Modeling & Forecasting COVID-19 in NM

March 22, 2022

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So what?

Our model suggests that the number of daily cases is expected to range between 10 and 300 in the next few weeks.
So what?

Our model suggests that the number of daily deaths is expected to range between 1 and 15 in the next few weeks.
Cumulative Cases & Daily Growth Rate for NM: Mar 22

Santa Fe, Mora, Los Alamos, and Grant counties have the highest cumulative growth rates.

*Growth rate is in cumulative cases
Weekly Growth Rate for NM: Another View (Mar 22)

So what?

- Most people in New Mexico are living in a county that has medium per-capita case counts and decelerating growth rates.

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
The CDC ForecastHub is predicting a 12% decrease in one week incident cases to 885 (from March 19 at 1,007).
> Additional Regional Forecasts
Central & North Regions Daily Cases Forecast

So what?
The Central region is expected to see the most number of cases. Cases appear to be plateauing.

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South Regions Daily Cases Forecast

So what?
Both regions have a predicted plateau. The Southwest region is expected to see higher number of cases.
> 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>3/27/22</td>
<td>9</td>
<td>14</td>
<td>31</td>
</tr>
<tr>
<td>4/3/22</td>
<td>1</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>4/10/22</td>
<td>0</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>4/17/22</td>
<td>0</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>4/24/22</td>
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<td>6</td>
<td>40</td>
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<tr>
<td>5/1/22</td>
<td>0</td>
<td>8</td>
<td>50</td>
</tr>
</tbody>
</table>

“Scaled” Scenario

So what?

Model is predicting an decrease in COVID-19 ICU beds needed over the next several 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>2/6/22</td>
<td>23</td>
<td>39</td>
<td>105</td>
</tr>
<tr>
<td>2/13/22</td>
<td>2</td>
<td>16</td>
<td>103</td>
</tr>
<tr>
<td>2/20/22</td>
<td>0</td>
<td>13</td>
<td>112</td>
</tr>
<tr>
<td>2/27/22</td>
<td>0</td>
<td>15</td>
<td>126</td>
</tr>
<tr>
<td>3/6/22</td>
<td>0</td>
<td>22</td>
<td>148</td>
</tr>
<tr>
<td>3/13/22</td>
<td>1</td>
<td>37</td>
<td>179</td>
</tr>
</tbody>
</table>

“Scaled” Scenario

So what?
Med-surge general bed needs are predicted to decrease overall during the next 3 weeks
22 Mar 2022: Epigrid modeling

- NM daily incidence is declining. Drop in the death rate to 1/2x is highly notable (not only the number of deaths).
- A modest flattening of the rate of incidence-decline is highly likely. The causes are:
  - Reduced utilization of high quality masks while congregated and indoors, and
  - BA.2 variant virus. Proportion is increasing.
- Omicron is about as infectious as Delta variant. Virus evolution/immune evasion causative of Omicron wave.
- Immunological diversity from updated vaccines will further improve the situation.
- Situational awareness remains good as of January 2022, likely to the present time.
A look at the raw incidence data: 2021-2022

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

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.

- The reported incidence level is falling.
- Within-weekly variation in NM data indicates reliability.
- Color-coded by-day-of-week decline is large, but slowing.
22 March 2022 Vaccine Analysis (NM): Vaccinate before the next epidemic/wave

- 1687k first doses are used in modeling (3/22/22).
- 1687k first doses have been administered, +1k/2, +7k/2, +7,10k/2, +9k/2.
- 1435k completed initial vaccine series, +4k/2, +13k/2, +10,14k/2, +12k/2.
- 771k boosters completed, +11k/2, +22k/2, +20,28k/2, +35k/2.
- ~80.4% of all persons in New Mexico are at least minimally vaccinated.
- ~94.5% of all New Mexicans are eligible (~1981k).
- 78.0/94.5=85.1% of eligible New Mexicans vaccinated.
- 5-11 year-olds: 74k first doses (39.6%, 0.5%/2, 1.2%/2 +0%/2, +1.1%/2).

- Vaccination is slow. Expect waning immunity in May 2022.
- By-county 3rd-dose variation is large.

- Vaccination with updated antigen (i.e. Omicron) is likely to highly beneficial to limiting individual and population wide effects.

- Crucial to understand the level of immune evasion against neutralizing antibodies against the next variant well before the peak of that epidemic is reached.

- Monitor low-vaccination & congregated environments (i.e. age cohorts with lower vaccination rates).

[Graph showing vaccination progress and percentage of vaccinated individuals]
Variant Monitoring: Omicron is the current variant

https://www.cdc.gov/covid-data-tracker/#variant-proportions

- New variants have appeared without evident intermediates. Global and wastewater monitoring.
- NM data on BA.2 inconclusive for future events.
- Approximately 6-12 months is the longest variant-interval: D614G (~3 months), Alpha (~6-9 months), Delta (~6 months), Omicron (~6 months).
- Updated vaccine antigens likely important for limiting future severe disease.
- Priority on getting ahead of SARS-2 with immune diversity in the population. Both B- and T-cell.
Recent By-State Trends: Most Populous 10 States

Trends over the last 1-3 weeks: Increasing: n/a Flat: Michigan, New York, Texas. Declining: California, Florida, Georgia, Illinois, New Mexico, N. Carolina, Ohio, Pennsylvania.

Daily rates per 100,000 residents averaged March 8th 2022 thru March 22nd 2022.

<table>
<thead>
<tr>
<th>State</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>9.48</td>
<td>0.084</td>
</tr>
<tr>
<td>Michigan</td>
<td>8.02</td>
<td>0.503</td>
</tr>
<tr>
<td>Ohio</td>
<td>3.79</td>
<td>0.241</td>
</tr>
<tr>
<td>Florida</td>
<td>5.39</td>
<td>0.475</td>
</tr>
<tr>
<td>New Mexico</td>
<td>10.08</td>
<td>0.631</td>
</tr>
<tr>
<td>Illinois</td>
<td>9.91</td>
<td>0.241</td>
</tr>
<tr>
<td>Texas</td>
<td>13.43</td>
<td>0.287</td>
</tr>
<tr>
<td>California</td>
<td>10.29</td>
<td>0.322</td>
</tr>
<tr>
<td>North Carolina</td>
<td>12.21</td>
<td>0.199</td>
</tr>
<tr>
<td>Georgia</td>
<td>7.87</td>
<td>0.442</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>6.03</td>
<td>0.242</td>
</tr>
</tbody>
</table>