Modeling & Forecasting COVID-19 in NM

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14 Sept 2021: EpiGrid modeling

- Statewide NM daily incidence is declining. The red curve may not capture the full benefit of the masking order.
- High daily incidence might still be impairing some mitigations (i.e. tracing, followed by quarantine or isolation).
- Testing positivity rates are improving.
- NM daily deaths will likely peak in September.
A look at the raw incidence data

- Sunday, Monday
- Tuesday
- Wednesday/Thursday
- Friday
- Saturday

Cases rates are *falling* due to mitigations.

The 190 cases in the Lea county correctional facility are removed from data reported on March 26th. The 1/3 of reported cases that were > 2 weeks prior were removed from March 24th. Case reported for weekends starting April 10-12th are each divided by 3 to estimate individual day counts.
14 September 2021 Vaccine Analysis and Summary

- ~1385k first doses have been administered in NM.
- ~1206k completed vaccine series in NM.
- Epigrid is modeling this as 1385k first doses.
- ~66.1% of all persons in New Mexico are vaccinated.

- Federal vaccine orders will likely drive more rapid adoption in the near future.

Black – vaccination for all New Mexicans
Red – First dose data used in EpiGrid.
Variants: Still Delta (for now, keep watching …)


B.1.617.2, “Δ” is “Indian variant”
B.1.1.7, “α” is “UK variant”
Other variants are being reported in multiple countries.

New Mexico data likely still showing Delta dominant

What is happening in the rest of the U.S.? The 10 most populous states and New Mexico


<table>
<thead>
<tr>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>25.14</td>
</tr>
<tr>
<td>Michigan</td>
<td>24.53</td>
</tr>
<tr>
<td>Ohio</td>
<td>56.74</td>
</tr>
<tr>
<td>Florida</td>
<td>71.12</td>
</tr>
<tr>
<td>New Mexico</td>
<td>30.51</td>
</tr>
<tr>
<td>Illinois</td>
<td>29.93</td>
</tr>
<tr>
<td>Texas</td>
<td>57.65</td>
</tr>
<tr>
<td>California</td>
<td>24.4</td>
</tr>
<tr>
<td>North Carolina</td>
<td>56.27</td>
</tr>
<tr>
<td>Georgia</td>
<td>65.78</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>30.06</td>
</tr>
</tbody>
</table>

Any anticipated roll-over in cases is slow coming in this wave.
The relationship between vaccination and cases is strong and highly protective on a by-county basis.

- Lea County incidence appears to be falling rapidly.
- San Miguel County is high incidence relative to middle vaccination adoption.
- Eddy, Chaves, Lincoln, Colfax, Taos are marginally high.
- Roosevelt, Torrance, Otero, Grant, Los Alamos have better than typical incidence compared to vaccination.
- Seven counties are not on this plot due to relative isolation and small populations: Catron, De Baca, Guadalupe, Harding, Hidalgo, Mora and Union.

- Based on county level data showing correlations between effective COVID-19 mitigation procedures and case rates, extrapolation says statewide daily reported cases would be ~300/day if similar mitigations and vaccination are implemented statewide.
- The observed excess in daily incidence will translate into increased deaths per day over the next month.
Hospital bed concurrent usage by COVID-19 patients (Statewide)

- Left panel: linear vs. time (y-scale = 0:800)
- Right panel: log vs. time (y-scale = 40:800, 20x)
- Deviation of the data below the model is evident beginning in late August.
- Concurrent bed utilization data reach their peak before the peak in daily incidence on approximately September 1st.
- Flattening of the hospital load data is due to improved disease outcomes or other factors not present from March through late July, 2021.
Our model suggests that the number of daily cases is expected to be around 400 in the next few weeks (middle case scenario).
**So what?**

Our model suggests that the number of daily deaths is expected to range between 1 and 13 in the next few weeks (worst case scenario).
Growth Rate for NM

So what?
As of September 13th, the average growth rate in NM is at 0.38% (up from 0.22%)
Cumulative Cases & Daily Growth Rate for NM: Sept 13

Cumulative growth rates are rising in middle NM

*Growth rate is in cumulative cases
So what?

- Most people in New Mexico are living in a county that is high per-capita case counts with mixed accelerating & decelerating
- Bernalillo and Dona Ana are slightly accelerating; warning for Mora, Sierra, Sandoval

Number of New Mexicans living in regions with particular combinations of per capita case counts and 7-day growth rates

Low  <10 cases/100k per week
Med  10-99 cases/100k per week
High >100 cases/100k per week
> Additional Regional Forecasts
The number of daily cases across most regions appear to plateau but the northeast may see a slight increase.
South Regions Daily Cases Forecast

So what?
The number of daily cases across most regions appear to plateau but the southeast may see a slight increase.
Hospitalization Forecast
Concurrent Hosp & ICU Beds Based on Forecasts – Average Stay of 8 Hosp, 15 Days for ICU/vent & 25% ICU rate

**This week’s forecast**

Concurrent COVID-19 ICU beds

<table>
<thead>
<tr>
<th>Week</th>
<th>Qu. 5%  (best case)</th>
<th>Qu. 50% (median)</th>
<th>Qu. 95%  (worst case)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/19</td>
<td>58</td>
<td>85</td>
<td>166</td>
</tr>
<tr>
<td>9/26</td>
<td>11</td>
<td>51</td>
<td>181</td>
</tr>
<tr>
<td>10/3</td>
<td>2</td>
<td>38</td>
<td>184</td>
</tr>
<tr>
<td>10/10</td>
<td>2</td>
<td>33</td>
<td>188</td>
</tr>
<tr>
<td>10/17</td>
<td>1</td>
<td>35</td>
<td>192</td>
</tr>
<tr>
<td>10/24</td>
<td>1</td>
<td>39</td>
<td>206</td>
</tr>
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“Scaled” Scenario

So what?

Interpret with caution, the model is potentially having trouble interpreting “outliers” from Labor Day reporting. Assume actual between median and worst case scenario.
Concurrent Hosp & ICU Beds Based on Forecasts – Average Stay of 8 Hosp, 15 Days for ICU/vent & 25% ICU rate

Concurrent COVID-19 non-ICU “med-surge” beds

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<td>259</td>
</tr>
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<td>3</td>
<td>55</td>
<td>258</td>
</tr>
<tr>
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<td>289</td>
</tr>
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<td>2</td>
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<td>274</td>
</tr>
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<td>310</td>
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