

Modeling & Forecasting COVID-19 in NM

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Short- & Long-Term Forecast for NM: Cases

Cumulative Cases Forecasts

6-Week Forecast of Confirmed Cases for
New Mexico Based on Data as of 2020-10-18

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile)^
2020-10-18		36,788*	
2020-10-25	38,767	40,449	42,760
2020-11-01	40,269	43,655	48,836
2020-11-08	41,427	46,360	55,348
2020-11-15	42,298	48,637	62,003
2020-11-22	42,944	50,629	68,582
2020-11-29	43,388	52,379	75,106

*Last reported confirmed cases count

^Closest-matching scenario

Weekly Confirmed Cases Forecasts

Week	Best Case	Middle Case	Worst Case^
2020-10-25	1,979	3,661	5,972
2020-11-01	1,502	3,206	6,076
2020-11-08	1,158	2,705	6,512
2020-11-15	871	2,277	6,655
2020-11-22	646	1,992	6,579
2020-11-29	444	1,750	6,524

So what?

The daily number of cases are expected to range between 850 and 950 for the worst case scenario

Short- & Long-Term Forecast for NM: Deaths

Cumulative Cases Forecasts

6-Week Forecast of Deaths for
New Mexico Based on Data as of 2020-10-18

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)^	Worst Case (95th Percentile)
2020-10-18		934*	
2020-10-25	948	968	1,004
2020-11-01	960	996	1,069
2020-11-08	968	1,021	1,133
2020-11-15	976	1,043	1,200
2020-11-22	981	1,059	1,257
2020-11-29	985	1,075	1,322

*Last reported deaths count

^Closest-matching scenario



Weekly Deaths Forecasts

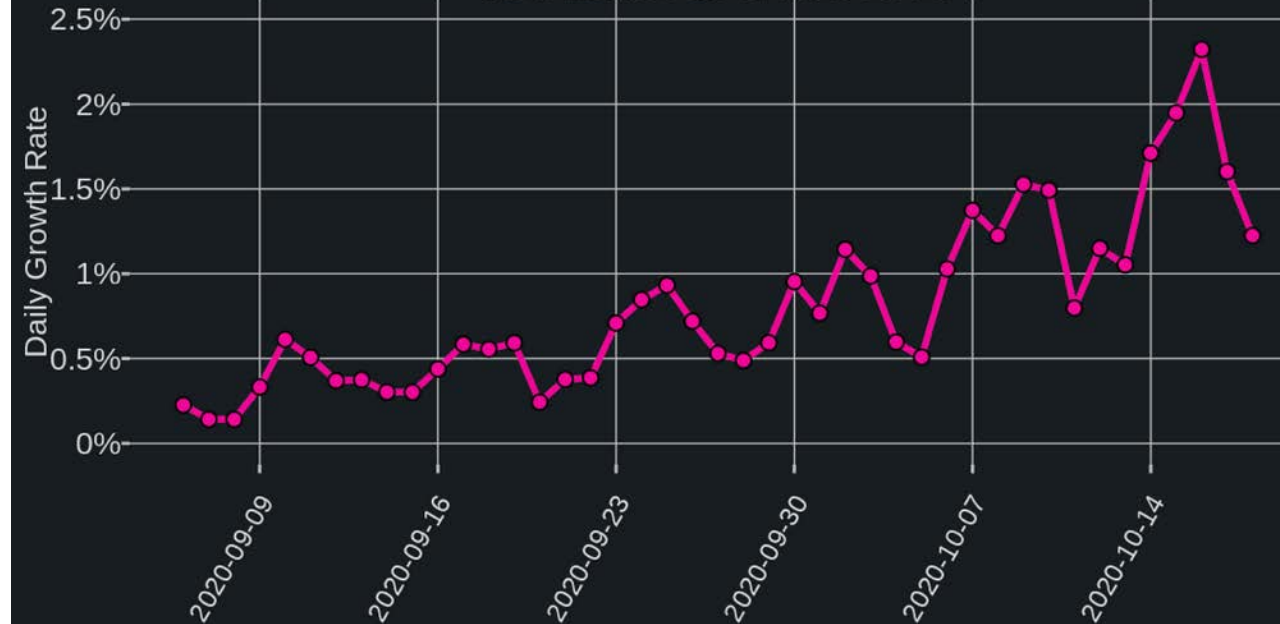
Week	Best Case	Middle Case^	Worst Case
2020-10-25	14	34	70
2020-11-01	12	28	65
2020-11-08	8	25	64
2020-11-15	8	22	67
2020-11-22	5	16	57
2020-11-29	4	16	65

So what?

The weekly number of deaths are expected to range between 16 and 34 for the middle case scenario

Growth Rate for NM

Daily Growth Rate for the Past Six Weeks in New Mexico as of 2020-10-18



6-Week Forecast of the Average Weekly Growth Rate for New Mexico Based on Data as of 2020-10-18

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile) [^]
2020-10-18		1.6%*	
2020-10-25	0.75%	1.4%	2.2%
2020-11-01	0.54%	1.1%	1.9%
2020-11-08	0.41%	0.86%	1.8%
2020-11-15	0.30%	0.69%	1.6%
2020-11-22	0.22%	0.58%	1.5%
2020-11-29	0.15%	0.49%	1.3%

*Last weekly mean daily growth rate

[^]Closest-matching scenario

So what?

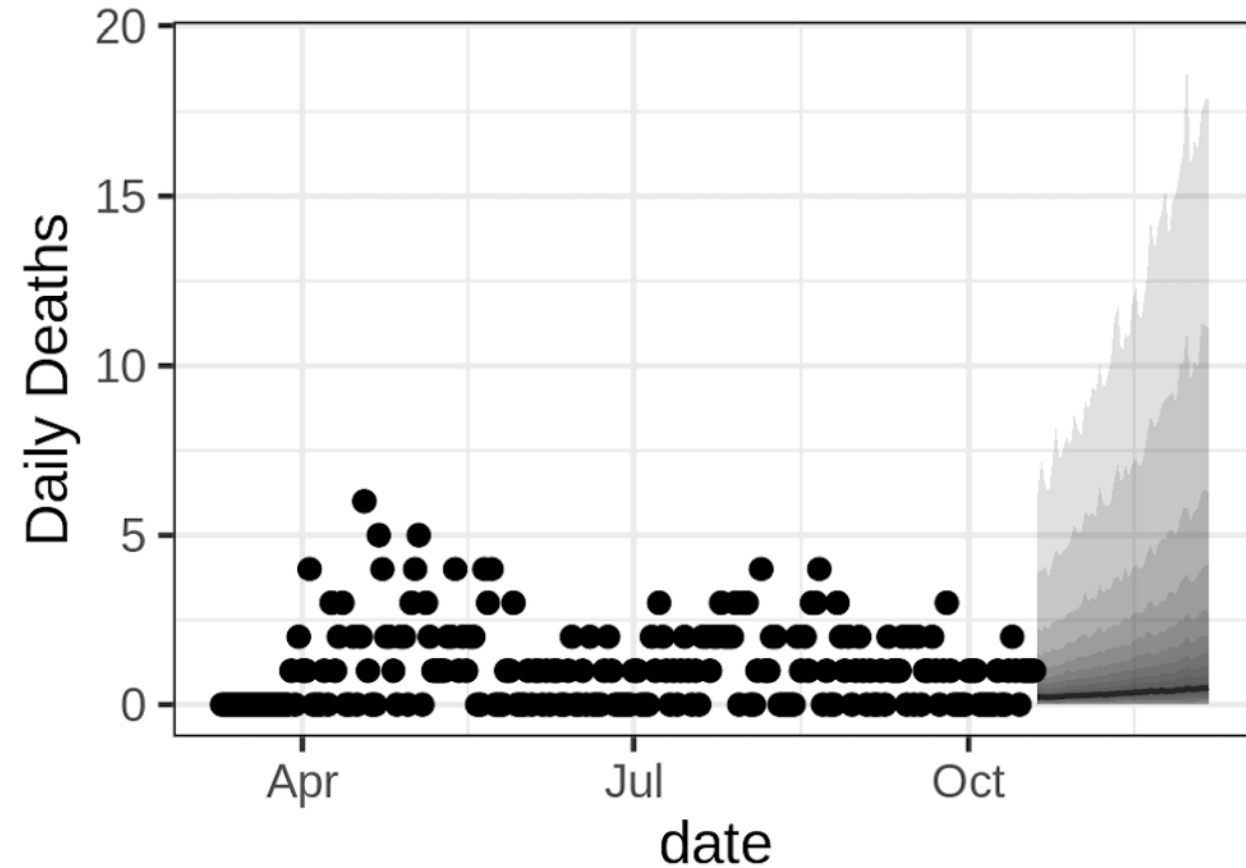
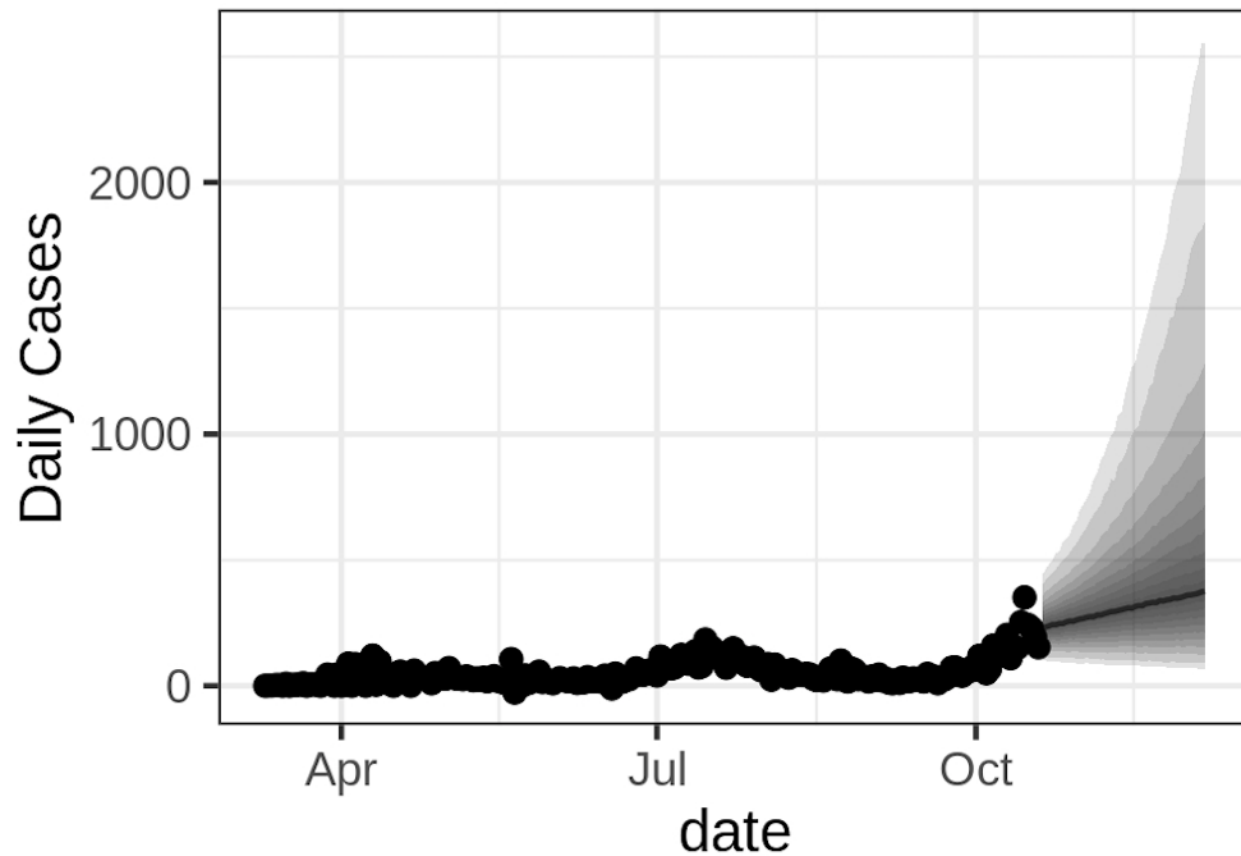
As of October 18th, the average growth rate in NM is at 1.6% (up from 1.1%)

NOTE: Forecasting model is in the process of being updated to change certain assumptions

