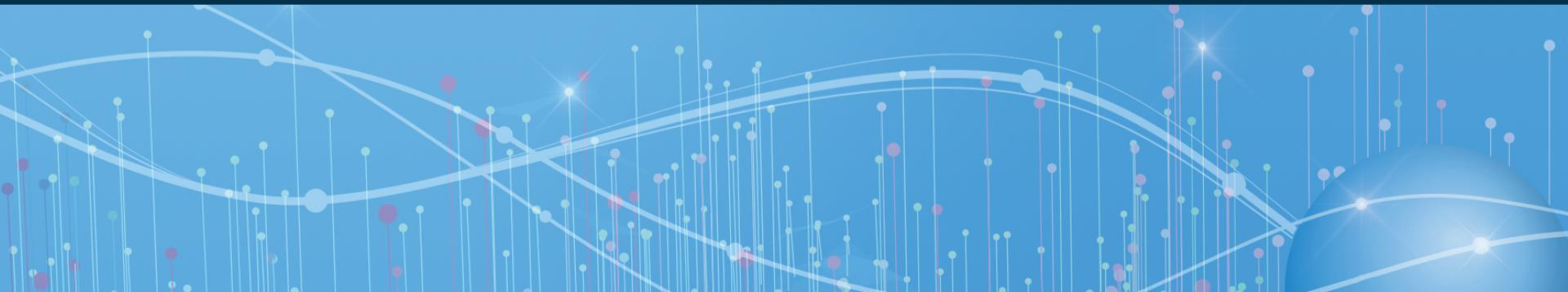
#SASGF

VIRTUAL

SAS® GLOBAL FORUM 2021



Disproportional Impact of COVID-19 on Marginalized Communities

David J Corliss, Peace-Work

With a PhD in statistical astrophysics, David Corliss has been working in SAS since SAS Date 12692. He is the founder and Director of Peace-Work, a volunteer cooperative of statisticians and data scientists applying statistical methods to issue-driven advocacy in poverty, education, social justice, and providing analytic support for charitable groups.

OUTLINE

Disproportionate Impact

Study Methodology

County-Level Time Series Analysis

Other Disproportionate Impacts

Summary and Conclusions

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Disproportionate Impact

CDC Rate Ratios by Ethnicity - Cumulative as of March 6, 2021

Based on the 53% of case reports that included race / ethnicity

Risk for COVID-19 Infection, Hospitalization, and Death By Race/Ethnicity

Rate ratios compared to White, Non-Hispanic persons	American Indian or Alaska Native, Non-Hispanic persons	Asian, Non-Hispanic persons	Black or African American, Non-Hispanic persons	Hispanic or Latino persons
Cases[1]	1.7x	0.7x	1.1x	1.3x
Hospitalization[2]	3.7x	1.0x	2.9x	3.1x
Death[3]	2.4x	1.0x	1.9x	2.3x

Race and ethnicity are risk markers for other underlying conditions that affect health, including socioeconomic status, access to health care, and exposure to the virus related to occupation, e.g., among frontline, essential, and critical infrastructure workers.

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Disproportionate Impact

Methodological Issues

- Many case reports do not report race / ethnicity
- Point in time data late in the pandemic averages the time series, understating the intrinsic risk
- Politicization has resulted in a degree of behavior-driven morbidity and mortality for certain groups

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Disproportionate Impact

Methodological Issues

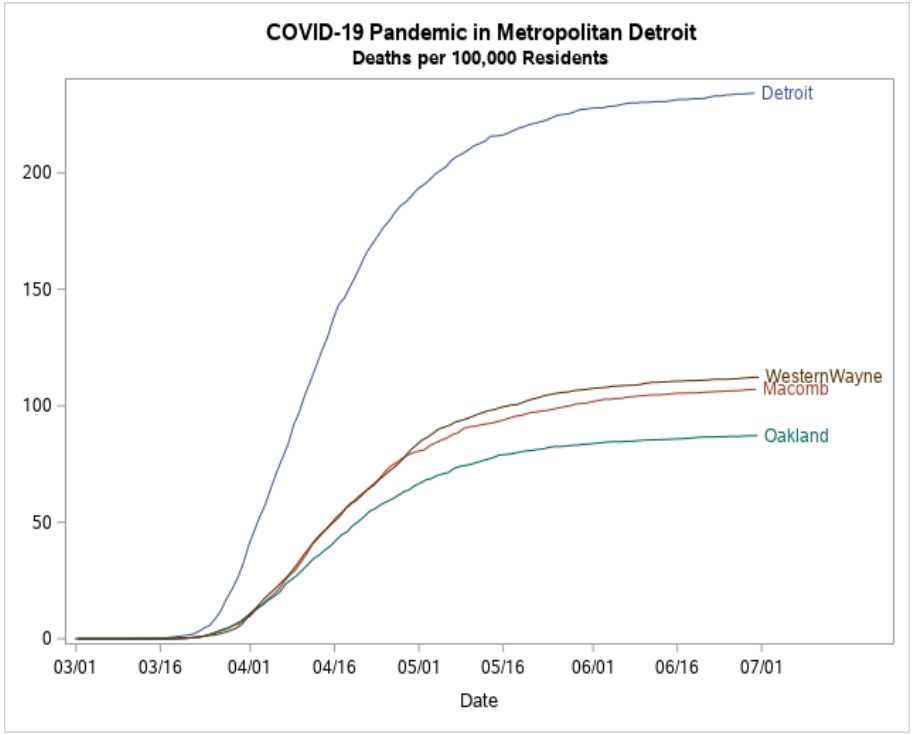
- Many case reports do not report race / ethnicity
- Point in time data late in the pandemic averages the time series, understating the intrinsic risk
- Politicization has resulted in a degree of behavior-driven morbidity and mortality for certain groups

