

SUPPLEMENTAL TABLES/FIGURES:

Table S1. Changes in Age-Standardized Covid-19 Death Rates by Race/Ethnicity across Combinations of Census Regions and Metro-Nonmetro Categories, March 2020-February 2021 to March 2021-February 2022

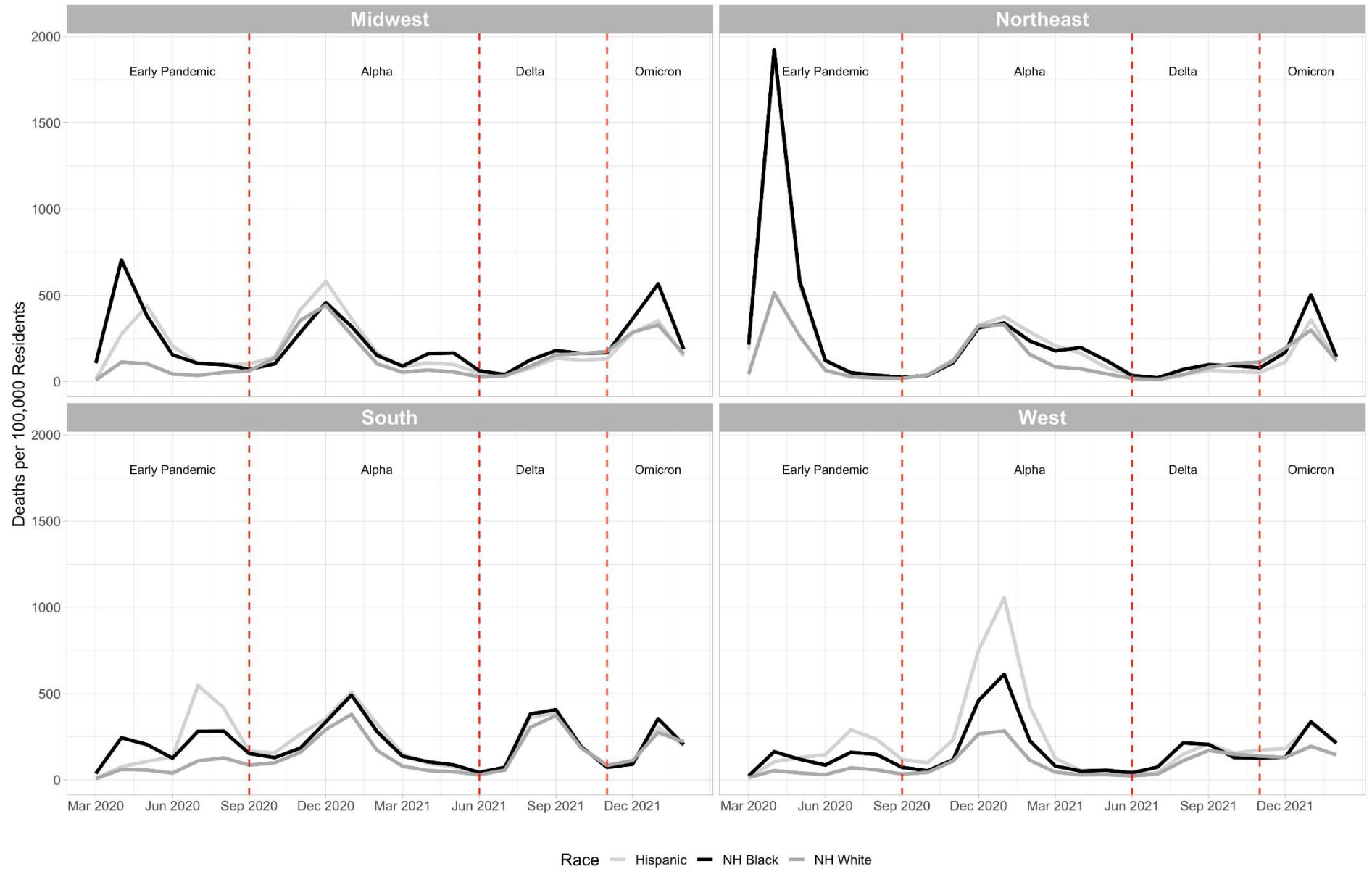
Region	Metro-Nonmetro Category	Race/Ethnicity	Age-Standardized Death Rates		Percent Change in Death Rates, Year 1 to Year 2	Rate Ratios		Percent Change in Rate Ratios, Year 1 to Year 2
			Year 1	Year 2		Year 1	Year 2	
Midwest	Large Metro	Hispanic	257	126	-51%	1.92	1.08	-44%
	Large Metro	NH Black	245	182	-26%	1.83	1.57	-14%
	Large Metro	NH White	134	116	-13%	Ref	Ref	Ref
	Medium/Small Metro	Hispanic	199	158	-21%	1.40	1.20	-14%
	Medium/Small Metro	NH Black	246	221	-10%	1.73	1.68	-3%
	Medium/Small Metro	NH White	142	132	-8%	Ref	Ref	Ref
	Nonmetro	Hispanic	233	154	-34%	1.46	0.96	-34%
	Nonmetro	NH Black	254	183	-28%	1.59	1.15	-28%
	Nonmetro	NH White	160	160	0%	Ref	Ref	Ref
Northeast	Large Metro	Hispanic	356	107	-70%	2.01	1.21	-40%
	Large Metro	NH Black	342	139	-59%	1.93	1.57	-19%
	Large Metro	NH White	177	89	-50%	Ref	Ref	Ref
	Medium/Small Metro	Hispanic	232	121	-48%	1.59	1.16	-27%
	Medium/Small Metro	NH Black	275	162	-41%	1.88	1.55	-18%
	Medium/Small Metro	NH White	146	105	-28%	Ref	Ref	Ref
	Nonmetro	Hispanic	96	93	-3%	0.91	0.70	-23%
	Nonmetro	NH Black	169	173	3%	1.61	1.31	-18%

