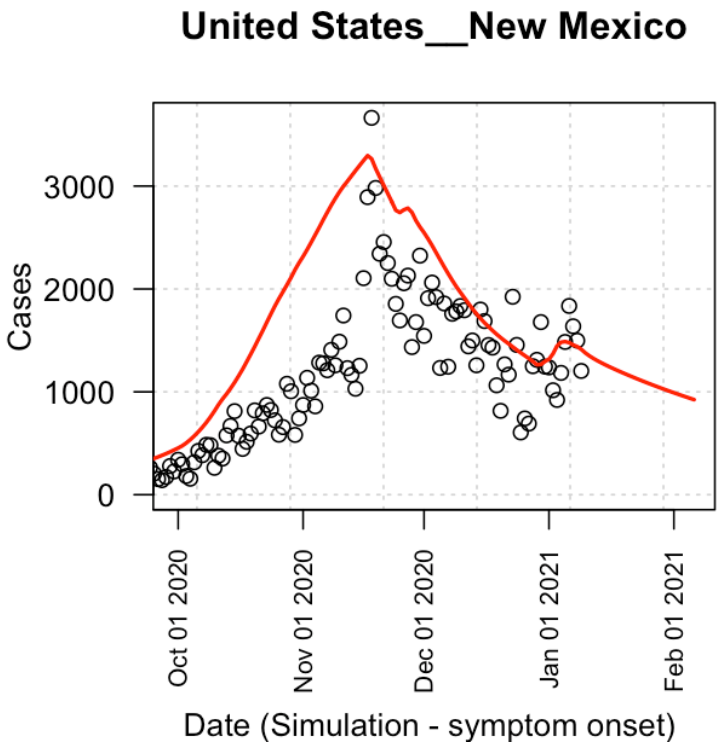
Modeling & Forecasting COVID-19 in NM

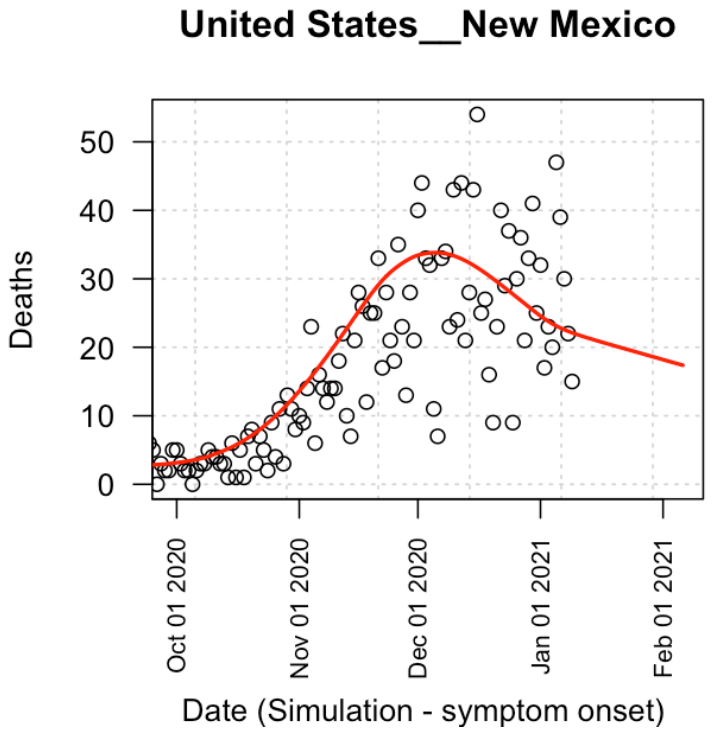
January 12, 2021

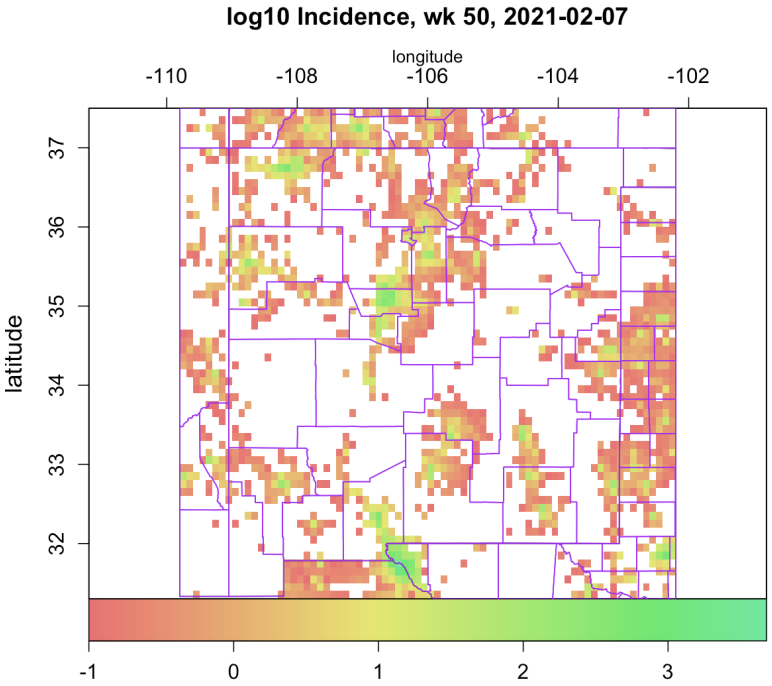
NNSA
National Nuclear Security Administration

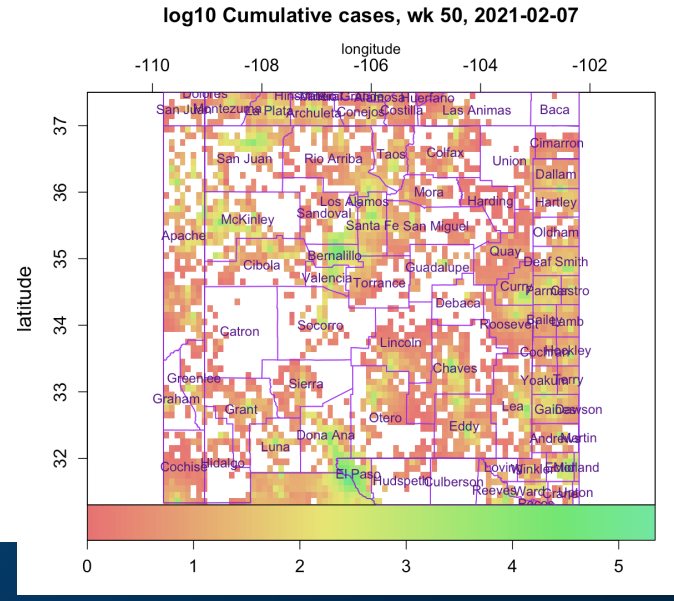
12 Jan 2021: EpiGrid modeling

- Assumes all counties remain “red”. (More precisely we assume that transmission parameters stay as they are.)
- Transmission increases due to Christmas and New Year’s are significantly increased over Thanksgiving (~4x) and a transient 3-4 day reporting delay are assumed.



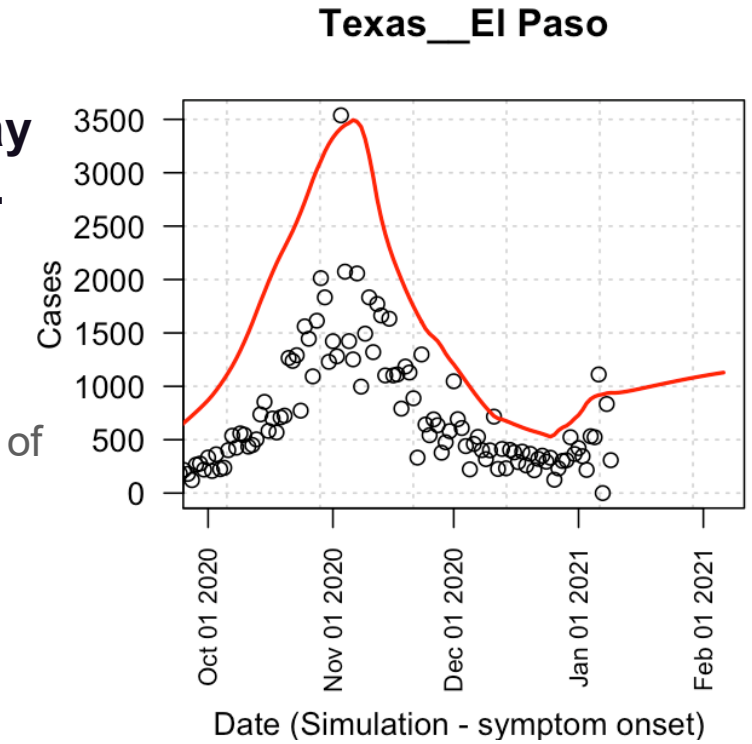






05 January 2021 Model (EpiGrid) – more details and information

- **Daily reported cases in El Paso are no longer declining.**
- **Simulation models vaccination as starting Dec. 15th with 2700 people per day changing to 3200 people per day on Jan 4th and 90% vaccine effectiveness. This results in 76,400 on Jan 11th. The CDC reports 76,773 for NM.**
- **Transmission is based on mobility with modifications due to PHO's.**
  - Modeling of public reaction and public health orders (PHO) is similar to previous models.
  - Geographical heterogeneity of mobility accounts for the majority of variations in the force of infection from county-to-county.
- **Death rates include inhomogeneity, by-county**
  - Counties with higher-risk populations have higher death rates.
- **Isolation and quarantine rates are assumed to be stable.**
  - Swab to results times: Assuming 1-3 days
  - Base isolation rates mostly modeled at 50% Dec. 8th-22nd and 45% afterwards (quarantine times slower later).
- **Baseline results do *not* reflect B.1.1.7 (N501Y/"Kent") variant of SARS-CoV-2**
  - Potential for a 50% increase in contagion/force of infection.
  - Caveats apply, non-flat age distribution of cases, higher viral titers but no increased pathology apparent.
  - No clear epidemiological evidence for widespread B.1.1.7 in New Mexico at this time.

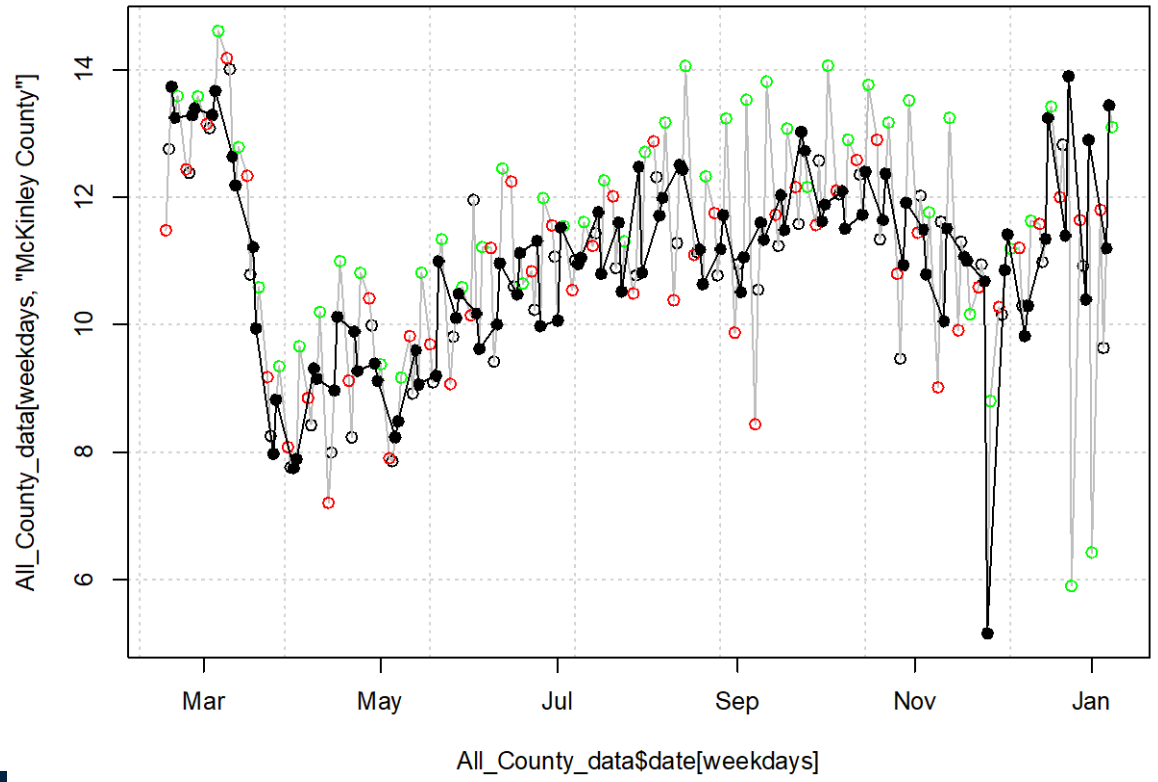


T-80 Mobility – northern counties (Data only).

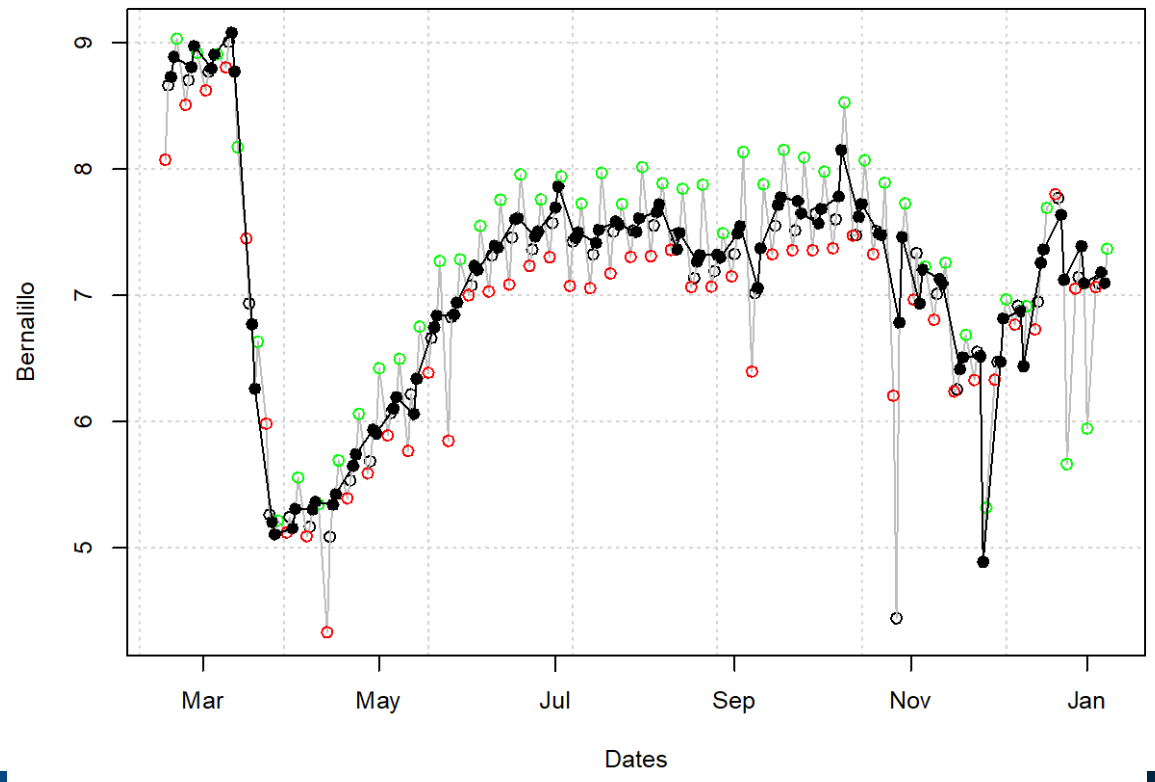
- Bernalillo, Rio Arriba, Sandoval, and San Juan are similar with relatively low mobility compared to summer.
- McKinley, Los Alamos, Santa Fe, Taos, and Valencia have variable mobility which appears to be higher than the first set on average.

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

McKinley



Bernalillo

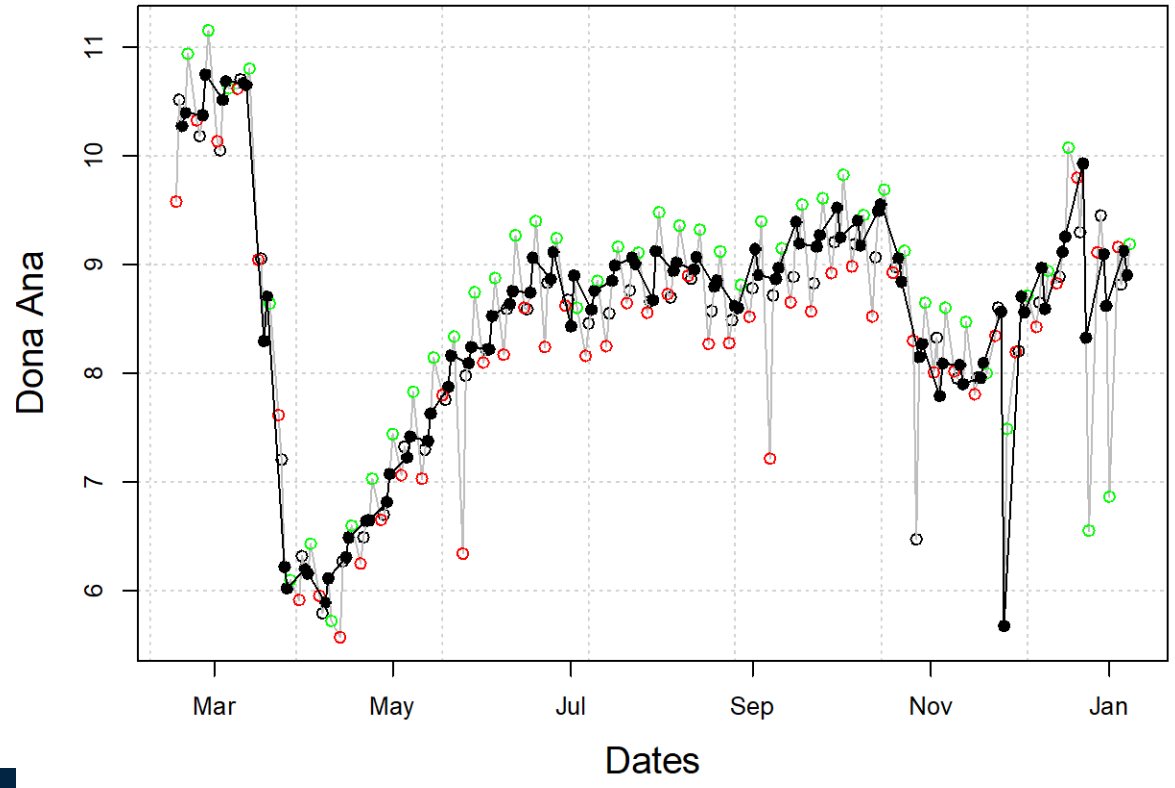


T-80 Mobility – southern counties (and Curry) (Data only)

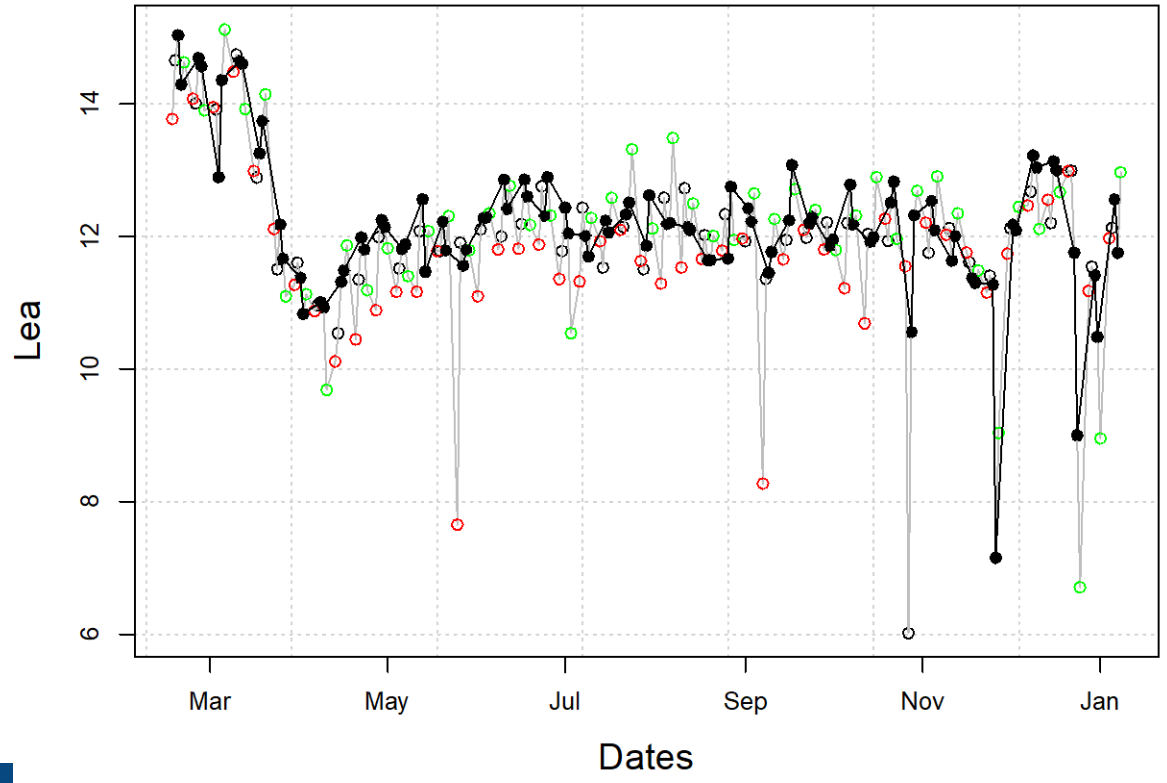
- Eddy, Luna, Roosevelt lower than summer
- Curry, Dona Ana, Grant barely lower than summer
- Lea, Socorro, Chaves, Lincoln similar to summer

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

Dona Ana



Lea



Fundamental Considerations for Vaccination Objectives. Effects Modeled.

