COVID-19 Mortality Disparities Across Demographic & Geographic Groups

STA 199 Lab - Data Divas

Mira, Josh, Yasong, and Helen



United States, 2020-2026

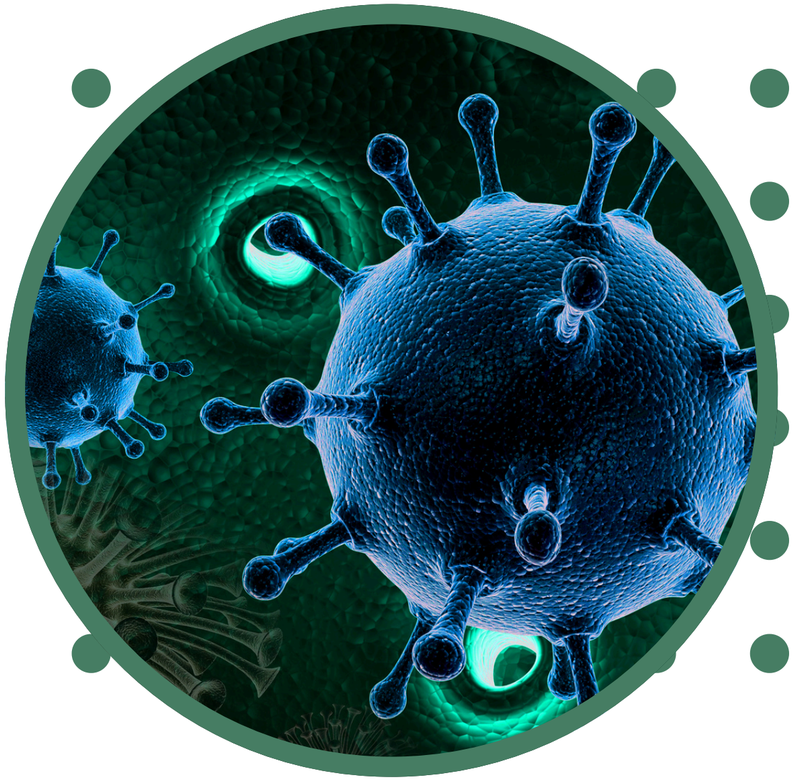
Topic & Motivation

Why examine COVID-19 mortality?

- Various populations were disproportionately affected
- Age, race/ethnicity, and geography can reveal different patterns of mortality

RESEARCH QUESTION

How did COVID-19 mortality vary across age and racial/ethnic groups in the U.S., and how did racial/ethnic mortality patterns differ accross HHS regions?





Data Source & Methodology

CDC/NCHS

Data Set: Provisional COVID-19 Death Counts and Rates by Month, Jurisdiction of Residence, and Demographic Characteristics

- ***Study period:*** *January 2020–August 2026*
- ***80 monthly observations*** *per demographic group*

CENTERS FOR DISEASE CONTROL AND PREVENTION

71,280 observations and 13 variables

Analytical Approach

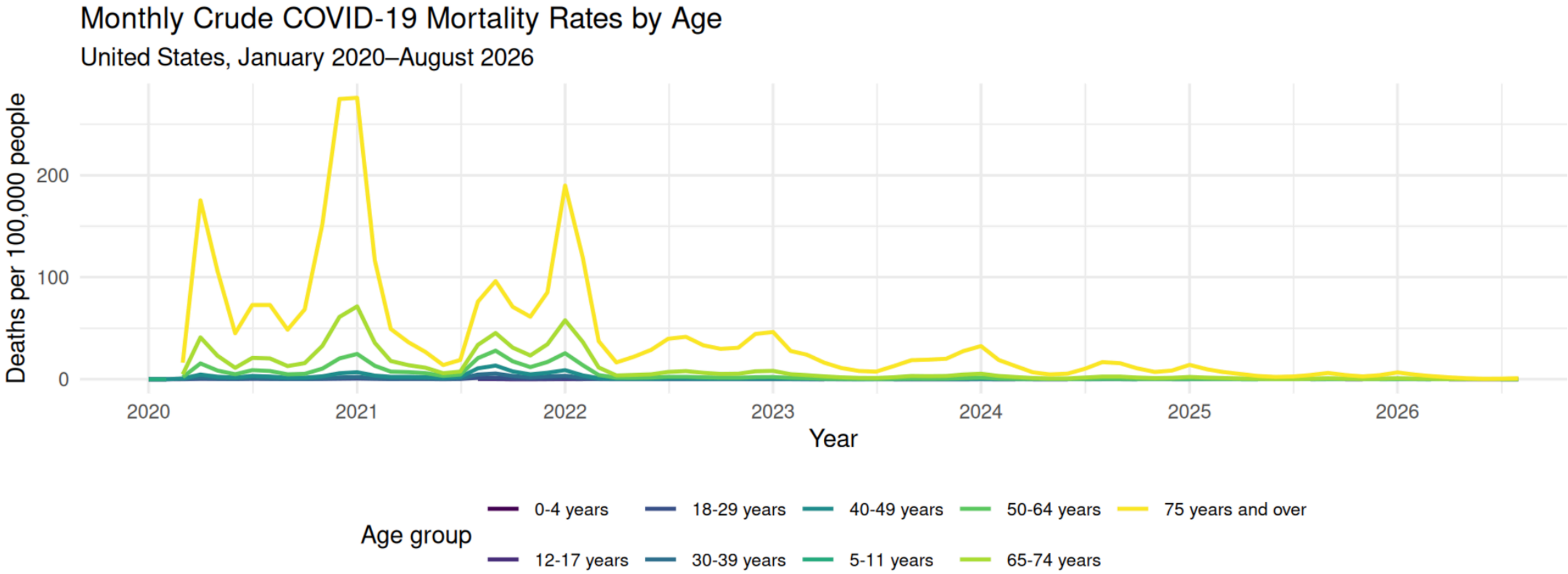
Age Comparison: Monthly Crude Mortality Rates