	Nonmetro	NH White	105	132	26%	Ref	Ref	Ref
	Large Metro	Hispanic	217	160	-27%	1.92	1.33	-31%
	Large Metro	NH Black	198	166	-16%	1.75	1.38	-21%
	Large Metro	NH White	113	120	6%	Ref	Ref	Ref
South	Medium/Small Metro	Hispanic	311	181	-42%	2.45	1.18	-52%
	Medium/Small Metro	NH Black	237	186	-21%	1.86	1.21	-35%
	Medium/Small Metro	NH White	127	154	21%	Ref	Ref	Ref
	Nonmetro	Hispanic	374	230	-38%	2.06	1.07	-48%
	Nonmetro	NH Black	323	213	-34%	1.78	0.99	-44%
	Nonmetro	NH White	181	215	18%	Ref	Ref	Ref
West	Large Metro	Hispanic	325	128	-61%	3.23	1.59	-51%
	Large Metro	NH Black	192	138	-28%	1.91	1.71	-10%
	Large Metro	NH White	101	81	-20%	Ref	Ref	Ref
	Medium/Small Metro	Hispanic	262	163	-38%	3.01	1.45	-52%
	Medium/Small Metro	NH Black	165	140	-15%	1.89	1.25	-34%
	Medium/Small Metro	NH White	87	112	29%	Ref	Ref	Ref
	Nonmetro	Hispanic	202	201	-1%	2.69	1.41	-48%
	Nonmetro	NH Black	93	110	19%	1.23	0.78	-37%
	Nonmetro	NH White	75	142	89%	Ref	Ref	Ref

NH = Non-Hispanic

Notes: Death rates were age-standardized using 3 age groups (0-54, 55-74 and 75+) and the overall U.S. 2020 population as the standard population. Year 1 refers to March 2020 to February 2021, and year two refers to March 2021 to February 2022. Data was imputed for one or more age categories for NH Black in year 1 in nonmetro areas in the Northeast and West and for Hispanic in year 1 in nonmetro areas in the Northeast because death counts were between 1 and 9 for one or more age categories and were thus suppressed by CDC WONDER.

Figure S1. Age-Standardized Covid-19 Death Rates by Race/Ethnicity across Census Regions by Month from March 2020 to February 2022



NH = Non-Hispanic

Notes: Death rates were age-standardized using 3 age groups (0-54, 55-74 and 75+) and the overall U.S. 2020 population as the standard population. Data was imputed for one or more age categories for Hispanic residents in the Midwest in March 2020 because death counts were between 1 and 9 for one or more age categories and were thus suppressed by CDC WONDER.

