

Modeling & Forecasting COVID-19 in NM

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October 12, 2021

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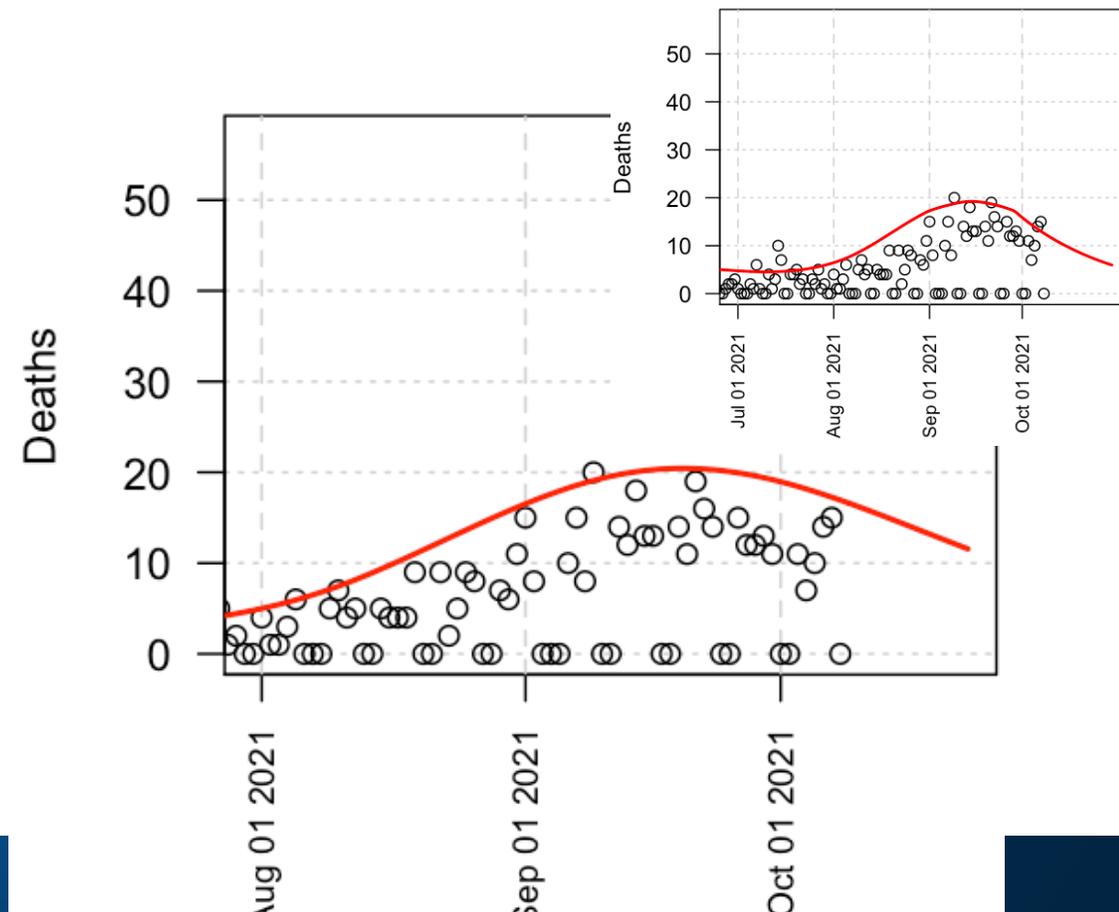