Racial/Ethnic Comparisons: Crude & Age-Adjusted Rates

Geographic Comparison: HHS Regional Averages & Chloropleth Maps

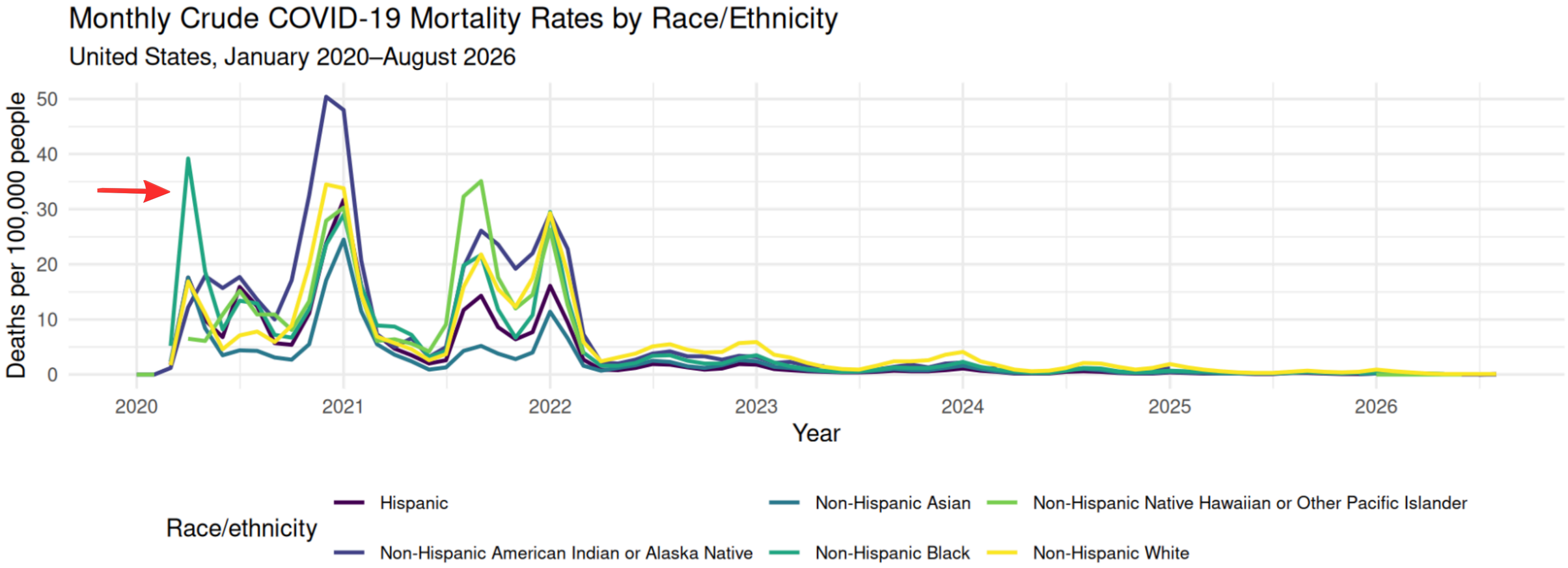
Data Limitations: Missing Analysis

Age-Related Mortality Patterns



Key Figures: Mean, Median Lowest: 5-11 Years: 0.02, 0 Highest: 75+ Years: 39.3, 18.8

Racial & Ethnic Mortality Patterns



9.81

NH Native Hawaiian or Other Pacific Islander

Mean crude rate per 100,000

2.73

NH Asian

Mean crude rate per 100,000

Why Does Age-Adjustment Matter?