0. EpiGrid reflects vaccination.

- Analysis greatly aided by access to by-time and by-location data (county, or finer resolution). Currently matching cumulative NM vaccinations reported by the CDC.

1. Reduce the death rate. Time frame ~4 weeks to initial effects with Pfizer. No evidence yet – based on epidemiological data – of a reduction in CFR or IFR.

- Early administration to high-risk populations and individuals at elevated risk of mortality (immediately after 1a).
  - At-risk and often congregated populations in multi-generation housing, etc.
  - People living with ESRD, DMII, COPD, etc.
  - 65-and-over years of age, *see recent TX directives for vaccination* after group 1a (older populations).
- *These populations are driving hospital load, and mortality.*
- High risk-for-mortality populations are *widely distributed* and preferential administration is unlikely to inhibit other objectives.

2. Lower the rate of spread. Connectivity-based, and geographically-based. Time frame ~3 weeks to see initial effects with Pfizer.

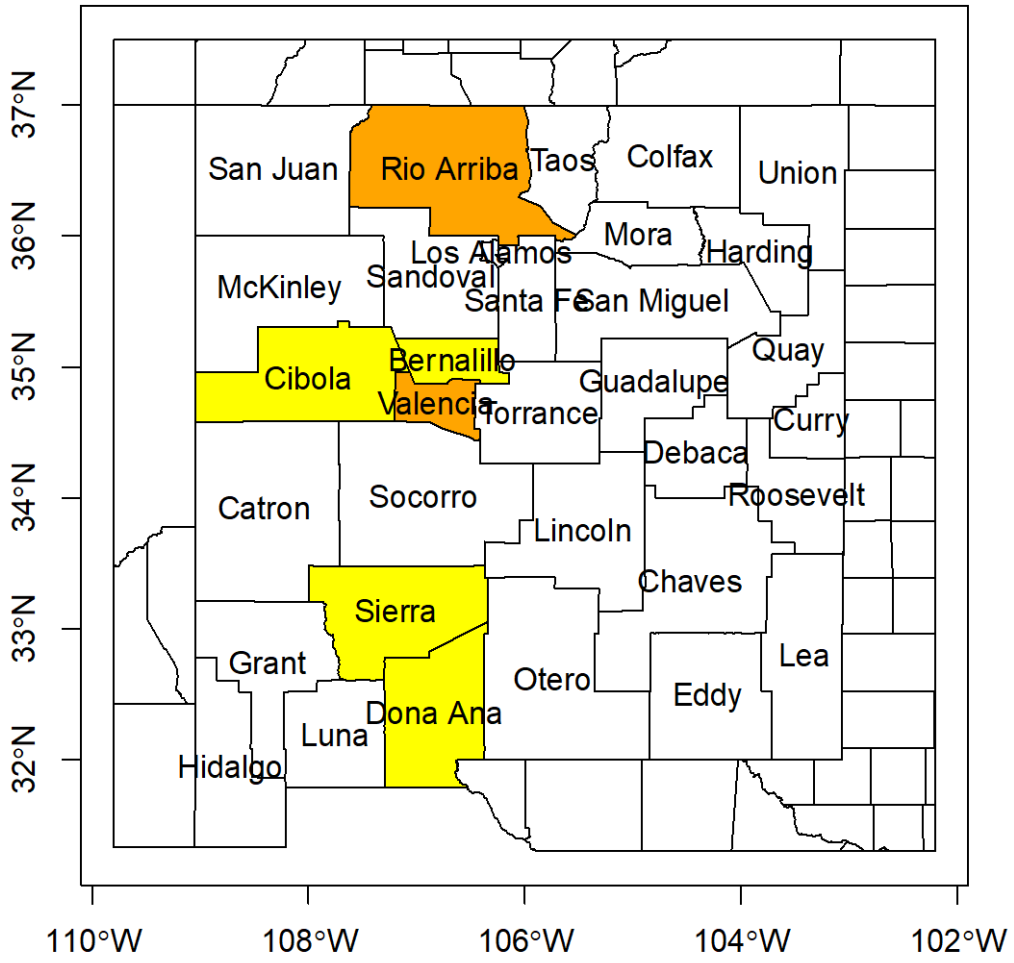
- Initial (threshold-discernable) effects on epidemic growth rate are present in NM's EpiGrid *model*. No confirmation yet, but suggestive.
- The existence of geographical hot-spots (N.B. Top 10 Zip Code list) allows targeting of other demographic contributors to risk of transmission.
- Employment description is correlated with daily contact rate and associated demographic risk factors (i.e. income, etc.).
  - Targeting job that are *high-transmission* will automatically select for the most significant risk during stemming from high-contact work.
  - "Front-line" vs. "essential". Essential works may in some cases be low-risk.

3. Achieve vaccine-mediated herd immunity. Time frame determined by integrated vaccine production and administration.

- Because vaccine-mediated herd immunity can go well beyond the extinction threshold, this creates an opportunity for the elimination of COVID.
- Recent events in the B.1.1.7 (N501Y & assoc. mutations) point out the extraordinary utility of elimination *as distinct from* epidemic "control".
- The presence of B.1.1.7 in the US may create a race between strain replacement and vaccination to avoid undesirably outcomes.

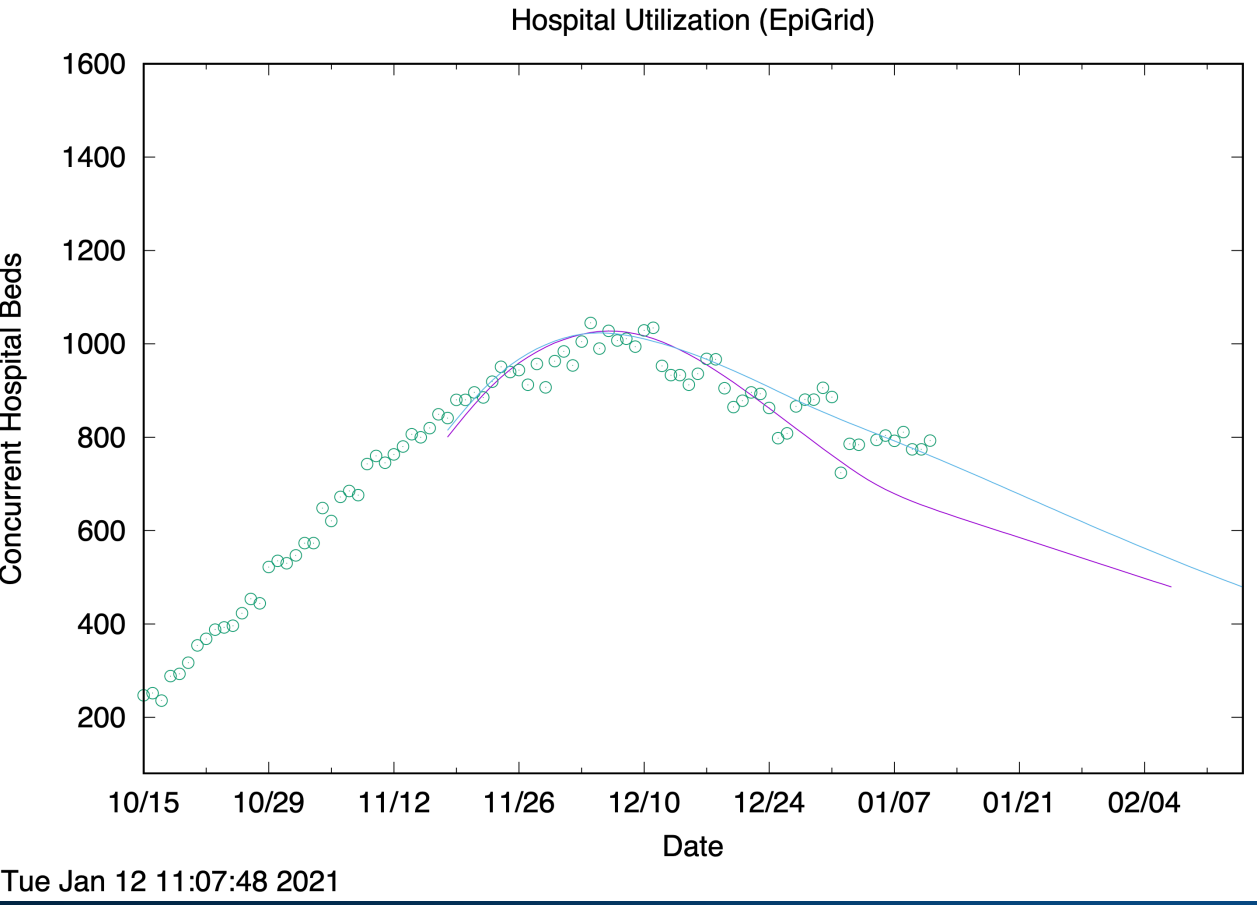
Situational Awareness by County:

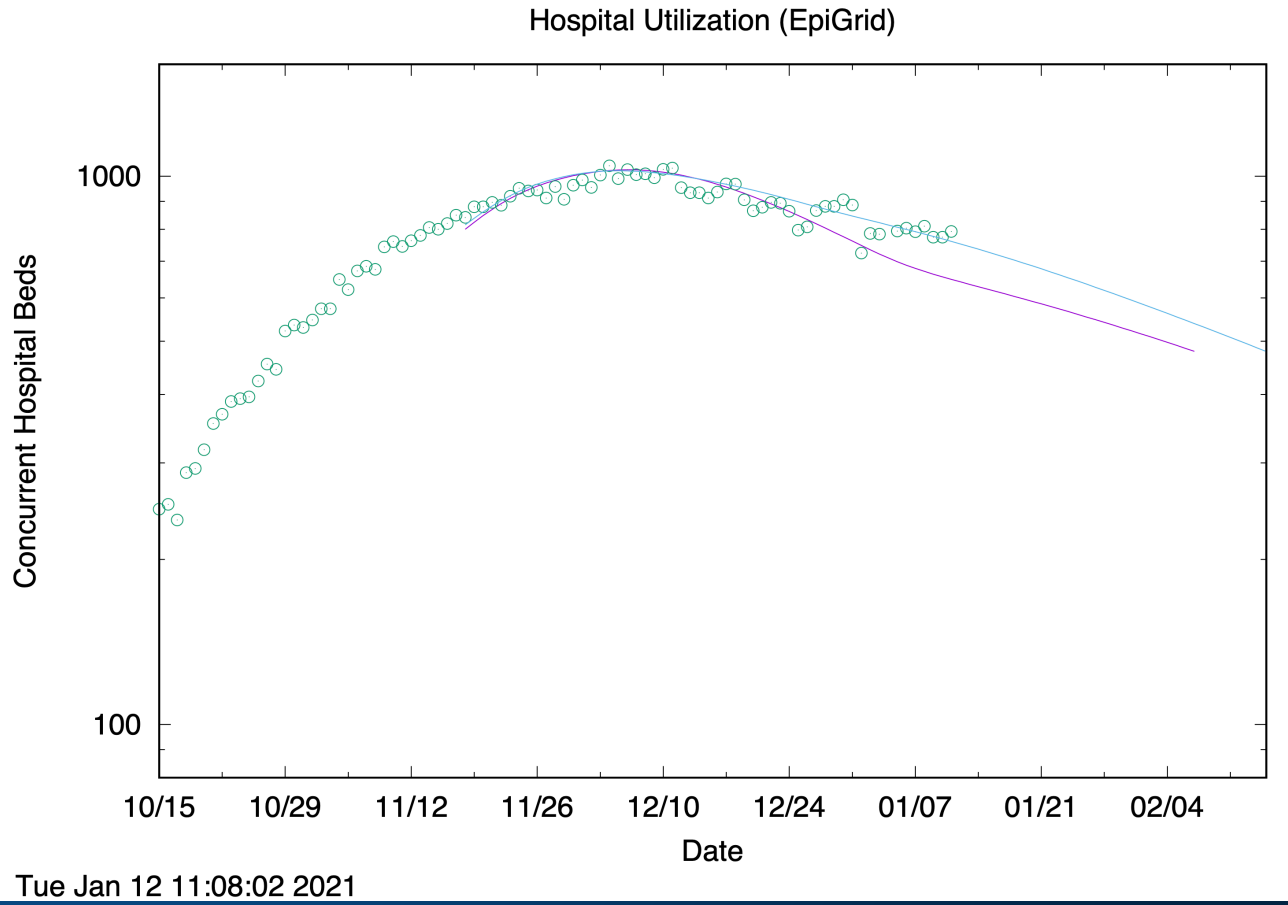
- Rio Arriba and Valencia have significantly increased transmission compared to what is expected from mobility.
- Bernalillo, Cibola, Dona Ana, and Sierra have slightly increased transmission compared to what is expected from mobility.



Hospital bed concurrent usage by COVID-19 patients

- Left panel: Linear vs. time shows hospital utilization. Current (lower) model and 15 December 2020 model (upper, cyan).
- Right panel: Log vs. time, same data and models.
- November 16th PHO and Thanksgiving are now parameterized, Christmas and New Year's are 4-5x Thanksgiving.





Conclusions and Discussion

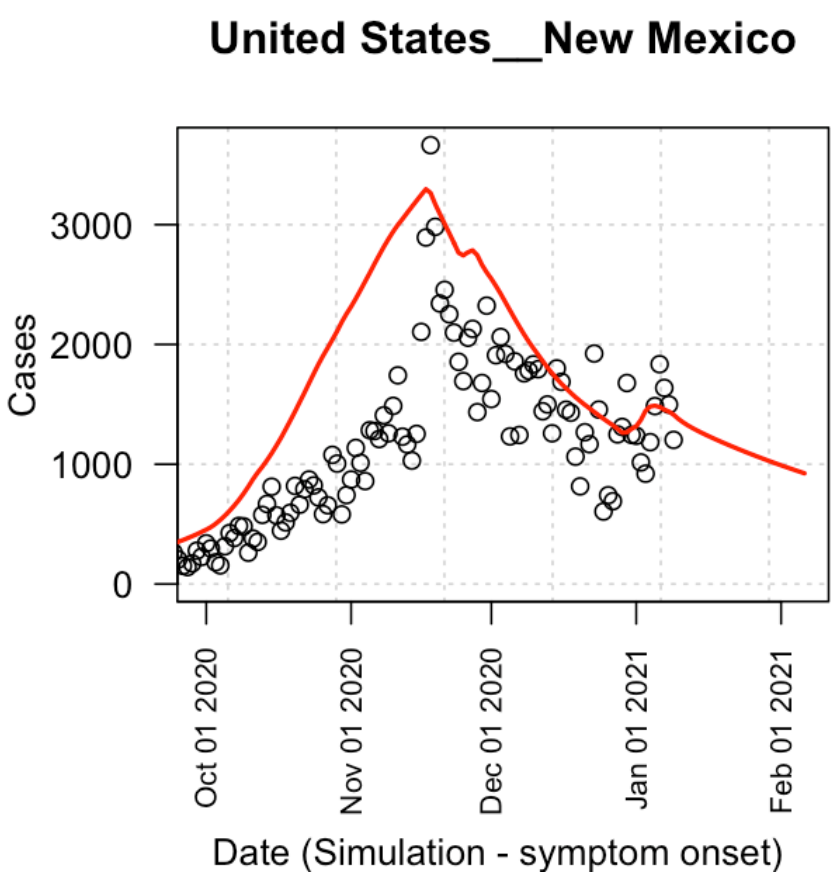
- New Mexico's epidemic spread appears stable at a high incidence level.
- **Variant B.1.1.7 (N501Y/"Kent") represents a source of potentially dangerous uncertainty through strain replacement. *Monitoring capable of detecting B.1.1.7 spread in New Mexico should be a priority.***
- **El Paso's daily incidence has risen over the last week.**
- Nationwide geographical dispersion likely a significant source of cross-state seeding of local transmission.
- Bernalillo's role driving ICU need/requirements is less important compared to statewide resources than in the past.
- NM Test positivity remains above 7%. >~10% recently.
- The effects of vaccination are detectable in New Mexico's Epigrid *model*. Confirmation not yet achieved.
- Targeting vaccine to high-mortality areas and populations will have the largest immediate effect on this model.
- Hospital loading appears predictable for ~1 month with error bars comparable to daily variation in incidence.
- Discussion:
  - Vaccinating high risk-of-mortality populations will lower the mortality rate *and* further lower hospital loading.
  - Schools are highly mitigated, elementary school provides little evidence for in-school spread with the current viral strain. SARS-CoV-2 strain B.1.1.7 represents a potential risk to in-person schooling plans. Improved PPE might be required, etc.
  - There is not yet clear epidemiological evidence for a more contagious variant of SARS-CoV-2 in New Mexico. This is not a warning system.
  - There is an urgent need for a capability to detect B.1.1.7. The level of contagion may be 1.5x that of the current "Milan" strain that dominates in the US and NM.
  - Qualitatively higher testing rates (i.e. 10x) can substantially offset local epidemics (i.e. South Korea) by facilitating tracing and quarantine. Sequencing can provide diagnostics, and provides variant-level information that is likely to become important in the near future, and is compatible with high testing rates.

