

Modeling & Forecasting COVID-19 in NM

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March 30, 2021

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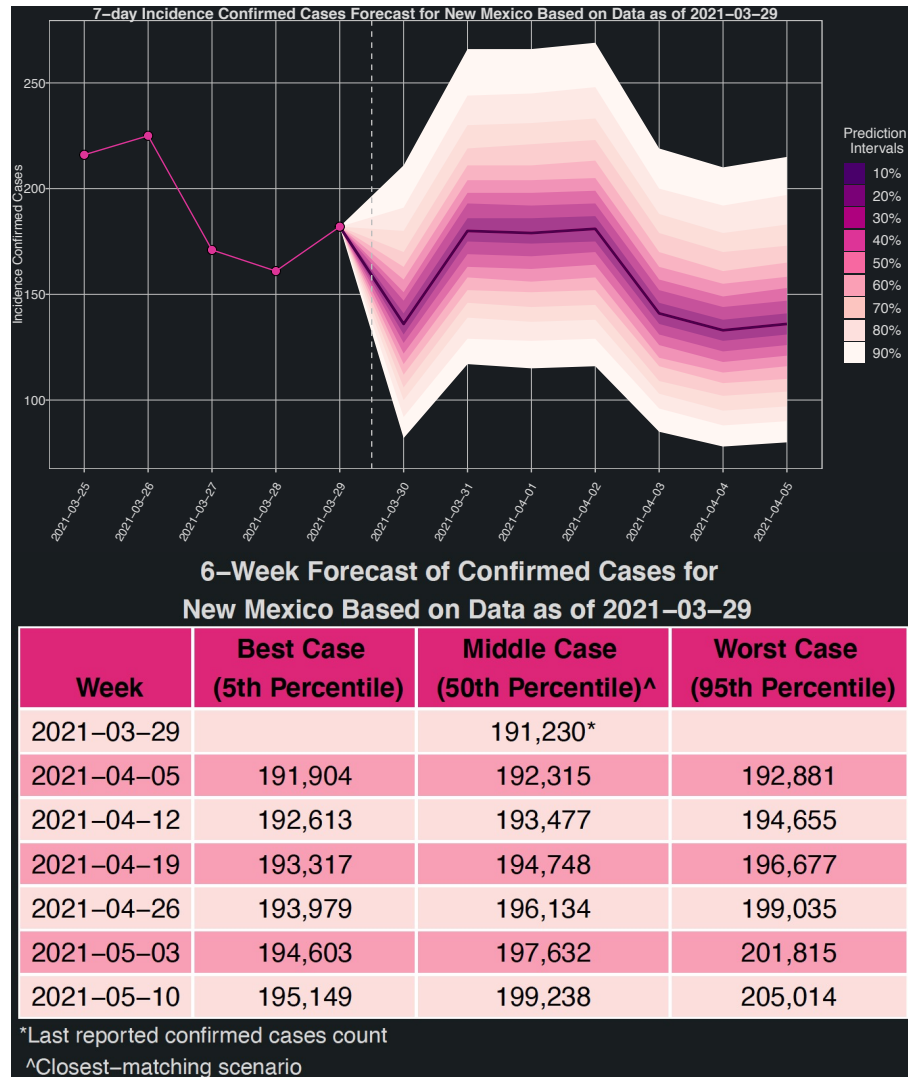
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Short- & Long-Term Forecast for NM: Cases



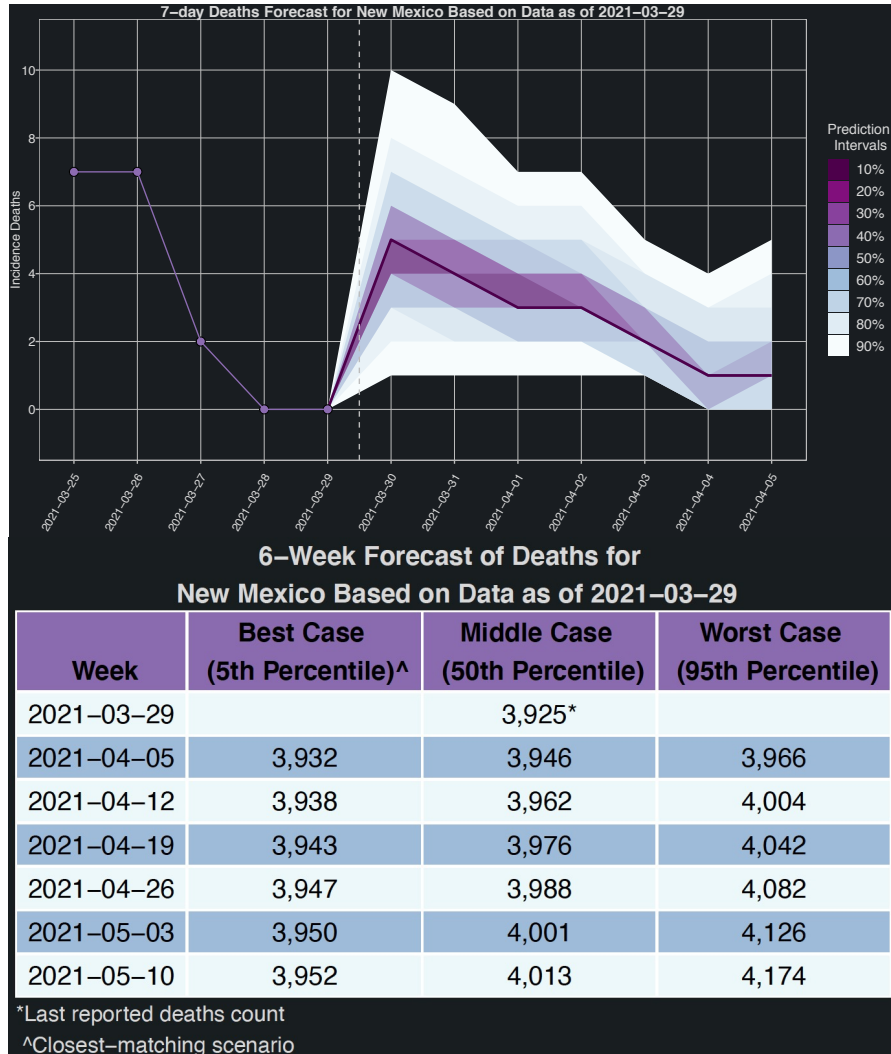
6-Week Forecast of Daily Average of Confirmed Cases for New Mexico Based on Data as of 2021-03-29

Week	Best Case (5th Percentile)	Middle Case (50th Percentile) [^]	Worst Case (95th Percentile)
2021-03-29		191*	
2021-04-05	96	155	236
2021-04-12	101	166	253
2021-04-19	101	182	289
2021-04-26	95	198	337
2021-05-03	89	214	397
2021-05-10	78	229	457

*Last reported confirmed cases count
[^]Closest-matching scenario

So what?
The daily number of cases are expected to range between 96 and 289 in the next few weeks

Short- & Long-Term Forecast for NM: Deaths



6-Week Forecast of Daily Average of Deaths for New Mexico Based on Data as of 2021-03-29

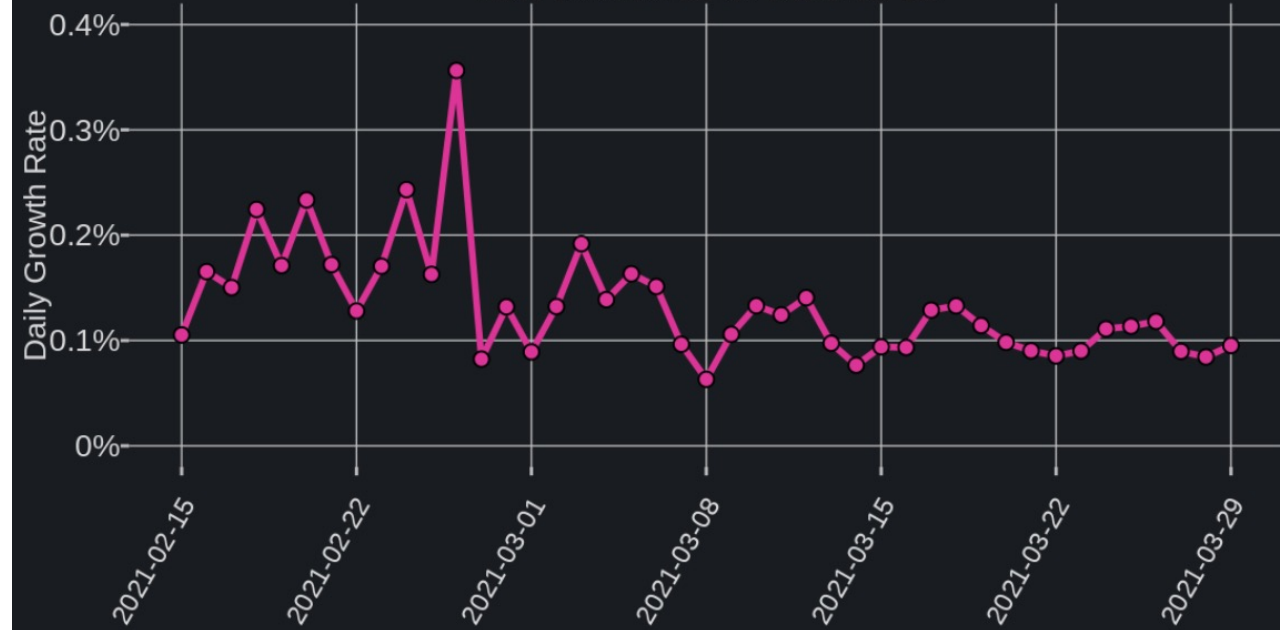
Week	Best Case (5th Percentile)^	Middle Case (50th Percentile)	Worst Case (95th Percentile)
2021-03-29		5*	
2021-04-05	1	3	6
2021-04-12	1	2	5
2021-04-19	1	2	5
2021-04-26	1	2	6
2021-05-03	0	2	6
2021-05-10	0	2	7

*Last reported confirmed deaths
^Closest-matching scenario

So what?
The daily number of deaths are expected to range between 1 and 6 in the next few weeks

Growth Rate for NM

Daily Growth Rate for the Past Six Weeks in New Mexico as of 2021-03-29



6-Week Forecast of the Average Weekly Growth Rate for New Mexico Based on Data as of 2021-03-29

