UCLA Anderson Forecast

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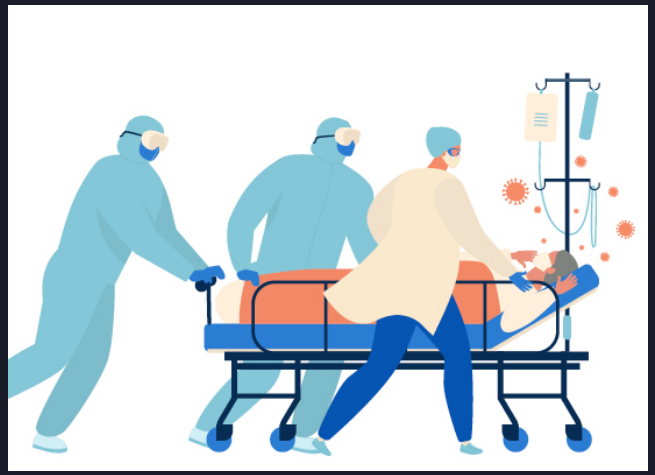
2021

Health in America:

What Explains the Variation in COVID-19 Mortality Rate Across the U.S.



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Economist
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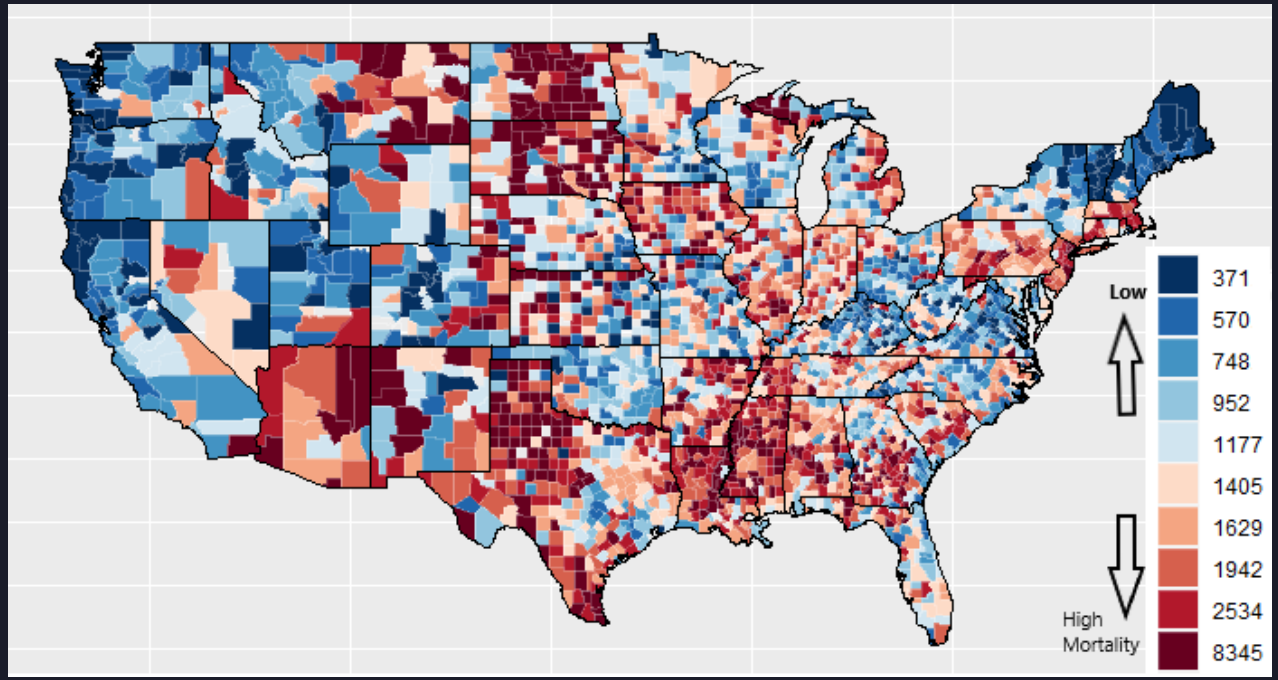
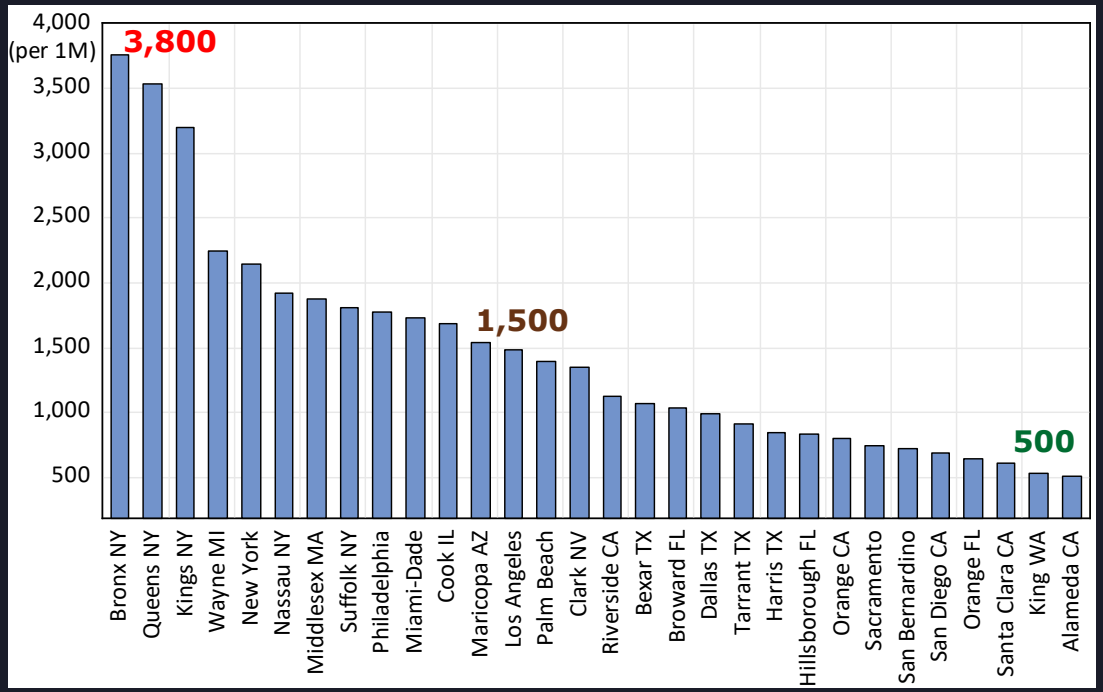
March 2021

