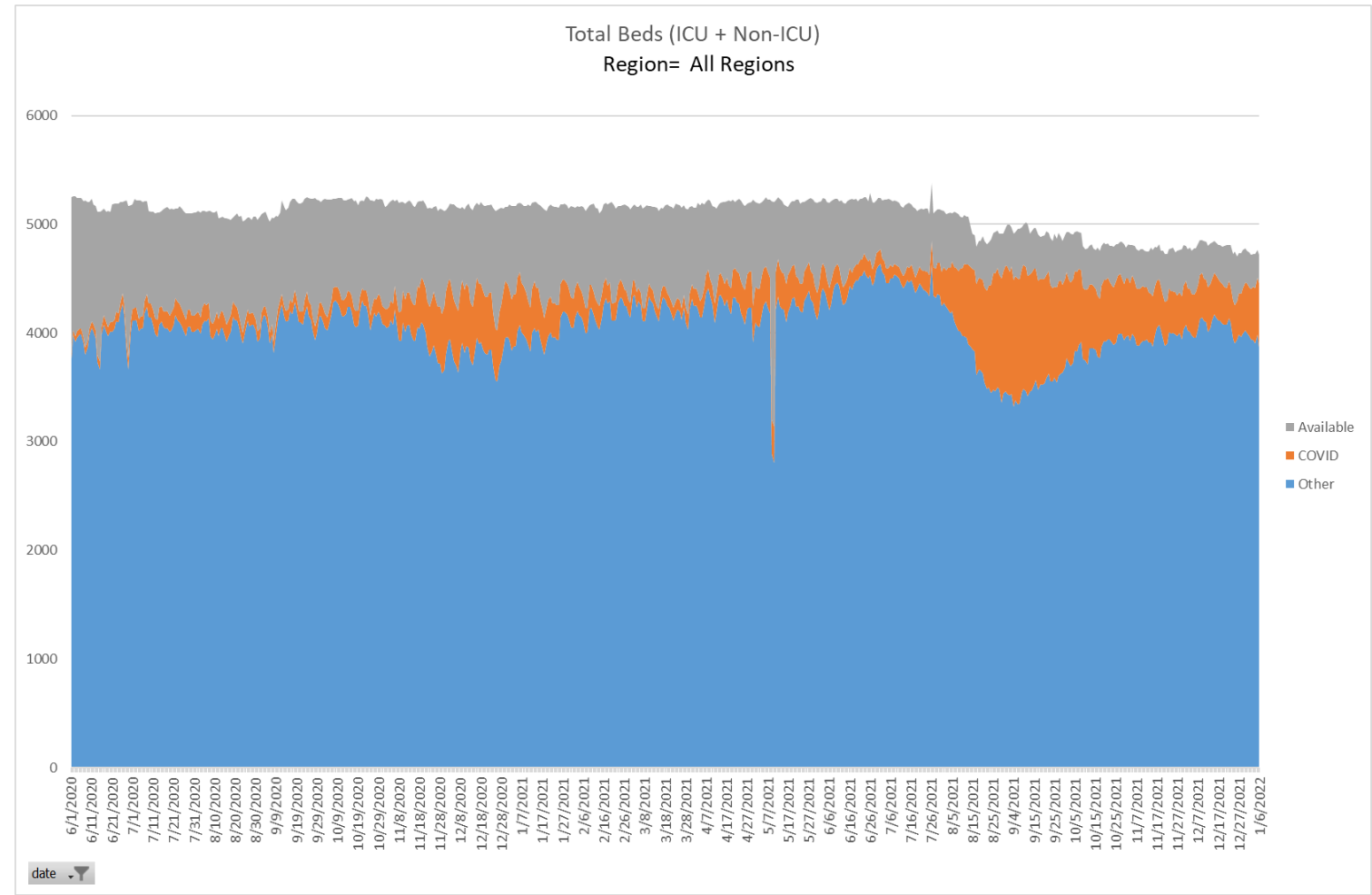
Region	ICU	Non-ICU	Total
1	23%	16%	17%
2	30%	17%	19%
3	14%	13%	13%
5	40%	16%	19%
6	13%	16%	15%
7	13%	15%	15%
<u>9</u>	<u>22%</u>	<u>20%</u>	<u>20%</u>
Total	24%	16%	17%





# Oregon Hospital Capacity

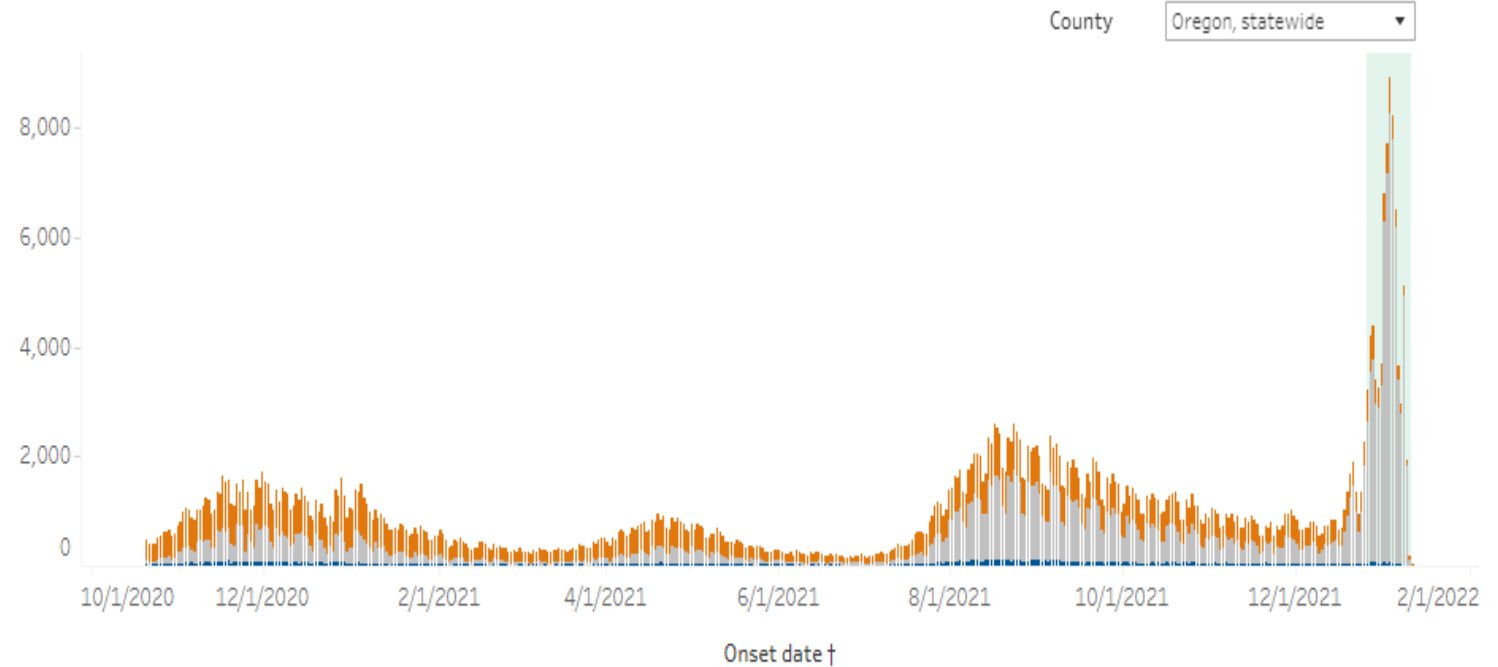
These data are based on Oregon's hospital capacity web system (HOSCAP) reports of individuals infected with COVID.



# New Cases per Capita

A sharp increase in cases is evident by specimen date.

This chart shows the number of Oregonians who have been identified as COVID-19 cases and whether they were ever hospitalized for their illness ‡



# Cases by Vaccination Status

As of 1/6/22, a sharp drop in vaccine effectiveness is noted against infection. This has rebounded in the most recent week, though may it may yet be revised.

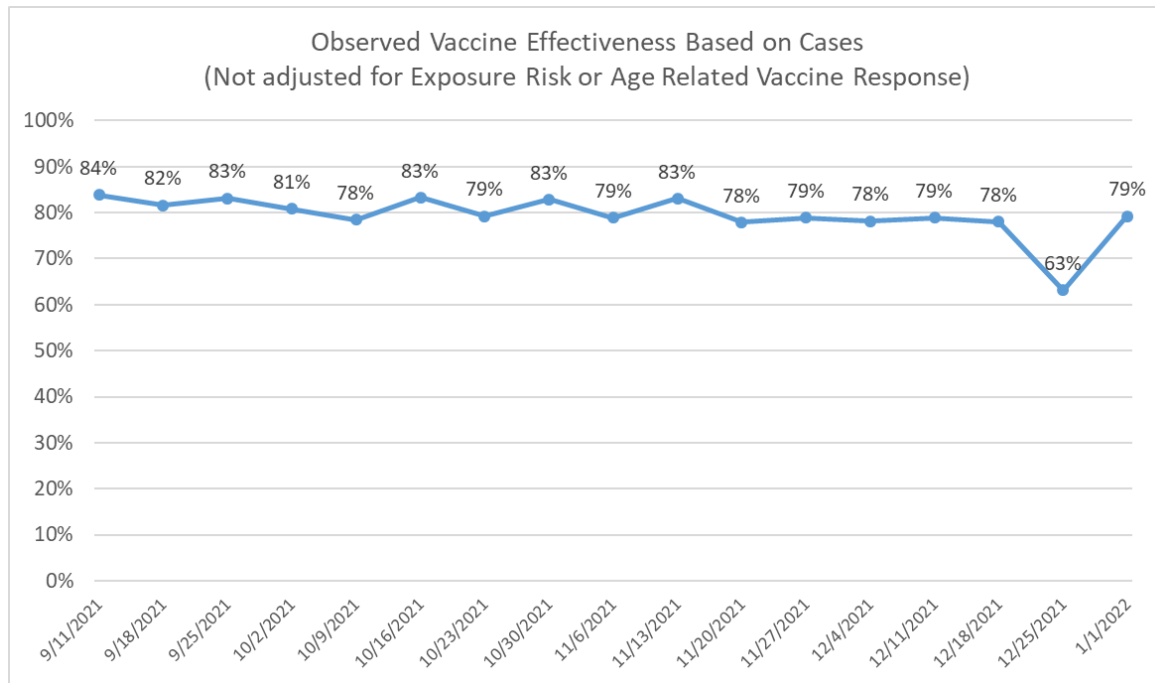
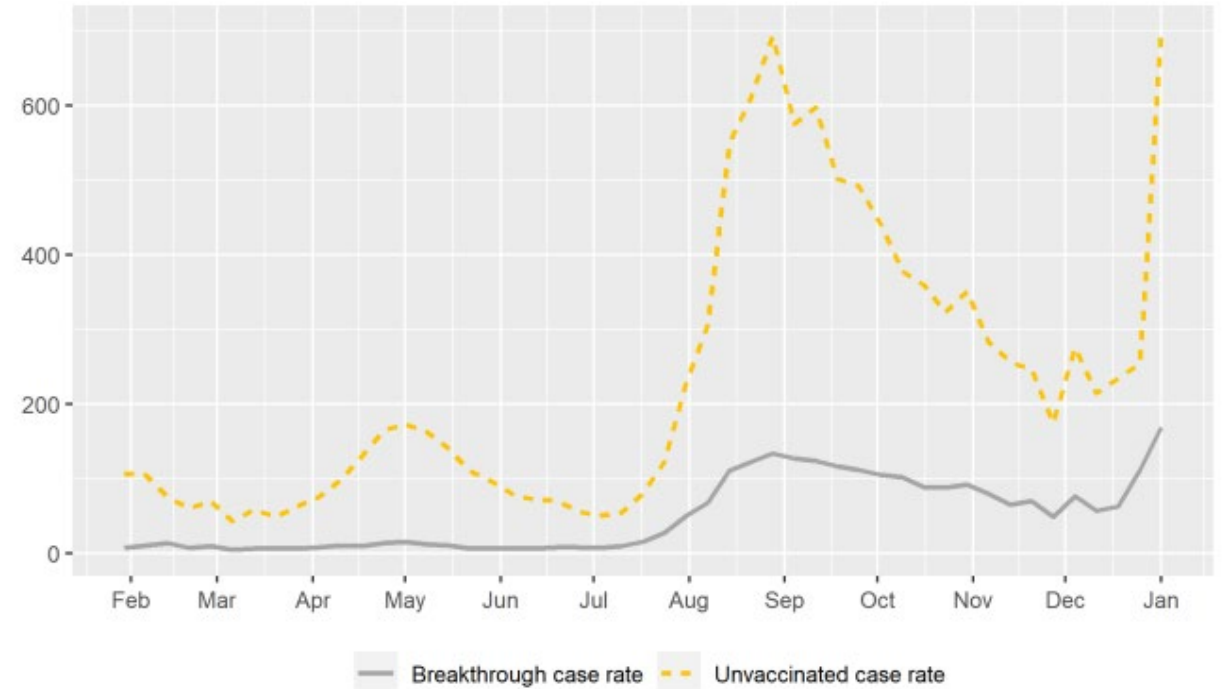