Week	Best Case (5th Percentile)	Middle Case (50th Percentile) [^]	Worst Case (95th Percentile)
2021-03-29		0.10%*	
2021-04-05	0.050%	0.081%	0.12%
2021-04-12	0.053%	0.086%	0.13%
2021-04-19	0.052%	0.094%	0.15%
2021-04-26	0.049%	0.10%	0.17%
2021-05-03	0.046%	0.11%	0.20%
2021-05-10	0.040%	0.12%	0.22%

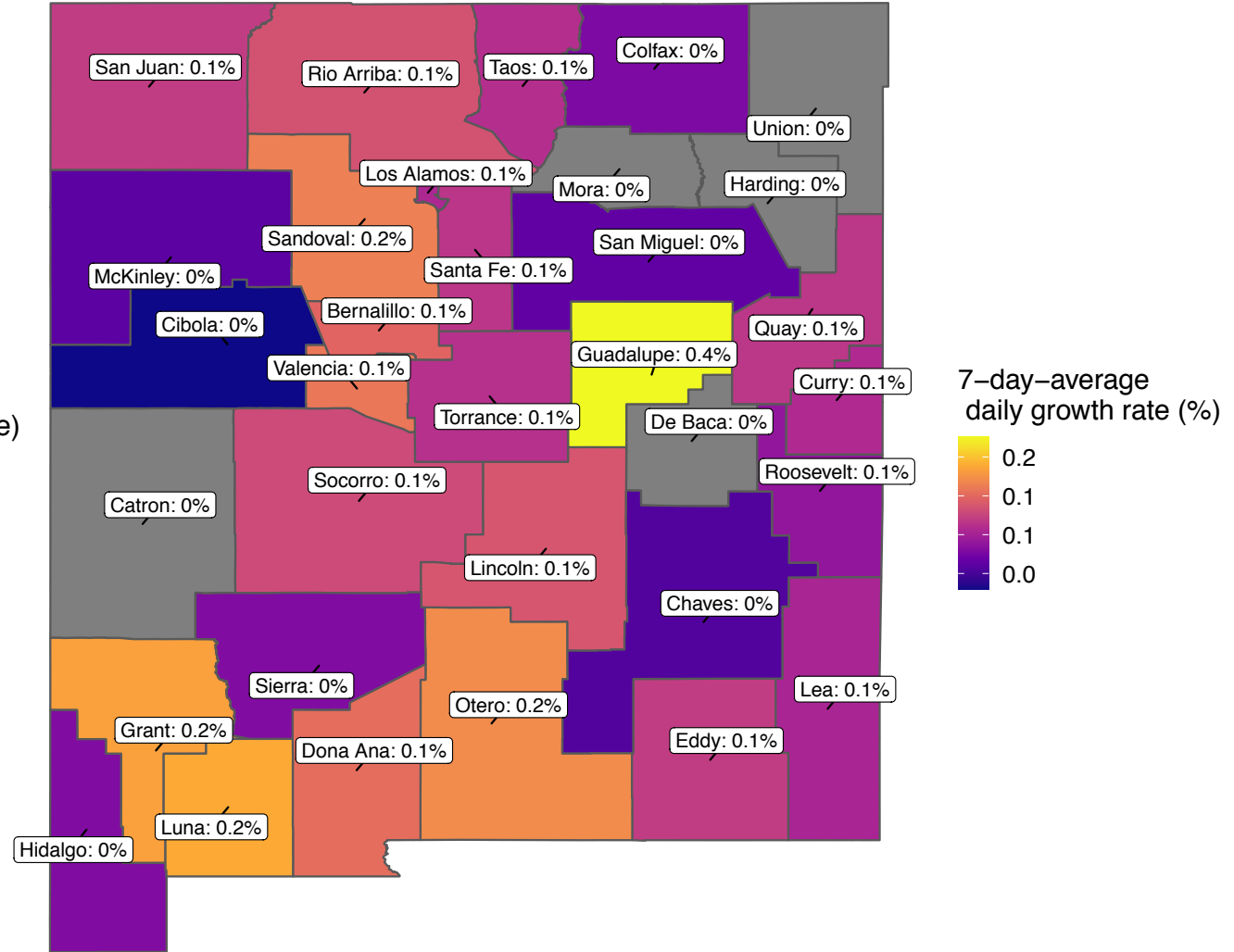
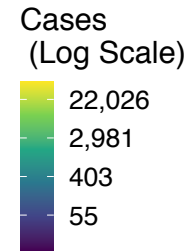
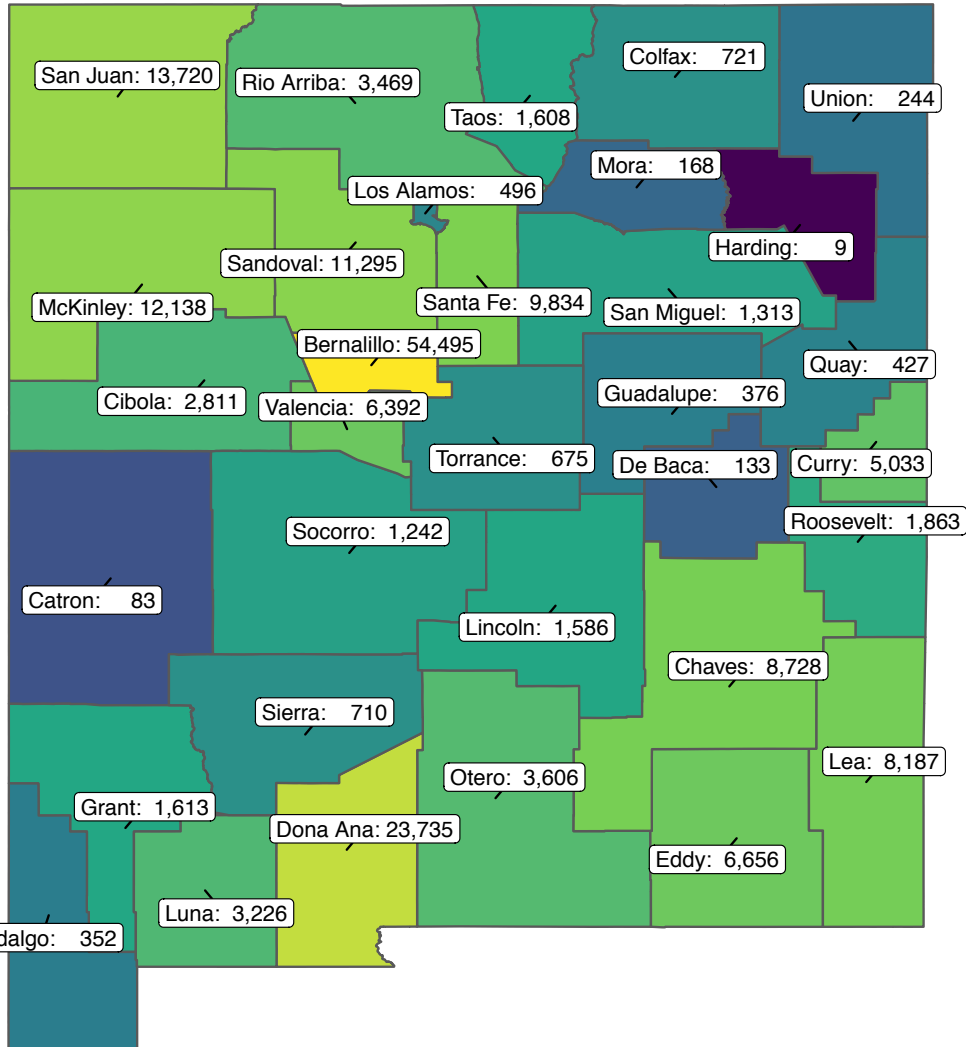
*Last weekly mean daily growth rate

[^]Closest-matching scenario

So what?

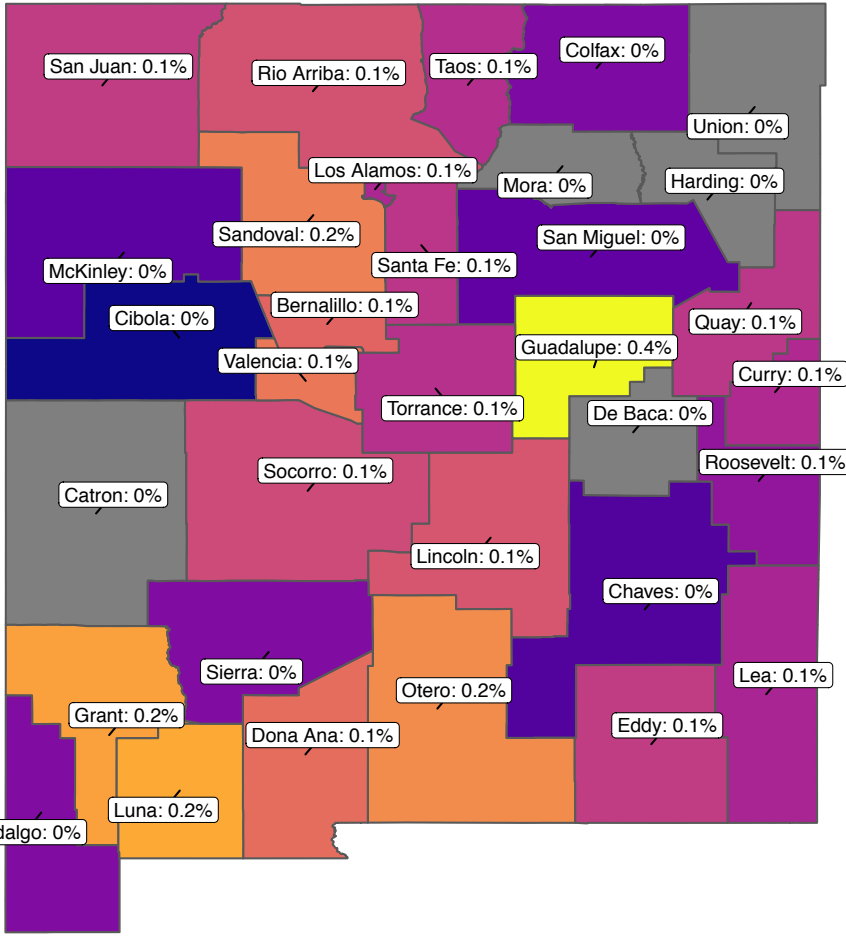
As of March 29th, the average growth rate in NM is at 0.10% (down from last week)

Cumulative Cases & Daily Growth Rate for NM: March 29

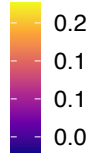


*Growth rate is in cumulative cases

Daily Growth Rate for NM Mar 29



7-day-average daily growth rate (%)