There is wide variation in COVID-19 mortality rate across the country



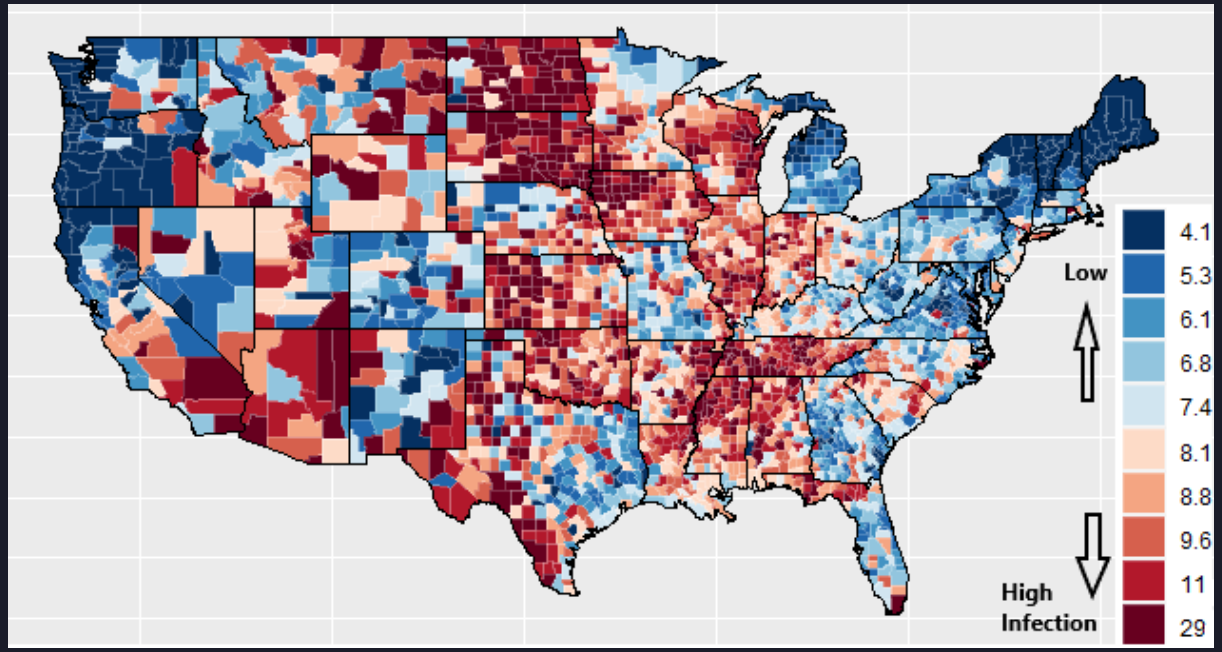
Cumulative county COVID-19 mortality rate (per 1M) as of January 23, 2021. Source: USA Facts