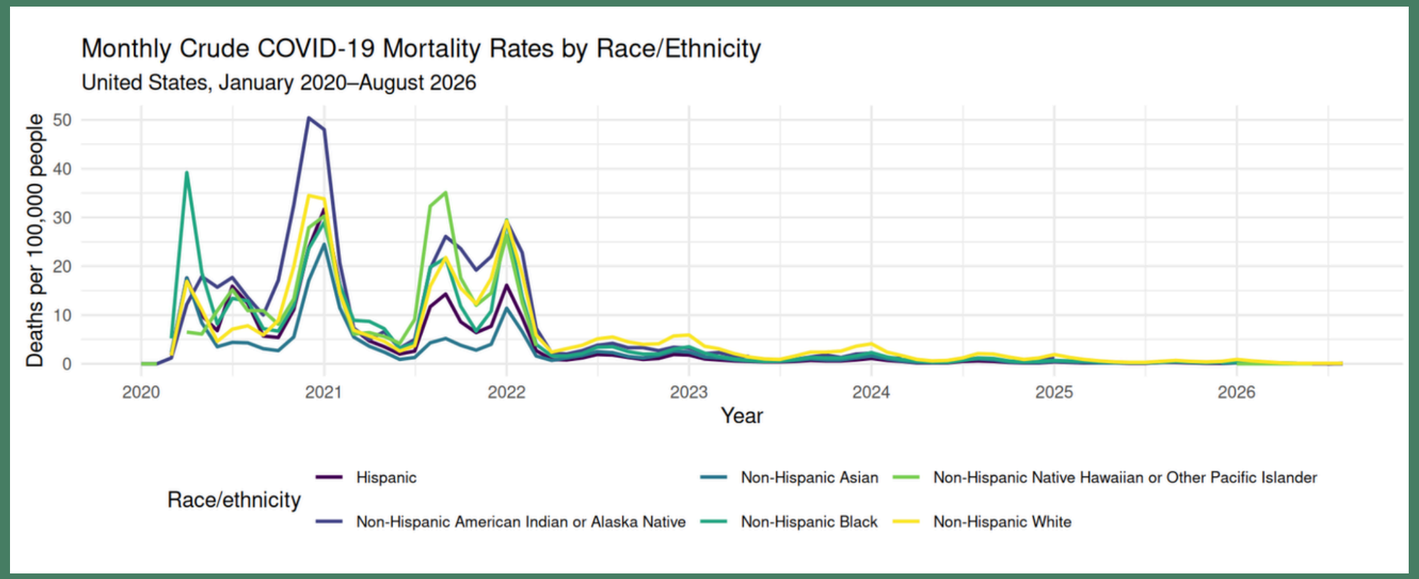
Crude vs. Age-Adjusted Mortality Rates

Populations have different age distributions

Age adjustment helps make racial/ethnic comparisons less influenced by differences in population age composition

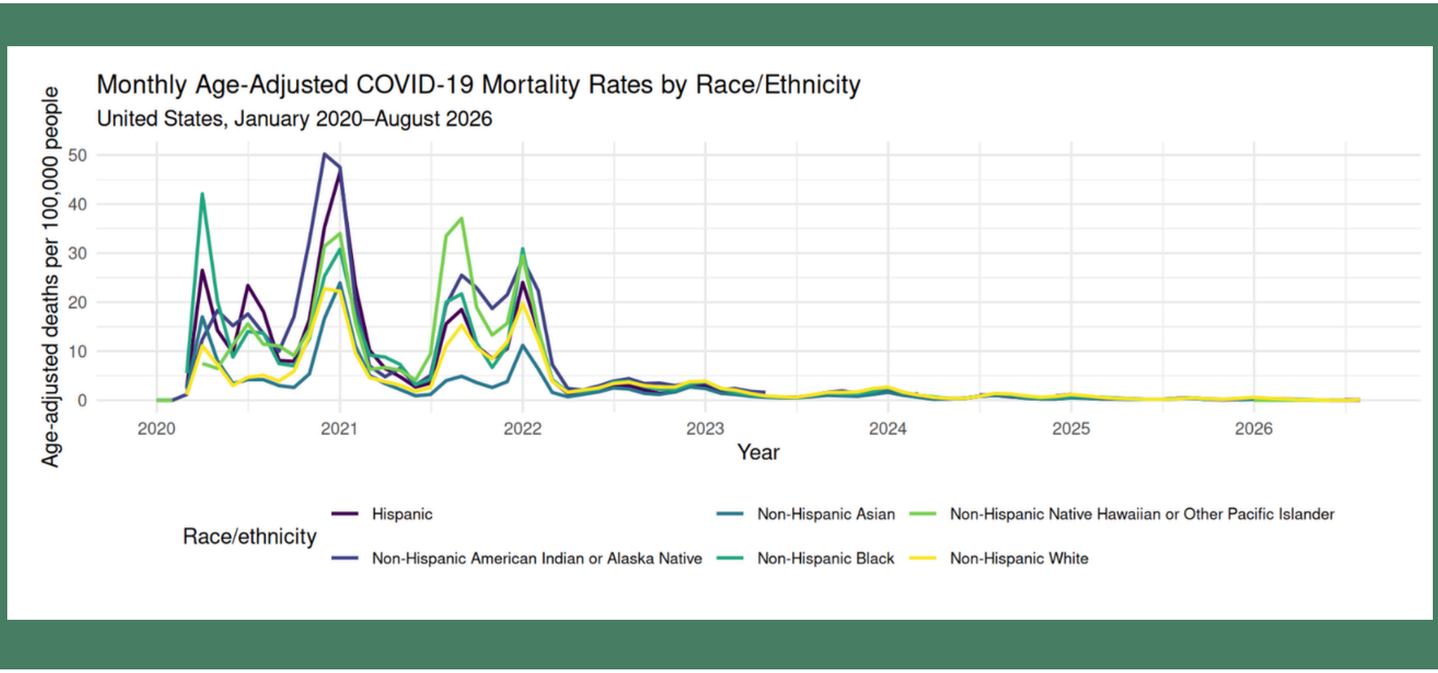
```
# A tibble: 6 × 5
  subgroup1                        crude_mean crude_median adjusted_mean adjusted_median
  <chr>                                 <dbl>        <dbl>         <dbl>           <dbl>
1 Hispanic                               3.74          0.8          5.42             1.3
2 Non-Hispanic American I…               9.07         3.25          9.03            3.45
3 Non-Hispanic Asian                     2.73          1.2          2.66             1.2
4 Non-Hispanic Black                     5.22         1.55          5.49            1.65
5 Non-Hispanic Native Haw…               9.81          6.5          10.6             7.5
6 Non-Hispanic White                     5.46          2.4          3.65             1.6
```

