SARS-CoV-2 N.M. Pandemic Update

Dr. Jason Mitchell
SVP, Chief Medical Officer
Presbyterian Healthcare Services

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Disclosures

- None

Learning Objectives

1. Understanding the role of predictive analytics in a Pandemic
2. Review of disparities in health outcomes during the pandemic
3. Evolution of treatments for COVID 19
4. Update: progress in achieving vaccine-based herd immunity

Topics for today

- New Mexico's development and use of predictive modeling.
- Current SARS-CoV-2 modeling and projections in New Mexico.
- Equity in Care – impact of SARS-CoV-2 on populations.
- Vaccine Distribution and Trials – where we stand today.
- EBM Pharmacotherapy for COVID-19

New Mexico's Development and Use of Predictive Modeling

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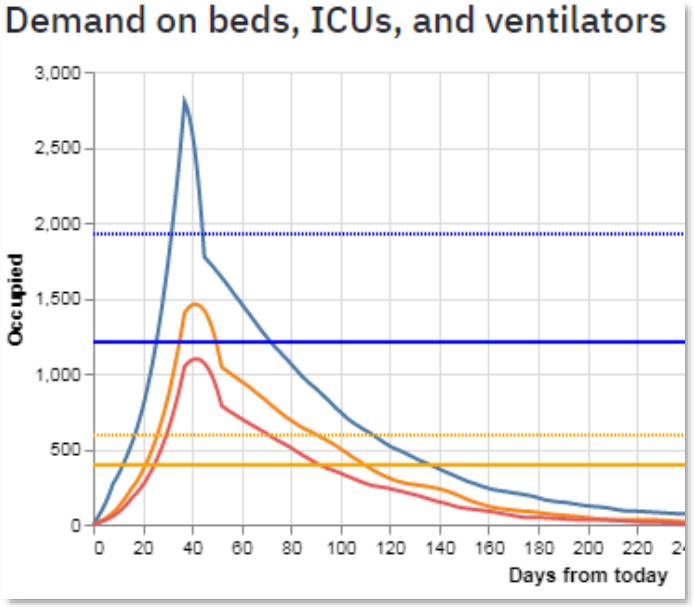
NM modeling collaboration

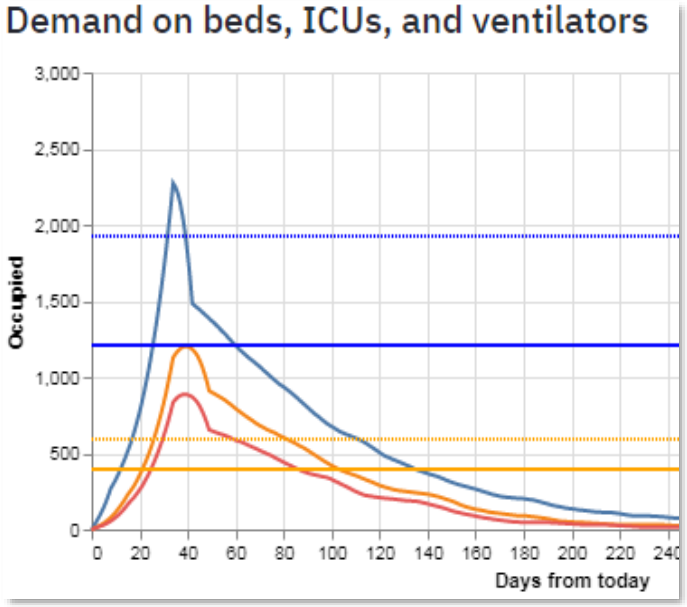
- Began in early April when the first cases had been identified in N.M.
- Presbyterian, N.M. Department of Health, Los Alamos National Lab and Sandia National Labs.
- Key to making data driven healthcare decisions:
  - Where to place ambulances/transport across the state.
  - Where to place or move ventilators between organizations.
  - Timing and need for beds and staffing by region and community.

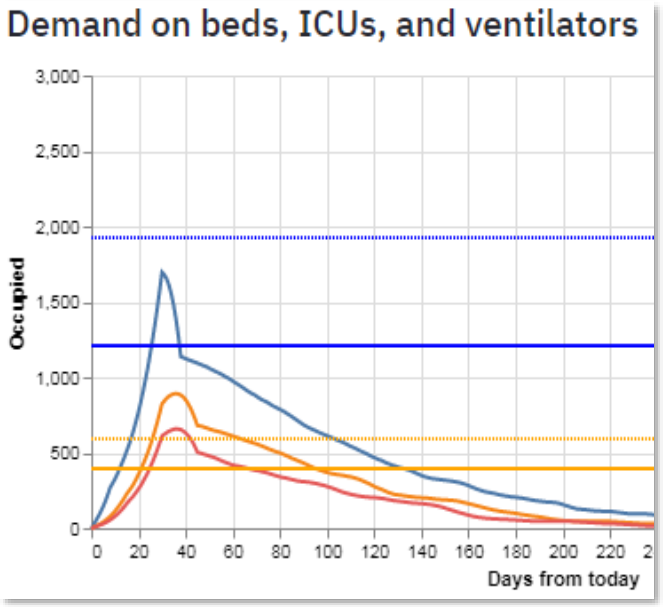
NM modeling methodology

- **Enhanced Susceptible, Infectious, Recovered (SIR) Model**
  - Allows for instantaneous scenario planning.
- **Near real-time daily data feeds**
  - State wide testing rates and results.
  - Geographic distribution.
  - Hospitalizations/Vents/ICU/ and outcomes.
  - Capacity and demand by county and facility.
  - County level SIR model projections.
- **Population risk-adjusted**
  - Integrated comprehensive data on social determinants of health (SDOH).
  - Integrated Johns Hopkins ACG Groupers for county level risk adjusted for disease burden.
  - Further enhanced with health plan claims data and delivery system clinical data.

Modeling to inform – April 2020

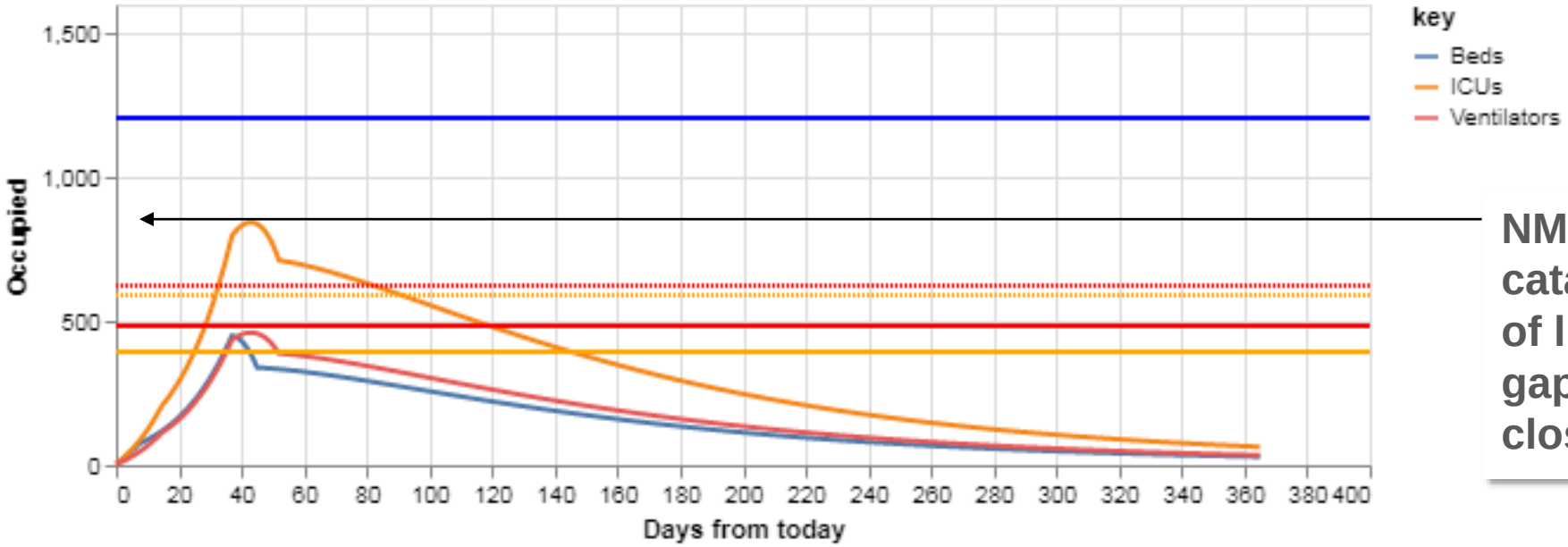






Most Effective

Modeling to inform health care systems – April 17, 2020



NM Can prevent catastrophic loss of life if the ICU gap can be closed

Current Forecast

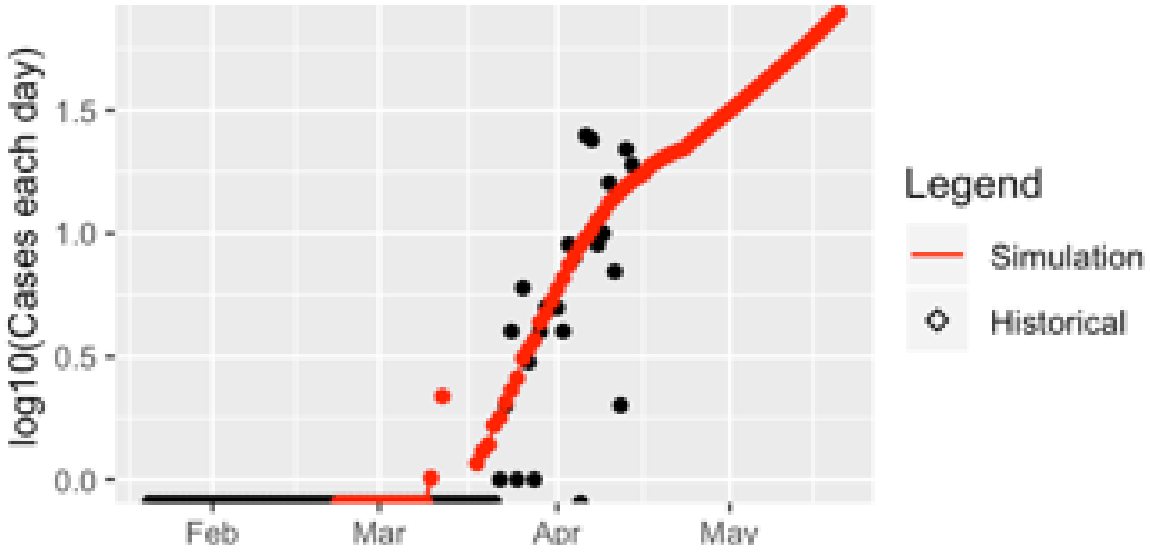
- ICU surge capacity is exceeded by 200 beds for over 60 days causing risk of catastrophic loss of life.