Figure 1. COVID-19 cases per 100,000 per week, by vaccination status



Note: Observed Vaccine efficacy is calculated as  $1 - (\text{CasesVac} / \text{CaseUnvac}) * (\text{PctUnvac} / \text{PctVac})$

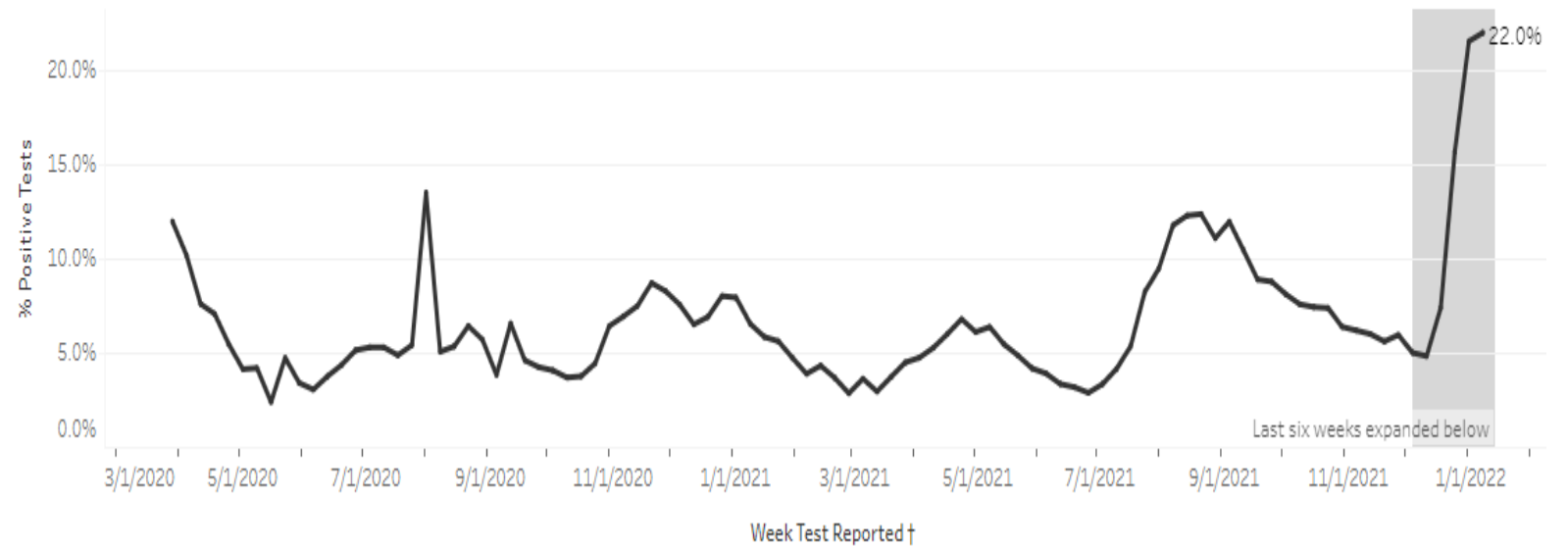
# Test Positivity

The most recent complete week (1/2/22-1/8/22) had a test positivity of 21.6%.

This represents the highest positivity rate observed, as well as a sharp increase, over the last 4 weeks.

## Weekly test positivity over time - All

This line chart shows the weekly percent test positivity, the number of positive tests divided by the number of total tests, by date reported to public health.

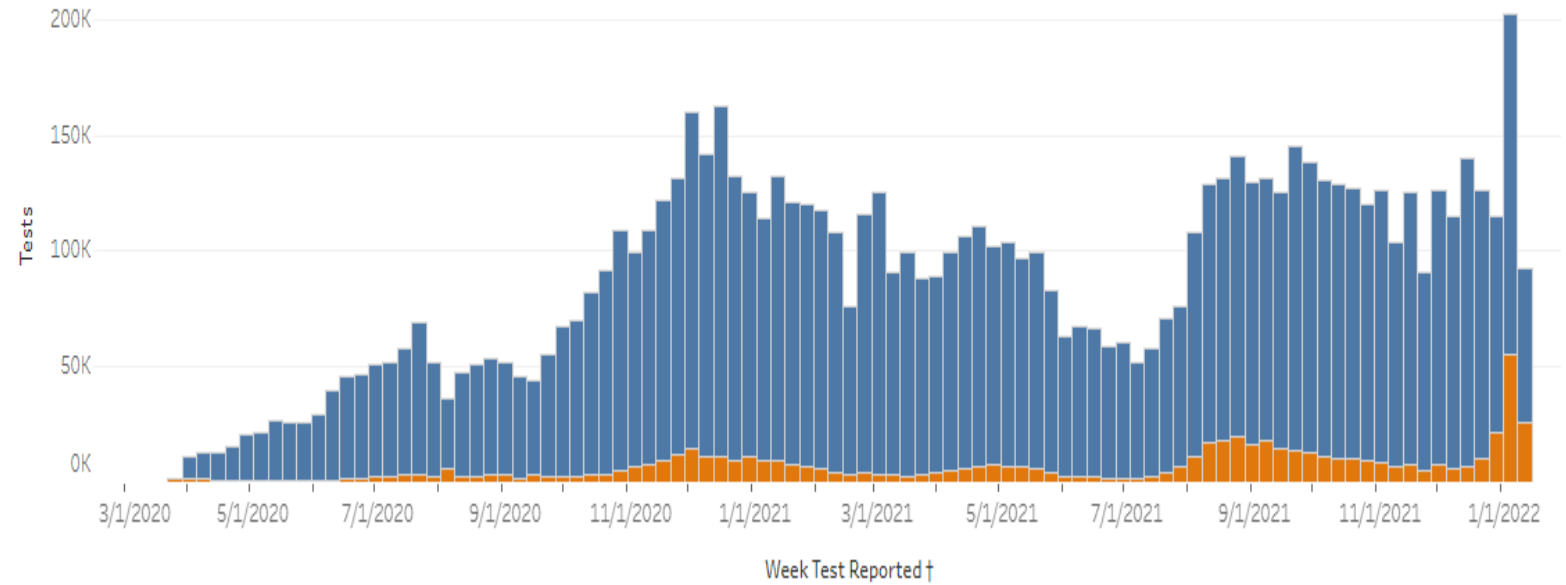


# Total Tests

Testing levels remain at similar levels seen throughout Oregon's Delta surge.

Weekly **Positive** and **Negative** COVID-19 test counts over time - All

This stacked bar chart shows weekly total tests by the date reported to public health and result, positive or negative.



