

# Modeling & Forecasting COVID-19 in NM

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August 31, 2021

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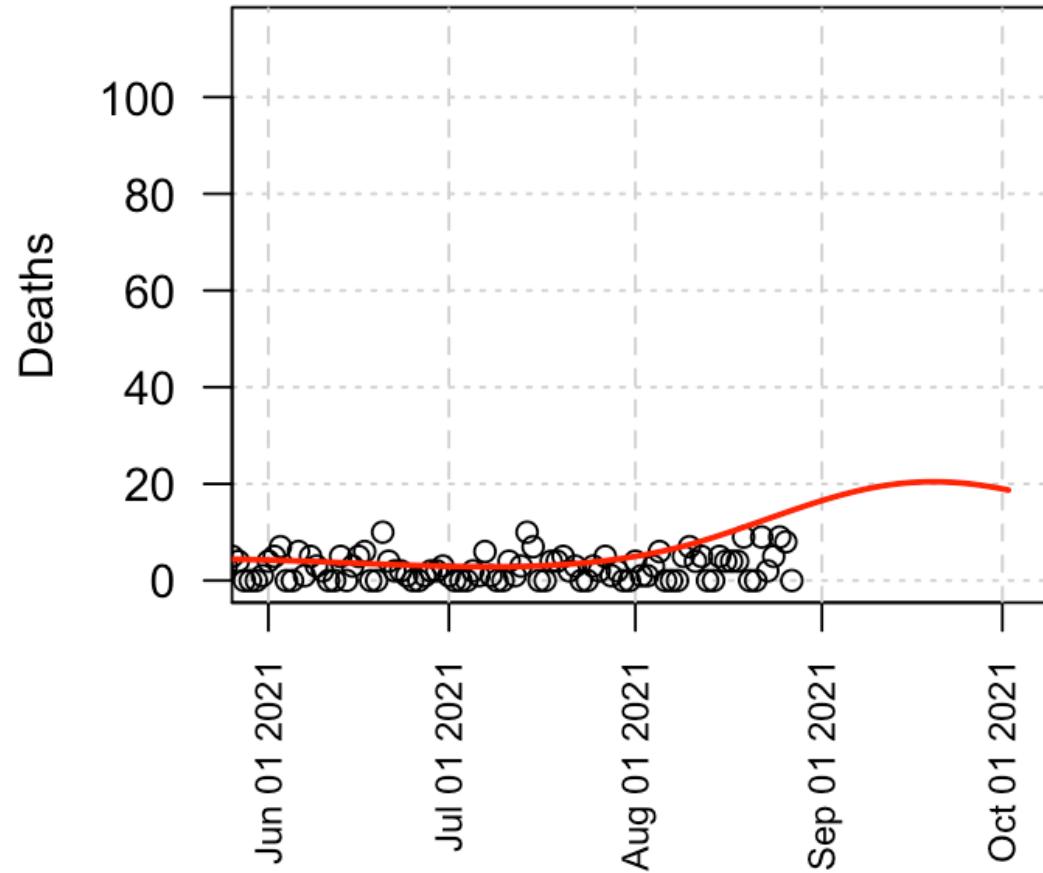
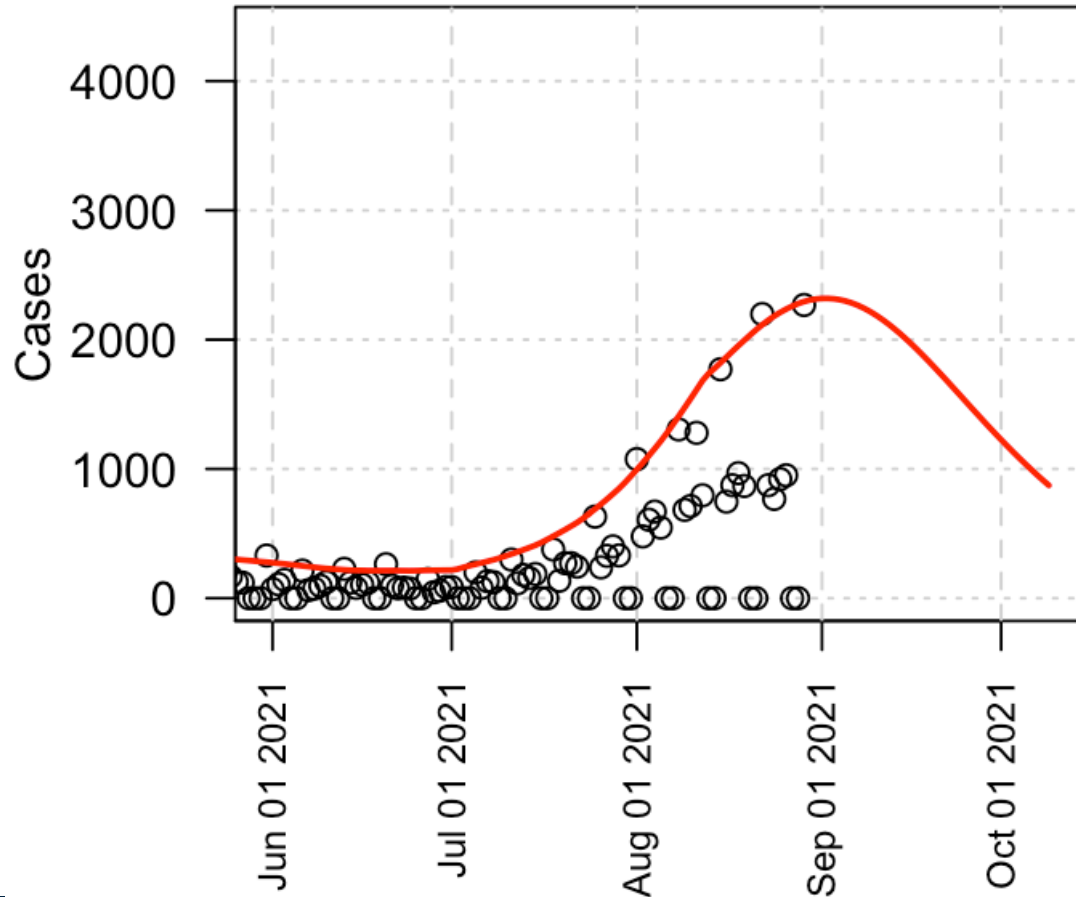
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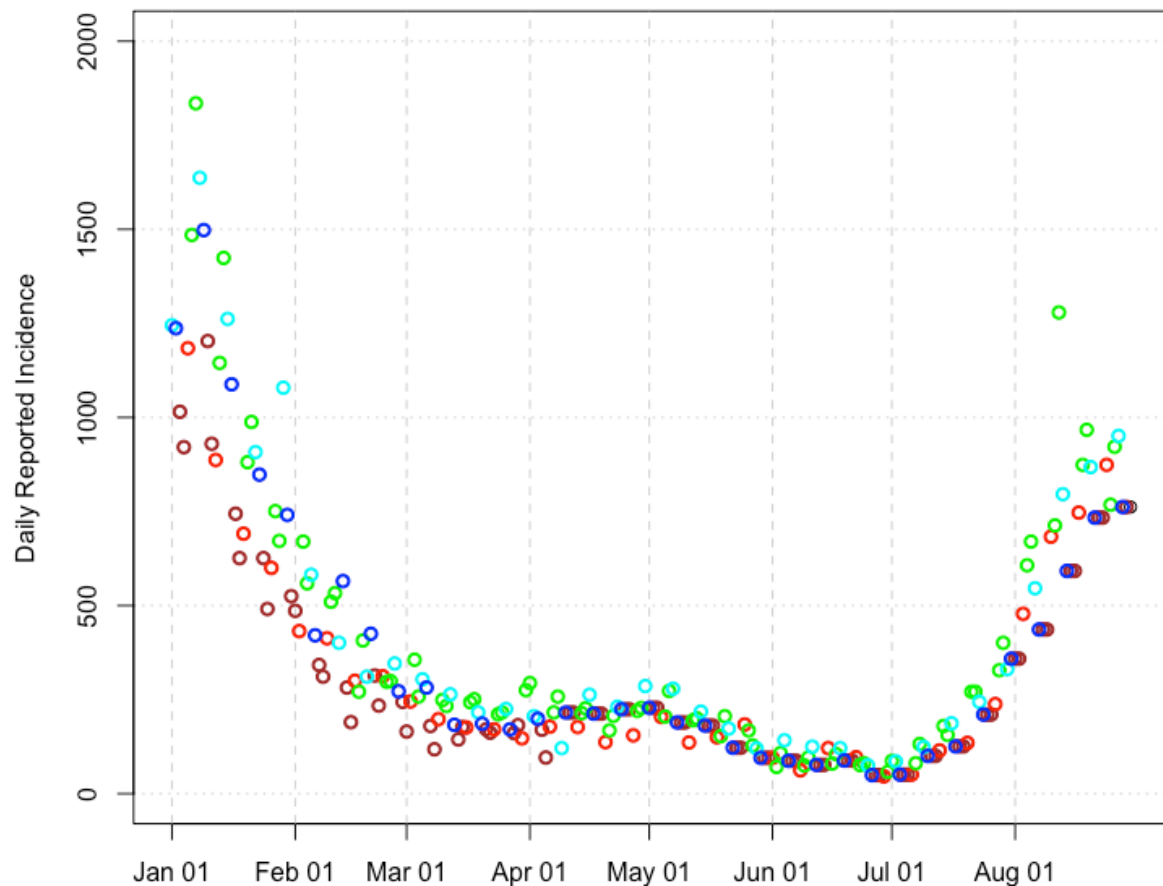
# 31 Aug 2021: EpiGrid modeling

- Increases in NM daily incidence should peak shortly. By-county and regional heterogeneity are determining outcomes. *These outcomes are vaccine- and mitigation-dependent (i.e. behavioral).*
- *Failure of adherence to the masking order, school infection control, etc. will nullify these curves.*
- NM daily deaths will likely peak in September, contingent on events in the next week.



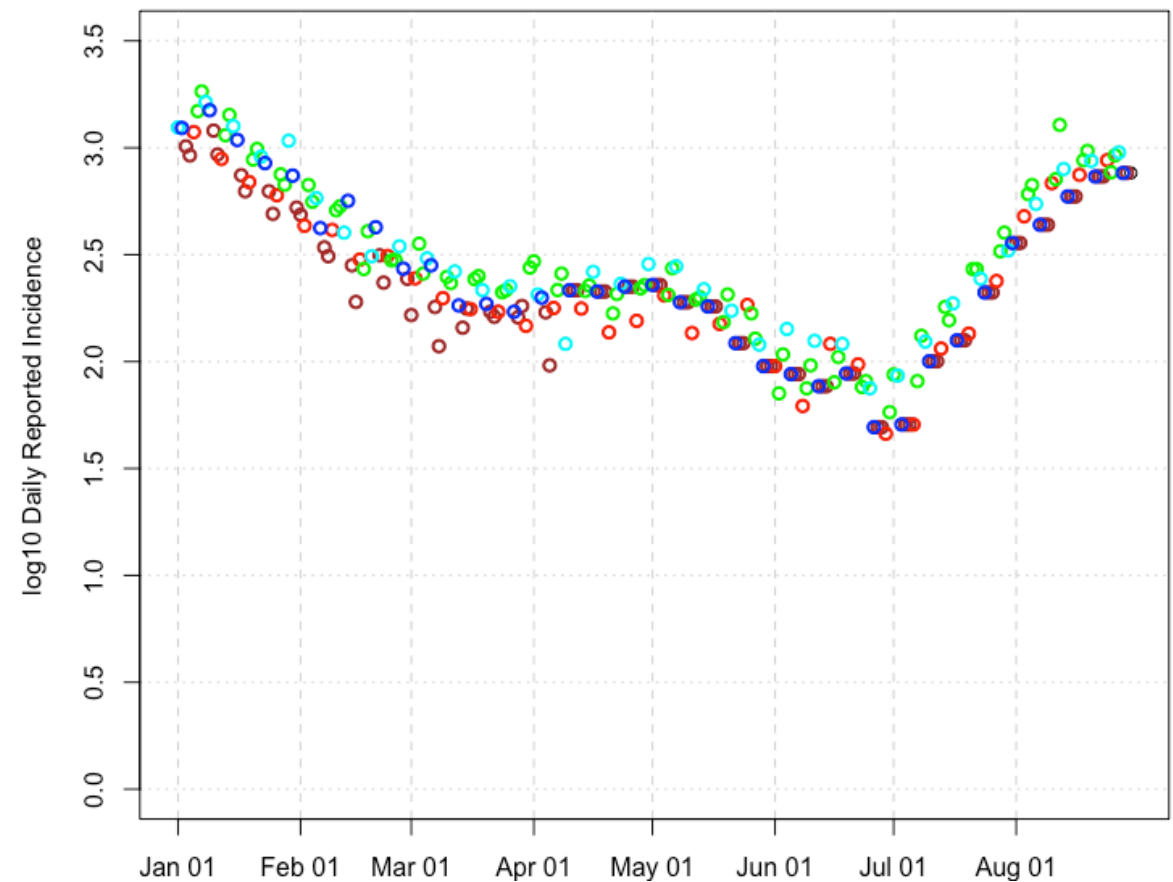
# A look at the raw incidence data

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



## Cases rates are moderating due to mitigations.

The 190 cases in the Lea county correctional facility are removed from data reported on March 26<sup>th</sup>. The 1/3 of reported cases that were > 2 weeks prior were removed from March 24<sup>th</sup>. Case reported for weekends starting April 10-12<sup>th</sup> are each divided by 3 to estimate individual day counts.