ICU capacity

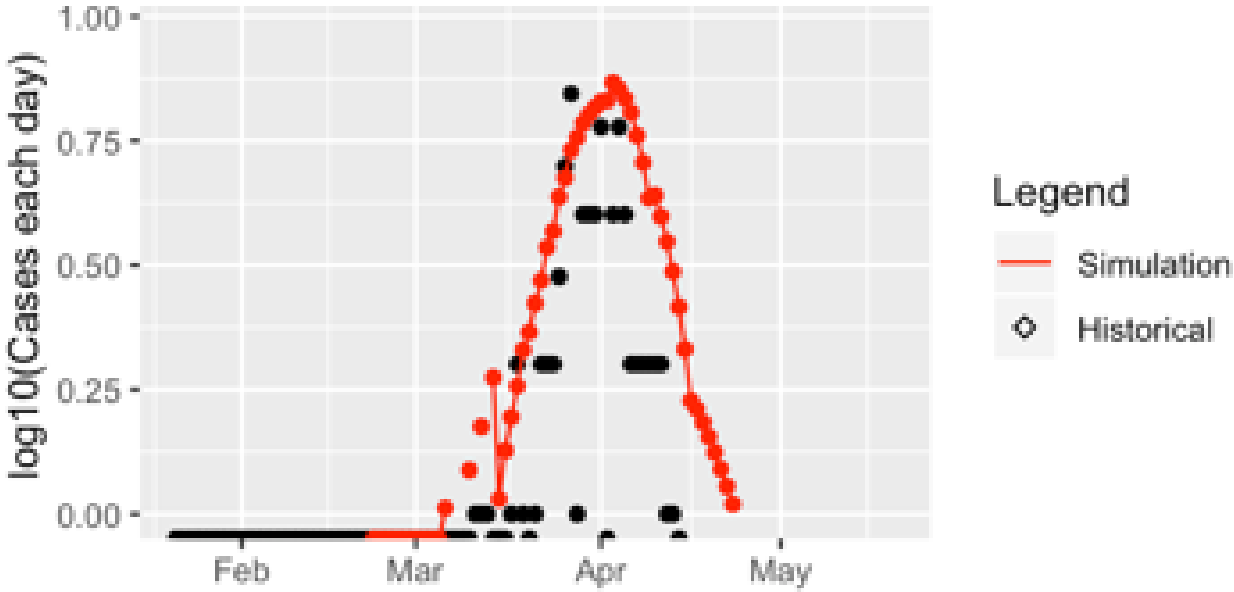
- ICU capacity is exceeded on **May 11.**
- Statewide ICU surge capacity is exceeded on **May 18.**

Modeling at the county level – April 17, 2020

In San Juan historical results model continued growth



In Santa Fe historical results mirror simulation of full control



Current SARS-CoV-2 modeling and projections in NM

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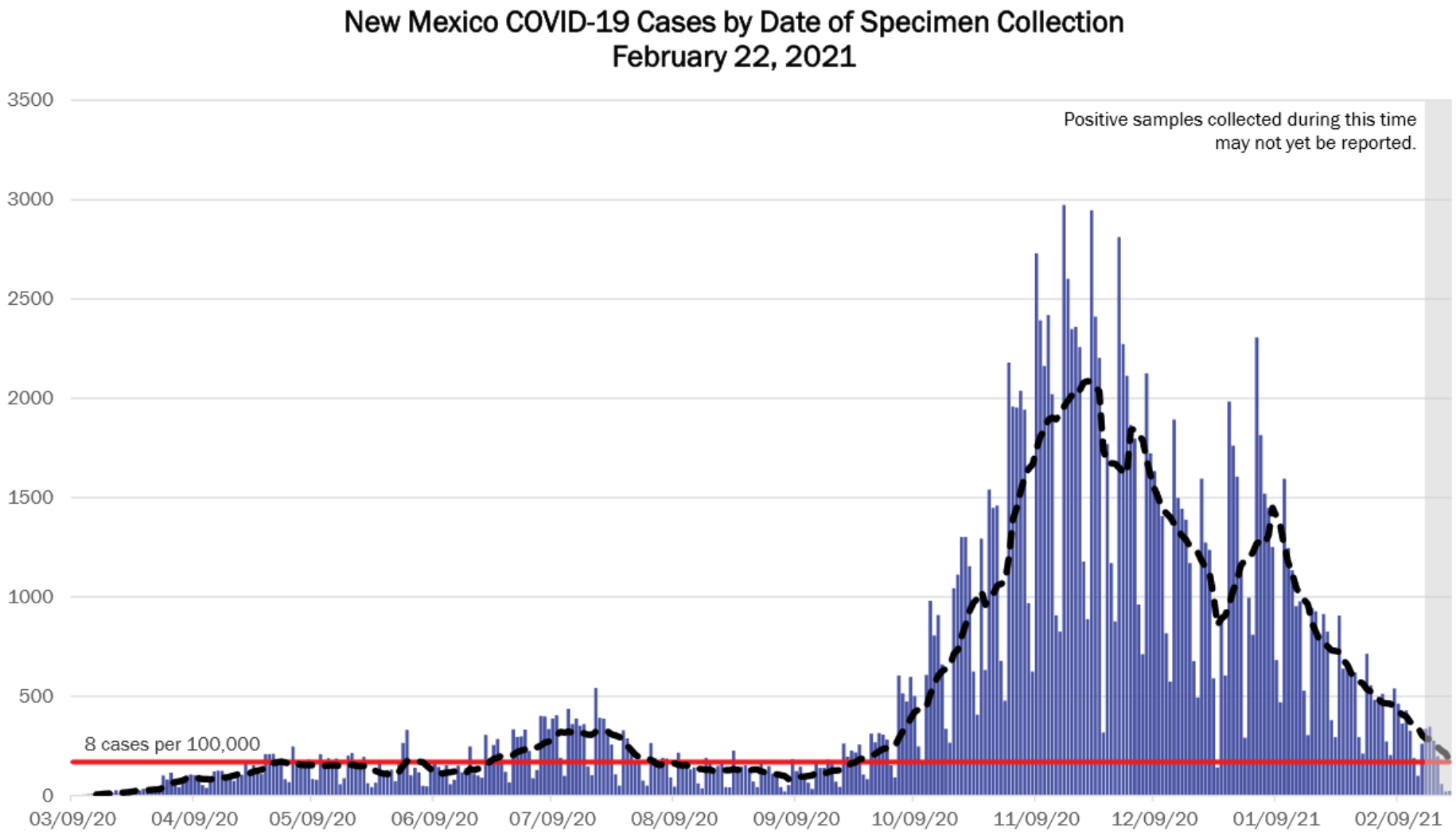
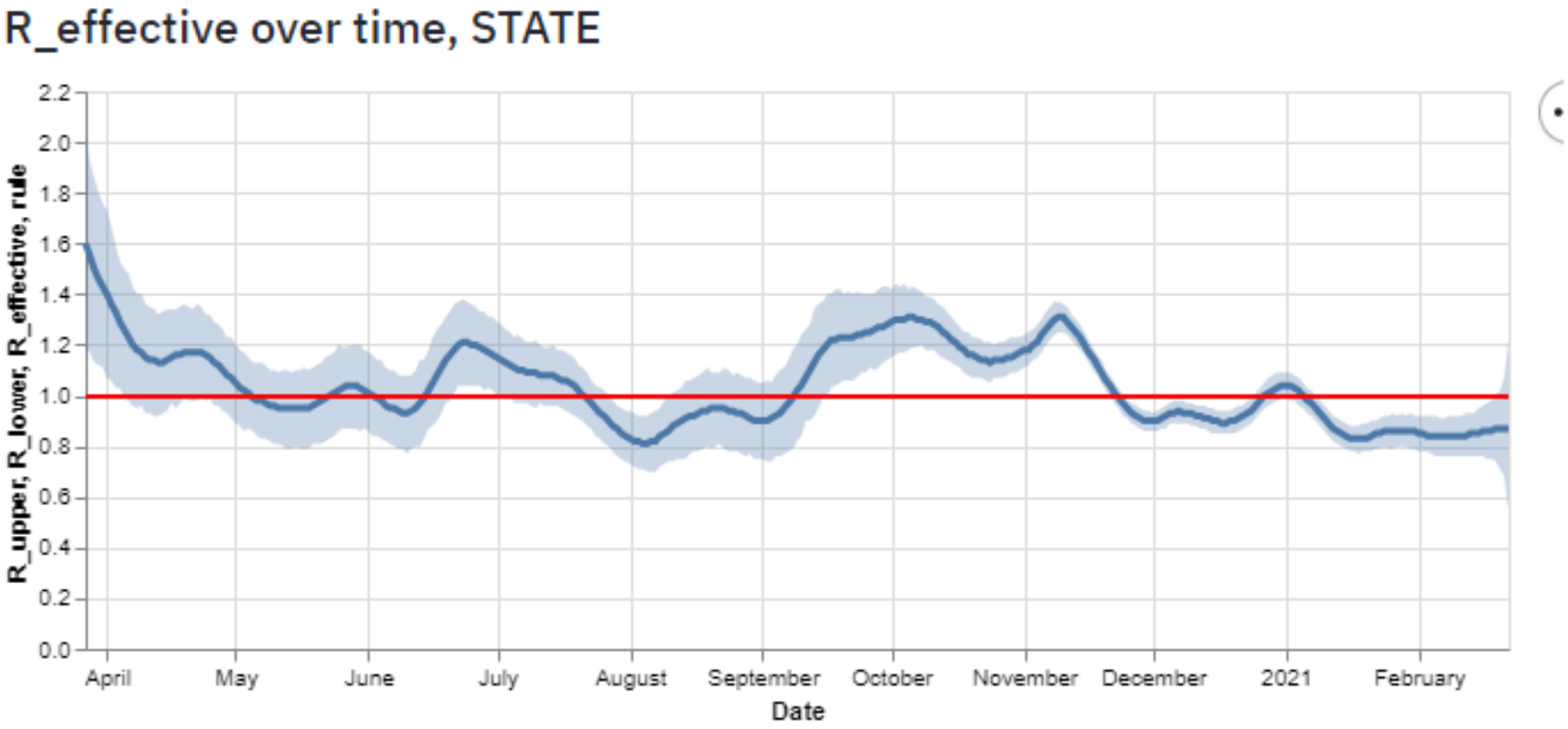
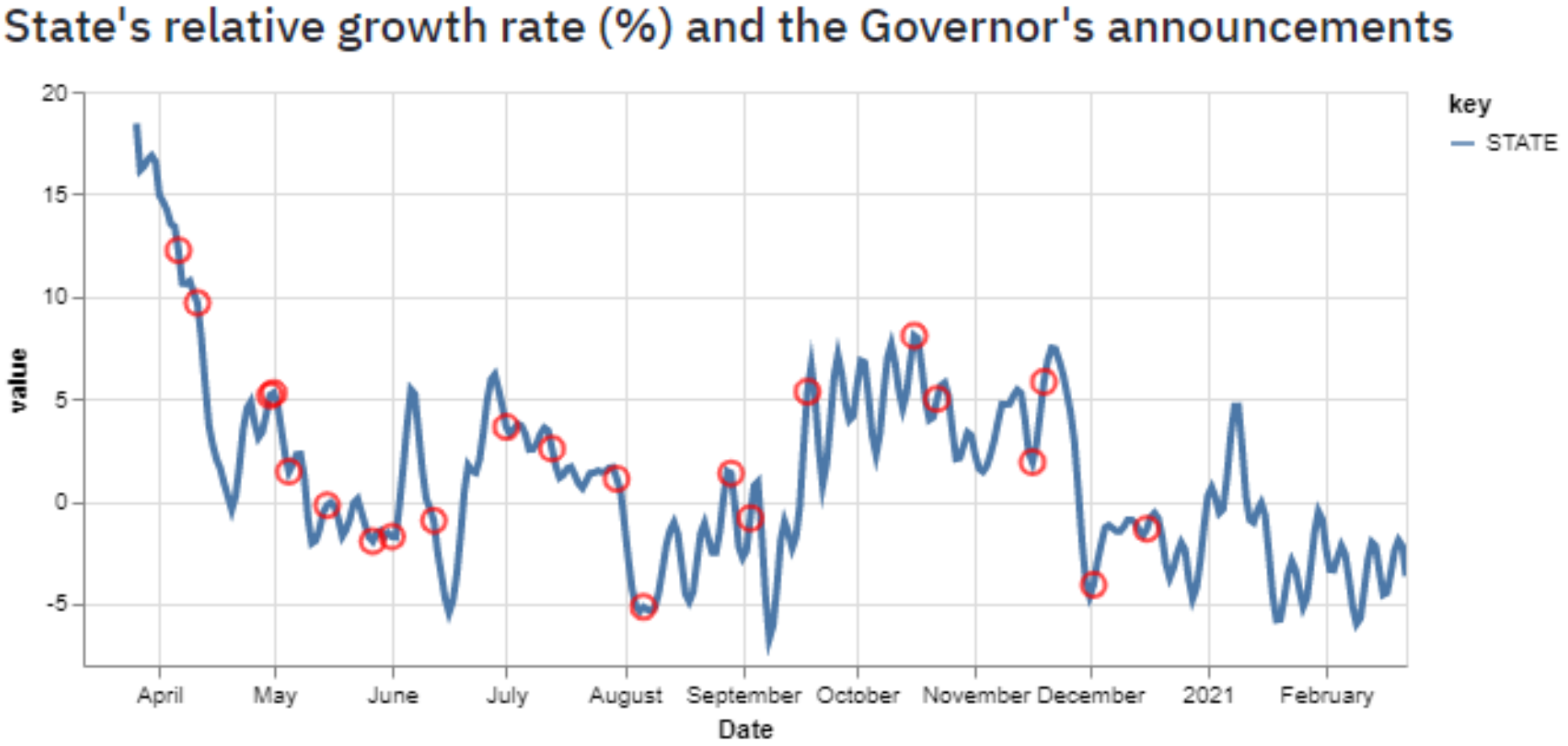
Progress in New Mexico – February 2021



