20 Apr 2021: EpiGrid modeling

- NM daily incidence is flat, but model rises slowly
  - Model over-predicts incidence in a few counties (Eddy, Lea, Quay, Roosevelt) with low State vaccination levels
  - Rise is dominated by vaccination uncertainty.
- NM deaths are now slightly below the model.
  - Model does not yet account for vaccination of cohorts with higher death rates.
A look at the raw incidence data

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

Cases appear to constant.

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 the 10-12th and 17th – 19th are each divided by 3 to estimate individual day counts.
06 April 2021 Model (Mechanistic) – more details and information

- Figure for historical State first-dose vaccinations.
- Most Federal doses are allocated to specific counties in this model.
  - Some are allocated to McKinley, Cibola, and San Juan Counties (IHS).
  - Some are allocated to: Cannon (Curry), Holloman (Otero), and Kirtland AFBs (Bernalillo).
  - DOE doses distributed to Los Alamos, Rio Arriba and Santa Fe Counties.
- 947,701 first doses have been administered in NM (Federal and State).
- Transmission is based on mobility with modifications due to PHO’s and the red/yellow/green/turquoise (RYGT) framework.
  - Public health orders (PHO) and public behavior similar to previous models.
  - There are no extrapolations to RYGT assignments.
  - Currently modeling turquoise counties as a progressively increasing force-of-infection.
- Daily reported cases in El Paso are flat, some ambiguity.

- Baseline results reflect novel variants of SARS-CoV-2. The effect may be detectable now.
  - Potential for a 50% increase in contagion/force of infection.
  - Epidemiological evidence does not discount strain replacement in New Mexico.
  - Without vaccination and with the current state of PHO opening, an increased daily incidence would be occurring.
T-80 Mobility – northern counties (data only)

Mobility is the same or slightly lower than pre-covid-19 levels in most counties (Bernalillo, Los Alamos, McKinley, Rio Arriba, Sandoval, Santa Fe, Taos, Valencia) with the exception of San Juan which is slightly higher.

- Weekends not shown
- Monday
- Wednesday/Thursday
- Friday (usually higher)
T-80 Mobility – southern counties and Curry (data only)

Mobility is similar to pre covid-19 (Chaves, Curry, Lincoln, Luna, Otero, Socorro) with some counties having higher mobility (Dona Ana, Grant, Roosevelt) and some possibly with lower mobility (Eddy, Lea).
Hospital bed concurrent usage by COVID-19 patients (Statewide)

- Left panel: Linear vs. time (y-scale=0:900) shows hospital beds.
- Right panel: Log vs. time, same data and models (y-scale = 90:900, 10x).
- Divergence between 15Dec2020 model, subsequent EMR data, and later EG models reflects the impact of vaccination.
- Hospital load is very unlikely to increase substantially in the next month due to COVID-19.
What is happening in the rest of the U.S.?
The 10 most populous states

Case are rising: Florida, Illinois, Pennsylvania, Texas

Flat or possibly rising: Georgia, Michigan, Ohio

Case are not rising: California, New York, North Carolina
**Outlook with Vaccination**

- ~948k people vaccinated (1 or 2 doses).
- ~644k people with 2 doses.
- No later than end-of-June, NM will be at ~1.6M NM doses at the current rate.
- Expanded EUA for ages >= 12 likely before late June.
- Uncertainties in vaccination dominate uncertainties in predictions.
- Quarantine continues to play an important role in control.
- Infection control is important but may be playing a numerically less-dominant role at this time.
- Further loss of infection control would be detrimental.
- Currently modeling 90% vaccine effectiveness.
- Matching to some county’s vaccination data.
- Curry, Eddy, Lea, Otero, Roosevelt, and Quay Counties cannot be easily explained with the reported vaccination data and observed cell phone T80 mobility data.
- Assuming only susceptible people are vaccinated.
- Unchanged quarantine effectiveness assumed in all cases.
- Interim vaccine hesitancy numbers are being implicitly account for, but end-state hesitancy is not being predicted.
Short- & Long-Term Forecast for NM: Cases

So what?
The daily number of cases are expected to range between 53 and 346 in the next few weeks.
Short- & Long-Term Forecast for NM: Deaths

So what?
The daily number of deaths are expected to range between 4 and 6 in the next few weeks.
Growth Rate for NM

So what?
As of April 19th, the average growth rate in NM is at 0.11% (up from two weeks ago 0.10%)
Regional Forecasts

Central Region
Weekly cases will range between 189-269 in the next few weeks

Northeast Region
Weekly cases will range between 14-28 in the next few weeks

Northwest Region
Weekly cases will range between 672-720 in the next few weeks
Regional Forecasts

Southeast Region

Weekly cases will range between 15-35 in the next few weeks

Southwest Region

Weekly cases will range between 53-65 in the next few weeks
Cumulative Cases & Daily Growth Rate for NM: April 19

Cases (Log Scale)

- 22,026
- 2,981
- 403
- 55

7-day-average daily growth rate (%)

- 0.5
- 0.1
- 0.0

*Growth rate is in cumulative cases
### Daily Growth Rate for NM April 19

**County** | **Daily Growth Rate** | **Change**
--- | --- | ---
San Juan | 0.2% | =
Rio Arriba | 0.2% | =
Sierra | 0.1% | =
McKinley | 0.0% | =
Sandoval | 0.2% | =
Santa Fe | 0.1% | =
Cibola | 0.1% | =
Bernalillo | 0.2% | =
Valencia | 0.2% | =
Torrance | 0.1% | =
Lincoln | 0.1% | =
San Miguel | 0.1% | =
Chaves | 0.1% | =
Dona Ana | 0.1% | =
Otero | 0.1% | =
Lea | 0.0% | =
Eddy | 0.1% | =
Curry | 0.0% | =
Grant | 0.2% | =
Luna | 0.1% | =
Taos | 0.2% | =

*arrows indicate more than 0.5% difference in growth rate from last week’s analysis; growth rate is in cumulative cases*
So what?

- Most people in New Mexico are living in a county that is medium per-capita case counts with a mixture of accelerating and constant.
- Chaves, Curry, McKinley, and Socorro are accelerating; Bernalillo was classified as accelerating but is more likely constant; Taos was classified constant but may be accelerating.
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>
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<tbody>
<tr>
<td>4/25</td>
<td>20</td>
<td>29</td>
<td>47</td>
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<tr>
<td>5/2</td>
<td>6</td>
<td>20</td>
<td>53</td>
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<tr>
<td>5/30</td>
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<td>29</td>
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</tr>
</tbody>
</table>

“So what? Model is predicting ICU beds to decrease 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

So what?
Med-surge general bed needs are predicted to stay the same over the next 3 weeks.

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>
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<tr>
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<tr>
<td>5/30</td>
<td>17</td>
<td>103</td>
<td>307</td>
</tr>
</tbody>
</table>

“Scaled” Scenario