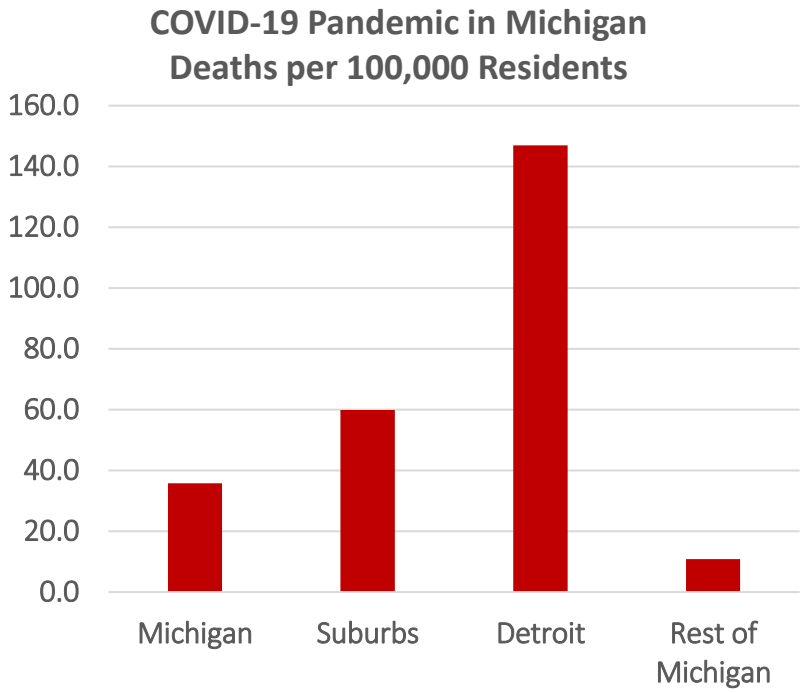
=> Time series methods are needed for a full understanding of disproportionate impact