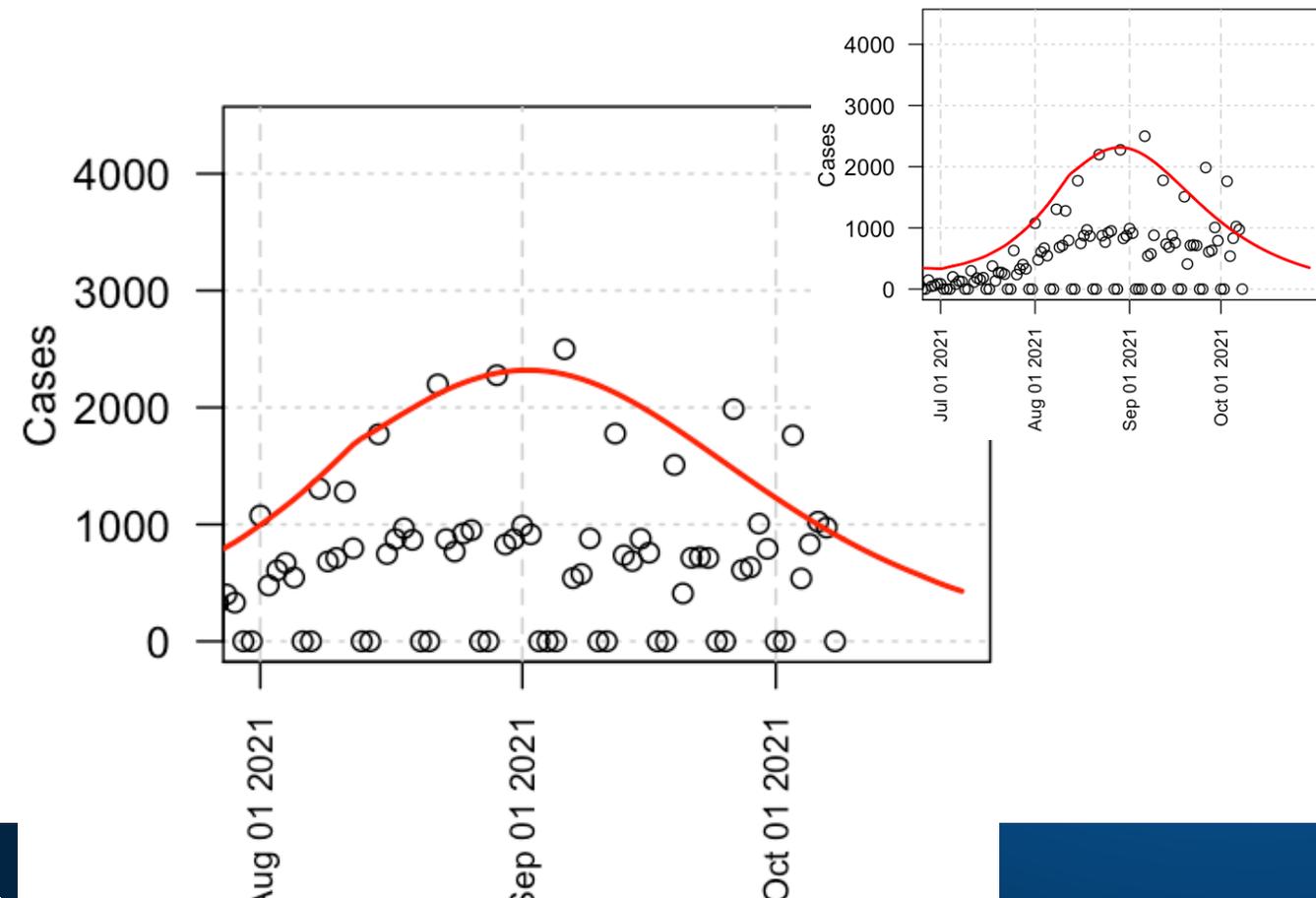
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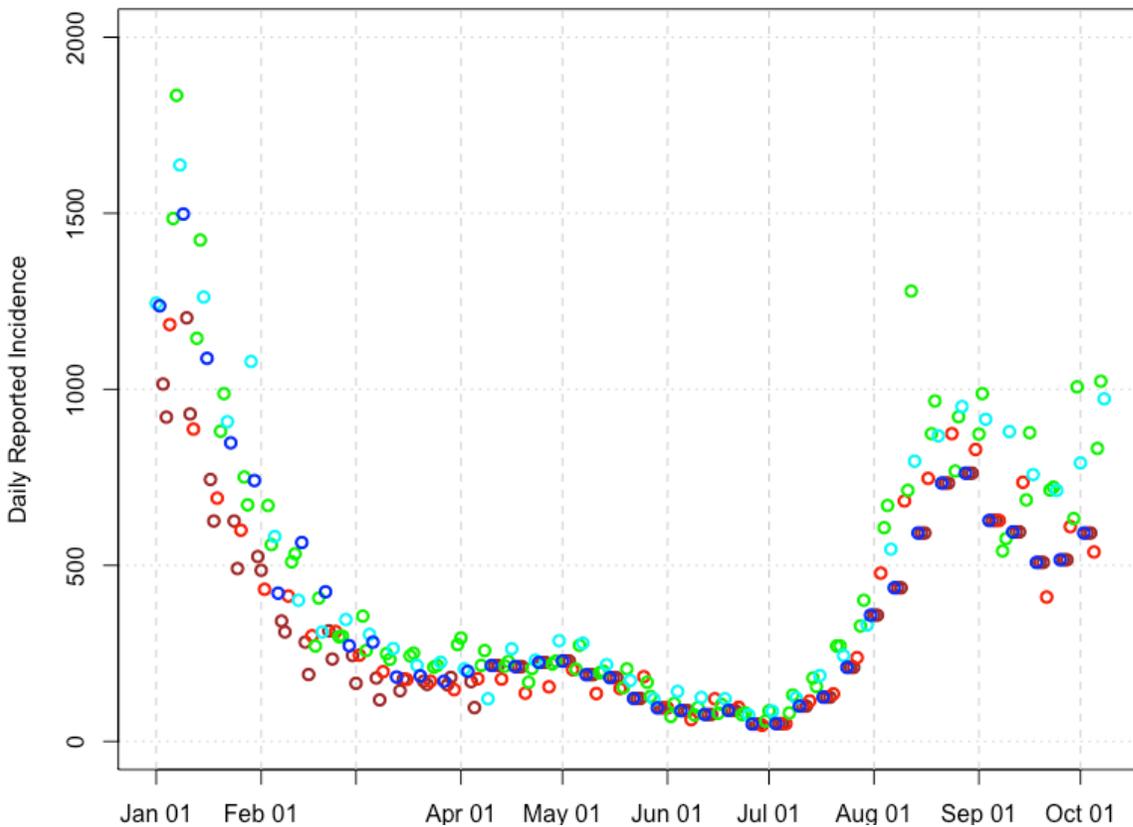
12 Oct 2021: EpiGrid modeling