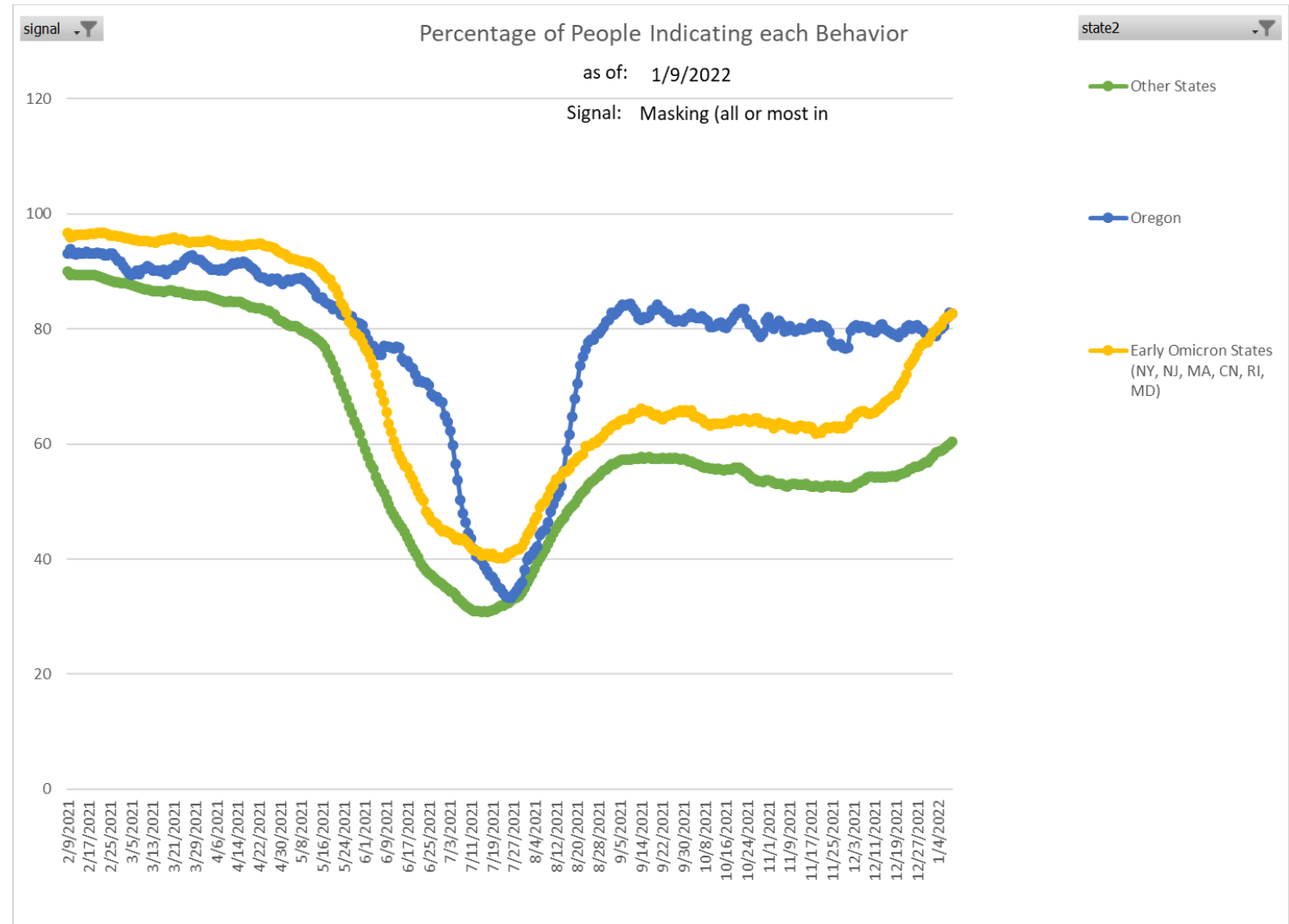
# Review of Leading Indicators



# Masking

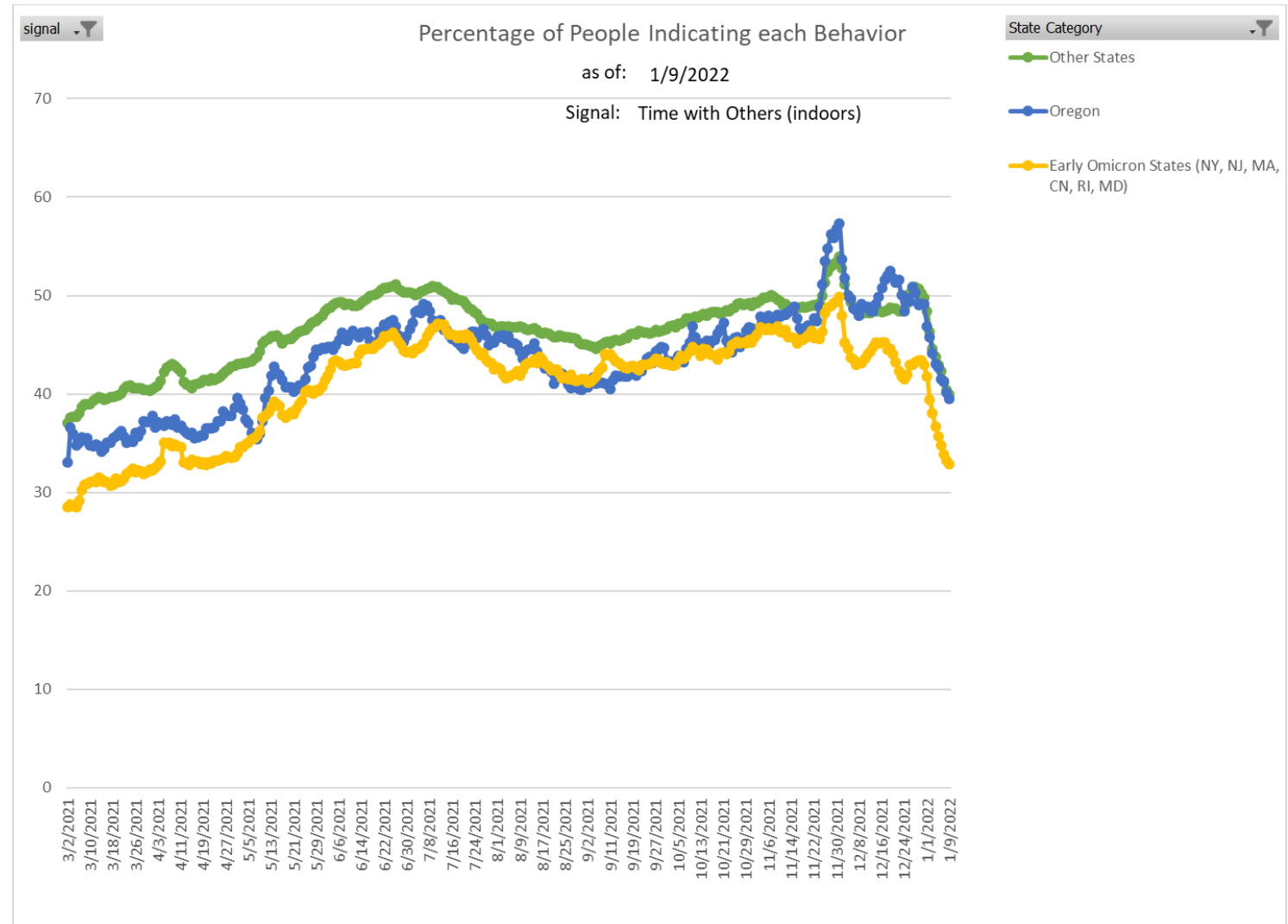
Oregon's masking rate increased slightly.

States that experienced Omicron are responding by increasing their masking rate.



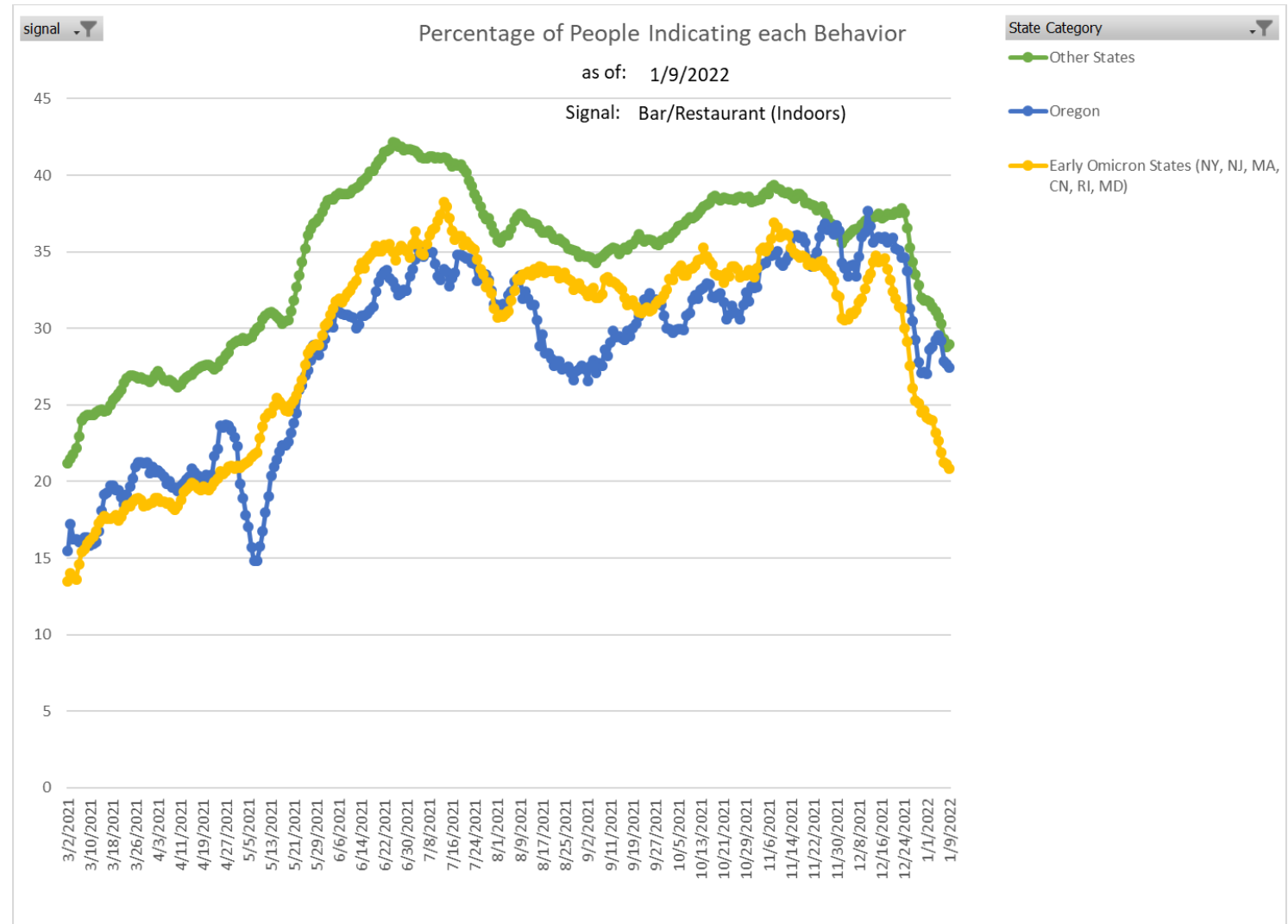
# Time with Others Indoors

Time with others indoors is declining in Oregon to levels last seen during peak of Delta. This decline is slightly behind what other “Early Omicron” states began in December.