Effective rate of transmission



Impact of policy on relative growth rate

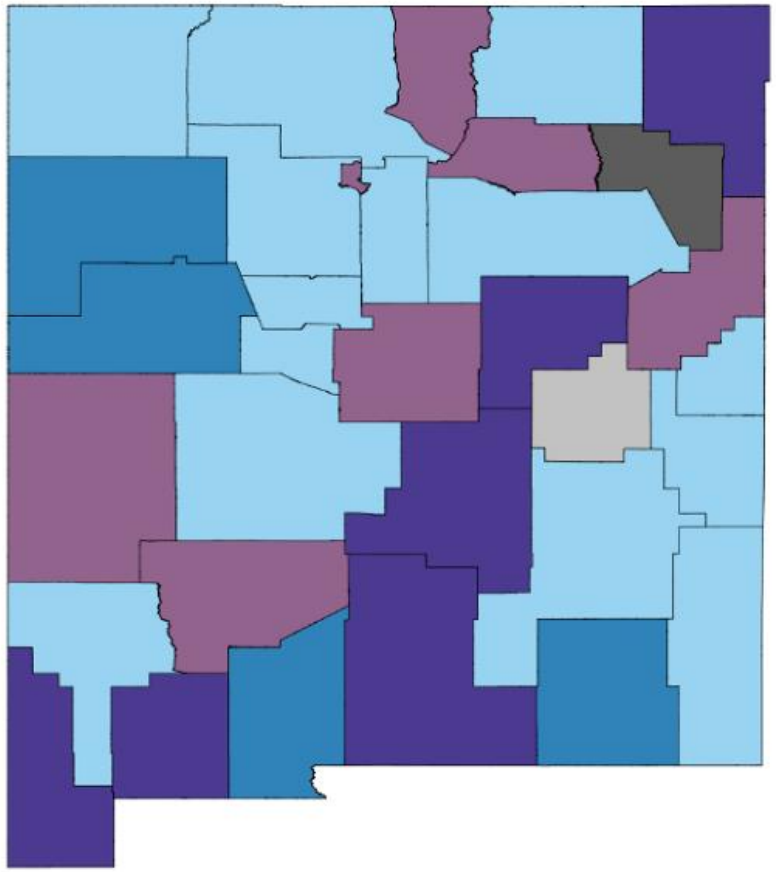


Deceleration of growth across most of NM

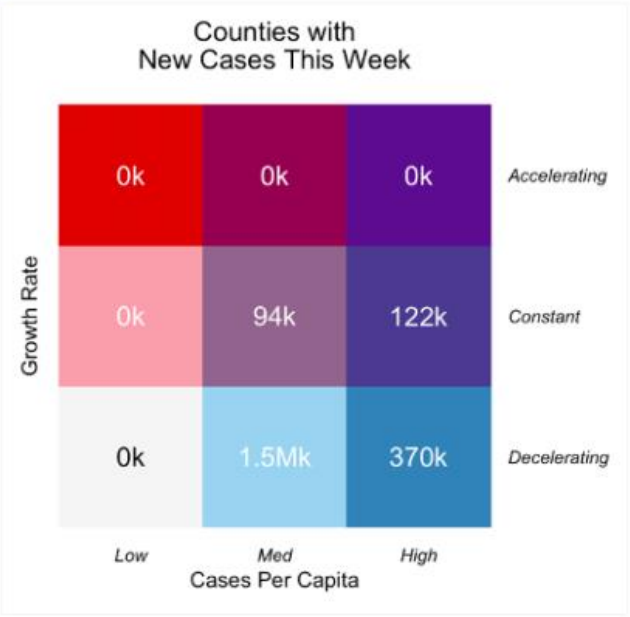
COVID-19 across New Mexico

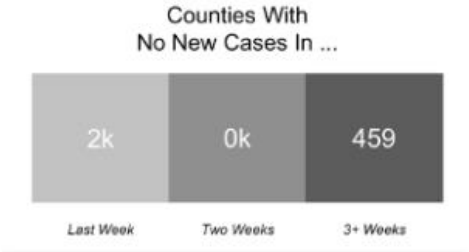
A 7-day moving window comparison

February 22, 2020

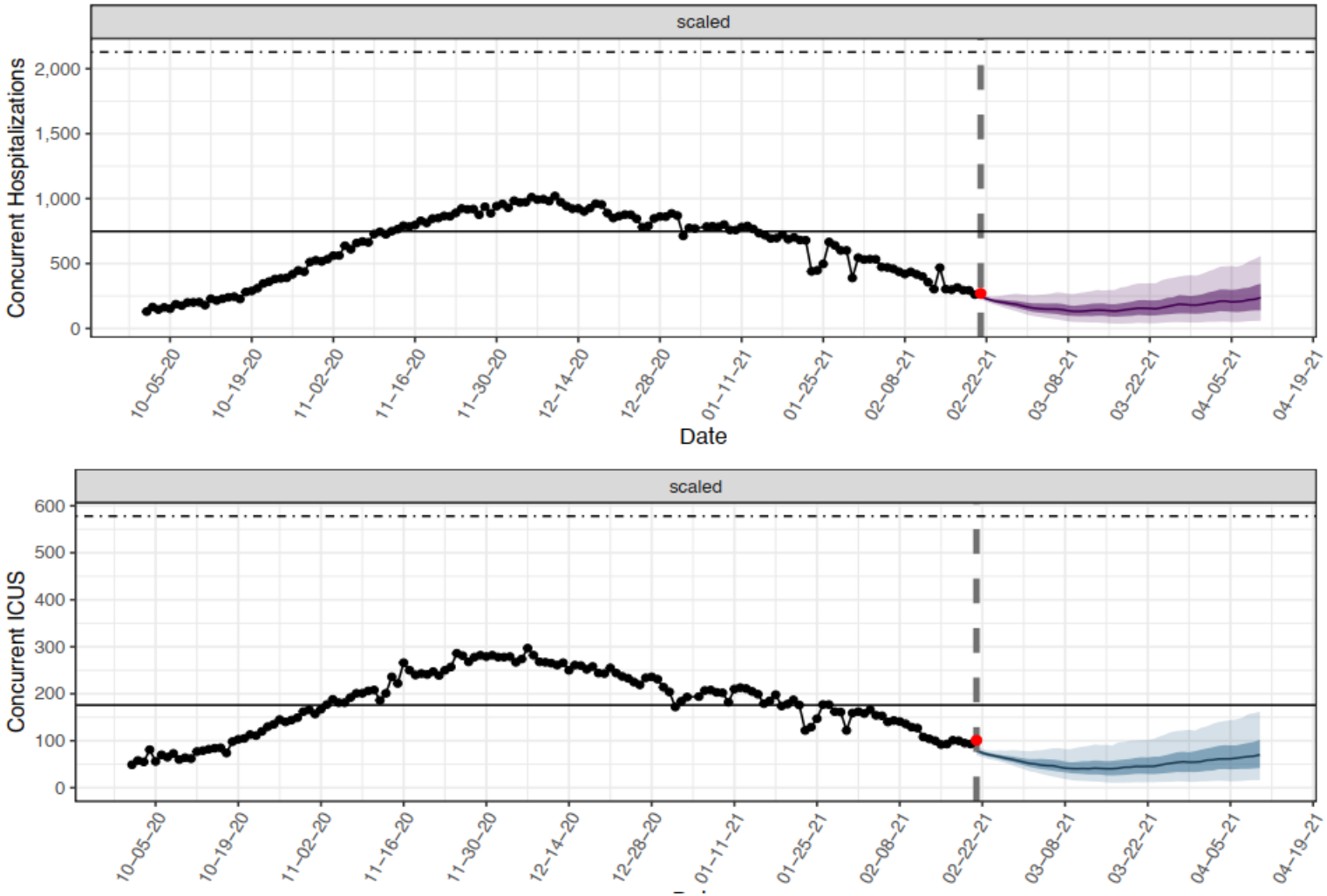


Impacted New Mexicans





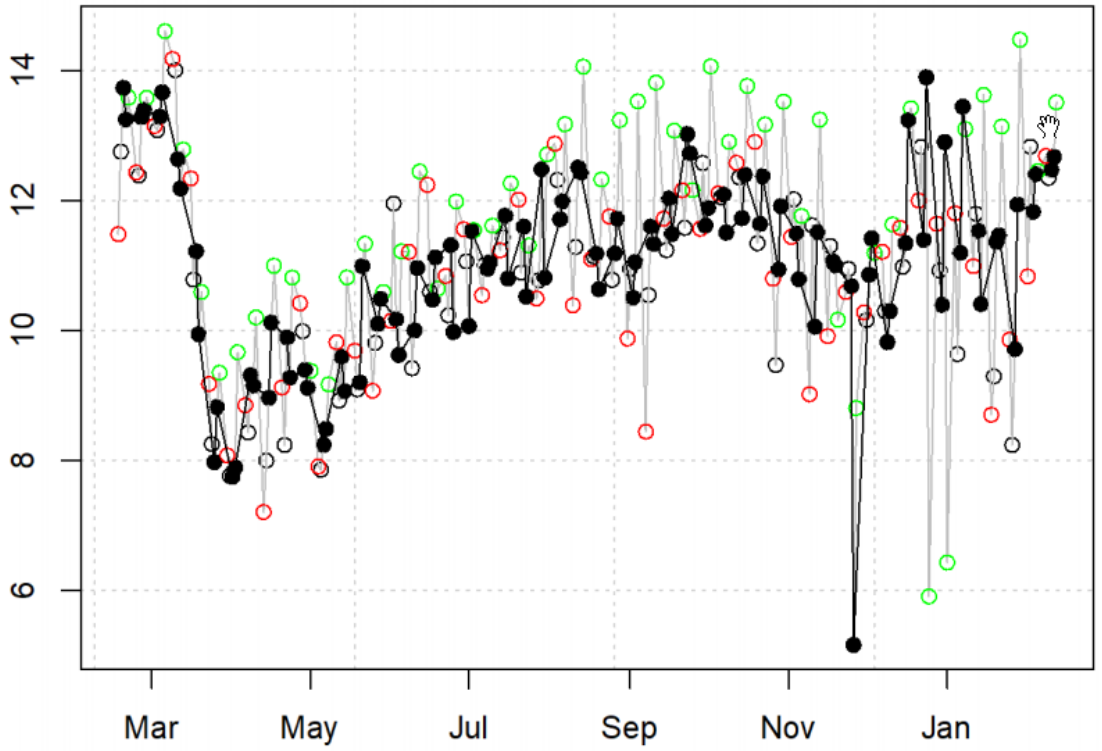
Near-term hospitalization predictions



