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Trends in premature mortality from acute myocardial infarction in the United States, 1999 to 2019

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ORIGINAL RESEARCH

Trends in Premature Mortality From Acute Myocardial Infarction in the United States, 1999 to 2019

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BACKGROUND: Evaluating premature (<65 years of age) mortality because of acute myocardial infarction (AMI) by demographic and regional characteristics may inform public health interventions.

METHODS AND RESULTS: We used the Centers for Disease Control and Prevention's WONDER (Wide-Ranging Online Data for Epidemiologic Research) death certificate database to examine premature (<65 years of age) age-adjusted AMI mortality rates per 100 000 and average annual percentage change from 1999 to 2019. Overall, the age-adjusted AMI mortality rate was 13.4 (95% CI, 13.3–13.5). Middle-aged adults, men, non-Hispanic Black adults, and rural counties had higher mortality than young adults, women, NH White adults, and urban counties, respectively. Between 1999 and 2019, the age-adjusted AMI mortality rate decreased at an average annual percentage change of −3.4 per year (95% CI, −3.6 to −3.3), with the average annual percentage change showing higher decline in age-adjusted AMI mortality rates among large (−4.2 per year [95% CI, −4.4 to −4.0]), and medium/small metros (−3.3 per year [95% CI, −3.5 to −3.1]) than rural counties (−2.4 per year [95% CI, −2.8 to −1.9]). Age-adjusted AMI mortality rates >90th percentile were distributed in the Southern states, and those with mortality <10th percentile were clustered in the Western and Northeastern states. After an initial decline between 1999 and 2011 (−4.3 per year [95% CI, −4.6 to −4.1]), the average annual percentage change showed deceleration in mortality since 2011 (−2.1 per year [95% CI, −2.4 to −1.8]). These trends were consistent across both sexes, all ethnicities and races, and urban/rural counties.

CONCLUSIONS: During the past 20 years, decline in premature AMI mortality has slowed down in the United States since 2011, with considerable heterogeneity across demographic groups, states, and urbanicity. Systemic efforts are mandated to address cardiovascular health disparities and outcomes among nonelderly adults.

Key Words: acute myocardial infarction ■ epidemiology ■ mortality

Cardiovascular disease (CVD) is the leading cause of mortality and morbidity in the United States.[1,2] Although therapeutic advances have led to a decline in CVD mortality,[3,4] the initial decrease in CVD mortality observed in the United States at the turn of the century has plateaued since 2011.[5,6] These concerning trends are mainly driven by the slowing of CVD mortality among elderly adults (≥65 years of age). In contrast, the decline in CVD mortality has stalled among nonelderly individuals (≤65 years of age).[6] Acute myocardial infarction (AMI) is the major contributor to CVD mortality. Studies have illustrated age-based disparities regarding revascularization strategies, with higher use of revascularization limited to older adults (≥65 years of age).[7] Furthermore, the comorbidity profile of nonelderly adults experiencing AMI has become complex

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CLINICAL PERSPECTIVE

What Is New?

- Between 1999 and 2019, the decline in premature acute myocardial infarction mortality has decelerated since 2011, with considerable demographic and regional variability in age-adjusted mortality rates.
- The premature acute myocardial infarction mortality decline was slower in the rural counties compared with urban counties.

What Are the Clinical Implications?

- The deceleration in premature mortality because of acute myocardial infarction may reflect the growing burden of cardiovascular disease among the nonelderly population.
- Implementing evidence-based strategies to treat premature cardiovascular disease and public health interventions targeting high-risk groups may reduce the demographic and regional disparities.

Nonstandard Abbreviations and Acronyms

AAPC	average annual percent change
NH	non-Hispanic
WONDER	Wide-Ranging Online Data for Epidemiologic Research

over the years.[7,8] The age-based differences might be further heightened by sex, ethnic and racial, and regional disparities. Therefore, examining premature mortality because of AMI may serve as an essential foundation for shaping health care policy and curb the growing burden of premature CVD. Consequently, we studied the US death certificate database to examine premature mortality (<65 years of age) from AMI, stratified by demographic groups, states, and counties.

METHODS

Data Availability Statement

The Centers for Disease Control and Prevention's WONDER (Wide-Ranging OnLine Data for Epidemiologic Research)[9] data sets used in this project are publicly available. Therefore, the results of this study are easily replicable from the methods described in the article.

Data Source

We analyzed the Underlying Cause of Death Public Use Record from the National Center for Health Statistics database, which provides state- and county-level mortality data for all US populations based on death certificates from the Centers for Disease Control and Prevention's WONDER database.[9,10] Underlying cause of death is selected from the conditions entered by the physician or other individuals besides physicians, such as the local coroner in certain out-of-hospital deaths, on the cause of death section of the death certificate. In case of more than one cause or condition, the underlying cause is determined by the sequence of conditions on the certificate leading to death, the *International Classification of Diseases, Tenth Revision* (*ICD-10*) provisions, and associated selection rules and modifications. The population estimates are Census Bureau estimates of US national, state, and county resident populations.[9]

We selected natural deaths attributed to AMI identified using *ICD-10* codes I21-I22.[9–11] The funeral director reports ethnicity and race information as provided by the surviving next of kin or based on observation, in the case of the informant's absence. We determined ethnicity and race using the death certificates, reporting race and Hispanic origin separately following the standards put forth by the Office of Management and Budget.[12] We abstracted population estimates using the Census Bureau estimates of US national, state, and county resident populations.[13] Race and ethnicity information from the census is based on self-description.

This study did not require institutional review board approval because the analysis used government-issued public-use data without individually identifiable information.

Data Extraction

We abstracted the number of deaths attributable to AMI and the population size from 1999 to 2019. We abstracted the data on age, sex, ethnicity and race, states, and counties, further stratified by urbanicity. We selected decedents <65 years of age and grouped them into young (18–44 years of age) and middle-aged (45–64 years of age) adults to focus on premature mortality. We identified race and ethnicity on death certificates as non-Hispanic (NH) White adults, NH Black adults, and Hispanic adults. For ethnicity and race, we classified the study population into NH White adults, NH Black adults, and Hispanic adults. We did not include NH American Indian or Alaska Native and Asian/Pacific Islander populations in the study because the mortality estimates were small among these demographic subgroups. Finally, we classified counties using the National Center for Health Statistics 2013 Urban-Rural Classification Scheme and divided them into large and medium metro, small metro, and rural counties (micropolitan and noncore).