- Socorro 0.1% =
- Roosevelt 0.1% =
- DeBaca 0.0% =
- Los Alamos 0.1% =
- Quay 0.1% =
- Colfax 0.0% =
- Harding 0.0% =
- Hidalgo 0.0% =
- Union 0.0% =
- Mora 0.0% =

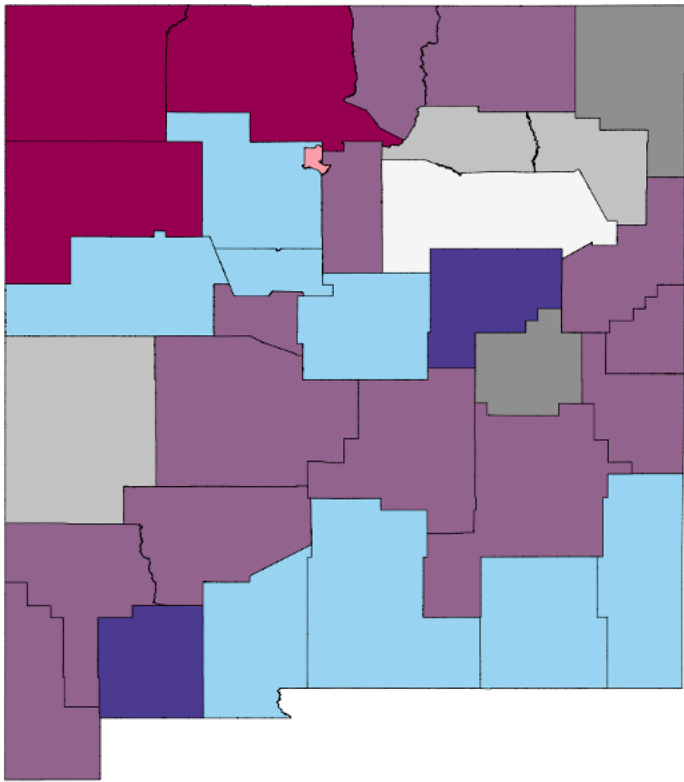
County	Daily Growth Rate	Change
San Juan*	0.1%	=
Rio Arriba*	0.1%	=
Sierra	0.0%	=
McKinley	0.0%	=
Sandoval	0.2%	=
Santa Fe	0.1%	=
Cibola	0.0%	=
Bernalillo	0.1%	=
Valencia	0.1%	=
Torrance	0.1%	=
Lincoln	0.1%	=
San Miguel	0.0%	=
Chaves	0.0%	=
Dona Ana	0.1%	=
Otero	0.2%	=
Lea	0.1%	=
Eddy	0.1%	=
Curry	0.1%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

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

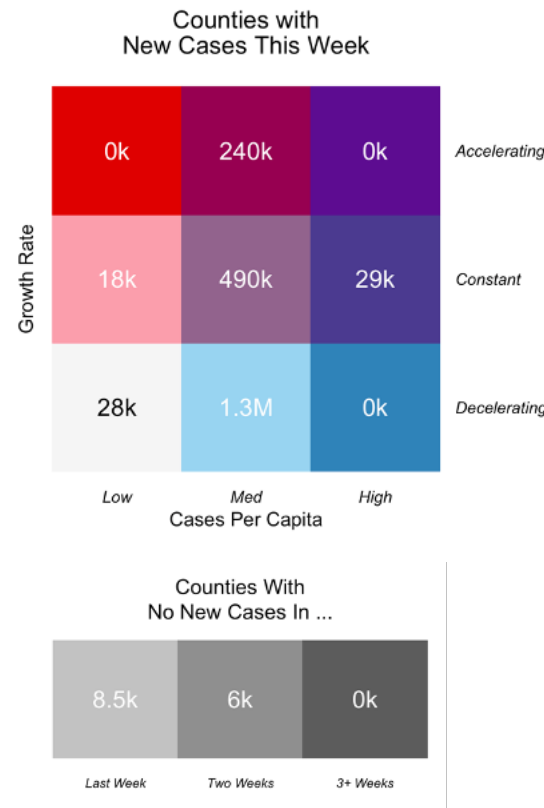
Weekly Growth Rate for NM: Another View (Mar 29)

COVID-19 across New Mexico

A 7-day moving window comparison
March 29, 2021



Impacted New Mexicans



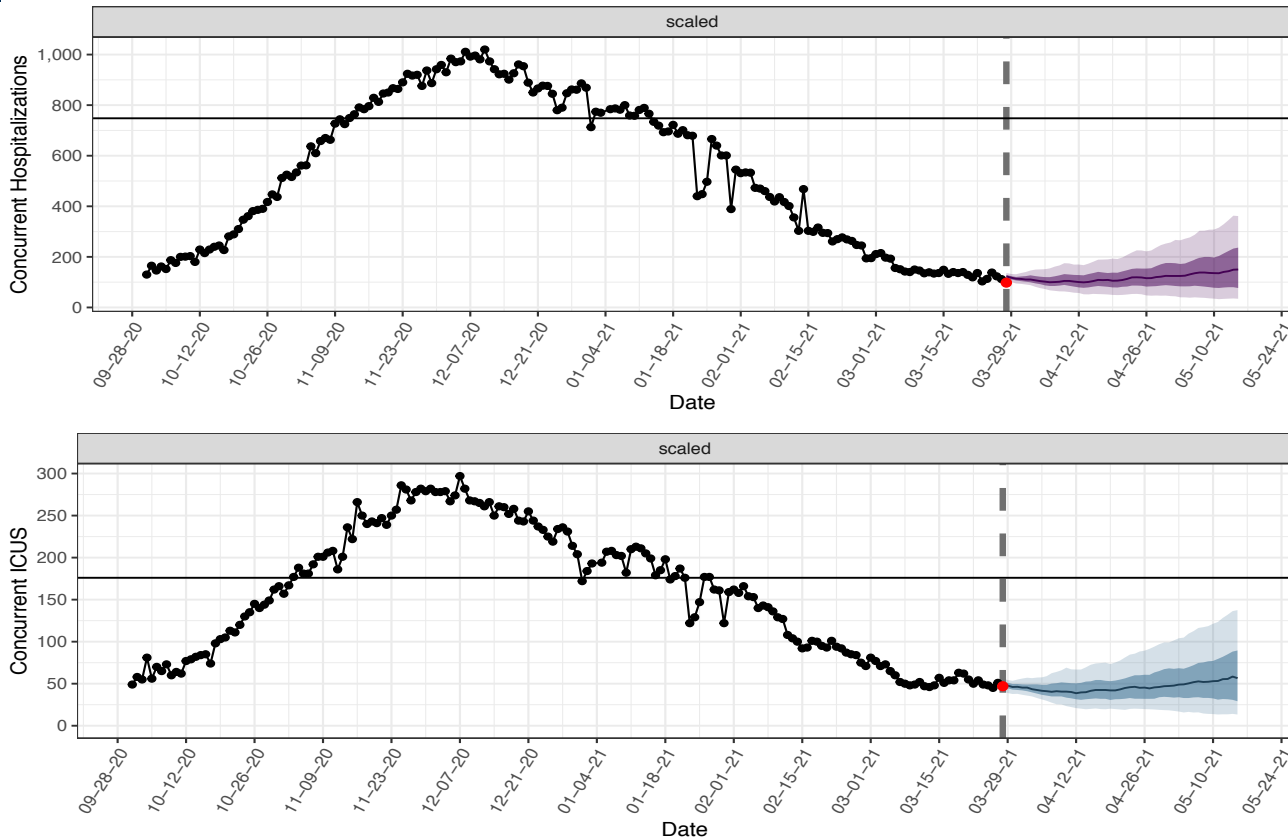
So what?

- Most people in New Mexico are living in a county that is **decelerating with medium per-capita case counts**
- San Juan and Rio Arriba are **accelerating**

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

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

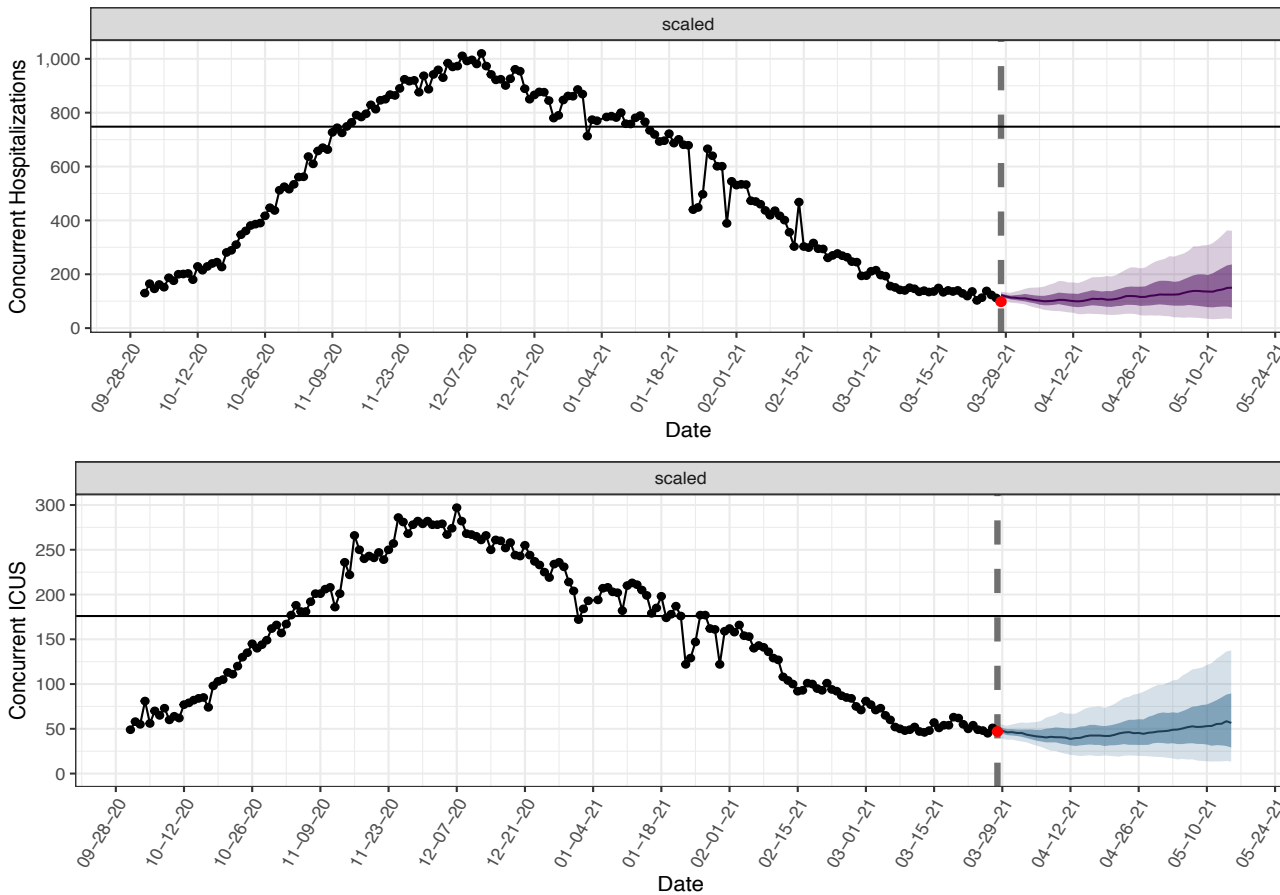
Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
4/4	33	42	57
4/11	22	40	67
4/18	20	42	75
4/25	20	45	88
5/2	18	48	102
5/9	14	52	118

“Scaled” Scenario

So what?