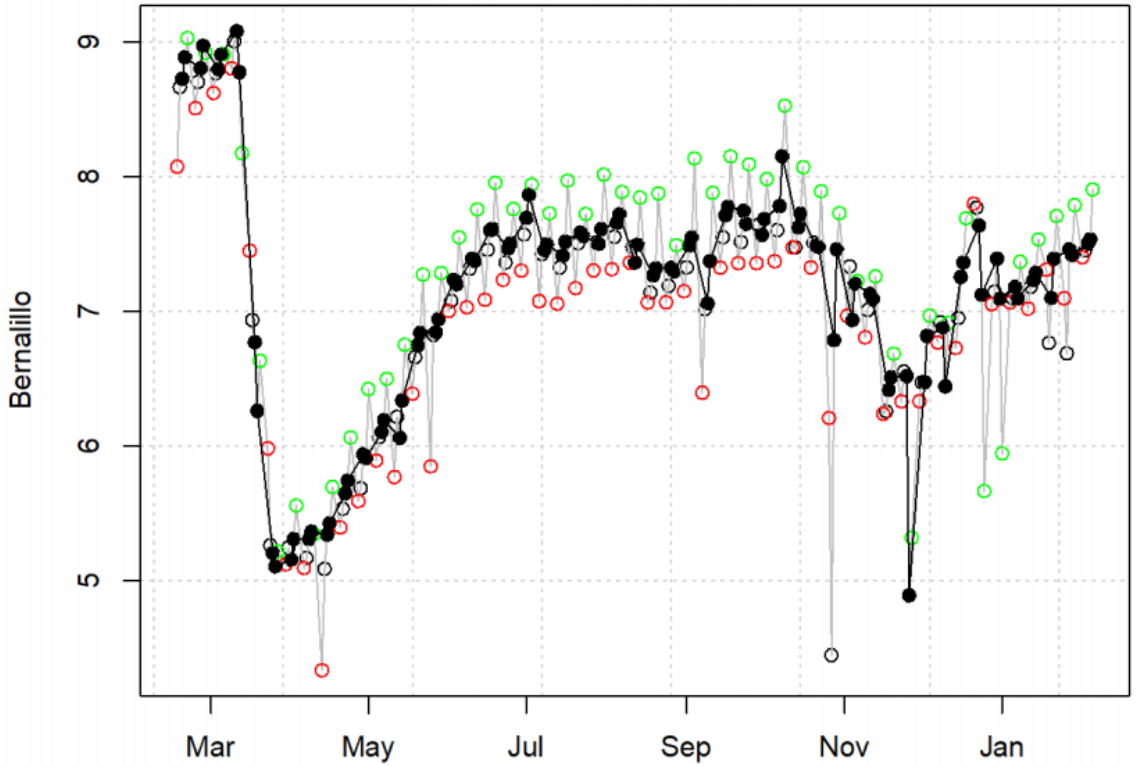
Mobility in Bernalillo, Sandoval and Valencia: A concerning trend

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

McKinley

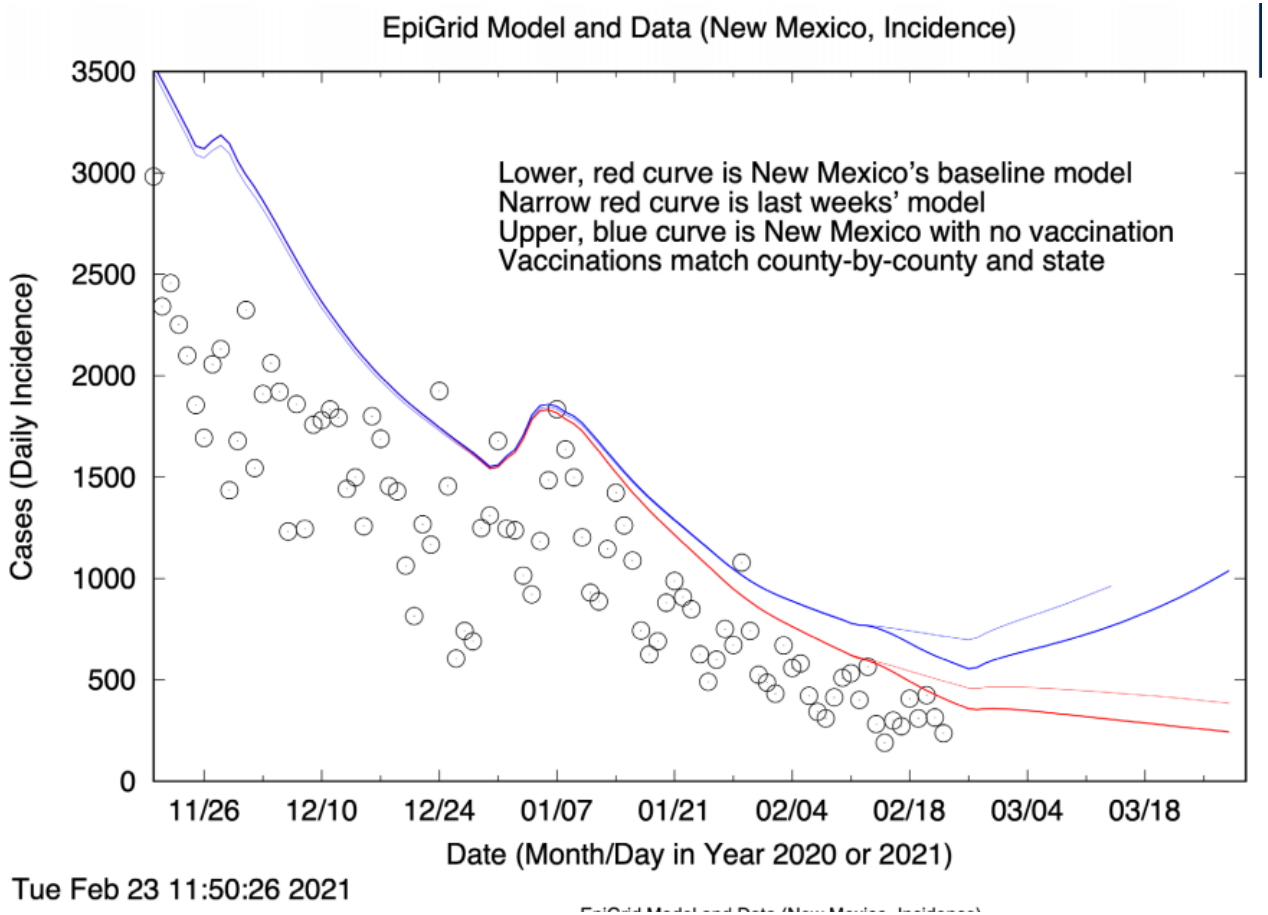


Bernalillo



Positive impact of vaccines in NM

- **Vaccination** is lowering daily incidence by 20% providing additional mitigation of spread.
- **Infection control** and **quarantine** *currently* play larger roles in epidemic control than the vaccination and must be maintained.