> Regional Forecasts, Growth Rates, & Hospitalizations

Central Region Forecasts

NM Central Region

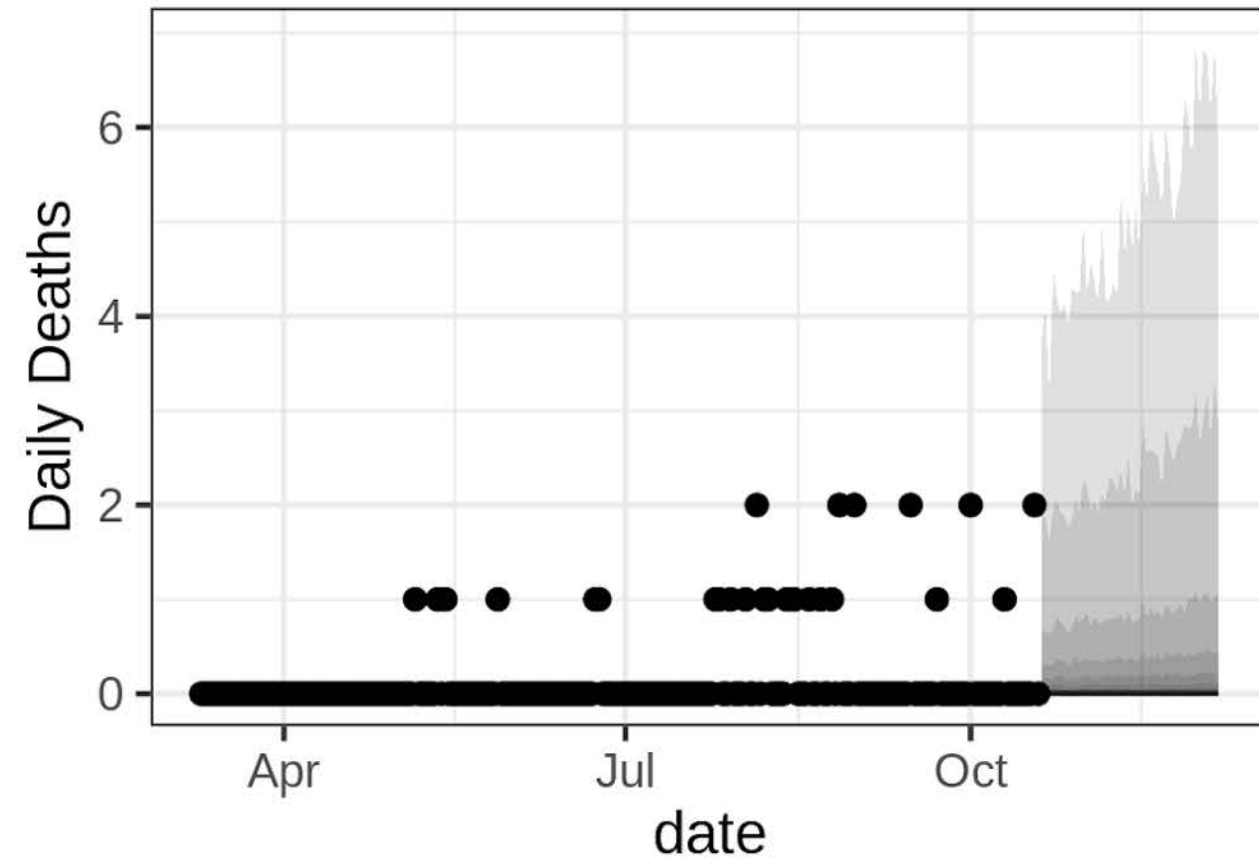
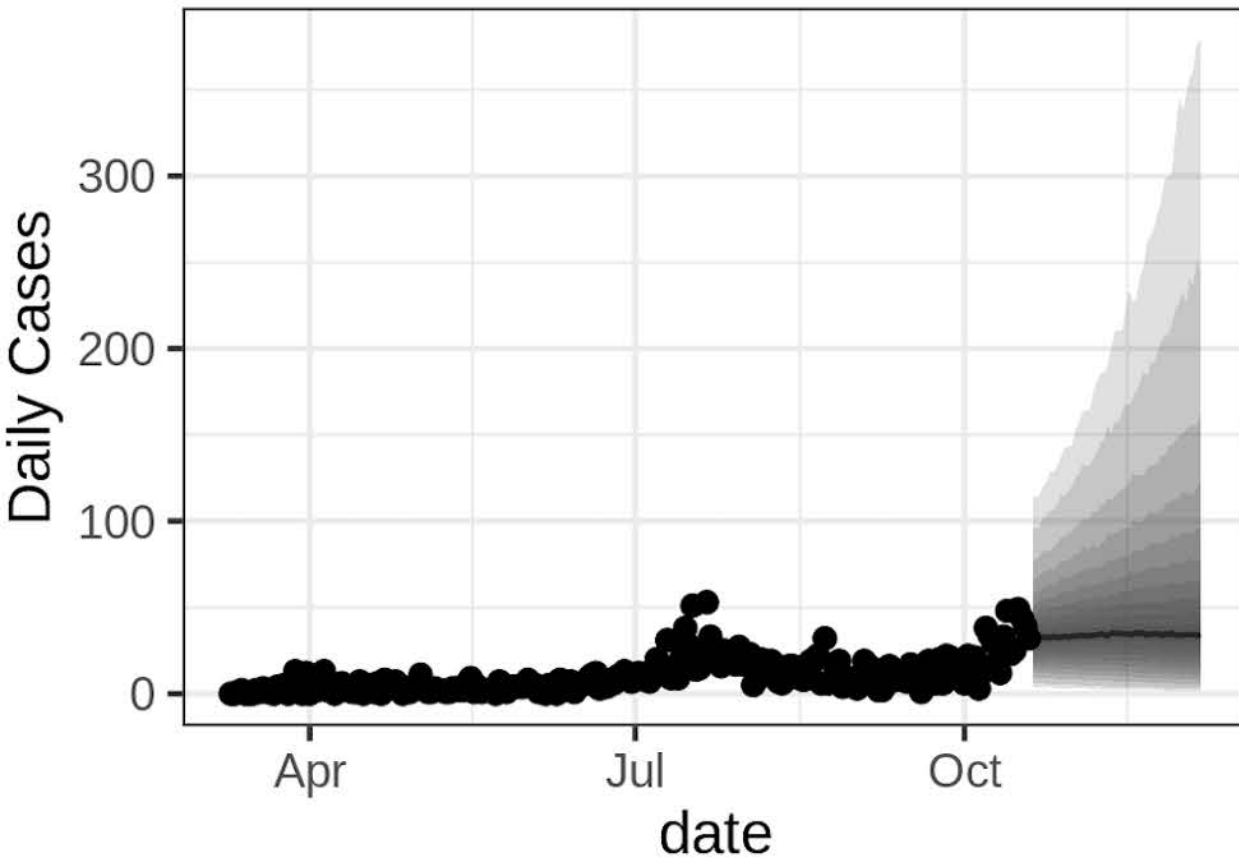


So what?

The daily number of cases is expected to range between 260 and 350 for the middle case scenario

Northeast Region Forecasts

NM Northeast Region

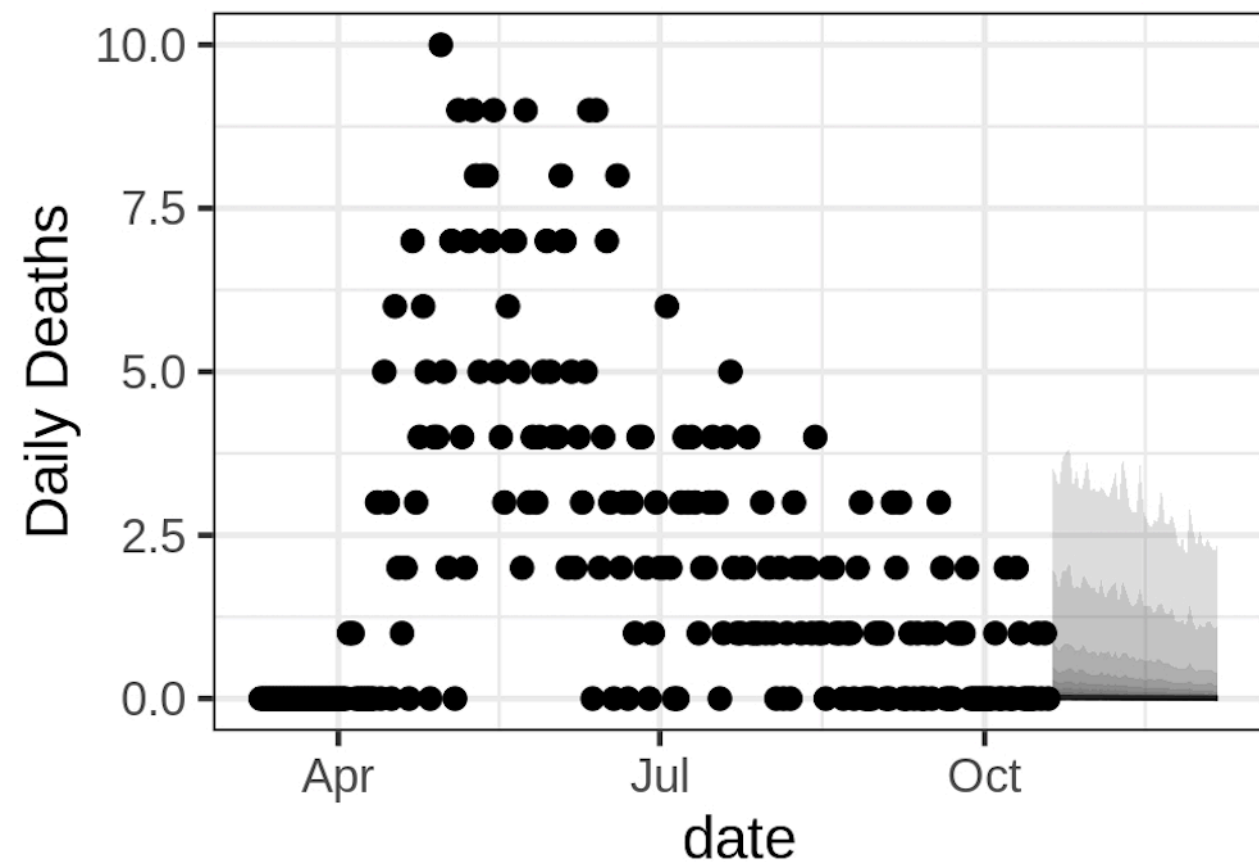
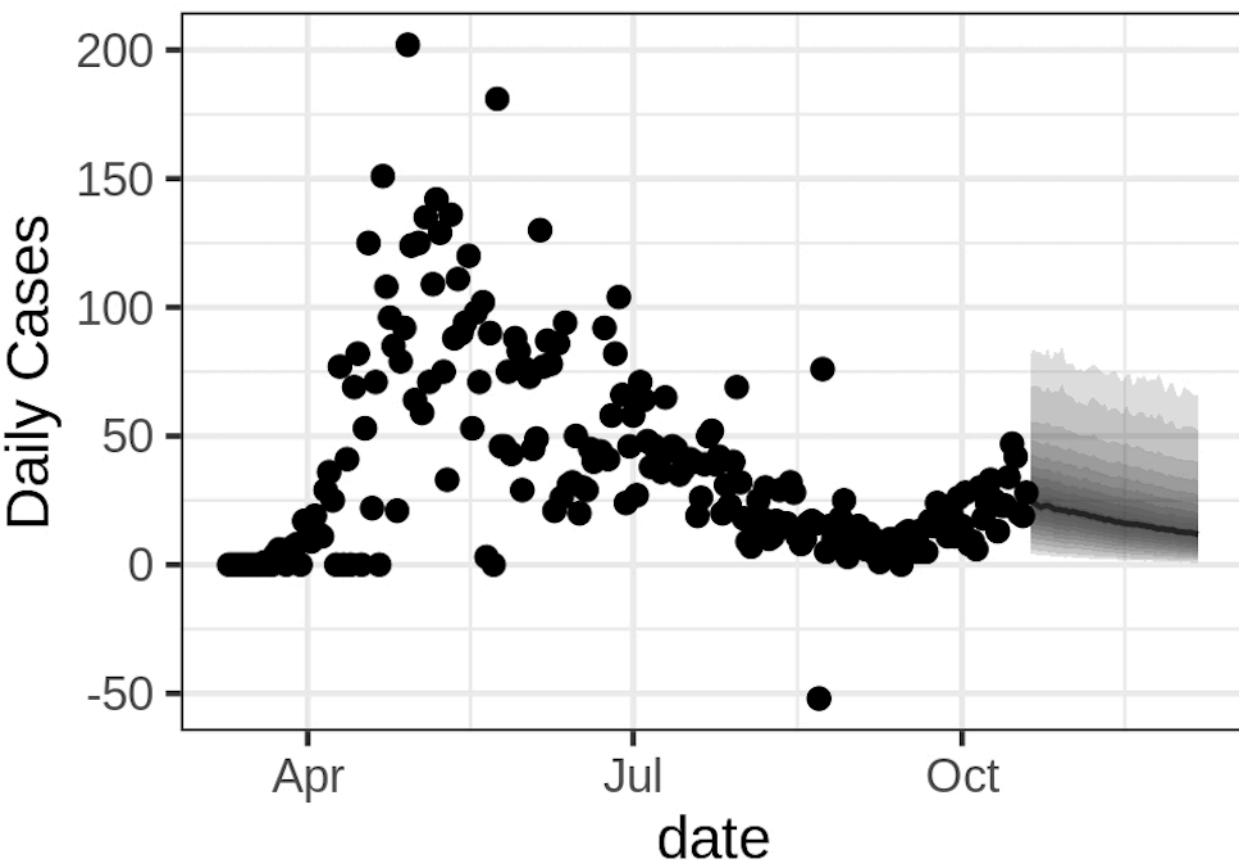


So what?