Statistical Analysis

We calculated the individual-year crude death rates by dividing the number of AMI deaths by the corresponding population. Then, using the 2000 US standard population, we directly adjusted the mortality rates per 100 000 US adults.[14] We considered statistically significant differences for age-adjusted mortality rates between 2 independent populations when their 95% CIs did not overlap. Temporal trends were analyzed by fitting log-linear regression models using the Joinpoint Regression Program version 4.7.0.0 (National Cancer Institute).[15] We applied the grid search method (2, 2, 0), 0 to 3 joinpoints, permutation test, and parametric method to estimate average annual percent change (AAPC) and 95% CIs. We calculated AAPC with 95% CIs in age-adjusted mortality rates for all analyses from 1999 to 2019, further stratified into 1999 to 2011 and 2011 to 2019, weighted to account for differences among inflection points.[6,16] We used 2011 as the inflection point in mortality trends following the national mortality data reporting CVD mortality trends.[16,17] Slopes were perceived as increasing or decreasing if the estimated slope differed significantly from 0.[18,19] For all analyses, statistical significance was set at 5%.

RESULTS

Between 1999 and 2019, a total of 615 848 premature deaths occurred in adults (3 964 352 768 person-years) corresponding to an age-adjusted AMI mortality rate of 13.4 (95% CI, 13.3–13.5) per 100 000 (Table S1). Overall, the age-adjusted AMI mortality rate decreased from 20.4 (95% CI, 20.2–20.7) per 100 000 in 1999 to 9.9 (95% CI, 9.8–10.6) per 100 000 in 2019, with an AAPC of −3.4 per year (95% CI, −3.6 to −3.3). Between 1999 and 2011, the AAPC in age-adjusted AMI mortality rate was −4.3 per year (95% CI, −4.6 to −4.1), which slowed down between 2011 and 2019 (−2.1 per year [95% CI, −2.4 to −1.8]) (Figure 1).

Trends in AMI Mortality by Age

The age-adjusted AMI mortality rates were higher for middle-aged (34.9 [95% CI, 34.8–35.0]) adults than young adults (2.5 [95% CI, 2.4–2.6]). Table S2 reports age-adjusted AMI mortality rates among young and middle-aged adults, stratified by sex, ethnicity and race, and US states. Between 1999 and 2019, the AAPCs in age-adjusted AMI mortality rates were −2.7 per year (95% CI, −3.1 to −2.5) in young adults, and −2.1 per year (95% CI, −2.4 to −1.7) in middle-aged adults. The AAPC in age-adjusted AMI mortality rates in young adults did not vary over the study period (Figure 2A; Table S1). However, for middle-aged adults, after initial decline in age-adjusted AMI mortality rates between 1999 and 2011 (AAPC, −3.6 per year [95% CI, −4.0 to −3.2]), mortality decreased at an accelerated pace between 2011 and 2019 (AAPC, −4.6 per year [95% CI, −5.2 to −4.0]).

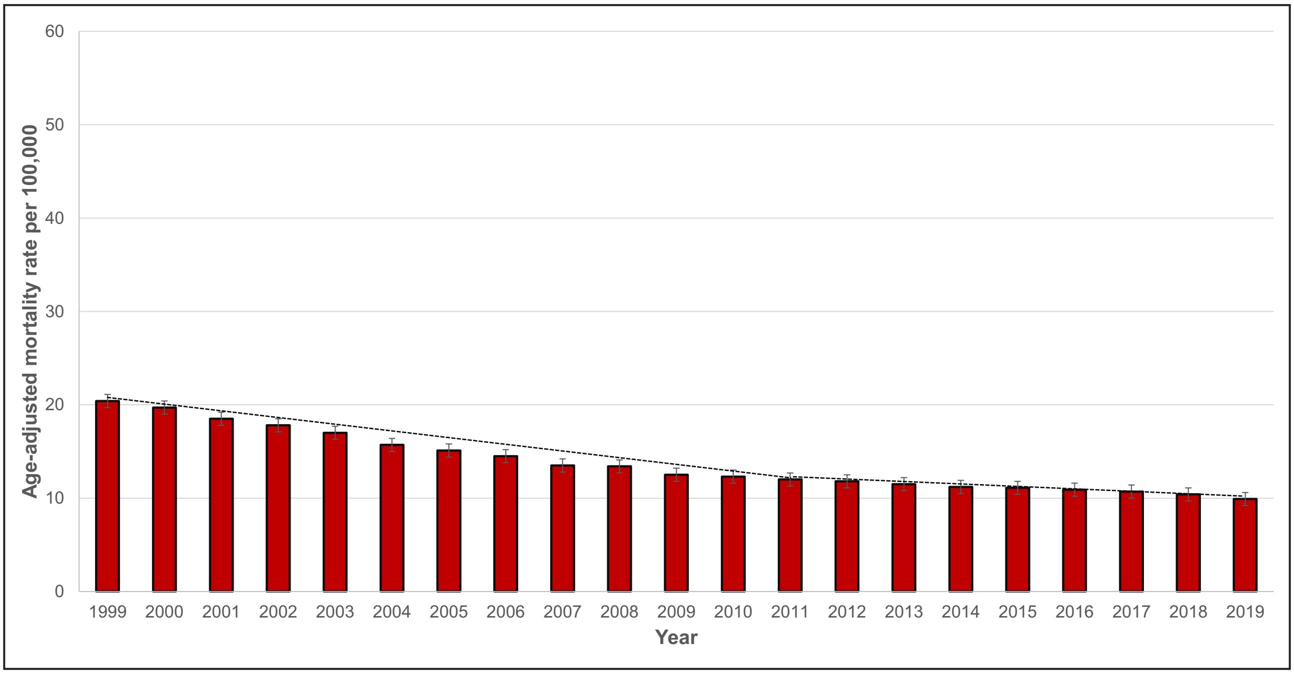

Figure 1. Trends in age-adjusted acute myocardial infarction mortality rates per 100 000 among adults <65 years of age in the United States, 1999 to 2019.

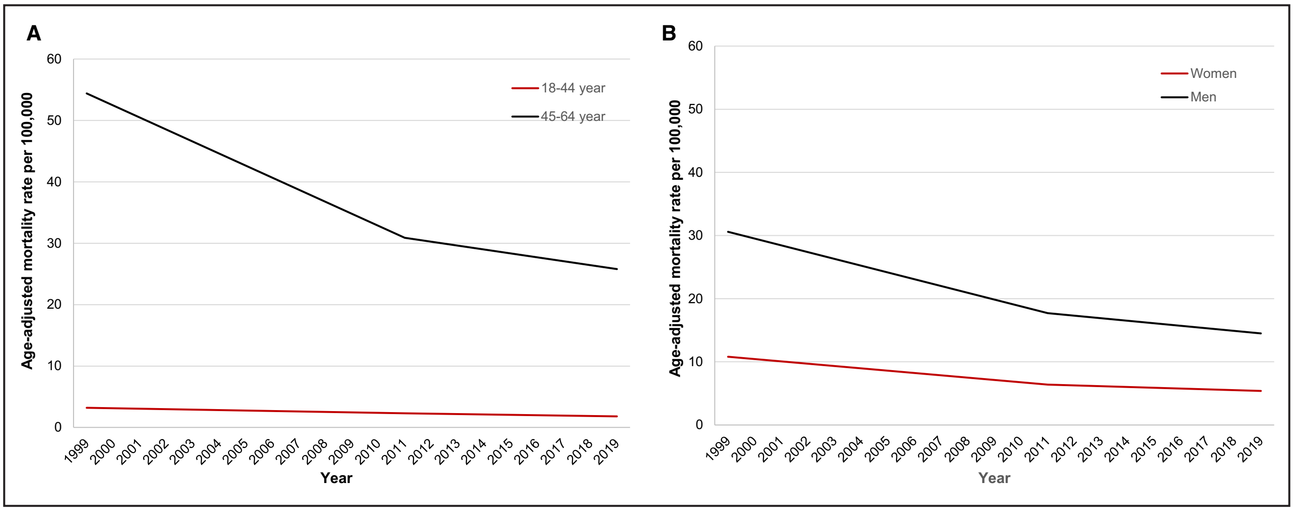

Figure 2. Trends in age-adjusted acute myocardial infarction mortality rates per 100 000 among adults <65 years of age stratified by (A) age, and (B) sex in the United States, 1999 to 2019.