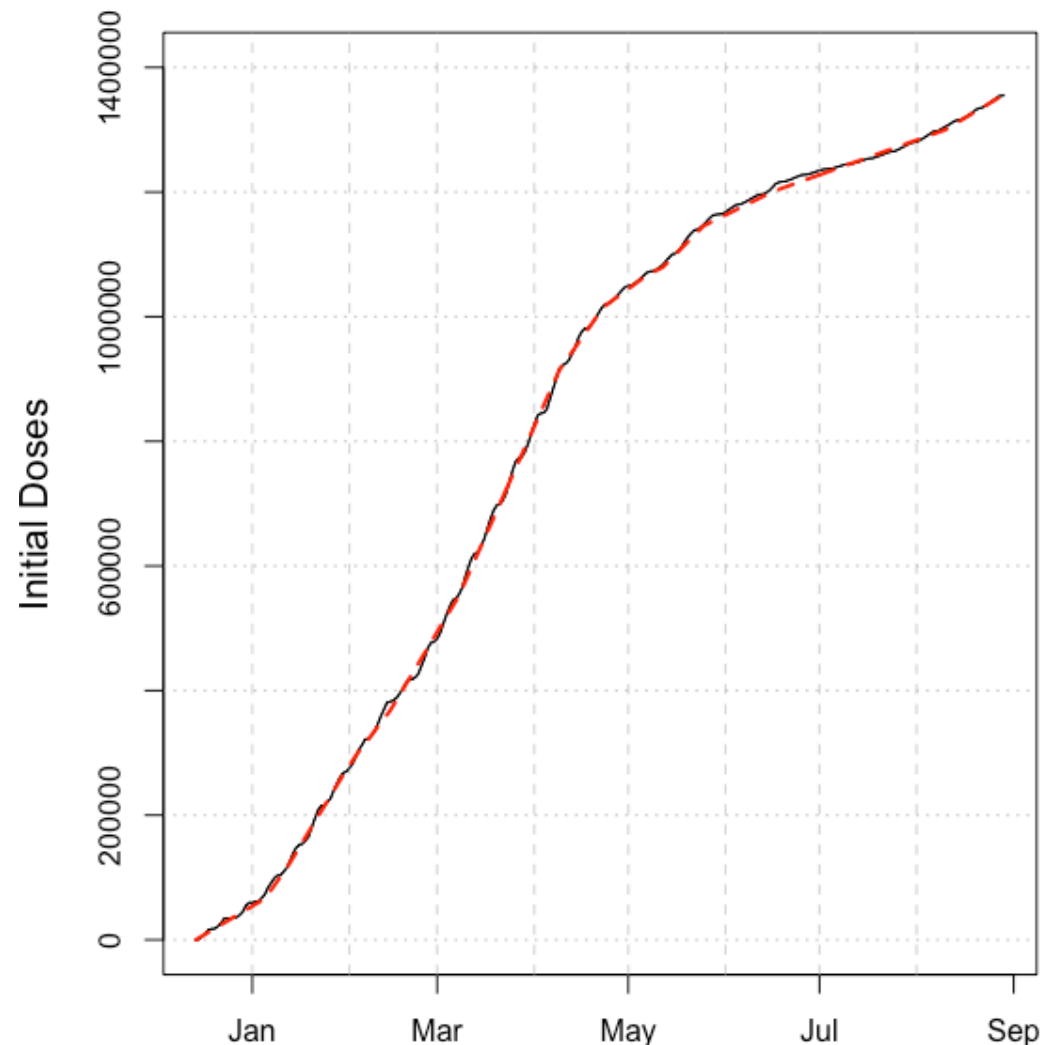


# 31 August 2021 Vaccine Analysis and Summary

- ~1357k first doses have been administered in NM.
- ~1177k completed vaccine series in NM.
- EpiGrid is modeling this as 1357k first doses.
- ~64.7% of all persons in New Mexico are vaccinated.
  
- Implications of [https://cv.nmhealth.org/wp-content/uploads/2021/08/Vaccination-Case-Report-2021-08-24\\_v3.pdf](https://cv.nmhealth.org/wp-content/uploads/2021/08/Vaccination-Case-Report-2021-08-24_v3.pdf) for vaccinated vs. unvaccinated outcomes with combined Delta and Alpha variants:
  - 5.7x *raw* protection ratio against infection (this likely contains biases due to high prevalence in areas with low vaccination)
  - 6.8x *raw* protection ratio against hospitalization.
  - 12.8x *raw* protection against mortality.
- **“Raw” does not mean un-normalized.**

Black – vaccination for all New Mexicans

Red – First dose data used in EpiGrid.



# Variants: Still Delta (for now, keep watching ...)

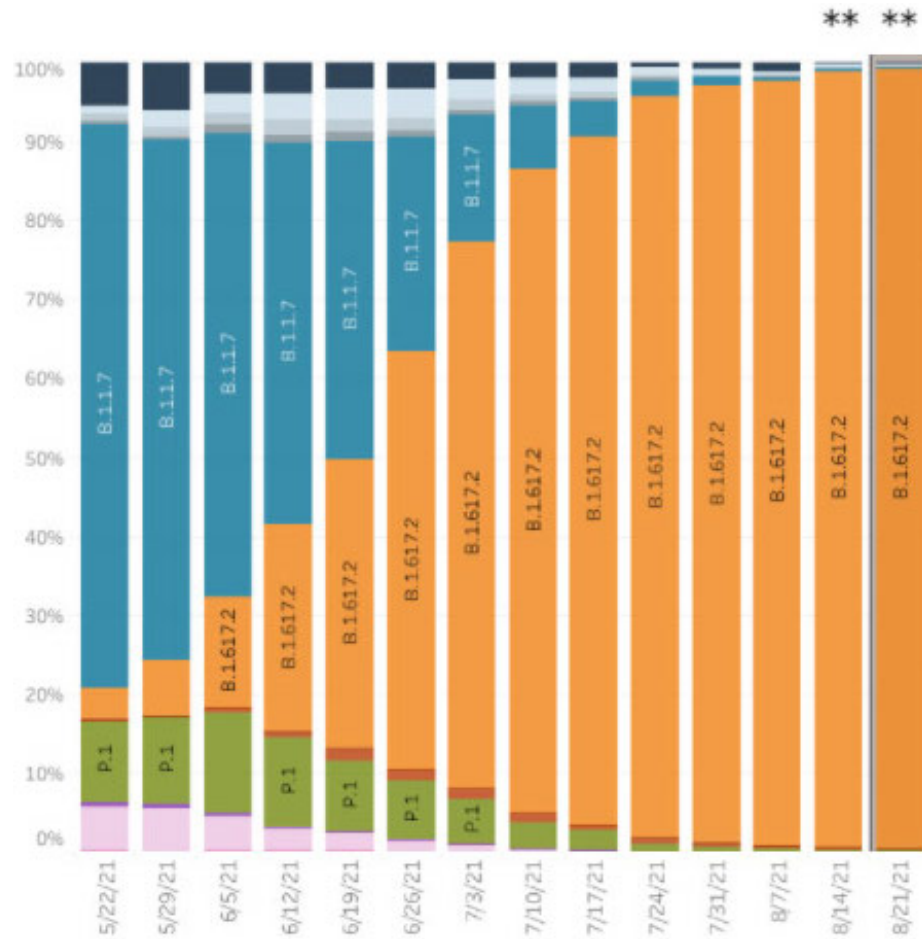
<https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/index.html>

B.1.617.2, “Δ” is “Indian variant”

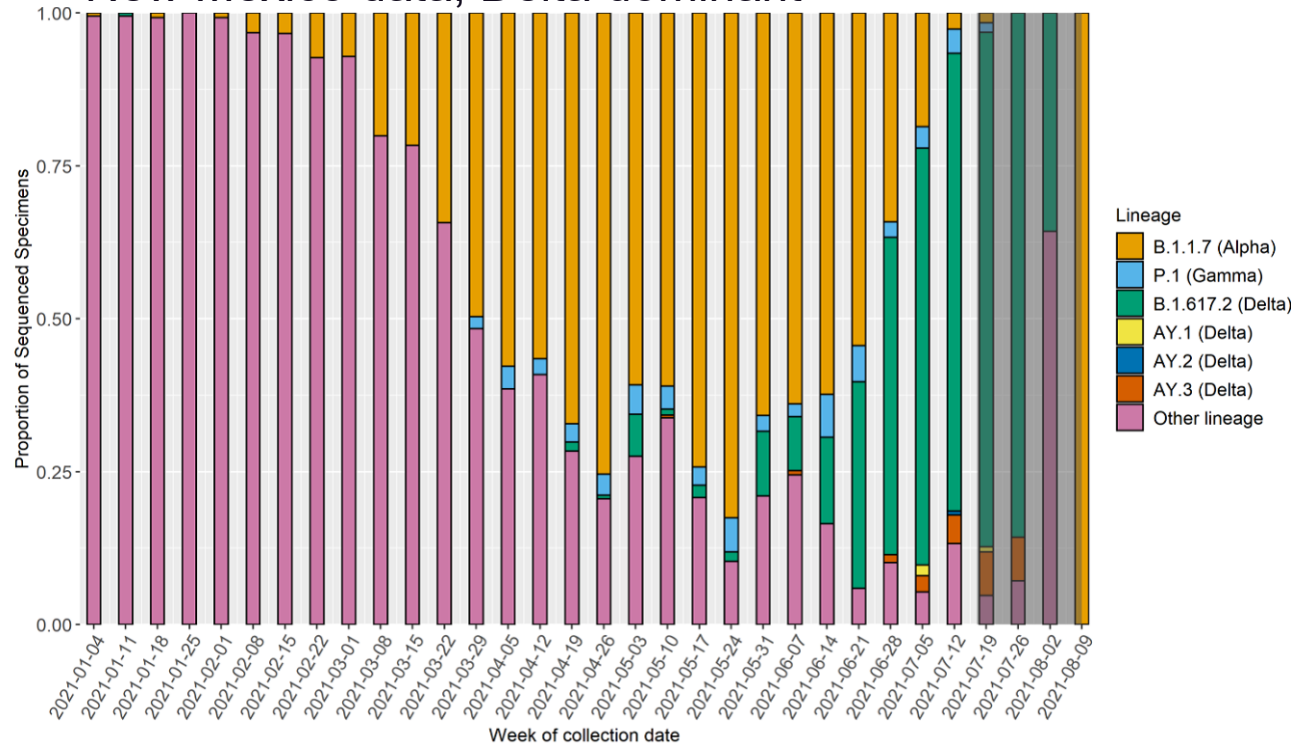
B.1.1.7, “α” is “UK variant”

P.1 is “Brazilian variant”

C.1.2 variant is being reported in multiple countries.