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Disproportionate Impact

Metro Detroit Case Study: Early Evidence of Disproportionate Impact

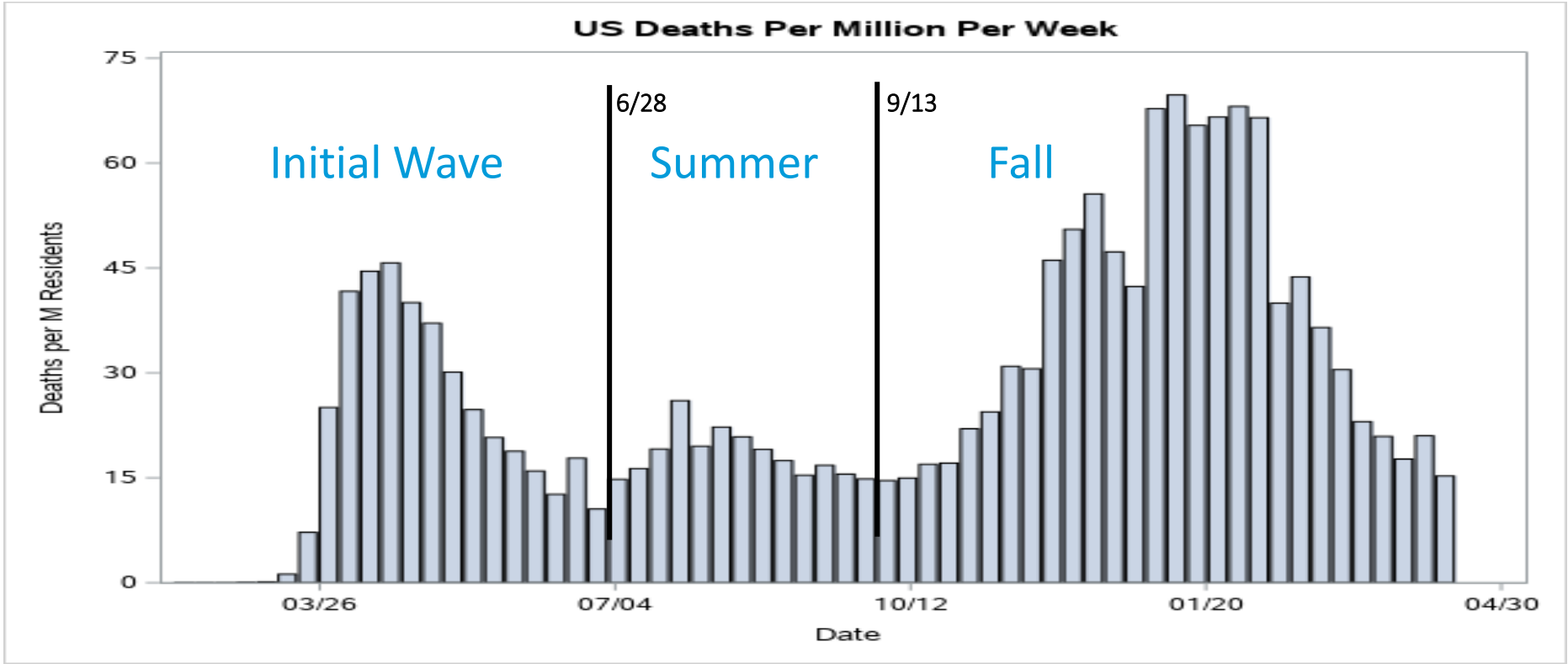




SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Study Methodology

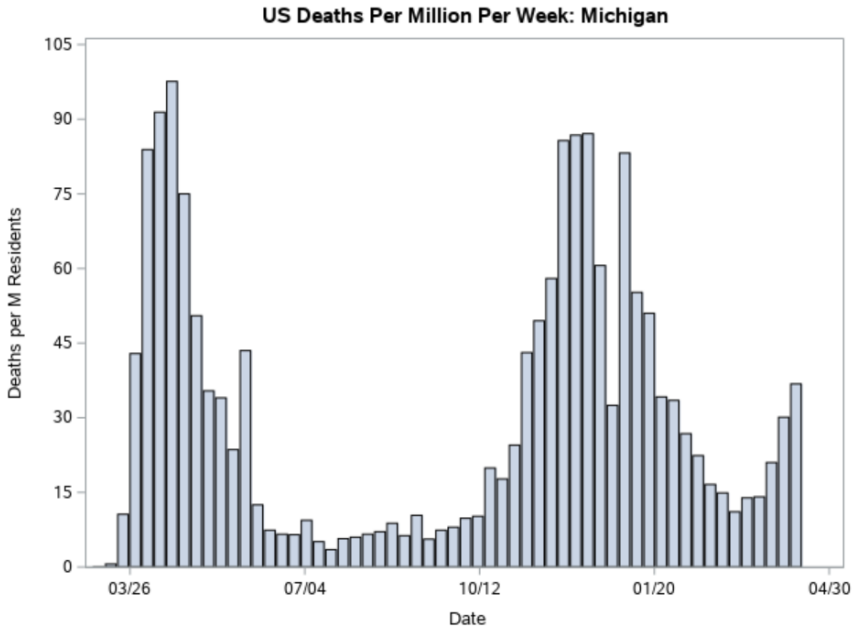
Series of Waves

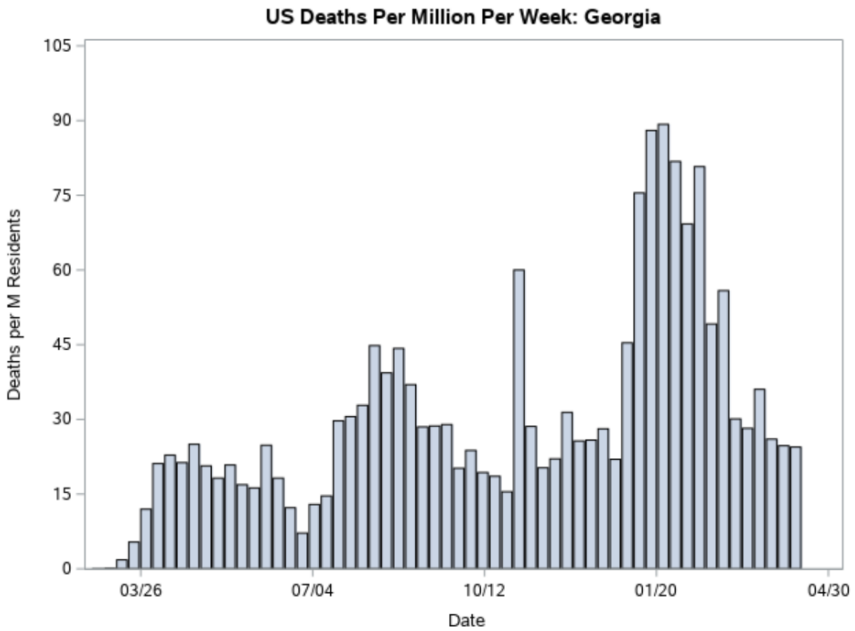


SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Study Methodology

Summer Wave Not Found in All Areas





SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Study Methodology

Methodology Best Practices

- Track deaths rather than cases, which are often missed
- Adjust for population size => use Per Capita metrics
- County-Level data – NYT data based on screen-scraping county health department pages, complete and current
- First Wave shows intrinsic, underlying risks apart from political influences