- **This model is still optimistic.** New Mexico has flat (or rising) incidence. Some updated model results are shown (insets).
- Some large-population counties are deteriorating.
- NM has no statewide trend toward recovery.
- NM daily deaths show a weak peak in September. A long tail of mortality into October is occurring. An increase in mortality is possible.
- Rising cases are in part due to poor infection control of Delta variant and lower vaccination rates.



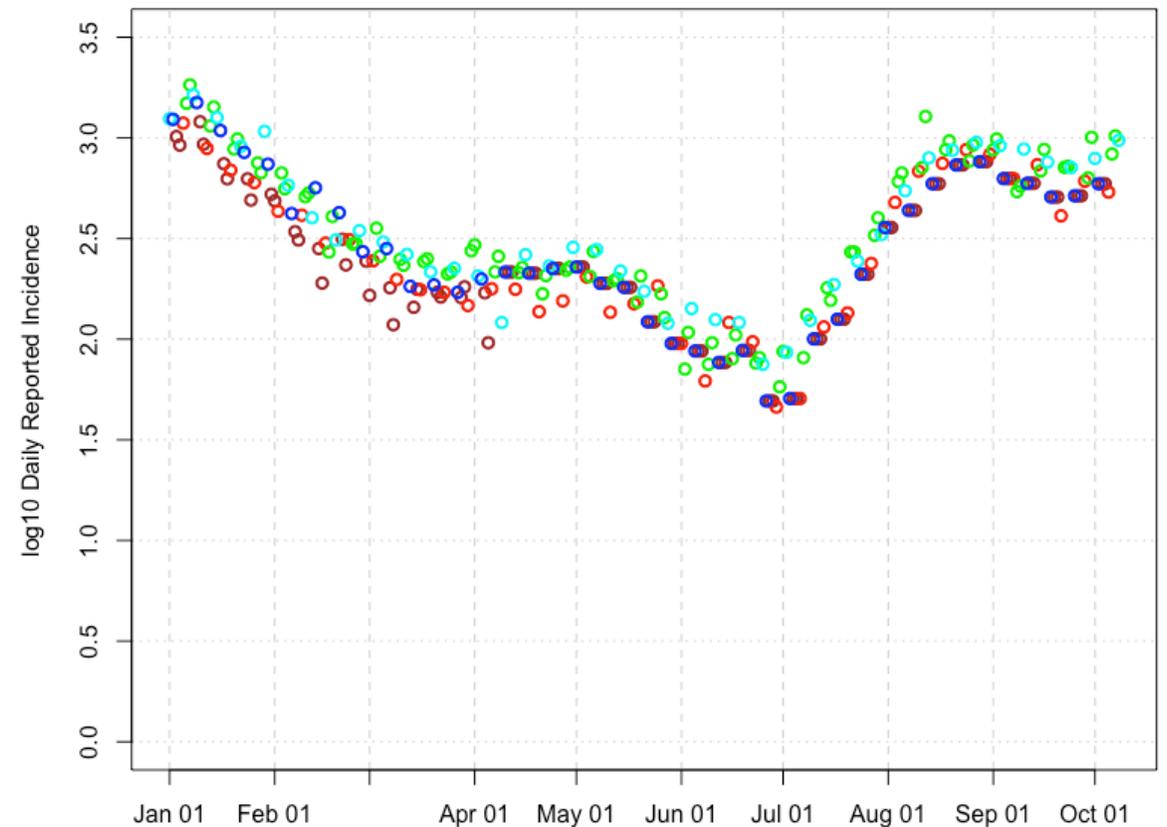
A look at the raw incidence data

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



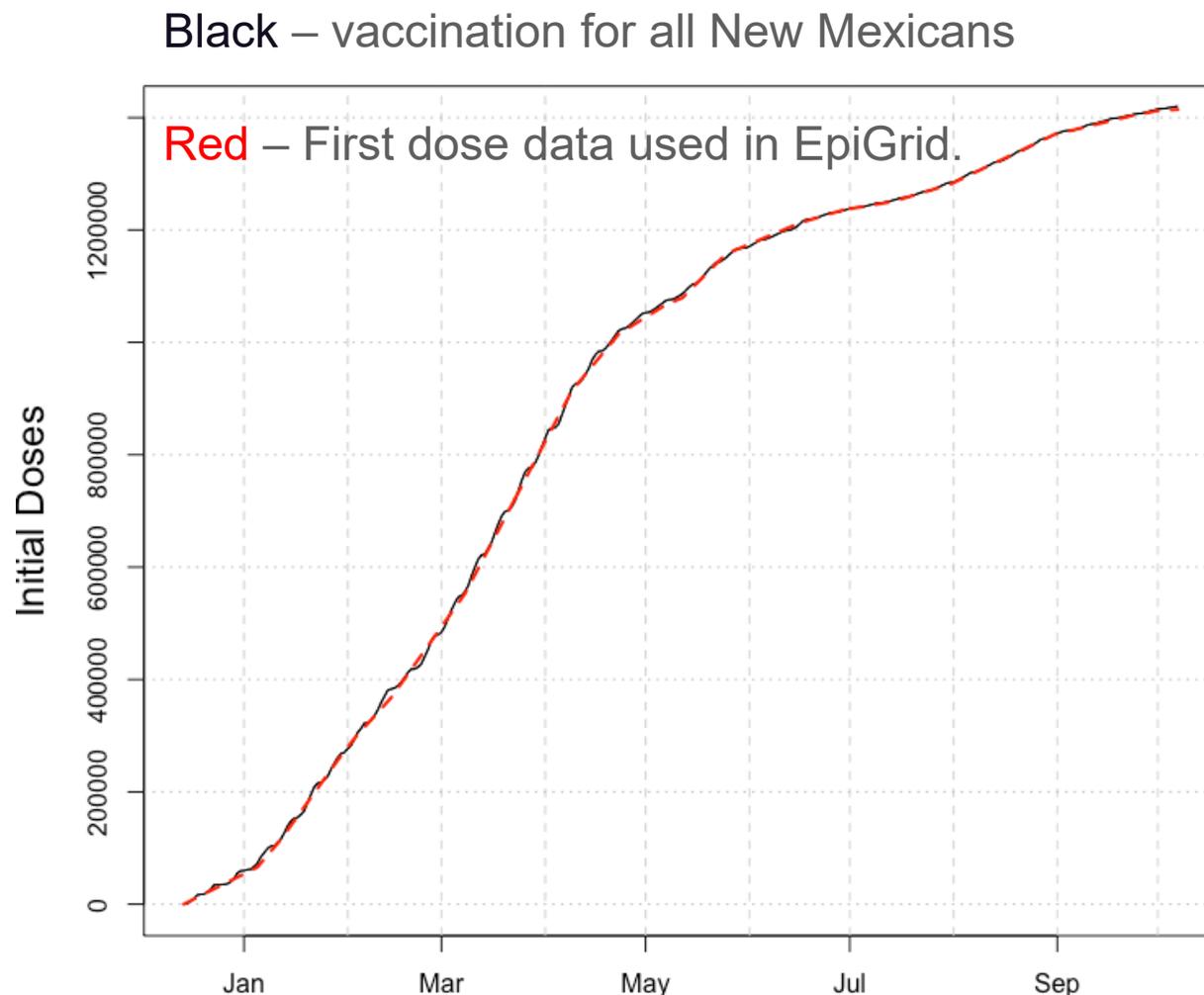
Cases rates are rising (or flat).