## New Mexico data, Delta dominant



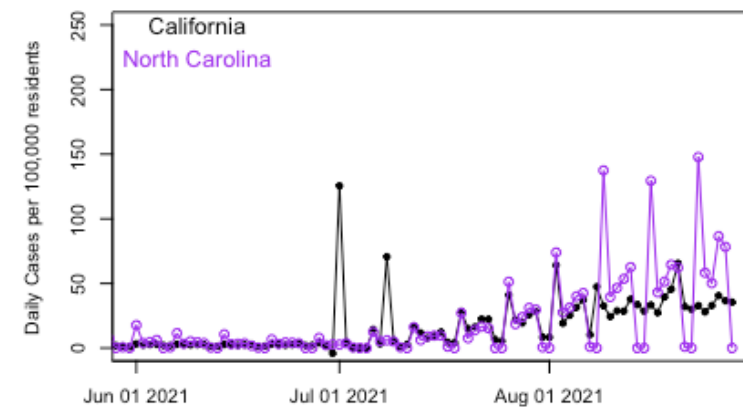
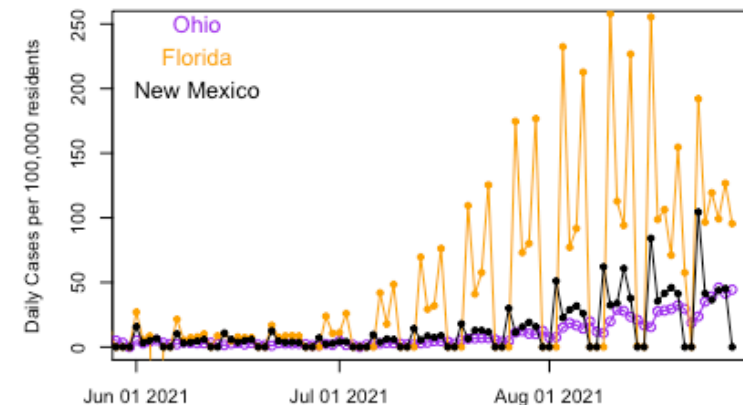
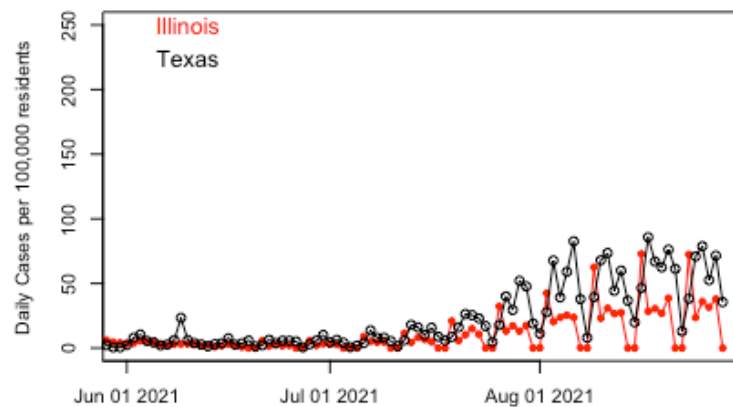
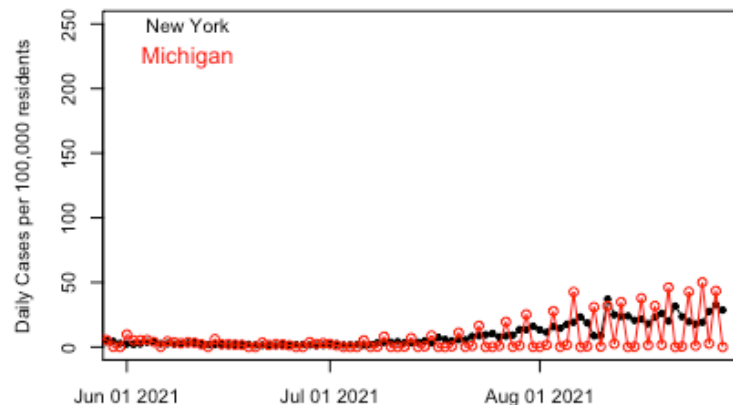
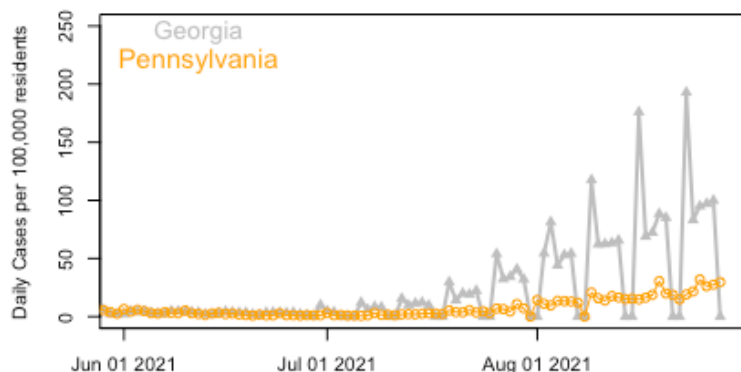
[https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/08272021/images/variants1\\_08272021.jpg](https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/08272021/images/variants1_08272021.jpg)

# What is happening in the rest of the U.S.? The 10 most populous states plus New Mexico

Trends over the last 3 weeks: **Increasing:** Georgia, Ohio. **Recent increases:** . **Steady:** California, Florida, Illinois, Michigan, New Mexico(?), New York, North Carolina, Pennsylvania, Texas.

	Cases	Deaths
New York	24.17	0.123
Michigan	20.06	0.179
Ohio	35.54	0.134
Florida	104.22	1.124
New Mexico	38.77	0.224
Illinois	28.8	0.224
Texas	51.51	0.649
California	33.79	0.213
North Carolina	60.16	0.35
Georgia	81.18	0.459
Pennsylvania	24.36	0.148

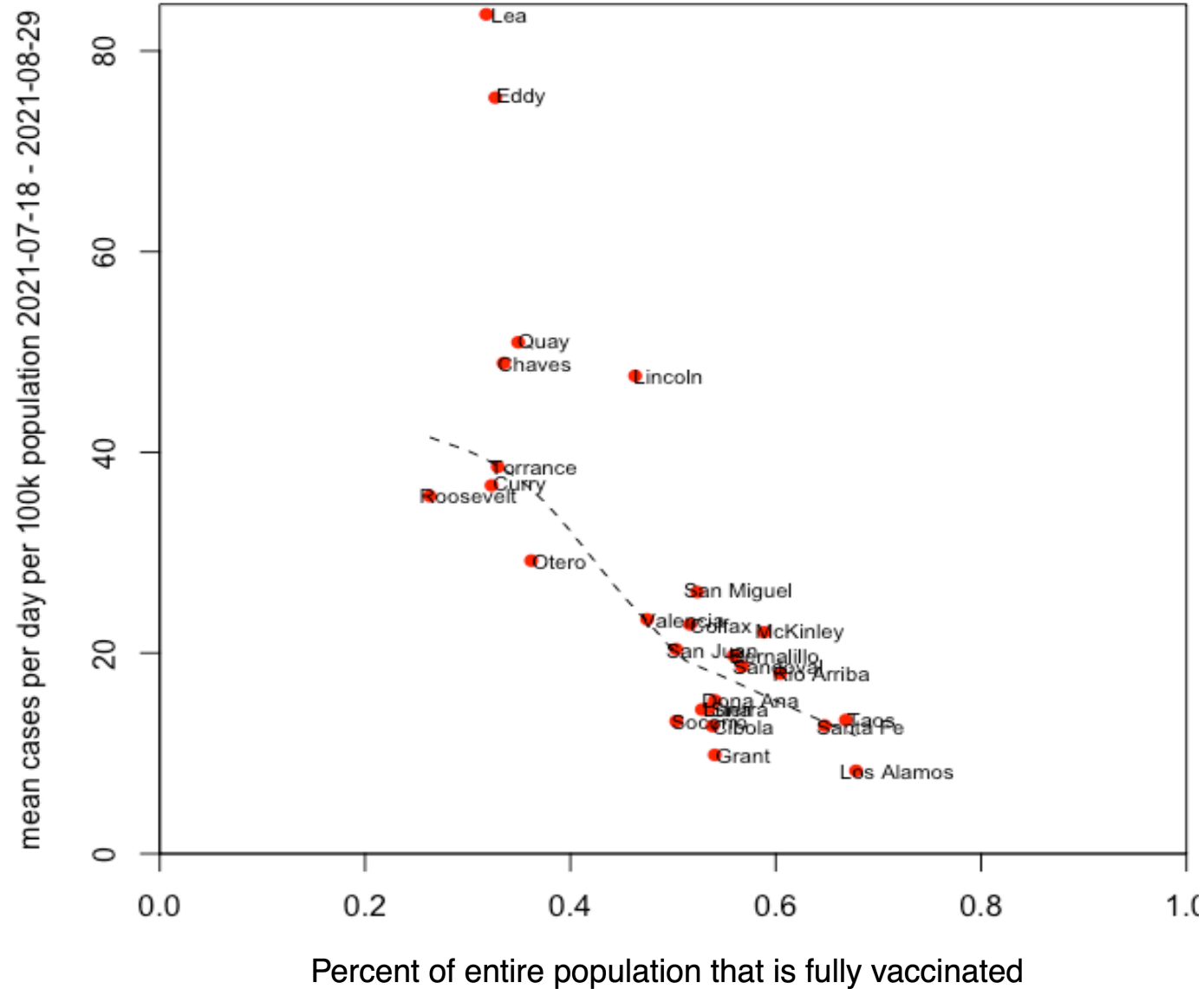
Daily rates per 100,000 residents averaged August 23<sup>rd</sup> thru August 29<sup>th</sup> 2021.



# Cases plotted versus vaccination by county

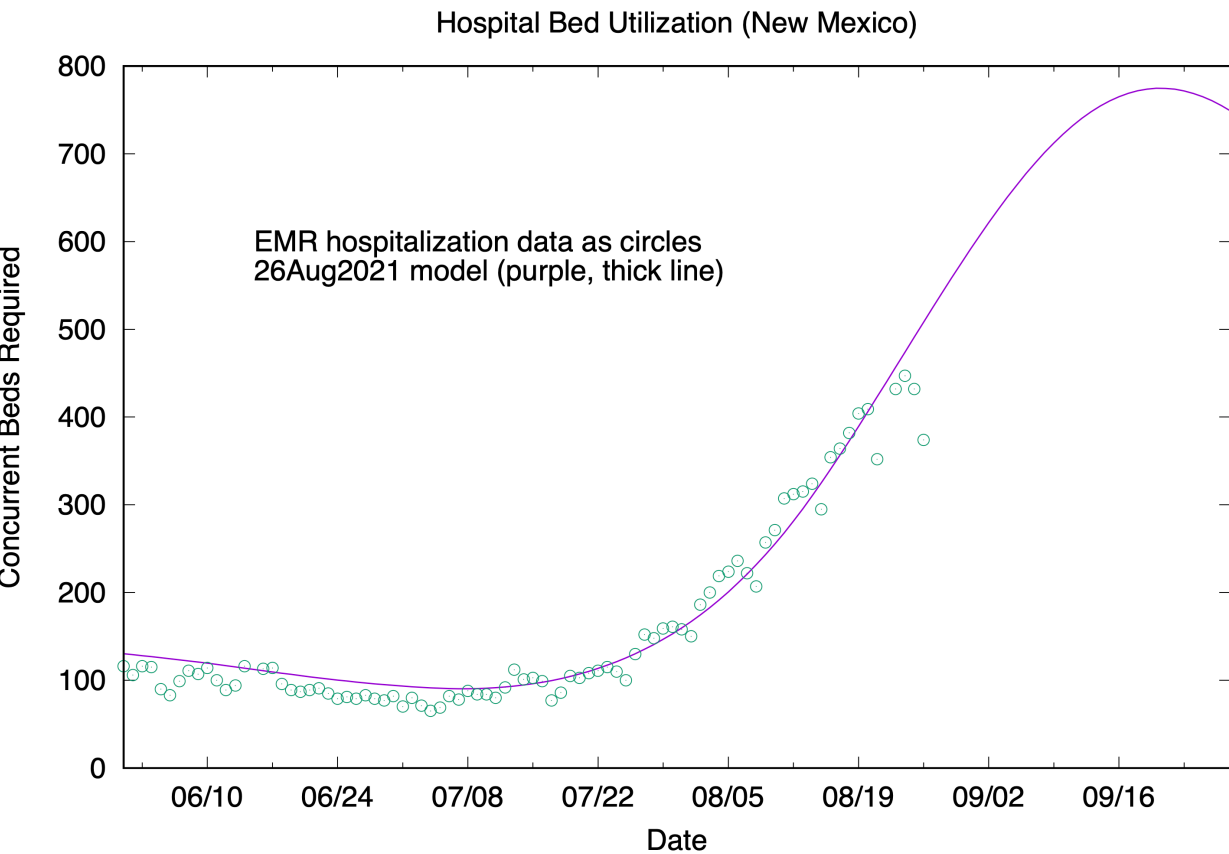
The relationship between vaccination and cases is strong.

- Lea and Eddy Counties have high incidence, likely even when accounting for low vaccine adoption. Lincoln is somewhat high for the level of vaccination.
- Seven counties are not on this plot due to relative isolation and small populations: Catron, De Baca, Guadalupe, Harding, Hidalgo, Mora and Union.

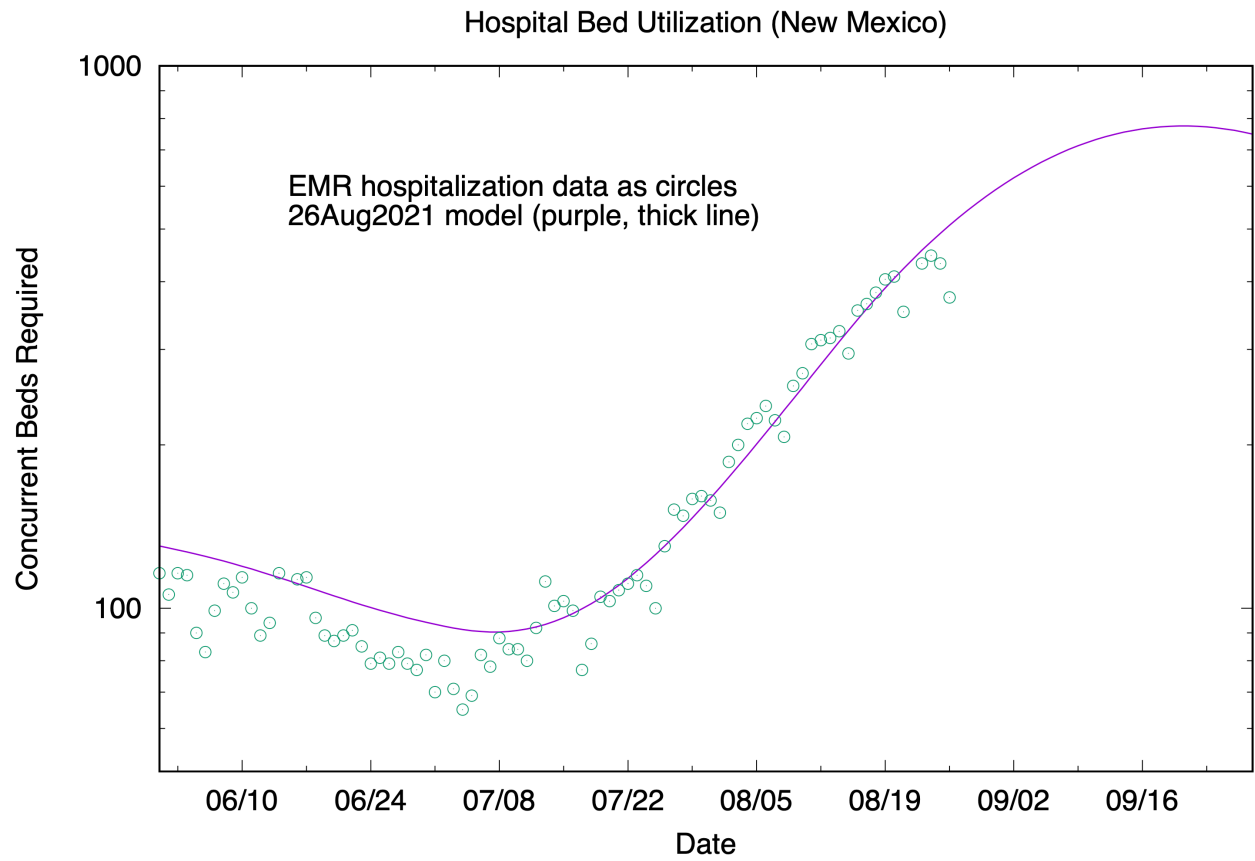


# Hospital bed concurrent usage by COVID-19 patients (Statewide)

- Left panel: linear vs. time (y-scale = 0:800)
- Right panel: log vs. time (y-scale = 50:1000, 20x)
- Some deviation of data below the model *may* be evident in late August.
- A peak in concurrent bed usage by mid- to late- September. Not expected to exceed ~770 beds.