METHODS SUPPLEMENT

Data Sources & Extraction Procedure:

Mortality Data

Data Source:

CDC WONDER (<https://wonder.cdc.gov/mcd-icd10-provisional.html>)

Rationale for Querying Approach:

While it is possible to query CDC WONDER for mortality data by sorting with variables such as ethnicity, race, 10-year age groups, urbanization, region, month, and year, sorting by these variables reduces the data into smaller cells than required for the analysis, resulting in unnecessary data suppression since death counts between 1 and 9 are suppressed. Thus, it is critical to submit separate queries for each piece of data needed so that no unnecessary suppression occurs, especially for racial/ethnic groups with smaller populations. In total, 192 CDC WONDER queries are needed to extract all the data needed for this analysis.

CDC WONDER Query #1 (Table 1 and Figure 1):

Covid-19 Mortality by Race/Ethnicity, Urbanization and Year (36 Files Total)

- Use Multiple Cause Provisional Mortality Statistics, 2018 through Last Month
- Select Multiple Cause of Death (Any Mention on Death Certificate): Covid-19 (U07.1)
- Select Show Zero Values and Suppressed Values
- Select Months (Separate Files for Each)
 - March 2020 to February 2021
 - March 2021 to February 2022
- Select 2013 Urbanization (by Residence) Categories (Separate Files for Each)
 - Nonmetro (Noncore (Nonmetro) and Micropolitan (Nonmetro))
 - Small/Medium Metro (Small Metro and Medium Metro)
 - Large Metro (Large Fringe Metro and Large Central Metro)
- Select 10-Year Age Categories (Separate Files for Each)
 - Ages 0-54
 - Ages 55-74
 - Ages 75+
- Select Race/Ethnicity (Separate files for Each)
 - Select Hispanic and All Races
 - Select Non-Hispanic and All Races and Group by Single Race 6

CDC WONDER Query #2 (Table 1 and Figure 1):

Covid-19 Mortality by Race/Ethnicity, Census Region and Year (12 Files Total)

- Use Multiple Cause Provisional Mortality Statistics, 2018 through Last Month
- Select Multiple Cause of Death (Any Mention on Death Certificate): Covid-19 (U07.1)
- Select Show Zero Values and Suppressed Values
- Select Months (Separate Files for Each)
 - March 2020 to February 2021
 - March 2021 to February 2022
- Select 10-Year Age Categories (Separate Files for Each)
 - Ages 0-54

- Ages 55-74
- Ages 75+
- Specify Race/Ethnicity (Separate files for Each)
 - Select Hispanic and All Races
 - Select Non-Hispanic and All Races and Group by Single Race 6
- Group by Census Region (by Residence)

CDC WONDER Query #3 (Figure 2 and Table S1):

Covid-19 Mortality by Race/Ethnicity, Census Region, Metro-Nonmetro Category and Year (54 Files Total)

- Use Multiple Cause Provisional Mortality Statistics, 2018 through Last Month
- Select Multiple Cause of Death (Any Mention on Death Certificate): Covid-19 (U07.1)
- Select Show Zero Values and Suppressed Values
- Select Months (Separate Files for Each)
 - March 2020 to February 2021
 - March 2021 to February 2022
- Select 2013 Urbanization (by Residence) Categories (Separate Files for Each)
 - Nonmetro (Noncore (Nonmetro) and Micropolitan (Nonmetro))
 - Small/Medium Metro (Small Metro and Medium Metro)
 - Large Metro (Large Fringe Metro and Large Central Metro)
- Select 10-Year Age Categories (Separate Files for Each)
 - Ages 0-54
 - Ages 55-74
 - Ages 75+
- Specify Race/Ethnicity (Separate files for Each)
 - Select Hispanic and All Races
 - Select Non-Hispanic and Black or African American
 - Select Non-Hispanic and White
- Group by Census Region

CDC WONDER Query #4 (Figure 4):

Covid-19 Mortality by Race/Ethnicity, Urbanization and Month (27 Files Total)