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



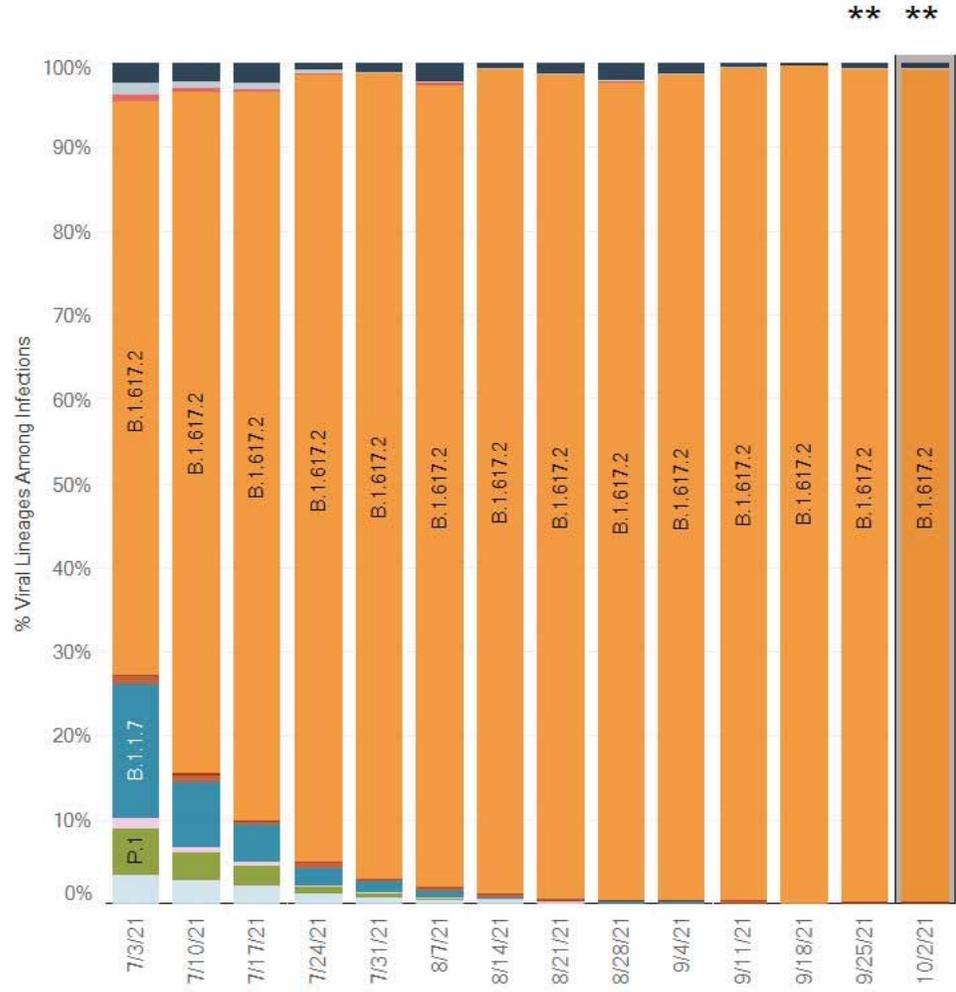
12 October 2021 Vaccine Analysis

- ~1424k first doses have been administered in NM.
- ~1255k completed vaccine series in NM.
- ~67.9% of all persons in New Mexico are at least minimally vaccinated.
- ~85.5% of all persons in New Mexico are currently eligible (~1792k).
- 67.9/85.5 ~ 79.5% of all eligible people.
- 5-11 year old should soon provide significant help.
- US Census Bureau reports 2097k people in New Mexico.



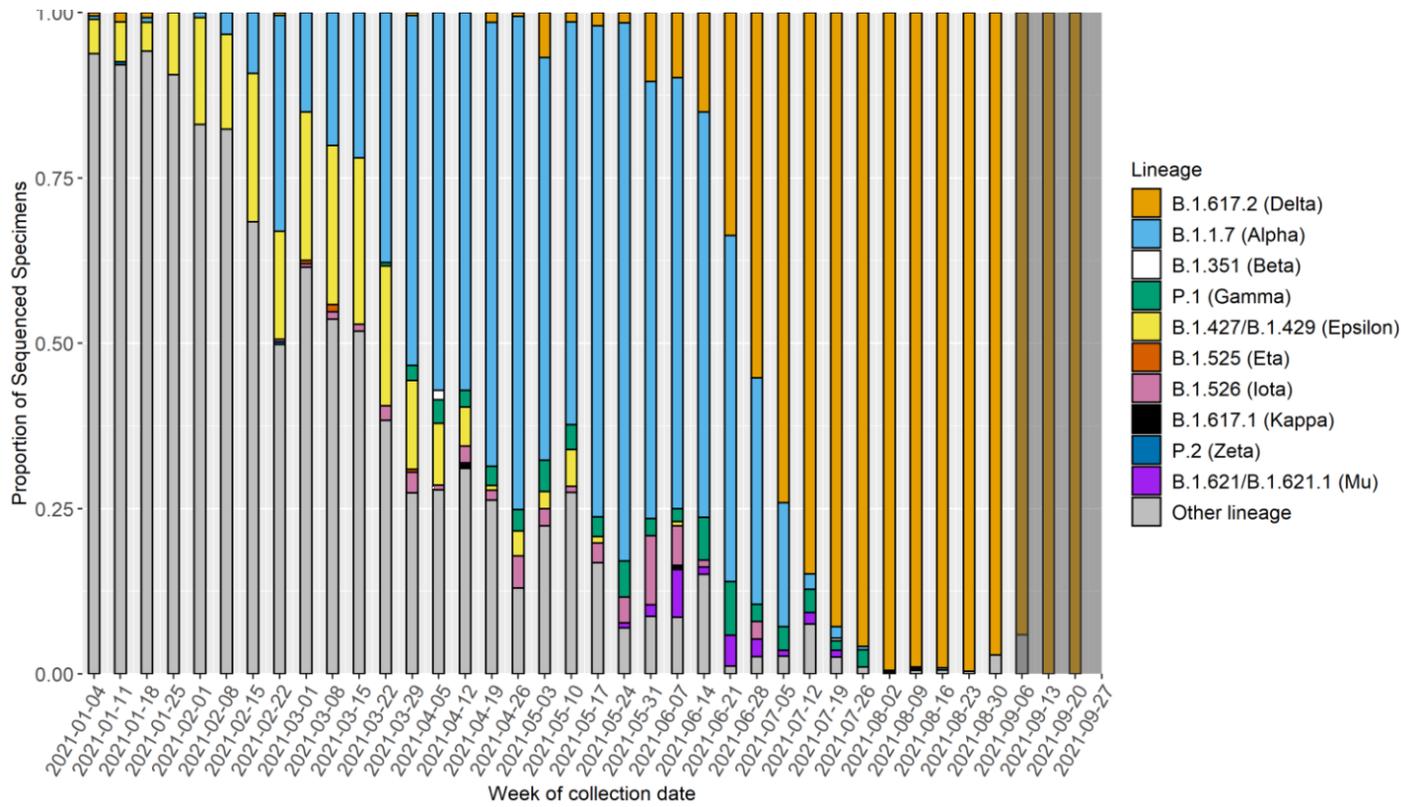
Variant Monitoring.

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



- B.1.617.2, “Δ”, ”Delta”, is the “Indian” variant.
- New variants have appeared without evident intermediates.
- *Low levels* of old variants often persist (E.g. the A-lineage).

New Mexico’s data are consistent with Delta being dominant.