Equity in Care: Impact SARS-CoV-2 on populations

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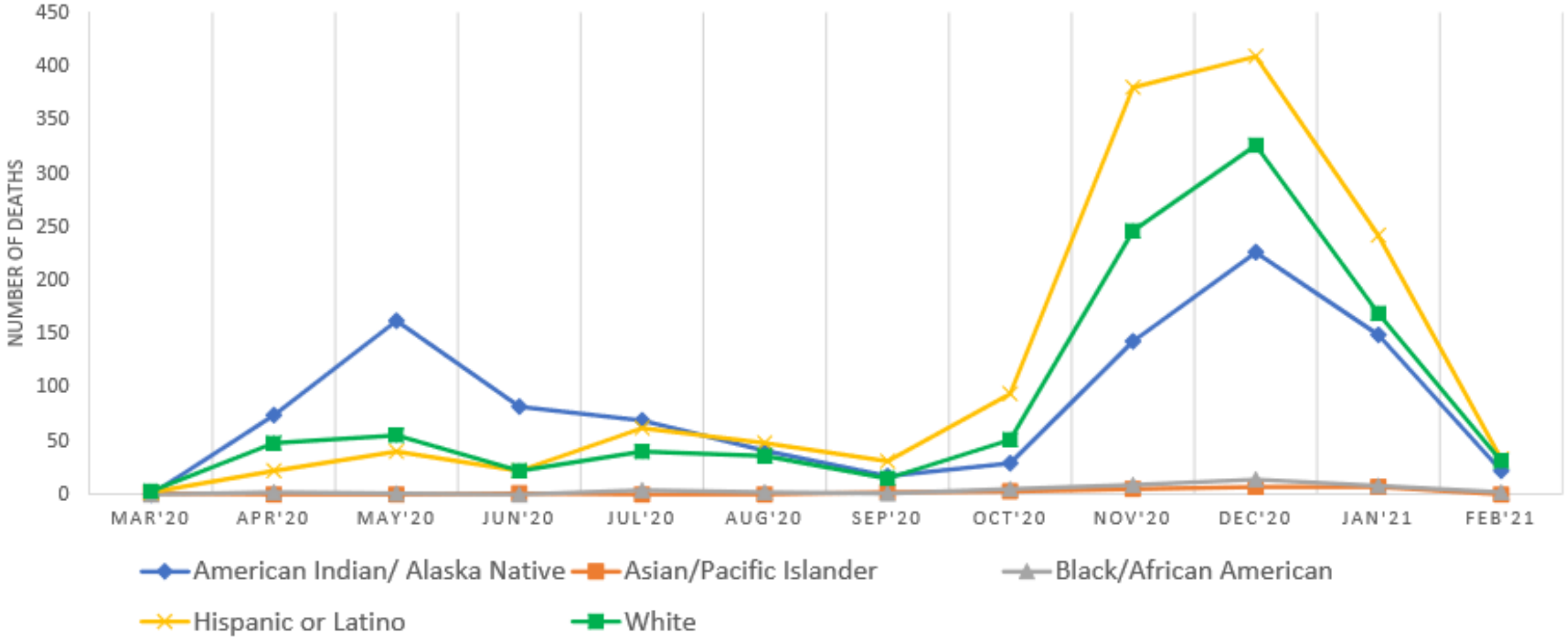
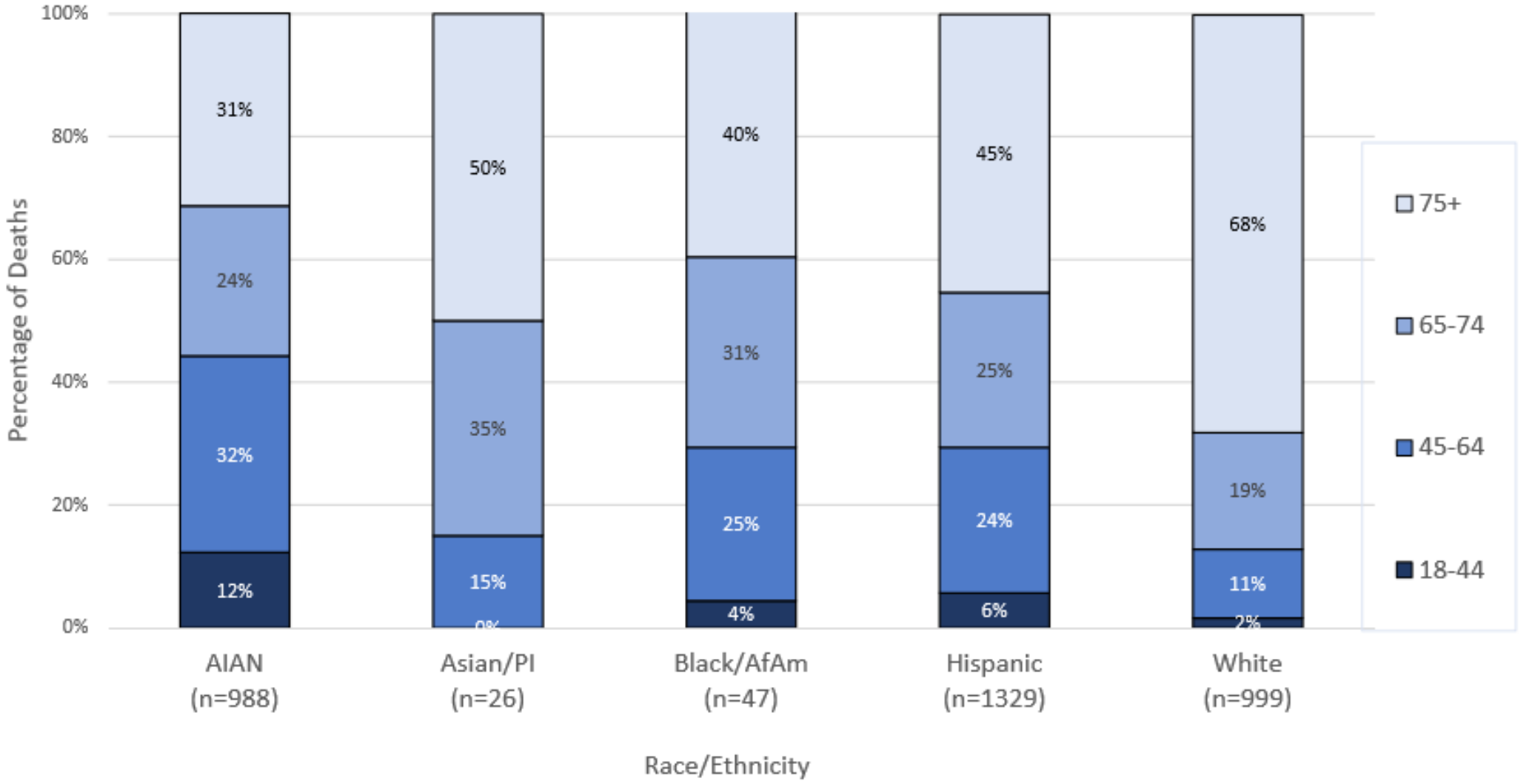
Mortality by race/ethnicity