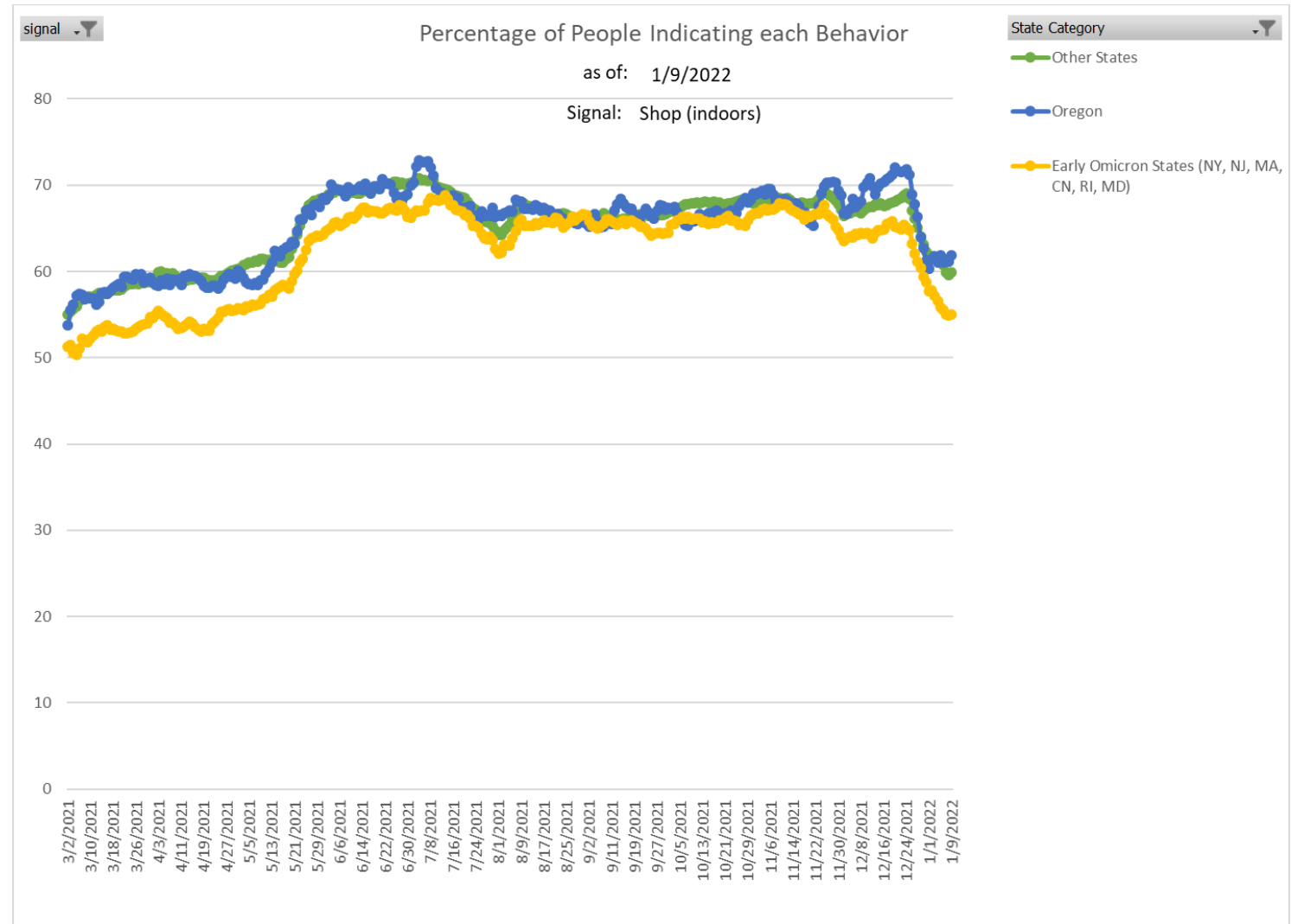
# Bar/Restaurant Indoors

The percent of people indicating going to a bar or restaurant indoors has declined sharply to the level seen at peak of Delta surge. This drop is also evident in the “Early Omicron” states.



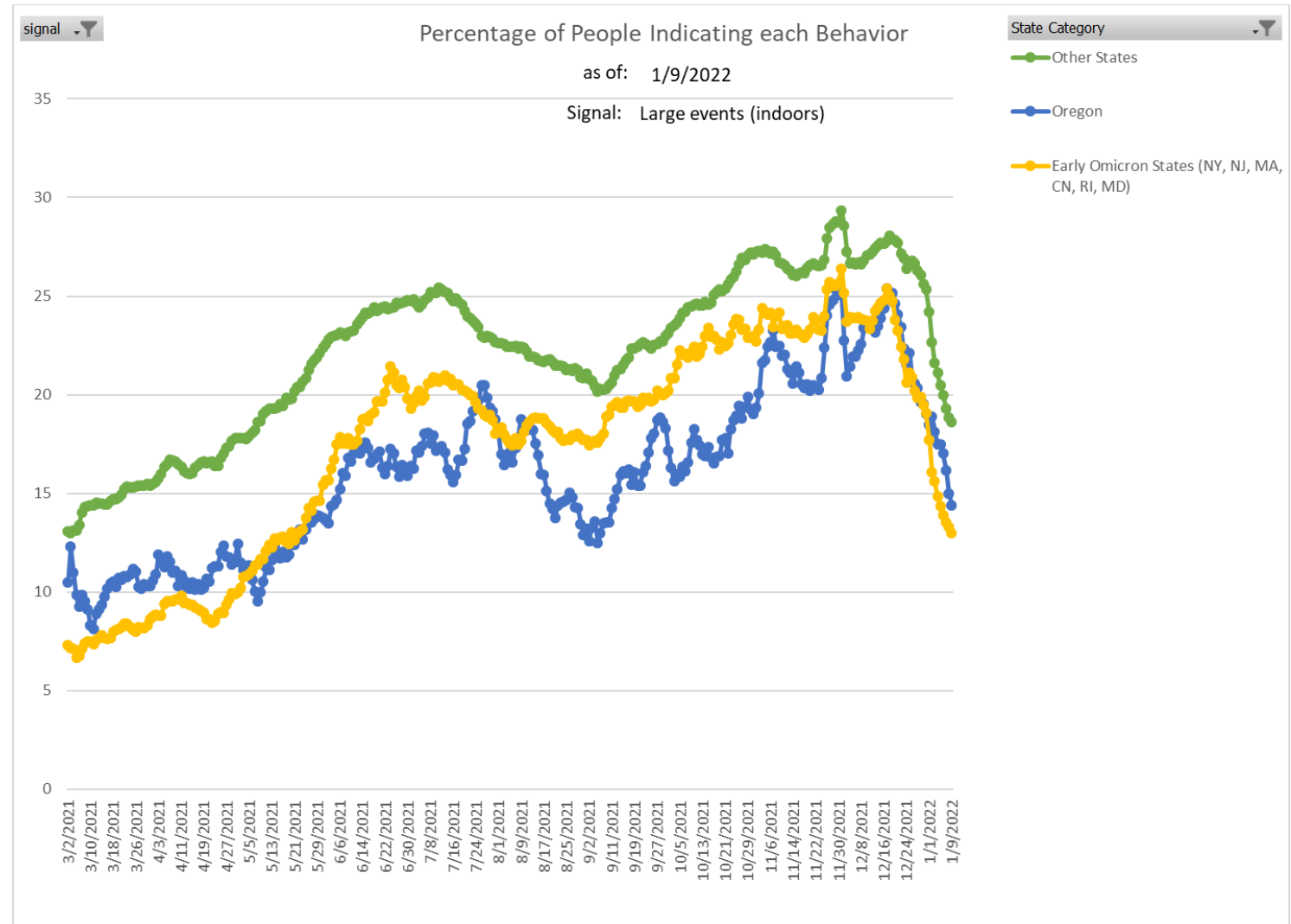
# Shopping Indoors

Shopping indoors is showing uncharacteristic decline. This likely reflecting some real concern about safety in these situations.



# Large Events Indoors

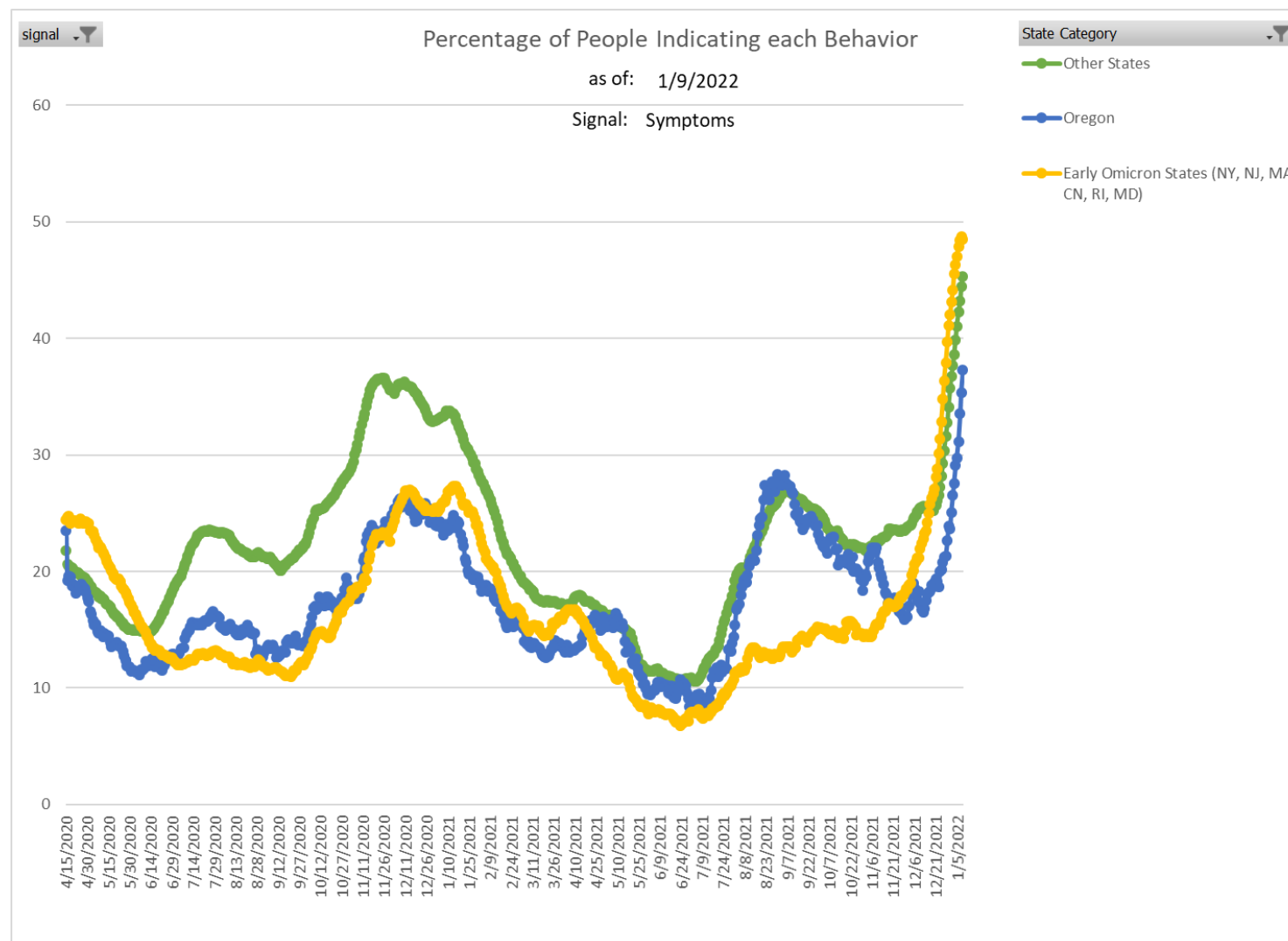
Sharp decreases are shown in the number of people going to large events indoors.