- Hispanic (+1.68 Mean)
- Native Hawaiian / Other. Pacific Islander (+1.0 Median)
- White (-1.81 Mean)



Crude Mortality

COVID-19 deaths per 100,000 people.

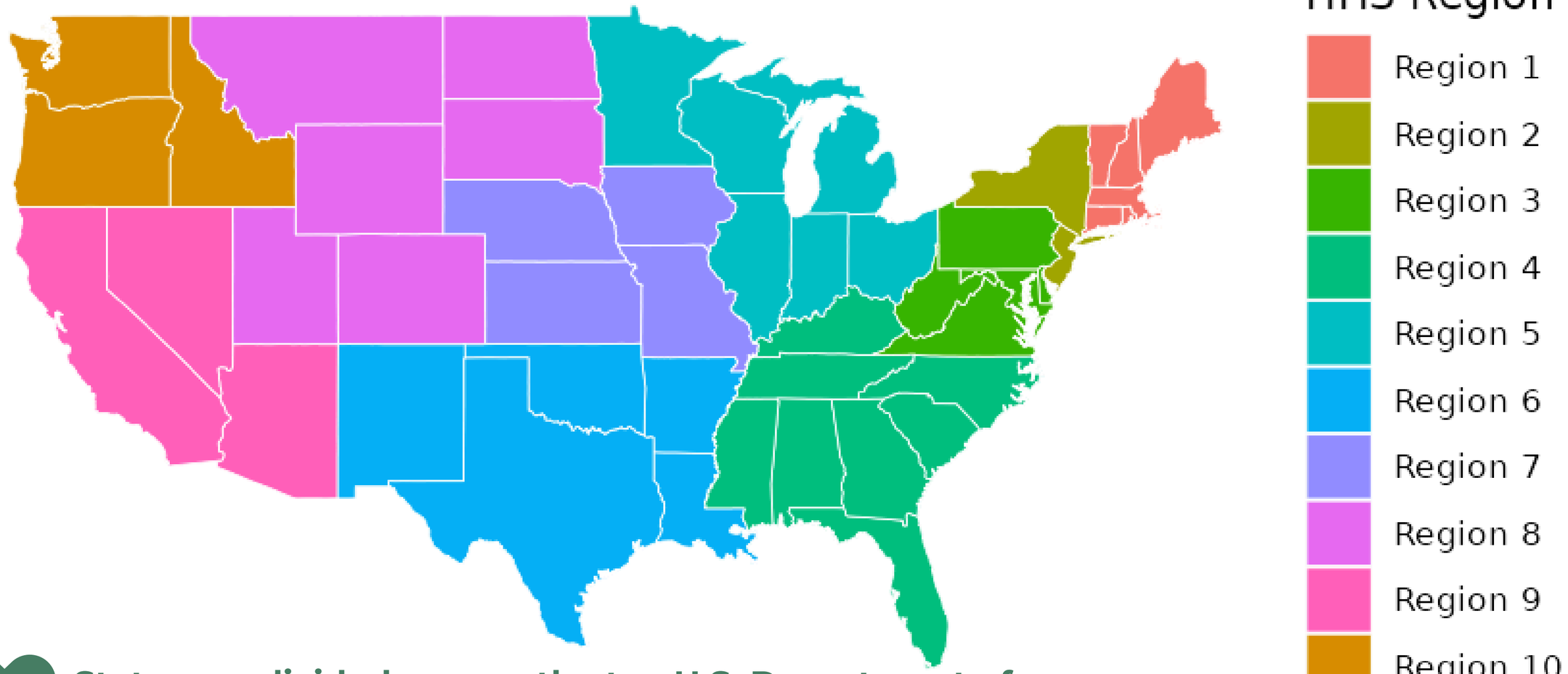


Age-Adjusted Mortality