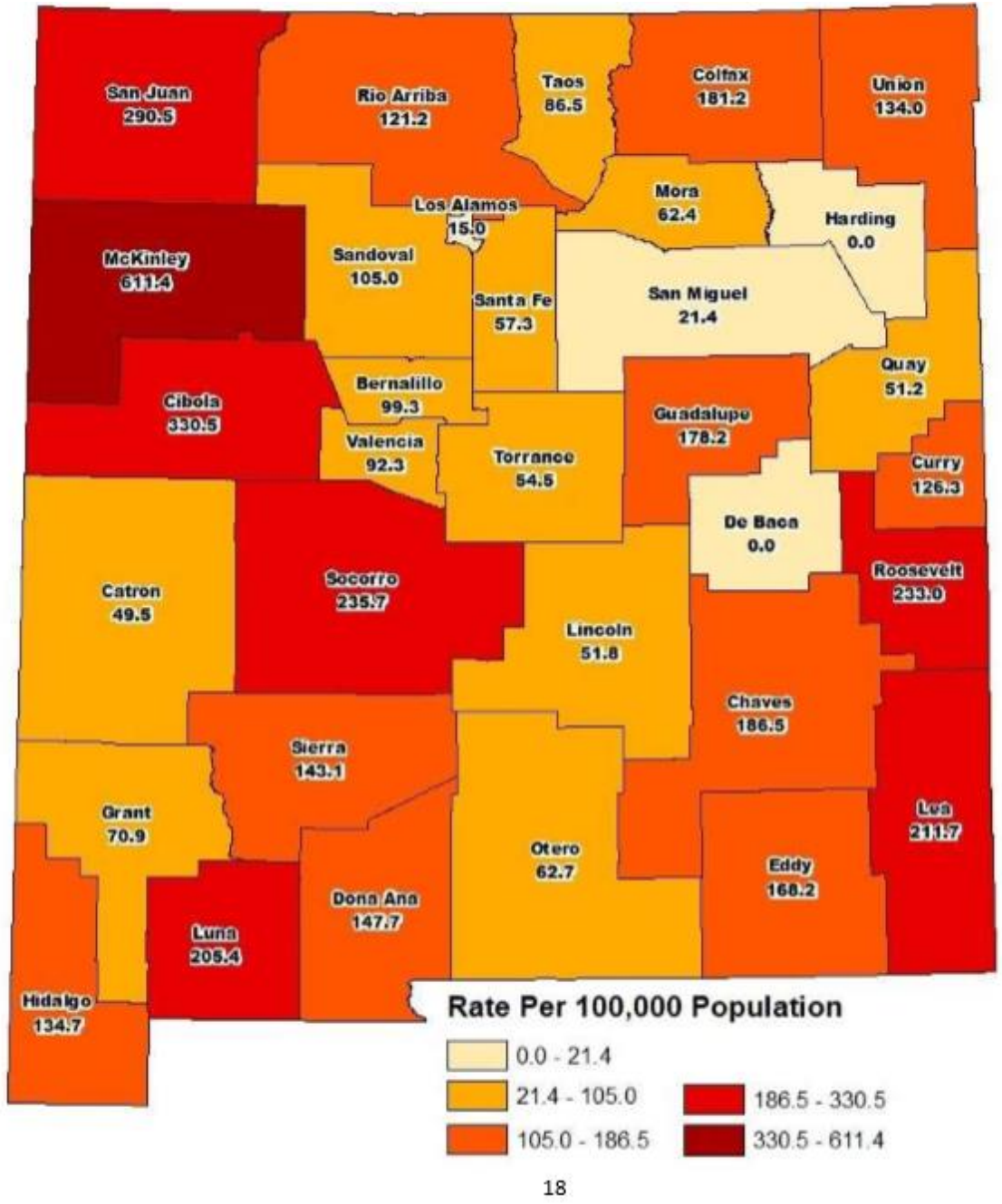


Mortality by race/ethnicity and age

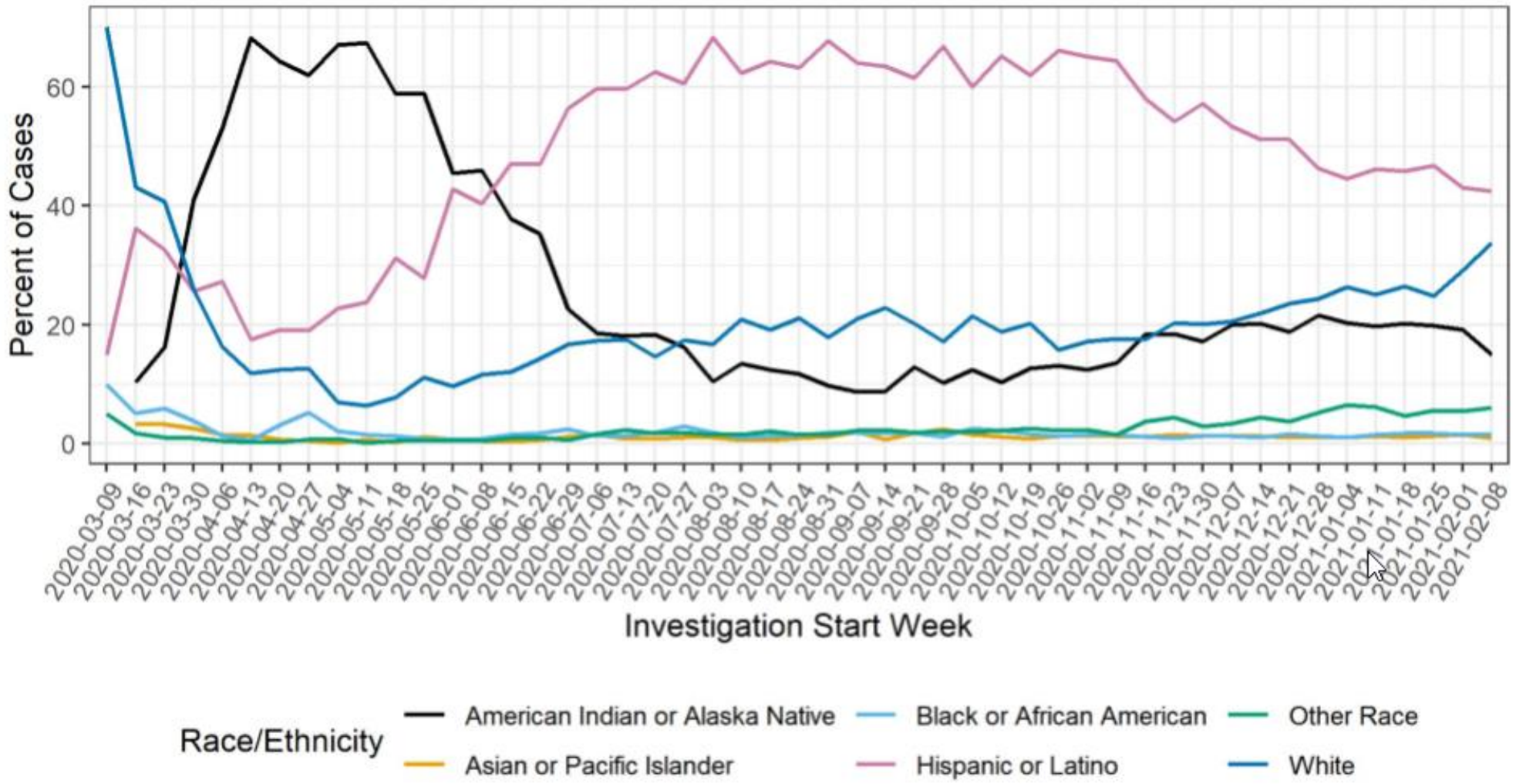


Geographic distribution of mortality

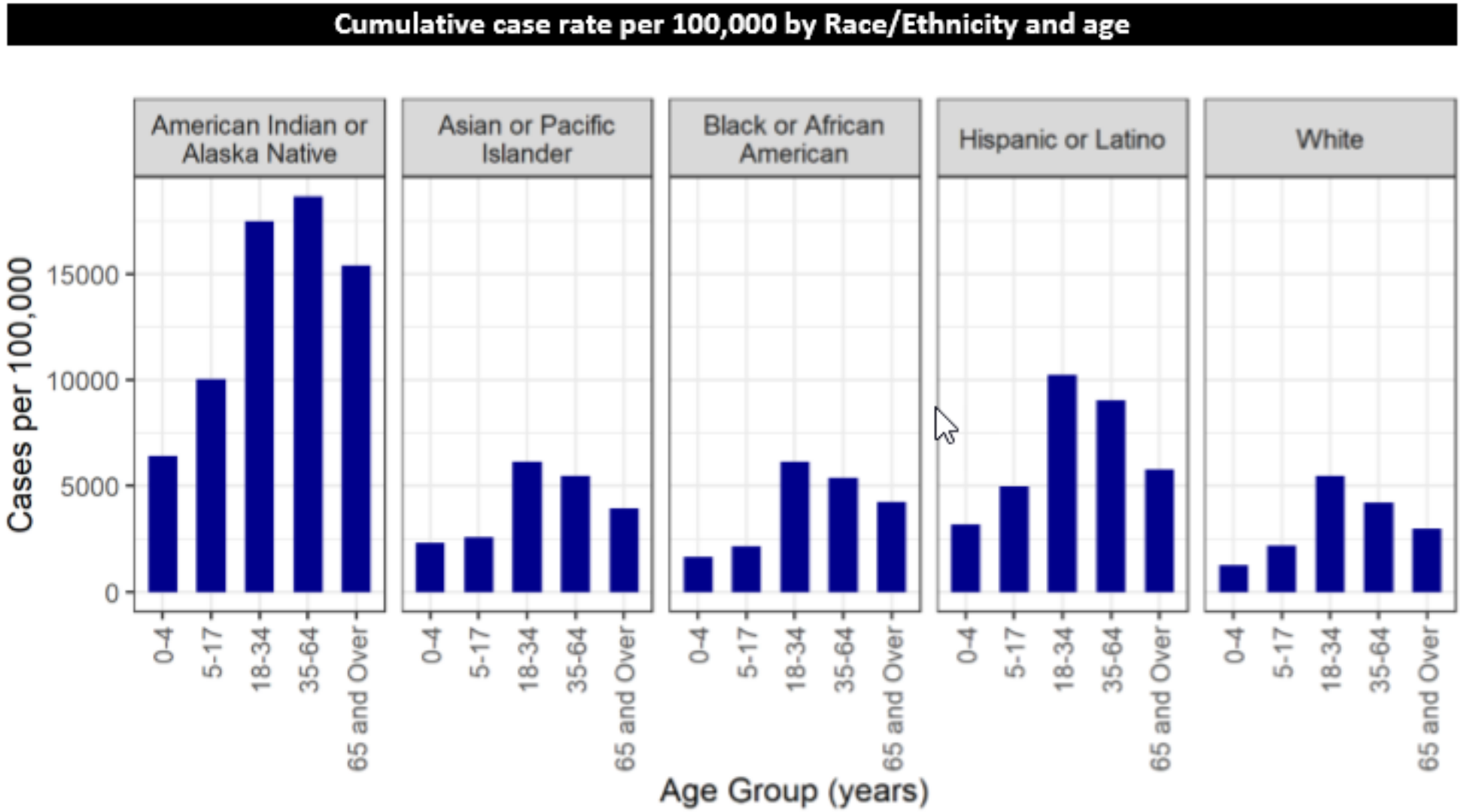
Age-adjusted mortality rate per 100,000 population by New Mexico county



New cases by race/ethnicity



Cumulative case rate per 100k



Vaccine Update

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NM is leading the nation in vaccination

Last Updated: 2/24/2021

New Mexico State Data

Cumulative Doses Administered*
520,029

Total Primary Doses Administered
338,543

Total Booster Doses Administered
181,486

Doses Administered in the Last 7 Days
58,142

Total Doses Received*
531,625

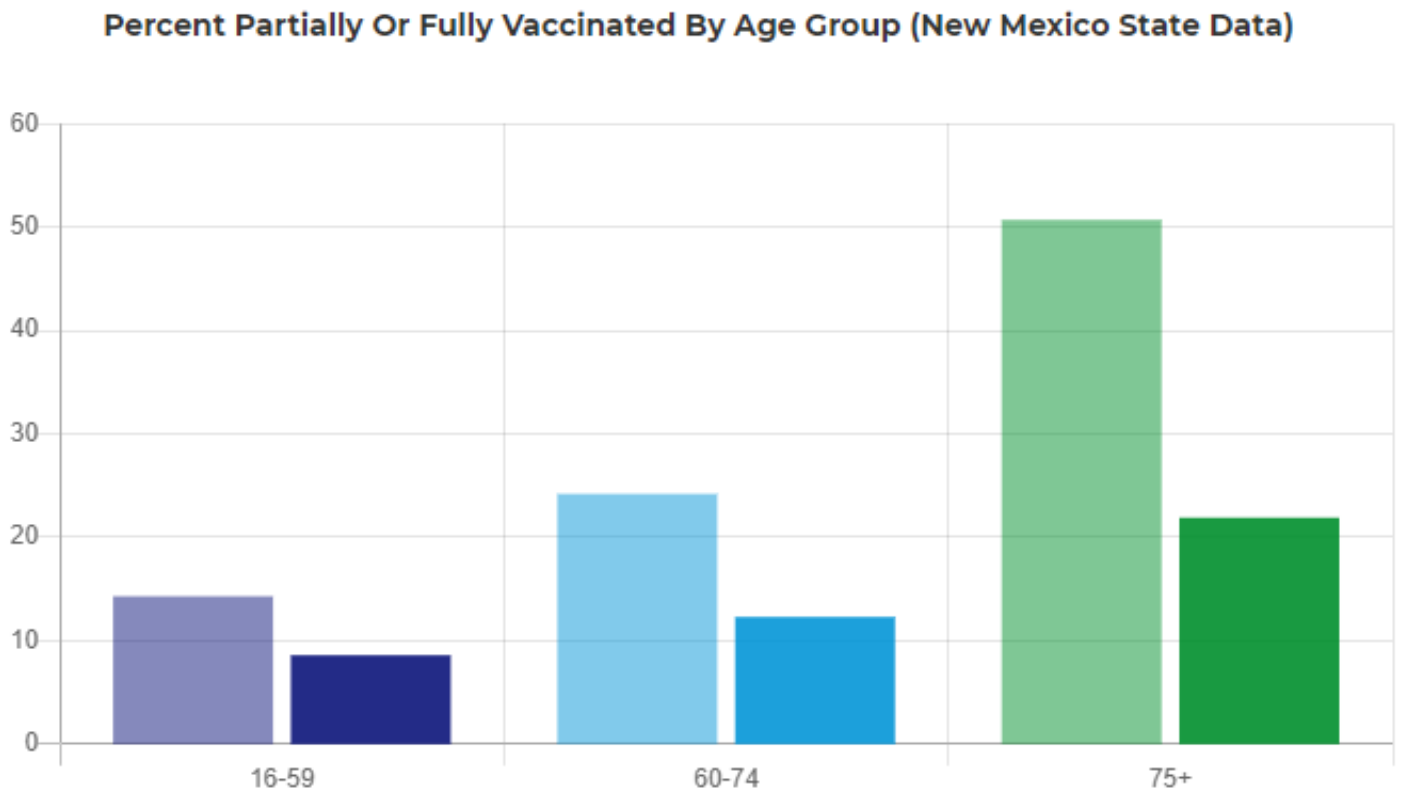
Total Registrants
649,718

*Doses administered may occasionally exceed doses received; in some cases, providers have been able to use six doses of Pfizer – not five – from each vial.