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Study Methodology

Methodology Best Practices

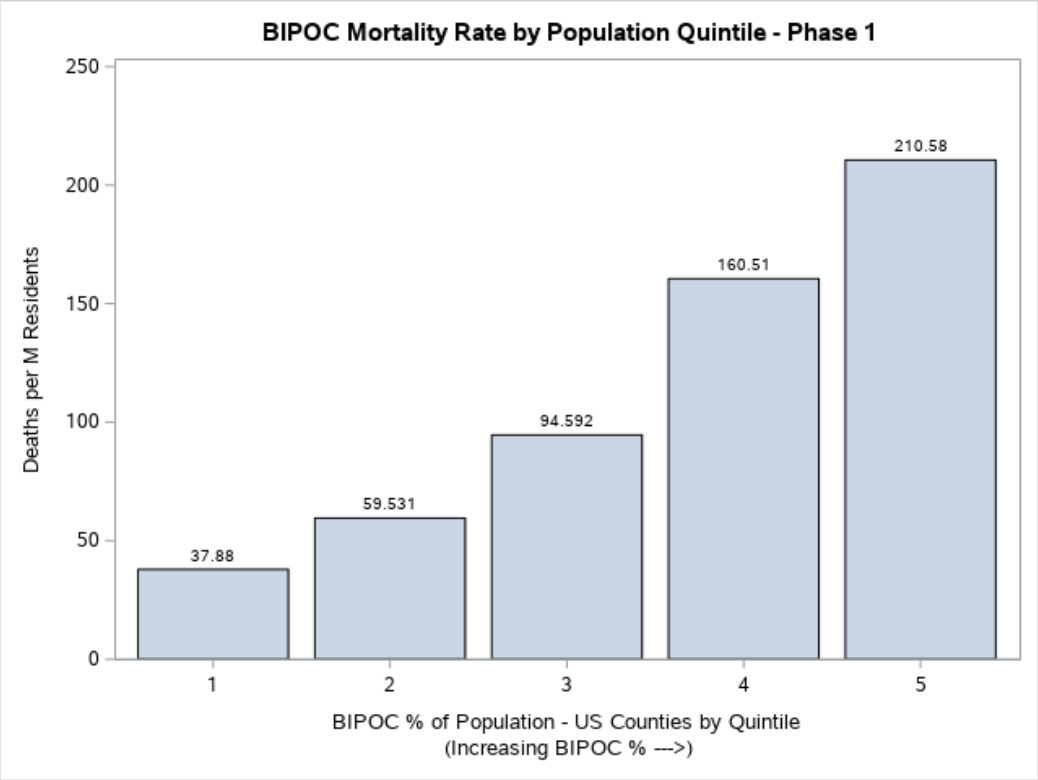
- Track deaths rather than cases, which are often missed
- Adjust for population size => use Per Capita metrics
- County-Level data – NYT data based on screen-scraping county health department pages, complete and current
- First Wave shows intrinsic, underlying risks apart from political influences

=> Key Metric: Cumulative deaths per capita through Week 25 (June 27)

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

Wave 1: January – June 2020

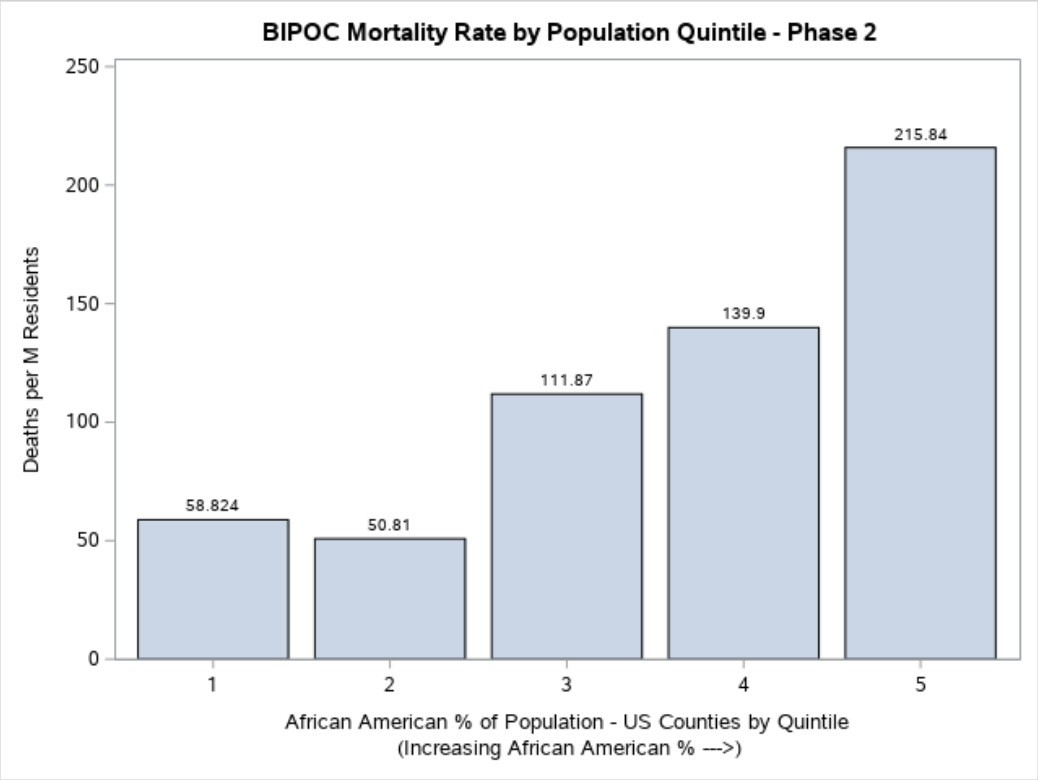


Dividing all US counties into quintiles from lowest to highest BIPOC % of total population, each quintile has higher COVID mortality