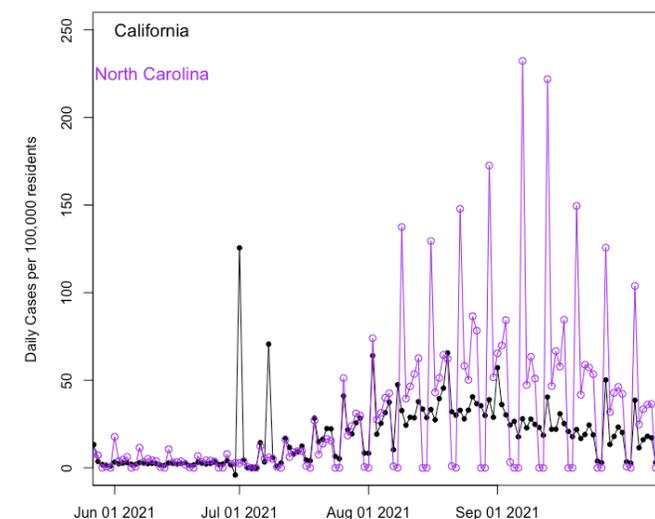
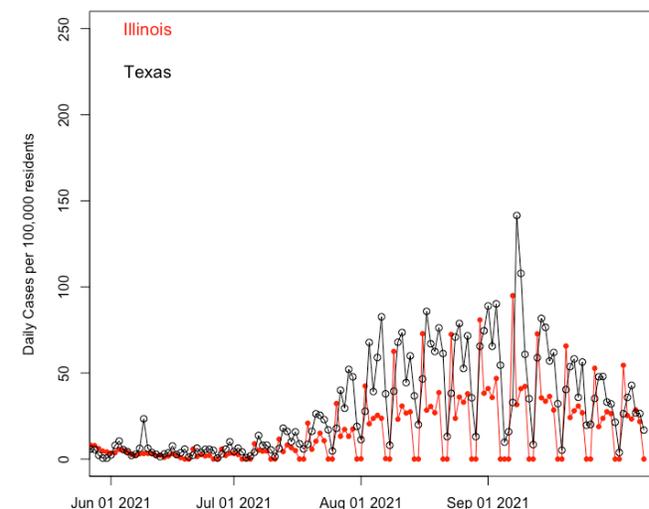
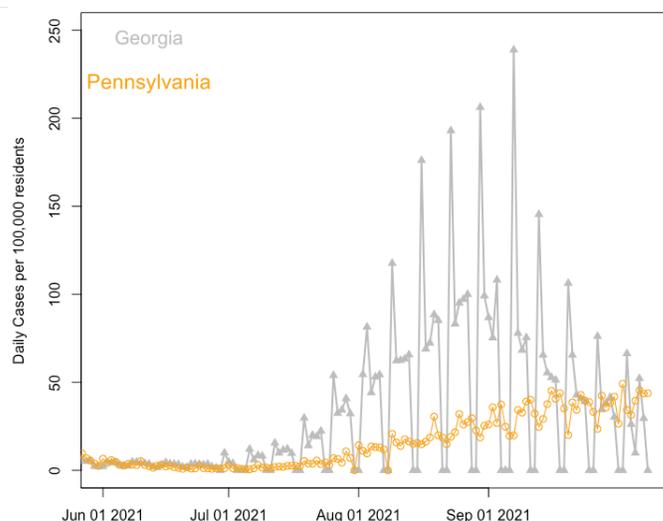
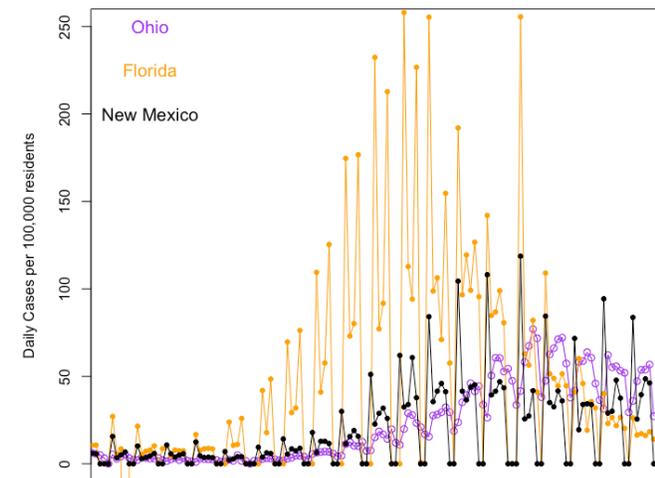
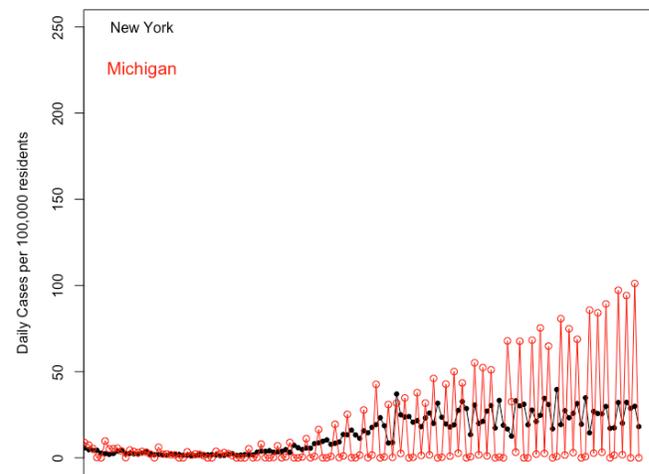
https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/10082021/images/variants-1_10082021.jpg?_=39527?noicon

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

Trends over the last 3 weeks: **Increasing**: Michigan. **Steady**: Georgia, N. Carolina, New Mexico(?), Pennsylvania, New York. **Modest Declines**: California, Florida, Illinois, Ohio, Texas. **Declining**:

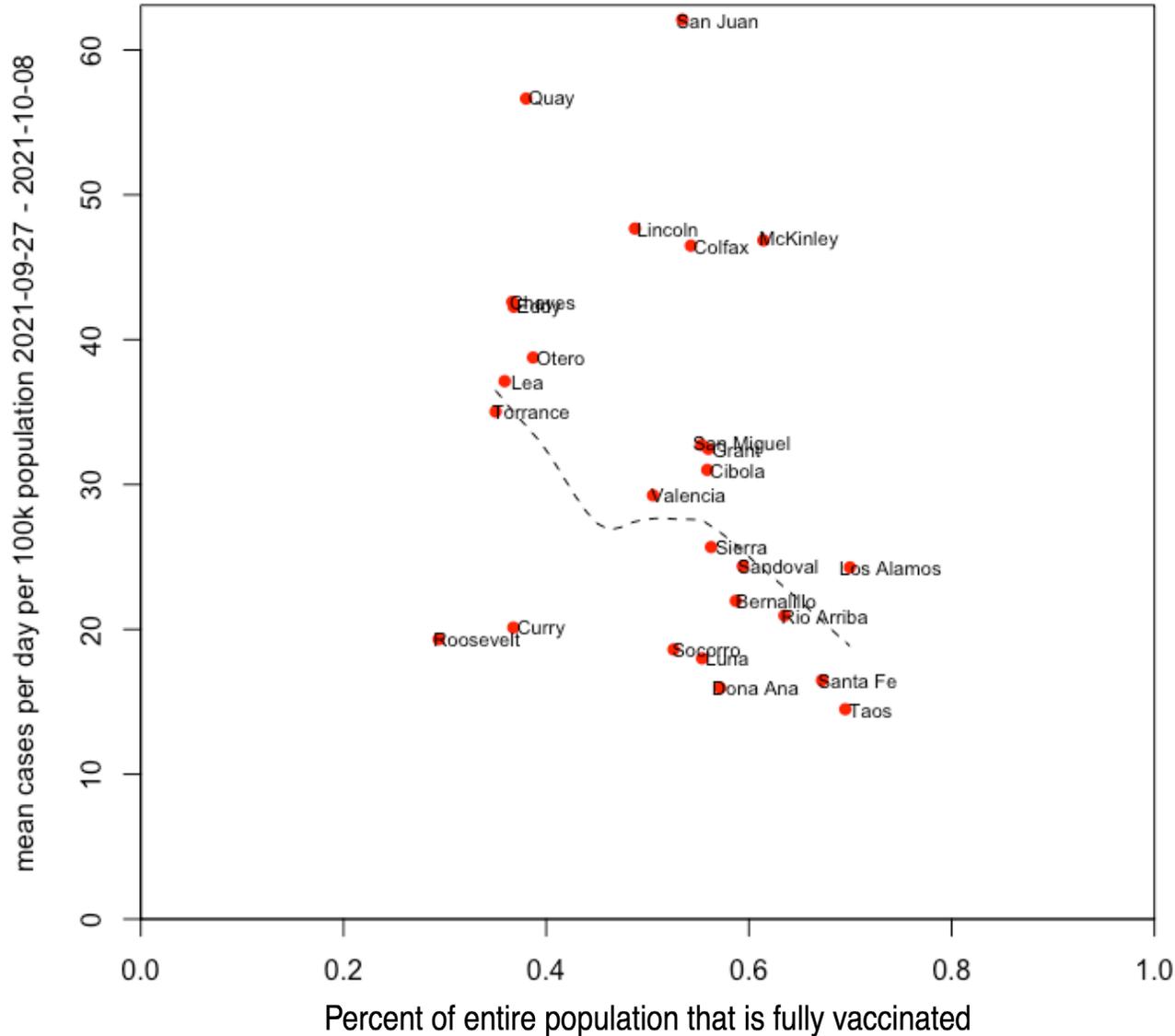
	Cases	Deaths
New York	25.53	0.173
Michigan	42.28	0.375
Ohio	43.45	0.666
Florida	15.51	0.891
New Mexico	34.8	0.387
Illinois	21.89	0.285
Texas	25.52	0.857
California	15.28	0.27
North Carolina	33.52	0.662
Georgia	26.3	1.113
Pennsylvania	41.03	0.467