Trends in AMI Mortality by Sex

Overall, age-adjusted AMI mortality rates were higher in men (20.0 [95% CI, 19.9–20.1]) than women (7.3 [95% CI, 7.2–7.4]). Table S3 reports age-adjusted AMI mortality rates by sex, stratified by the US states. Between 1999 and 2019, the AAPCs in age-adjusted AMI mortality rates were −3.3 per year (95% CI, −3.6 to −3.1) in women and −3.5 per year (95% CI, −3.7 to −3.4) in men. In both sexes, after an initial decrease, AAPCs showed that age-adjusted AMI mortality decline has slowed down between 2011 and 2019 (Figure 2B; Table S1).

Trends in AMI Mortality by Ethnicity and Race

Overall, age-adjusted AMI mortality rates were higher in NH Black adults (17.5 [95% CI, 17.4–17.6]) than NH White adults (13.7 [95% CI, 13.6–13.8]). Table S3 reports age-adjusted AMI mortality rates by ethnicity and race, stratified by the US states. Between 1999 and 2019, the AAPCs in age-adjusted AMI mortality rates were −3.9 per year (95% CI, −4.3 to −3.6) in NH Black adults, −3.3 per year (95% CI, −3.5 to −3.1) in NH White adults, and −3.5 per year (95% CI, −4.1 to −3.0) in Hispanic adults. Between 1999 and 2011, AAPCs showed a reduction in age-adjusted AMI mortality rates for all ethnicities and races. However, AAPCs showed a significant deceleration in age-adjusted AMI mortality rates between 2011 and 2019 among all ethnicities and races (Figure 3; Table S1).

Trends in AMI Mortality by the US States

Table S1 documents trends in age-adjusted AMI mortality rates across the US states. Figure 4 illustrates the distribution of age-adjusted AMI mortality rates across the US states. States with age-adjusted AMI mortality rates >90th percentile were distributed in the South (Arkansas, Mississippi, Kentucky, Louisiana, and Tennessee), and those with age-adjusted AMI mortality rates <10th percentile were clustered in the West and Northeast (Colorado, Utah, Vermont, Connecticut, and Alaska). We noted marked state-level variations in AMI mortality trends. For instance, in New Mexico, age-adjusted AMI mortality rates decreased at an AAPC of −4.2 per year (95% CI, −4.9 to −3.4) between 1999 and 2011, followed by an increase at an AAPC of 3.5 per year (95% CI, 0.3–6.8) between 2011 and 2019. However, after an initial decrease in mortality, AAPCs showed that age-adjusted AMI mortality decline had stalled between 2011 and 2019 in the US states clustered in the West (Arizona, Idaho, Montana, and Nevada), the South (Arkansas and Mississippi), and in the Midwest (Nebraska and South Dakota).

Trends in AMI Mortality by Urbanicity

Age-adjusted AMI mortality rates were significantly higher in the rural versus urban counties (Table S1). Between 1999 and 2019, AAPCs showed higher decline in age-adjusted AMI mortality rates among large (−4.2 per year [95% CI, −4.4 to −4.0]), and medium/small metros (−3.3 per year [95% CI, −3.5 to −3.1]) than rural counties (−2.4 per year [95% CI, −2.8 to −1.9]). Between 1999 and 2011, AAPCs showed a substantial decline in age-adjusted AMI mortality rates, followed by deceleration between 2011 and 2019.

DISCUSSION

During the past 20 years, we found considerable demographic and geographic variations in premature

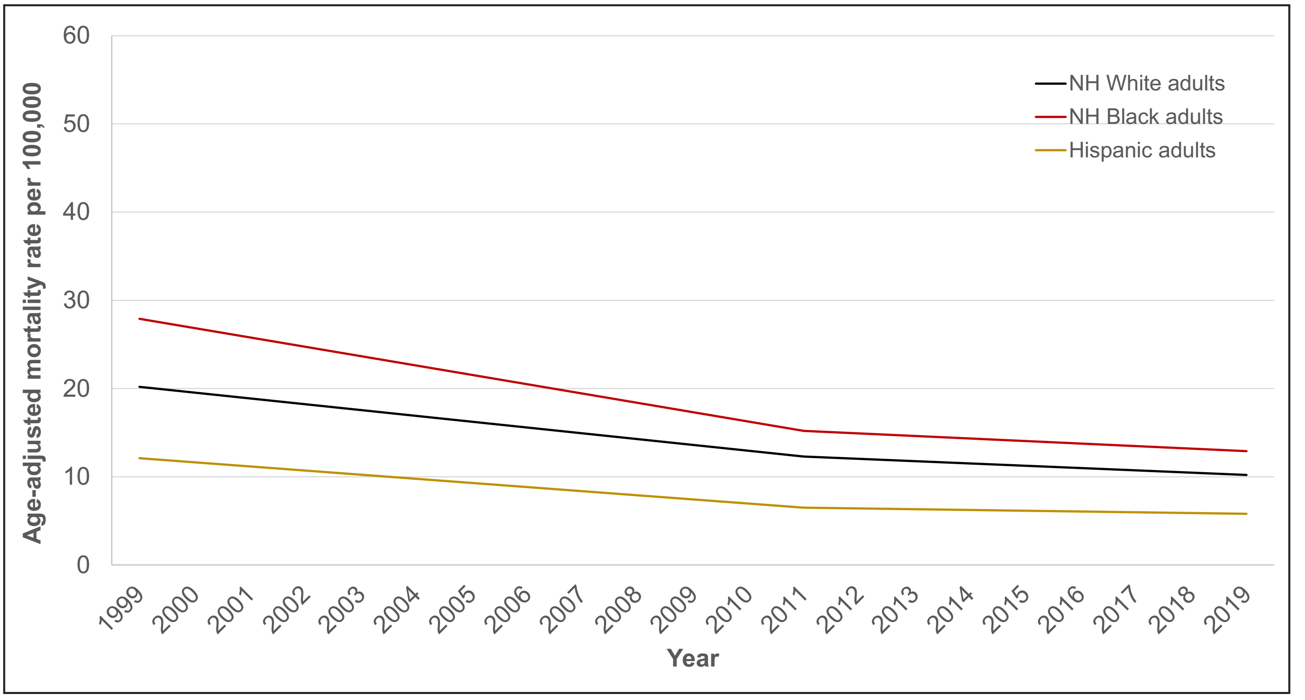

Figure 3. Trends in age-adjusted acute myocardial infarction mortality rates per 100 000 among adults <65 years of age stratified by ethnicity and race in the United States, 1999 to 2019.