The daily number of cases is expected to range between 30 and 40 for the middle case scenario

Northwest Region Forecasts

NM Northwest Region

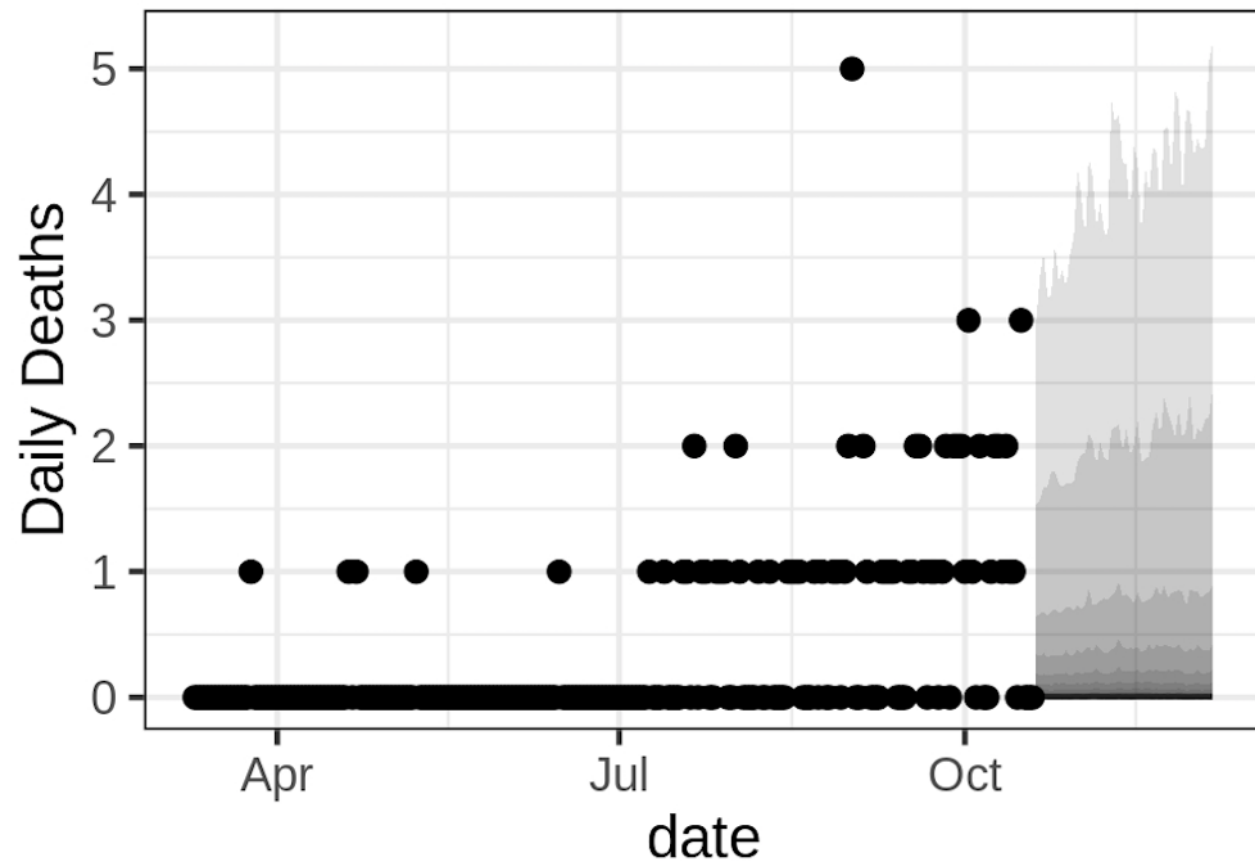
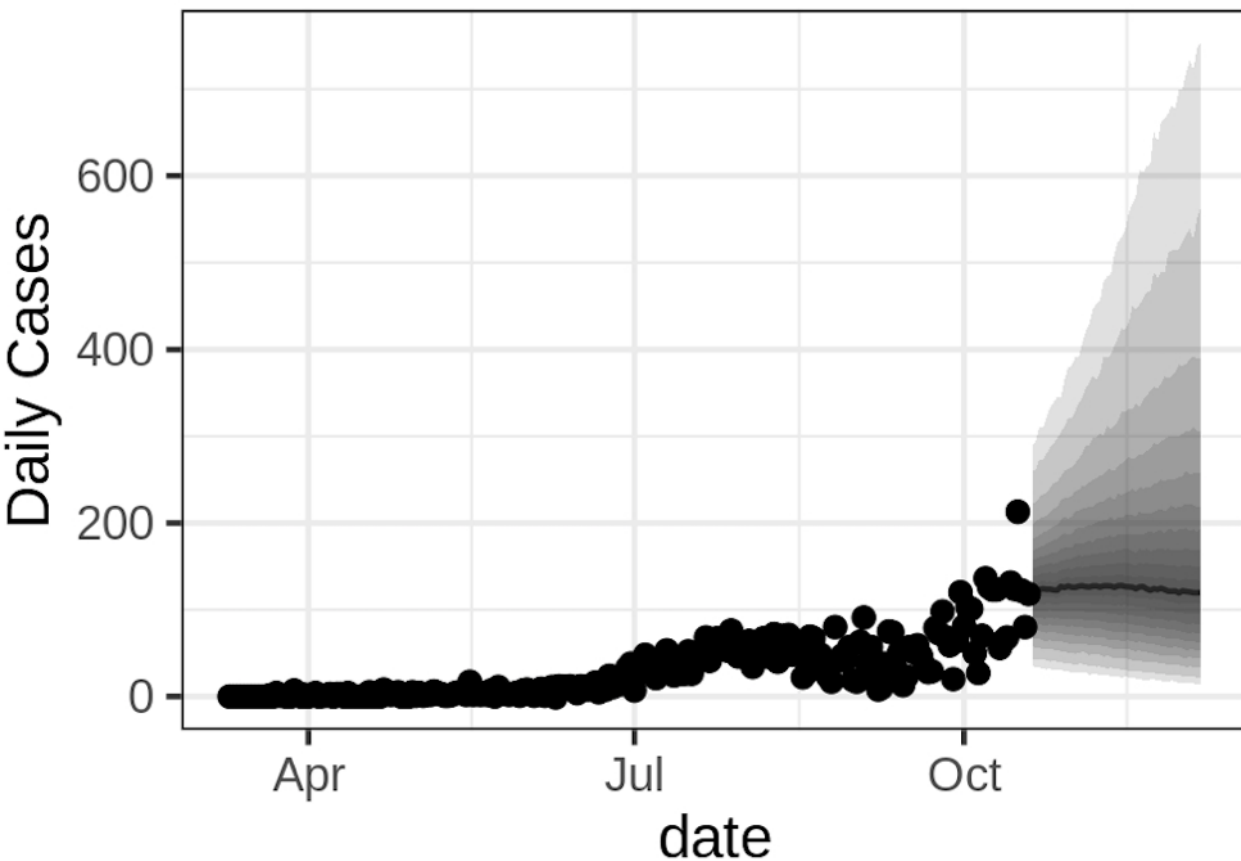


So what?

The daily number of cases is expected to range between 15 and 25 for the middle case scenario

Southeast Region Forecasts

NM Southeast Region

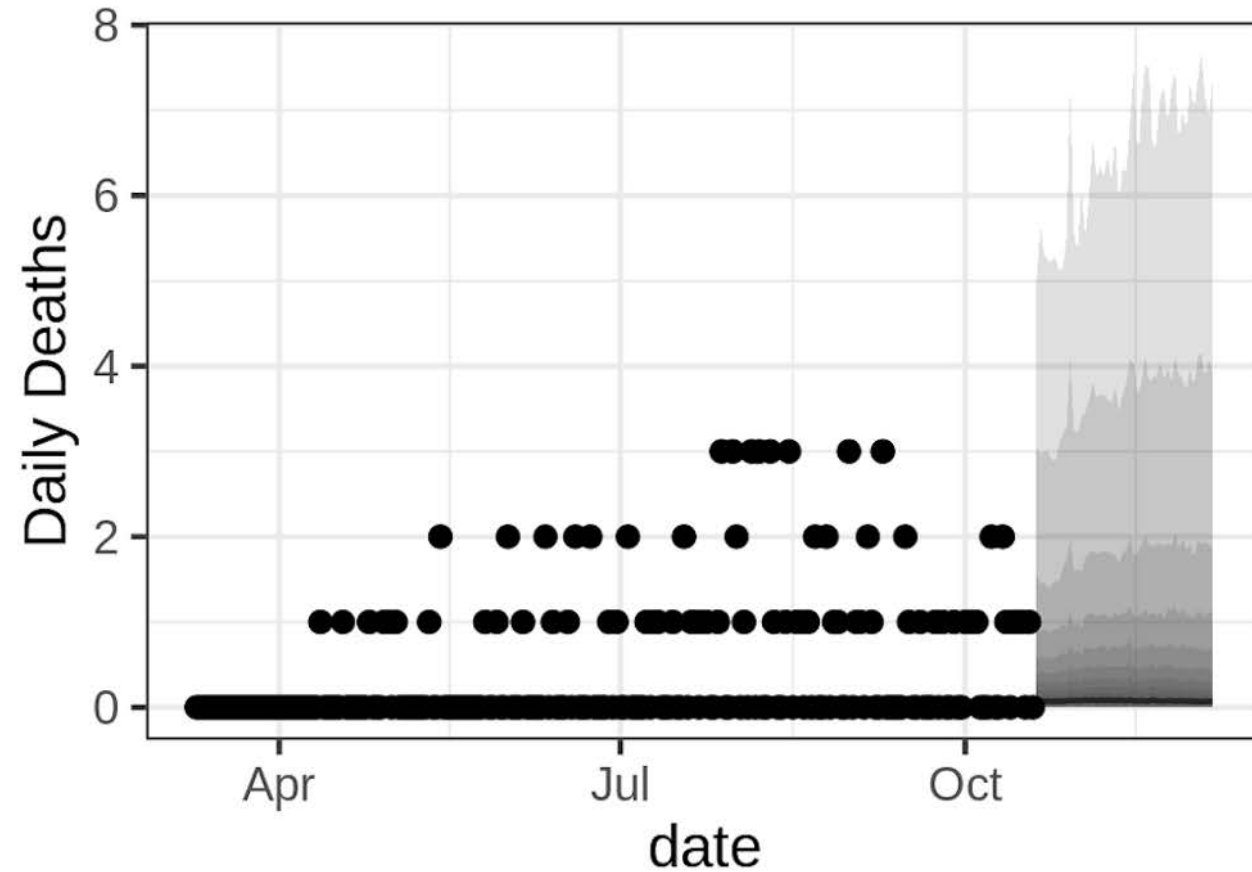
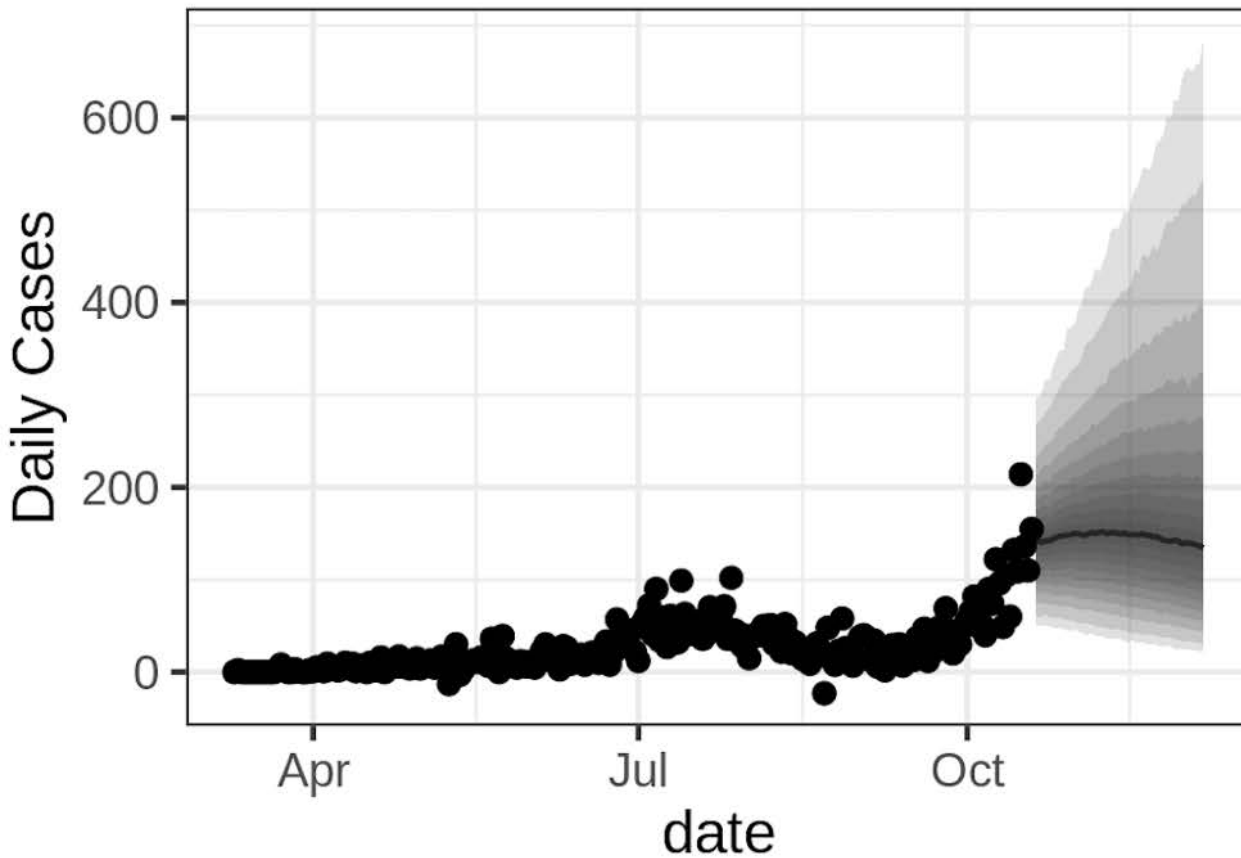


So what?