Hybrid schools *vs.* no schools: using 12 Jan 2021 EG model (update)

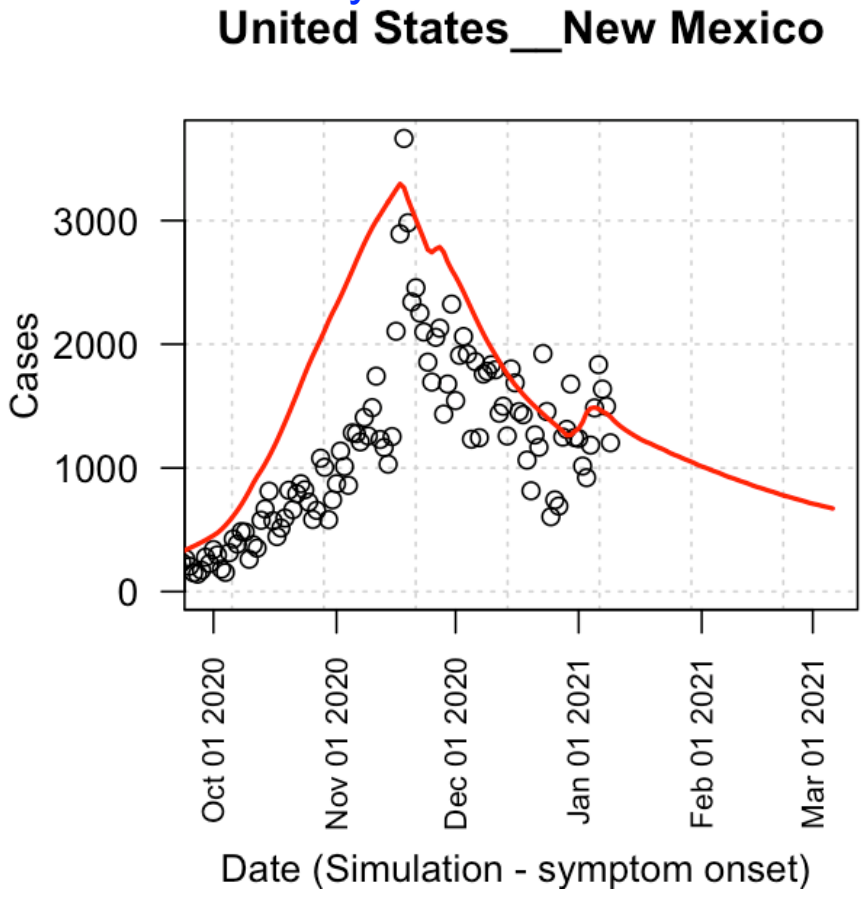
Schools have a small effect (increased cases):

- Compare red curves near intersection of grid lines at 1000 cases/day and ~Feb 2021
- Note time-axis is longer with schools than without
- We are assume the B.1.1.7 variant is not a significantly affecting NM epidemiology at this time

No Schools



Hybrid Schools



Analysis of the impact of vaccinating prisons

Analysis Performed:

- Examined case fatality rate (CFR), an important driver of hospital loading.
  - Compared CFR of prisons with the general public
  - Compared CFR of prisons with long term care facilities
  - Examined the effect of security-level and/or housing-type on CFR.

- Examined cases as a fraction of population as it is suggestive of the rate of spread.
  - Compared fractional disease burden in prisons with the general public
  - Does evidence of detectable spread into the community exist now; may contrast with early pandemic behavior when prisons may have seeded local epidemics.

- Examined relevant literature for support and substantiation, when available.

- Modeled a covid-19 epidemic in a location where 50% of population has already had covid-19. This may reflect the higher burden of disease already found in prisons and detention facilities.

Covid-19 case fatality rate (CFR) in NM prisons: large dispersion

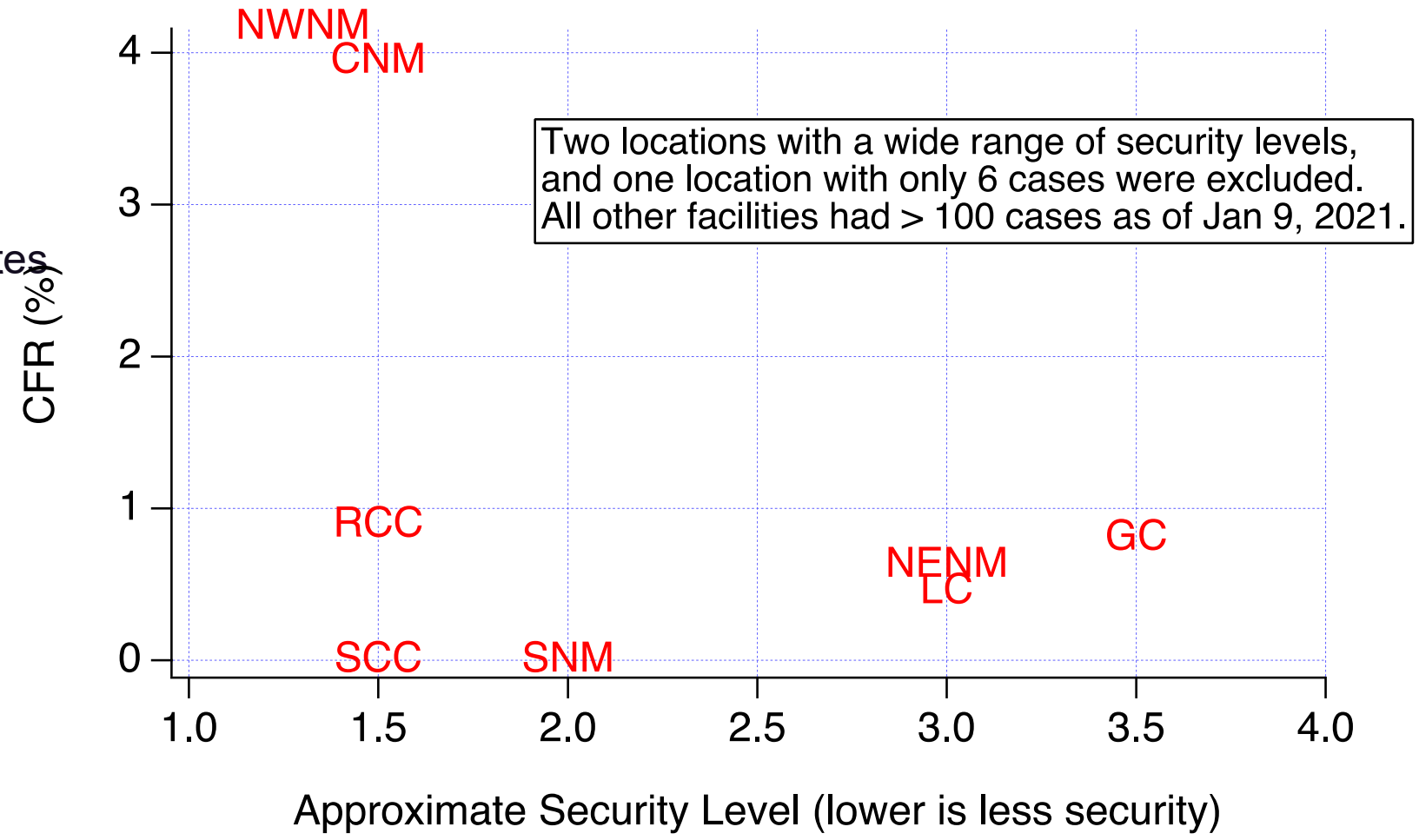
- **CFR is calculated by dividing cumulative deaths on Jan 9th, 2021 by cumulative cases on December 26th, 2020 - a two week delay.**

Facts:

- The two facilities with high CFR's are relatively low-security facilities.
- NWNM prisoners all have release dates <= 1-2 years in the future.
- CNM has a geriatric unit.

Abbreviations:

NWNM; Northwest New Mexico Correctional Facility
CNM; Central New Mexico Correctional Facility
RCC; Roswell Correctional Center
SNM; Southern New Mexico Correctional Facility
NENM; Northeast New Mexico Correctional Facility
LC; Lea County Correctional Facility
GC; Guadalupe County Correctional Facility

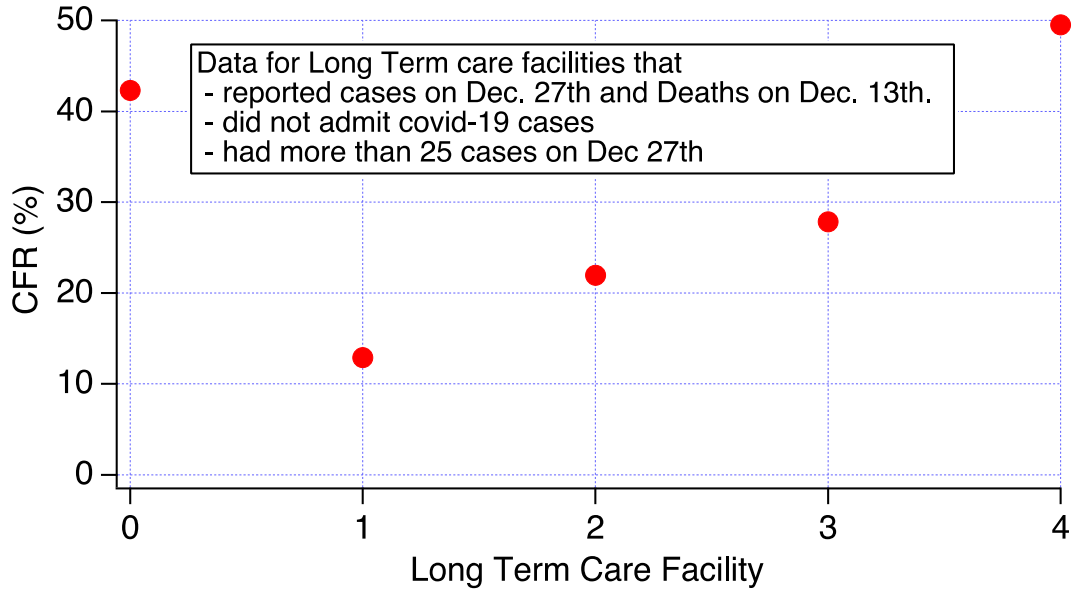


Comparison of prison CFR to long term care and general NM populations

- **The *average* CFR for inmates is 1.1%. This is lower than the ~2% CFR in the general population. The difference could be due to the small fraction of prisoners 65 and over. The percentage of the male population over 65 is 2.5% in prisons** (NEW MEXICO PRISON POPULATION FORECAST: FY 2021—FY 2030; New Mexico Sentencing Commission) **versus ~21.5% of the general population** (https://usafacts.org/articles/population-pyramids-every-state/).

- **The *average* CFR for long term care (LTC) facilities is ~ 31%.**
  - Likely age-correlated differences and conditions, additionally mere residence indicates the potential for pre-existing conditions.
  - CFR's are for NM LTC's that reported cases by Dec. 27th. Deaths were taken from the Dec. 23rd reports.
    - Long term care facility data are from https://data.cms.gov/stories/s/COVID-19-Report-Archived-Datasets/dyvx-s2qr/.

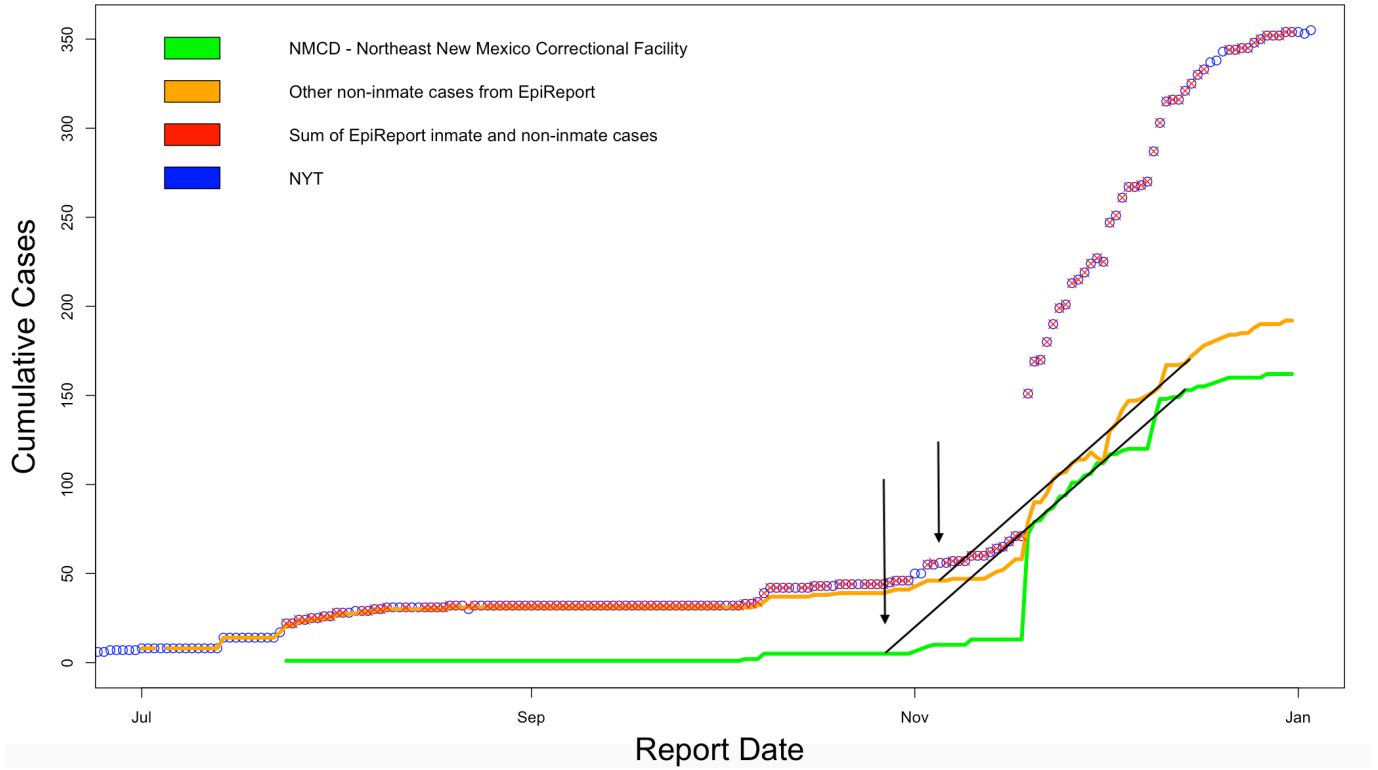
- As with correctional facilities, there is variation in the CFR in long term care facilities
  - We have not investigated potential causes.
  - Selected long term care facility names replaced with numbers 0-4.



Prevalence and spread in prisons and the general population.

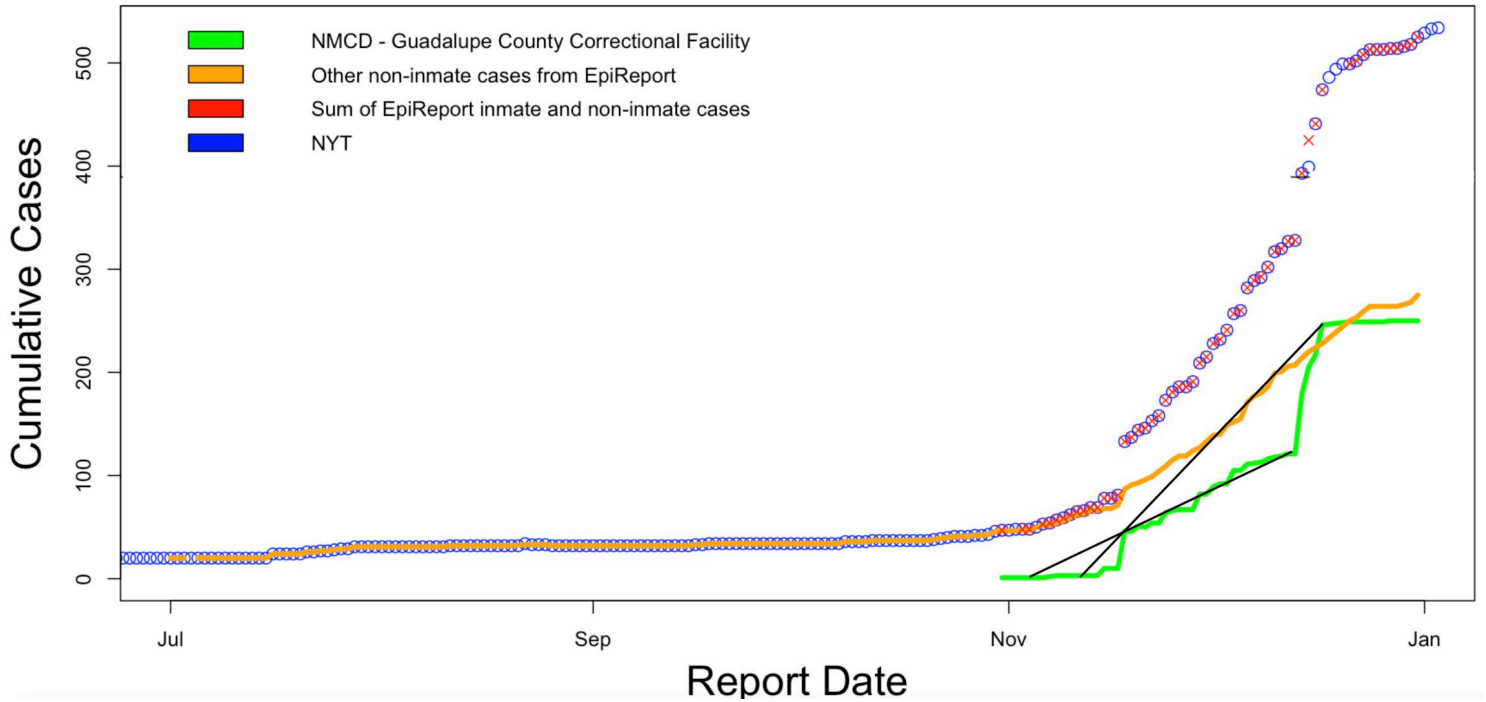
- **Prevalence in dormitory-based housing units is higher than in cell-based housing units**
  - In a descriptive analysis, prevalence was 3 times higher in dormitory units than cell based housing.
    - Hagan et al. "**Mass Testing for SARS-CoV-2 in 16 Prisons and Jails — Six Jurisdictions, United States, April–May 2020". MMWR 69:33 (2020)**
- **Positive cases per 1000 prisoners is > 260 in NM.**
  - Total number of covid-19 cases in NM prisons as of Jan 9th is 2227 (https://cd.nm.gov/COVID-19%20Updates/)
  - NM state prison population Jan 8, 2020 was 5,962. https://cd.nm.gov/
  - The calculation of positive cases per 1000 prisoners took into account the fact that the prison population in early 2020 was higher and that there is turn-over in the prisons, about 8518 people have been in NM prisons at some point since covid-19 arrived in NM.
    - 2227/8518*1000 = 261
- **Positive cases per 1000 for NM as a whole is ~74.**
    - 154954/2100000*1000
- **Higher covid-19 rates in the NM prison population is consistent with the literature**
  - Based on data up to July 15th : NM general: 8 per 1000, NM prison: 24 per 1000
    - Lemasters et al, "COVID-19 cases and testing in 53 prison systems" Health and Justice 8:24 (2020).
- **Covid-19 can spread from prisons to general population (Wallace et al. MMWR 2020)**
  - Epidemics in prisons possibly accelerated early pandemic growth.

Time Series of Incidence in Prisons and Counties: Union County



- Suggests that an epidemic in NNMCF (green curve) started in the last week of October (extrapolation), or slightly earlier (exponential vs. linear extrapolation).
- Suggests that increased growth in the community (orange curve) started two weeks later in November (extrapolation), or slightly earlier (exponential vs. linear extrapolation)
- One fatality in NNMCF, CFR apparently consistent with the general population.
- This raises the possibility that ~10 weeks ago, a correctional facility amplified a local epidemic.
- The Union County epidemic was quite small in September through mid-October, making possible amplification by NNMCF more significant than if the Union County burden of disease was higher.