AMI mortality in the United States. Overall, premature AMI mortality rates were higher in men versus women, NH Black adults versus NH White adults, and rural versus urban counties. Although premature AMI mortality has declined by nearly 52% during the past 2 decades, the initial gains in cardiovascular survival achieved by an accelerated decline in premature AMI mortality have been attenuated by the deceleration in mortality decline since 2011. These trends were consistent across demographic subgroups and by urbanicity.

This study uncovered demographic and regional heterogeneities in premature AMI mortality, which could have been masked in aggregate CVD mortality. Previous data showed that CVD mortality rates in nonelderly adults (25–64 years of age) had no appreciable change since 2011, despite a 70% decline in the preceding 4 decades (1968–2011).[20] However, in a subgroup of adults 55 to 64 years of age, a slight 4% increase in CVD mortality was observed between 2011 and 2017. In contrast, the rates were stable for adults 25 to 54 years of age.[20] Shah and colleagues reported a modest 3% decline in young and a ~2% increase in cardiac mortality in middle-aged adults between 2011 and 2018.[6] The rise in cardiac mortality in the middle-age group was driven by increased mortality because of heart failure, hypertensive heart

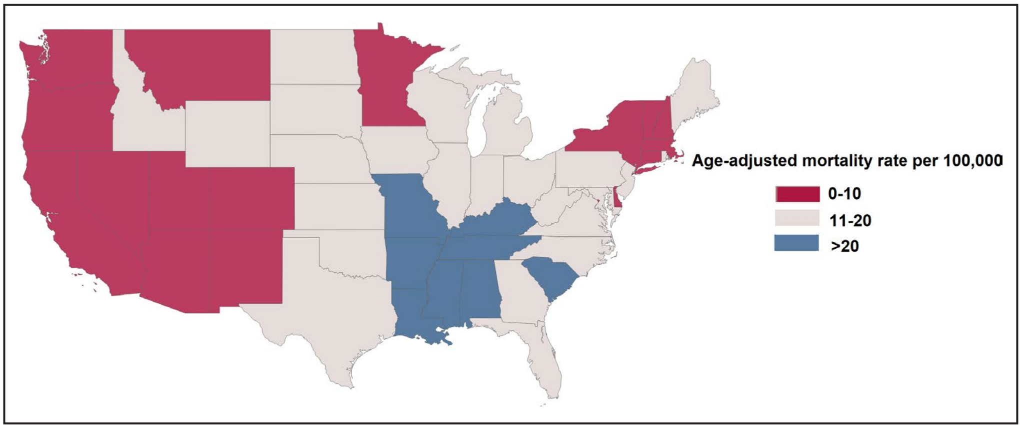

Figure 4. Age-adjusted acute myocardial infarction mortality rates per 100 000 across the United States, 1999 to 2019.

disease, valvular heart disease, arrhythmia, pulmonary heart disease, and other causes.[6] Another report mentioned that over 20% of cardiometabolic deaths (heart disease, stroke, and diabetes) occurred in adults <65 years of age.[20] We focused explicitly on premature mortality attributable to AMI to understand the influence of this fundamental determinant of CVD mortality.

In our study, mortality rates were higher for middle-aged versus younger adults. The absolute difference in AAPC between middle-aged and young adults during the past 2 decades was −0.7 per year, suggesting that the rate of decline was slower in the middle-aged adults than in the younger population. The observed heterogeneity may be explained by the higher prevalence of traditional cardiovascular risk factors in the middle-aged than young adults, making protective secular trends less effective in this age group. For instance, during 2015 to 2016, hypertension prevalence was 33.2% in individuals 40 to 59 years of age, compared with 7.5% in the 18 to 39 years of age group.[21] Furthermore, a higher prevalence of cardiometabolic diseases in the middle aged, such as hypertensive heart disease or diabetes, might explain this variation.[20,22,23]

We reported higher AMI mortality rates for men than women and a comparable reduction in mortality across both sexes over time. We also noted higher AMI morality for NH Black than NH White adults. Previous observations demonstrated that NH Black adults have a higher prevalence of diabetes and hypertension than NH White adults.[24,25] Additionally, low socioeconomic status, higher uninsured rates, and limited access to health care among NH Black minorities widen the health gap between both races.[26,27] NH Black patients had fewer resources for procedural access, low procedural success, higher recurrence of AMI, hospitalizations, and death after AMI than their counterparts, even after adjustment for baseline characteristics or treatment approach.[28] This scenario gets further complicated because of the underuse of revascularization and guideline-recommended medical therapy after AMI in NH Black individuals versus NH White adults.[28] The recent AMI mortality trends underscore health care disparities faced by ethnic and racial minorities.[29]

We noted higher AMI mortality in the Southern states than other regions and rural versus urban counties. Southern states have a higher age-adjusted obesity prevalence (Mississippi 40.7%, Arkansas 37.6%, Kentucky 36.2%, Louisiana 35.9%, and Tennessee 36.3%),[30] and lower self-reported amount of physical activity (Kentucky 16.1%, Mississippi 16.2%, Arkansas 9.4%, Louisiana 19.8%, and Tennessee 22.1%).[30] Similarly, smoking, hypertension, and hypercholesterolemia were also highly prevalent in states in the South.[30] Moreover, social gradients in education, employment, immigration, and demographic behavior patterns are essential factors shaping these mortality trends.[31] For instance, besides Kentucky, none of the other states with higher AMI mortality were early adopters of the Patient Protection and Affordable Care Act, the largest Medicaid coverage expansion since the inception of the program,[32] which may influence the survival of nonelderly adults by limiting access to health care.[32] In this regard, the rural–urban CVD mortality gap doubled during the past 2 decades, predominantly because of the same disproportionate distribution of socioeconomic and health indicators between rural and urban counties.[33]

