Modeling & Forecasting COVID-19 in NM

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Our model suggests that the number of daily cases is expected to be around 500 in the next few weeks.
Our model suggests that the number of daily deaths is expected to range between 1 and 9 in the next few weeks.
So what?
As of September 7th, the average growth rate in NM is at 0.22% (down from 0.36%)
Cumulative Cases & Daily Growth Rate for NM: Sept 6

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 and accelerating**

- Dona Ana, Chaves, San Juan, San Miguel, Lincoln, Colfax, Luna, Socorro are accelerating with high per-capita cases (Low <10 cases/100k per week, Med 10-99 cases/100k per week, High >100 cases/100k per week)

Number of New Mexicans living in regions with particular combinations of per capita case counts and 7-day growth rates
Additional Regional Forecasts
Central & North Regions Daily Cases Forecast

Northwest

Northeast

Central

So what?
All regions are expected to see a decline in the number of cases
*These forecasts may change due to Labor Day travel & activities
So what?

All regions are expected to see a decline in the number of cases

*These forecasts may change due to Labor Day travel & activities
Hospitalization Forecast
Concurrent Hosp & ICU Beds Based on Forecasts – Average Stay of 8 Hosp, 15 Days for ICU/vent & 25% ICU rate

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>9/12</td>
<td>87</td>
<td>133</td>
<td>218</td>
</tr>
<tr>
<td>9/19</td>
<td>45</td>
<td>122</td>
<td>273</td>
</tr>
<tr>
<td>9/26</td>
<td>36</td>
<td>119</td>
<td>280</td>
</tr>
<tr>
<td>10/3</td>
<td>33</td>
<td>122</td>
<td>295</td>
</tr>
<tr>
<td>10/10</td>
<td>31</td>
<td>123</td>
<td>309</td>
</tr>
<tr>
<td>10/17</td>
<td>25</td>
<td>123</td>
<td>318</td>
</tr>
</tbody>
</table>

“Scaled” Scenario

So what?

Model is predicting a slow decrease in COVID-19 ICU beds needed over the next 3 weeks.
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

<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>9/12</td>
<td>91</td>
<td>183</td>
<td>353</td>
</tr>
<tr>
<td>9/19</td>
<td>55</td>
<td>180</td>
<td>400</td>
</tr>
<tr>
<td>9/26</td>
<td>56</td>
<td>179</td>
<td>417</td>
</tr>
<tr>
<td>10/3</td>
<td>50</td>
<td>173</td>
<td>432</td>
</tr>
<tr>
<td>10/10</td>
<td>45</td>
<td>176</td>
<td>454</td>
</tr>
<tr>
<td>10/17</td>
<td>38</td>
<td>180</td>
<td>471</td>
</tr>
</tbody>
</table>

“Scaled” Scenario

So what?
Med-surge general bed needs are predicted to gradually decrease during the next 3 weeks
7 Sept 2021: EpiGrid modeling

- Statewide NM daily incidence is plateauing. By-county and regional heterogeneity are determining outcomes. *Some counties improving, others are not.* The red curve likely rolls over too fast.
- High daily incidence likely impairing some mitigations (i.e. tracing, followed by quarantine or isolation).
- Testing positivity rates in some counties may also be compromising mitigations.
- NM daily deaths will likely peak in September or early October, contingent on continued improvement.
A look at the raw incidence data

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

Cases rates are moderating 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.
7 September 2021 Vaccine Analysis and Summary

- ~1374k first doses have been administered in NM.
- ~1193k completed vaccine series in NM.
- Epigrid is modeling this as 1381k first doses.
- ~65.5% of all persons in New Mexico are vaccinated.

- Implications of NM reporting for vaccinated vs. unvaccinated outcomes with Delta variant:
  o 5.4 x raw protection ratio against infection (this likely contains biases due to high prevalence in areas with low vaccination)
  o 10. x raw protection ratio against hospitalization.
  o 18. x raw protection against mortality.
- “Raw” does not mean un-normalized.
- The scale of incidence, hospitalization, and mortality are being driven by:
  – Delta variant, and
  – Unvaccinated, and: partially or unprotected individuals.
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, Delta is still dominant


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

**Trends over the last 3 weeks:** **Increasing:** Ohio. **Steady:** California, Georgia, Illinois, Michigan, New Mexico, New York, North Carolina, Pennsylvania, Texas. **Modest Declines:** Florida (from a high baseline).

<table>
<thead>
<tr>
<th></th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>22.87</td>
<td>0.144</td>
</tr>
<tr>
<td>Michigan</td>
<td>23.18</td>
<td>0.212</td>
</tr>
<tr>
<td>Ohio</td>
<td>48.42</td>
<td>0.18</td>
</tr>
<tr>
<td>Florida</td>
<td>70.46</td>
<td>1.527</td>
</tr>
<tr>
<td>New Mexico</td>
<td>39.91</td>
<td>0.319</td>
</tr>
<tr>
<td>Illinois</td>
<td>34.65</td>
<td>0.22</td>
</tr>
<tr>
<td>Texas</td>
<td>64.58</td>
<td>0.808</td>
</tr>
<tr>
<td>California</td>
<td>35.1</td>
<td>0.256</td>
</tr>
<tr>
<td>North Carolina</td>
<td>63.86</td>
<td>0.523</td>
</tr>
<tr>
<td>Georgia</td>
<td>82.22</td>
<td>0.722</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>27.53</td>
<td>0.192</td>
</tr>
</tbody>
</table>

Daily rates per 100,000 residents averaged August 30th thru September 6th 2021.

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 and Eddy Counties continue to have high incidence, even when accounting for low vaccine adoption.
- Adoption of masking in these counties would rapidly improve this situation (~2 weeks).
- Seven counties are not on this plot due to relative isolation and small populations: Catron, De Baca, Guadalupe, Harding, Hidalgo, Mora and Union.

- If every county was as well vaccinated as McKinley County, simple extrapolation says statewide daily reported cases would now be <500/day (i.e. at or near the peak)
- In reality, because people travel, high-incidence counties raise incidence everywhere. Uniform vaccination at the rates in McKinley would lead to even better control than stated above
- This translates to multiple deaths per day over the next 1-2 months that are avoidable.
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 = 50:1000, 20x)
- Deviation of data below the model is evident in late August.
- Flattening of the hospital load data is either due to improved disease progression or other factors.
By-county situational awareness for notable counties (incidence, recent change)

- High but possibly declining: Eddy, Lea
- Still rising, but possibly plateauing soon: San Juan, Valencia,
- Plateaued: Bernalillo, Sandoval (within county heterogeneity possible), McKinley, Santa Fe, Roosevelt
- Likely still rising: San Miguel, Socorro, Chavez

Discernable improvement in some counties with high incidence, but:
  - Many areas are plateauing, not immediately declining
  - Strongest declines are in counties with the poorest infection control
  - Declines are more modest in counties with higher levels of baseline mitigation