Wide variation of mortality occurs in the most populous counties as well



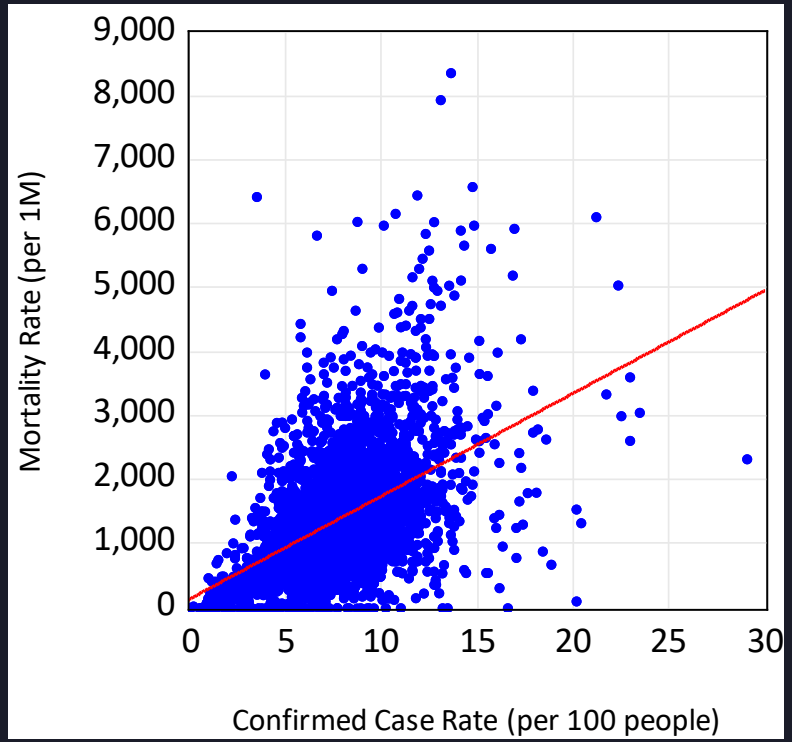
Cumulative county COVID-19 mortality rate (per 1M) as of January 23, 2021 for 30 largest counties