Standardized using the U.S. 2000 population, allowing for a fairer comparison.

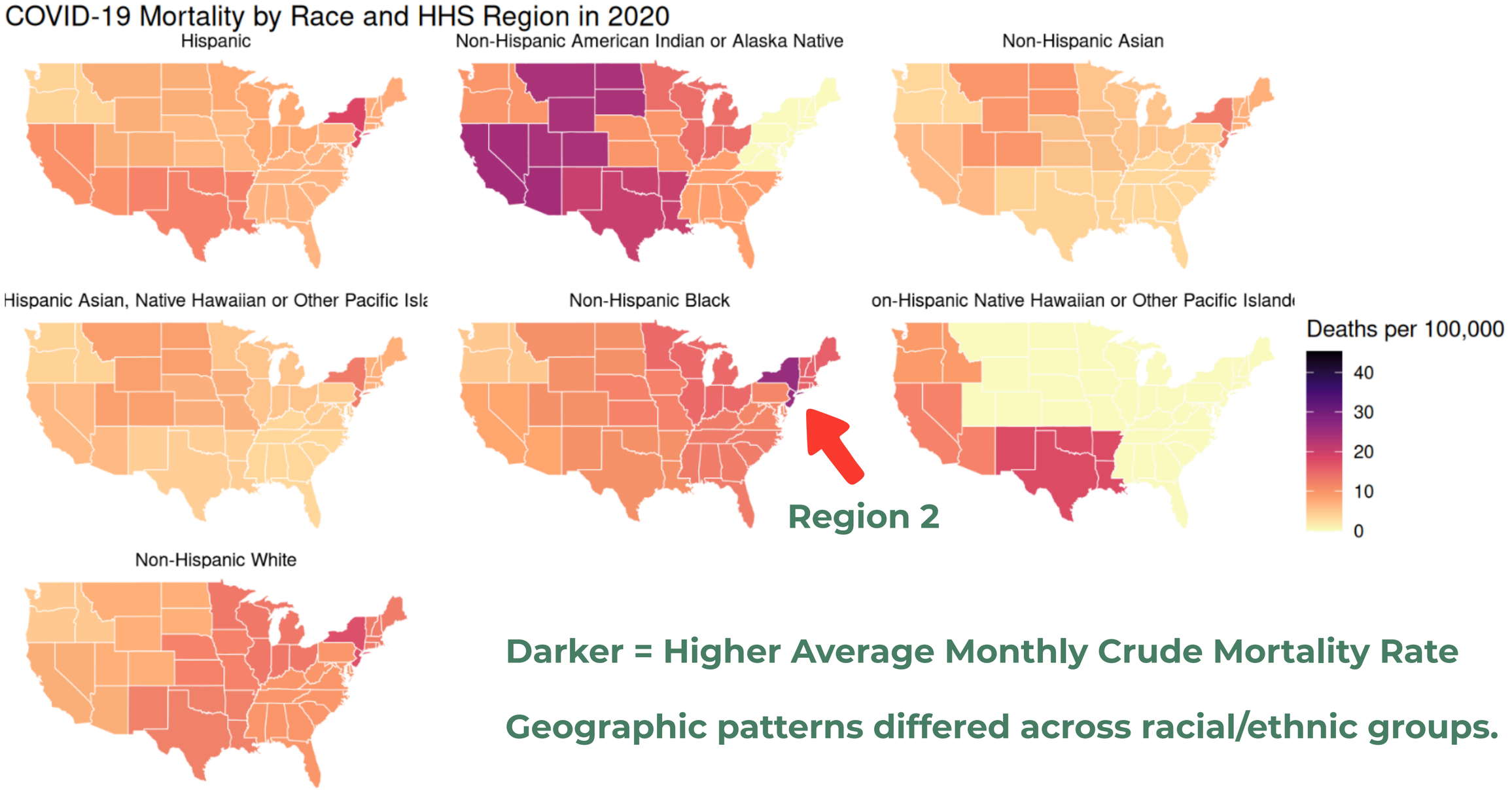
Regional Visualization

U.S. Health and Human Services Regions



States are divided among the ten U.S. Department of Health and Human Services (HHS) regions