- Use Multiple Cause Provisional Mortality Statistics, 2018 through Last Month
- Select Multiple Cause of Death (Any Mention on Death Certificate): Covid-19 (U07.1)
- Select Show Zero Values and Suppressed Values
- Select Months March 2020 to February 2022
- Select 2013 Urbanization (By Residence) Categories (Separate Files for Each)
 - Nonmetro (Noncore (Nonmetro) and Micropolitan (Nonmetro))
 - Small/Medium Metro (Small Metro and Medium Metro)
 - Large Metro (Large Fringe Metro and Large Central Metro)
- Select 10-Year Age Categories (Separate Files for Each)
 - Ages 0-54
 - Ages 55-74
 - Ages 75+
- Select Race/Ethnicity (Separate files for Each)
 - Select Hispanic and All Races
 - Select Non-Hispanic and Black or African American
 - Select Non-Hispanic and White
- Group by Month

CDC WONDER Query #5 (Figure 3 and Figure 5):

Covid-19 Mortality by Race/Ethnicity, Census Division, Metro-Nonmetro Category and Year (54 Files Total)

- Use Multiple Cause Provisional Mortality Statistics, 2018 through Last Month
- Select Multiple Cause of Death (Any Mention on Death Certificate): Covid-19 (U07.1)
- Select Show Zero Values and Suppressed Values
- Select Months (Separate Files for Each)
 - March 2020 to February 2021
 - March 2021 to February 2022
- Select 2013 Urbanization (By Residence) Categories (Separate Files for Each)
 - Nonmetro (Noncore (Nonmetro) and Micropolitan (Nonmetro))
 - Small/Medium Metro (Small Metro and Medium Metro)
 - Large Metro (Large Fringe Metro and Large Central Metro)
- Select 10-Year Age Categories (Separate Files for Each)
 - Ages 0-54
 - Ages 55-74
 - Ages 75+
- Specify Race/Ethnicity (Separate files for Each)
 - Select Hispanic and All Races
 - Select Non-Hispanic and Black or African American
 - Select Non-Hispanic and White
- Group by Census Division (By Residence)

CDC WONDER Query #6 (Figure S1):

Covid-19 Mortality by Race/Ethnicity, Region and Month (9 Files Total)

- Use Multiple Cause Provisional Mortality Statistics, 2018 through Last Month
- Select Multiple Cause of Death (Any Mention on Death Certificate): Covid-19 (U07.1)
- Select Show Zero Values and Suppressed Values
- Select Months March 2020 to February 2022
- Select 10-Year Age Categories (Separate Files for Each)
 - Ages 0-54
 - Ages 55-74
 - Ages 75+
- Select Race/Ethnicity (Separate files for Each)
 - Select Hispanic and All Races
 - Select Non-Hispanic and Black or African American
 - Select Non-Hispanic and White
- Group by Census Region (By Residence) and Month

Population Data

Data Source:

U.S. Census 2021 Vintage Population Estimates (<https://www2.census.gov/programs-surveys/popest/datasets/2020-2021/counties/asrh/cc-est2021-all.csv>)

Data Dictionary (<https://www2.census.gov/programs-surveys/popest/technical-documentation/file-layouts/2020-2021/cc-est2021-alldata.pdf>)

This file provides county-level estimates of population by race/ethnicity and age, which can be aggregated to the levels of metro-nonmetro categories, Census regions, and states. Querying CDC WONDER by county and metro-nonmetro category, Census region, or state will generate the necessary crosswalks for aggregation.

Non-bridged race categories (Hispanic, non-Hispanic AIAN alone, non-Hispanic Asian alone, non-Hispanic NHOPI alone, non-Hispanic Black alone, and non-Hispanic white alone) were used for this analysis. Bridged race estimates are not yet available for 2021 and 2022 mortality data.

Vaccination Data

Data Source:

CDC Covid-19 Vaccination Data by County (<https://data.cdc.gov/Vaccinations/COVID-19-Vaccinations-in-the-United-States-County/8xkx-amqh/data>)

The relevant variable is percent of the county fully vaccinated (Series_Complete_Pop_Pct), as of February 28, 2022.

Age-Standardization Procedure:

The U.S. 2020 population was used as the standard population. 70.3% of the population was between the ages of 0 to 54 years, 22.7% was between the ages of 55 to 74 years, and 7.0% was 75 years or older.

For each geographic and temporal unit, age-specific death rates were calculated for ages 0-54, 55-74, and 75+. Each age-specific death rate was multiplied by the corresponding percentage of the population in that age group, and then the 3 components were added together to produce the age-standardized death rate.

It was not possible to use 10-year age intervals for age-standardization due to data suppression.