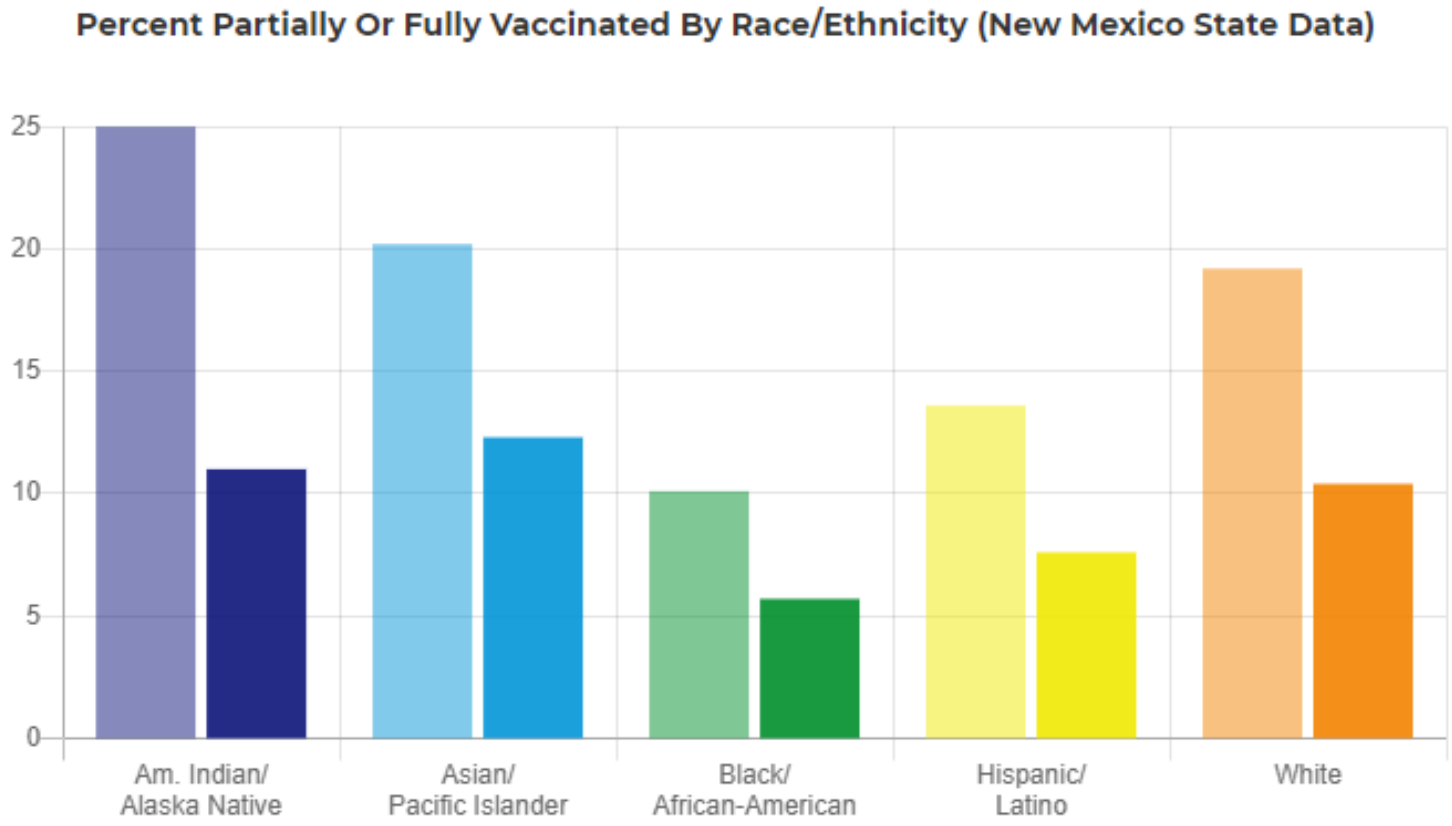
Federal Data

Doses received by Veterans Administration, Indian Health Service, and Bureau of Prisons
148,850

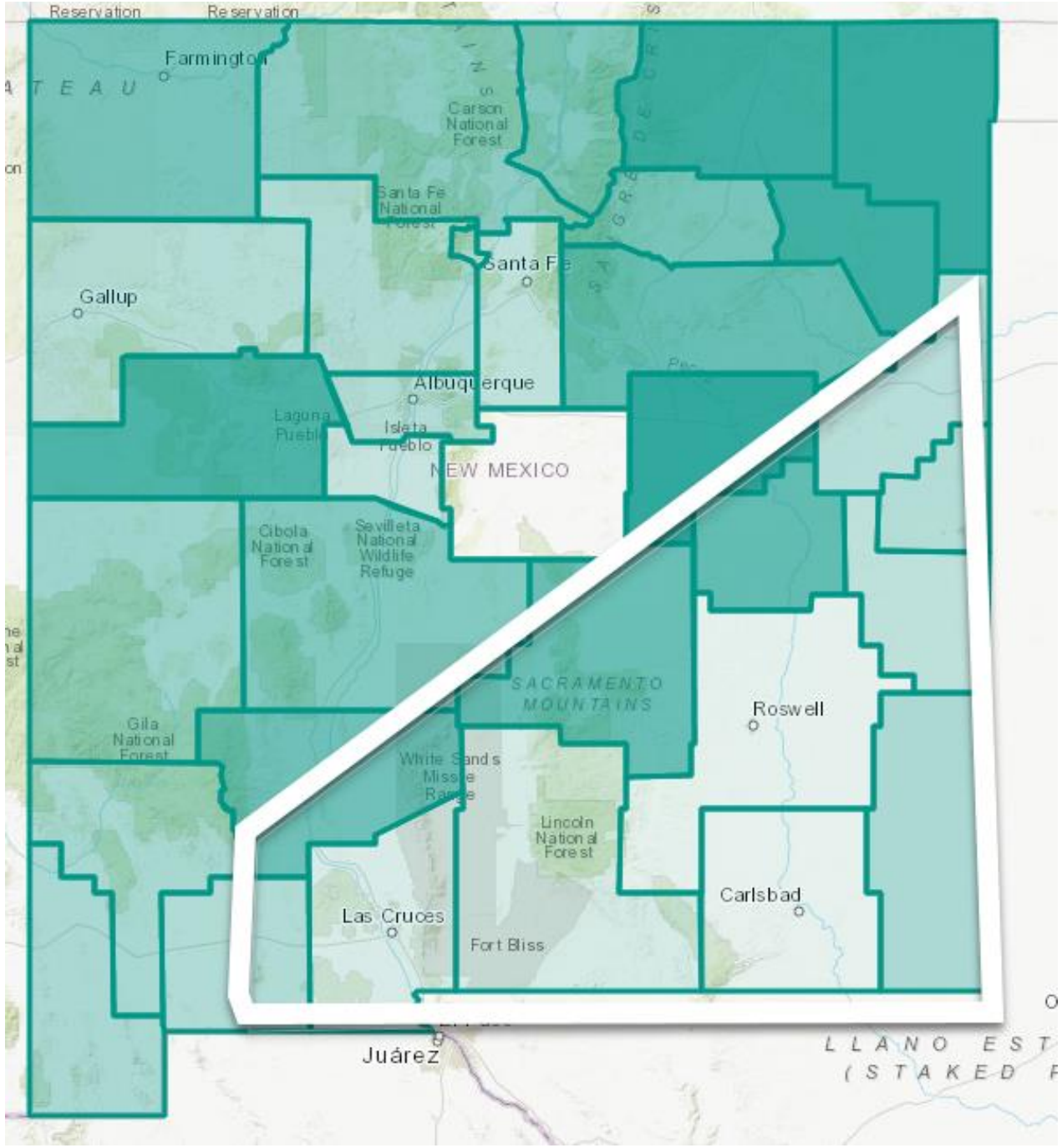
Vaccination distribution as of 2/24/21



Vaccination distribution as of 2/24/21



Geographic distribution of vaccine



CDC update on vaccines

Company	Platform	Doses	Non-clinical results	Number of people who got vaccine	Protection from hospitalizations /death	Protection from severe disease (may not be hospital)	Efficacy against milder disease
moderna	mRNA-1273 mRNA in lipid nanoparticle	2	Neutralizing Abs; Strong Th1 response; protection from challenge	~15,000	100%	100% (30 cases in placebo arm; 0 in vaccine)	94.1%
Pfizer	BNT162b2 mRNA in lipid nanoparticle	2	Neutralizing Abs; Strong Th1 and Th2 response; protection from challenge	~18,600	100%	100% (9 cases in placebo arm; 0 in vaccine)	95%
AstraZeneca	AZD 1222 Non-replicating Chimp Adenovirus-DNA	2	Neutralizing Abs; Strong Th1 and Th2 response; protection from challenge	~5800	100%	100% (10 in placebo; 0 in vaccine)	90% half-full-dose; 70% overall
Johnson&Johnson	JNJ-78436725 Non-replicating human adenovirus/DNA	1	Neutralizing Abs; Strong Th1 and Th2 response; protection from challenge	~22,000	100%	85% (across South Africa, U.S., Latin America	72% US; 66% Latin America; 57% S. Africa
NOVAVAX Creating Tomorrow's Vaccines Today	NVX-CoV2373 Spike protein/RBD + Matrix M adjuvant	2	Neutralizing Abs; protection from challenge	~9700	100%		89.3% UK; 60% S. Africa
Sputnik V	Ad26 and Ad5 adenovirus/DNA	2	Neutralizing Abs; Strong Th1 and Th2	~11360	100%	100% (20 cases placebo; 0 in	91.4%