Regional Mortality Patterns in 2020



Darker = Higher Average Monthly Crude Mortality Rate

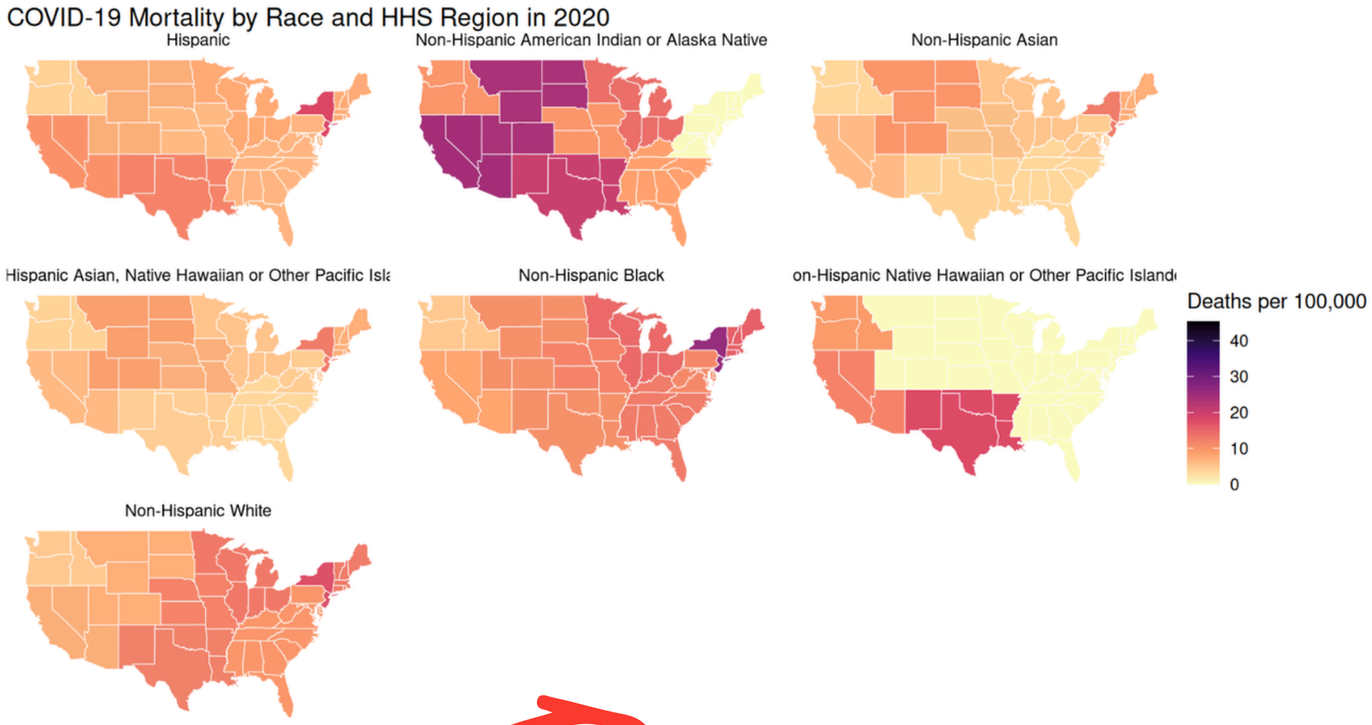
Geographic patterns differed across racial/ethnic groups.