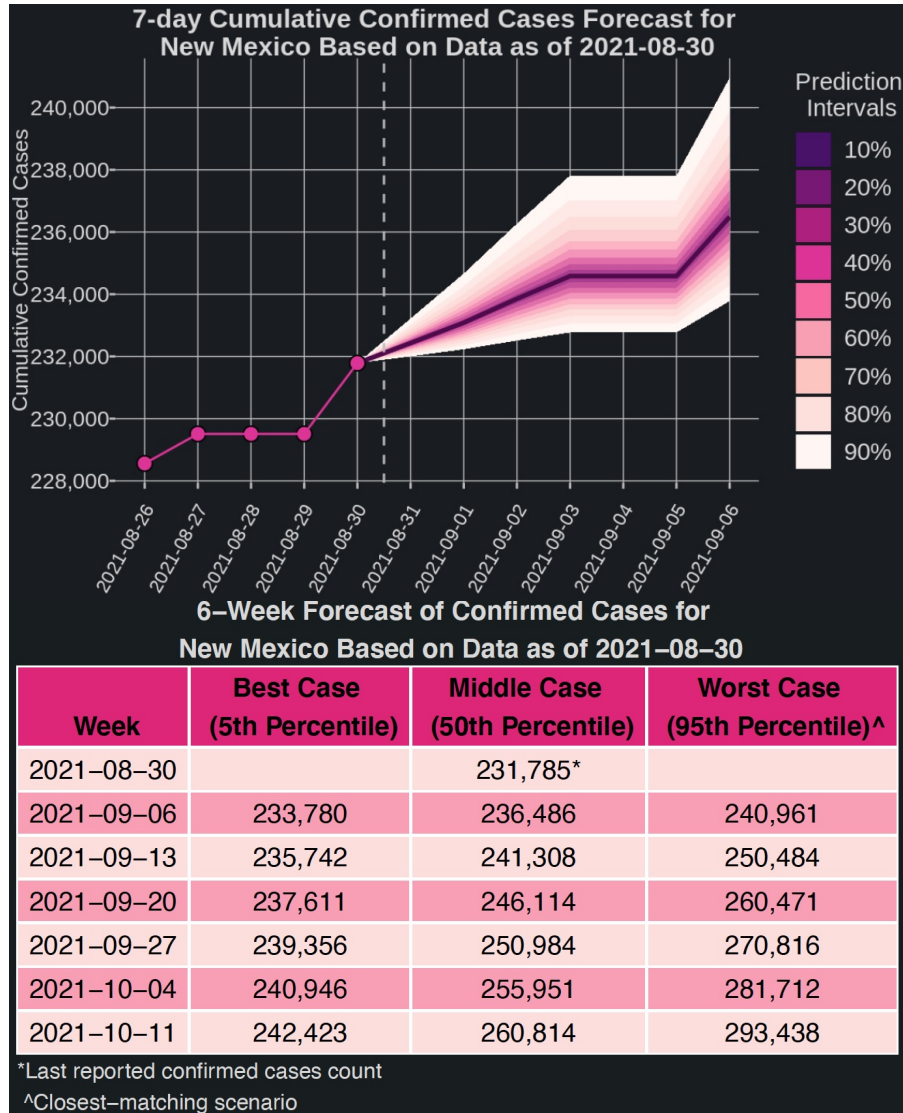
Tue Aug 31 10:02:09 2021



Tue Aug 31 10:10:42 2021



# Short- & Long-Term Forecast for NM: Cases



**6-Week Forecast of Daily Average of Confirmed Cases for New Mexico Based on Data as of 2021-08-30**

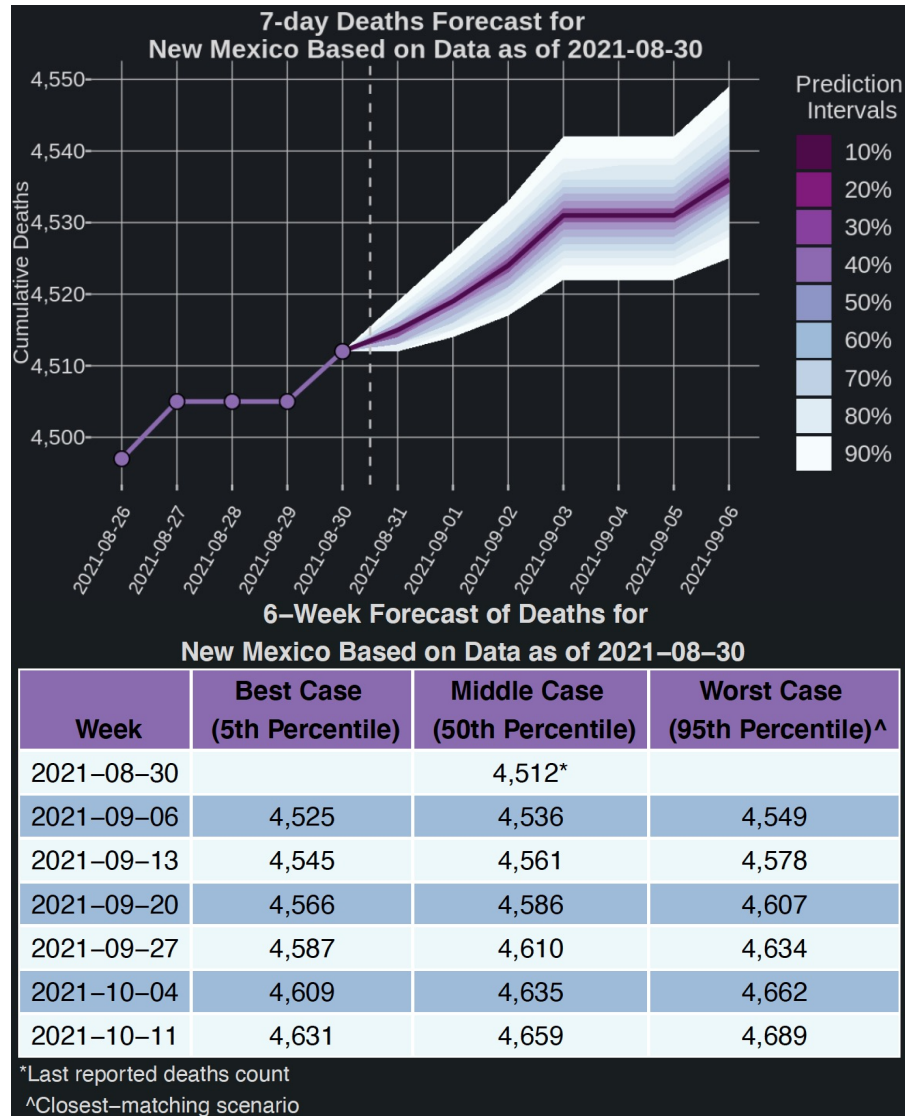
Week End Date	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile)^
2021-08-30		827*	
2021-09-06	285	672	1,317
2021-09-13	277	685	1,369
2021-09-20	263	692	1,430
2021-09-27	240	693	1,508
2021-10-04	212	687	1,598
2021-10-11	184	674	1,711

\*Last reported confirmed cases count  
^Closest-matching scenario

**So what?**

**Our model suggests that the number of daily cases is expected to range between 260 and 1,400 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 2021-08-30**

Week Start Date	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile)^
2021-08-30		4*	
2021-09-06	0	3	8
2021-09-13	0	3	8
2021-09-20	0	3	8
2021-09-27	0	3	8
2021-10-04	0	3	7
2021-10-11	1	3	8

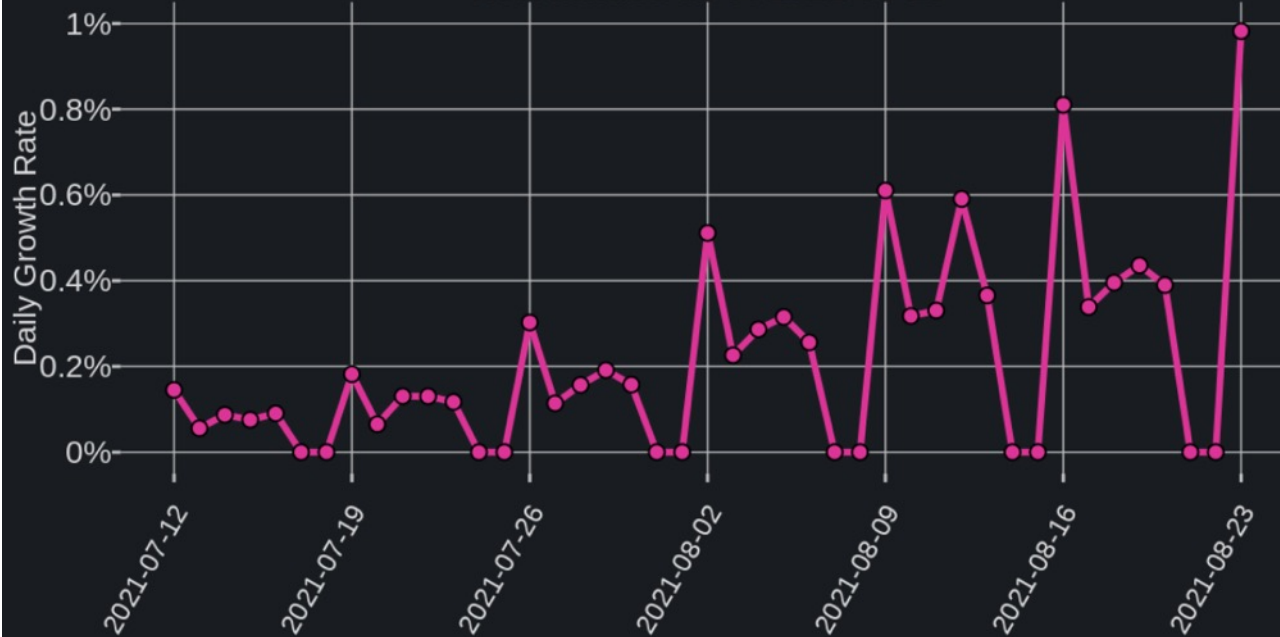
\*Last reported confirmed deaths  
^Closest-matching scenario

**So what?**

**Our model suggests that the number of daily deaths is expected to range between 0 and 8 in the next few weeks**

# Growth Rate for NM

Daily Growth Rate for the Past Six Weeks in New Mexico as of 2021-08-23



6-Week Forecast of the Average Weekly Growth Rate for New Mexico Based on Data as of 2021-08-23

Week	Best Case (5th Percentile)	Middle Case (50th Percentile)	Worst Case (95th Percentile) <sup>^</sup>
2021-08-23		0.36%*	
2021-08-30	0.16%	0.33%	0.59%
2021-09-06	0.17%	0.35%	0.60%
2021-09-13	0.16%	0.33%	0.58%
2021-09-20	0.13%	0.30%	0.54%
2021-09-27	0.095%	0.26%	0.51%
2021-10-04	0.083%	0.23%	0.49%