Time Series of Incidence in Prisons and Counties: Guadalupe



- Data from GCCF (green curve) do not provide a clear estimate for the starting case with either a linear to exponential extrapolation back in time. Partly this is due to delays in recognition of cases in GCCF.
- The Guadalupe County epidemic curve (orange curve) is higher than GCCF until >1 month after the epidemic there starts.
- No large deviations in growth rate in the Guadalupe County epidemic curve.
- No clear evidence that 8 weeks ago the GCCF amplified the Union County epidemic.
- Four fatalities in GCCF, CFR about that expected for 250 cases in the general population.
- The GCCF experienced a large epidemic and vaccination would be helpful, but there is no clear evidence vaccinating GCCF in this context is a higher priority than other highly congregated facilities if the goal is infection control or reductions in mortality.

Prison epidemics when a significant population fraction has already had covid-19

There is significant population turn-over in the prison system:

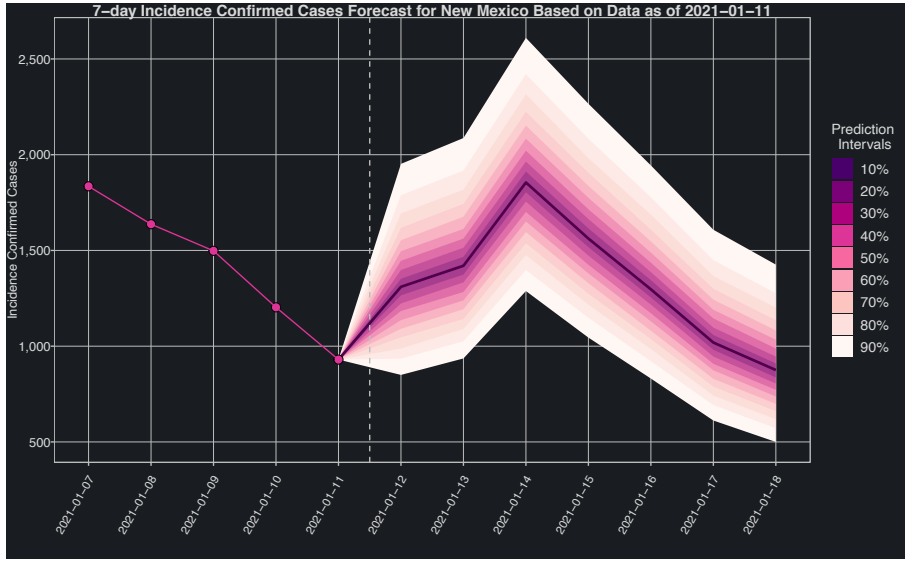
- **Cases per 1000 is difficult to estimate by facility due to variations in turnover rates (and lack of data on individual prison populations), but appears to be lower at higher security facilities.**
  - In some facilities cumulative disease burden is likely > 50%, at others < 15%.
- **Roughly 7.5 % of the population in the state correctional system is expected to turn over in the next 3 months.**
  - The present inmate population is ~6000 (https://cd.nm.gov) and was ~7100 at the start of epidemic (NEW MEXICO PRISON POPULATION FORECAST: FY 2021—FY 2030; New Mexico Sentencing Commission).
    - In Q2 (Oct – Dec), Q3 (Jan-Mar), and Q4 (Apr-Jun) of FY20, ~ 685, 690, and 420 people were newly incarcerated, respectively.
    - Assuming the Q1, Q2, of FY21 are similar to Q4 of FY20, ~420 people will be incarcerated in the next 3 months.
- **In many prison systems, prisoners move to lower security facilities before release, possibly further decreasing the percent of low security prison populations that are immune.**

- **Due to the potential for a high rate of transmission in congregated environments, 50% immunity (acquired through previous infection) does not prevent substantial prison outbreaks.**
  - R0 has been estimated to be 8 in an urban jail (Puglisi *et al*. Annals of Epidemiology 53, 2021)
  - An epidemic with this level of transmission and 50% immunity (due to previous infection) leads to epidemic progression faster than was seen in the general public in September 2020. (Based on simulations with EpiGrid.)

Summary of where and how vaccination would have the biggest effect

- Inmate CFR is likely amenable to being lowered by selective vaccination of at-risk cohorts. Because at-risk cohorts not only experience elevated CFR but also greater hospitalization, targeted vaccination is also likely to reduce the hospital burden arising from inmates with covid.
- Unlike earlier in the pandemic when community spread of covid was comparatively rarer and prison outbreaks common, the high community burden is obscuring inmate's contributions to community spread. (Union and Cibola Counties are possibly the most recent examples of prisons causing detectable changes in community epidemiology). Prisons could potentially still play a role in amplifying new SARS-CoV-2 variants if infection control is ineffective, but this is not yet demonstrated.
- Cohorts to consider for covid-19 vaccination:
  - NWNMCF appears to have low fractional disease prevalence (normalized to capacity/beds), but a high CFR/death rate. Assuming this high CFR is accurate (i.e. not due to a lack of testing, or our estimation of the inmate population being incorrect due to inmate movement), vaccination at this facility would preferentially lower prisoner mortality, reduce hospital bed requirements, and might lower the rate of disease escape with inmate release.
  - Vaccination of inmates at the CNMCF geriatric unit could substantially lower the prisoner mortality rate from COVID-19 and reduce the demand for hospital beds.
  - Vaccination of geriatric-age inmates in all NM facilities would similarly lower CFR and hospital loading.
  - In the event that there was renewed evidence for substantial community seeding of covid case from prison infections, preferential early vaccination should consider prioritizing dormitory-style correction facilities because of their higher spread rates.

Short- & Long-Term Forecast for NM: Cases



6–Week Forecast of Confirmed Cases for New Mexico Based on Data as of 2021–01–11

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)^	Worst Case (95th Percentile)
2021–01–11		157,087*	
2021–01–18	163,187	166,428	170,971
2021–01–25	169,522	176,356	185,847
2021–02–01	175,797	186,639	201,804
2021–02–08	181,626	197,245	218,823
2021–02–15	186,853	208,041	236,641
2021–02–22	191,483	218,968	256,169

*Last reported confirmed cases count
^Closest–matching scenario

6–Week Forecast of Daily Average of Confirmed Cases for New Mexico Based on Data as of 2021–01–11

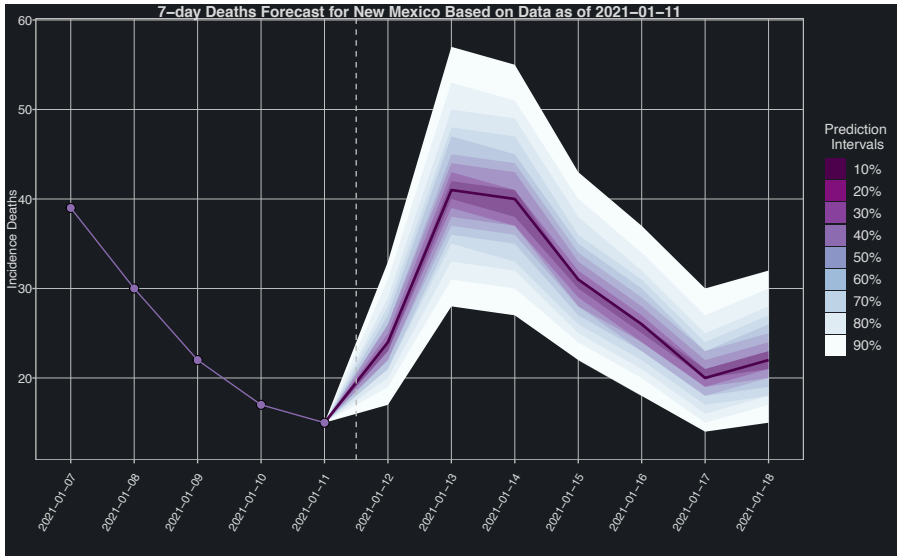
Week	Best Case (5th Percentile)	Middle Case (50th Percentile)^	Worst Case (95th Percentile)
2021–01–11		1,396*	
2021–01–18	871	1,334	1,983
2021–01–25	905	1,418	2,125
2021–02–01	896	1,469	2,280
2021–02–08	833	1,515	2,431
2021–02–15	747	1,542	2,545
2021–02–22	662	1,561	2,790

*Last reported confirmed cases count
^Closest–matching scenario

So what?

Our model suggests that the number of daily cases will continue to go up in foreseeable future

Short- & Long-Term Forecast for NM: Deaths



6–Week Forecast of Deaths for New Mexico Based on Data as of 2020–11–16

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile)^
2020–11–16		1,236*	
2020–11–23	1,301	1,360	1,425
2020–11–30	1,379	1,505	1,670
2020–12–07	1,462	1,668	1,976
2020–12–14	1,541	1,837	2,351
2020–12–21	1,613	2,006	2,769
2020–12–28	1,677	2,163	3,233

*Last reported deaths count
^Closest–matching scenario

6–Week Forecast of Daily Average of Deaths for New Mexico Based on Data as of 2020–11–16

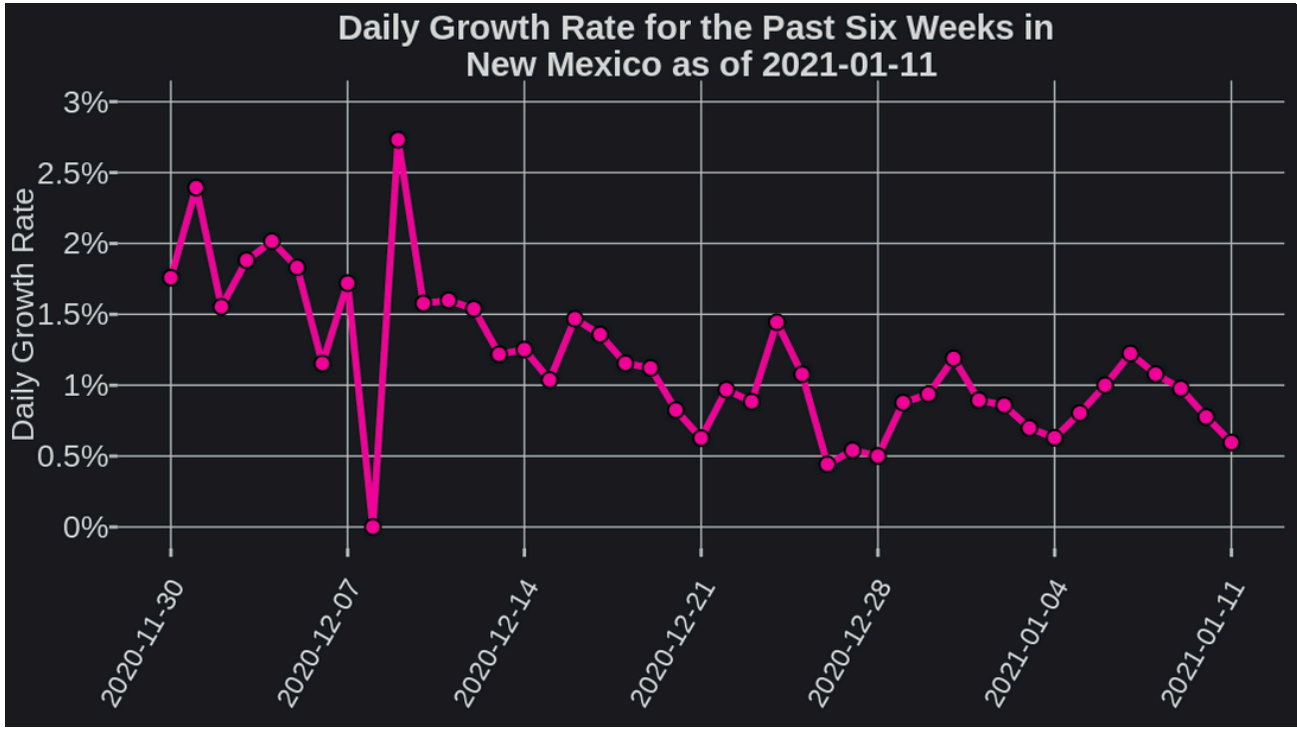
Week	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile)^
2020–11–16		15*	
2020–11–23	9	18	27
2020–11–30	11	21	35
2020–12–07	12	23	44
2020–12–14	11	24	54
2020–12–21	10	24	60
2020–12–28	9	22	66

*Last reported confirmed deaths
^Closest–matching scenario

So what?

The daily number of deaths will continue to go up in the foreseeable future

Growth Rate for NM



6-Week Forecast of the Average Weekly Growth Rate for New Mexico Based on Data as of 2021-01-11

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)^	Worst Case (95th Percentile)
2021-01-11		0.92%*	
2021-01-18	0.55%	0.83%	1.2%
2021-01-25	0.55%	0.83%	1.2%
2021-02-01	0.52%	0.81%	1.2%
2021-02-08	0.47%	0.79%	1.2%
2021-02-15	0.41%	0.76%	1.1%
2021-02-22	0.35%	0.73%	1.1%

*Last weekly mean daily growth rate

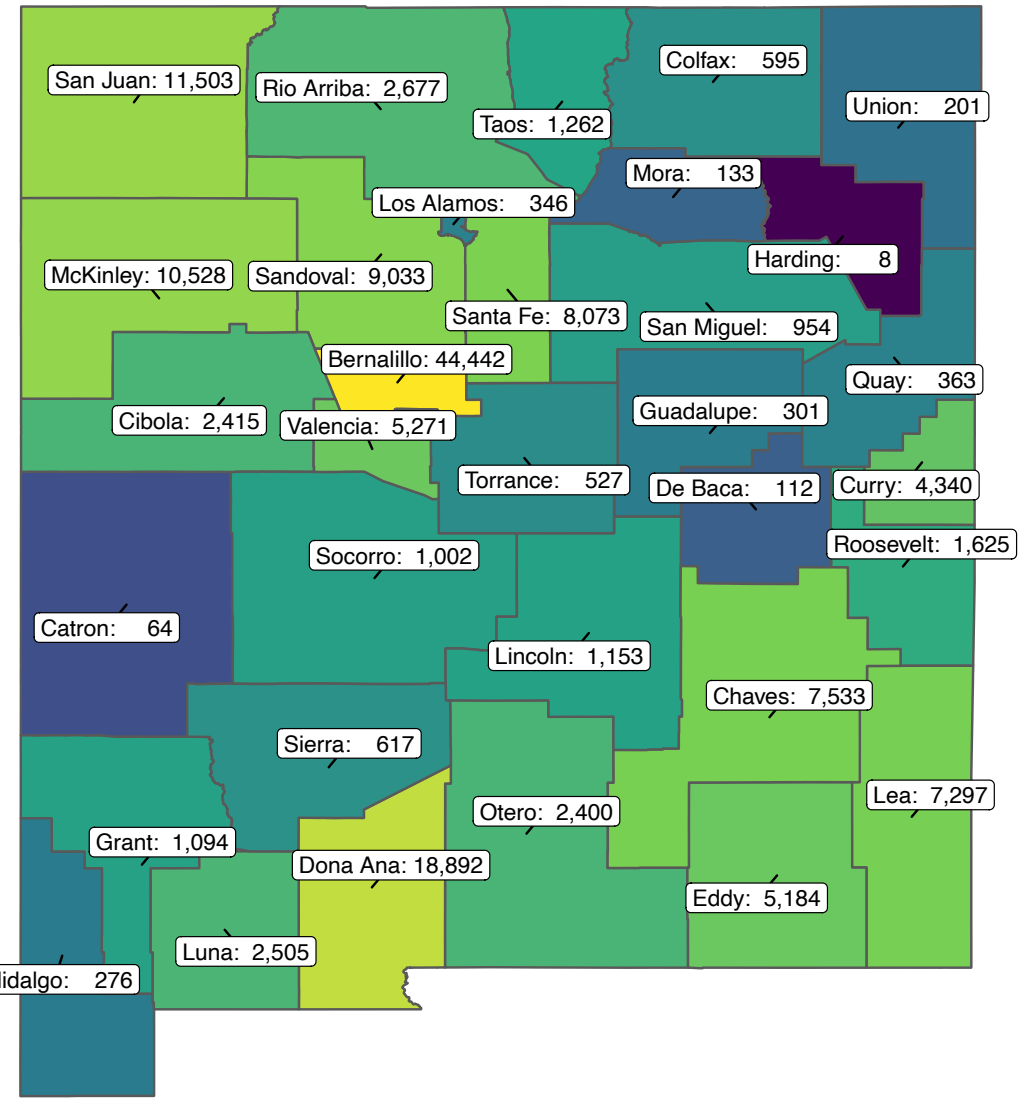
^Closest-matching scenario

So what?

As of January 11th, the average growth rate in NM is at 0.92% (up from 0.87 %)

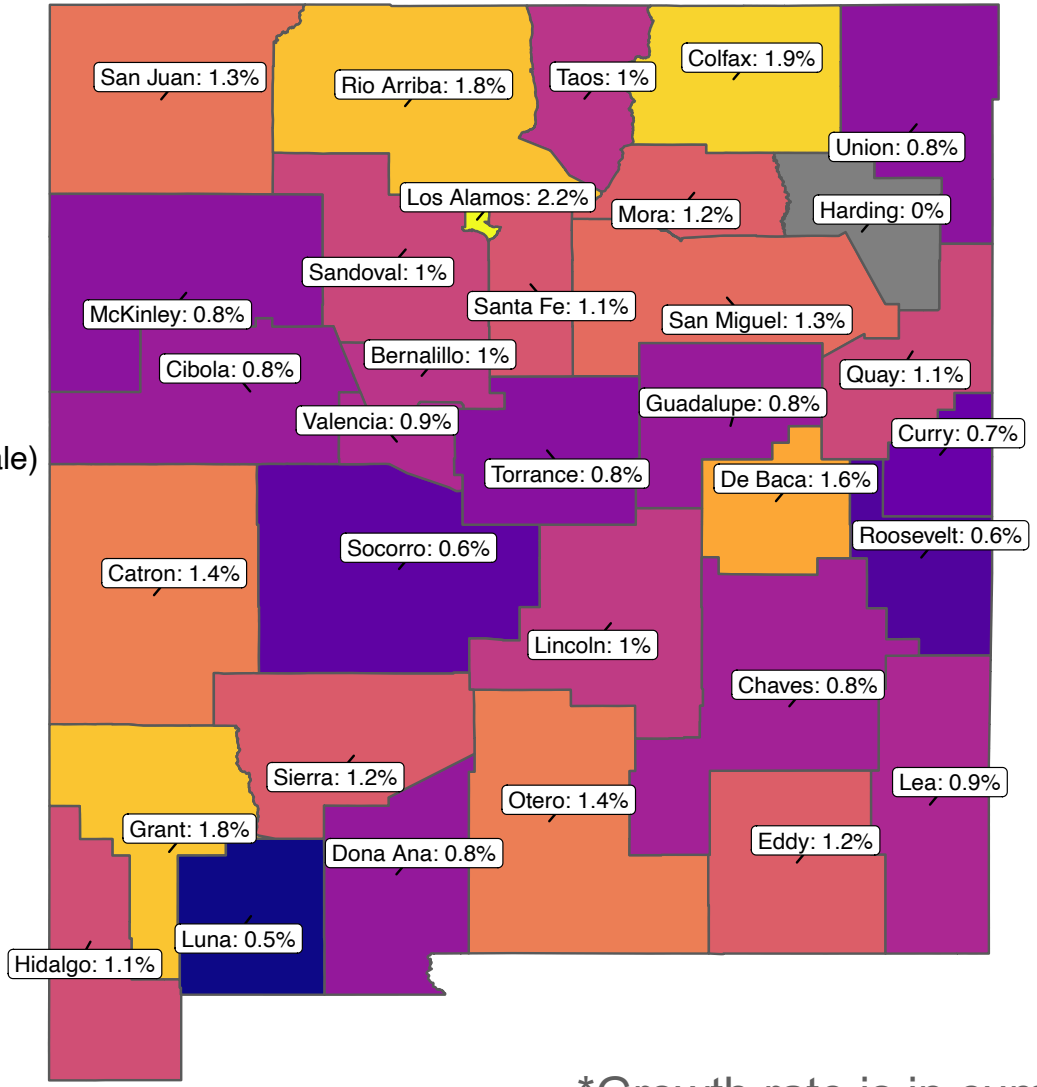
> Growth Rates, & Hospitalizations

Cumulative Cases & Daily Growth Rate for NM: Jan 11



Cases (Log Scale)