The daily number of cases is expected to range between 120 and 130 for the middle case

Southwest Region Forecasts

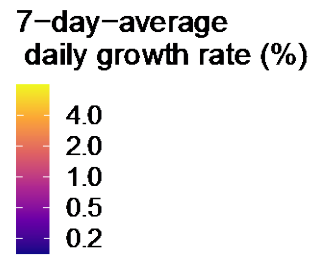
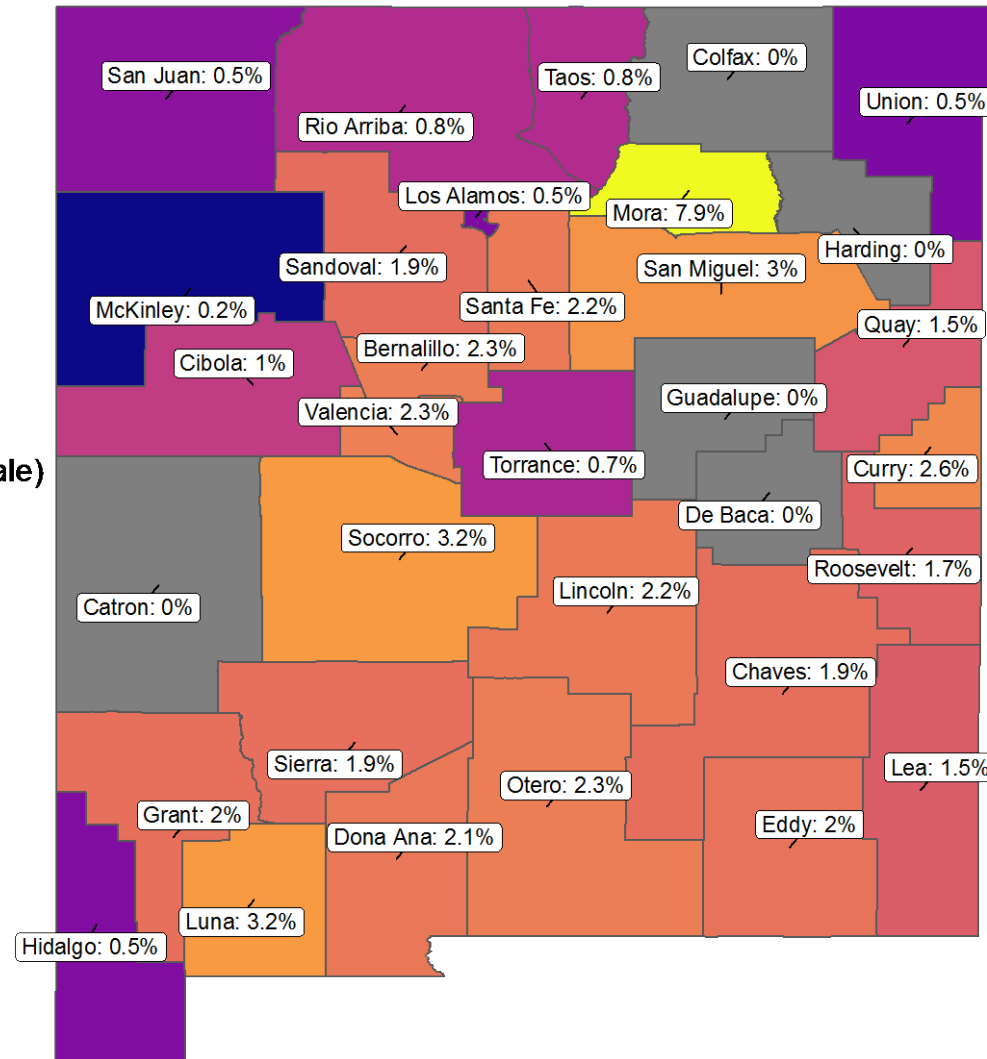
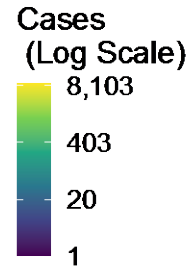
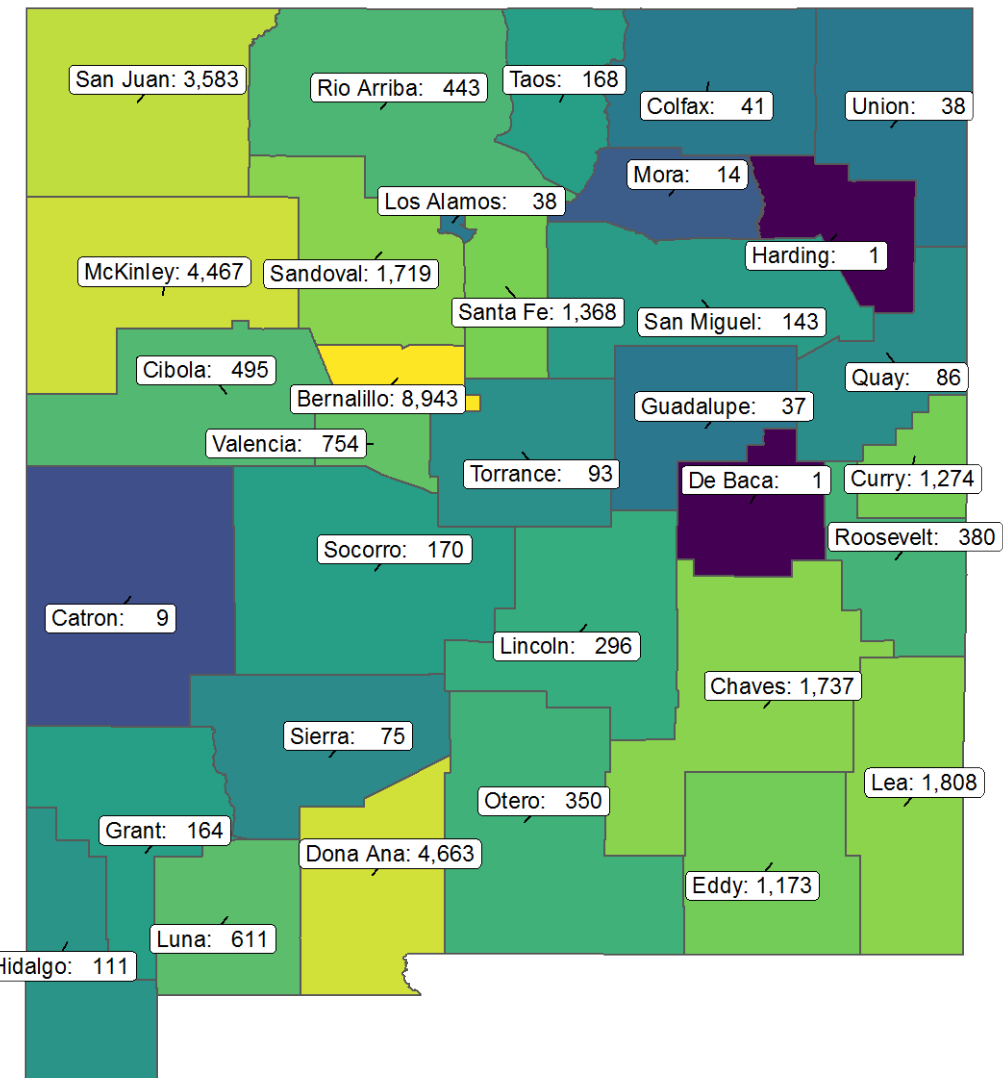
NM Southwest Region



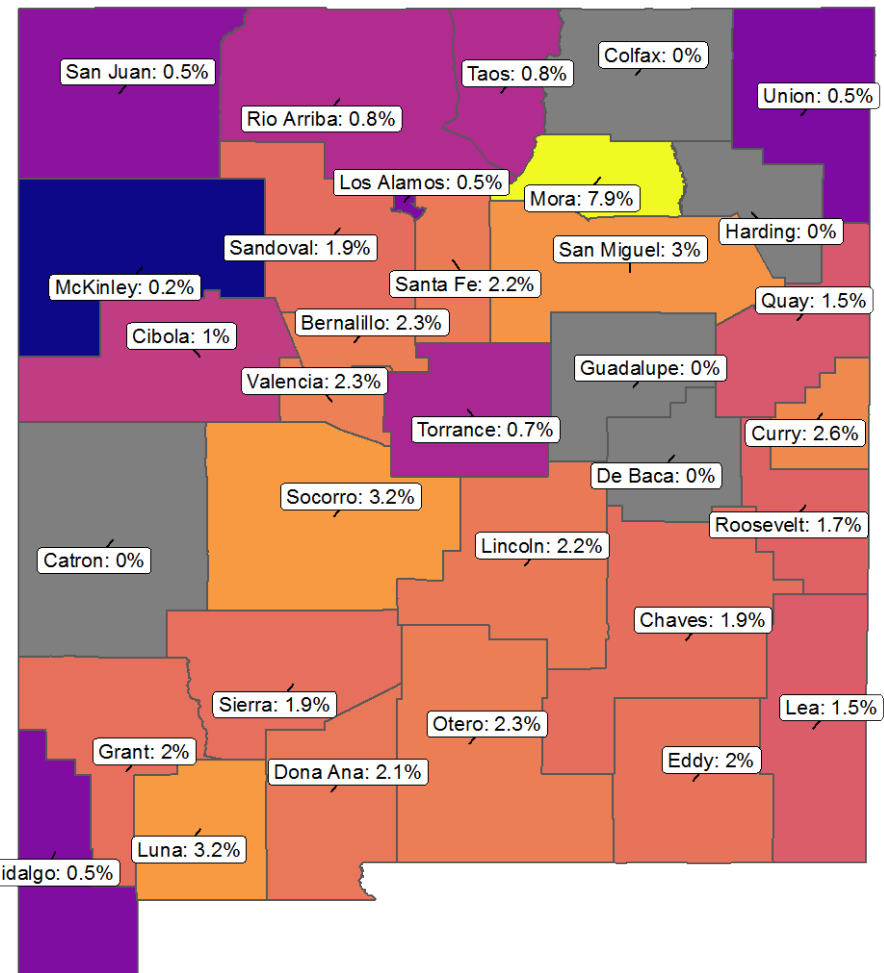
So what?

The daily number of cases are expected to range between 140 and 160 for the middle case scenario

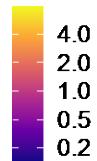
Cumulative Cases & Growth Rate for NM: Oct 19



Daily Growth Rate for NM Oct 19



7-day-average daily growth rate (%)



Hidalgo 0.5% =
 DeBaca 0.0% =
 Catron 0.0% =
 Los Alamos 0.5% =
 Colfax 0.0% =
 Union 0.5% ↓
 Roosevelt **1.7%** ↓
 Socorro **3.2%** =
 Quay **1.5%** =
Mora 7.9% ↑

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

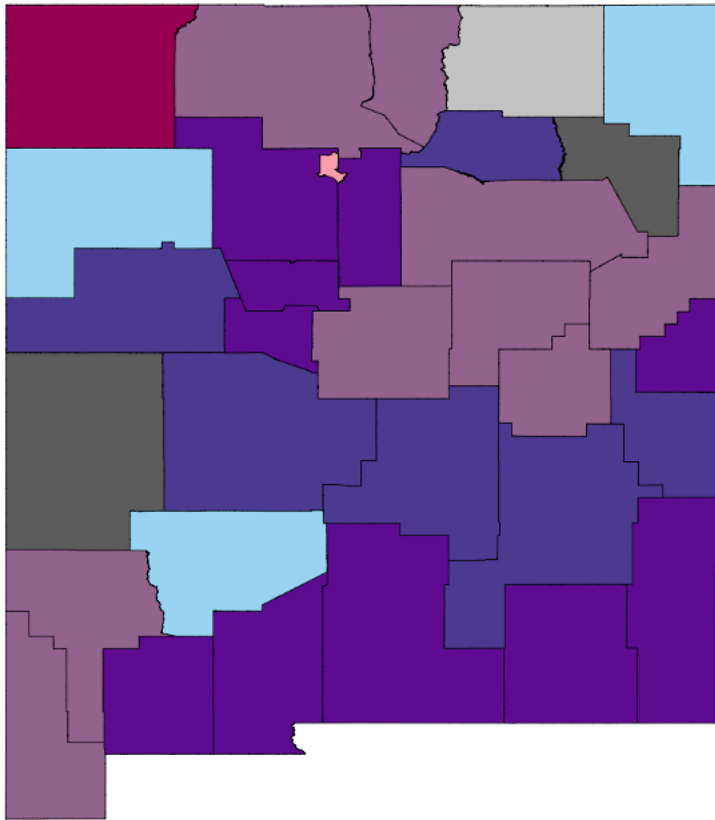
County	Daily Growth Rate	Change
San Juan	0.5%	=
Rio Arriba	0.8%	=
Sierra	1.9%	↓
McKinley	0.2%	=
Sandoval	1.9%	↑
Santa Fe	2.2%	↑
Cibola	1.0%	=
Bernalillo	2.3%	↑
Valencia	2.3%	↑
Torrance	0.7%	↓
Lincoln	2.2%	=
San Miguel	3.0%	↑
Chaves	1.9%	=
Dona Ana	2.1%	↑
Otero	2.3%	↑
Lea	1.5%	=
Eddy	2.0%	=
Curry	2.6%	↑
Grant	2.0%	=
Luna	3.2%	↑
Taos	0.8%	↑