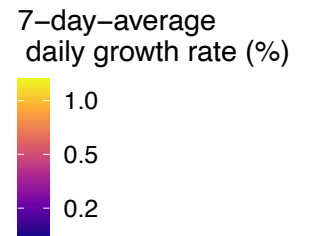
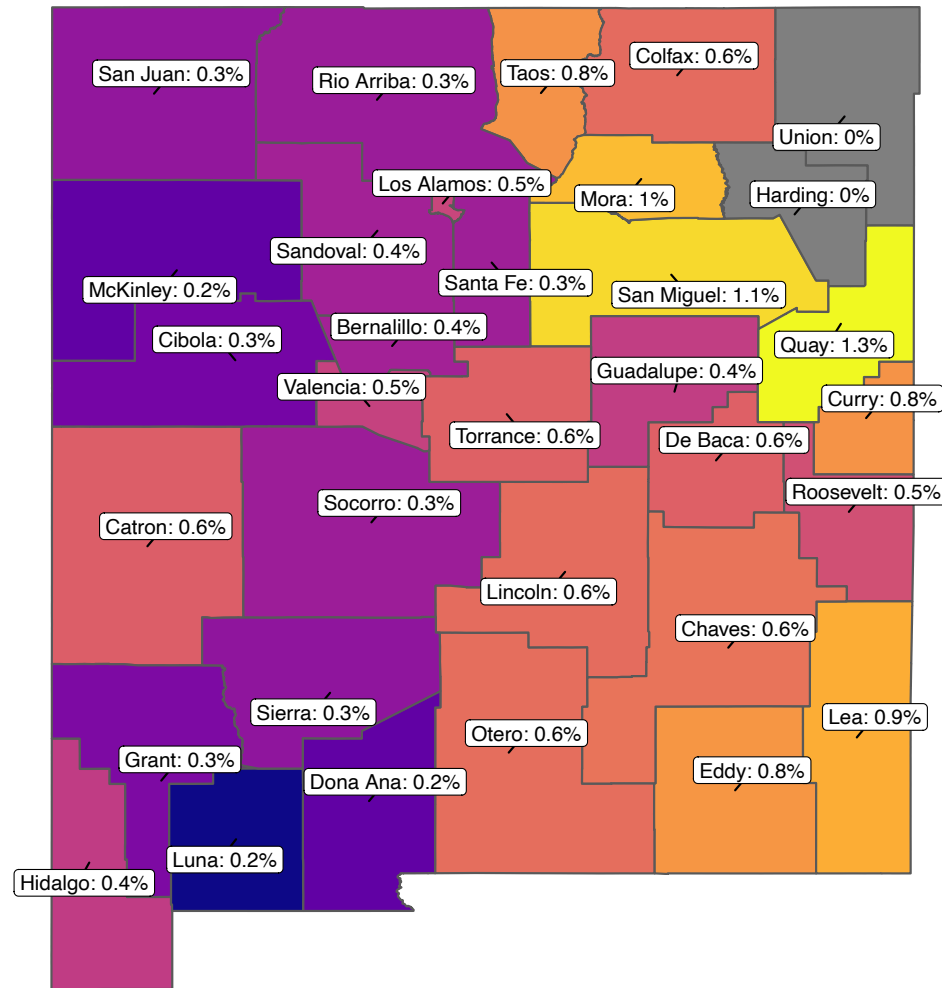
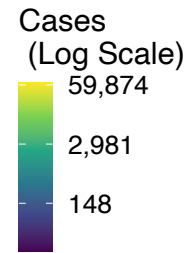
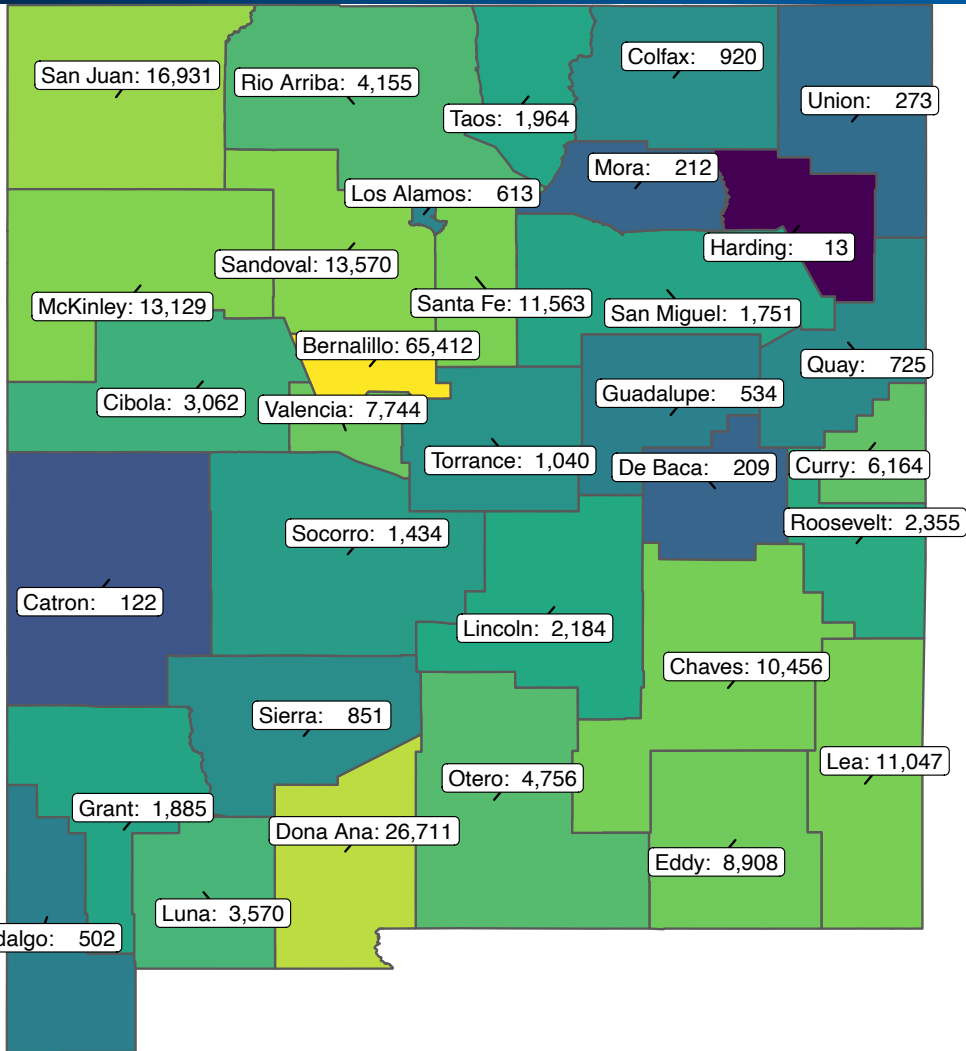
\*Last weekly mean daily growth rate

<sup>^</sup>Closest-matching scenario

**So what?**

**As of August 31<sup>st</sup>, the average growth rate in NM is at 0.36% (same as last week)**

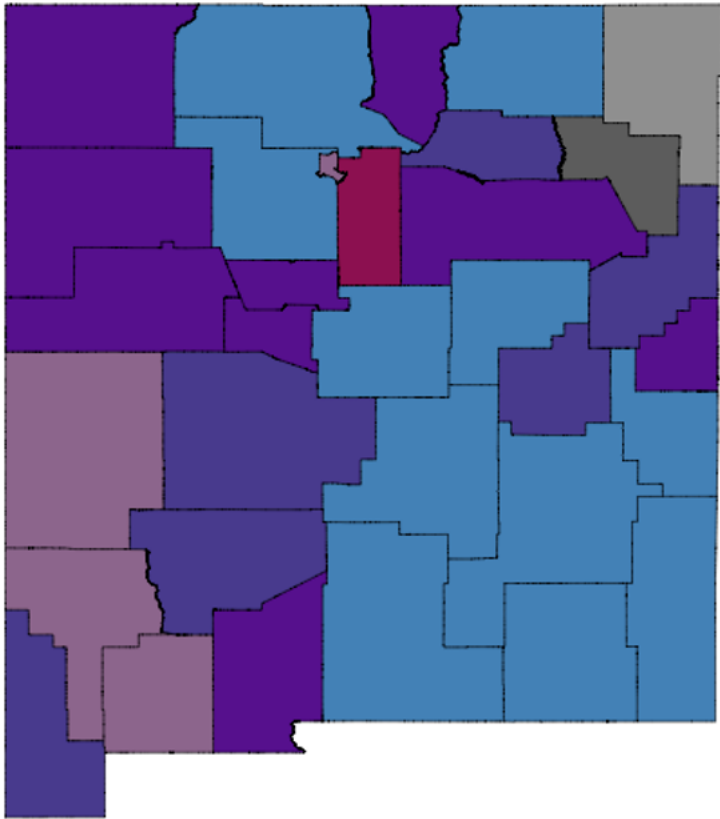
# Cumulative Cases & Daily Growth Rate for NM: Aug 30



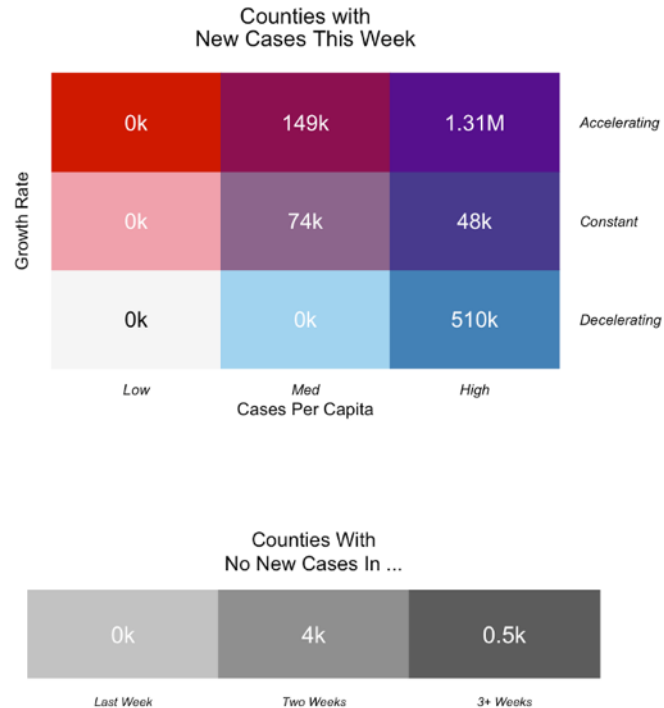
So what? Cumulative growth rates are mixed

\*Growth rate is in cumulative cases

# Weekly Growth Rate for NM: Another View (Aug 30)



Impacted New  
Mexicans



## So what?

- Most people in New Mexico are living in a county that is **high per-capita case counts with accelerating growth**
- Northwest and metro are accelerating and high per-capita, Southeast are decelerating with high per-capita

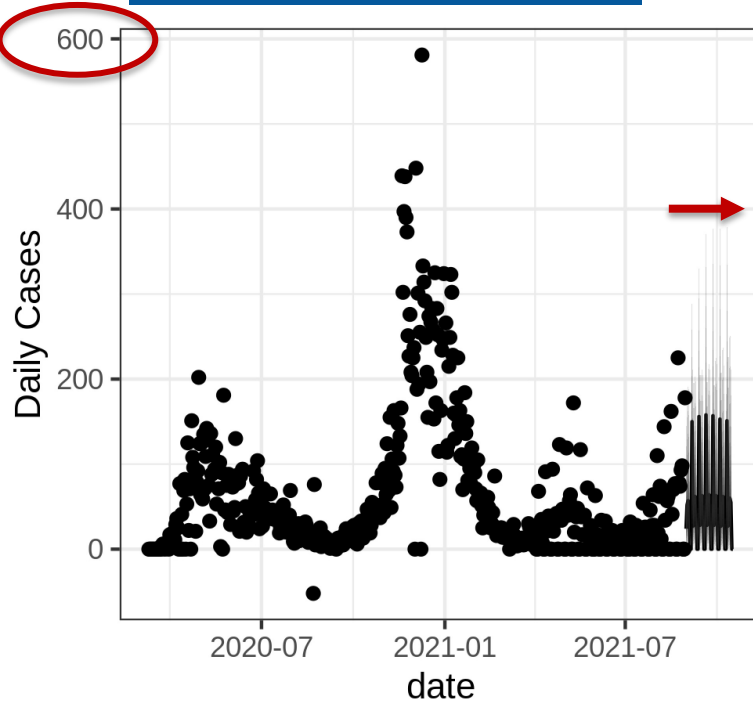
Number of New Mexicans living in regions with particular combinations of per capita case counts and 7-day growth rates