We are below ICU bed capacity for concurrent COVID-19 patients. Model is predicting ICU beds to stay the same 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

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
4/4	43	62	93
4/11	36	62	102
4/18	32	66	115
4/25	32	73	137
5/2	26	77	166
5/9	22	84	189

“Scaled” Scenario

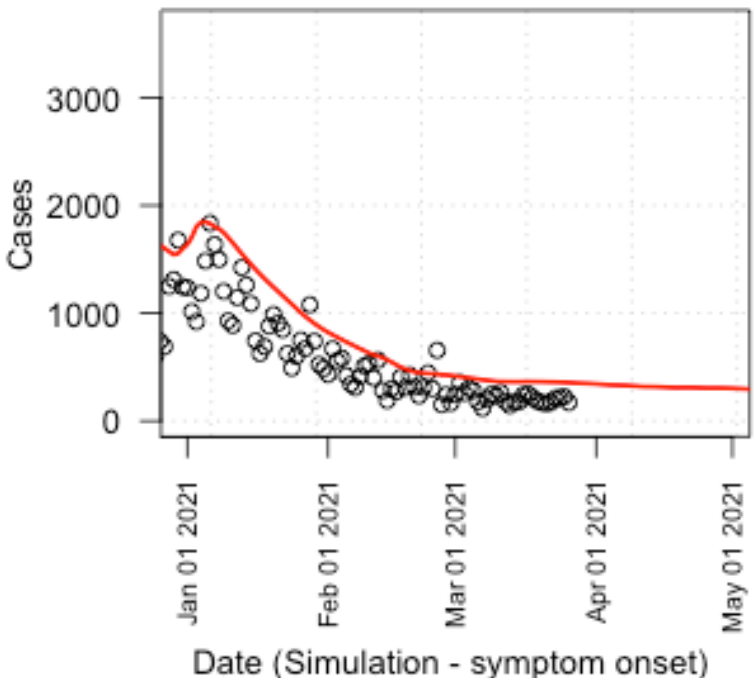
So what?

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

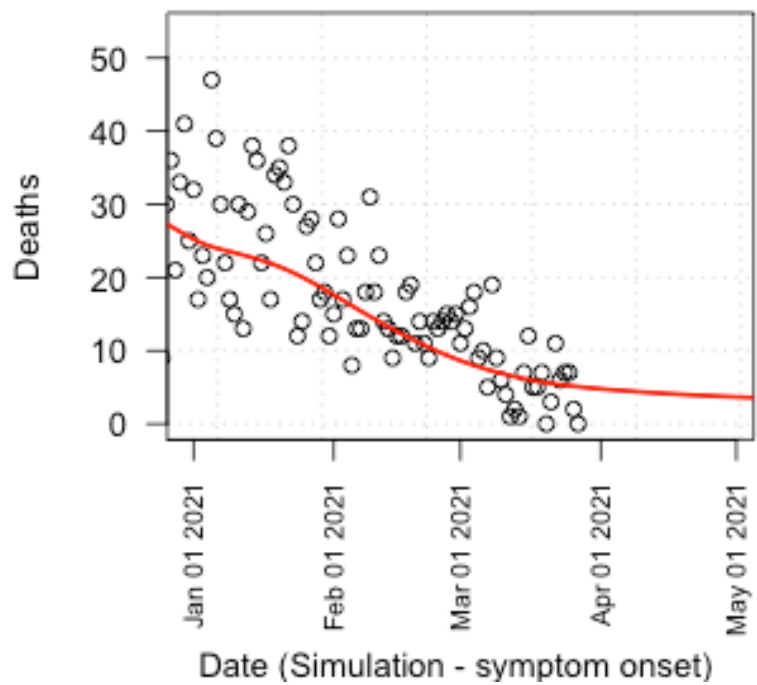
30 Mar 2021: EpiGrid modeling

- NM daily incidence is flat.
- NM deaths are now below the model.
 - Model does not yet account for vaccination of cohorts with higher death rates.
- Baseline model does not include in-person school opening.
- Some in-person schooling in later slides.