# Symptoms

The rate of symptom reporting increased dramatically in recent weeks.

Note: “Symptoms” refer to community reports of COVID-like symptoms through Facebook surveys.





# Vaccination Rates

29.8% of Oregon's total population has received an extra dose (booster).

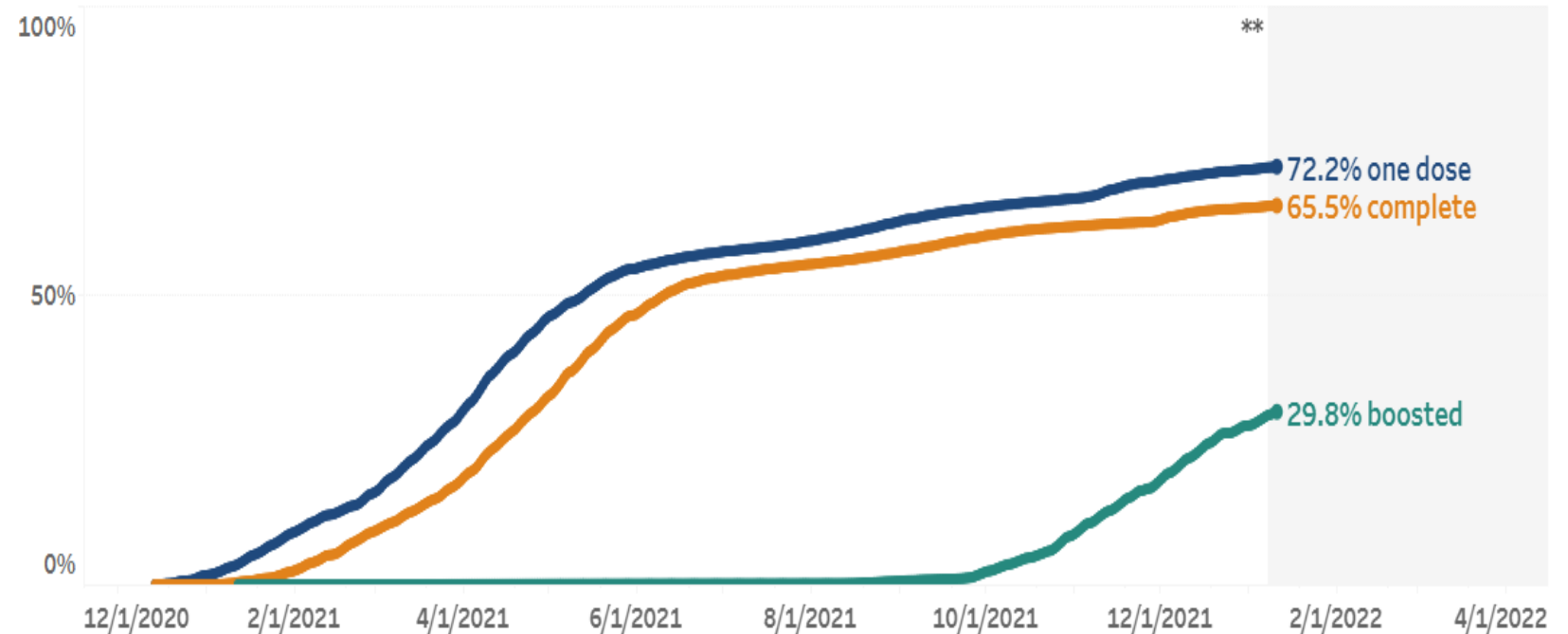
## Vaccination Coverage

People of all ages living in Oregon

72.2% have initiated COVID-19 vaccination and have received at least one dose of any COVID-19 vaccine.\*

65.5% have completed their primary series, or have received 1 dose of Johnson & Johnson, 2 doses of Moderna, or 2 doses of Pfizer vaccines.

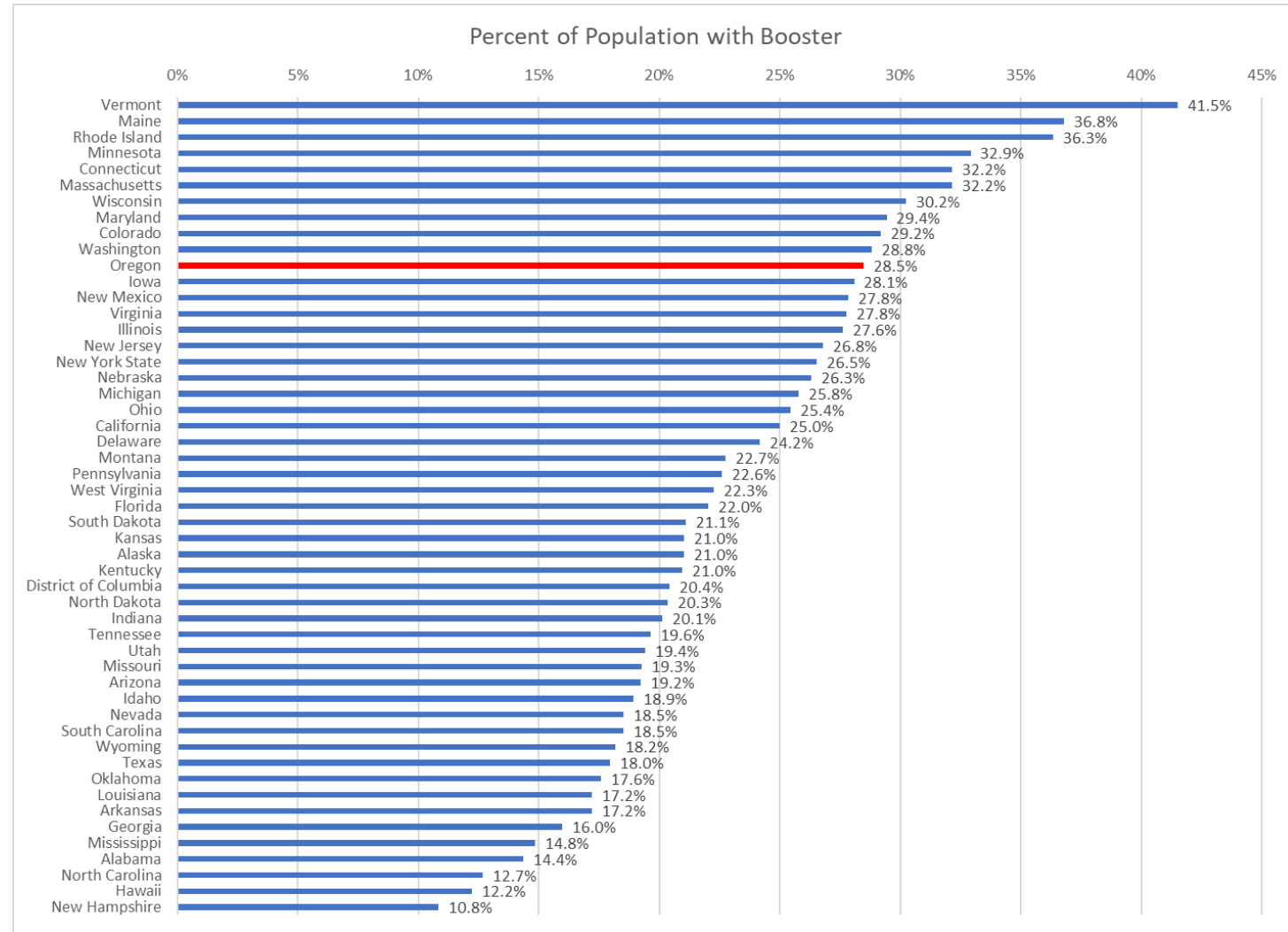
29.8% have received a booster of any COVID-19 vaccine in addition to completing their primary series.



# Booster Rates

As of 1/12/22, Oregon has the 11<sup>th</sup> highest rate of boosters per capita in the country.

Note: The CDC data has slightly lower counts of boosters reported. This may be due to where the booster was administered.



# Statewide Forecast

# Key Parameters

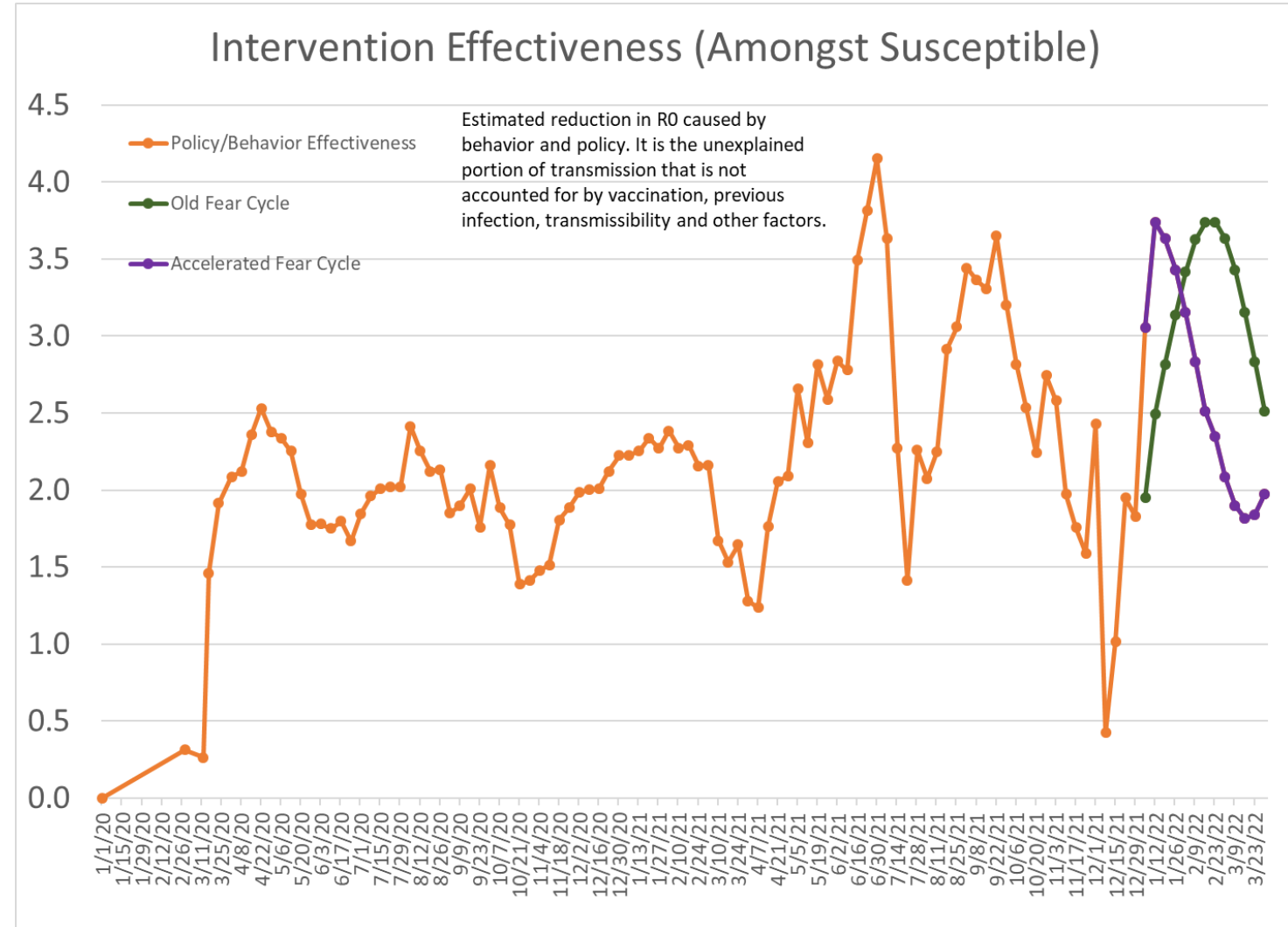
- Less protection (immune escape)
  - Vaccine and previous infection do not prevent infection at same rate as previous strains
  - Boosters do prevent infection
- Faster transmitting ( $R_0$ )
  - Even without immunity escape, this means the virus just spreads faster
- Less severe (hospitalization rate)
  - Compared to Delta how much less likely is a person to be hospitalized
  - Compared to Delta how much more likely is a person to not have immunity
- Other factors
  - Length of stay, days until hospitalization, first case date, booster rate, behavior response