Variation and clusters in COVID-19 confirmed case (infection) rate

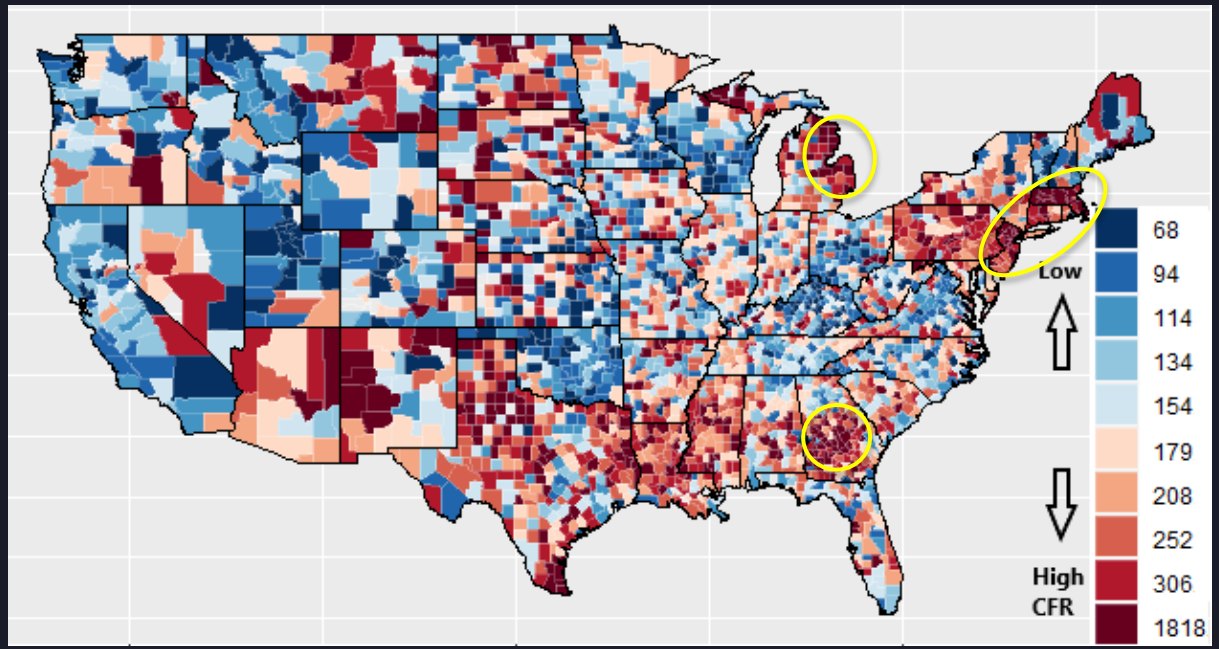


Cumulative county COVID-19 confirmed case rate (per 100) as of January 23, 2021

Mortality rate and case rate are highly correlated.
We calculate case fatality rate (CFR) = mortality / case



Case fatality rate also varies across the country



Cumulative county case fatality rate (per 10,000) as of January 23, 2021

7 multivariate regressions

Model	Dependent Variable	Explanatory Variables	Adj. R-Squared	Appendix
1	Death rate	Age, Race, Socioeconomic, Health factors	0.35	1
2	Case rate	Age, Race, Socioeconomic, Health factors	0.33	2
3	Case fatality rate = Death / Case	Age, Race, Socioeconomic, Health factors	0.25	3
4	Death rate	Age, Socioeconomic, Health factors	0.32	4
5	Death rate	Age, Race, Socioeconomic, Health factors, State fixed effect	0.48	5
6	Death rate	Case rate, Age, Race, Socioeconomic, Health factors	0.44	6
7	Death rate	Death rate on May 31, 2020, Age, Race, Socioeconomic, Health factors	0.42	7

Data sources:
Age, race, socioeconomic variables: American community survey 2019
Industry variable: Quarterly Census of Employment and Wages 2019
Health variables: a couple of indicators from County Health Ranking Data

Model 1	Dep Var: Death Rate			
coefficient	estimate	std error	t statistic	p value
(Intercept)	4189.45	590.1	7.10	0.00
a85a	288.47	24.02	12.01	0.00
a7584	122.95	18.80	6.54	0.00
a6574	-50.16	15.91	-3.15	0.00
a5564	-18.32	15.58	-1.18	0.24
a2034	-16.72	8.40	-1.99	0.05
pdensity	-0.02	0.02	-1.14	0.26
pop	0.00	0.00	-0.09	0.92
aindian	20.17	2.75	7.32	0.00
black	15.30	1.99	7.70	0.00
latino	11.92	1.45	8.19	0.00
asian	-6.74	7.07	-0.95	0.34
sparent	23.26	10.27	2.26	0.02
mincome	0.00	0.00	0.12	0.90
poverty	12.23	5.96	2.05	0.04
chci	-12.28	3.08	-3.98	0.00
lcp	1.76	3.62	0.49	0.63
ur	1.04	8.11	0.13	0.90
disable	-22.41	5.98	-3.75	0.00
hi_pub	-10.24	3.55	-2.89	0.00
demv	-9.32	1.82	-5.11	0.00
commute_p	41.13	8.78	4.68	0.00
wfh	-30.35	6.70	-4.53	0.00
computer	-22.24	4.04	-5.50	0.00
p_nursehome	184.52	31.10	5.93	0.00
p_liquor	903.72	316.9	2.85	0.00
drinking	27.94	6.52	4.29	0.00
premature d	0.04	0.01	3.71	0.00
lowbirthw	21.61	12.30	1.76	0.08
Observations:	2799		Adj. R2:	0.35

Significant factors to predict COVID-19 mortality

Positively correlated

- Age
- Early states hit by the first wave
- Poverty
- Nursing home exposure
- Excessive drinking
- Premature death in 2016-18
- Minority group

Inversely correlated

- Human capital / education
- Disability insurance
- Public health insurance
- Work from home
- % Vote for Clinton in 2016
- Computer access