Growth Rate for NM: Another View (Oct 19)

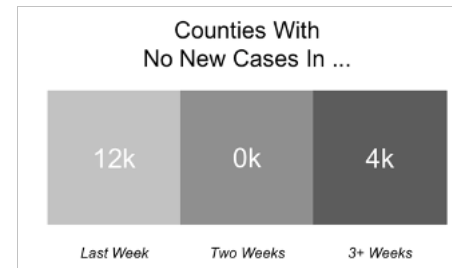
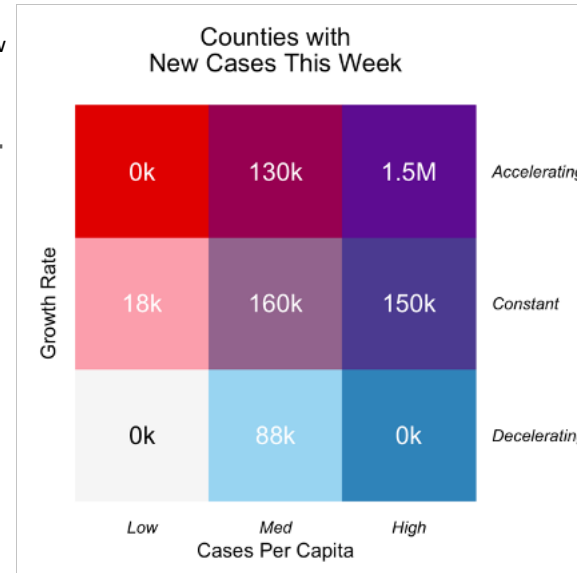
COVID-19 across New Mexico

A 7-day moving window comparison

October 19, 2020



Impacted New
Mexicans



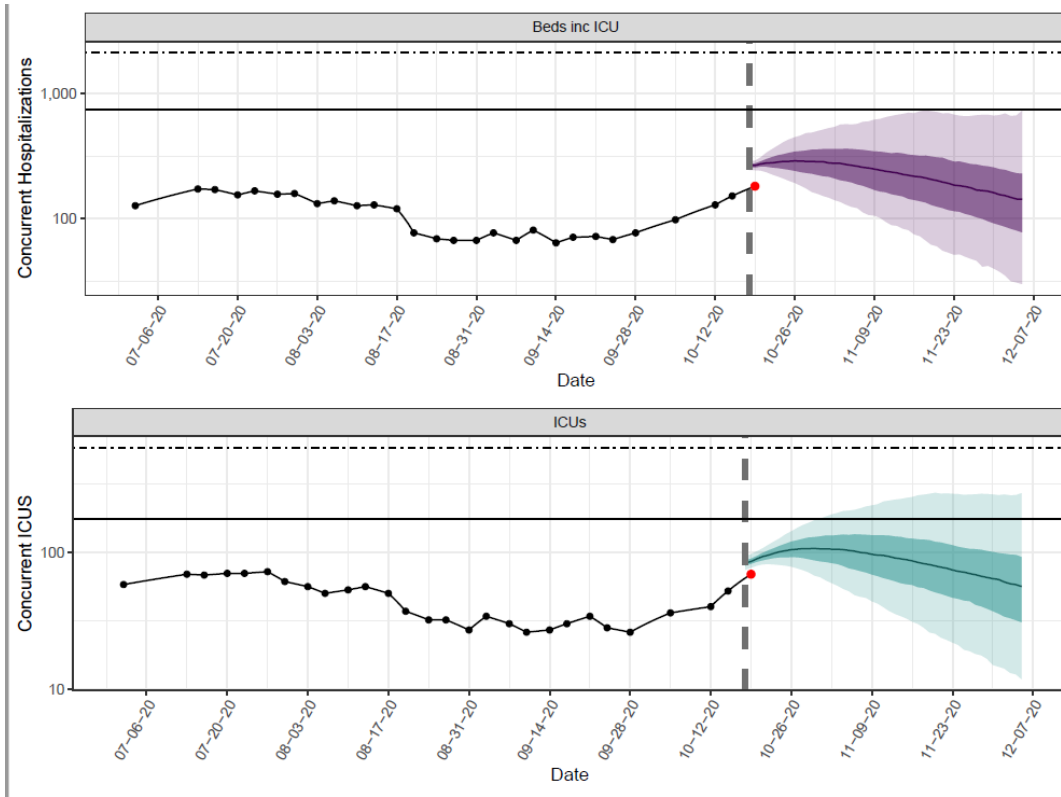
So what?

- MOST New Mexicans live in a county with currently accelerating growth and high per-capita case counts

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

Low <10 cases/100k
Med 10-99 cases/100k
High >100 cases/100k

Concurrent Hosp & ICU Beds Based on Forecasts – Average Stay of 8 Hosp, 15 Days for ICU/vent & 25% ICU rate



Concurrent COVID-19 ICUs beds

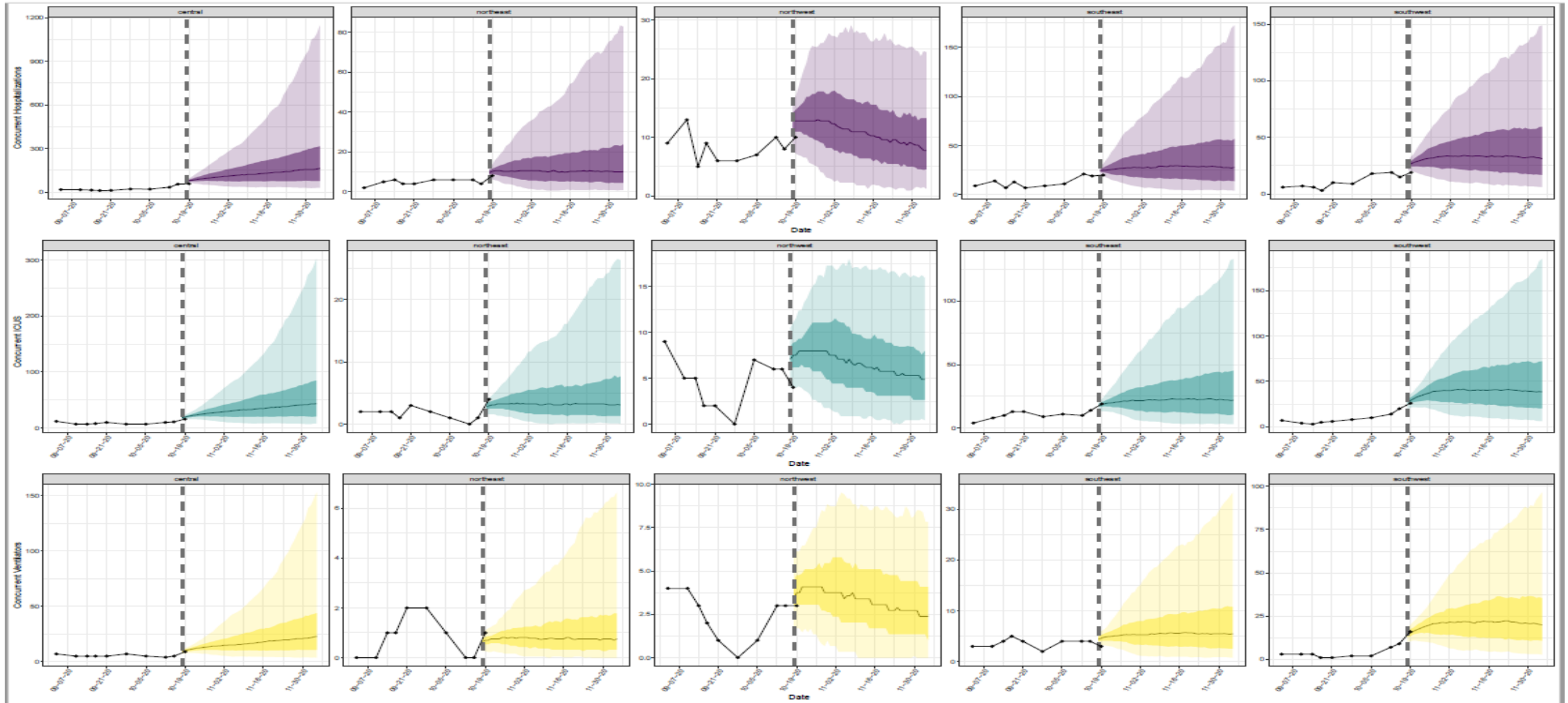
Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
10/25	79	102	134
11/1	61	105	181
11/8	45	98	215
11/15	32	87	248
11/22	22	75	268
11/29	16	64	265

"Scaled" Scenario

So what?

We are tracking with the **WORST CASE** scenario right now for cases, indicating that at current case growth rates we may exceed ICU beds by early November

Regional Hospitalization Forecasts



Central

Northeast

Northwest

Southeast

Southwest

Regional Hospitalization Forecasts

Concurrent COVID-19 ICUs beds: Southwest

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
10/25	21	37	59
11/1	15	40	87
11/8	12	41	108
11/15	10	40	127
11/22	9	41	146
11/29	8	40	162

Concurrent COVID-19 ICUs beds: Central

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
10/25	15	25	40
11/1	11	29	66
11/8	10	32	91
11/15	9	35	126
11/22	9	37	175
11/29	8	41	236

So what?

We are tracking with the WORST CASE scenario for cases right now

Regional Hospitalization Forecasts

Concurrent COVID-19 ICUs beds: Southeast

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
10/25	11	21	39
11/1	6	22	59
11/8	5	22	76
11/15	4	23	94
11/22	4	22	104
11/29	3	22	114

Concurrent COVID-19 ICUs beds: Northwest

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
10/25	3	8	14
11/1	2	8	17
11/8	1	7	18
11/15	1	6	17
11/22	0	6	16
11/29	0	5	16

So what?

We are tracking with the WORST CASE scenario for cases right now

Regional Hospitalization Forecasts

Concurrent COVID-19 ICUs beds: Northeast

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
10/25	1	3	7
11/1	0	3	11
11/8	0	3	13
11/15	0	3	16
11/22	0	3	20
11/29	0	3	23

So what?

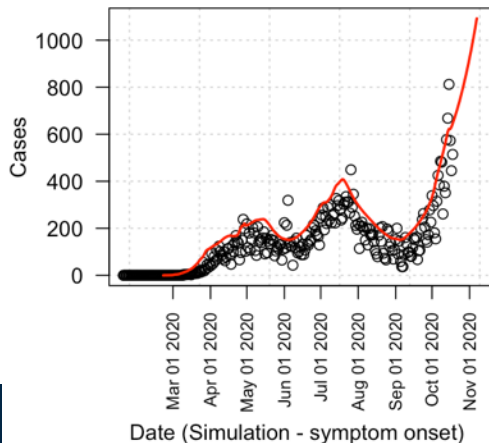
We are tracking with the WORST CASE scenario for cases right now

20 Oct 2020: EpiGrid modeling

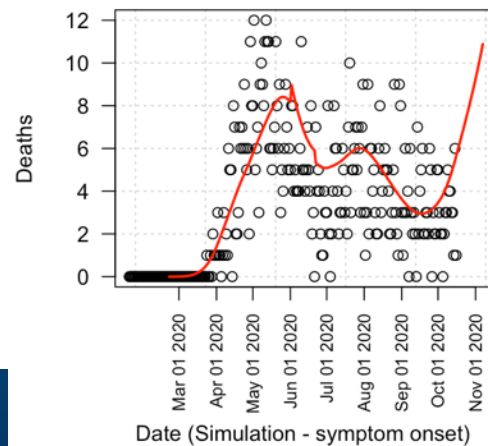
Summary of transmission and contact tracing quantification

- Statewide **transmission increases** for indoor dining, etc. (10%)
 - Aug. 29th Public Health Order (PHO) includes 25% indoor dining, other activities
- **Entire region: transmission increase** for Labor Day weekend (~10%)
- **Large** additional transmission increases starting after Labor Day:
 - Bernalillo and Dona Ana ~40%. Socorro ~ 50%.
 - Santa Fe ~20%
- Small additional transmission increases in some frontier/rural counties
 - up to 10%.
- Contact tracing is **reduced** in October, by ~15%.
 - State reports longer times for isolating positive cases and quarantining contacts of positive cases. This follows from cases exceeding capability.
- **Significant transmission increases in Texas and Arizona**
 - 30% for El Paso county starting end of September (PHO, Sept. 22)