This study has several limitations. Vital statistics and census data rely on death certificates. Therefore, accurate ascertainment of demographic information and cause of death based on *ICD-10* codes, which are subject to misclassification, can bias the results.[34] The Framingham Heart Study showed that death certificates might overestimate coronary heart disease (CHD) as the cause of death up to 24% compared with physician-adjudicated CHD mortality.[34,35] These observations were consistent across other studies comparing death certificates with nosologists' coding of death certificates,[35] or with data gathered through informant interviews, physician, or coroner questionnaires.[36] However, in the Framingham Heart Study, overestimation of CHD mortality was more prominent among older adults, showing a 109% difference between death certificates and physician-ascertained CHD mortality. Whereas, after excluding deaths from unknown causes, death certificates were shown to slightly underestimate CHD mortality compared with physician-adjudicated mortality among nonelderly adults (<65 years of age, −2.2%).[34] Therefore, these trivial differences among the nonelderly population are unlikely to influence mortality trends over 2 decades.[20] Since the Centers for Disease Control and Prevention's WONDER database does not specify certain groups in each bridged-race category, reliable disaggregated data on NH American Indian/Alaska Native decedents and NH Asian/Pacific Islander individuals were unavailable.[20] The database also lacks information on clinical and social determinants of health. Thus, the apparent disparities in demographic and census region variations cannot be directly ascribed to clinical variables or social determinants of health. Although reporting of deaths may vary across states or deaths within the population, the vital statistics records deaths to the state of residence at the time of death and does not account for migration between states.[37]

In conclusion, premature mortality attributable to AMI declined in the United States during the past 20 years. However, this decline was more prominent in the first decade but diminished since 2011. The rate of decline varied across demographic groups, states, and urban/rural counties. Future studies are warranted to define key drivers and the best interventions to ameliorate premature mortality attributable to AMI. These findings have sizeable public health implications regarding identifying clinical differences and social vulnerabilities in critical demographic subgroups and geographic hotspots.

ARTICLE INFORMATION

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Supplemental Material

Tables S1–S3.

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Supplemental Material

Table S1. Trends in age-adjusted acute myocardial infarction mortality rates in the non-elderly adults in the United States, 1999-2019.

	Age-adjusted mortality rates (95% CI)			Average Annual Percent Change (95% CI)		
	1999	**2011**	**2019**	**1999-2011**	**2011-2019**	**1999-2019**
Entire US	20.4 (20.2-20.7)	12.0 (11.8-12.1)	9.9 (9.8-10.0)	-4.35 (-4.57, -4.13)	-2.09 (-2.38, -1.81)	-3.45 (-3.64, -3.27)
Alabama	31.5 (29.4-33.5)	23.6 (22.0-25.2)	13.4 (12.2-14.6)	-5.48 (-6.84, -4.10)	-7.44 (-8.17, -6.71)	-6.27 (-7.13, -5.40)
Alaska	11.7 (8.3-16.1)	3.0 (2.1-5.9)	3.1 (2.2-6.2)	-8.16 (-12.38, -3.74)	-1.59 (-3.76, 0.63)	-5.59 (-8.50, -2.58)
Arizona	14.6 (13.3-16.0)	6.3 (5.5-7.0)	5.6 (4.9-6.3)	-7.10 (-8.99, -5.17)	-3.76 (-4.41, -3.11)	-5.78 (-6.98, -4.56)
Arkansas	40.7 (37.7-43.7)	37.8 (35.2-40.4)	40.6 (37.9-43.3)	-3.06 (-4.50, -1.59)	0.05 (-1.18, 1.30)	-1.82 (-2.85, -0.79)
California	14.0 (13.4-14.5)	7.8 (7.4-8.1)	6.3 (6.0-6.6)	-6.11 (-6.57, -5.64)	-3.74 (-4.50, -2.98)	-5.17 (-5.59, -4.75)
Colorado	13.8 (12.3-15.2)	6.4 (5.6-7.2)	5.4 (4.7-6.1)	-6.93 (-7.42, -6.44)	-3.13 (-4.40, -1.84)	-5.43 (-6.02, -4.83)
Connecticut	10.9 (9.6-12.3)	5.5 (4.7-6.4)	5.2 (4.3-6.1)	-6.19 (-6.79, -5.59)	-4.68 (-5.31, -4.05)	-5.59 (-6.06, -5.11)
Delaware	15.8 (12.5-19.7)	8.7 (6.6-11.3)	4.9 (3.5-6.8)	-7.86 (-11.74, -3.81)	-6.24 (-8.65, -3.77)	-7.22 (-9.85, -4.50)
District of Columbia	9.3 (6.4-13.1)	5.1 (3.2-7.8)	8.0 (5.5-11.2)	-4.78 (-9.29, -0.04)	-3.35 (-5.83, -0.81)	-4.21 (-7.16, -1.17)
Florida	16.4 (15.6-17.1)	8.9 (8.5-9.4)	7.3 (6.8-7.7)	-6.42 (-7.39, -5.44)	-3.79 (-4.12, -3.46)	-5.38 (-5.99, -4.76)
Georgia	24.3 (22.9-25.6)	12.8 (11.9-13.6)	12.2 (11.4-13.0)	-6.20 (-7.58, -4.80)	-3.56 (-4.14, -2.97)	-5.15 (-6.02, -4.28)
Hawaii	7.9 (4.8-12.2)	7.5 (5.0-10.8)	7.5 (5.0-10.8)	-3.99 (-4.64, -3.33)	-3.99 (-4.64, -3.33)	-3.99 (-4.64, -3.33)
Idaho	27.1 (23.5-30.8)	15.3 (13.0-17.7)	14.4 (12.2-16.5)	-5.26 (-5.68, -4.83)	-3.14 (-6.57, 0.41)	-4.42 (-5.81, -3.00)
Illinois	23.2 (22.1-24.3)	12.4 (11.7-13.2)	10.4 (9.7-11.1)	-6.50 (-6.79, -6.21)	-3.63 (-4.10, -3.15)	-5.36 (-5.62, -5.10)
Indiana	25.7 (24.1-27.3)	18.2 (17.0-19.4)	14.6 (13.5-15.7)	-5.51 (-6.08, -4.93)	-3.40 (-5.68, -1.07)	-4.67 (-5.68, -3.65)
Iowa	20.4 (18.3-22.4)	11.4 (10.0-12.7)	10.1 (8.8-11.4)	-5.11 (-5.43, -4.80)	-5.11 (-5.43, -4.80)	-5.11 (-5.43, -4.80)
Kansas	19.1 (17.9-21.3)	10.9 (9.5-12.4)	8.7 (7.4-10.0)	-6.65 (-7.42, -5.86)	-2.50 (-4.13, -0.85)	-5.01 (-5.88, -4.14)
Kentucky	37.6 (35.3-39.9)	27.4 (25.6-29.2)	26.3 (24.6-28.1)	-4.88 (-5.31, -4.44)	-2.22 (-3.33, -1.09)	-3.82 (-4.34, -3.29)
Louisiana	32.1 (30.0-34.3)	20.1 (18.5-21.6)	14.8 (13.5-16.2)	-6.00 (-7.50, -4.47)	-4.99 (-6.31, -3.65)	-5.60 (-6.62, -4.56)
Maine	16.7 (14.0-19.3)	9.3 (7.5-11.0)	6.4 (5.0-8.0)	-5.79 (-6.78, -4.79)	-3.62 (-4.67, -2.56)	-4.93 (-5.71, -4.14)
Maryland	16.3 (14.9-17.6)	9.5 (8.6-10.4)	7.8 (7.0-8.6)	-6.80 (-7.14, -6.46)	-4.88 (-6.22, -3.52)	-6.04 (-6.62, -5.45)
Massachusetts	15.0 (13.8-16.3)	6.1 (5.4-6.7)	4.7 (4.1-5.3)	-6.47 (-8.79, -4.09)	-5.33 (-5.83, -4.82)	-6.01 (-7.45, -4.56)
Michigan	20.4 (19.3-21.6)	10.5 (9.8-11.3)	8.5 (7.9-9.2)	-6.55 (-7.01, -6.10)	-3.80 (-4.39, -3.21)	-5.46 (-5.84, -5.08)
Minnesota	13.3 (12.0-14.6)	5.0 (4.3-5.7)	4.9 (4.2-5.6)	-7.85 (-8.59, -7.10)	-2.92 (-4.84, -0.96)	-5.91 (-6.84, -4.97)
Mississippi	42.2 (39.2-45.3)	32.2 (29.8-34.6)	36.3 (33.7-38.9)	-4.67 (-5.49, -3.84)	0.88 (-1.96, 3.80)	-2.49 (-3.75, -1.21)
Missouri	31.5 (29.7-33.4)	23.9 (22.5-25.3)	18.6 (17.3-19.8)	-4.70 (-5.25, -4.14)	-3.40 (-3.72, -3.07)	-4.18 (-4.56, -3.80)
Montana	13.2 (10.5-16.5)	8.0 (6.2-10.3)	5.5 (3.9-7.6)	-8.00 (-9.18, -6.81)	-2.46 (-6.25, 1.48)	-5.82 (-7.51, -4.11)
Nebraska	14.2 (11.9-16.5)	10.1 (8.3-11.8)	10.3 (8.6-12.1)	-5.58 (-6.35, -4.80)	-0.34 (-1.37, 0.71)	-3.51 (-4.17, -2.85)
Nevada	14.4 (12.3-16.5)	6.5 (5.4-7.7)	5.7 (4.6-6.7)	-7.70 (-8.64, -6.76)	-1.77 (-3.81, 0.32)	-5.37 (-6.35, -4.39)
New Hampshire	14.4 (11.8-17.0)	6.0 (4.7-7.7)	3.9 (2.9-5.2)	-6.78 (-7.91, -5.64)	-4.58 (-5.38, -3.76)	-5.91 (-6.72, -5.09)
New Jersey	17.3 (16.2-18.4)	8.8 (8.0-9.5)	6.7 (6.1-7.4)	-6.64 (-7.26, -6.01)	-4.23 (-4.64, -3.81)	-5.68 (-6.11, -5.25)
New Mexico	9.5 (7.7-11.4)	5.5 (4.4-6.9)	7.7 (6.2-9.2)	-4.15 (-4.94, -3.36)	3.48 (0.25, 6.81)	-1.17 (-2.54, 0.22)
New York	15.9 (15.1-16.6)	8.0 (7.6-8.5)	6.4 (6.0-6.9)	-5.80 (-6.61, -4.99)	-5.00 (-5.81, -4.19)	-5.48 (-6.14, -4.82)
North Carolina	21.4 (20.1-22.6)	11.7 (10.9-12.5)	9.3 (8.6-9.9)	-5.95 (-6.43, -5.48)	-4.17 (-4.51, -3.84)	-5.25 (-5.59, -4.91)