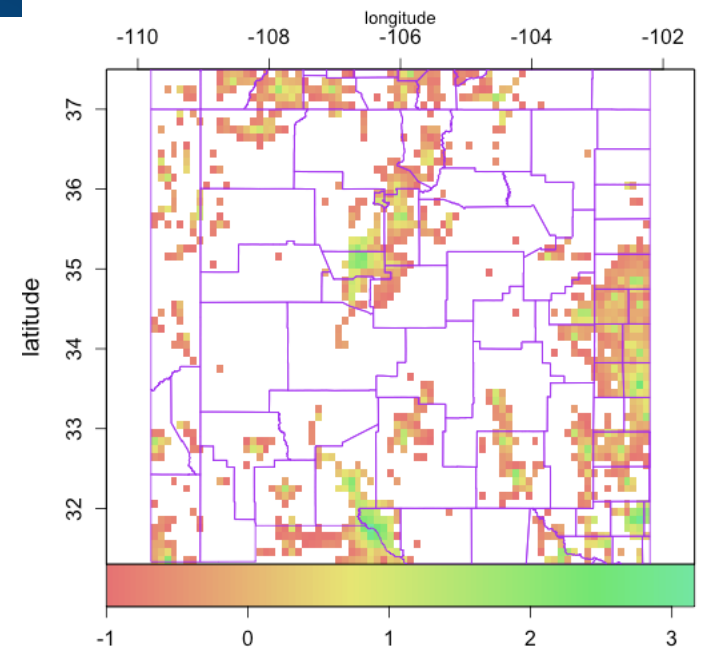
United States__New Mexico



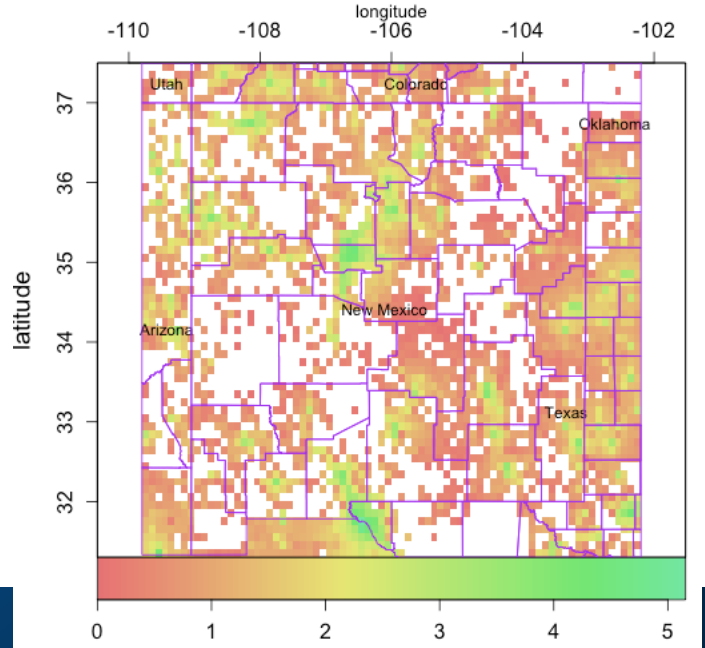
United States__New Mexico



log10 Incidence, wk 62, 2021-05-02

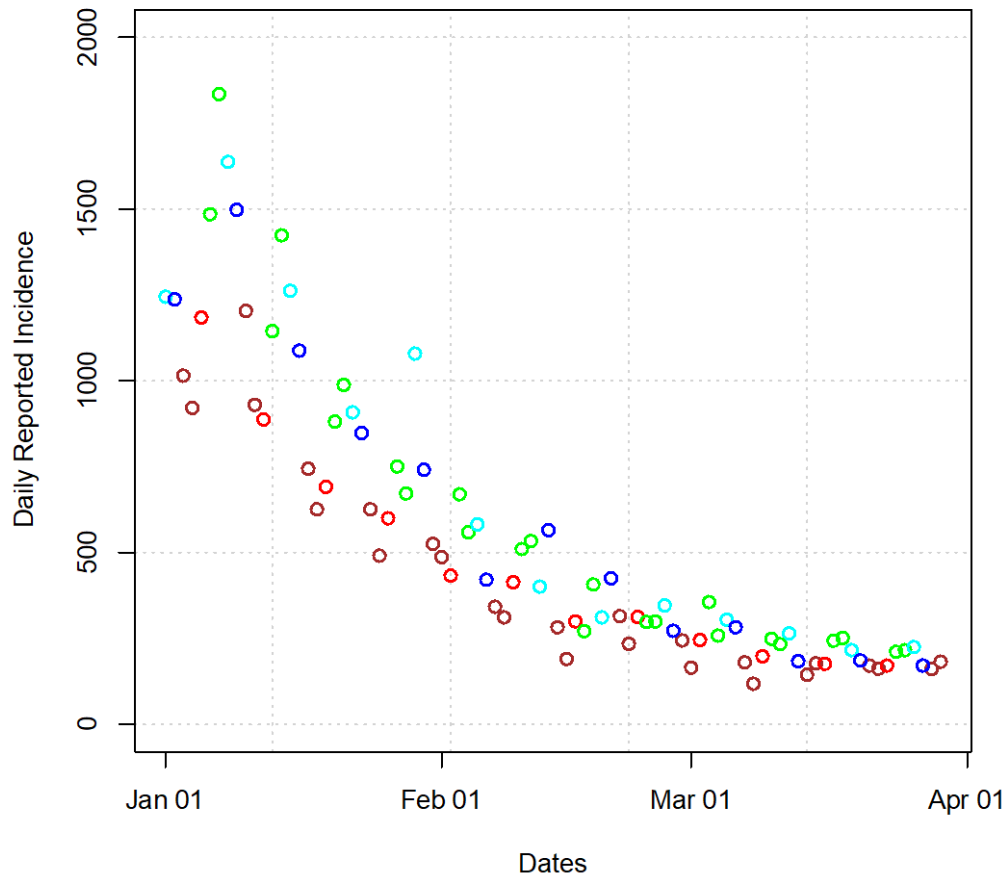


log10 Cumulative cases, wk 62, 2021-05-02



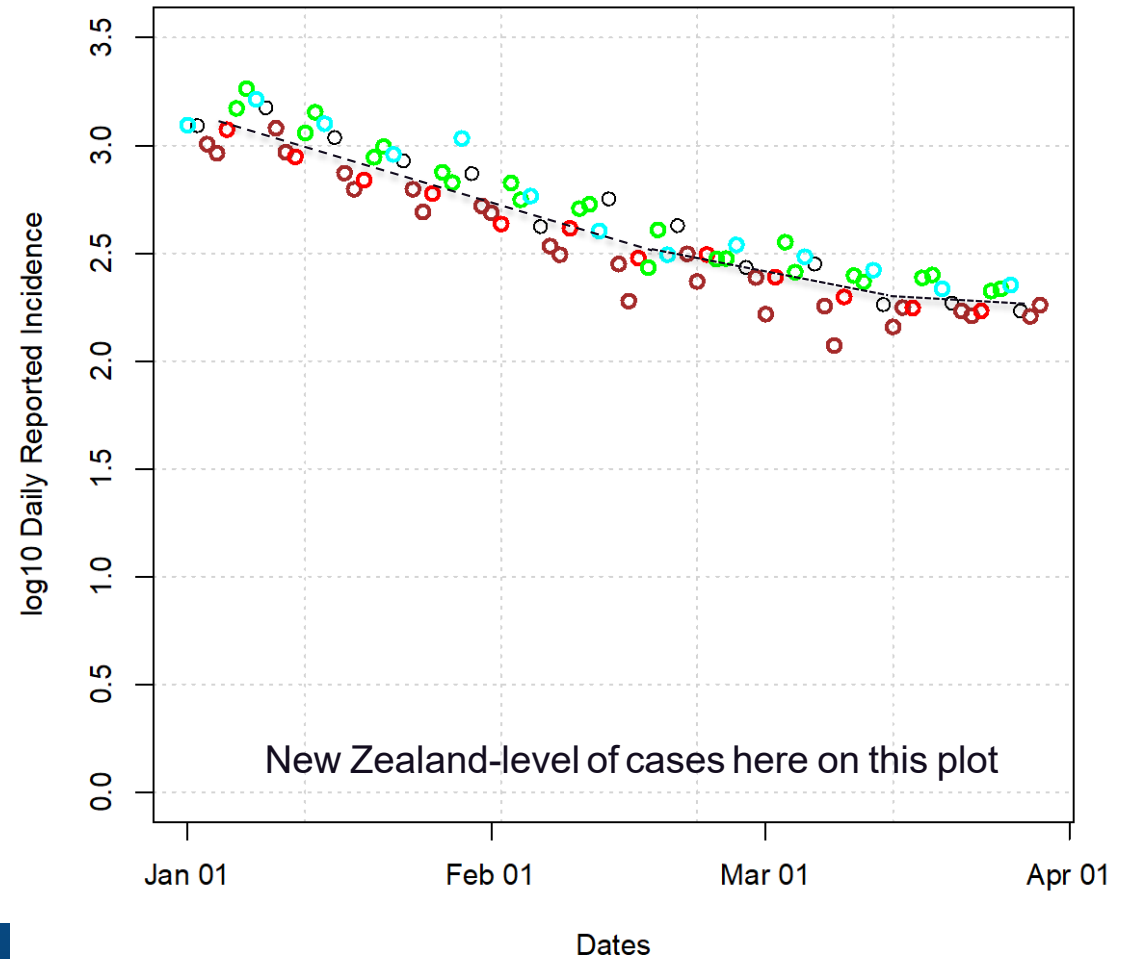
A look at the raw incidence data

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



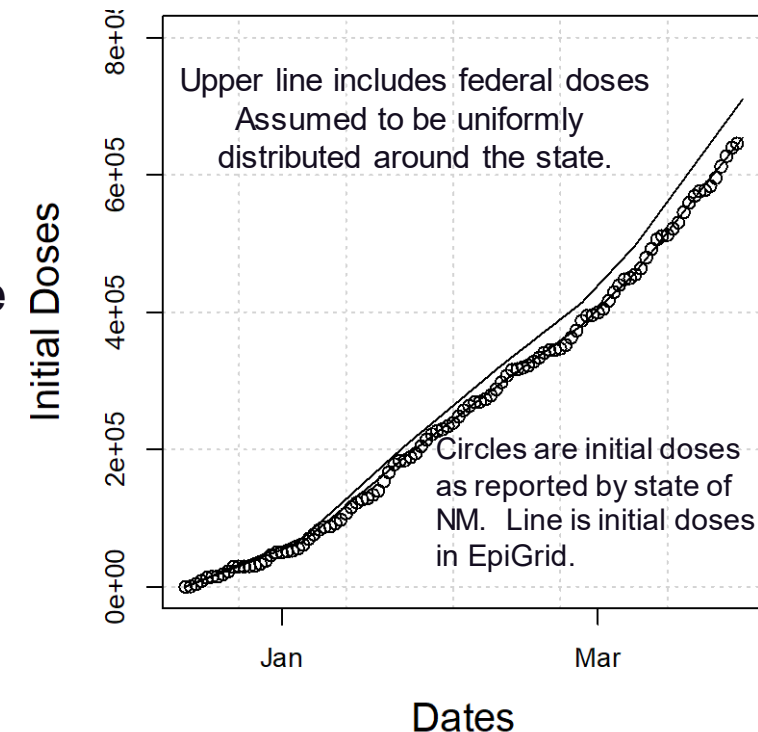
Possibly still slowing, but much slower than in January and early February: **Incidence possibly flat.**

The 190 cases in the Lea county correctional facility are removed from data reported on the 26th. The 1/3 of reported cases that were > 2 weeks prior were removed from the 24th.



30 March 2021 Model (Mechanistic) – more details and information

- **See Figure for historical first-dose vaccinations.**
 - Some Federal doses are uniformly distributed around the state, the rest are in McKinley, Cibola, and San Juan.
 - 727,986 first doses have been administered in NM as of 28 March 2021.
- **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 current extrapolations to RYGT assignments (last week's model differed).
- **Daily reported cases in El Paso are steady or declining.**
- **Questions about the reliability of data from TX as a whole-state.**
- **Isolation and quarantine rates are assumed to be stable based on state-reported quarantine times.**
 - Base isolation rates mostly modeled as 50% Dec. 8th-22nd, 45% until Jan 10th then are increased to 55%.
 - Having a large positive effect on the situation in New Mexico.
- **Baseline results reflect novel variants of SARS-CoV-2. The effect may be detectable in the near future.**
 - 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.

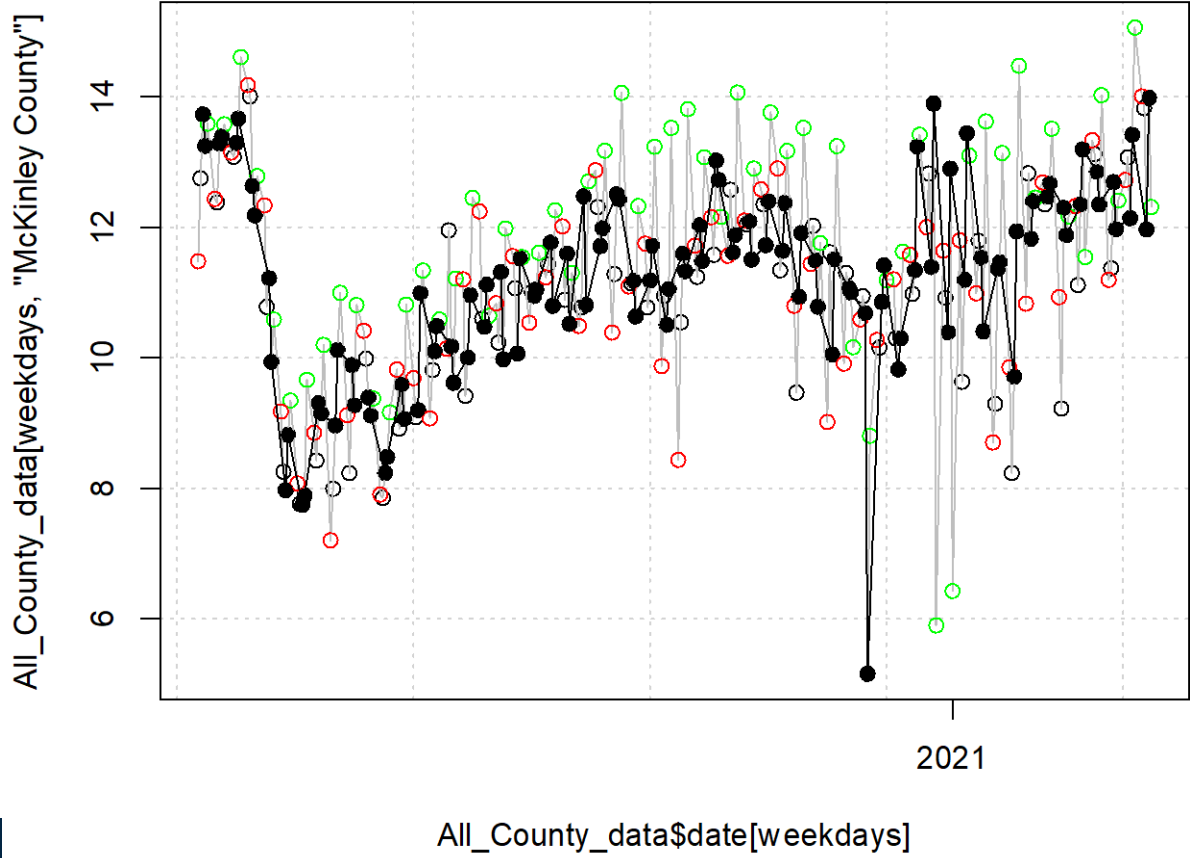


T-80 Mobility – northern counties (Data only)