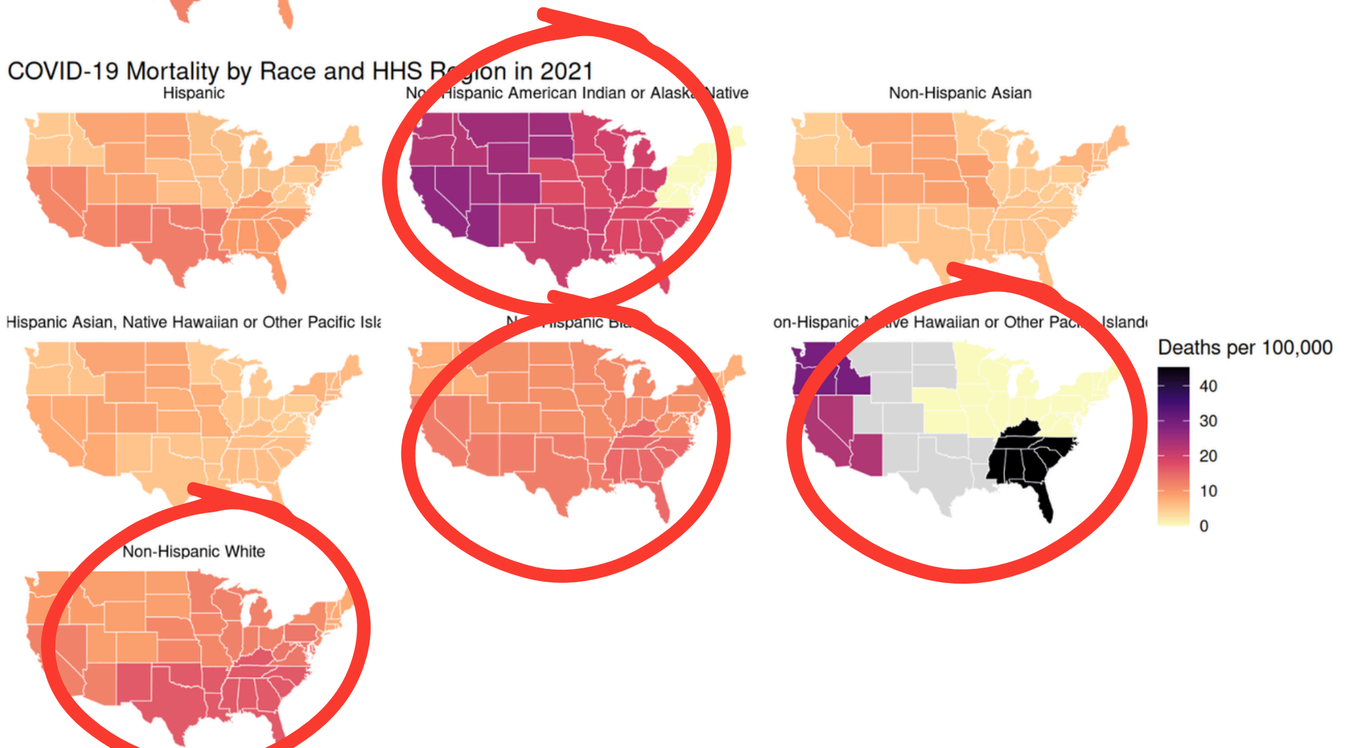
Compare 2020-2021 Regional Mortality Patterns

Racial/ethnic group	# HHS regions with the highest rate
American Indian or Alaska Native	6
Black	3
White	1

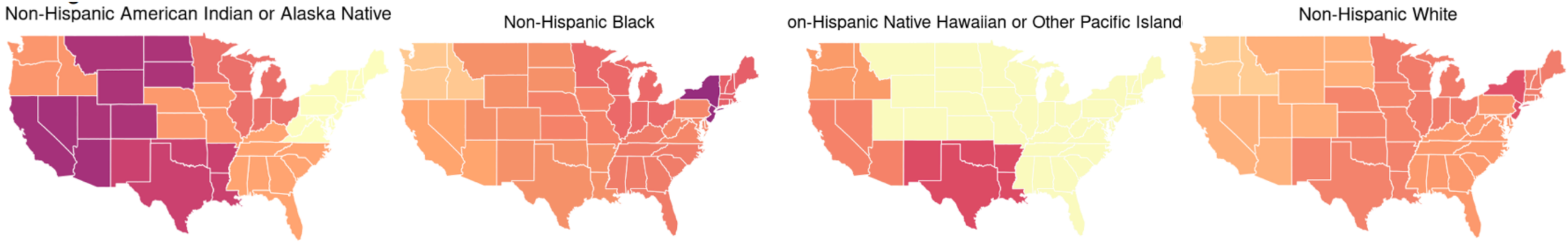
Zoom in on 4 groups:

1. **American Indian/Alaska Native**
2. **Black**
3. **White**
4. **Native Hawaiian/Other Pacific Islander**