22,026
2,981
403
55

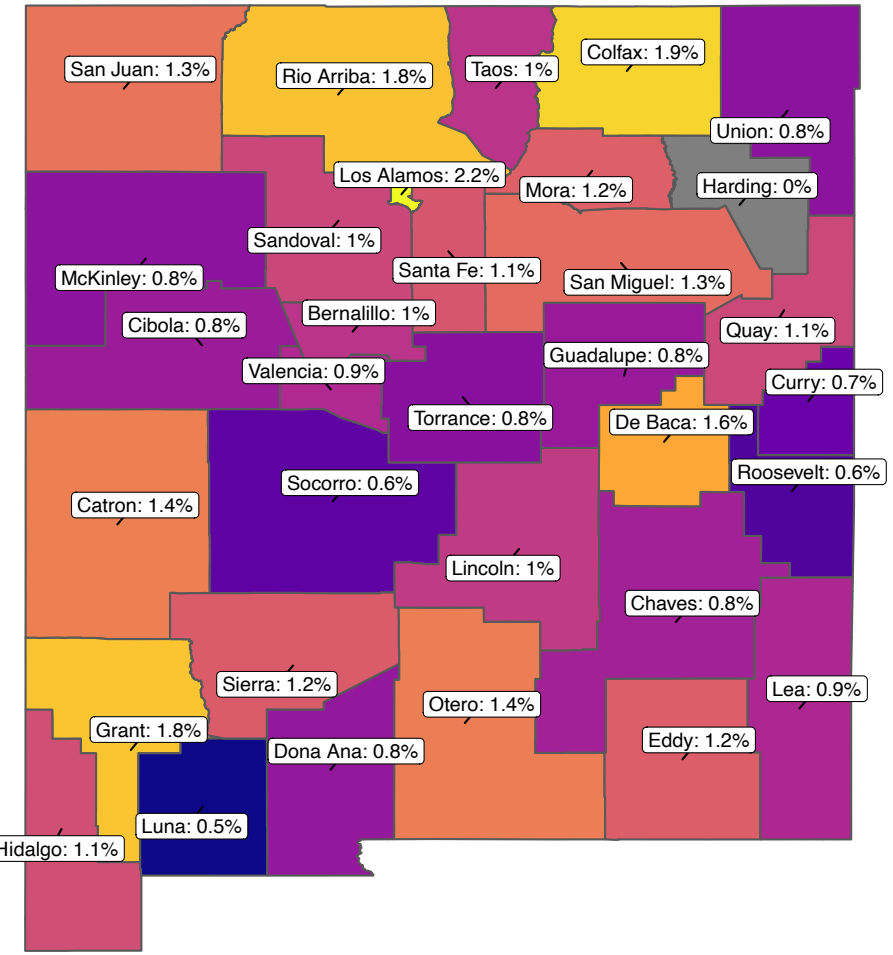


7–day–average daily growth rate (%

2.0
1.0

*Growth rate is in cumulative cases

Daily Growth Rate for NM Jan 11



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

Socorro 0.6% =
Mora **1.2%** ↓
Hidalgo **1.1%** =
Roosevelt 0.6% =
DeBaca **1.6%** ↓
Los Alamos **2.2%** =
Catron* **1.4%** =
Quay **1.1%** =

Union 0.8% ↑
Colfax **1.9%** ↑

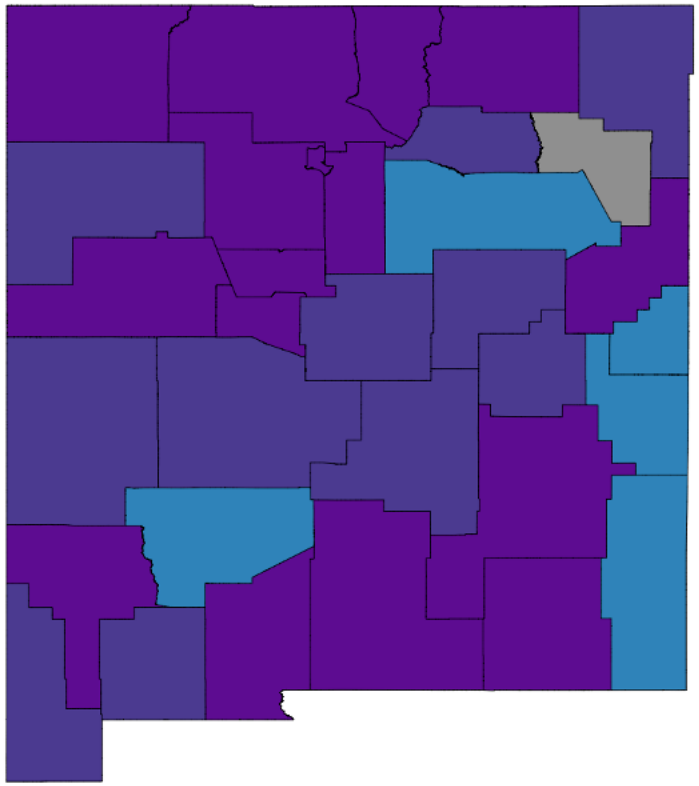
County	Daily Growth Rate	Change
San Juan	**1.3%**	=
Rio Arriba	**1.8%**	↑
Sierra	**1.2%**	=
McKinley	0.8%	=
Sandoval	**1.0%**	=
Santa Fe	**1.1%**	=
Cibola	0.8%	=
Bernalillo	**1.0%**	=
Valencia	0.9%	=
Torrance	0.8%	=
Lincoln	**1.0%**	=
San Miguel	**1.3%**	=
Chaves	0.8%	=
Dona Ana	0.8%	=
Otero	**1.4%**	↑
Lea	0.9%	=
Eddy	**1.2%**	=
Curry	0.7%	=
Grant	**1.8%**	=
Luna	0.5%	=
Taos	**1.0%**	=

Weekly Growth Rate for NM: Another View (Jan 11)

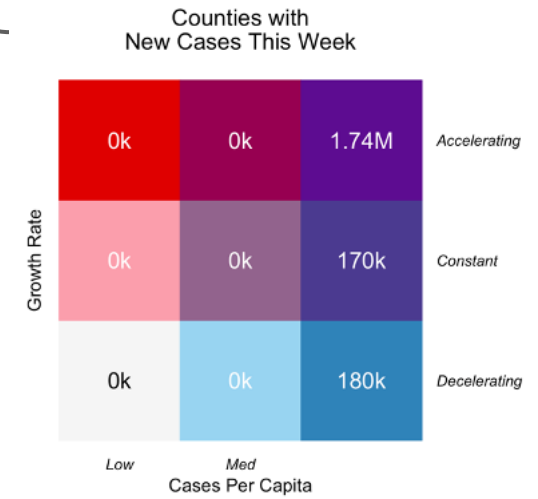
COVID-19 across New Mexico

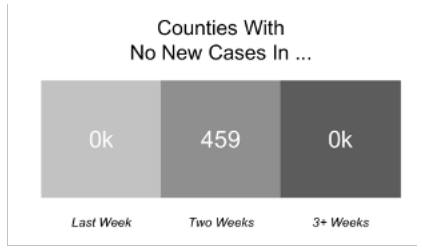
A 7-day moving window comparison

January 11, 2020



Impacted New Mexicans





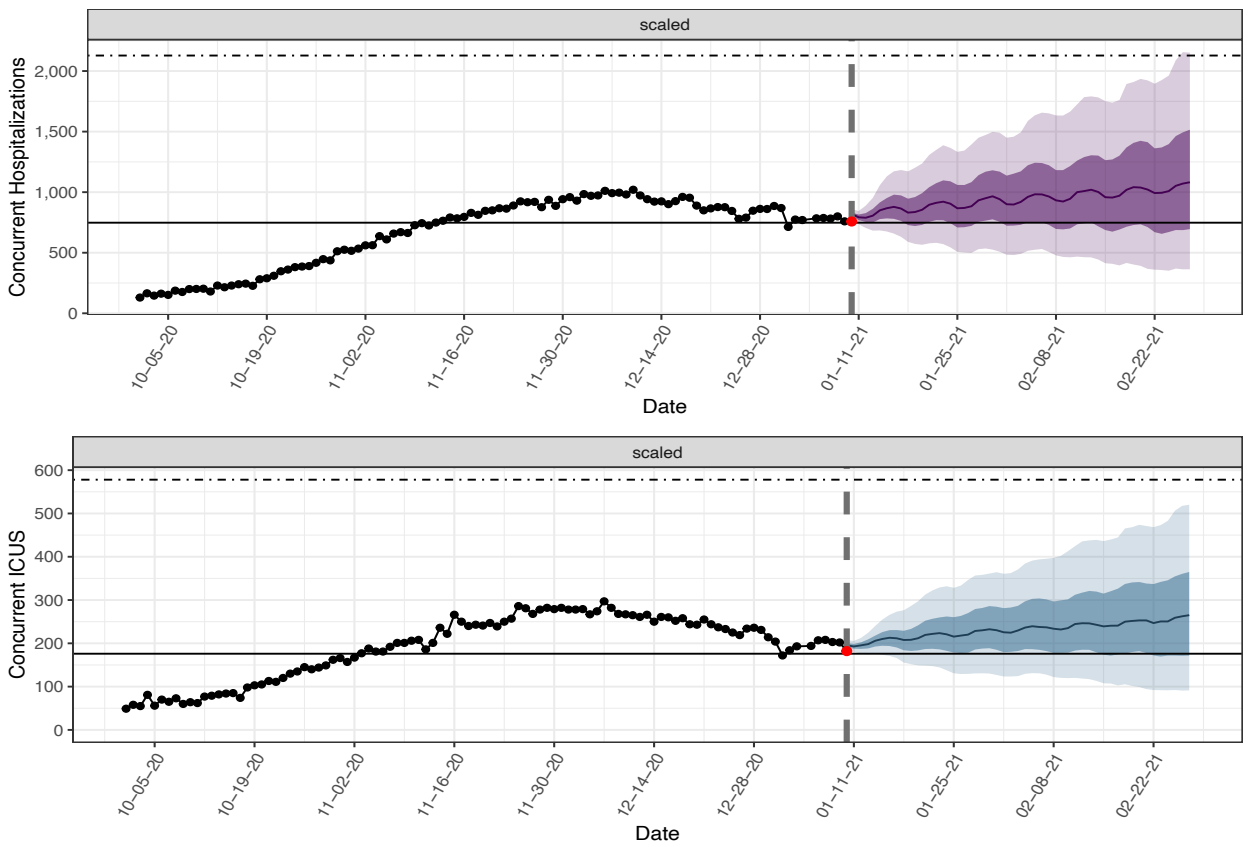
So what?

- Most people in New Mexico are living in a county that is accelerating
- Counties with >500 weekly cases per 100k: Chaves, Cibola, Eddy, Hidalgo, Lea, McKinley, Rio Arriba, San Juan

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 ICUs beds

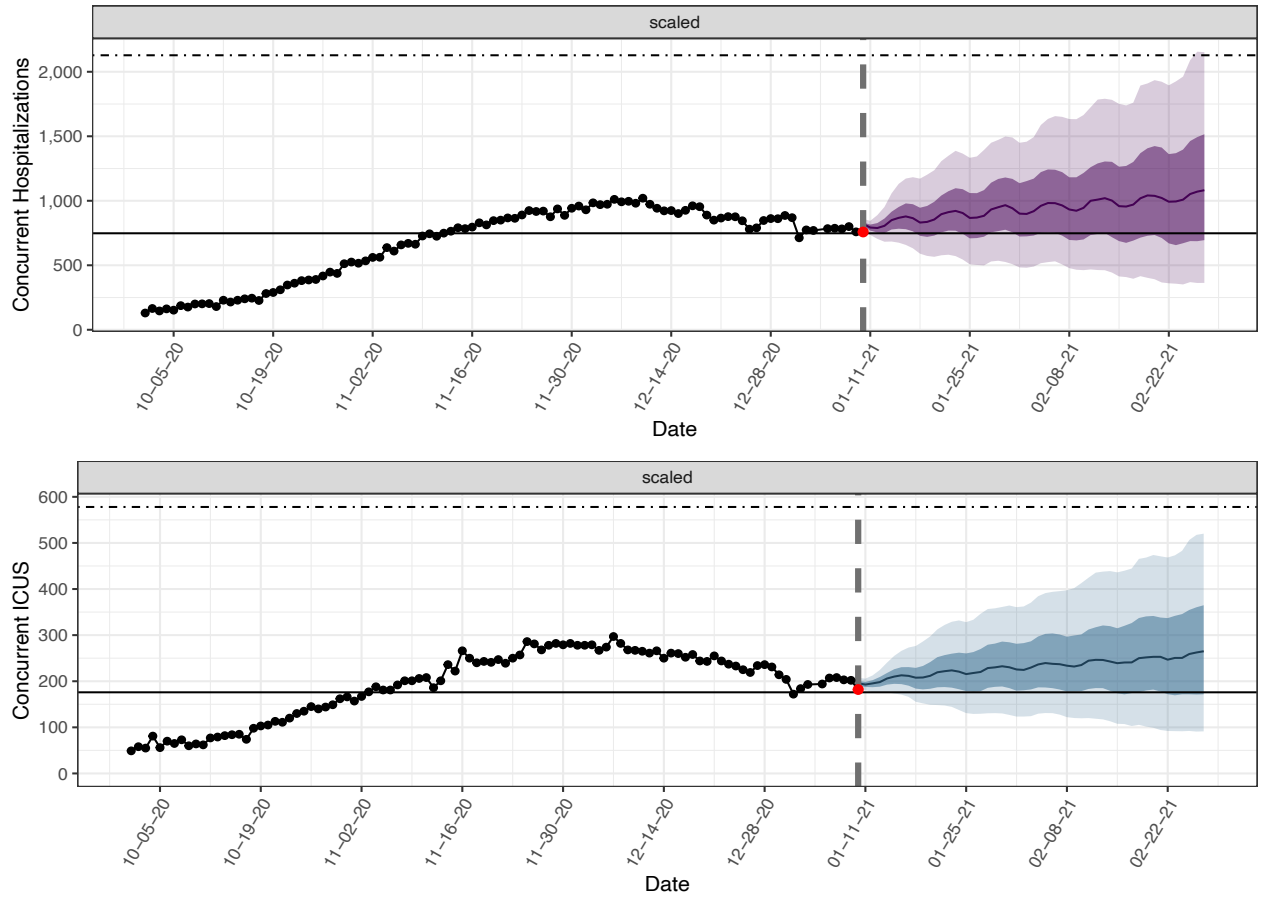
Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
1/17	166	212	273
1/24	138	221	332
1/31	127	230	364
2/7	128	237	395
2/14	113	243	439
2/21	94	253	471

"Scaled" Scenario

So what?

We are over baseline ICU bed capacity for concurrent COVID-19 patients; our model is tracking with the median this week. Model is predicting a gradual increase 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)
1/17	465	653	910
1/24	407	684	1034
1/31	382	712	1126
2/7	379	727	1255
2/14	330	759	1344
2/21	273	769	1452

"Scaled" Scenario

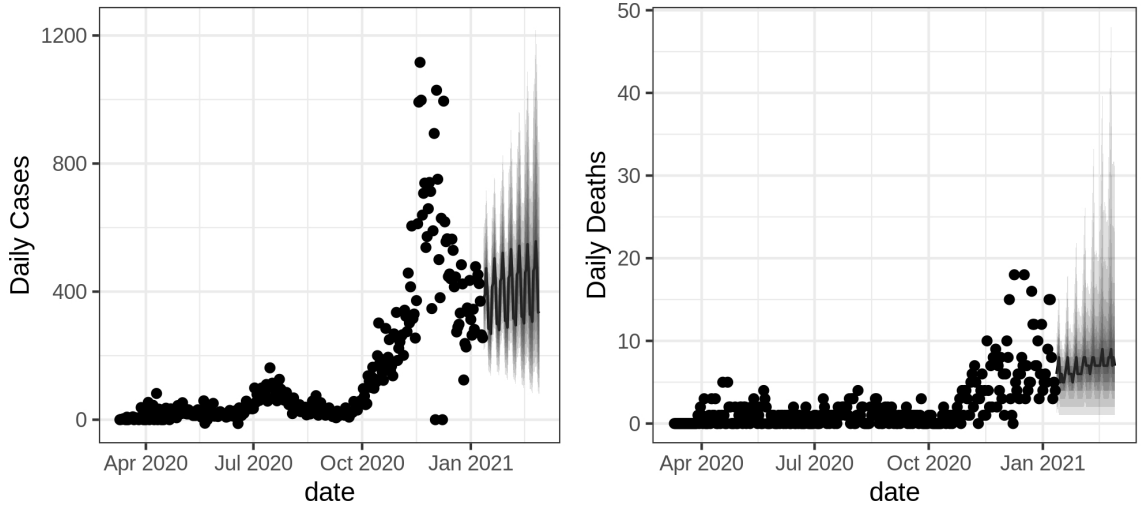
So what?

