Key Information

• Oregon hospitals are nearing full capacity
• By Sept. 7, Oregon will be short 400-500 needed staffed hospital beds.
• Currently no policies in place that significantly change projections
• Masking in Oregon is 45% as of Aug. 8
Key Outcomes
As of 8/8/2021, the statewide census was 554.

Source: https://public.tableau.com/profile/oregon.health.authority.covid.19#!/vizhome/OregonCOVID-19HospitalCapacitySummaryTables_15965754787060/HospitalizationbySeveritySummaryTable
Regional Hospital Census

Region 5 is showing dramatic increase to extremely high census levels.

All other regions are showing increases to levels at peak of winter/fall surge.

Source: https://public.tableau.com/profile/oregon.health.authority.covid.19#!/vizhome/OregonCOVID-19HospitalCapacity/BedAvailabilitybyRegion
The South and West are showing accelerating increase.

The Midwest is showing minor increases in hospital census.

The Northeast is showing slight increase at very low levels.

Source: https://carlsonschool.umn.edu/mili-misrc-covid19-tracking-project
Oregon Hospital Capacity

As of 8/4, of the 580 occupied ICU beds, 133 (23%) are filled with COVID patients.

<table>
<thead>
<tr>
<th>Region</th>
<th>ICU</th>
<th>Non-ICU</th>
<th>Total</th>
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<tr>
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<td>6%</td>
<td>7%</td>
</tr>
<tr>
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<td>6%</td>
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<td>20%</td>
</tr>
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<td>6%</td>
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</tr>
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<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>9</td>
<td>45%</td>
<td>8%</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>23%</td>
<td>7%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: https://public.tableau.com/profile/oregon.health.authority.covid.19#!/vizhome/OregonCOVID-19HospitalCapacitySummaryTables_15965754787060/HospitalizationbySeveritySummaryTable
New Cases per Capita

Dramatic increase in cases.

Oregon ranks 26th in the number of new cases per day.

Several states are showing sharp increases in cases per day.

Source: http://91-divoc.com/pages/covid-visualization/
New Cases by Vax Status

In Oregon, while cases amongst vaccinated are up in the last month, the rate of cases amongst unvaccinated are 6 times higher.

Hospitalization Rate

For the most recent week (7/18-7/24) of complete data, the hospitalization rate is 5.0%.

This represents a return to previous rates of hospitalization.

Source: https://public.tableau.com/profile/oregon.health.authority.covid.19#!/vizhome/OregonHealthAuthorityCOVID-19SummaryTable_15889676399110/OregonsEpiCurveSummaryTable
A sharp rise in positivity is developing.

The most recent complete week (7/18-7/24) had a test positivity of 5.4%.

Total Tests

Testing continues to increase.

Review of Leading Indicators
Leading Indicators Comparison

Leading indicators for Oregon from google are showing continued high levels of activity.

Source: SDI from: https://data.covid.umd.edu/
DEX from https://github.com/COVIDExposureIndices/, Google mobility reports from https://www.google.com/covid19/mobility/
Higher Risk Behaviors

Higher risk behaviors in Oregon have leveled off and even declined somewhat in recent weeks.

Source: https://covidcast.cmu.edu/
A very slight increase in mask wearing has occurred in last 10 days.

After a low of 32%, the rate has increased to 45% as of 8/8.

Source: https://covidcast.cmu.edu/
Symptoms are showing a sharp increase in the last week.

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

Source: https://covidcast.cmu.edu/
Statewide Forecast
“Fast” scenario assumes some increased vaccine rates due to attention from current surge. It also assume 5-11 become eligible in late fall.

“Slow” scenario show previous pattern of declining vaccine providing little boost to immunity levels.

The fast uptick in delta variant is shown by a kink in the overall R0 of circulating virus.

The “Fast” scenario assumes delta variant has an R0 of 8.0. The Slow scenario assumes the R0 is 7.0.
New variant prevalence data has impacted estimated intervention effectiveness. Now much more of surge is attributed to delta.

“Current” Scenario represents maintaining our current performance.

“Lowest Policy” shows what happens with our least amount of intervention effectiveness.

“Fear/Fatigue Cycle” shows a pattern of effectiveness from our history.

Intervention Effectiveness (Amongst Susceptible)

- Policy/Behavior Effectiveness
- Current
- Lowest Policy
- Fear/Fatigue Cycle

Effectiveness needed to keep virus from growing (i.e. $R_0-1$). (Note: Does not include reductions due to vaccinations.)

Note: The fear and fatigue cycle is shifted upwards to account for the increased transmissibility of the virus.
Census Forecast-Primary Scenario

The fifth wave is updated to be much more severe than previous forecasts. Its resolution is driven by future infections getting closer to herd immunity. Current intervention effect level is not able to slow down the variant.

The primary scenario is
- “Current” intervention effect
- Fast Variant (Delta $R_0=8.0$)
- Slow Vaccine

Source: OHSU COVID Forecast Model
Oregon’s policies have directly contributed to changing the trajectory of occupied hospital beds.