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

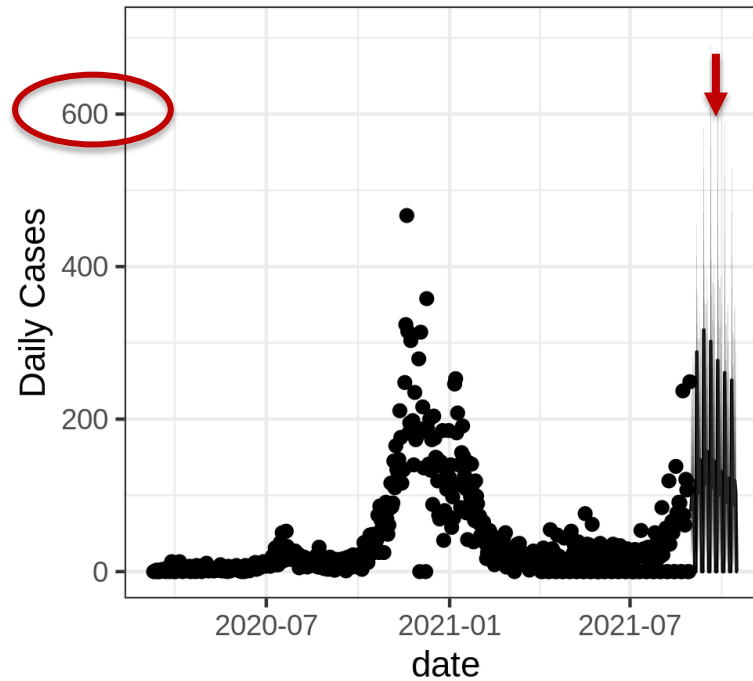
## > **Additional Regional Forecasts**

# Central & North Regions Daily Cases Forecast

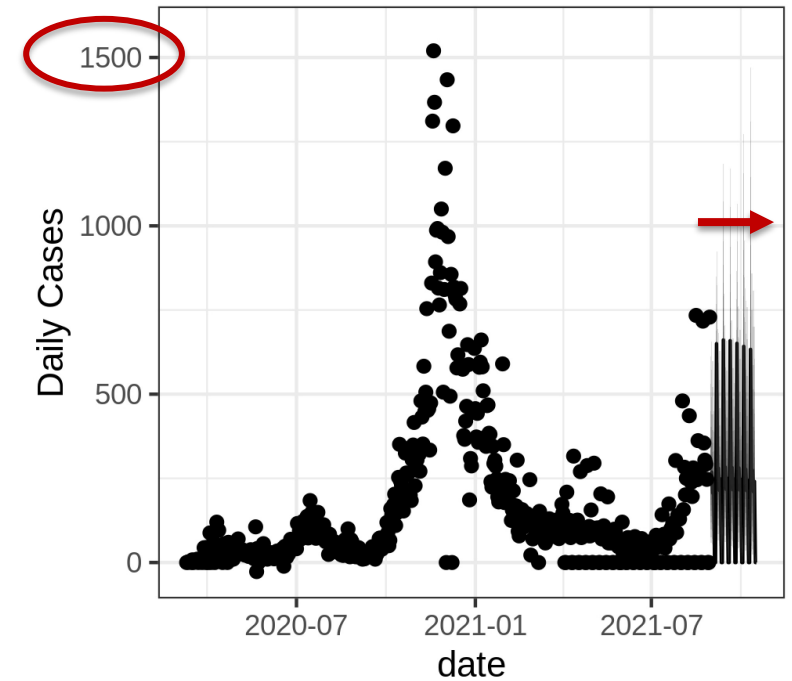
## Northwest



## Northeast



## Central

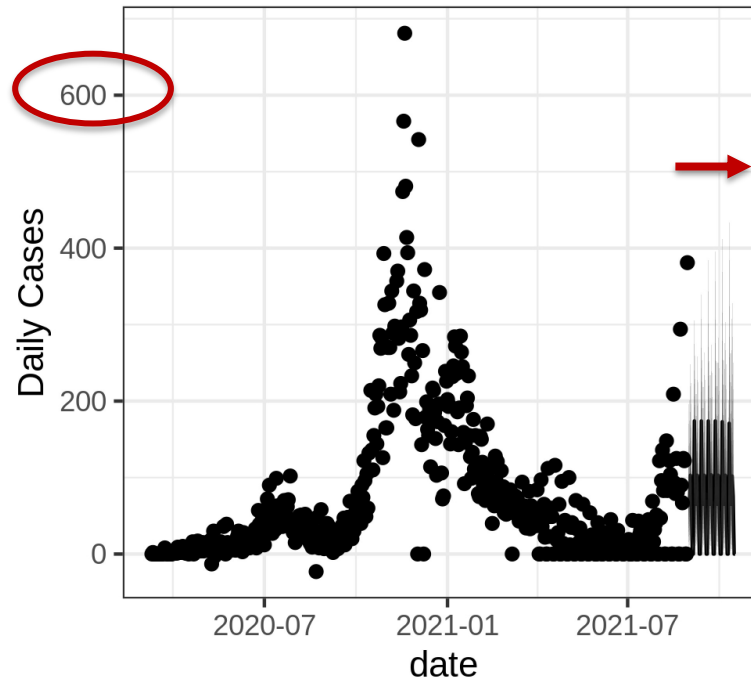


**So what?**

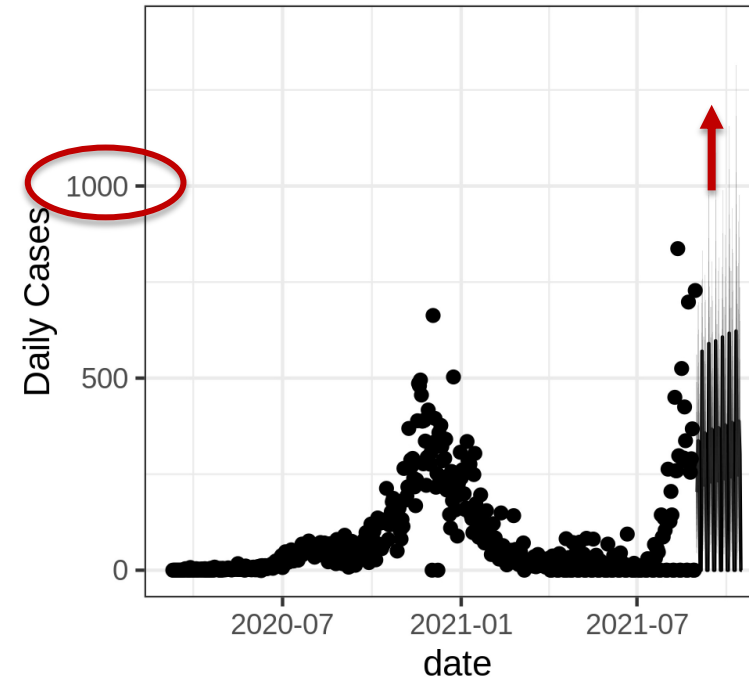
**The central region is expected to see the most number of cases followed by the northeast and northwest regions, respectively**

# South Regions Daily Cases Forecast

## Southwest



## Southeast



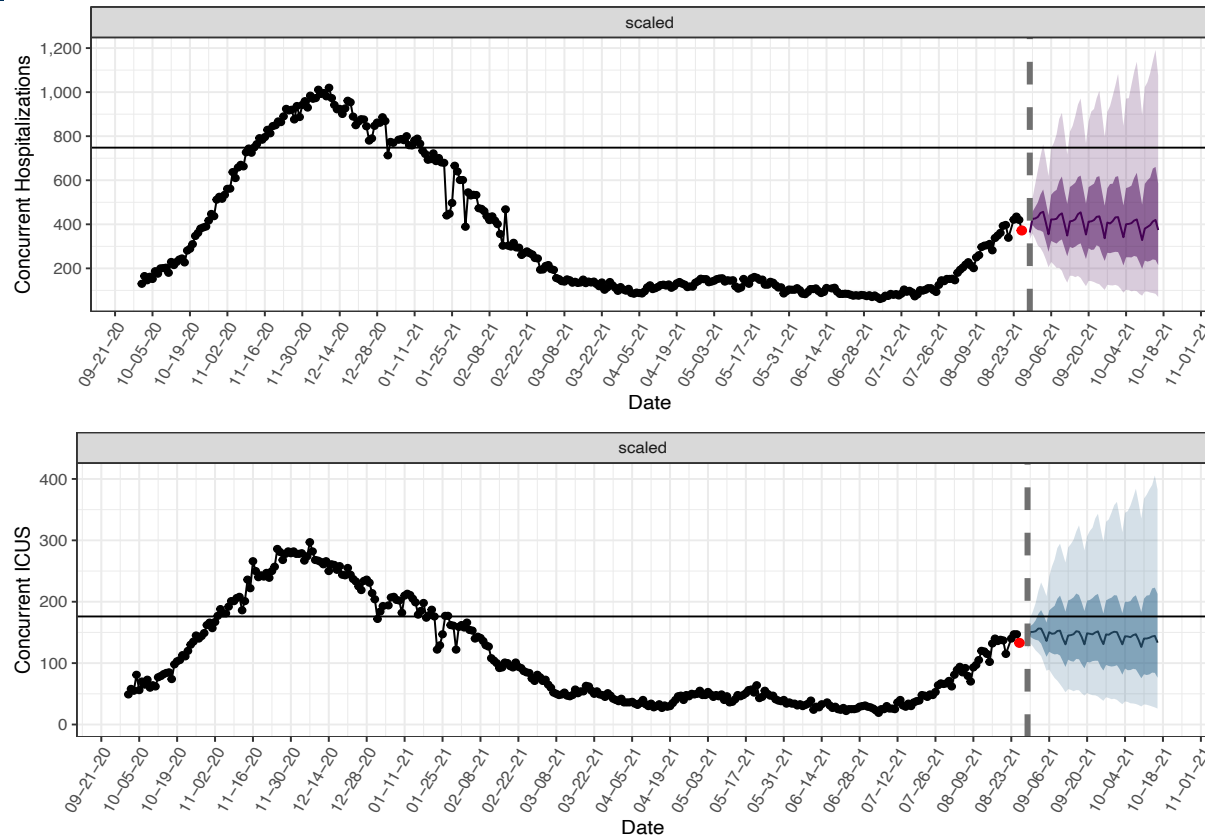
**So what?**

**The number of cases in the Southeast region are likely to go up**



# > 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

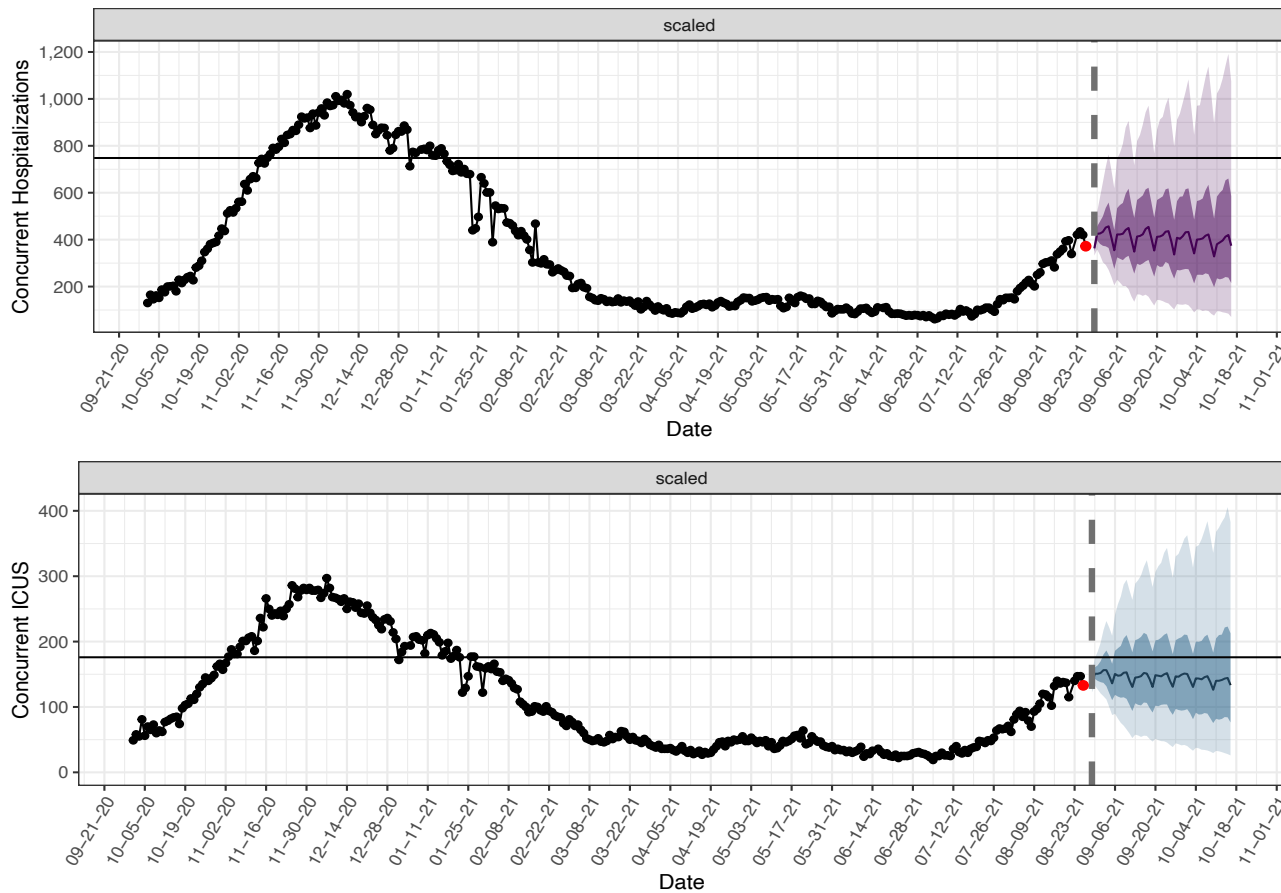
Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
9/5	88	136	209
9/12	52	131	264
9/19	47	131	284
9/26	39	131	298
10/3	33	131	313
10/10	29	126	336

“Scaled” Scenario

So what?

Model is predicting a holding steady or a slow 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



## Concurrent COVID-19 non-ICU “med-surge” beds

Week	Qu. 5% (best case)	Qu. 50% (median)	Qu. 95% (worst case)
9/5	117	219	410
9/12	83	218	453
9/19	72	223	484
9/26	64	206	500
10/3	57	211	534
10/10	47	202	560

“Scaled” Scenario

So what?