Med-surge general bed needs are tracking with the median case scenario this week; med-surge beds predicted to gradually increase during the next 3 weeks

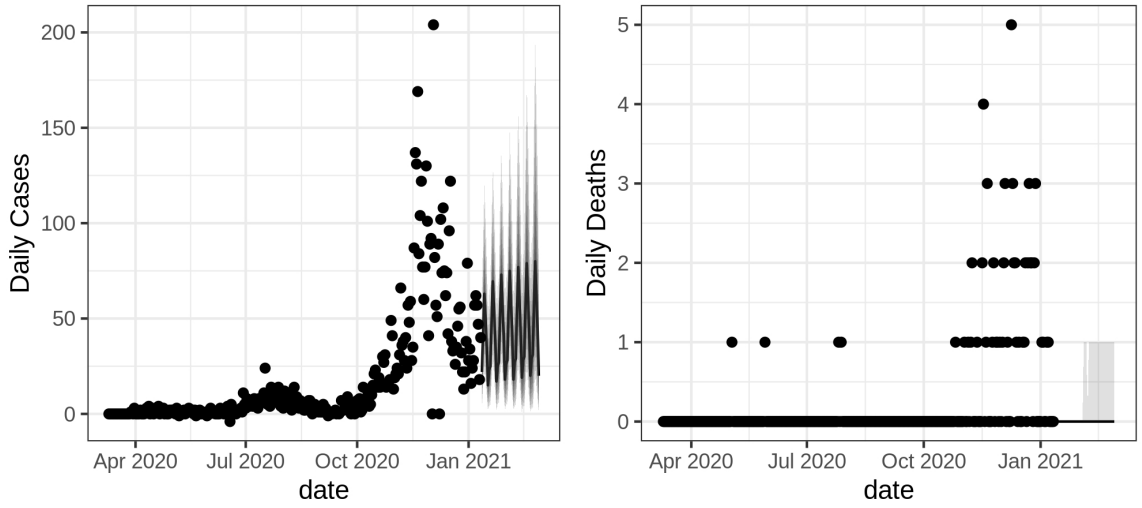
> Additional Slides

Central Region Forecasts

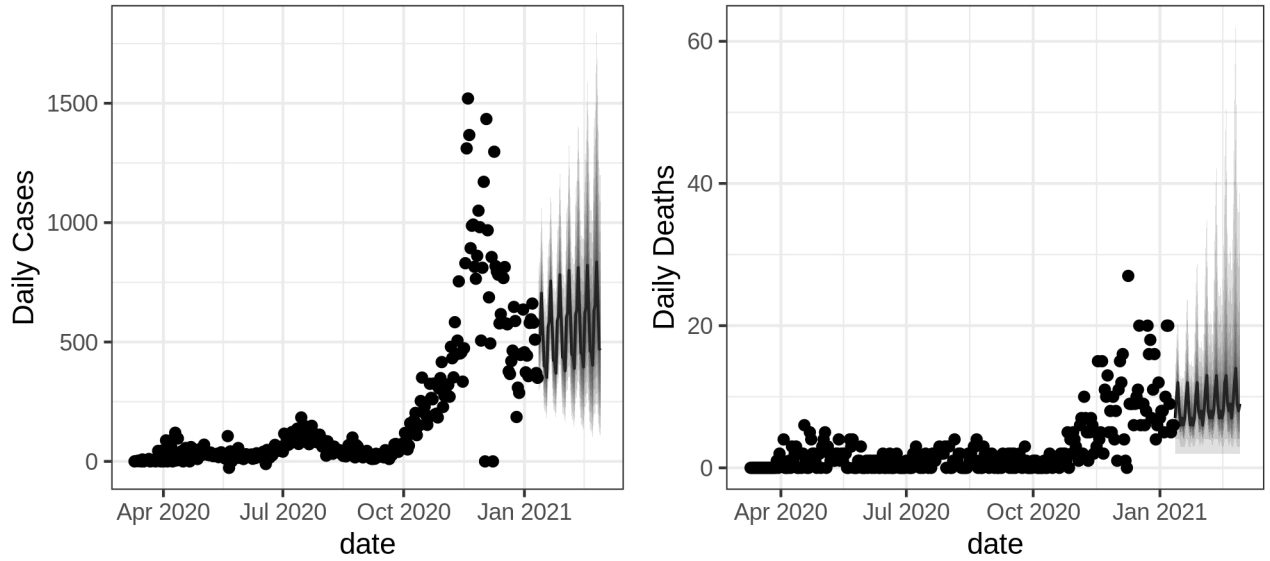
New Mexico - Bernalillo



New Mexico - Valencia



Health Region - NM Central Region

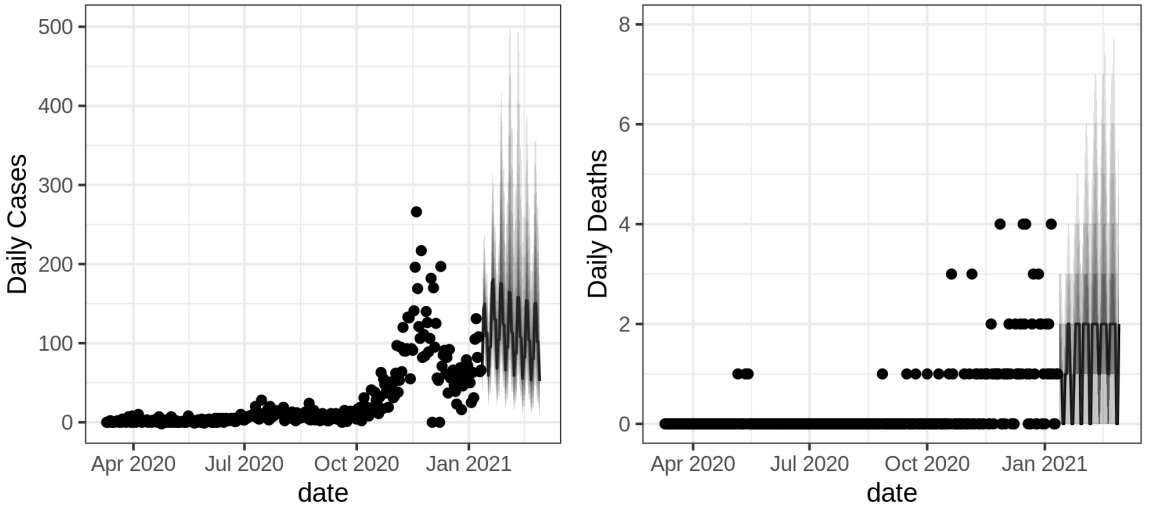


So what?

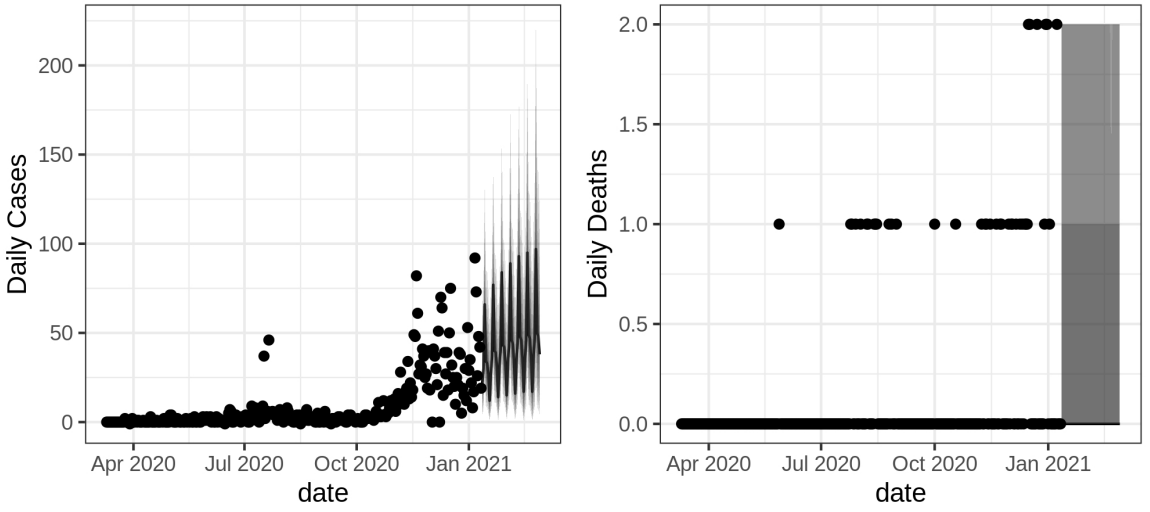
The average number of cases for the Central Region is expected to be around 500 next week

Northeast Region Forecasts

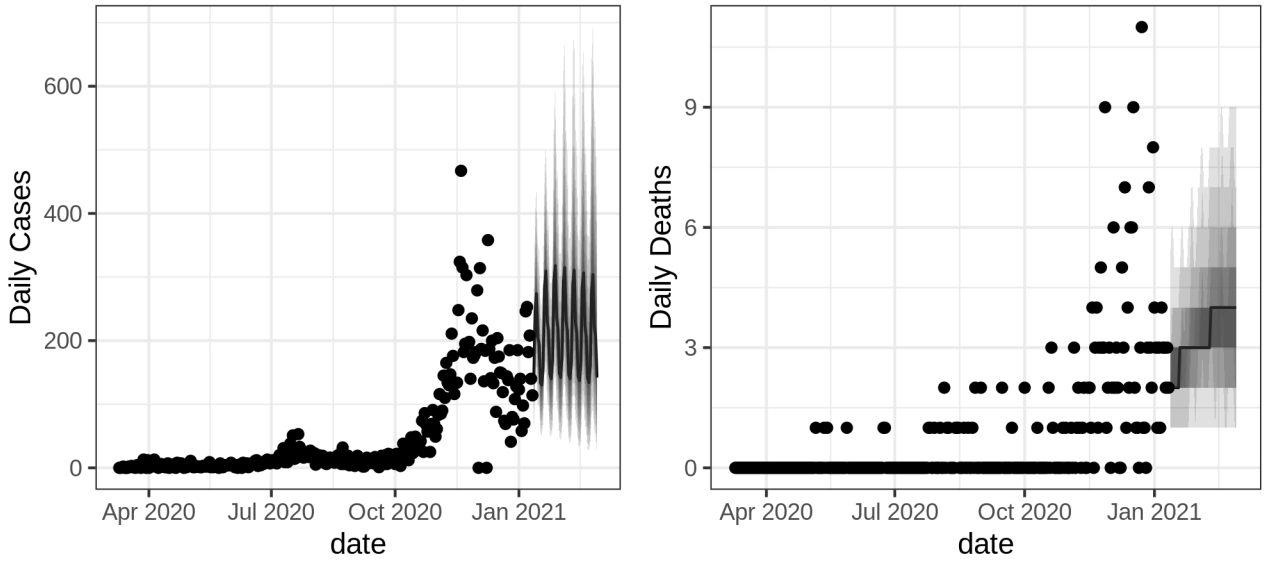
New Mexico - Santa Fe



New Mexico - Rio Arriba



Health Region - NM Northeast Region

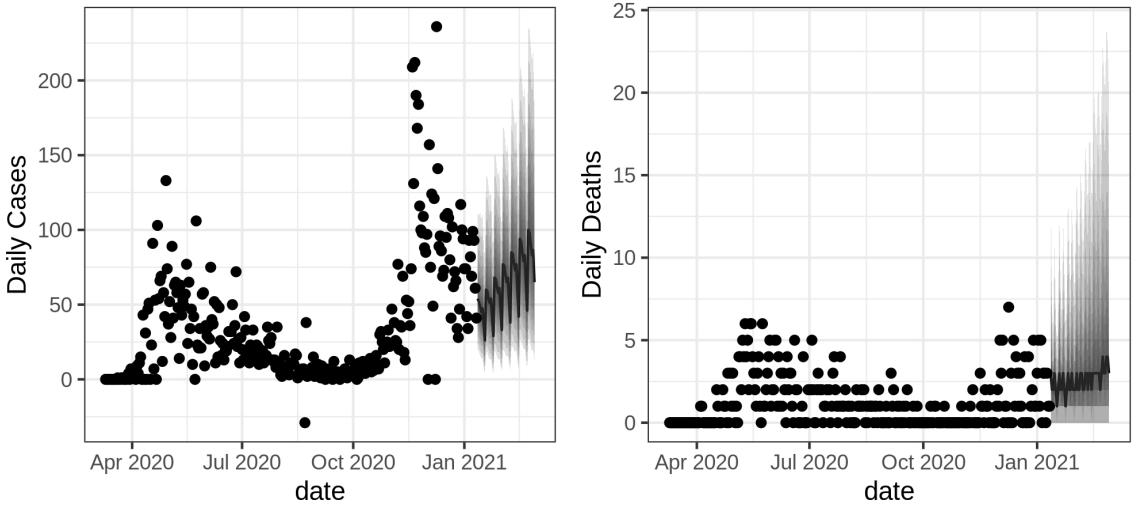


So what?

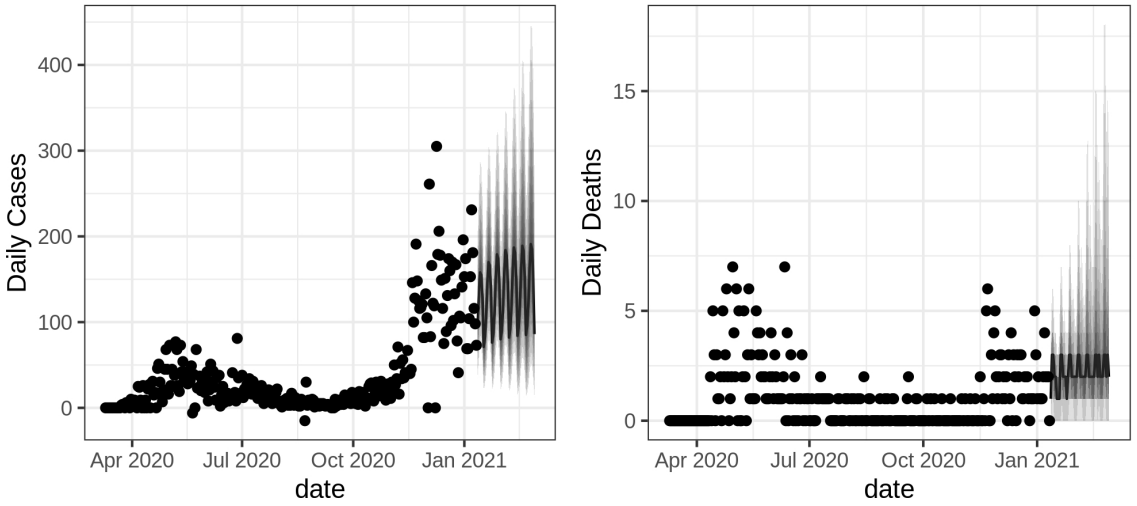
The average number of cases for the Northeast Region is expected to be around 210 next week

Northwest Region Forecasts

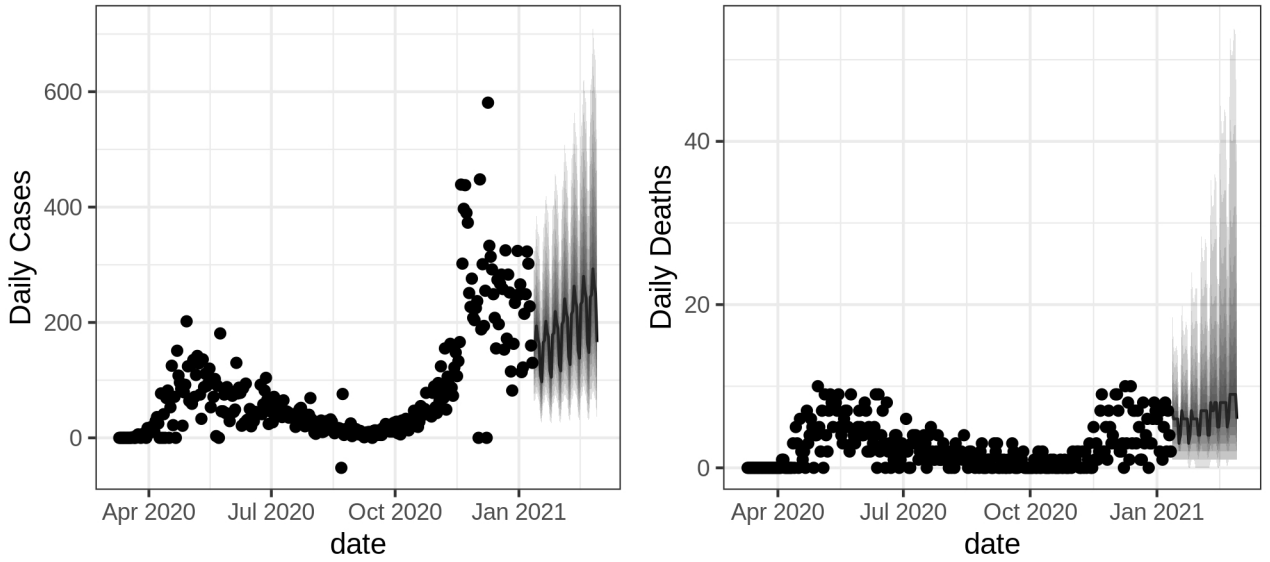
New Mexico - McKinley



New Mexico - San Juan



Health Region - NM Northwest Region

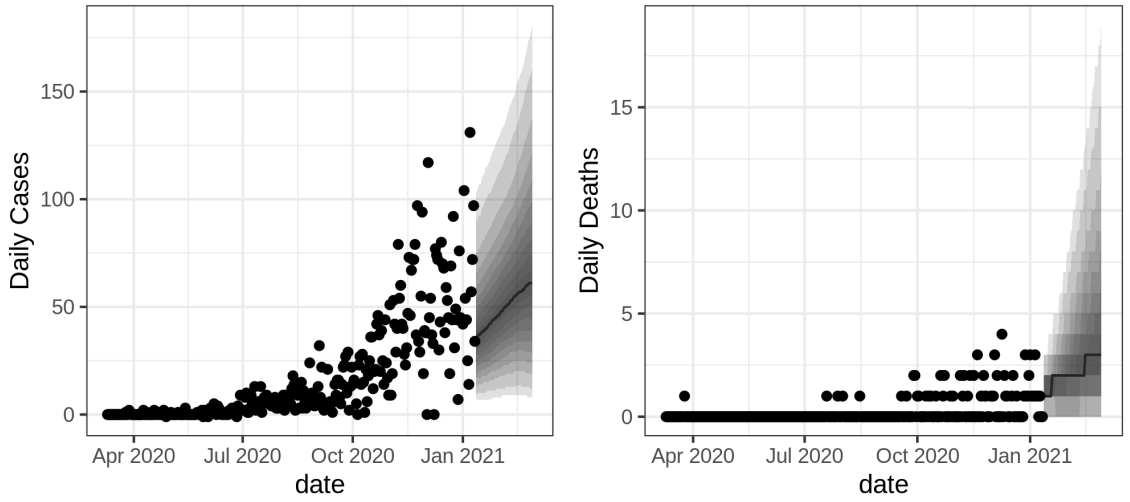


So what?