# Behavior Effects

This value represents how effective the non-pharmaceutical interventions (NPIs) and individual behaviors have been at reducing the spread of the virus.

The projections are based on historical patterns of the cycling.

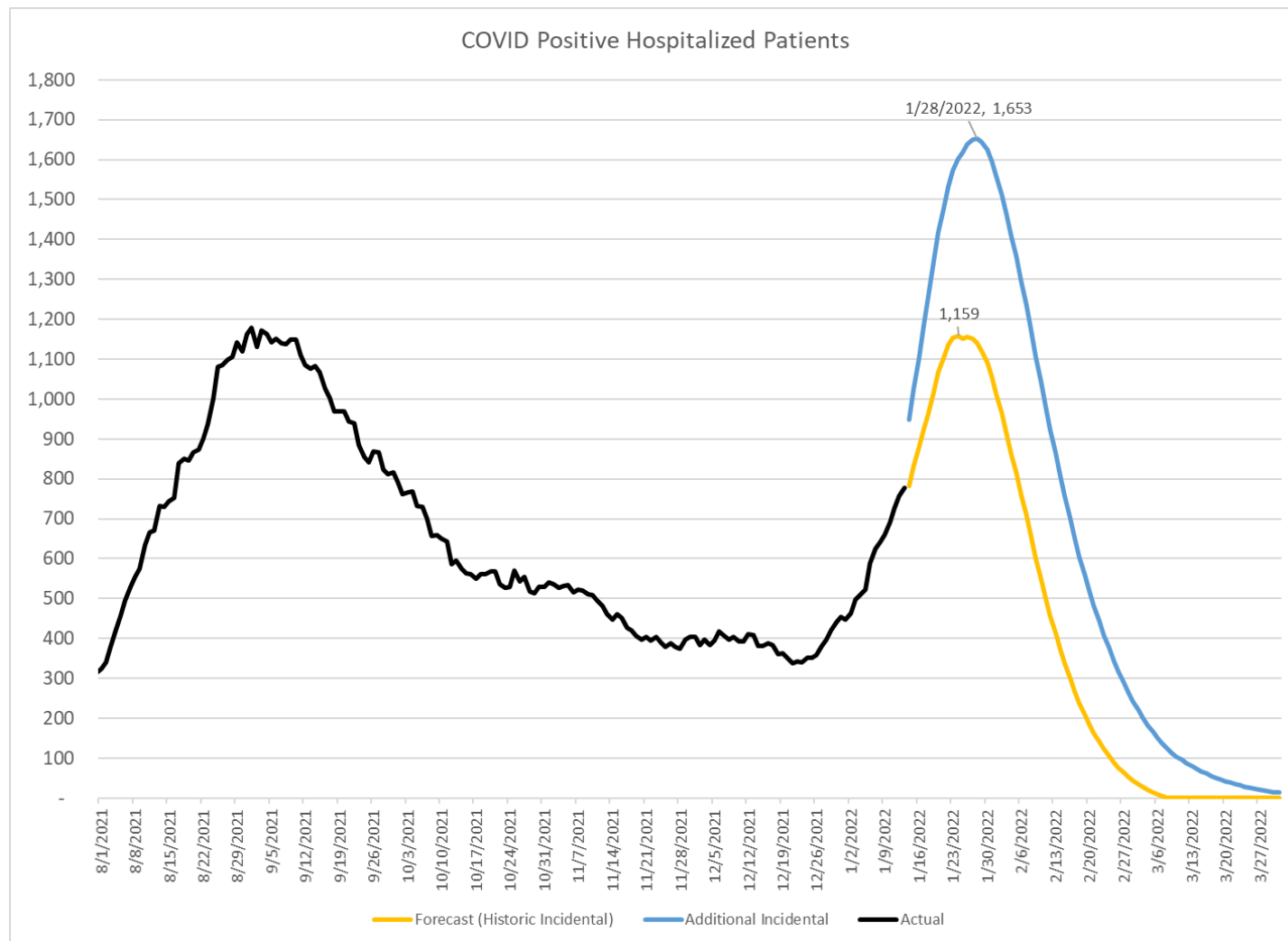
Two scenarios are shown. One has the expected fear cycle from last forecast. The other one is the revised pattern based on the sharp change in behavior observed over the last 2 weeks.



# Oregon COVID Forecast

## Specifications:

- R0=20% more than Delta
- Immune Escape=65%
- Behavior=accelerated fear cycle
- Hospitalization Rate=20% of Delta
- ICU Rate of hospitalized=80% of Delta
- Boosters=12k/day