Med-surge general bed needs are predicted to hold steady during the next 3 weeks

## > **Non-Congregational Shelter Forecast**

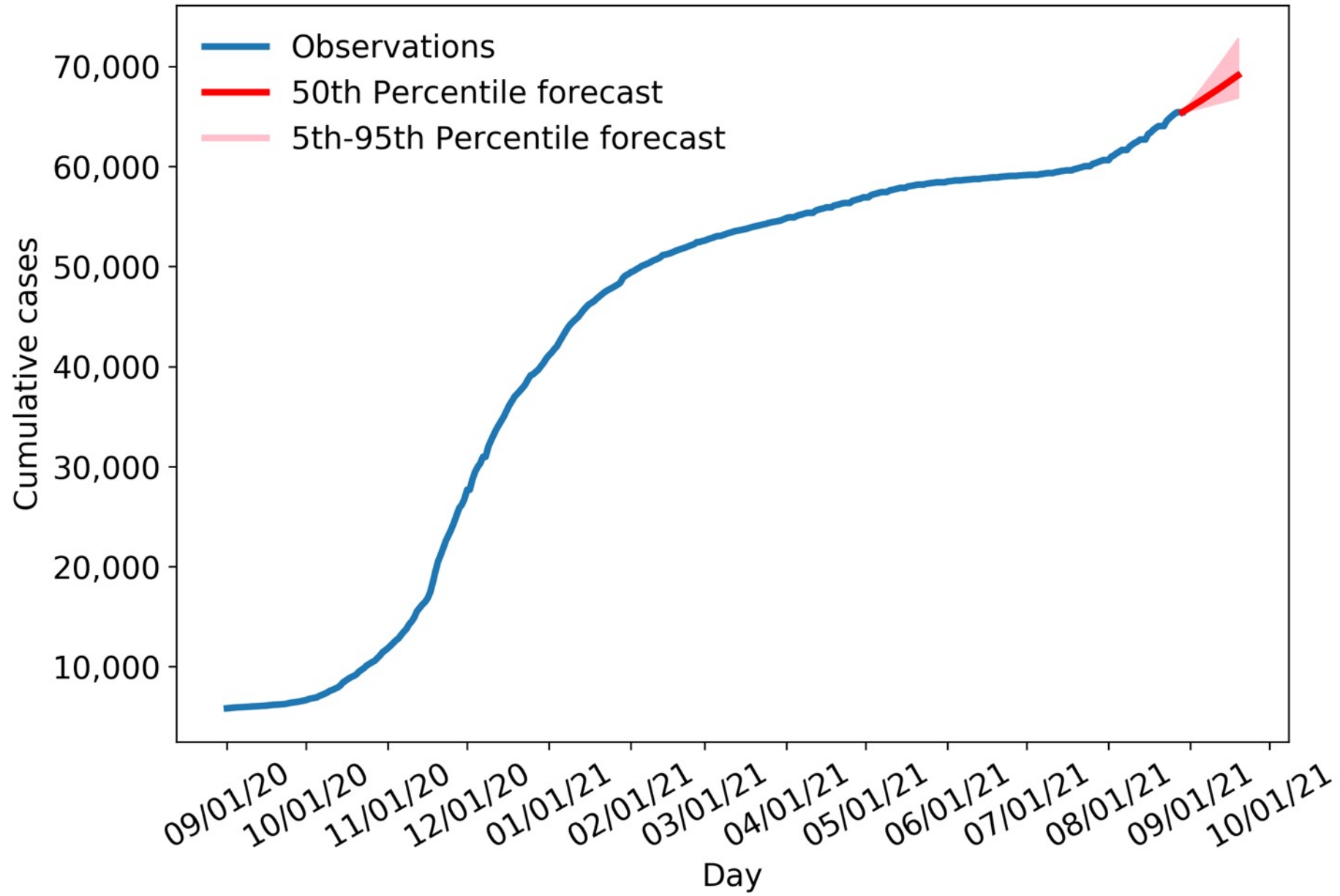
# Non-Congregate Shelter Forecast

- **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**
- **We add a second forecast method for comparison by averaging the shelter forecast with the number of current shelters in use to smooth the forecast**
- **We add a third forecast method for comparison using a historical record of shelter usage based on a similar time period with the same number of new cases per day, averaged over the previous two weeks**

# Recommendations

- In addition to the counties that already have shelters:
- Based on current trends in new cases per day and case forecasts, we recommend the following counties be considered for potential shelter locations:
  - Eddy

# Bernalillo County Cumulative COVID-19 cases and 6-week forecast



# Bernalillo

Cumulative cases as of 8/29/21: **65,412**

Number of shelter rooms available: **221**

Total number of patients/medical workers (including specialty): **35**

Occupied rooms:new cases ratio: **0.18**

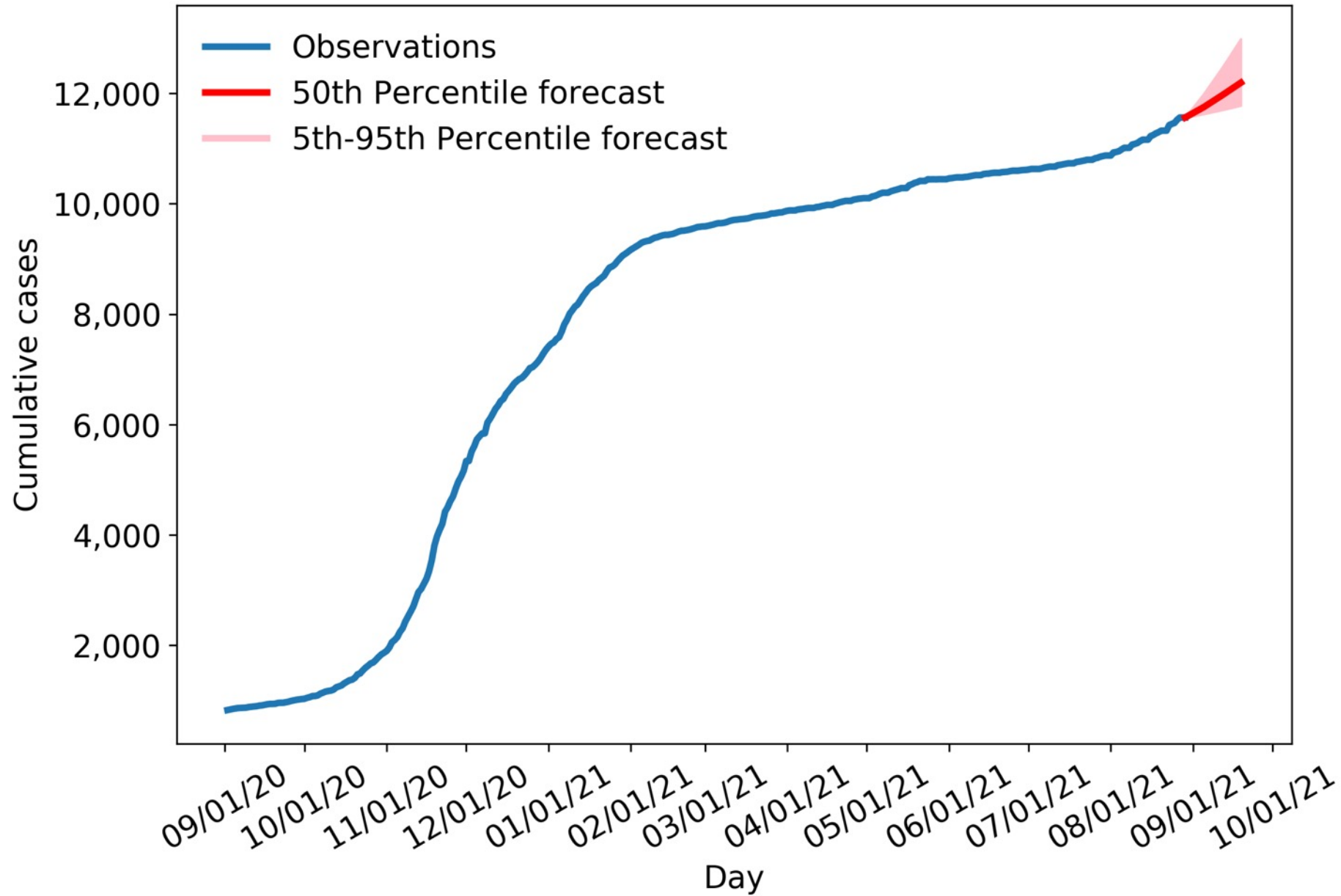
2-week avg. new cases per day: **195**

**(+21 cases/day from last week)**

	9/5/21	9/12/21	9/19/21
# of rooms needed (case ratio forecast)	30 (12-60)	31 (13-62)	33 (13-66)
# of rooms needed (smoothing forecast)	32	32	32
# of rooms needed (historical similarity)	41 rooms based on 179 new cases/day		



# Santa Fe County Cumulative COVID-19 cases and 6-week forecast



# Santa Fe

Cumulative cases as of 8/29/21: **11,563**

Number of shelter rooms available: **44**

Total number of patients/medical workers (including specialty): **8**

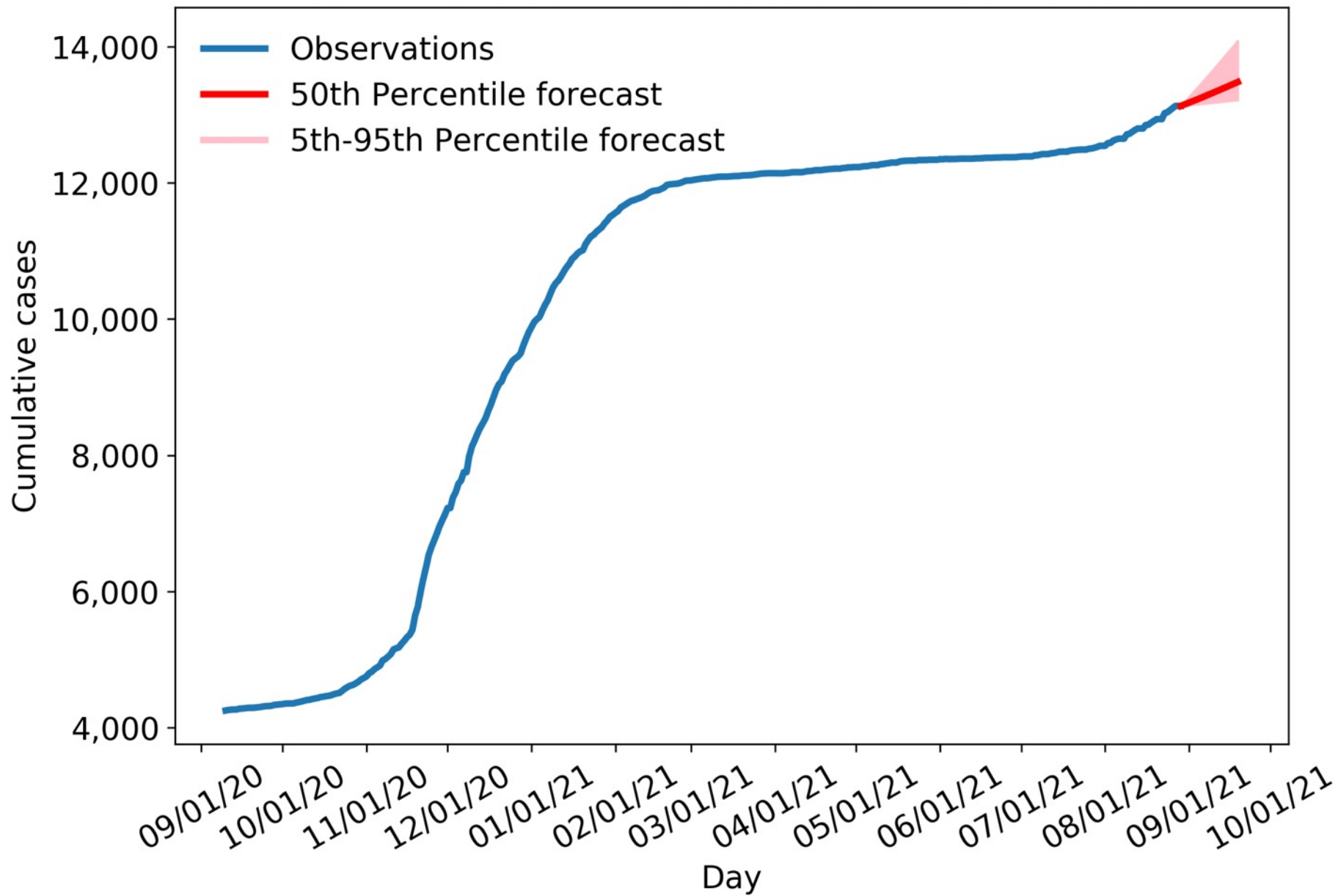
Occupied rooms:new cases ratio: **0.28**

2-week avg. new cases per day: **29**

**(+7 cases/day from last week)**

	9/5/21	9/12/21	9/19/21
# of rooms needed (case ratio forecast)	8 (3-17)	9 (3-19)	9 (3-21)
# of rooms needed (smoothing forecast)	8	8	8
# of rooms needed (historical similarity)	12 rooms based on 34 new cases/day		