North Dakota	23.2 (18.6-28.5)	8.7 (6.2-11.8)	7.7 (5.4-10.5)	-6.77 (-7.34, -6.20)	-3.38 (-6.29, -0.39)	-5.43 (-6.66, -4.19)
Ohio	22.5 (21.4-23.5)	13.9 (13.2-14.7)	11.5 (10.8-12.2)	-5.82 (-6.27, -5.37)	-3.18 (-3.76, -2.59)	-4.77 (-5.15, -4.40)
Oklahoma	22.0 (19.9-24.0)	9.0 (7.8-10.1)	7.8 (6.7-8.9)	-7.01 (-7.73, -6.29)	-5.54 (-6.69, -4.37)	-6.43 (-7.07, -5.78)
Oregon	13.1 (11.6-14.6)	6.2 (5.2-7.1)	5.7 (4.9-6.6)	-6.08 (-7.26, -4.89)	-2.65 (-3.66, -1.63)	-4.72 (-5.56, -3.88)
Pennsylvania	23.4 (22.4-24.5)	11.9 (11.2-12.6)	10.5 (9.8-11.1)	-6.41 (-6.65, -6.18)	-3.47 (-3.92, -3.03)	-5.25 (-5.46, -5.04)
Rhode Island	19.3 (15.9-22.7)	10.5 (8.4-13.0)	7.5 (5.7-9.8)	-5.88 (-7.40, -4.34)	-5.90 (-7.74, -4.02)	-5.89 (-7.12, -4.65)
South Carolina	35.1 (32.8-37.3)	19.3 (17.8-20.7)	13.8 (12.6-15.0)	-6.45 (-7.20, -5.68)	-5.43 (-6.52, -4.33)	-6.04 (-6.79, -5.29)
South Dakota	27.4 (22.5-32.4)	19.0 (15.3-22.6)	22.5 (18.6-26.5)	-3.68 (-4.63, -2.73)	-0.61 (-1.62, 0.40)	-2.47 (-3.22, -1.71)
Tennessee	30.9 (29.1-32.7)	21.6 (20.3-22.9)	16.8 (15.7-18.0)	-4.47 (-6.00, -2.90)	-3.81 (-4.37, -3.25)	-4.20 (-5.17, -3.23)
Texas	23.0 (22.2-23.9)	14.2 (13.7-14.8)	11.5 (11.1-12.0)	-6.47 (-7.07, -5.87)	-2.85 (-3.99, -1.69)	-5.04 (-5.57, -4.50)
Utah	9.4 (7.6-11.4)	7.4 (6.1-8.8)	4.7 (3.7-5.7)	-6.13 (-7.28, -4.97)	-3.63 (-4.63, -2.62)	-5.14 (-6.00, -4.27)
Vermont	15.2 (11.7-19.4)	6.9 (4.8-9.6)	3.6 (2.1-5.7)	-6.44 (-7.03, -5.85)	-6.44 (-7.03, -5.85)	-6.44 (-7.03, -5.85)
Virginia	17.9 (16.7-19.1)	11.1 (10.2-11.9)	8.6 (7.8-9.3)	-5.63 (-6.00, -5.25)	-3.80 (-4.29, -3.31)	-4.90 (-5.22, -4.58)
Washington	12.6 (11.4-137)	8.2 (7.4-9.0)	6.5 (5.8-7.2)	-4.50 (-4.78, -4.21)	-4.50 (-4.78, -4.21)	-4.50 (-4.78, -4.21)
West Virginia	28.5 (25.6-31.4)	15.7 (13.7-17.7)	13.7 (11.7-15.6)	-5.91 (-6.63, -5.18)	-3.81 (-4.44, -3.19)	-5.08(-5.62, -4.53)
Wisconsin	21.4 (19.8-22.9)	12.2 (11.2-13.2)	9.7 (8.7-10.6)	-6.12 (-6.72, -5.52)	-4.07 (-4.59, -3.55)	-5.31 (-5.75, -4.86)
Wyoming	16.6 (12.4-21.6)	18.4 (14.6-22.9)	11.6 (8.4-15.7)	-2.68 (-3.23, -2.12)	-2.68 (-3.23, -2.12)	-2.68 (-3.23, -2.12)
Age, years						
<45	3.2 (3.1-3.3)	2.3 (2.2-2.4)	1.8 (1.7-1.9)	-2.79 (-3.07, -2.50)	-2.79 (-3.07, -2.50)	-2.79 (-3.07, -2.50)
45-64	54.4 (53.8 - 55.0)	30.9 (30.5 - 31.3)	25.8 (25.5 - 26.1)	-3.61 (-4.00, -3.23)	-4.62 (-5.21, -4.02)	-2.09 (-2.42, -1.75)
Sex						
Women	10.8 (10.6 - 11.1)	6.4 (6.2 - 6.5)	5.4 (5.3 - 5.6)	-4.29 (-4.67, -3.91)	-1.93 (-2.34, -1.53)	-3.35 (-3.66, -3.05)
Men	30.6 (30.2 - 31.0)	17.7 (17.5 - 18.0)	14.5 (14.3 - 14.8)	-4.41 (-4.59, -4.23)	-2.25 (-2.49, -2.02)	-3.55 (-3.71, -3.40)
Ethnicity/race						
NH White adults	20.2 (20.0-20.5)	12.3 (12.1-12.5)	10.2 (10.1-10.4)	-4.01 (-4.29, -3.72)	-2.18 (-2.43, -1.94)	-3.28 (-3.49, -3.07)
NH Black adults	27.9 (27.2-28.7)	15.2 (14.8-15.7)	12.9 (12.5-13.3)	-5.41 (-5.75, -5.06)	-1.69 (-2.35, -1.03)	-3.94 (-4.25, -3.63)
Hispanic adults	12.1 (11.5-12.7)	6.5 (6.2-6.8)	5.8 (5.6-6.1)	-4.73 (-5.34, -4.11)	-1.74 (-2.55, -0.93)	-3.54 (-4.06, -3.02)
Urbanicity						
Large metro	16.2 (16.0-16.5)	8.3 (8.1-8.4)	6.8 (6.6-6.9)	-5.43 (-5.64, -5.22)	-2.32 (-2.66, -1.97)	-4.20 (-4.39, -4.00)
Medium/small metro	21.8 (21.4-22.2)	13.3 (13.0-13.5)	11.1 (10.9-11.4)	-3.97 (-4.21, -3.72)	-2.25 (-2.47, -2.04)	-3.28 (-3.47, -3.10)
-Rural	30.8 (30.2-31.4)	21.8 (21.3-22.3)	19.0 (18.6-19.5)	-3.05 (-3.39, -2.72)	-1.42 (-2.29, -0.53)	-2.40 (-2.85, -1.95)