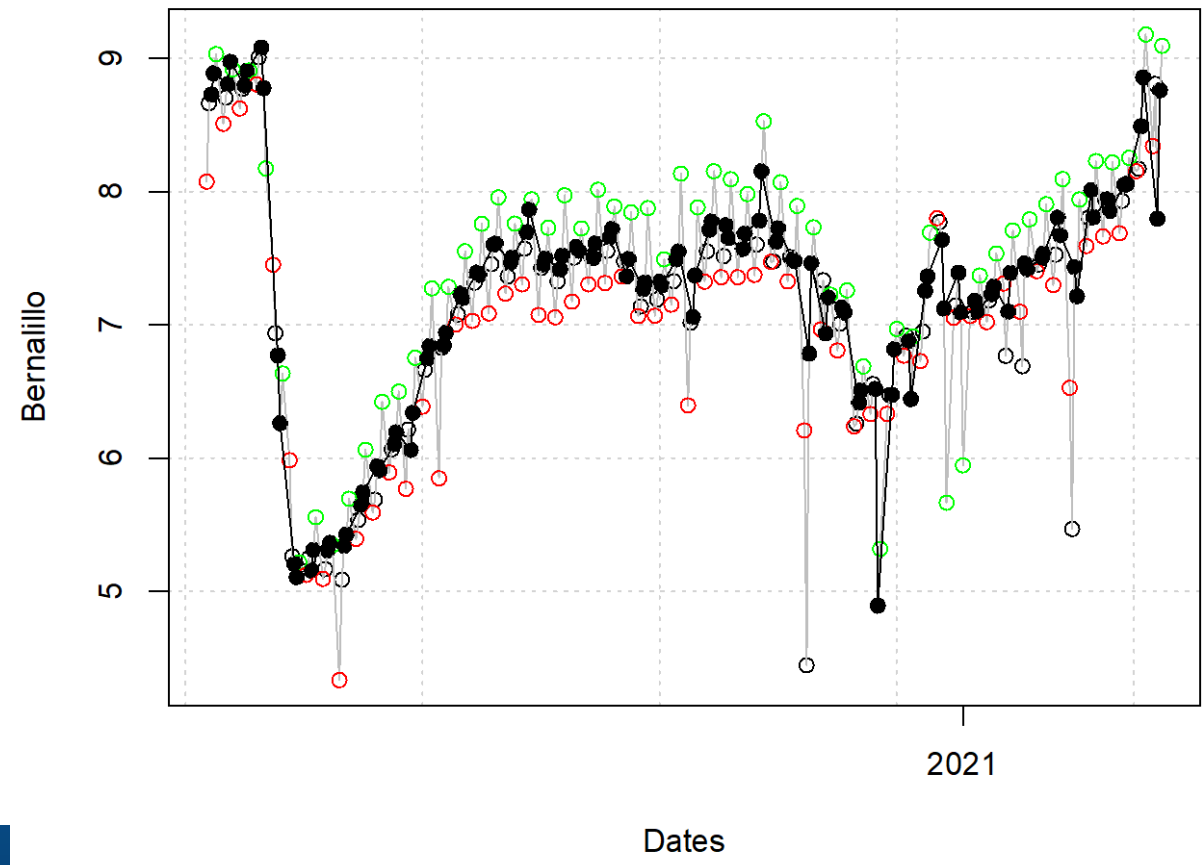
- Los Alamos, San Juan, Santa Fe, and Valencia, had significantly decreasing mobility
- Bernalillo, McKinley, Sandoval, and Taos had stable or decreasing mobility
- Rio Arriba had slightly increasing mobility

- Weekends not shown
- Monday
- Wednesday/Thursday
- Friday (usually higher)

McKinley



Bernalillo

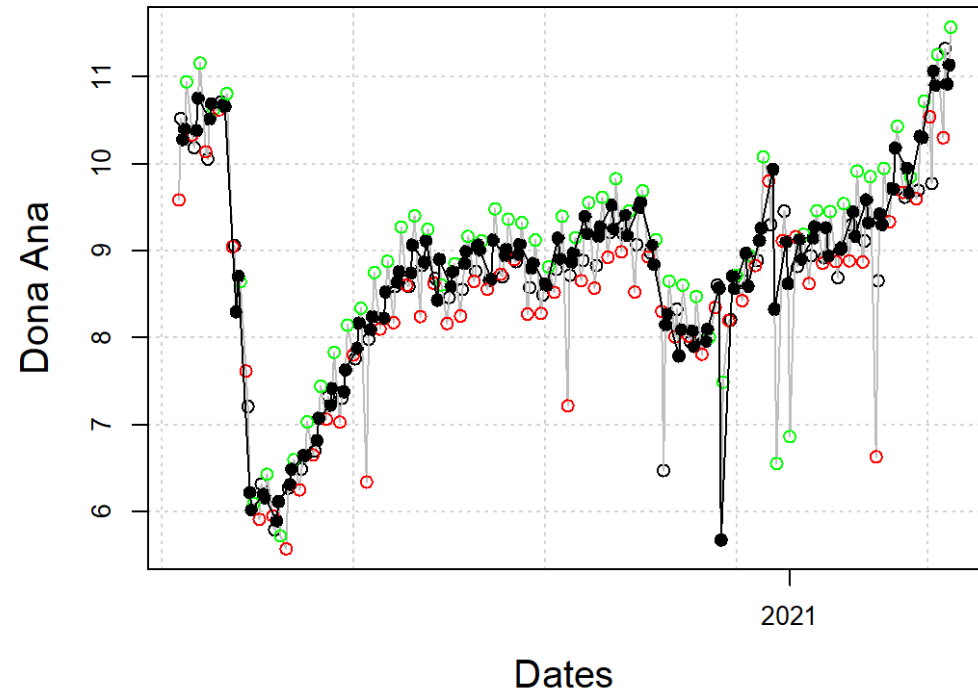


T-80 Mobility – southern counties and Curry (Data only)

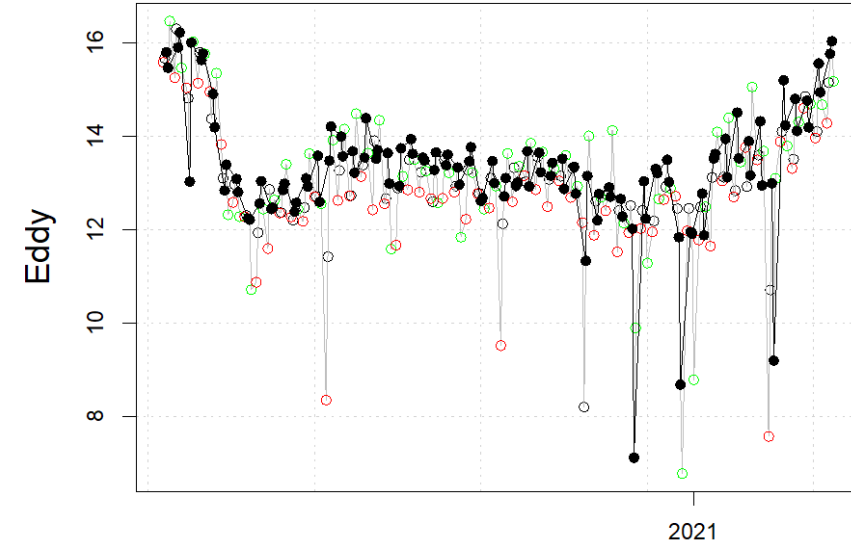
- **Roosevelt** had decreasing mobility
- **Dona Ana, Grant, Lincoln, Luna, Otero**, had stable or decreasing mobility.
- **Chaves, Curry, Eddy, Lea, Socorro** had increasing mobility.

- Weekends NOT shown
- **Monday**
- **Wednesday/Thursday**
- **Friday (usually higher)**