# McKinley County Cumulative COVID-19 cases and 6-week forecast



# McKinley

Cumulative cases as of 8/29/21: **13,129**

Number of shelter rooms available: **410**

Total number of patients/medical workers (including specialty): **111**

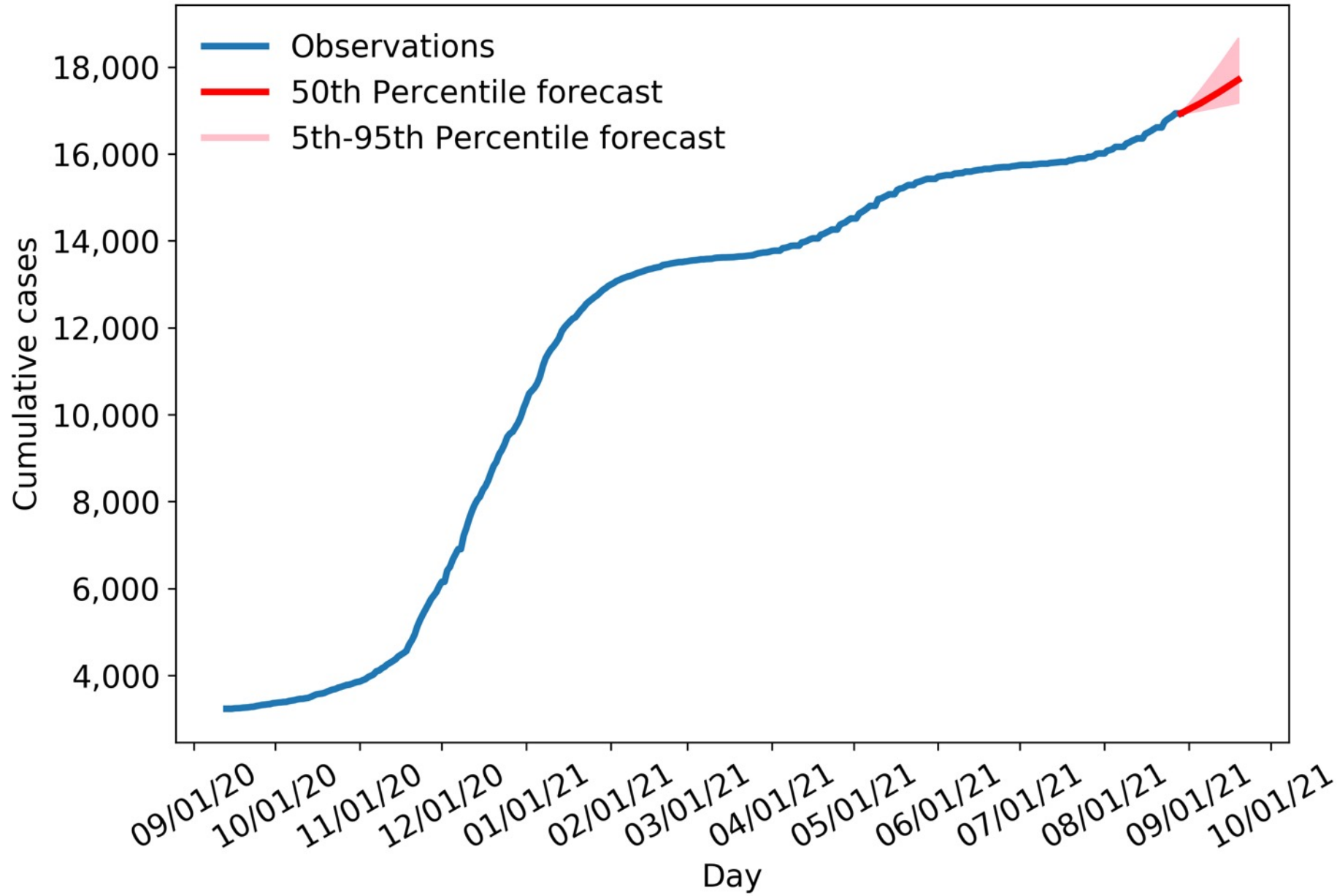
Occupied rooms:new cases ratio: **4.7**

2-week avg. new cases per day: **24**

**(+3 cases/day from last week)**

	9/5/21	9/12/21	9/19/21
# of rooms needed (case ratio forecast)	74 (18-206)	79 (20-213)	81 (19-220)
# of rooms needed (smoothing forecast)	93	88	86
# of rooms needed (historical similarity)	149 rooms based on 22 new cases/day rate (July 2020) or 23 rooms based on 24 new cases/day rate (Feb 2021)		

# San Juan County Cumulative COVID-19 cases and 6-week forecast



# San Juan

Cumulative cases as of 8/29/21: **16,931**

Number of shelter rooms available: **67**

Total number of patients/medical workers (including specialty): **1**

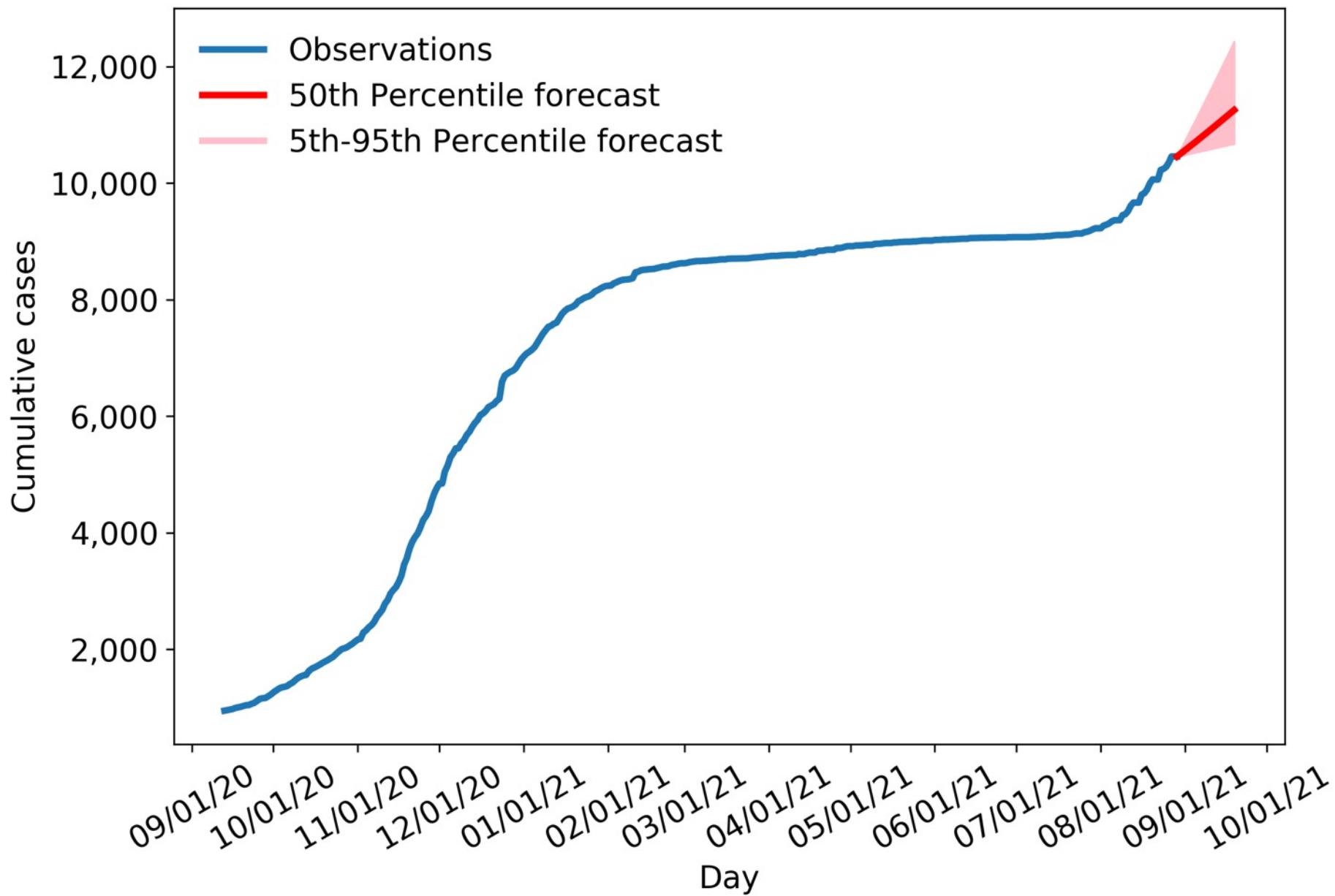
Occupied rooms:new cases ratio: **0.02**

2-week avg. new cases per day: **41**

**(+9 cases/day from last week)**

	9/5/21	9/12/21	9/19/21
# of rooms needed (case ratio forecast)	1 (0-2)	1 (0-2)	1 (0-2)
# of rooms needed (smoothing forecast)	1	1	1
# of rooms needed (historical similarity)	2 rooms based on 41 new cases/day		

# Chaves County Cumulative COVID-19 cases and 6-week forecast



# Chaves

Cumulative cases as of 8/29/21: **10,456**

Number of shelter rooms available: **0**

Total number of patients/medical workers (including specialty): **6**

Occupied rooms:new cases ratio: **0.11**

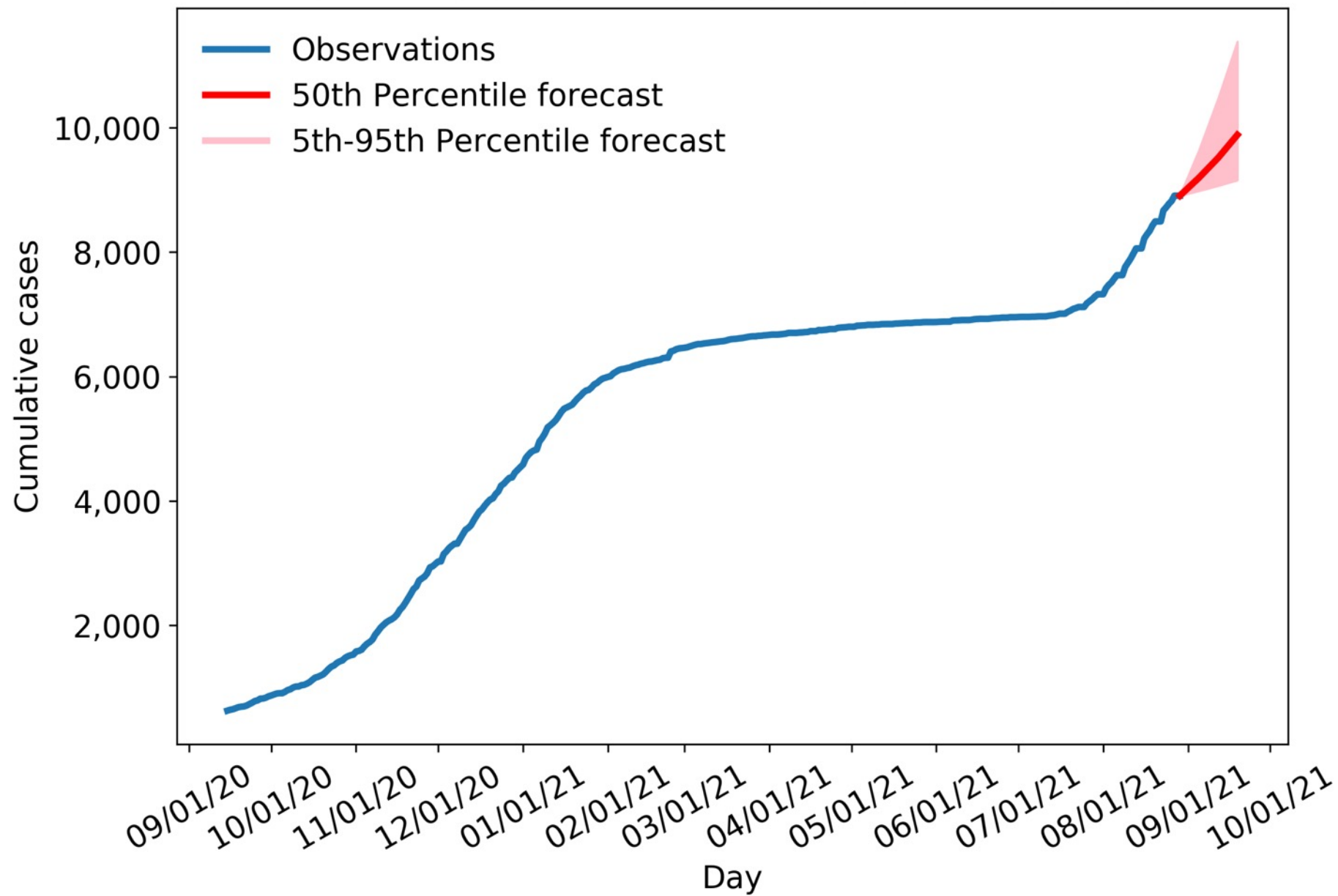
2-week avg. new cases per day: **57**

	9/5/21	9/12/21	9/19/21
# of rooms needed (case ratio forecast)	4 (1-10)	4 (1-10)	4 (1-10)
# of rooms needed (smoothing forecast)	5	5	5
# of rooms needed (historical similarity)	-		



# Eddy County

## Cumulative COVID-19 cases and 6-week forecast



# Eddy

Cumulative cases as of 8/29/21: **8,908**

Number of shelter rooms available: **0**

Total number of patients/medical workers (including specialty): **0**

Occupied rooms:new cases ratio: **0**

2-week avg. new cases per day: **61**

**(-1 cases/day from last week)**

	9/5/21	9/12/21	9/19/21
# of rooms needed (case ratio forecast)	-	-	-
# of rooms needed (smoothing forecast)	-	-	-
# of rooms needed (historical similarity)	-		