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

Wave 2: July – Mid-September 2020



Summer Wave

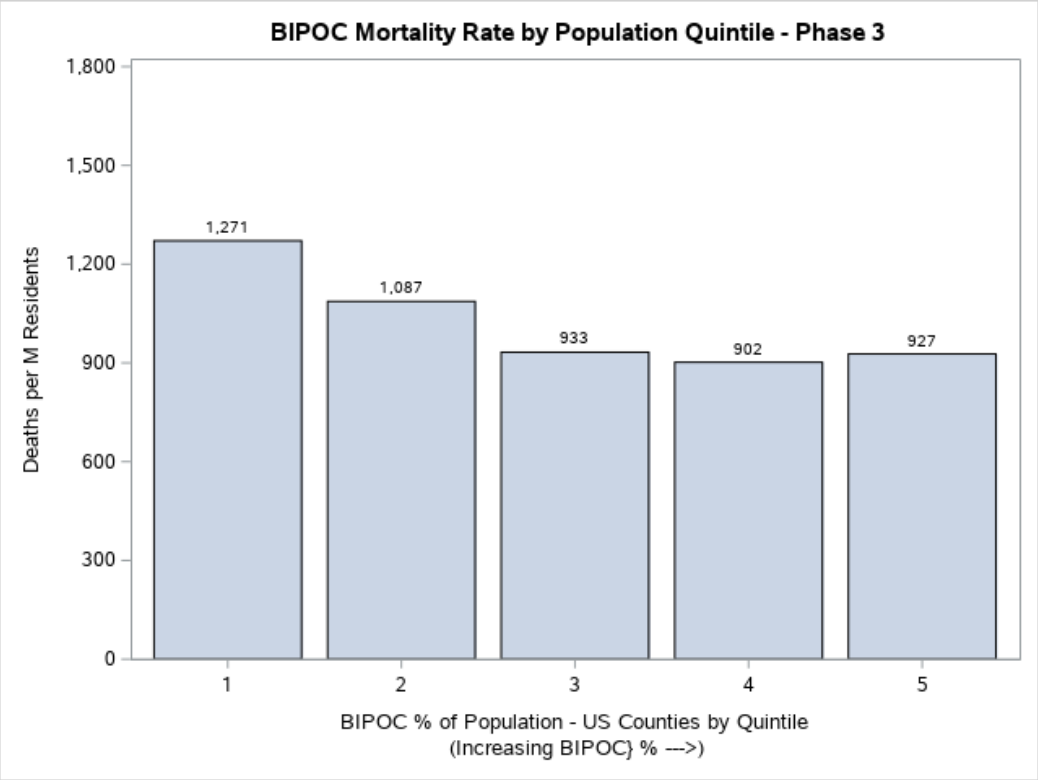
Still high BIPOC mortality rate

Increasing mortality in counties with the least BIPOC %

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

Wave 3: Late September - Present



Fall Wave

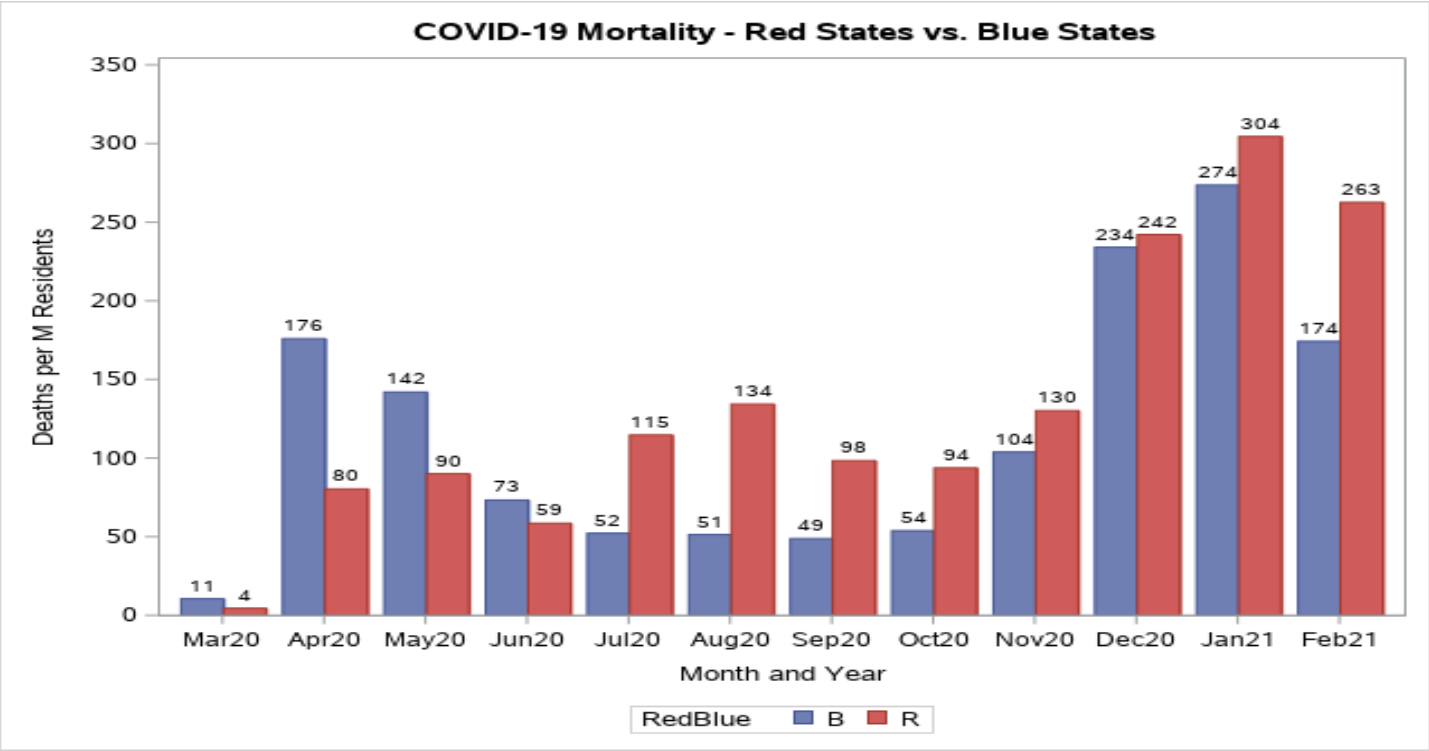