Daily rates per 100,000 residents averaged October 4th thru October 11th 2021.



Cases plotted versus vaccination by county

The relationship between vaccination and cases is strong and **highly** protective on a by-county basis.



Infection control *relative to vaccination rates*.

- San Juan, Quay Counties have very high incidence.
- Lincoln, Colfax, McKinley Counties are high.
- Eddy, Chaves, Cibola, Lea, Los Alamos, Rio Arriba, and San Miguel Counties are marginally high compared with vaccination.
- Curry, Dona Ana, Luna, Socorro, and Sierra have better than typical incidence compared to vaccination.
- Roosevelt has surprisingly low incidence.
- Seven counties are not on this plot due to relative isolation and small populations: Catron, De Baca, Guadalupe, Harding, Hidalgo, Mora and Union.

Vaccination rates are uniformly low in: Quay, Lea, Eddy, Chaves, Torrance, Curry, Otero, and Roosevelt Counties. All have rates below ~40% of their *total* population.

- **All counties have high absolute transmission**, well above 10 per 10⁵ per day.
- Further improvement in both vaccination and infection control are crucial to minimizing the pandemic's burden.
- Improvement in poorly-performing regions benefits all counties because travel drives epidemic spread from areas of high incidence.

Recent by-county *trends* in daily incidence (are things getting better? **No.**)

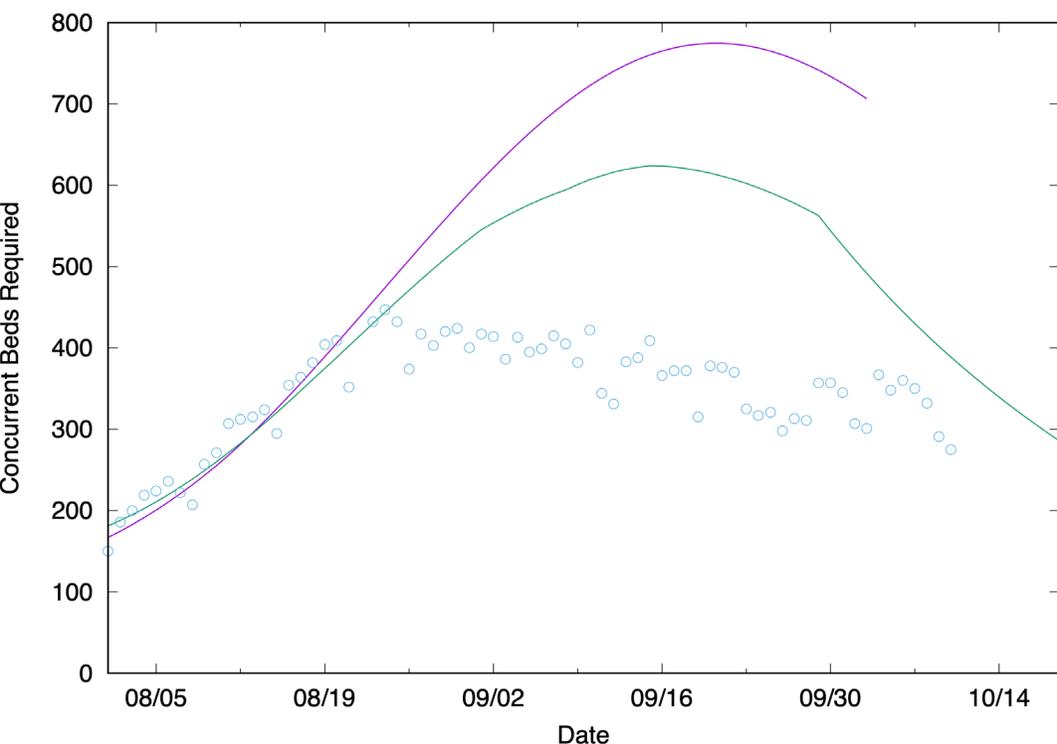
- Trends, meaning time-dependence, not magnitude
- Per capita normalization not needed here (trends, not magnitude)
- Not referenced to vaccination rates (see the previous slide)
- Not referenced to whether the situation is currently intermediate, bad, or really bad. Barely reaching good anywhere in the USA.
- **Counties with falling incidence:** Chaves, Curry.
- **Counties with slowly falling incidence:** Lea.
- **Counties with steady incidence:** Bernalillo, Catron, Colfax, De Baca, Dona Ana, Eddy, Guadalupe, Hidalgo, Lincoln, Luna, McKinley, Mora, Otero, Quay, Rio Arriba, Roosevelt, Sandoval, Santa Fe, San Miguel, Sierra, Socorro, Taos, Torrance, Union, Valencia.
- **Counties with rising incidence:** Cibola, Grant, Harding, Los Alamos, San Juan.

Statewide by-county incidence trends are heterogeneous, with few areas of good control, some counties with poor control, and most in an unstable intermediate range.