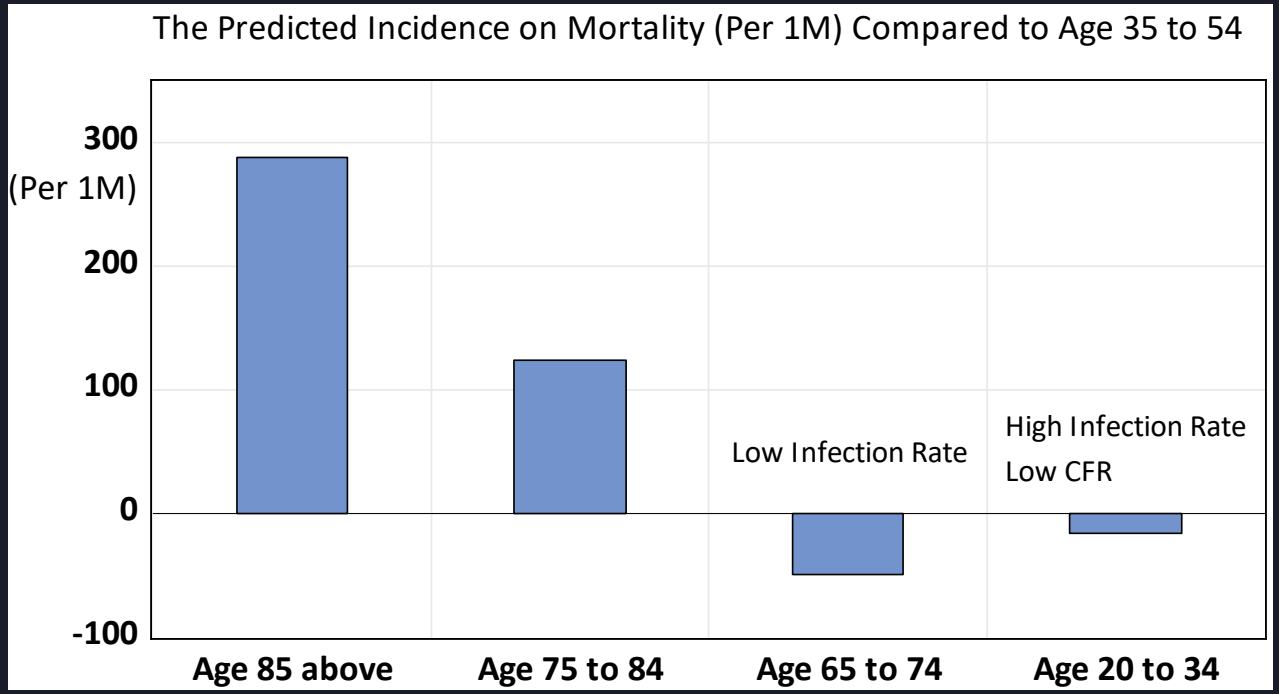
Insignificant factors to predict COVID-19 mortality

- Population and population density
- Median income
- Labor force participation
- Unemployment rate
- Industry employment % (NAICS code)
  - Meat packing factory
  - Airport
  - Leisure and hospitality
  - Office of physicians
  - Supermarkets & grocery stores