Long Predicted by Epidemiologists

Little differentiation in mortality by BIPOC %

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

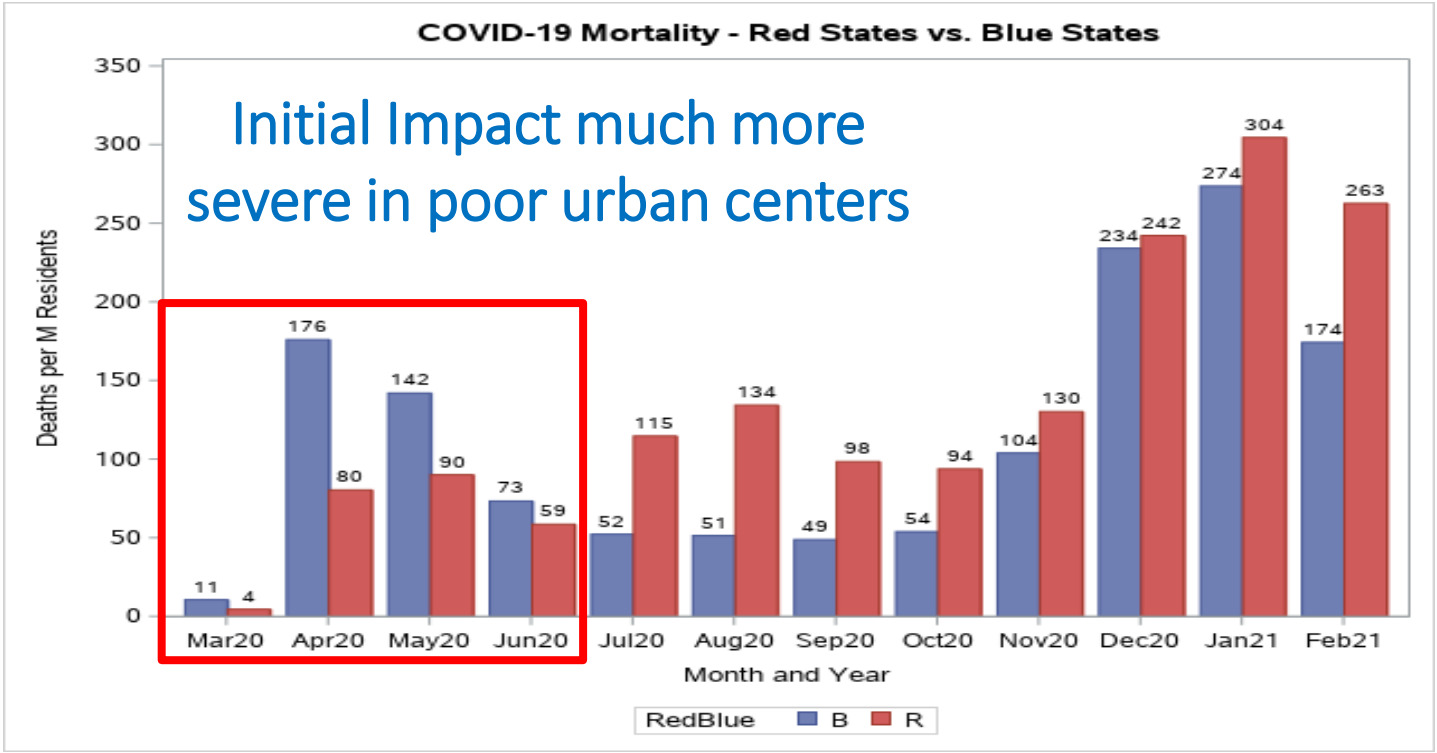
Red State vs. Blue States: Different Evolution of the Pandemic



SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

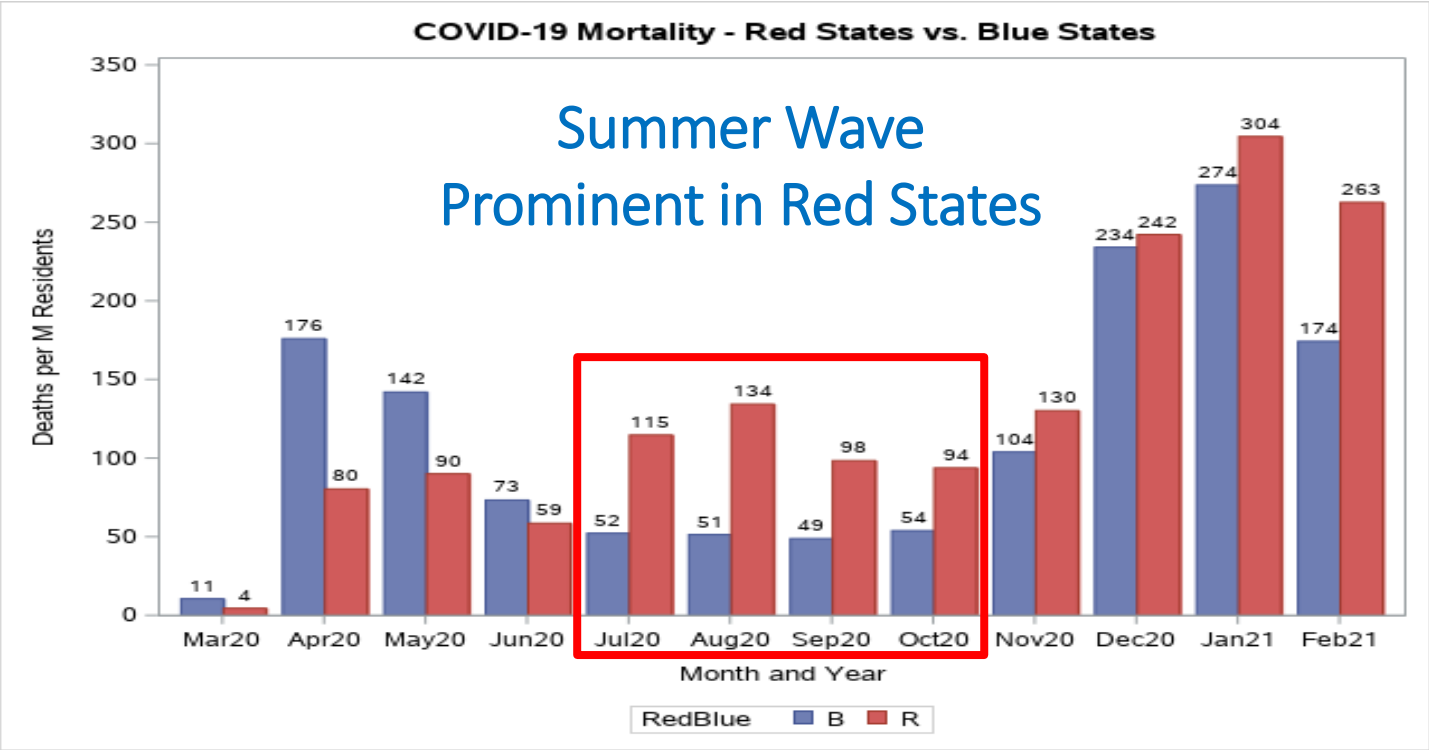
Red State vs. Blue States: Different Evolution of the Pandemic



SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

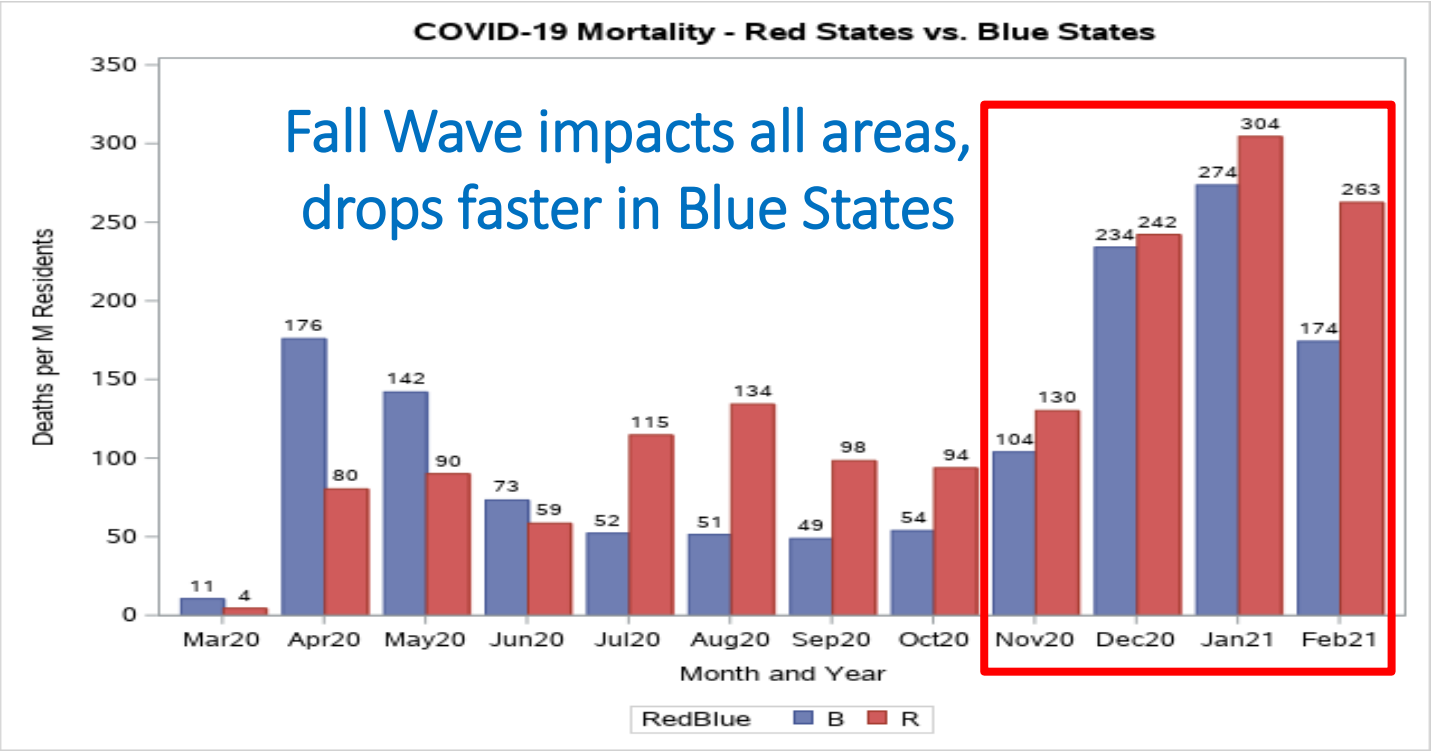
Red State vs. Blue States: Different Evolution of the Pandemic



SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

County-Level Time Series Analysis

Red State vs. Blue States: Different Evolution of the Pandemic



SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Other Disproportionate Impacts

COVID-19 impacts many social pathologies known to have disproportional impacts on marginalized communities, including addiction, domestic violence, suicide, human trafficking, and others