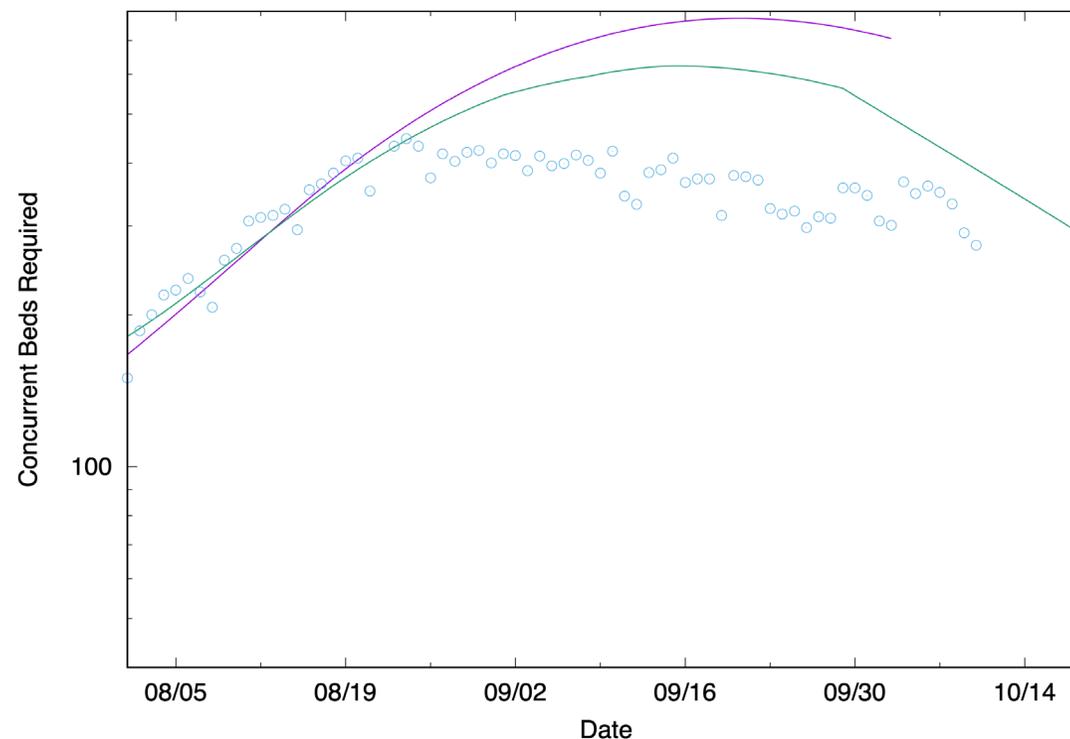
Need a population-wide understanding of what makes good infection control. The Delta variant is sufficiently contagious that people will have to re-learn what constitutes good infection control because lessons learned for the Alpha variant are no longer correct.

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 = 40:800, **20x**)
- Two models, purple (old), green (with a model of Regeneron usage with time). Further improvements to be made to the model.
- >2k courses of mAbs have likely lowered hospital loading. Likely > 1400 averted hospitalizations.
- Taking into account Remdesivir likely to improve model fit to data. Additional drugs may be coming on-line soon.
- Using better-than expected hospital loading improves the model's match to the death rate.
- **Full adoption of vaccination would greatly lower the burden on hospitals and the medical profession.**