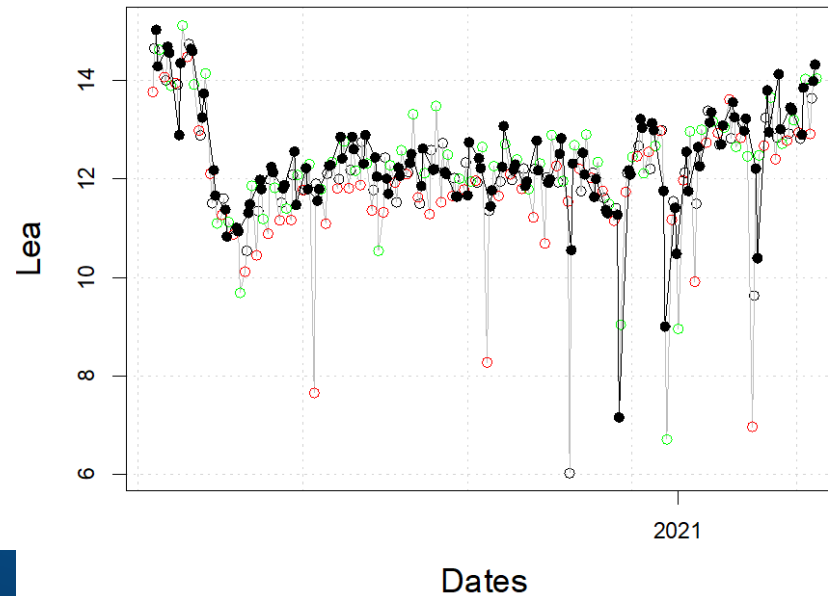
Dona Ana



Eddy



Lea

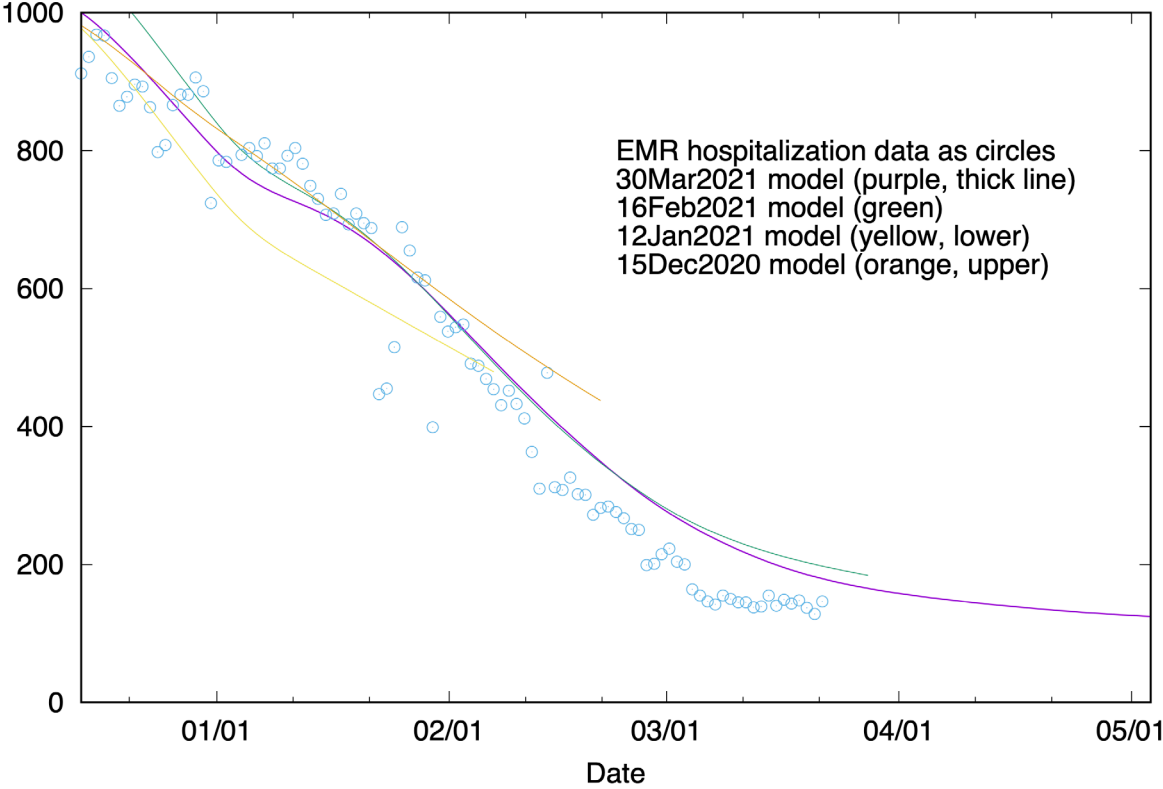


Dates

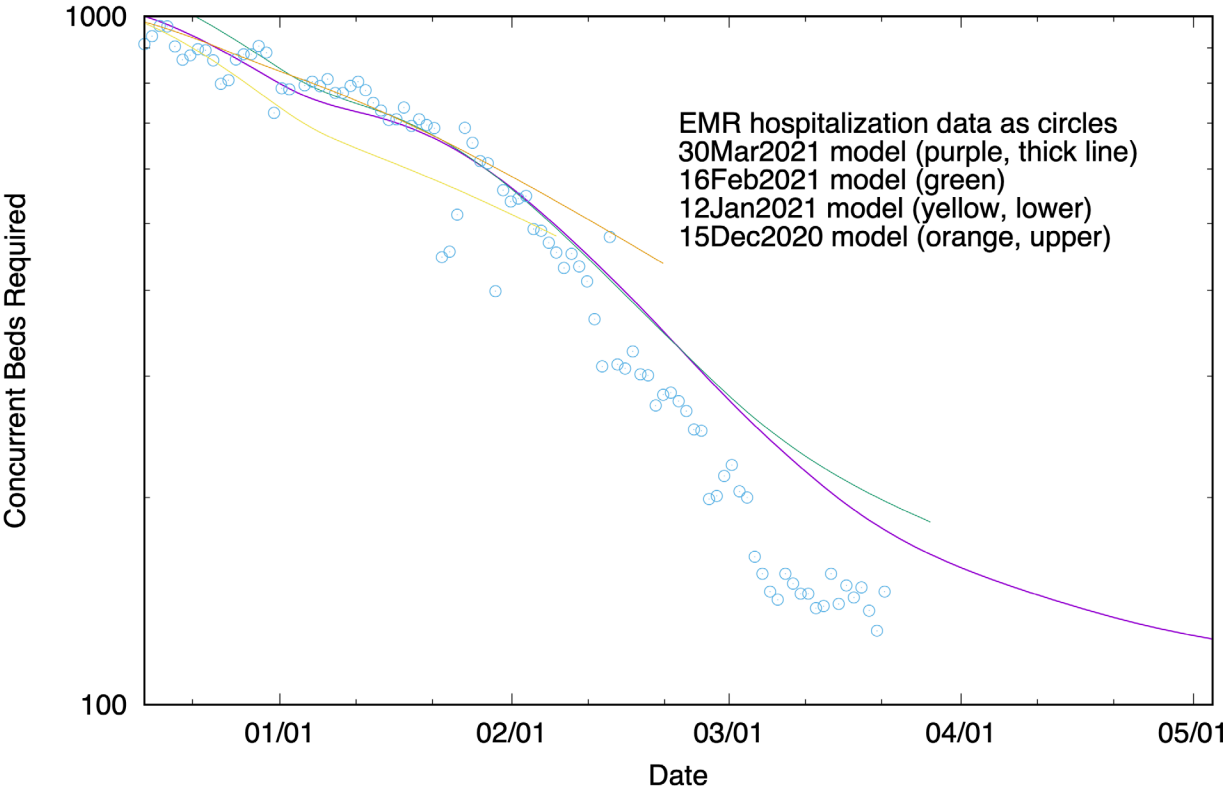
Hospital bed concurrent usage by COVID-19 patients (Statewide)

- Left panel: Linear vs. time (y-scale=0:1200) shows hospital beds.
- Right panel: Log vs. time, same data and models (y-scale = 100:1000, 10x).
- Divergence between 15Dec2020 model, subsequent EMR data, and later EG models reflects the impact of vaccination.
- **Flattening of data in the last week may indicate model limitations with respect to length of hospitalization. Reduced reliability.**

Hospital Bed Utilization (New Mexico)



Hospital Bed Utilization (New Mexico)

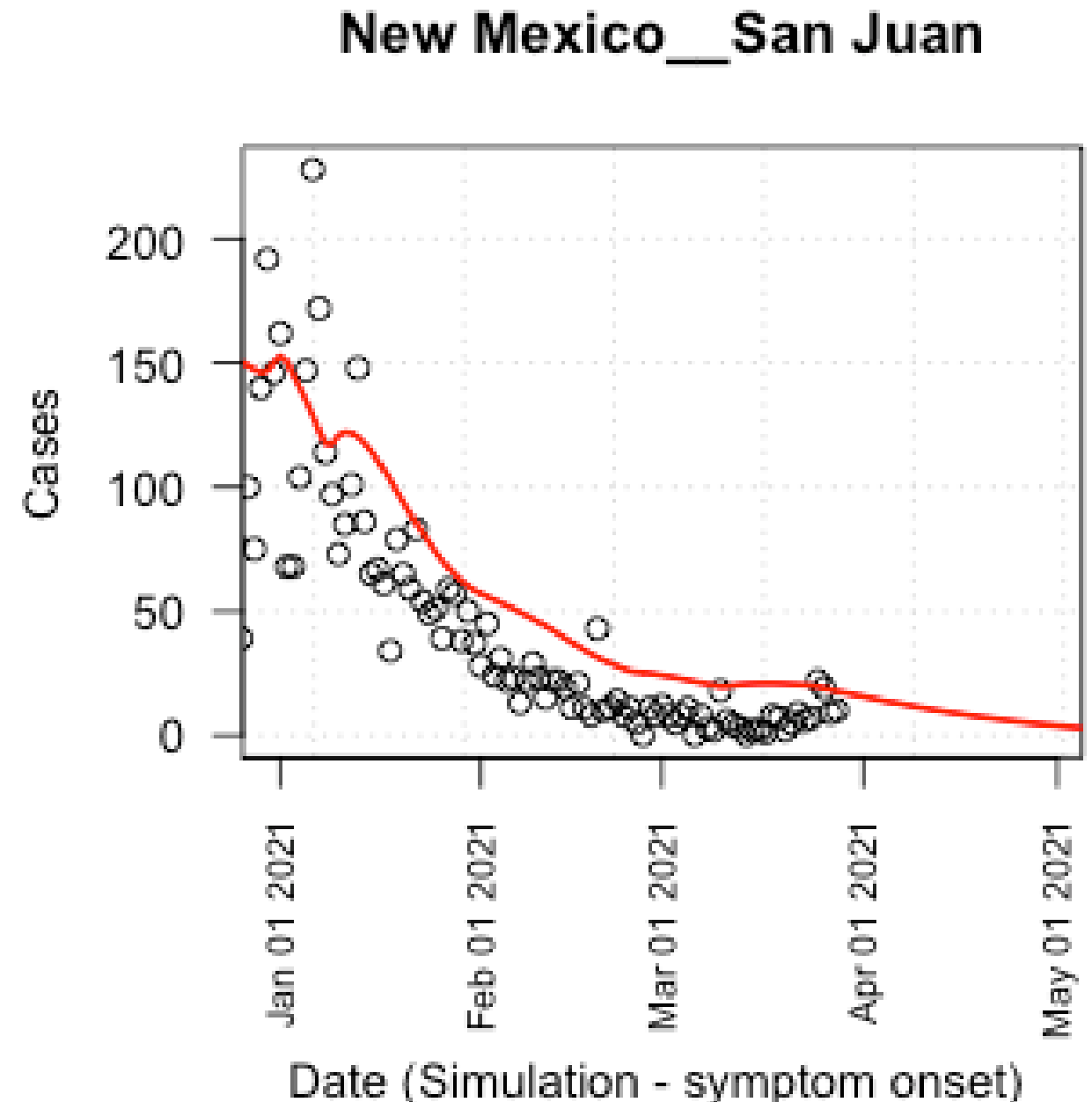


Tue Mar 30 09:51:52 2021

Tue Mar 30 09:45:07 2021

Counties to watch

- San Juan – reported cases are increasing. The rise is not well described by the current EpiGrid model. Is this a few discrete events or a trend? This may reflect behavior changes in the community, or novel variants.



What is happening in the rest of the U.S.?