1. Identify risk factors and model score - Pre-COVID
2. Identify the factors impacted by the pandemic
3. Calculate Post-COVID values for each geography
4. Evaluate model score with new values
5. Calculate pre / post difference and % change

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Other Disproportionate Impacts

Example: Impact of COVID-19 on Human Trafficking

- Poverty: % Below Poverty Line
- Affluence: Per Capita Income
- Gini Index: % Change
- New Homelessness: Foreclosure % Increase
- Race: % Persons of Color
- History of Legal Slavery: % in slavery in 1860
- Approach to Business Regulation: RTW

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Other Disproportionate Impacts

Example: Impact of COVID-19 on Human Trafficking

- Poverty: % Below Poverty Line
- Affluence: Per Capita Income
- Gini Index: % Change
- New Homelessness: Foreclosure % Increase

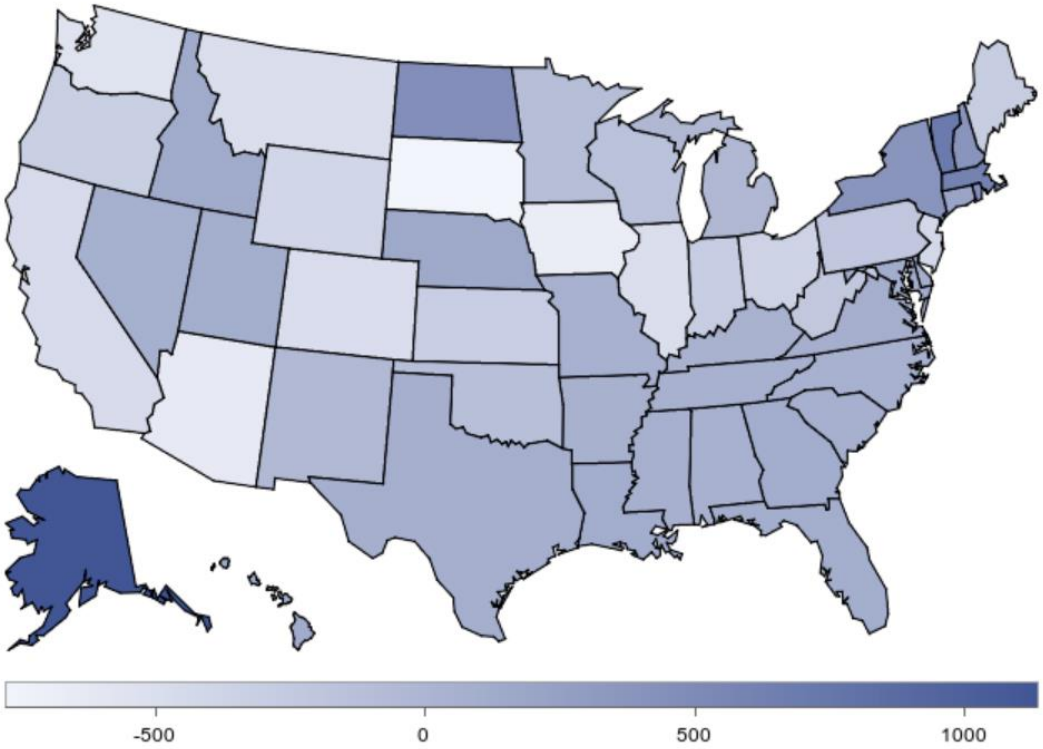
Affected by the Pandemic

- Race: % Persons of Color
- History of Legal Slavery: % in slavery in 1860
- Approach to Business Regulation: RTW

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Other Disproportionate Impacts

Example: Impact of COVID-19 on Human Trafficking



Largest Increases Due to COVID-19

Alaska

Central NE

North Dakota

New York

Nebraska

Idaho

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Summary of Time Series Analysis

Three distinct waves of the pandemic are seen:

- Initial: Feb-Jun, marginalized populations badly impacted
- Summer Wave: behavior-driven, only seen in Red States
- Fall Wave: worldwide, expected by epidemiologists

Politically-driven behaviors appear in Summer Wave with increases in Red States from disregarding safety measures

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Conclusions

- Disproportional impacts on marginalized populations are seen in COVID-19 per capita deaths rates
- Mortality rates increase with population percent BIPOC
- Intrinsic risk in BIPOC populations: Odds Ratio = 5.56
- Connections seen to other social pathologies with disproportionate impact on marginalized populations

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

References

Banks, D. and Kyckelhahn, T. (2011), “Characteristics of Suspected Human Trafficking Incidents, 2008-2010”, USDOJ

Center on Budget and Policy Priorities, *Tracking the COVID-19 Recession’s Effects on Food, Housing, and Employment Hardships* https://www.cbpp.org/research/poverty-and-inequality/tracking-the-covid-19-recessions-effects-on-food-housing-and

New York Times, Corona Virus County Data, New York Times, 2021

New York Times COVID-19 Data, accessed 3/6/2021: https://github.com/nytimes/covid-19-data

US Census Bureau Demographic Data
https://www.census.gov/programs-surveys/ces/data/restricted-use-data/demographic-data.html

US Center for Disease Control and Prevention (CDC), *Risk for COVID-19 Infection, Hospitalization, and Death By Race/Ethnicity,* 2021
https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html#footnote03

US Bureau of Labor Statistics Data https://www.bls.gov/data/

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Thank you!

David J Corliss

Director, Peace-Work
davidjcorliss@gmail.com