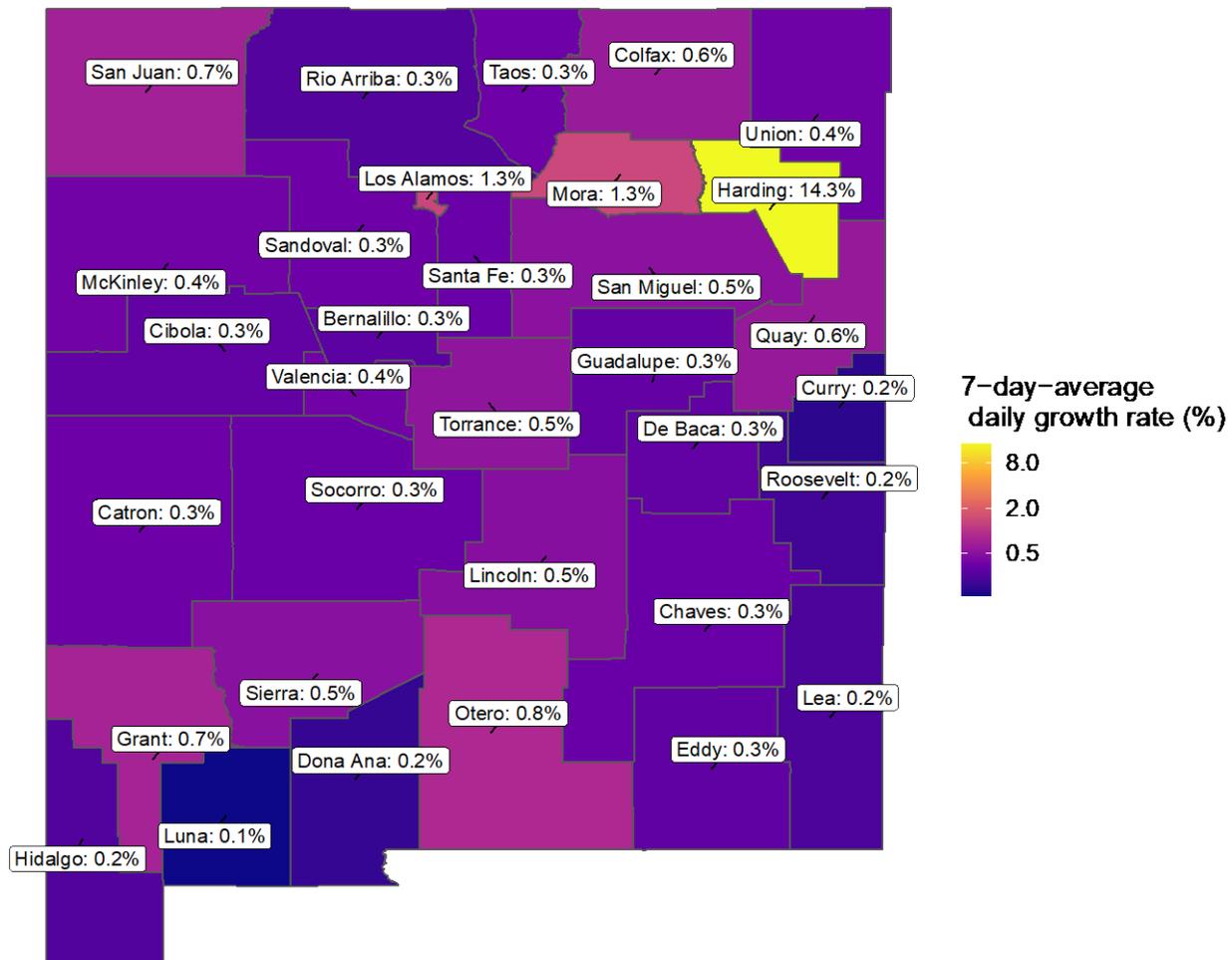
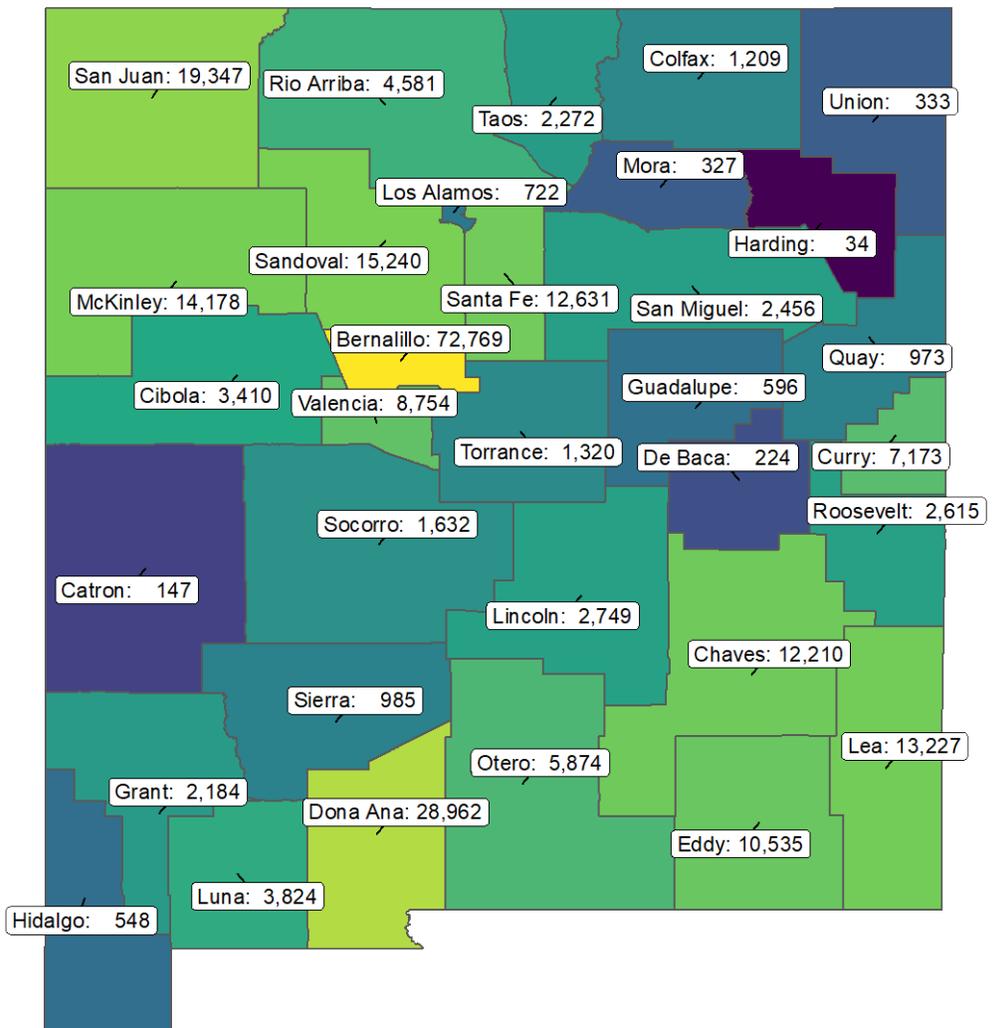


Tue Oct 12 11:51:08 2021



Tue Oct 12 11:51:24 2021

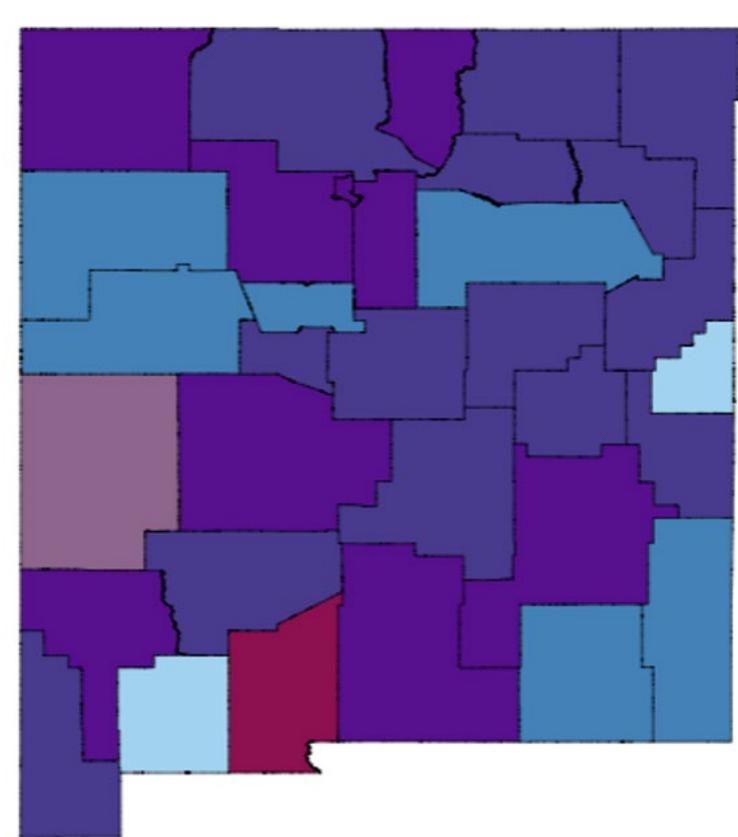
Cumulative Cases & Daily Growth Rate for NM: Oct 11



Otero, Grant, San Juan, Los Alamos, Harding, Mora have elevated cumulative growth rates

*Growth rate is in cumulative cases

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



Impacted New Mexicans

Counties with New Cases This Week

Growth Rate	Accelerating	0k	215k	645k
	Constant	0k	4k	221k
	Decelerating	0k	74k	933k
		Low	Med	High
		Cases Per Capita		

Counties With No New Cases In ...

0k	0k	0k
Last Week	Two Weeks	3+ Weeks

So what?

- San Juan, Grant, Los Alamos, Otero, Sandoval, Socorro, Santa Fe, Taos, Harding, and Chavez are accelerating
- Most people in New Mexico are living in a county that is **high per-capita case counts and decelerating**, but nearly **half 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