AAPC: Average Annual Percentage Change; CI: confidence interval; NH: Non-Hispanic

Table S2. Age-adjusted acute myocardial infarction related mortality rates stratified by age in the non-elderly adults in the United States, 1999-2019.

	Age- adjusted mortality rate (95% CI)		
	Overall	**18-45 years**	**45-64 years**
Entire US	13.4 (13.3-13.5)	2.5 (2.4-2.6)	34.9 (34.8-35.0)
Alabama	22.9 (22.6-23.3)	6.1 (5.8-6.4)	56.0 (55.1-56.9)
Alaska	5.3 (4.8-5.8)	1.2 (0.9-1.6)	13.3 (12.0-14.5)
Arizona	7.8 (7.6-7.9)	1.1 (1.0-1.2)	20.8 (20.3-21.3)
Arkansas	41.2 (40.6-41.8)	9.7 (9.3-10.1)	103.1 (101.5-104.7)
California	8.7 (8.6-8.8)	1.2 (1.1-1.3)	23.5 (23.3-23.8)
Colorado	7.5 (7.3-7.7)	1.3 (1.2-1.4)	19.7 (19.2-20.3)
Connecticut	6.8 (6.6-7.0)	1.1 (1.0-1.2)	18.0 (17.4-18.6)
Delaware	9.4 (8.9-10.0)	1.7 (1.3-2.0)	24.7 (23.3-26.1)
District of Columbia	9.4 (8.7-10.0)	1.7 (1.4-2.1)	24.5 (22.7-26.3)
Florida	10.3 (10.2-10.4)	1.9 (1.8-2.0)	26.8 (26.5-27.1)
Georgia	14.6 (14.4-14.8)	2.7 (2.6-2.8)	38.0 (37.5-38.5)
Hawaii	6.4 (5.8-7.0)	1.0 (0.7-1.4)	17.0 (15.4-18.6)
Idaho	18.6 (18.0-19.1)	3.2 (2.9-3.5)	48.8 (47.2-50.3)
Illinois	14.5 (14.3-14.6)	2.5 (2.4-2.6)	38.0 (37.5-38.4)
Indiana	19.0 (18.7-19.3)	3.9 (3.7-4.1)	48.8 (48.1-49.5)
Iowa	13.6 (13.3-13.9)	2.4 (2.2-2.6)	35.7 (34.8-36.6)
Kansas	11.6 (11.3-12.0)	1.9 (1.7-2.1)	30.8 (29.9-31.7)
Kentucky	30.2 (29.8-30.6)	6.8 (6.5-7.1)	76.2 (75.1-77.3)
Louisiana	24.1 (23.7-24.5)	5.4 (5.1-5.6)	60.9 (59.9-61.9)
Maine	10.6 (10.2-11.0)	1.8 (1.5-2.1)	27.8 (26.7-28.9)
Maryland	10.6 (10.4-10.9)	1.7 (1.6-1.9)	28.2 (27.6-28.8)
Massachusetts	8.3 (8.1-8.5)	1.2 (1.1-1.3)	22.2 (21.7-22.6)
Michigan	12.1 (11.9-12.3)	2.4 (2.2-2.5)	31.2 (30.8-31.7)
Minnesota	6.7 (6.5-6.8)	1.3 (1.2-1.4)	17.3 (16.8-17.8)
Mississippi	33.2 (32.7-33.8)	7.9 (7.5-8.3)	83.0 (81.6-84.5)
Missouri	23.9 (23.6-24.2)	5.0 (4.7-5.2)	61.2 (60.4-62.1)
Montana	8.9 (8.4-9.4)	1.8 (1.5-2.1)	22.9 (21.6-24.1)
Nebraska	10.6 (10.2-11.0)	2.1 (1.9-2.3)	27.4 (26.3-28.4)
Nevada	8.4 (8.1-8.7)	1.7 (1.5-1.9)	21.6 (20.8-22.5)
New Hampshire	7.5 (7.2-7.9)	1.5 (1.2-1.7)	19.5 (18.5-20.4)
New Jersey	10.2 (10.0-10.3)	1.6 (1.5-1.7)	27.0 (26.5-27.4)
New Mexico	8.1 (7.8-8.4)	1.4 (1.2-1.7)	21.2 (20.3-22.1)