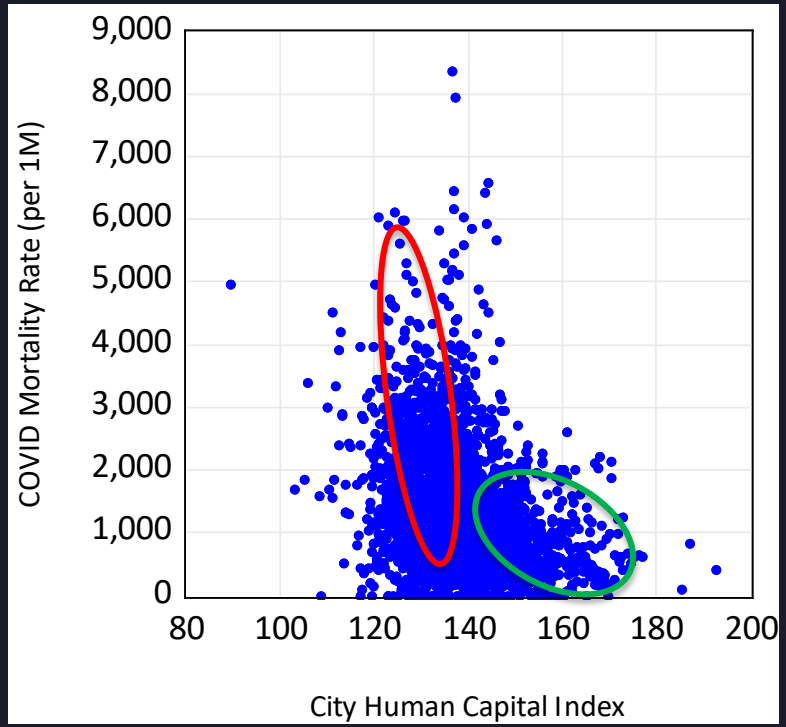
Health Indicators

- Poor physical health days
- Smoking
- Food environment index
- Physical inactivity

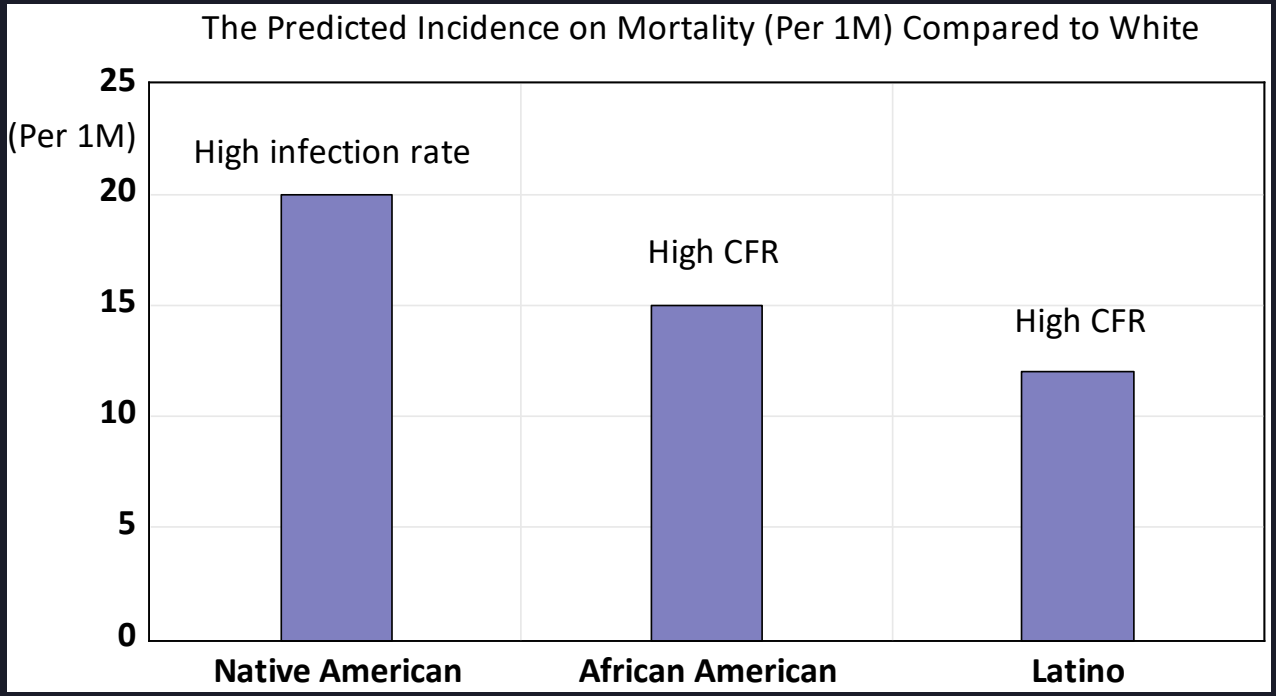
Age factor is a significant predictor



More educated people have lower mortality rate



Minority group are disproportionally affected



Conclusions

- There is wide variation in COVID-19 mortality rate across the country.
- We find the following significant predictors. *Factors **positively** associated with mortality:*
  - Age above 75 years old
  - First wave states
  - Poverty
  - Nursing home exposure
  - Excessive drinking
  - Comorbidity risk
  - Minority ethnicity
- *Factors **inversely** associated with mortality:*
  - High education
  - Having disability insurance
  - Having public health insurance
  - Work from home
  - Having access to computer
  - More stringent mitigation policies or more cautious behaviors