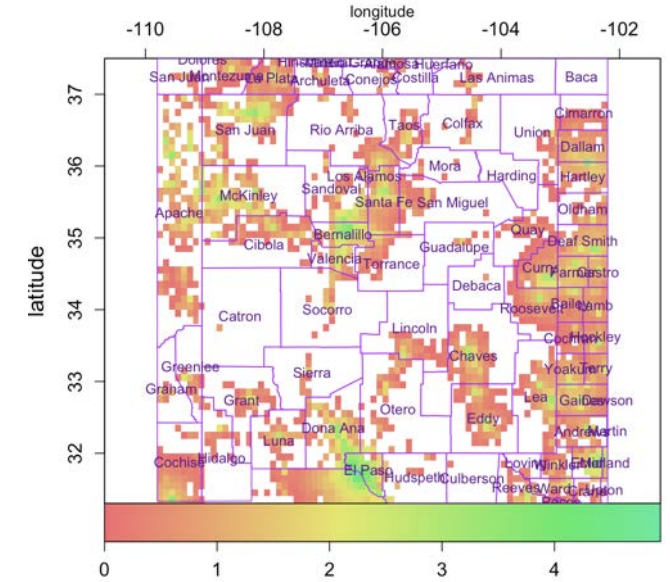
United States__New Mexico



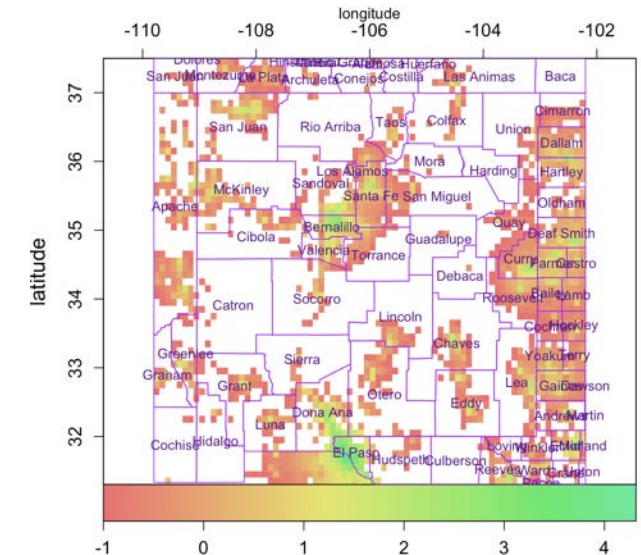
United States__New Mexico



log10 Cumulative cases, wk 37, 2020-11-08

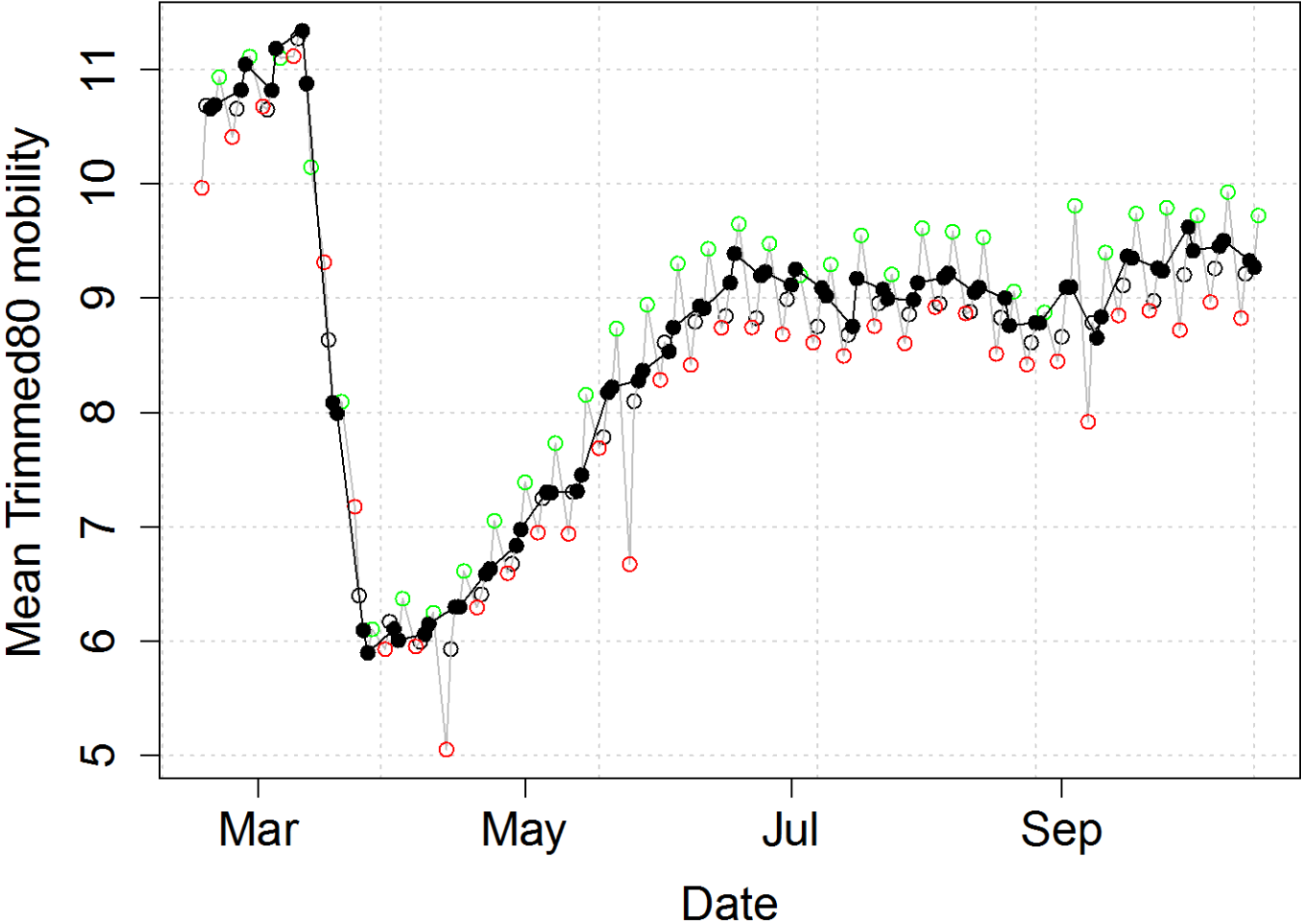


log10 Incidence, wk 37, 2020-11-08



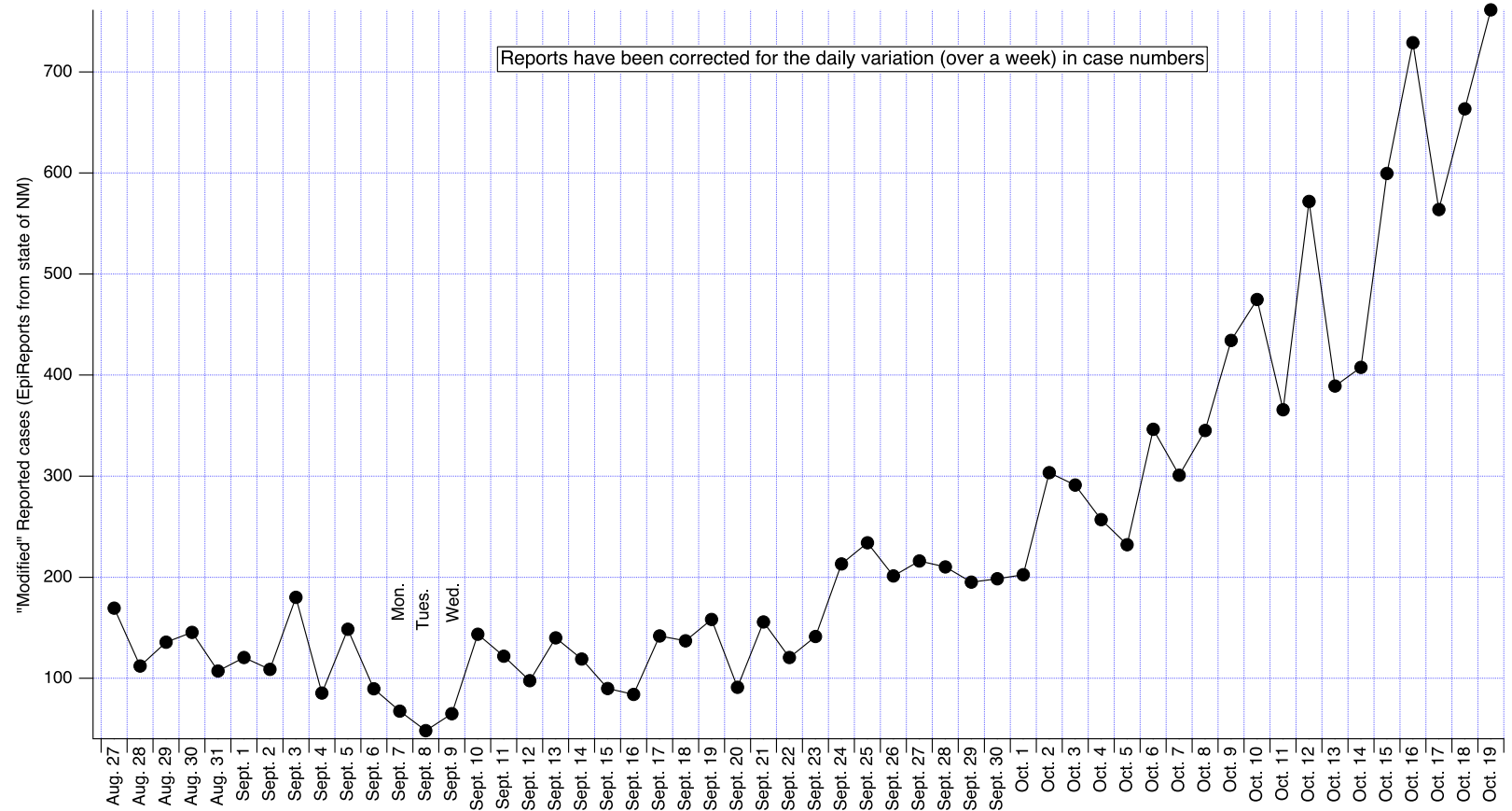
Mobility in urban counties may be **subsiding**, slightly. **Not sufficient for optimal control.**

- Average mobility for the four most populous counties: Bernalillo, Dona Ana, Santa Fe, Sandoval.
 - Weekends NOT shown
 - **Monday**
 - Wednesday/Thursday
 - **Friday**
- Mobility in San Juan county (5th most populous) also decreased in the last week.
- Mobility improvement is smaller compared with March 2020, and is likely not consistent with a limiting-fast roll-over in daily incidence.
- **Additional community infection control is a high need.**



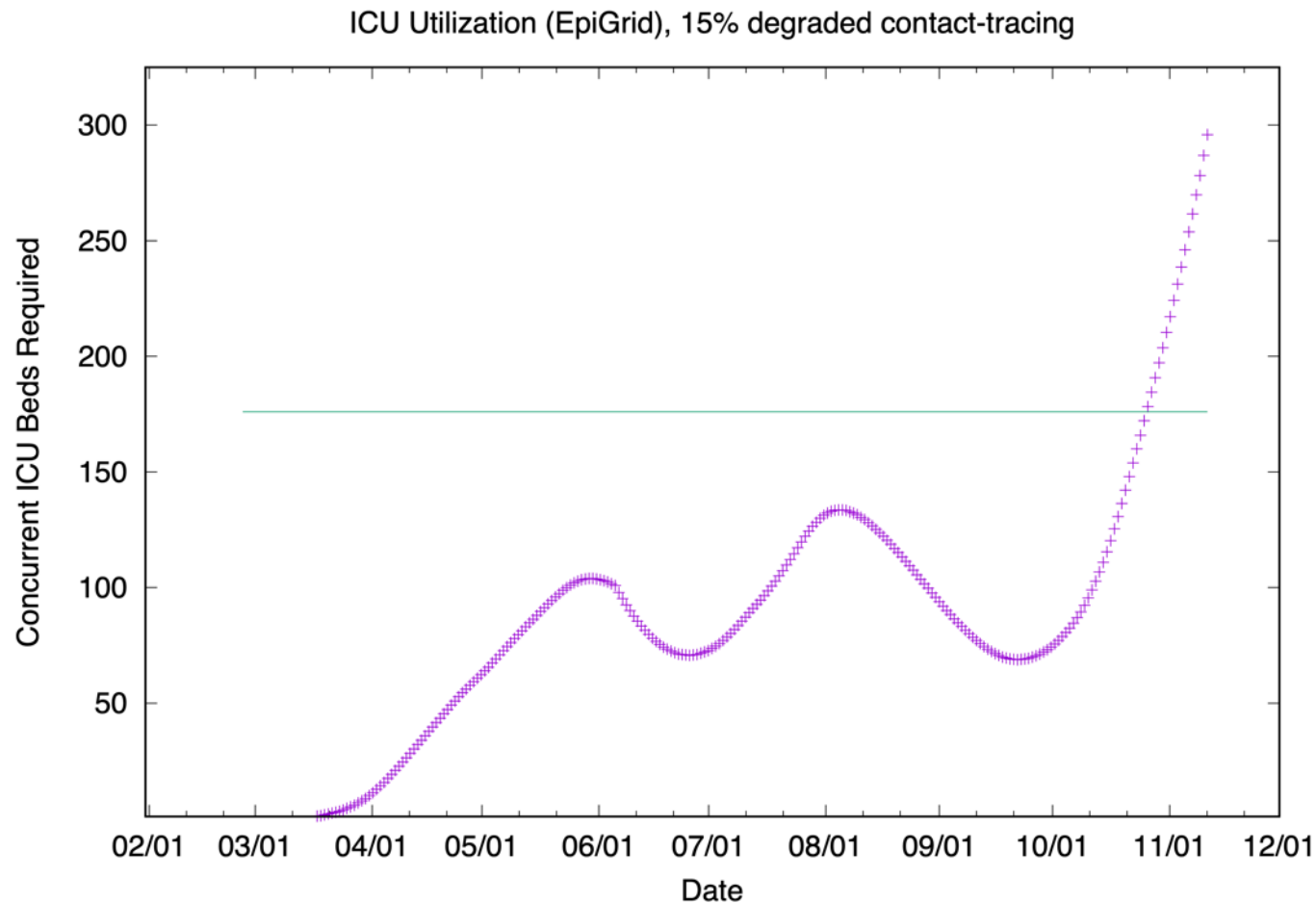
Correcting case counts for the day-to-day variation within a week indicates that incidence may be slowing: EpiGrid uses only a mild change in future behavior.