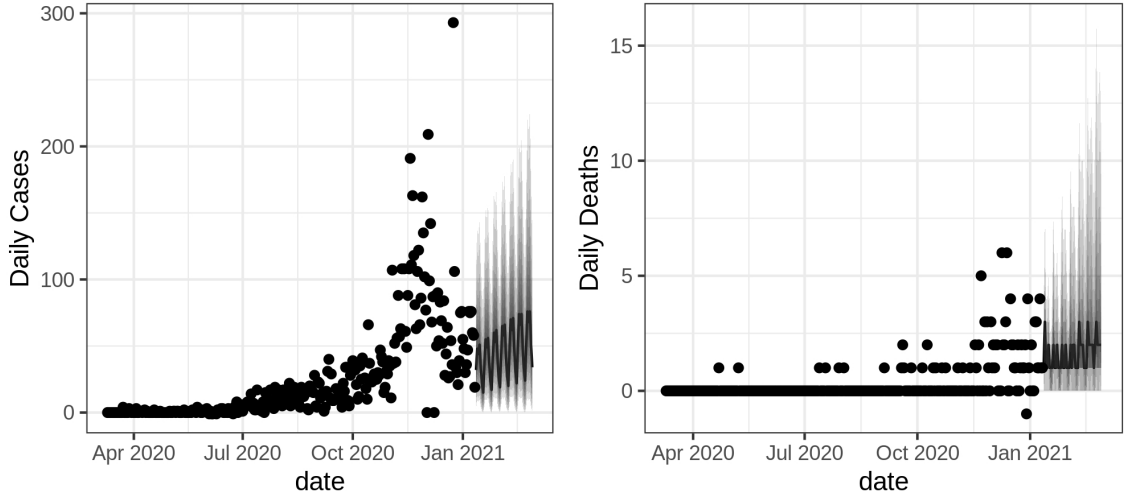
The average number of cases for the Northwest Region is expected to be around 160 next week

Southeast Region Forecasts

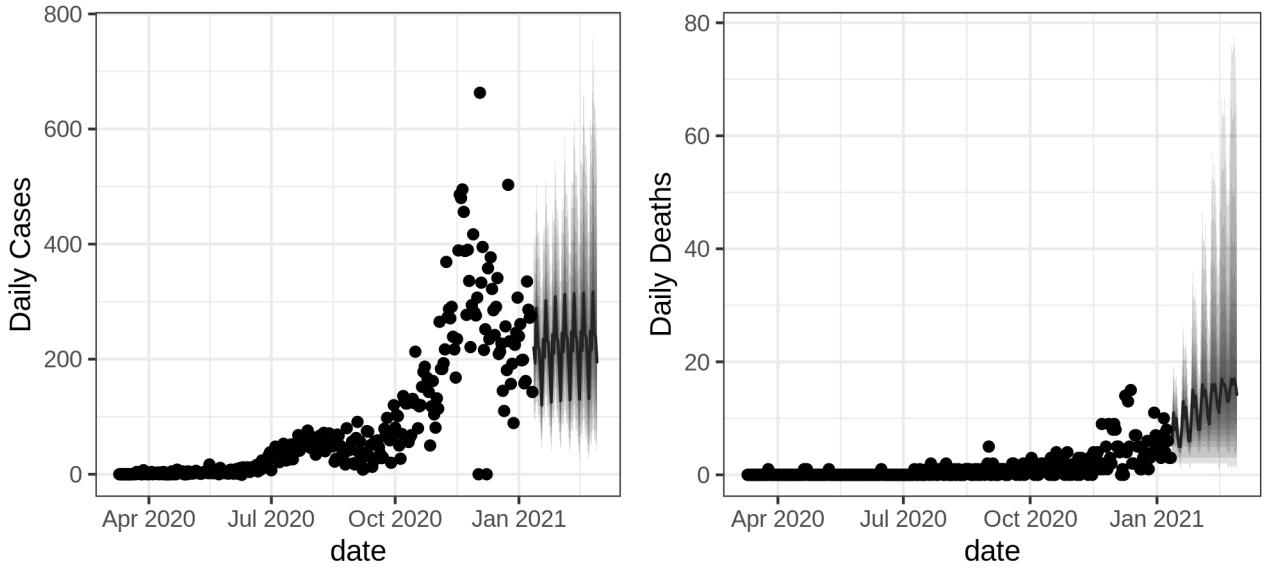
New Mexico - Eddy



New Mexico - Chaves



Health Region - NM Southeast Region

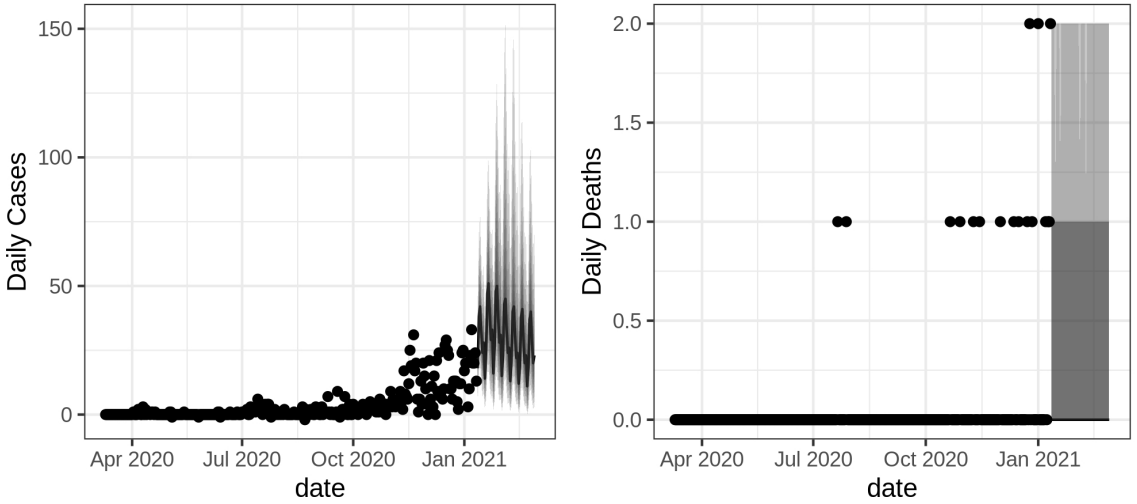


So what?

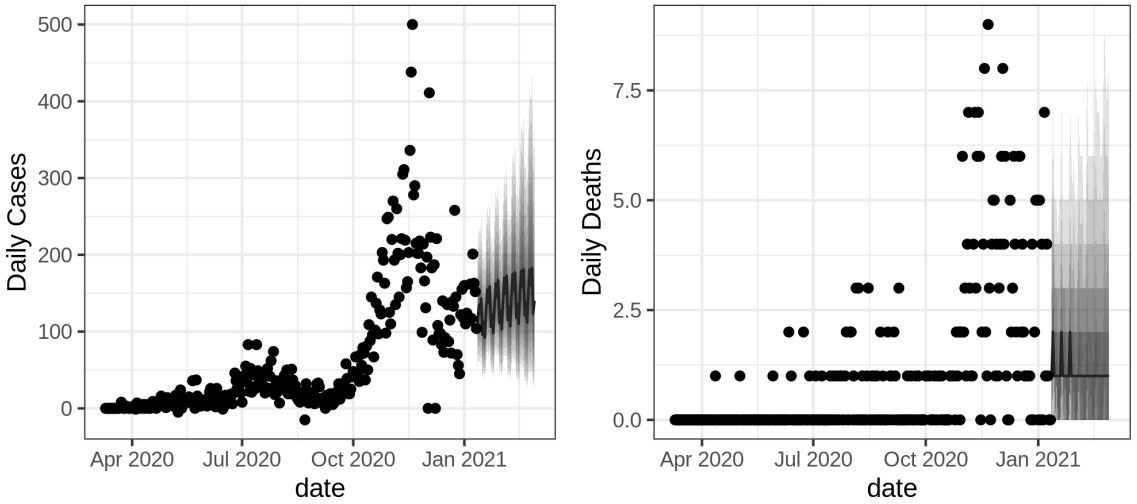
The average number of cases for the Southeast Region is expected to be around 220 next week

Southwest Region Forecasts

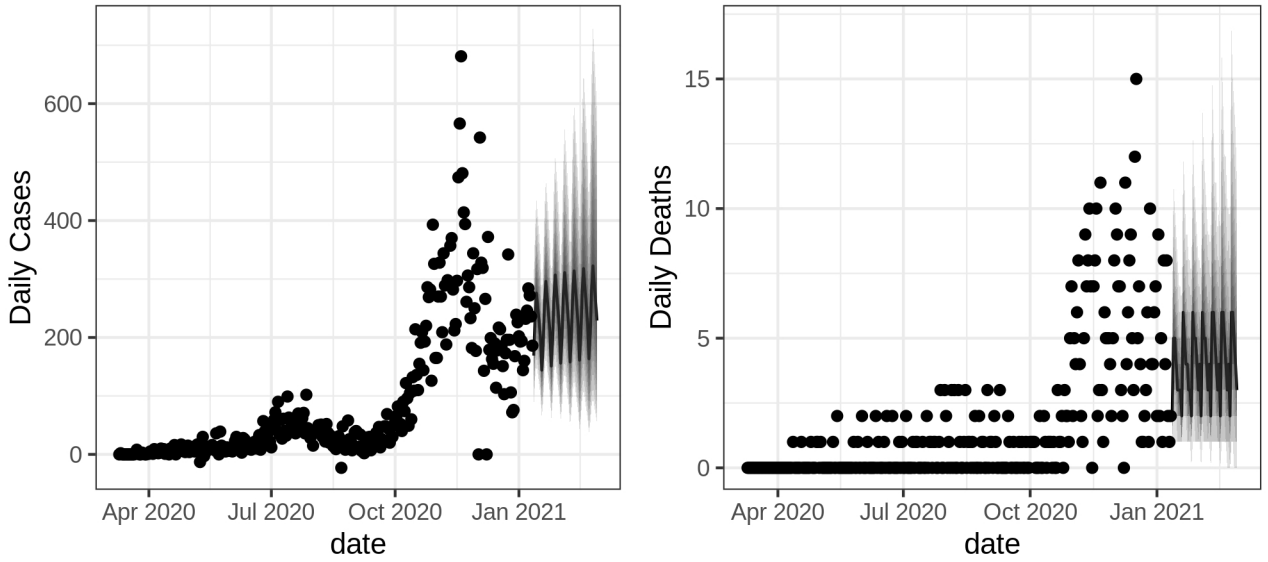
New Mexico - Grant



New Mexico - Dona Ana



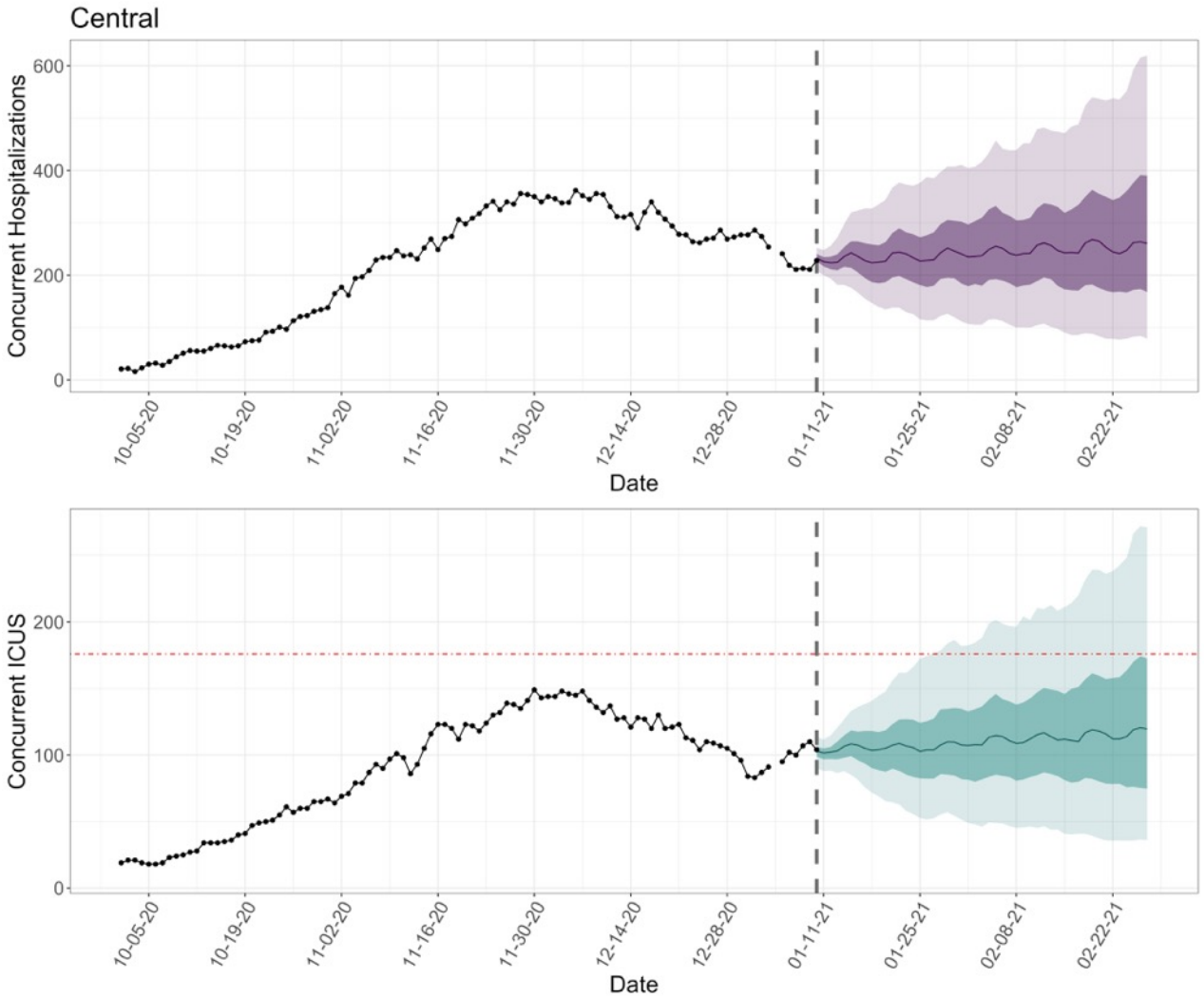
Health Region - NM Southwest Region



So what?

The average number of cases for the Southwest Region is expected to be around 240 next week

Regional Hospitalization Forecasts: Central



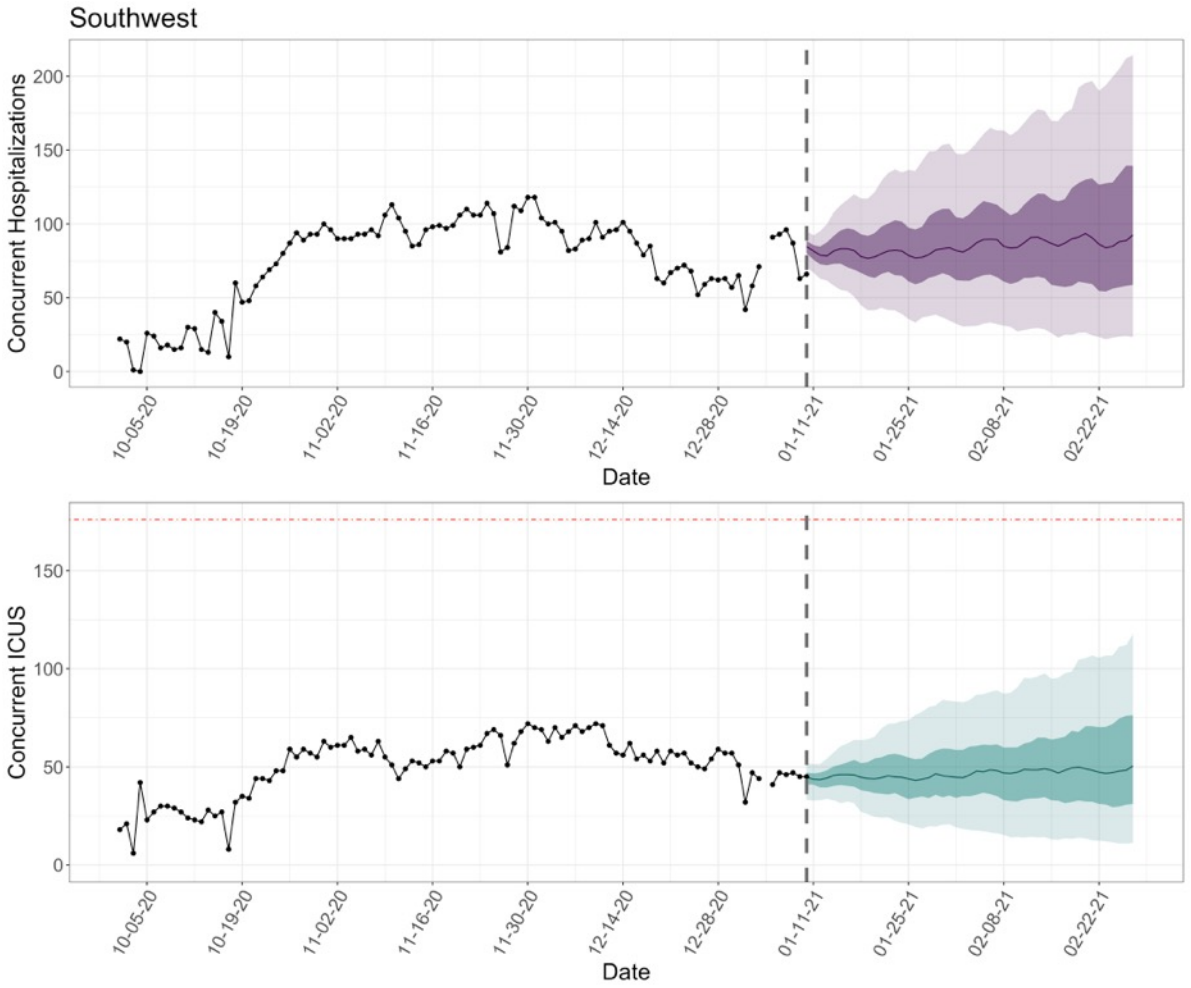
Concurrent COVID-19 ICUs beds: Central

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
1/17	76	105	138
1/24	56	106	166
1/31	52	108	182
2/7	47	111	197
2/14	44	111	208
2/21	36	116	236

So what?

ICU bed usage is expected to remain steady or gradually increase; tracking with median.

Regional Hospitalization Forecasts: Southwest



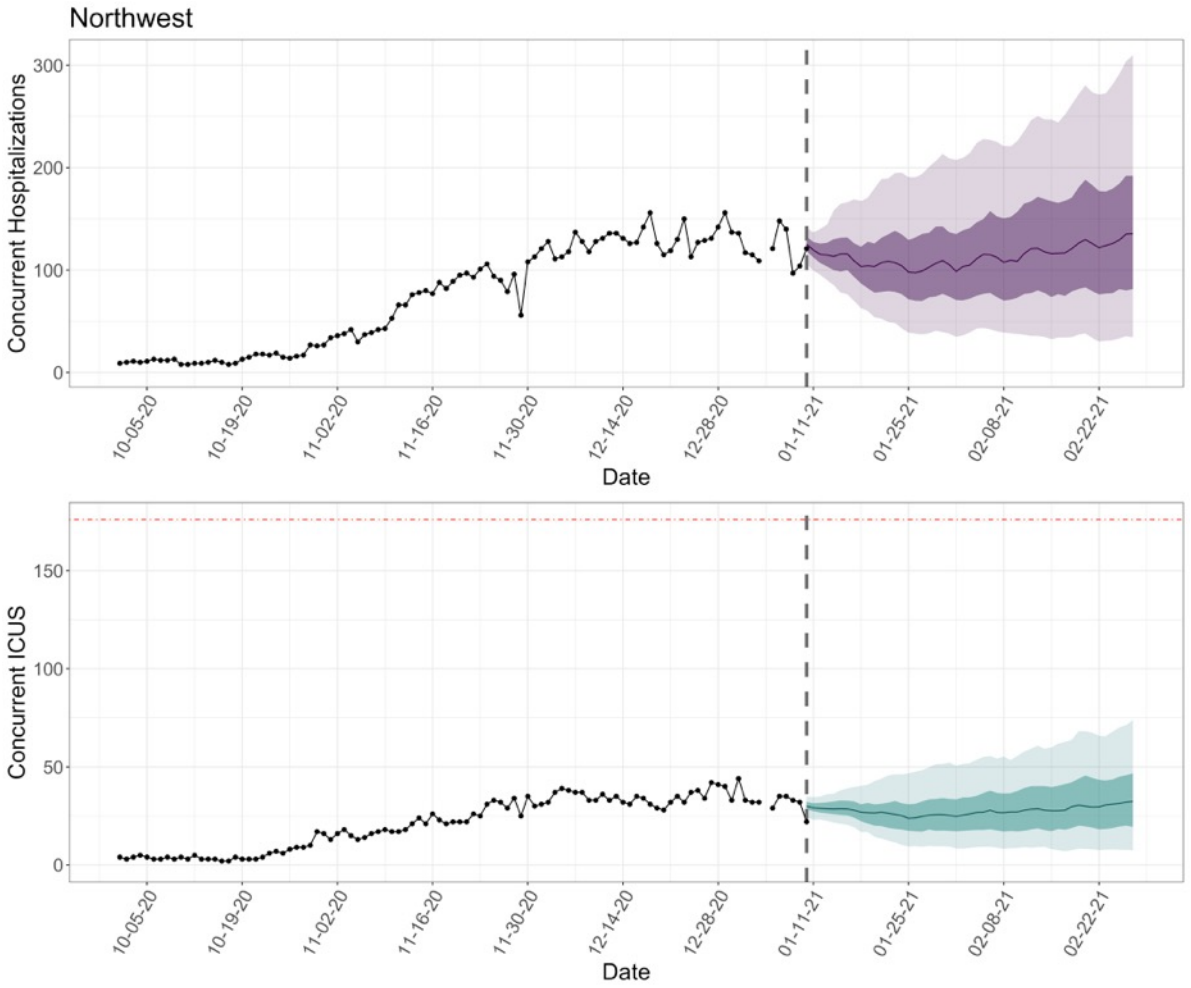
Concurrent COVID-19 ICUs beds: Southwest

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
1/17	32	46	64
1/24	22	45	73
1/31	21	45	84
2/7	16	48	89
2/14	14	49	98
2/21	13	48	107

So what?

ICU bed usage is expected to remain steady or gradually increase in the Southwest region.