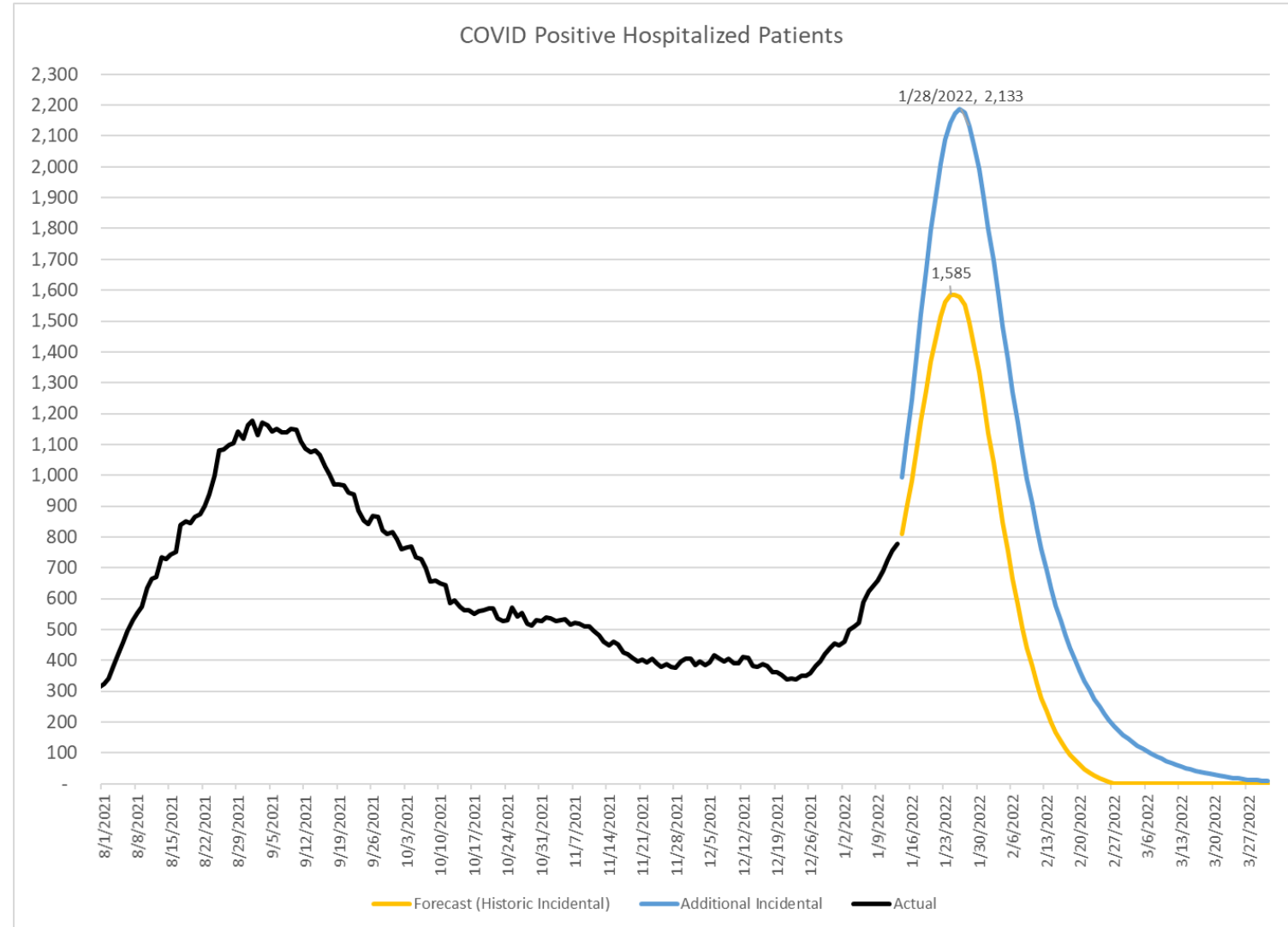




# Alternative Specification

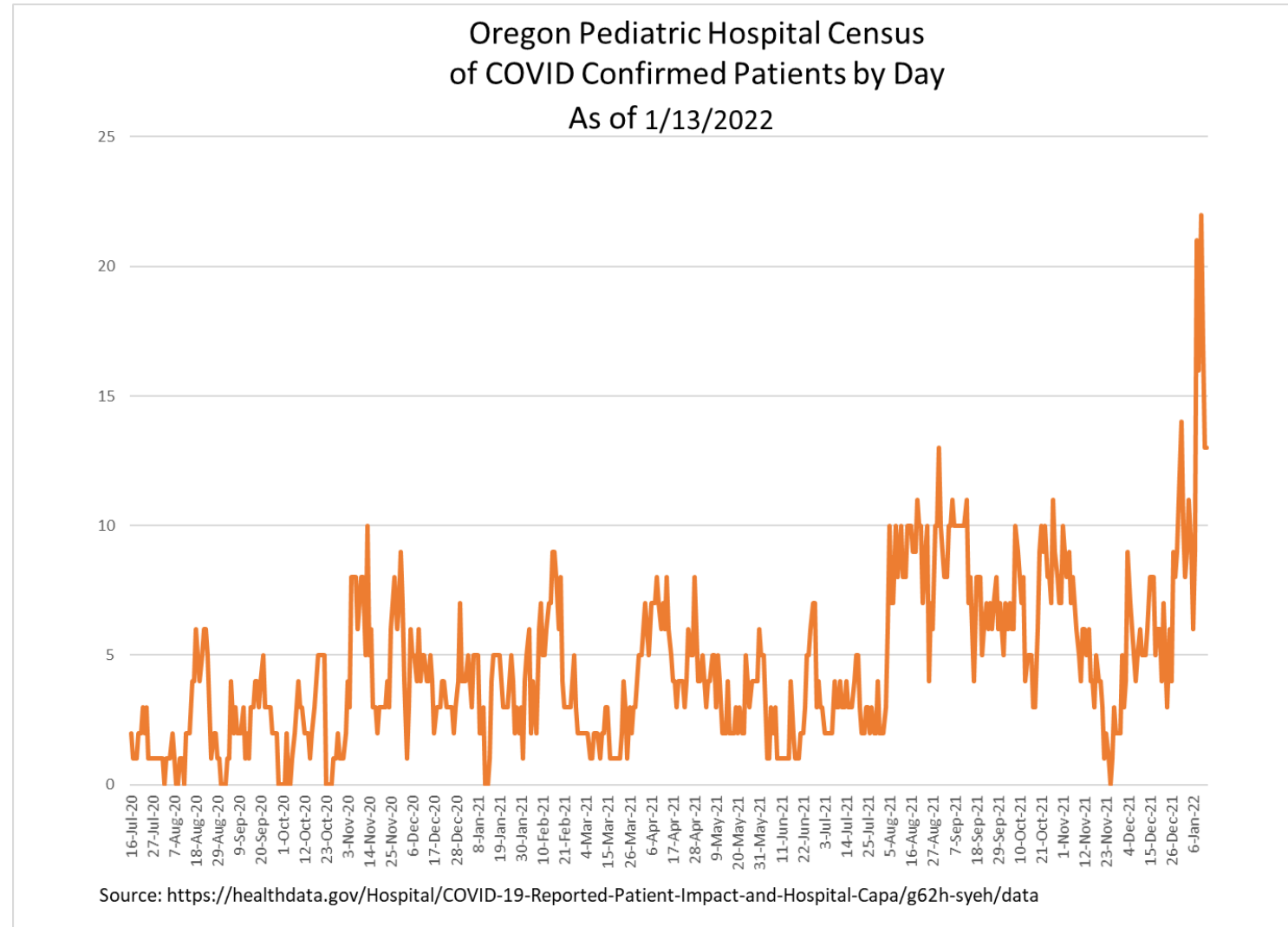
## Specifications:

- R0=20% more than Delta
- Immune Escape=65%
- Behavior=Old fear cycle
- Hospitalization Rate=20% of Delta
- ICU Rate of hospitalized=80% of Delta
- Boosters=12k/day



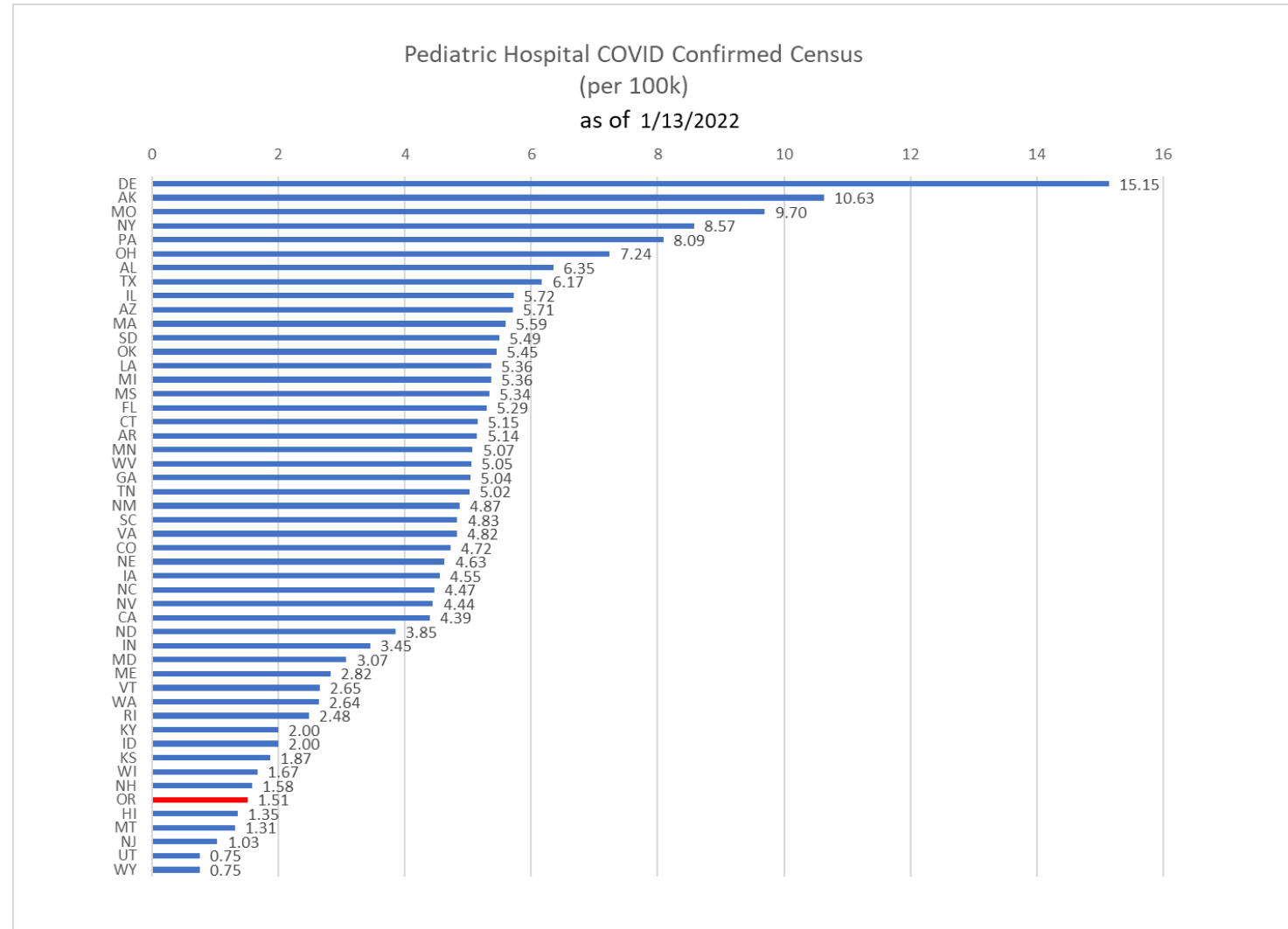
# Pediatric Census in Oregon

The pediatric census level in Oregon for confirmed positive patients under age 18 is 13 as of 1/13.



# Pediatric Census in Oregon

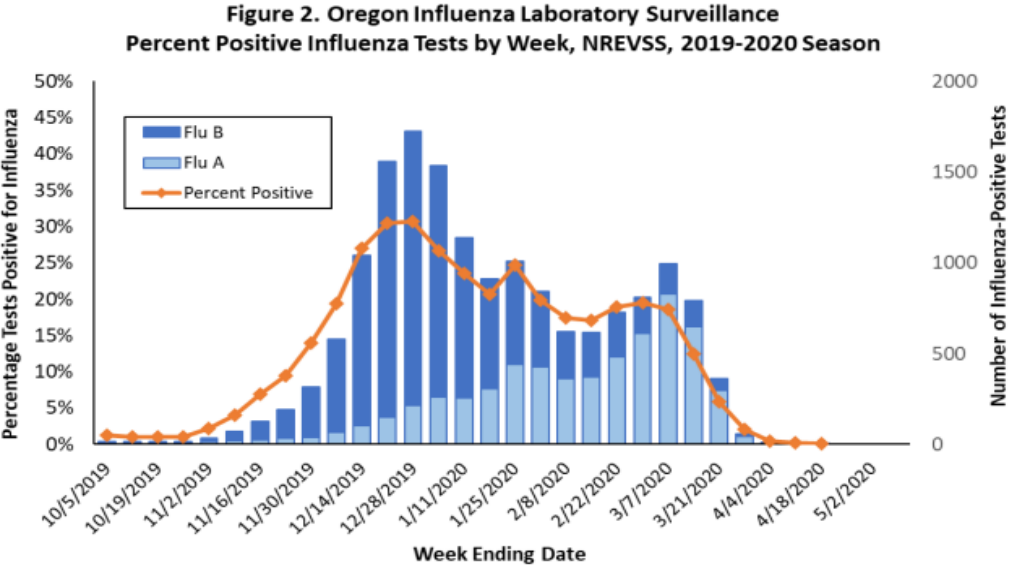
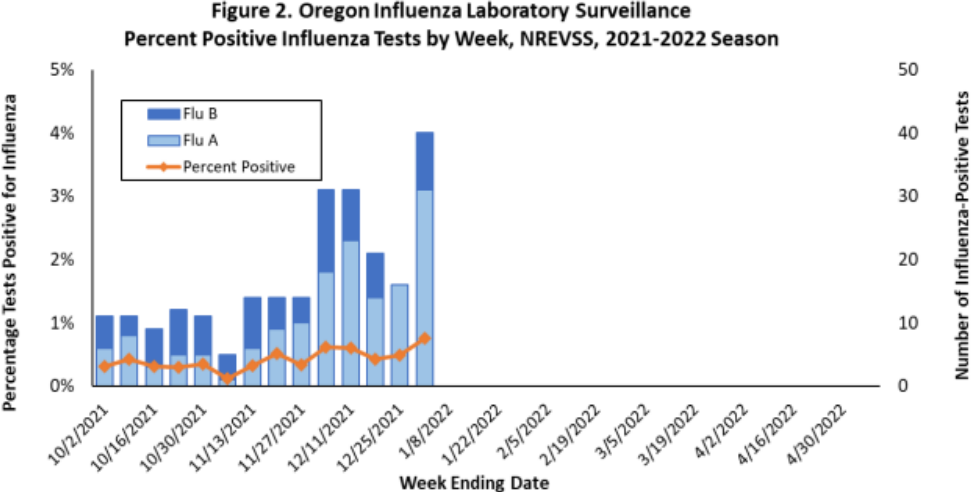
While Oregon has a pediatric census rate at 1.51 per 100k population of children (age <18), other states are showing rates up to 10 times higher.