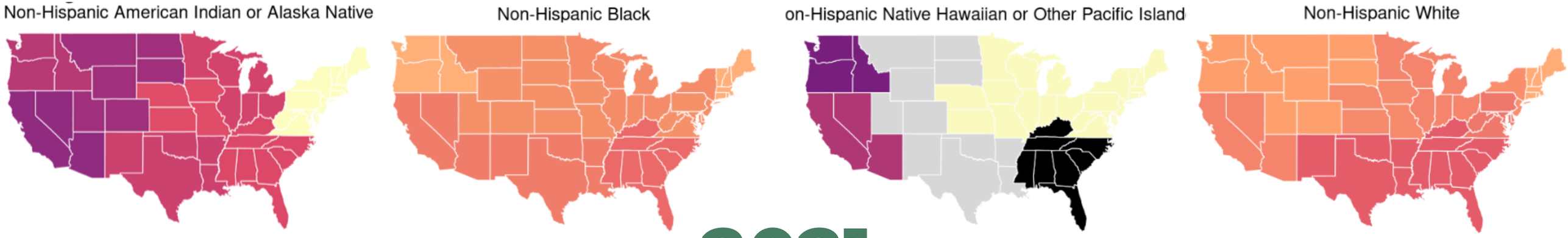




2020

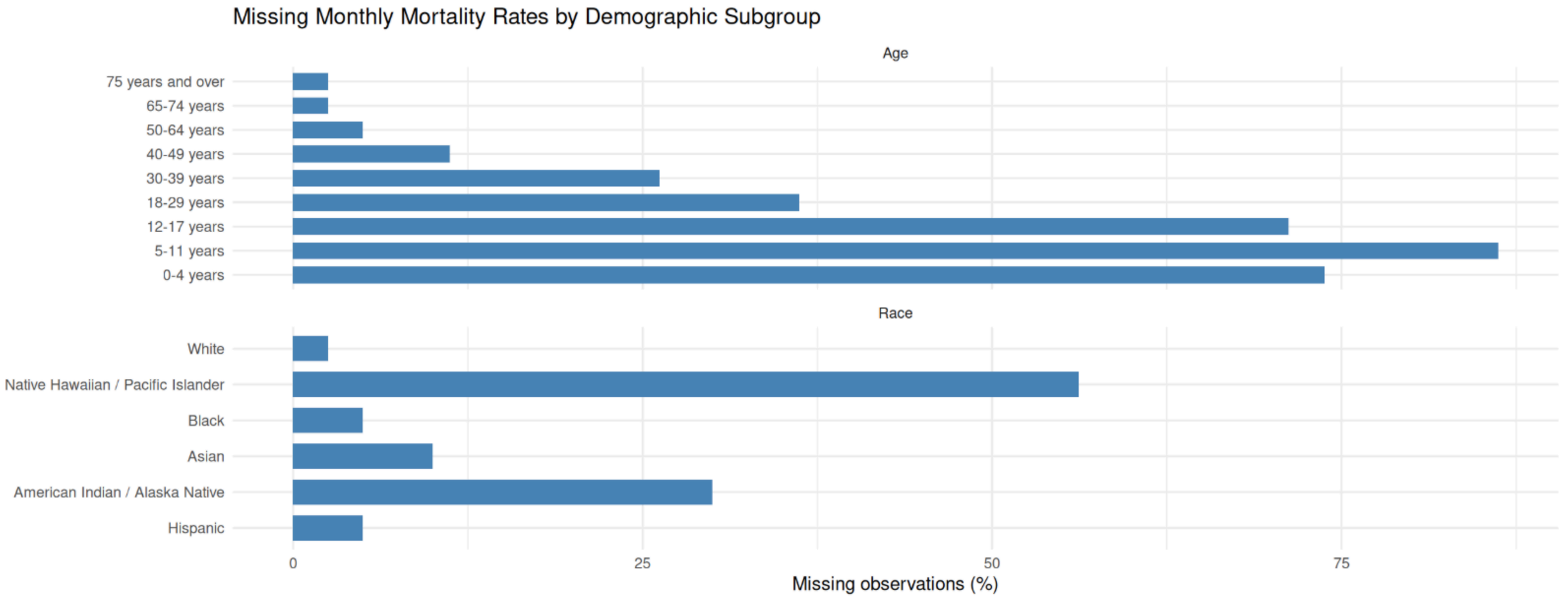


1. **American Indian mortality rates extended across western regions into the South.**
2. **Black populations' Northeast concentration was less pronounced in 2021.**
3. **Native Hawaiian populations showed the highest reported rates in the Southeast in 2021.**
4. **White populations had higher rates in several southern regions in 2021.**



2021

Visualizing Missingness



Limitations + What's Next?



Conclusion

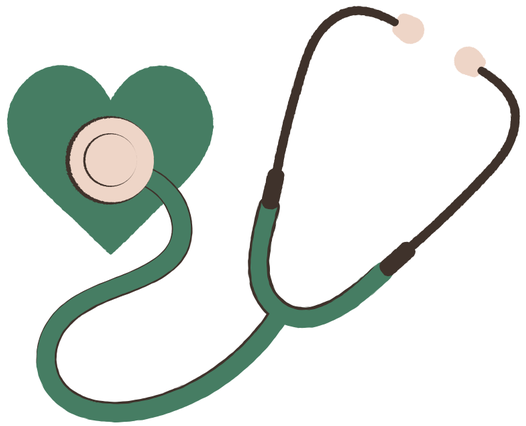
- Age: Older adults consistently experienced higher mortality
- Race: Mortality patterns differed across racial/ethnic groups
- Geography: The highest-mortality regions differed across racial/ethnic groups
- Time: Mortality patterns changed throughout the pandemic

What we still can't answer

- Our analysis is descriptive, not causal
- The dataset does not include factors that could explain the disparities
- Missing/suppressed rates affected some groups more than others

Where we would go next

- Add measures of healthcare access, income, or education
- Examine individual states/counties instead of broad HHS regions
- Study individual pandemic waves/variants separately



Thank You

Data Divas