- This epidemic behavior has been observed many times, beginning with Wuhan, China in late January and the first week of February 2020. It confirms that epidemics are significantly and rapidly responsive to Public Health Orders (PHO).
- Minimum 5 more days of data to confirm slowing.
- The extent of slowing is not yet determined. If confirmed next week, new data will allow quantification of the current PHO's effects on the level of community infection.
- **If the public interprets initial curvature in weekly incidence as license to stop masking and resume full activity and gather, the outcome will be severe.**



While there are reasons for cautious optimism, the current weekly incidence is a towering mountain compared to the previous peaks. These data indicate responsiveness of the epidemic to changes in PHO, not a complete solution.

Concurrent ICU usage, at current **~15% degradation** of tracing/isolation/quarantine.



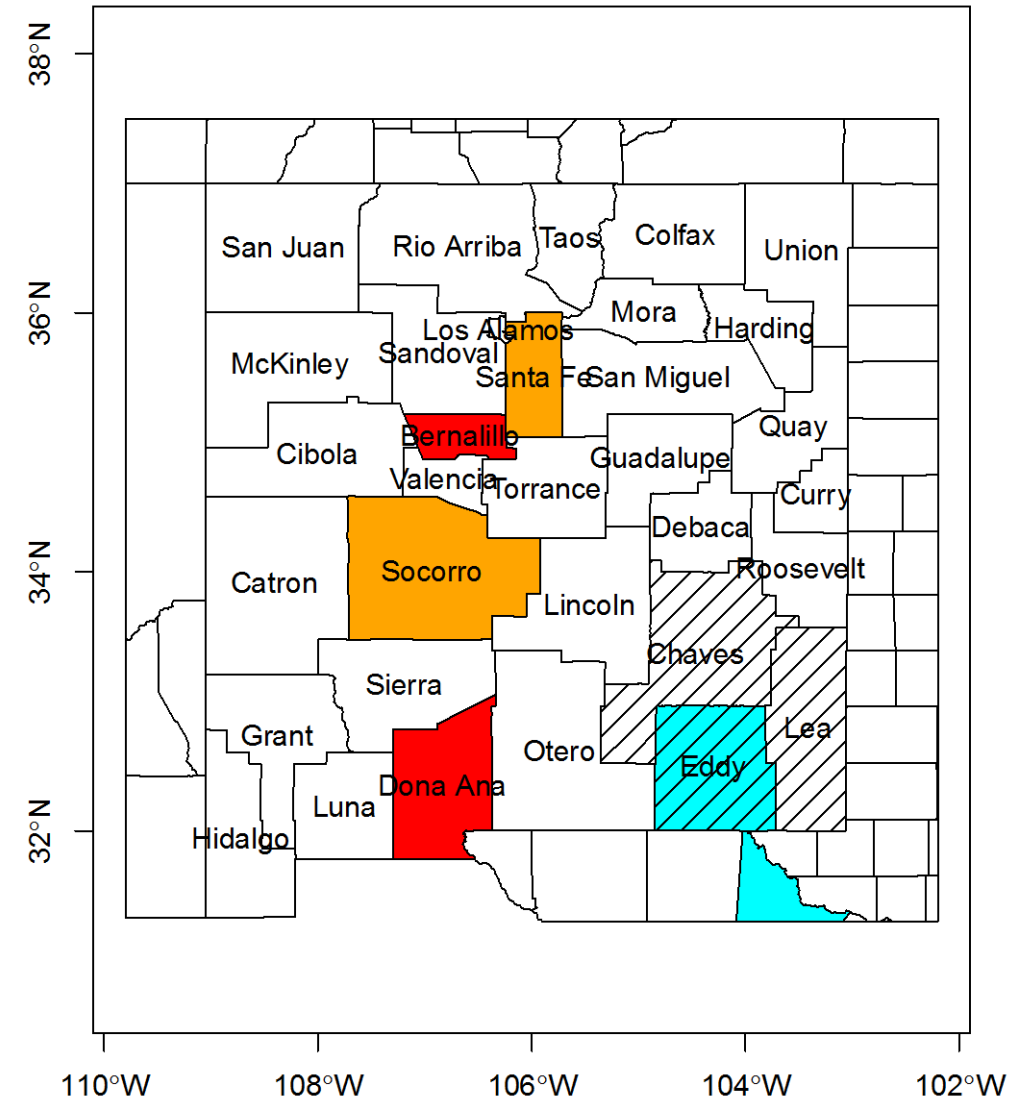
The next 16 days of this prediction are highly likely a committed outcome. The outcome is no longer responsive to modification of the PHO. Events past 2-3 weeks have not yet been determined by human choice. An optimally-fast drop in daily incidence is required to avoid increasing ICU bed requirements in early November.

Positivity rates are high in some New Mexico counties, nearly all Western TX

- **Positivity: roughly 10 to 3 days ago** (from Covid ActNow https://www.covidactnow.org/us/new_mexico-nm?s=1170284)
 - Eddy ~ 13%
 - Lea ~ 12%
 - Roosevelt ~13%
 - Curry ~ 11%
 - Chaves ~10%
 - Hidalgo ~ 10%
 - Dona Ana ~9%
 - Luna ~ 9%
- These positivity rates are ***not consistent with good situational awareness***. EpiGrid predictions for these counties have a possibility of being low estimates because a larger proportion of cases are not being identified as cases. This increased the difficulty of correctly modeling those counties.

Situational Awareness: Heterogeneity, mostly urban vs. frontier/rural

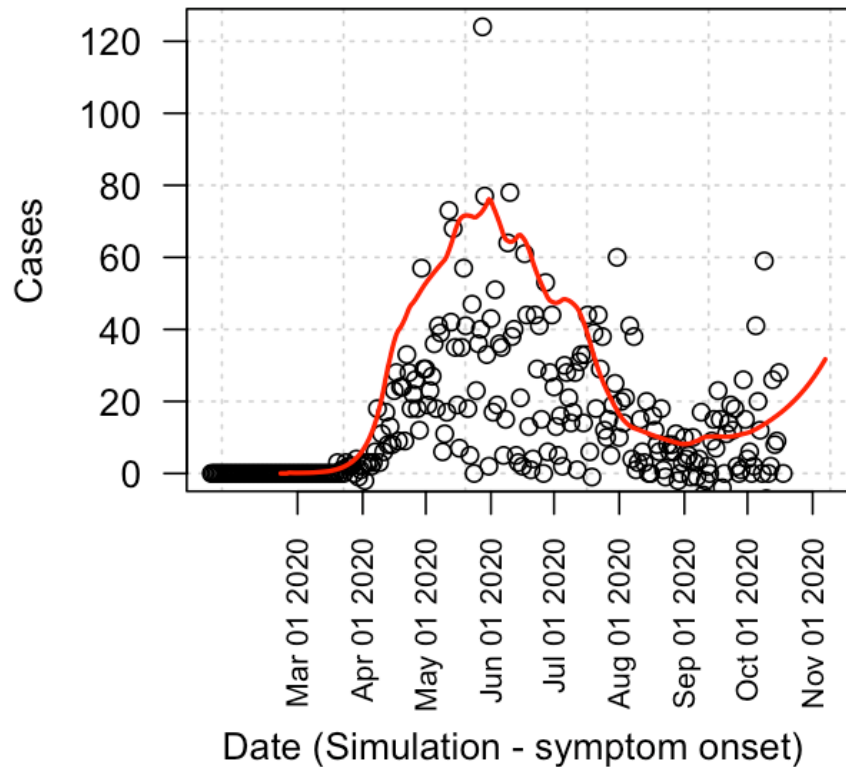
- Dona Ana and Bernalillo appear to be the main drivers of the current state-wide increases in incidence (daily cases). Well above expectation from increased T80 mobility. Geographical spread to other counties has begun and will continue to drive deteriorating rural conditions until better community infection control is achieved.
- Santa Fe has increased transmission like Bernalillo and Dona Ana, but to a lesser extent. Socorro also has increased transmission.
- The Southeast still has high case counts; Eddy continues to have higher transmission relative to mobility than other non-urban counties in the state as was true all summer.
- Lea, Eddy and Chaves are modeled with low quarantine, like due to the long-term high test positivity, meaning many cases are missed, and untraceable.
- Curry County has anomalously high incidence (even in the current unfavorable situation) and likely reflect high-transmission events. If these are not rapidly brought under control in the next week, the fractional incidence should drive discussion of Gallup-like intervention. $150:10^5/\text{day}$ peak, and absolute case numbers, very high.



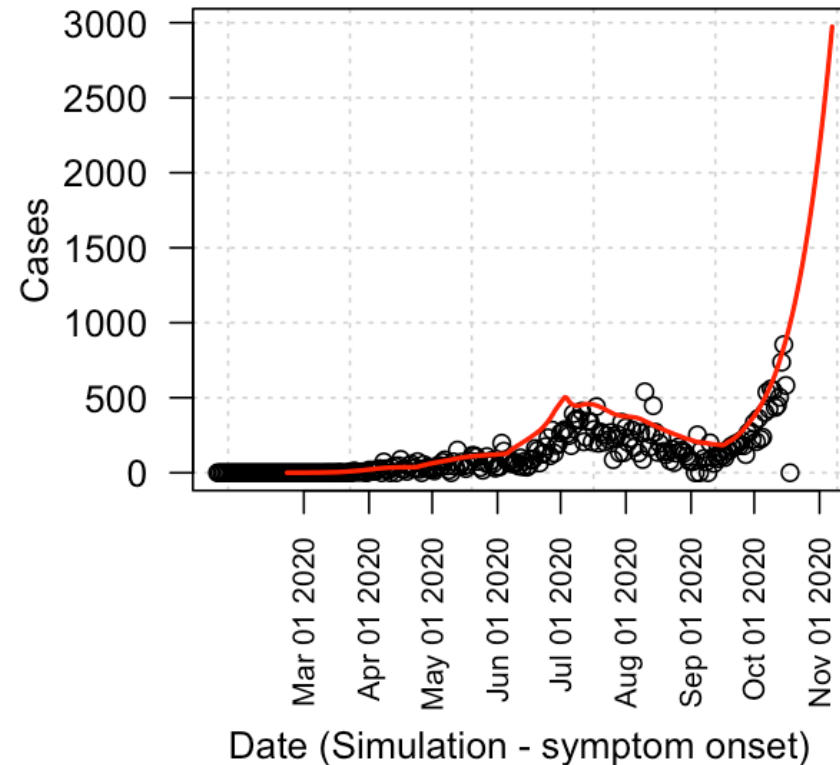
Cases appear to be rising in border counties of importance

(Zero cases for the last time point is an artifact.)