# Influenza in Oregon

The most recent week had 40 positive tests for influenza.

During the 2019-2020 season the same flu season week number had 1,586 positive cases.



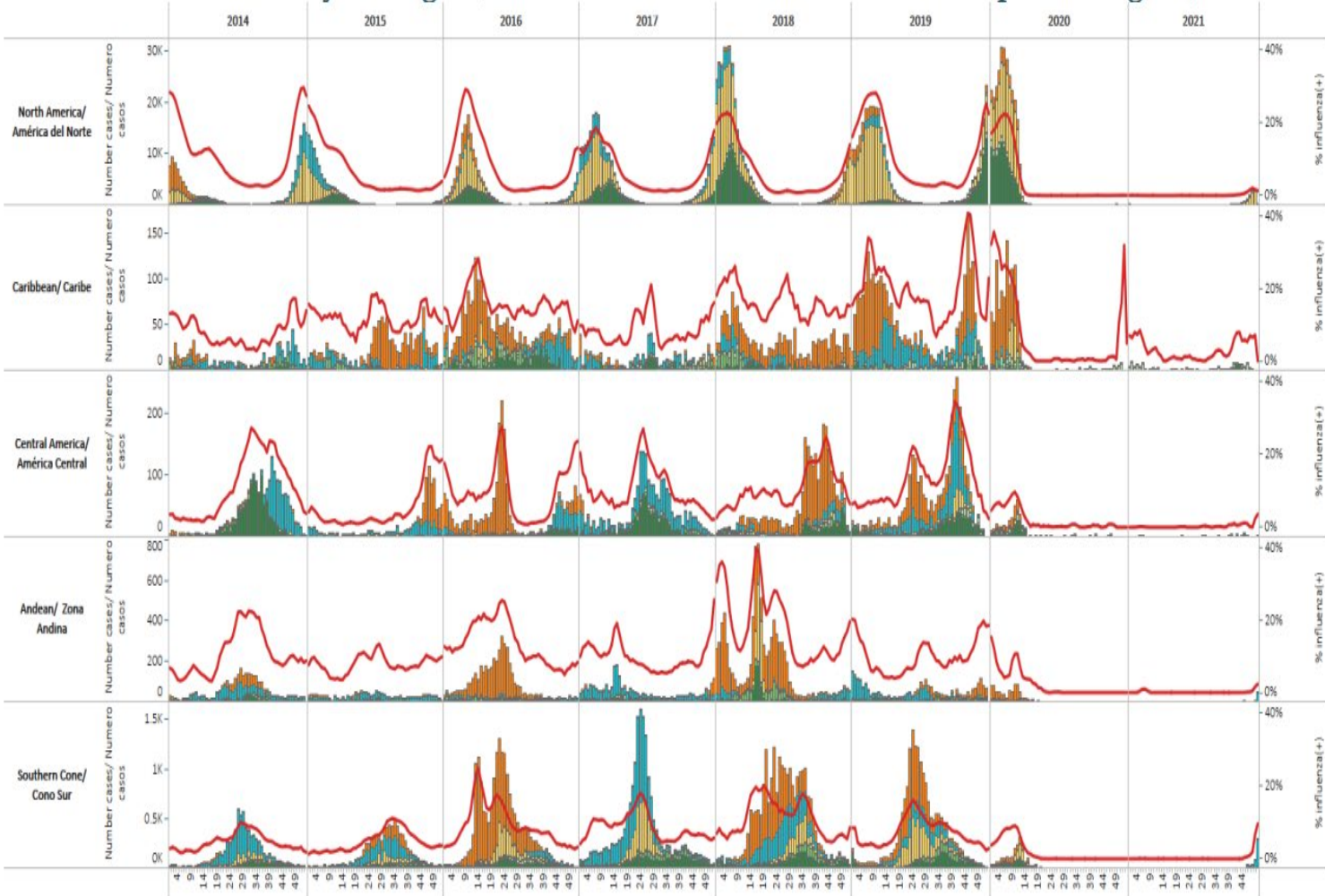
# Influenza Trends

Across the globe the amount of influenza has been low when measured against previous seasons where as many as 30k infections per week were detected.

Figure from EW50, Dec31.

- Influenza viruses/  
Virus influenza
- Influenza A(H1N1)pdm09
  - Influenza A(H3N2)
  - Influenza A not subtyped
  - Flu A non-subtypable
  - Influenza B/Victoria
  - B Victoria del 162/163
  - B Victoria del 162/164
  - Influenza B/Yamagata
  - Influenza B/Lineage non-determined
  - Influenza % positivity

Influenza circulation by subregion, 2014-21 Circulación virus influenza por subregión, 2014-21



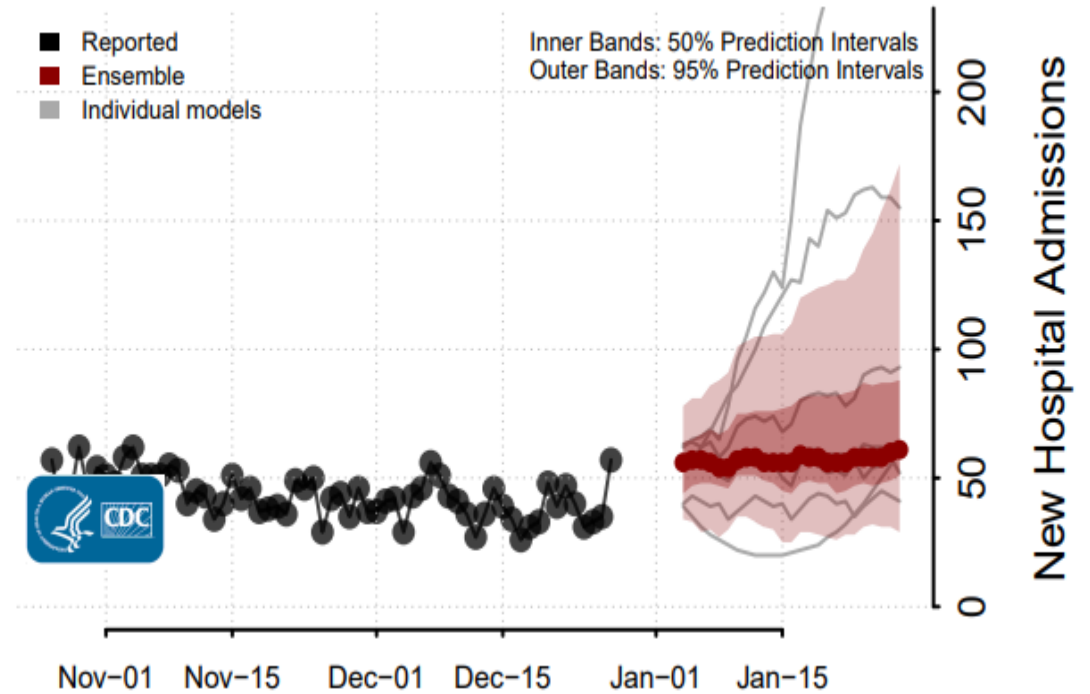
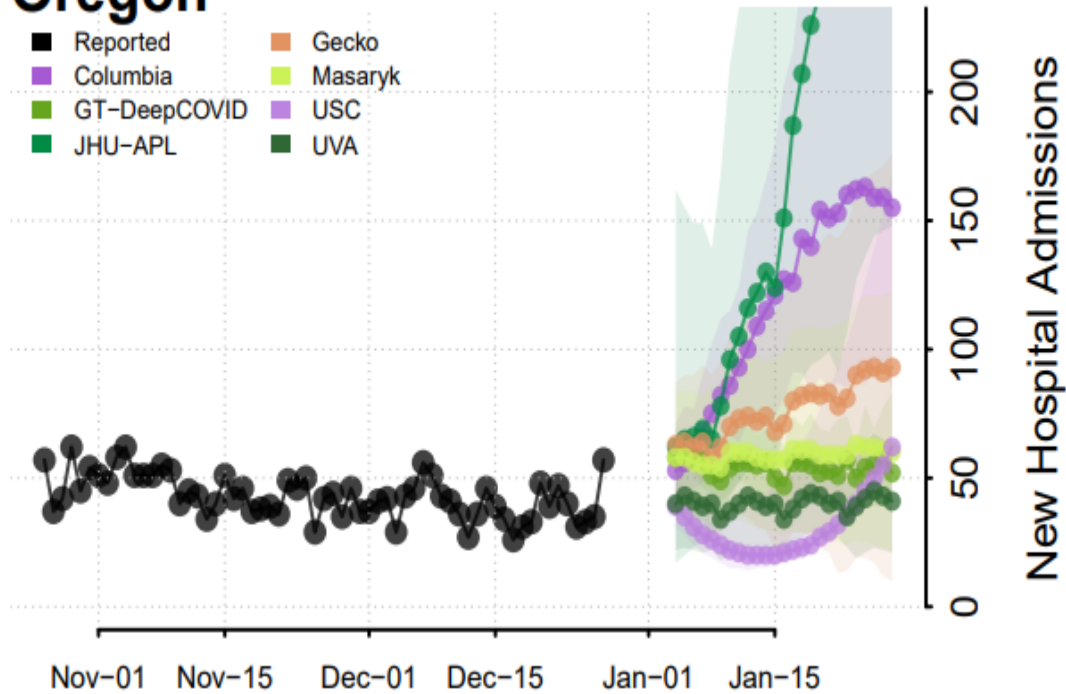
# Appendix



# CDC Forecast-Ensemble

Two of the CDC forecasts are showing sharp increases in hospital admissions.

## Oregon\*\*



# Acknowledgments

Each week this model requires updates, input and expertise from many people.

I would like to thank Dr. William Messer for his assistance in understanding waning dynamics, Brian O’Roak and Xuan Qin, at OHSU, for their expertise to understand genetic sequencing information, and the hospital forecasting workgroup for their feedback on weekly forecasts, including collaboration with Julie Maher and Erik Everson at Multnomah County PDES.

I would also like to give a special thank you to Michael Johnson from St. Charles Health who helped develop an early version of the model that has proven to be a good structure to handle the many twists and turns the problem has required.

Thank you!