Source: OHSU COVID Forecast Model
Census Comparisons

Other states have not been as aggressive and the impact on hospital census compared to Oregon’s has been notable.

As you can see, when Oregon’s census spike was flattened by the Freeze, other states continue to increase to levels 3 or 4 times higher.

Source: OHSU COVID Forecast Model
Census Forecast-Alternative Scenarios

Scenarios:

Variant
a) Fast (ie. Delta R₀=8.0)
b) Slow (ie. Delta R₀=7.0)

Policy/Behavior:

a) Current effectiveness level
b) Fear and Fatigue in policy restrictions
c) Lowest policy effectiveness

Vaccine:

a) Fast (quicker distribution)
b) Slow (slower distribution)
Previous Forecasts

Previous forecasts can help assess accuracy of the model.

Source: Primary scenario for each week is used
As of 8/8, the estimated population proportions are:
Susceptible: 27%
Vaccinated: 46%
Infected: 20%
Vaccinated & Infected: 7%

Projection uses primary scenario.

Source: OHSU COVID Forecast Model
Policy Issues
Vaccination Rates

Oregon has given a first dose to 61.0% of population (not just eligible).

This rate ranks 19th in the US.

Source: https://covid.cdc.gov/covid-data-tracker/#vaccinations
The chart shows the mask wearing rate of the 7 states with the highest rate of cases per day per capita (FL, LA, OK, AR, MS, AL, MO) compared to all other states.

The trend shows dramatic reduction in mask wearing beginning in May.

High case count states started with lower rates than other states.

Beginning in July those rankings flipped and high case count states now have higher masking rates (though still well below winter and spring levels).

Source: https://delphi.cmu.edu/covidcast/?level=county&region=42003&signalType=value
High Risk Behaviors in Outbreak States

These charts show the percent of people engaging in types of behaviors between the 7 states with the highest rate of cases per day per capita (AL, LA, MO, AR, MS, OK, FL) and all other states.

The trend shows high risk behaviors increasing into June and displaying a mild decrease in July.

High case count states had higher rates prior to July and then have shown stronger declines since.

Source: https://delphi.cmu.edu/covidcast/?level=county&region=42003&signalType=value
Vaccine Rates in Outbreak States

These charts show the number of new vaccines administered in the 5 states with the highest rate of cases per day per capita compared with other states.

The trend shows that outbreak states (LA, MO, AR, AL, MS, OK, FL) had lower vaccine rates but have increased and now have a higher daily rate of vaccines administered per capita.

Source: https://91-divoc.com/pages/covid-visualization/
Using data about hospital census and number of cases per day, it is possible to look at trends in the hospital census per case. The chart shows the average rate across all states.

Because hospitalizations occur after cases (in many cases) various lags are provided. (i.e. hospital census today divided by case count 1 week ago).

All measures are showing much higher levels than previous waves. This may be indicative of more severe disease or less thorough testing.

ICU patients have made up a slightly larger share of all COVID patients in Oregon in the last month.

Source: https://public.tableau.com/profile/oregon.health.authority.covid.19#!/vizhome/OregonCOVID-19HospitalCapacitySummaryTables_15965754787060/HospitalizationbySeveritySummaryTable
Appendix
The most recent forecast was issued on 7/29.

The model shows a dramatic increase over the next 3-4 weeks.

Figure 6: Observed hospitalized cases for Oregon and projection scenario. Black dots show observed daily counts, while the grey line shows model fit. The red line shows hospitalizations projected if the transmission rate estimated for the week ending July 14 persists. Shaded areas: 2.5th-97.5th percentile ranges.
CDC forecasts show dramatic increase in infections in many models.

Source: https://covid.cdc.gov/covid-data-tracker/#forecasting_weeklycases
As of 7/30, the IHME model is shown below.

Projections and scenarios: We produce three scenarios when projecting COVID-19. The reference scenario is our forecast of what we think is most likely to happen:

- Vaccines are distributed at the expected pace.
- Governments adapt their response by re-imposing social distancing mandates for 6 weeks whenever daily deaths reach 8 per million, unless a location has already spent at least 7 of the last 14 days with daily deaths above this rate and not yet re-imposed social distancing mandates. In this case, the scenario assumes that mandates are re-imposed when daily deaths reach 15 per million.
- Variants B.1.1.7 (first identified in the UK), B.1.351 (first identified in South Africa), and P1 (first identified in Brazil) continue to spread from locations with (a) more than 5 sequenced variants, and (b) reports of community transmission, to adjacent locations following the speed of variant scale-up observed in the regions of the United Kingdom. The worse scenario modifies the reference scenario assumptions in two ways:
  - First, it assumes that variants B.1.351 or P.1 begin to spread within three weeks in adjacent locations that do not already have B.1.351 or P.1 community transmission.
  - Second, it assumes that all those vaccinated increase their mobility toward pre-COVID-19 levels. The universal masks scenario makes all the same assumptions as the reference scenario but also assumes 95% of the population wear masks in public in every location.
Acknowledgements

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

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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!