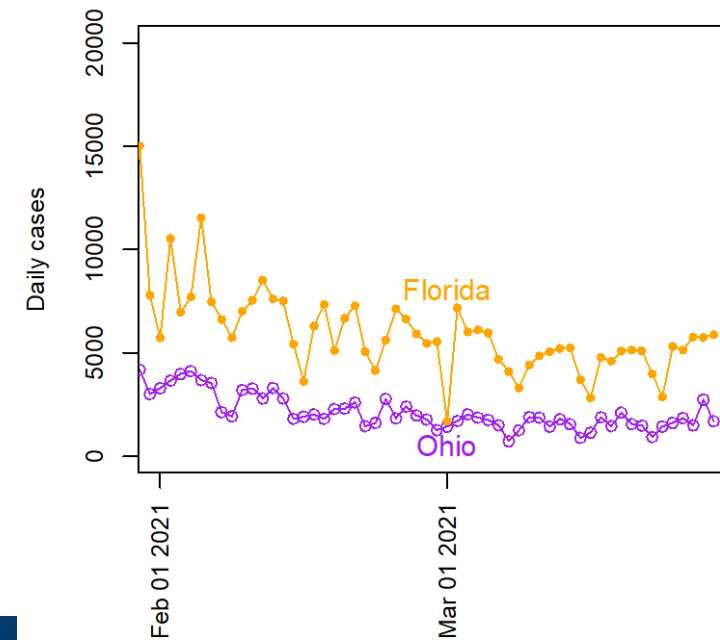
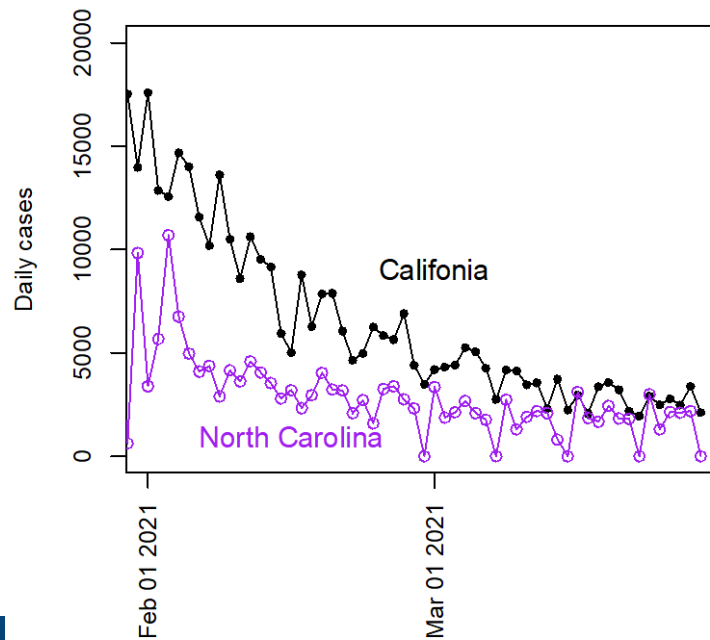
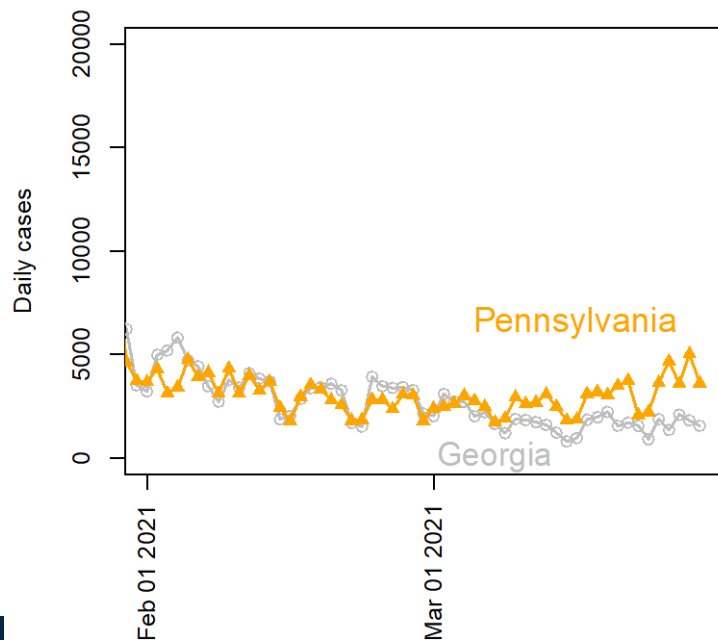
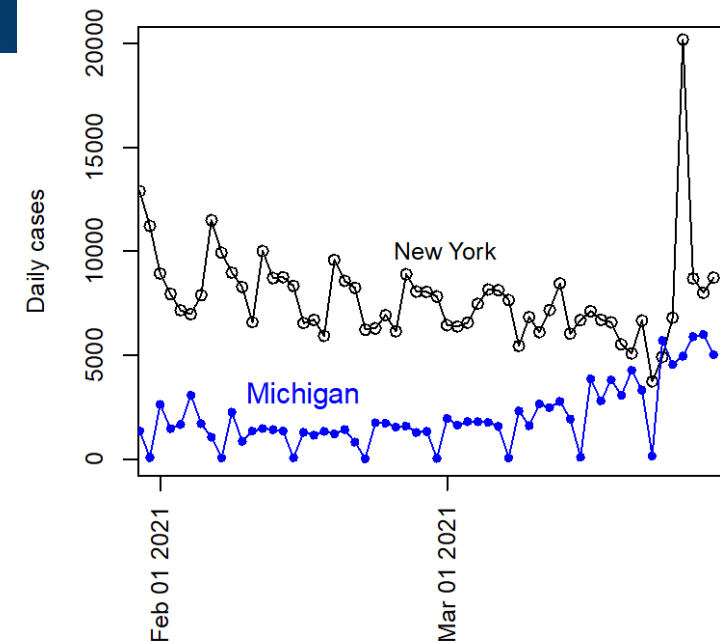
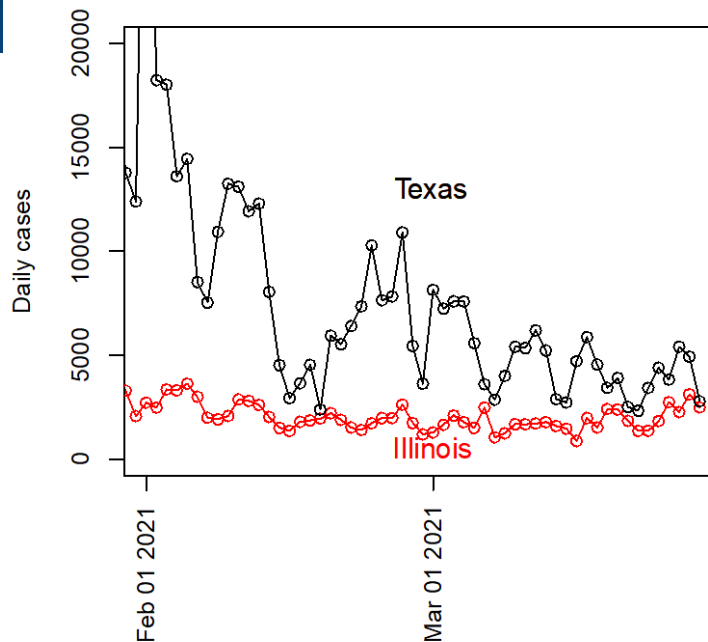
A look at the 10 most populous states

Case are rising: Illinois, Michigan, New York, Pennsylvania

Possibly rising: Florida, Ohio

Case are flat: California, Georgia, North Carolina, Texas

Significant importations are highly likely.



Case Fatality Rates and Deaths as a function of age (relevance to vaccination)?

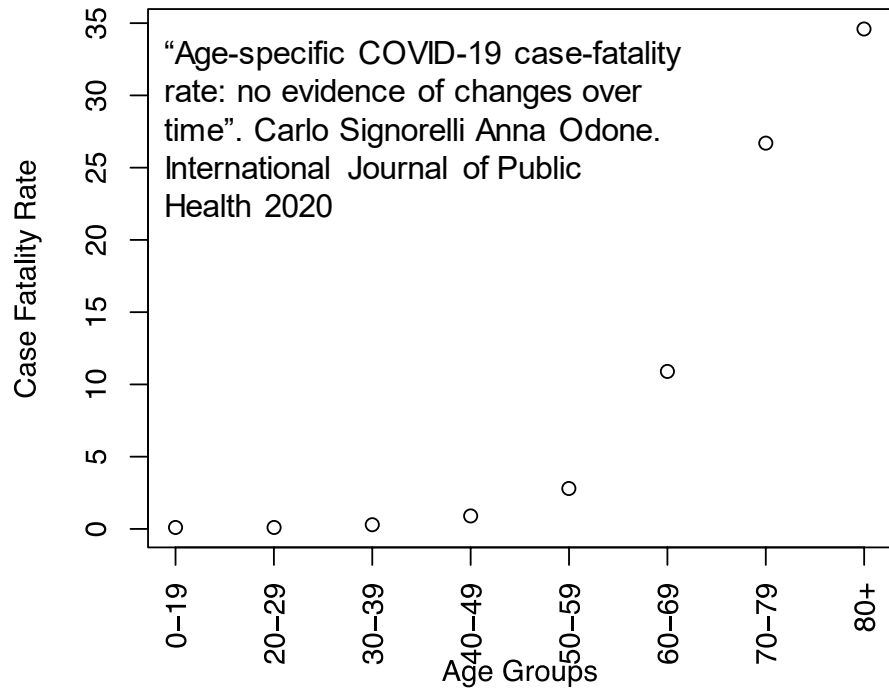


Table 15. Vaccine Efficacy^a of mRNA-1273 to Prevent COVID-19 From Dose 1 by Time Period in Participants Who Only Received One Dose, mITT Set

First COVID-19 Occurrence After Dose 1	Vaccine Group N=996 Case n (%)	Placebo Group N=1079 Case n (%)	VE (%) (95% CI)*
After dose 1	7/996 (87.5)	39/1079 (96.7)	80.2% (55.2%, 92.5%)
After dose 1 to 14 days after dose 1	5/996 (38.0)	11/1079 (41.1)	50.8% (-53.6%, 86.6%)
>14 days after dose 1**	2/983 (87.2)	28/1059 (96.2)	92.1% (68.8%, 99.1%)

Surveillance time in person years for given endpoint across all participants within each group at risk for the endpoint
 * VE is calculated as 1-ratio of incidence rates (mRNA-1273/Placebo). The 95% CI of VE is calculated using the exact method conditional upon the total number of cases, adjusting for person-years

**Participants who were not at risk (cases or censored at prior time period) are excluded from this analysis

^a Based on interim analysis: November 7, 2020 efficacy data cutoff.

Moderna Briefing Report to the US FDA, December 2020

So far in 2021, 20 – 30% of deaths are people without comorbidities.

Excess mortality also addressable via accelerated first-doses?