Pediatric vaccines are in the works

Vaccine clinical development: Children

	BIONTECH Pfizer	moderna	janssen	UNIVERSITY OF OXFORD AstraZeneca
Platform/ Design	mRNA: encodes stabilized spike; lipid NP	mRNA: encodes 2P-stabilized spike; lipid NP	Replication incompetent Ad26; stabilized spike	Replication incompetent ChAdOx1 chimp Ad; wild type spike
Dose/ Schedule Adults	IM 2 doses X 30 µg 21 days apart	IM 2 doses 100 µg 28 days apart	IM 1 dose at 5×10^{10} vp (also testing 2 doses (0, 56 days)	IM 2 doses at 5×10^{10} vp, (0, 28 days)
Current Status	EUA ages 16 and up	EUA ages 18 and up	Phase 3 adults	Phase 3 adults
Adolescents	Fully enrolled	TeenCOVE	Start 4-6wks after results from adult trials	Begin Early 2021
Younger Children	Planning early 2021	Planning early 2021	Planning early 2021	Planning early 2021
Comments			Platform used widely in teens, infants, children	

EBM Pharmacotherapy for COVID-19

Special thanks to Justin Schmetterer, PharmD, PhC, BCIDP
Infectious Disease Pharmacist
Presbyterian Healthcare Services
February 3, 2021

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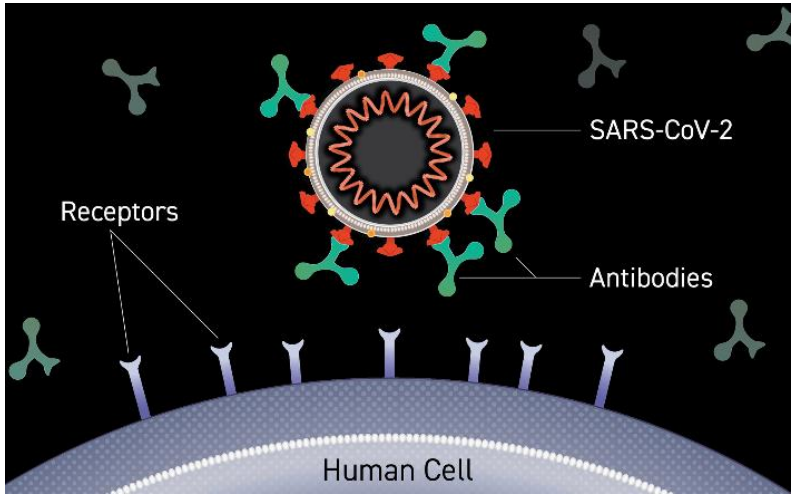
COVID-19 Pharmacotherapy

Bamlanivimab: Antiviral, monoclonal antibody

- November 2020: FDA issues EUA for non-hospitalized patients.
  NIH insufficient data for or against, IDSA suggests against routine use.

Casirivimab + imdevimab: Antiviral, monoclonal antibody

- November 2020: FDA issues EUA for non-hospitalized patients.
- December 2020: NIH insufficient data for or against.
- February 2021: IDSA suggests against routine use.



https://www.nih.gov/news-events/news-releases/clinical-trials-monoclonal-antibodies-prevent-covid-19-now-enrolling

COVID-19 Pharmacotherapy

Hydroxychloroquine: Antimalarial

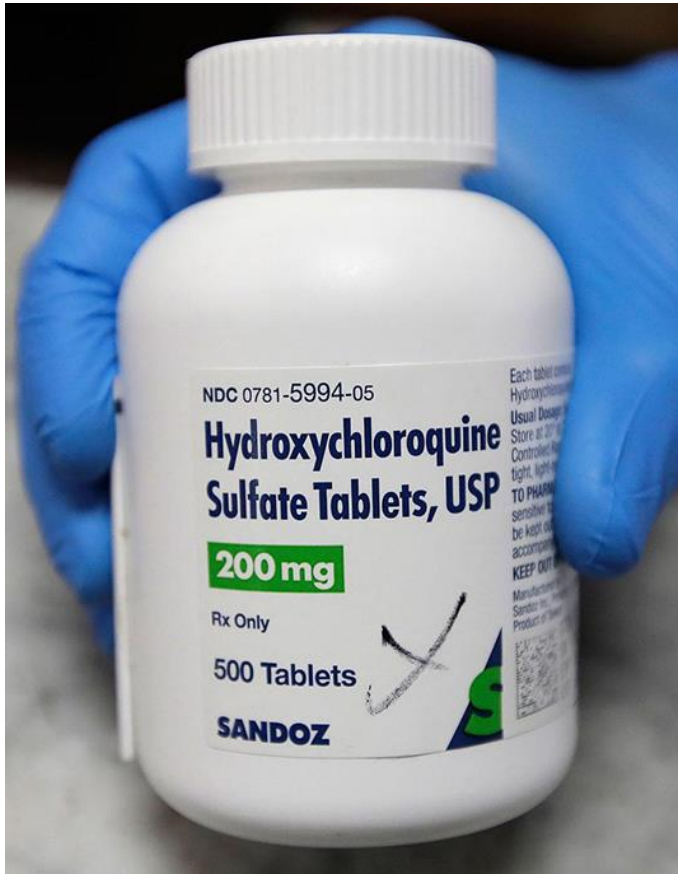
- March 2020: FDA issues EUA.
- June 2020: FDA revokes EUA.
- June to August 2020: NIH/IDSA recommend against.

Famotidine: Histamine H2 antagonist

- June 2020: IDSA suggests against use outside of a clinical trial.

Vitamin C, vitamin D, zinc: Supplements

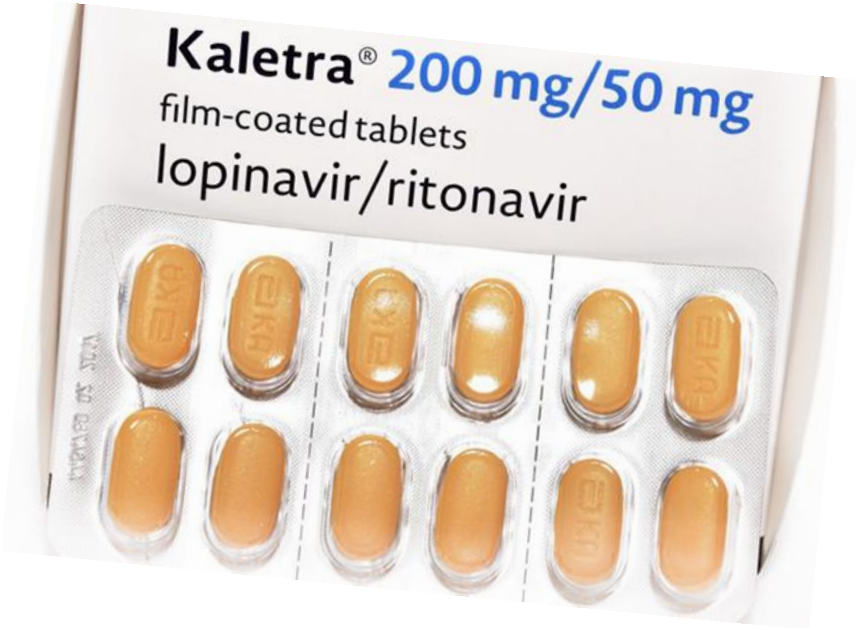
- July 2020: NIH insufficient evidence to recommend for or against.



COVID-19 Pharmacotherapy

Lopinavir/ritonavir: HIV antiretroviral, protease inhibitor

- May 2020: NIH recommends against.
- November 2020: IDSA recommends against use.



Tocilizumab: IL-6 receptor antagonist

- September 2020: ISDA suggests against routine use.
- February 2021: NIH recommends against.

Ivermectin: Antiparasitic

- January 2021: NIH insufficient evidence to recommend for or against.
- February 2021: IDSA suggests against use outside of clinical trial.

NIH/IDSA Guideline Development

- **Aimed to assist providers in treatment of COVID-19**
- Literature difficult to assess during COVID-19:
  - Conflicting results.
  - Retracted studies.
  - Questionable study designs and methodology.
  - Quality of literature.
  - Concern of literature being rushed for publication.

Strength of Recommendation	Quality of Evidence for Recommendation
A: Strong recommendation for the statement	**I:** One or more randomized trials without major limitations
B: Moderate recommendation for the statement	**IIa:** Other randomized trials or subgroup analyses of randomized trials
C: Optional recommendation for the statement	**IIb:** Nonrandomized trials or observational cohort studies
	III: Expert opinion

NIH Treatment Guidelines

Figure 1. Pharmacologic Management of Patients with COVID-19 Based on Disease Severity

Doses and durations are listed in the footnote.

DISEASE SEVERITY	PANEL'S RECOMMENDATIONS
Not Hospitalized, Mild to Moderate COVID-19	There are insufficient data to recommend either for or against any specific antiviral or antibody therapy. SARS-CoV-2 neutralizing antibodies (bamlanivimab or casirivimab plus imdevimab) are available through EUAs for outpatients who are at high risk of disease progression.[a] The Panel recommends against the use of **dexamethasone** or **other corticosteroids (AIII).**[b]
Hospitalized but Does Not Require Supplemental Oxygen	The Panel recommends against the use of **dexamethasone (AIIa)** or **other corticosteroids (AIII).**[b] There are insufficient data to recommend either for or against the routine use of remdesivir. For patients at high risk of disease progression, the use of remdesivir may be appropriate.
Hospitalized and Requires Supplemental Oxygen (But Does Not Require Oxygen Delivery Through a High-Flow Device, Noninvasive Ventilation, Invasive Mechanical Ventilation, or ECMO)	Use one of the following options: • **Remdesivir**[c,d] (e.g., for patients who require minimal supplemental oxygen) **(BIIa)** • **Dexamethasone**[e] **plus remdesivir**[c,d] (e.g., for patients who require increasing amounts of supplemental oxygen) **(BIII)**[f,g] • **Dexamethasone**[e] (e.g., when combination therapy with remdesivir cannot be used or is not available) **(BI)**
Hospitalized and Requires Oxygen Delivery Through a High-Flow Device or Noninvasive Ventilation	Use one of the following options: • **Dexamethasone**[e,g] **(AI)** • **Dexamethasone**[e] **plus remdesivir**[c,d] **(BIII)**[f,g]
Hospitalized and Requires Invasive Mechanical Ventilation or ECMO	**Dexamethasone**[e] **(AI)**[h]

Last updated 2/18/2021: https://www.covid19treatmentguidelines.nih.gov/therapeutic-management/

Questions

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Contact

Jason Mitchell, M.D.

Senior Vice President,
Chief Medical and Clinical
Transformation Officer

Presbyterian Healthcare Services

505-923-5393
jmitchell4@phs.org

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