Arizona__Apache

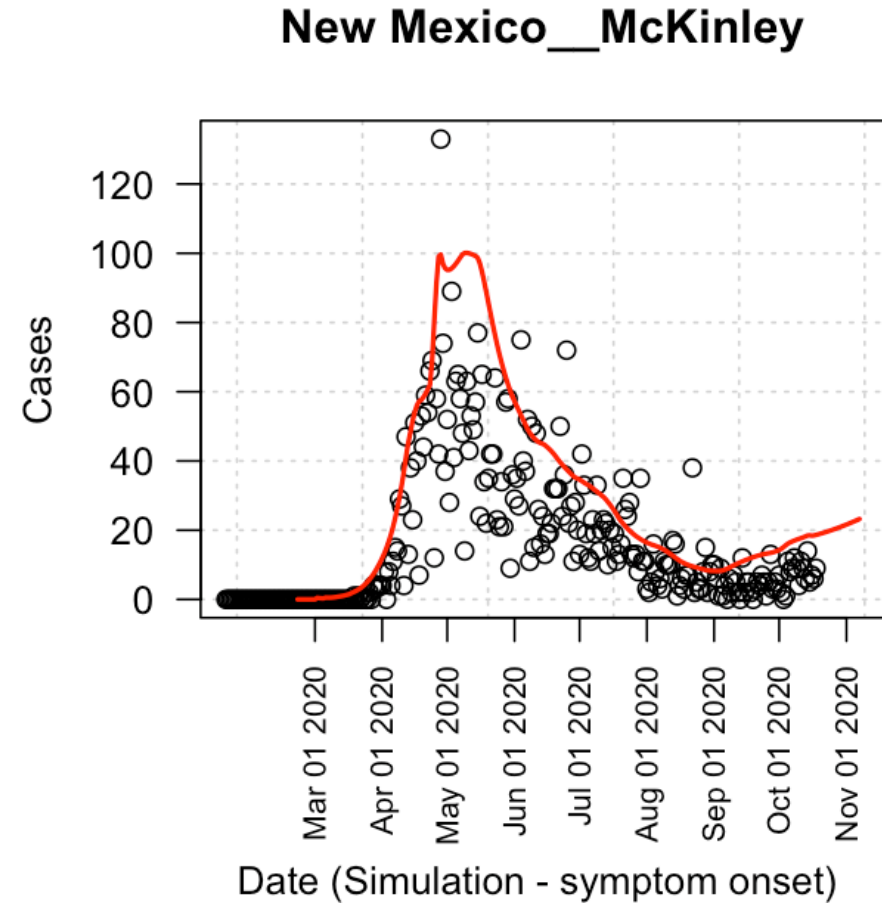
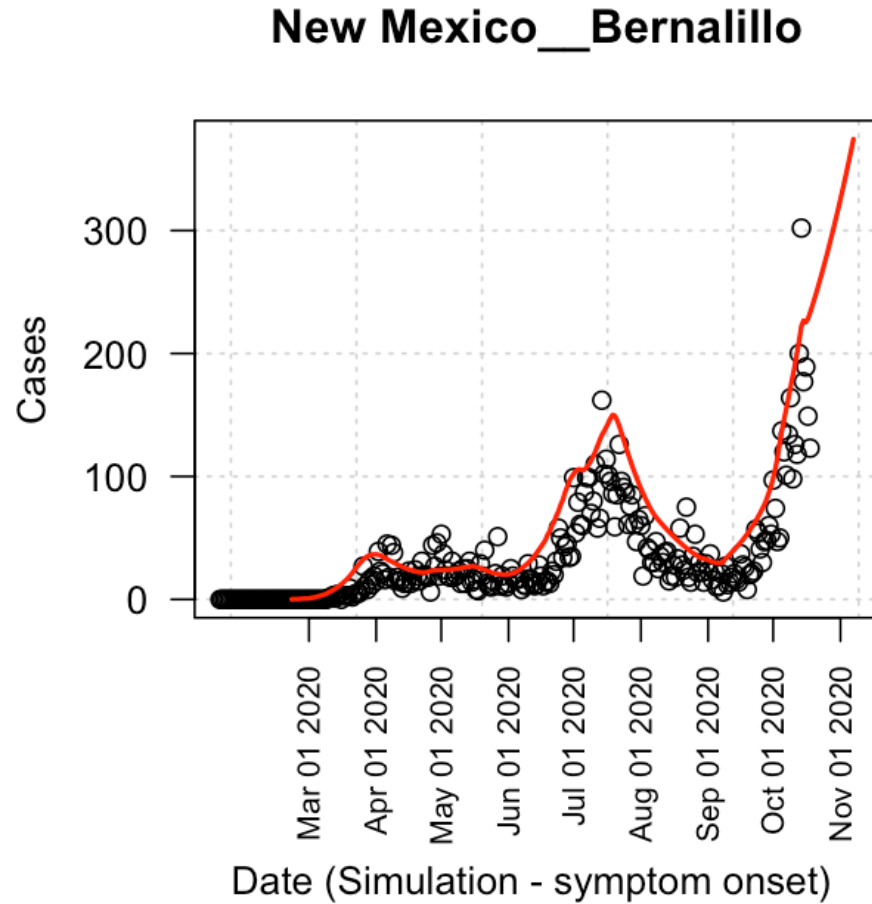


Texas__El Paso



Control in El Paso is likely improving

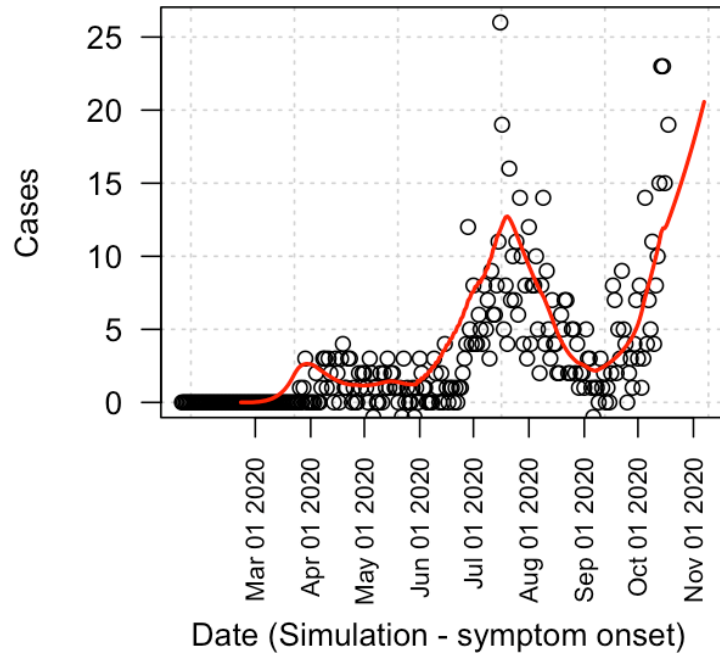
Diversity across the state: currently quantified force of infection



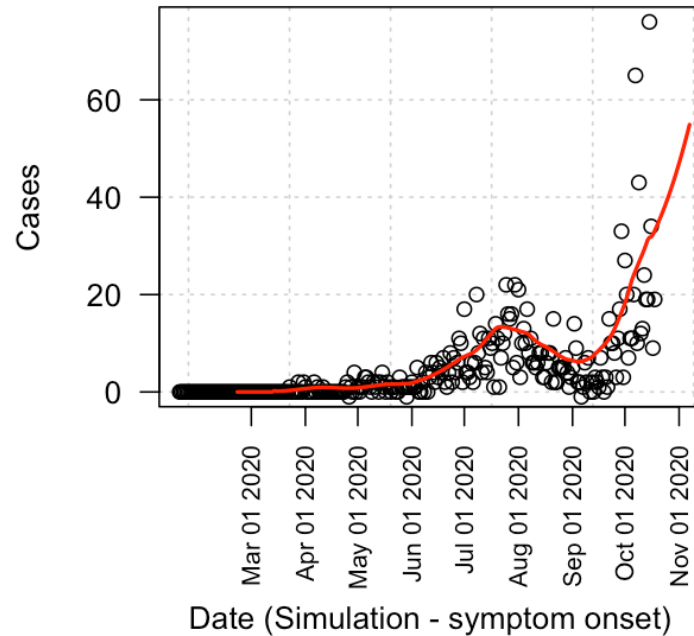
Better outcomes than shown are possible with continuing and improved community infection control

A few other counties

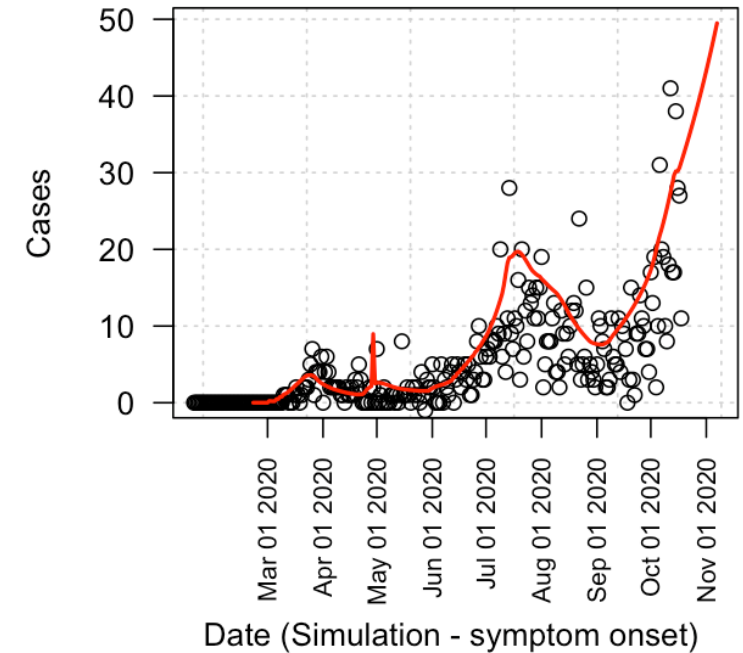
New Mexico__Valencia



New Mexico__Curry



New Mexico__Santa Fe

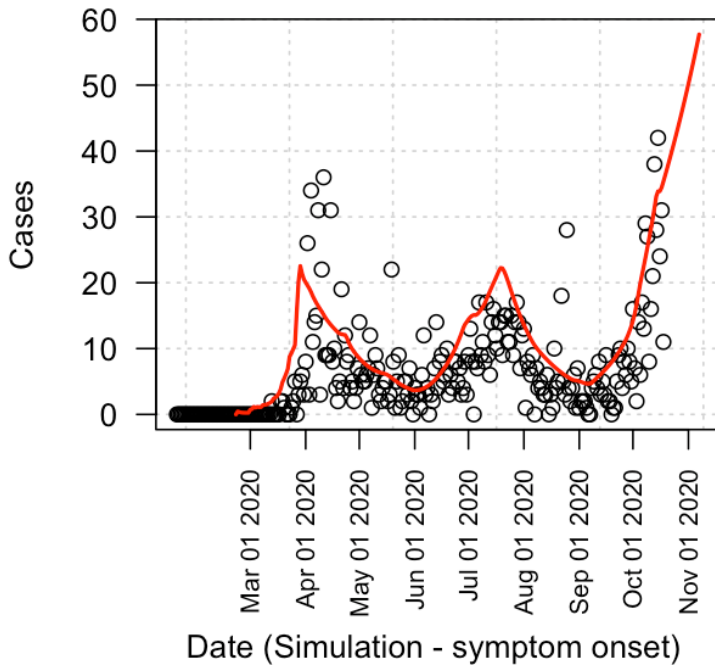


Better outcomes than shown are possible with continuing and improved community infection control

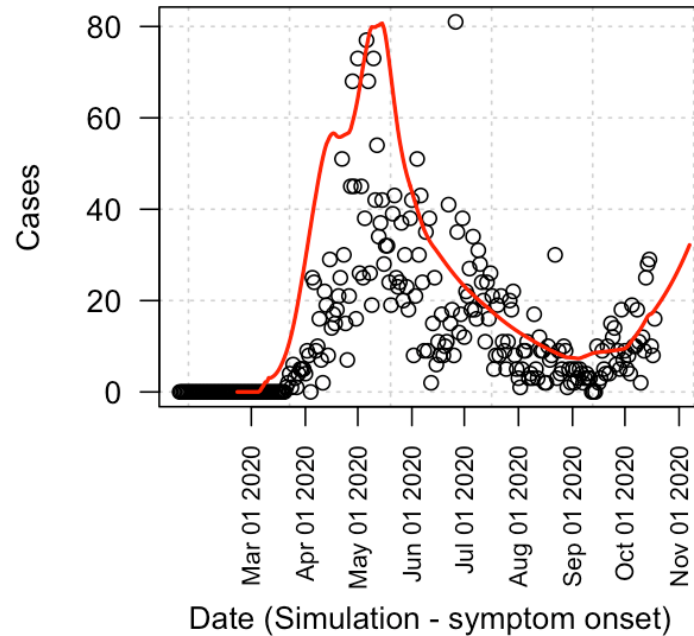
Possibilities for a better outcome over the next two weeks are not necessarily true in Curry County. Excursions-high in the data are large enough that they suggest the possibility of very poor community infection control.

A few other counties

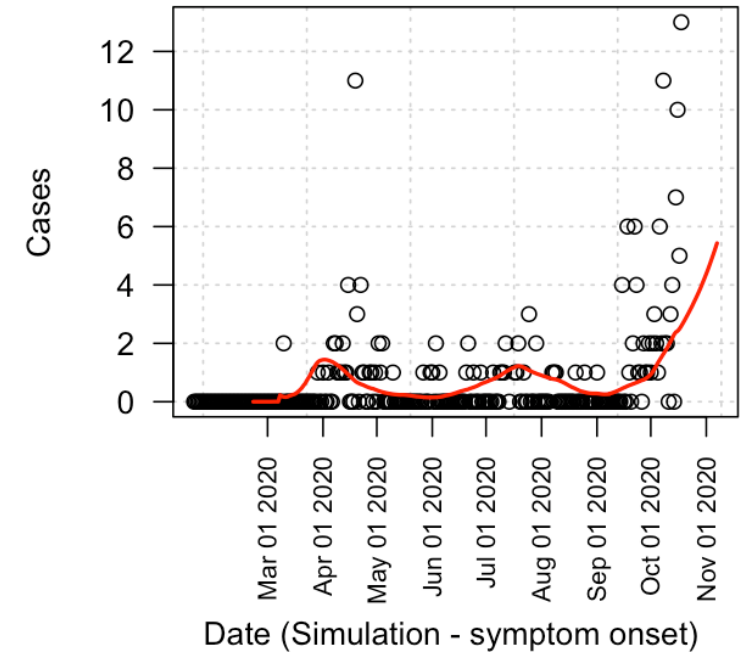
New Mexico__Sandoval



New Mexico__San Juan



New Mexico__Socorro



Better outcomes than shown are possible with continuing and improved community infection control.

Possibilities for a better outcome over the next two weeks are not necessarily true in Socorro County. Excursions-high in the data are large enough that they suggest very poor community infection control.

Observations, Conclusions

- Daily incidence data are consistent with improvement due to the latest Public Health Order (slide 3). Control is not yet achieved.
- One week's further data will bound the extent of improved community infection control from most recent PHO.
- Major metro areas continue to drive increasing daily incidence.
- Deteriorating conditions in frontier counties are still partly being driven by urban areas.
- A few non-metro counties are beginning to see large increases in daily incidence.
- Permian Basin/SE and some other rural areas likely have poor situational awareness.
- Degradation of contact tracing will not be reversed immediately upon improved control. Tracing has been fundamental to epidemic control in New Mexico, avoiding ~50% of onward transmission.
- The current situation remains precarious. Failure to observe improved community infection control will result in >1000 cases/day by November.