Regional Hospitalization Forecasts: Northwest



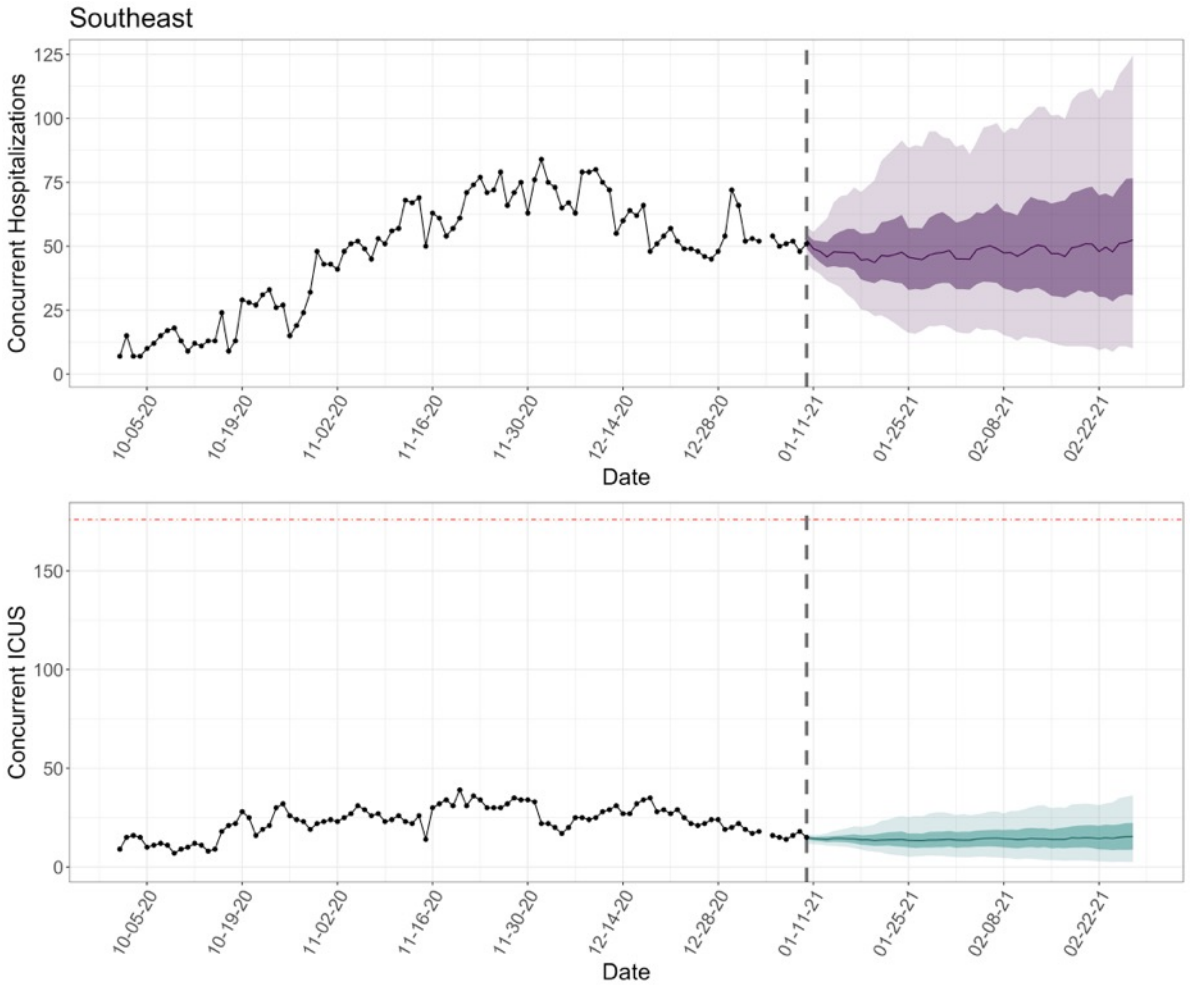
Concurrent COVID-19 ICUs beds: Northwest

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
1/17	19	28	40
1/24	10	25	46
1/31	9	25	52
2/7	9	27	54
2/14	9	28	59
2/21	8	30	67

So what?

ICU bed usage is expected to remain steady in the Northwest region

Regional Hospitalization Forecasts: Southeast



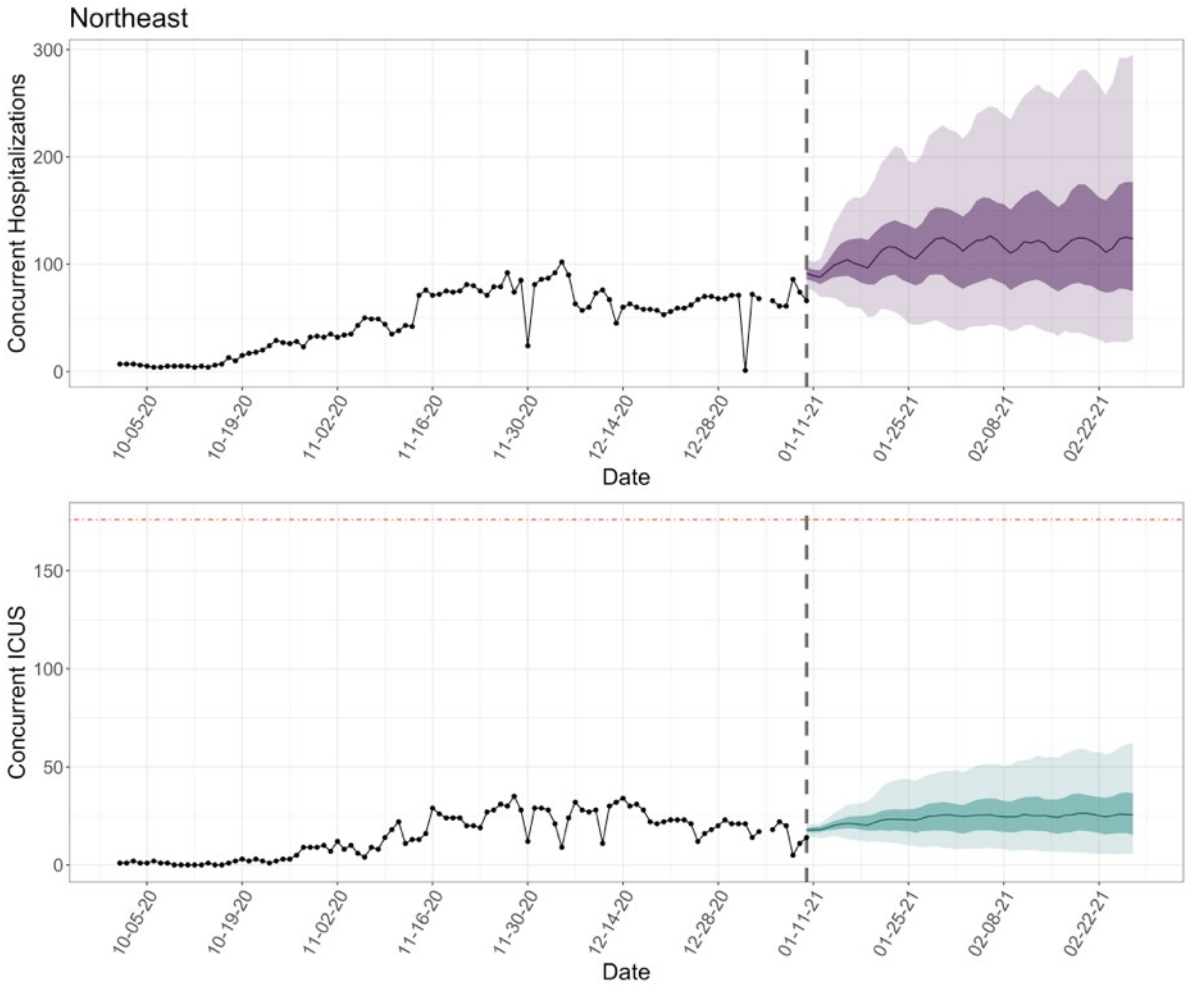
Concurrent COVID-19 ICUs beds: Southeast

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
1/17	10	14	21
1/24	6	14	26
1/31	5	14	27
2/7	5	15	28
2/14	4	14	31
2/21	3	15	32

So what?

ICU bed usage is expected to remain steady in the Southeast region

Regional Hospitalization Forecasts: Northeast



Concurrent COVID-19 ICUs beds: Northeast

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
1/17	13	21	31
1/24	11	23	44
1/31	9	26	48
2/7	8	25	51
2/14	7	25	55
2/21	6	26	57

So what?

ICU bed usage is expected to gradually increase in the Northeast region

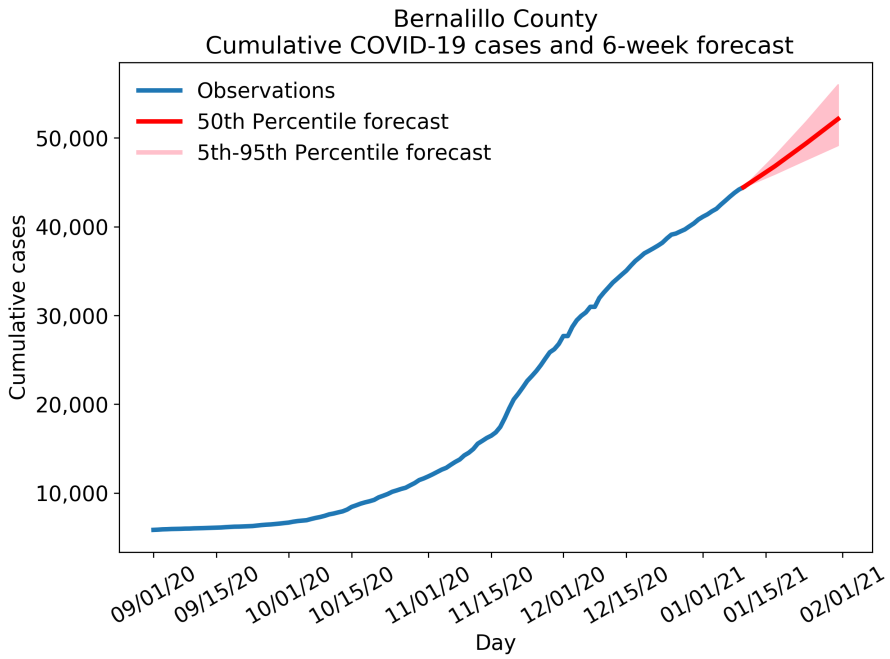
> Non-Congregational Shelter Forecast

Non-Congregate Shelter Forecast

- **Our goal is to inform the capacity of shelters for forecasting the need of additional rooms**
- **We calculate a ratio between the mean number of daily new cases over the previous two weeks to current occupied rooms**
  - We apply this ratio to the forecast of COVID-19 cases from the LANL COFFEE model to estimate the number of rooms needed
- **We use the spread in the case forecast to report a subsequent spread in the shelter forecast**
- **We calculate the number of new rooms need by applying the ratio of occupied rooms:new cases to the number of cases forecasted in each county**

Non-Congregate Shelter Forecast: Bernalillo

Number of cases as of 1/10/21: **44,442**
Number of shelter rooms available: **213**
Total number of patients/medical workers (including specialty): **46**
Number of patients: **43**
Number of medical workers: **3**
Occupied rooms:new cases ratio: **0.13**
2-week avg. new cases per day: **356**



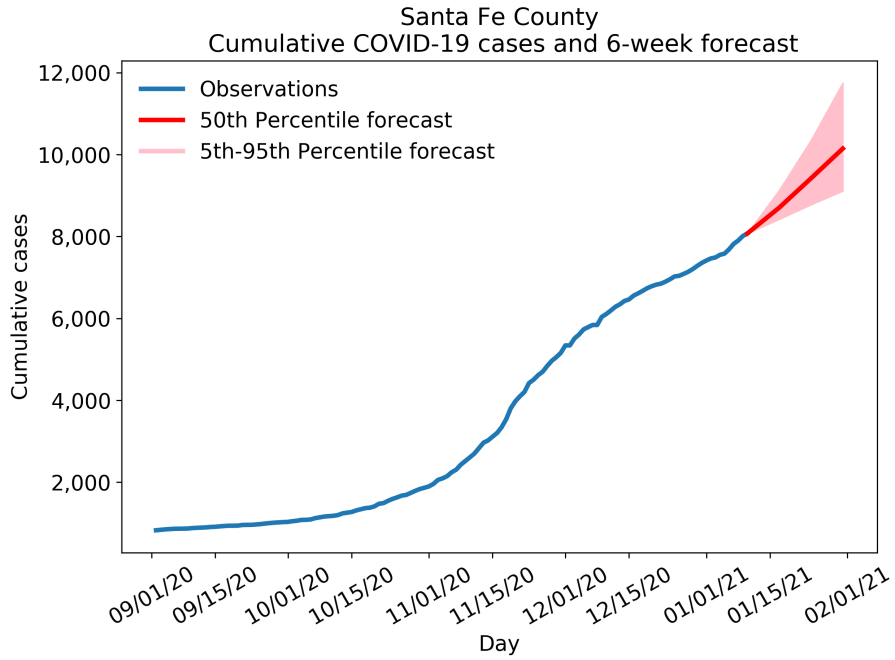
	1/17/21	1/24/21	1/31/21
Total cases	46,818 (45,955-48,105)	49,414 (47,573-51,879)	52,132 (49,169-55,994)
# of rooms needed	44 (28-66)	48 (30-71)	50 (29-76)
Deficit (-) or surplus of rooms	169	165	163

2-week avg. new cases per day increased from 318 last week to 356 this week, but only 3 more guests are using shelters.

The number of rooms needed increased in response to the increase in cases per day.

Non-Congregate Shelter Forecast: Santa Fe

Number of cases as of 1/10/21: **8,073**
Number of shelter rooms available: **52**
Total number of patients/medical workers (including specialty): **32**
Number of patients: **28**
Number of medical workers: **4**
Occupied rooms:new cases ratio: **0.45**
2-week avg. new cases per day: **71**



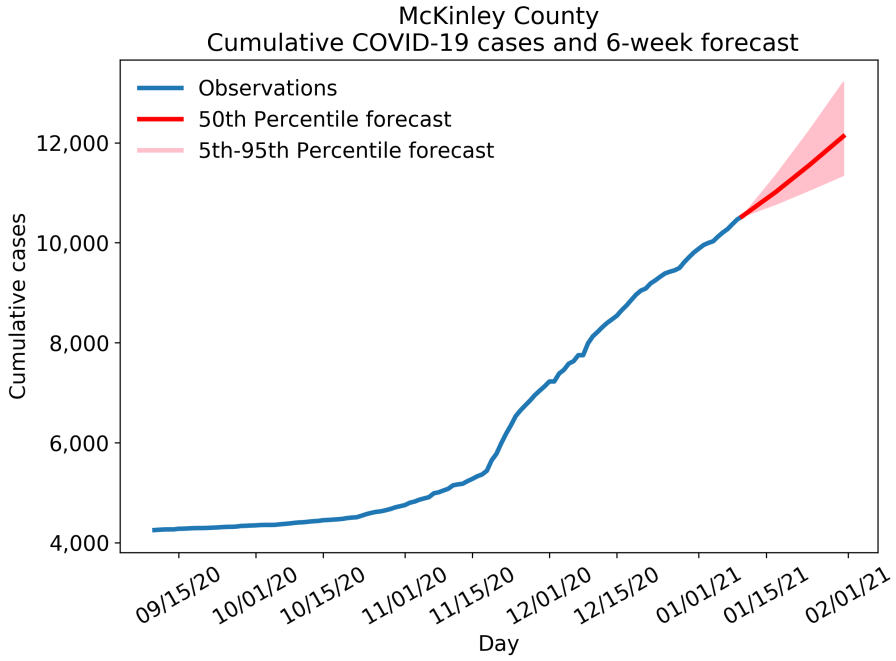
	1/17/21	1/24/21	1/31/21
Total cases	8,702 (8,420-9,120)	9,418 (8,777-10,341)	10,146 (9,111-11,745)
# of rooms needed	41 (23-68)	46 (23-79)	47 (22-91)
Deficit (-) or surplus of rooms	11	6	5

2-week avg. new cases per day increased from 50 last week to 71 this week

The number of rooms needed increased in response to the increase in cases per day. Santa Fe has a proportion of guests using shelters compared to the number of new cases.

Non-Congregate Shelter Forecast: McKinley

Number of cases as of 1/10/21: **10,528**
Number of shelter rooms available: **160**
Total number of patients/medical workers (including specialty): **64**
Number of patients: **59**
Number of medical workers: **5**
Occupied rooms:new cases ratio: **0.83**
2-week avg. new cases per day: **77**



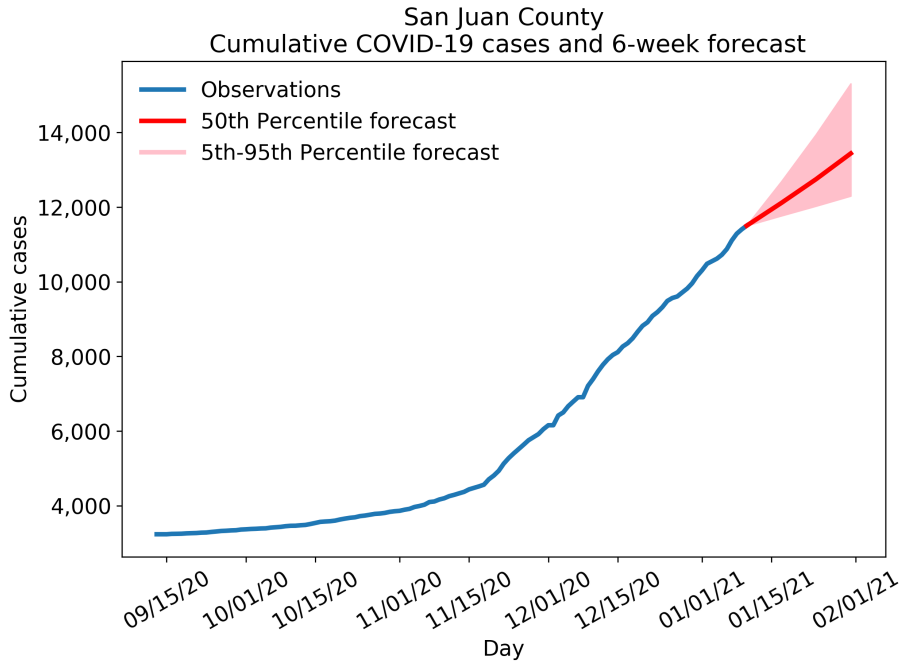
	1/17/21	1/24/21	1/31/21
Total cases	11,017 (10,777-11,354)	11,557 (11,060-12,254)	12,128 (11,352-13,212)
# of rooms needed	58 (30-98)	64 (34-107)	68 (35-114)
Deficit (-) or surplus of rooms	102	96	92

2-week avg. new cases per day increased from 68 last week to 77 this week. There are 13 more guests using shelters than last week.

The number of rooms needed increased in response to the increase in cases per day.

Non-Congregate Shelter Forecast: San Juan

Number of cases as of 1/10/21: **11,503**
Number of shelter rooms available: **25**
Total number of patients/medical workers (including specialty): **19**
Number of patients: **19**
Number of medical workers: **0**
Occupied rooms:new cases ratio: **0.14**
2-week avg. new cases per day: **136**



	1/17/21	1/24/21	1/31/21
Total cases	12,113 (11,769-12,684)	12,750 (12,030-13,945)	13,440 (12,300-15,308)
# of rooms needed	12 (5-24)	13 (5-25)	14 (5-27)
Deficit (-) or surplus of rooms (SJ)	13	12	11

2-week avg. new cases per day increased from 124 last week to 136 this week. There are 4 more guests using shelters than last week.

The number of rooms needed remained roughly the same.