New York	9.8 (9.7-9.9)	1.6 (1.5-1.7)	25.8 (25.5-26.1)
North Carolina	12.8 (12.6-13.0)	2.4 (2.3-2.5)	33.3 (32.7-33.8)
North Dakota	12.1 (11.4-12.8)	2.3 (1.8-2.7)	31.4 (29.6-33.3)
Ohio	15.2 (15.0-15.3)	3.1 (3.0-3.2)	38.8 (38.3-39.3)
Oklahoma	12.7 (12.4-13.0)	2.6 (2.4-2.8)	32.6 (31.8-33.5)
Oregon	7.7 (7.5-7.9)	1.1 (1.0-1.2)	20.6 (20.0-21.2)
Pennsylvania	14.3 (14.2-14.5)	2.6 (2.5-2.7)	37.4 (36.9-37.8)
Rhode Island	12.0 (11.5-12.5)	1.9 (1.6-2.2)	31.9 (30.5-33.4)
South Carolina	20.8 (20.5-21.2)	4.5 (4.2-4.7)	53.1 (52.2-54.0)
South Dakota	20.0 (19.2-20.8)	3.6 (3.1-4.1)	52.3 (50.1-54.5)
Tennessee	23.6 (23.3-23.9)	4.9 (4.7-5.1)	60.6 (59.8-61.4)
Texas	16.0 (15.9-16.1)	2.7 (2.6-2.8)	42.3 (41.9-42.6)
Utah	7.1 (6.8-7.4)	1.0 (0.9-1.2)	19.1 (18.3-20.0)
Vermont	6.9 (6.4-7.4)	1.3 (1.0-1.7)	18.0 (16.7-19.3)
Virginia	12.2 (12.0-12.4)	2.4 (2.3-2.5)	31.5 (30.9-32.0)
Washington	8.9 (8.8-9.1)	1.3 (1.2-1.4)	23.9 (23.4-24.4)
West Virginia	17.3 (16.8-17.7)	3.8 (3.4-4.1)	43.8 (42.6-45.1)
Wisconsin	13.7 (13.5-14.0)	2.4 (2.2-2.5)	36.1 (35.4-36.8)
Wyoming	17.6 (16.7-18.5)	3.5 (2.9-4.1)	45.4 (43.0-47.8)
Sex			
Women	7.3 (7.2-7.4)	1.4 (1.3-1.5)	18.8 (18.7-18.9)
Men	20.0 (19.9-20.1)	3.7 (3.6-3.8)	52.0 (51.8-52.1)
Ethnicity/race			
NH White adults	13.7 (13.6-13.8)	2.7 (2.6-2.8)	35.5 (35.4-35.7)
NH Black adults	17.5 (17.4-17.6)	3.6 (3.5-3.7)	44.8 (44.5-45.1)
Hispanic adults	7.6 (7.5-7.7)	1.1 (1.0-1.2)	20.2 (20.0-20.4)

CI: confidence interval; NH: Non-Hispanic

Rates were suppressed for data showing 0-9 deaths. Rates were not reported when estimates were unreliable for death counts less than 20.

Table S3. Age-adjusted acute myocardial infarction related mortality rates stratified by sex and ethnicity/race in the non-elderly adults in the United States, 1999-2019.

	Age-adjusted mortality rate (95% CI) per 100,000				
	Sex		Ethnicity/race		
	Women	Men	NH White adults	NH Black adults	Hispanic adults
Entire US	7.3 (7.2-7.4)	20.0 (19.9-20.1)	13.7 (13.6-13.8)	17.5 (17.4-17.6)	7.6 (7.5-7.7)
Alabama	13.5 (13.1-13.8)	33.0 (32.4-33.6)	23.1 (22.6-23.5)	23.8 (23.1-24.5)	6.4 (5.1-8.0)
Alaska	2.2 (1.8-2.7)	8.0 (7.2-8.8)	5.4 (4.9-5.9)	6.6 (4.1-10.2)	--
Arizona	3.9 (3.7-4.1)	11.8 (11.5-12.1)	8.2 (7.9-8.4)	9.6 (8.5-10.6)	6.2 (5.8-6.5)
Arkansas	23.7 (23.0-24.3)	59.5 (58.4-60.5)	40.5 (39.9-41.2)	52.6 (50.7-54.4)	10.5 (8.7-12.3)
California	4.8 (4.7-4.9)	12.8 (12.7-12.9)	9.3 (9.2-9.4)	14.0 (13.6-14.4)	6.3 (6.2-6.5)
Colorado	3.4 (3.2-3.6)	11.7 (11.3-12.0)	7.2 (7.0-7.5)	9.5 (8.3-10.6)	8.9 (8.3-9.5)
Connecticut	3.5 (3.3-3.7)	10.3 (10.0-10.7)	6.7 (6.5-7.0)	8.8 (8.0-9.6)	5.8 (5.1-6.5)
Delaware	5.3 (4.8-5.8)	14.0 (13.1-14.9)	9.3 (8.8-9.9)	10.8 (9.6-12.1)	4.9 (3.2-7.1)
District of Columbia	6.4 (5.6-7.1)	12.7 (11.6-13.8)	3.2 (2.5-3.9)	13.7 (12.7-14.7)	--
Florida	5.5 (5.4-5.6)	15.4 (15.2-15.6)	10.9 (10.8-11.1)	13.2 (12.8-13.6)	6.2 (6.0-6.4)
Georgia	8.4 (8.2-8.6)	21.3 (20.9-21.6)	14.9 (14.7-15.2)	15.7 (15.3-16.1)	3.7 (3.2-4.3)
Hawaii	2.7 (2.2-3.3)	9.6 (8.7-10.6)	6.5 (5.8-7.1)	--	6.2 (4.3-8.6)
Idaho	8.5 (8.0-9.1)	28.7 (27.7-29.7)	19.0 (18.4-19.6)	--	12.0 (10.1-13.9)
Illinois	7.8 (7.6-8.0)	21.4 (21.1-21.7)	14.7 (14.5-14.9)	19.1 (18.6-19.7)	6.0 (5.7-6.4)
Indiana	9.8 (9.5-10.0)	28.5 (28.0-29.0)	19.4 (19.1-19.7)	19.6 (18.6-20.6)	7.1 (6.2-8.1)
Iowa	6.6 (6.3-7.0)	20.6 (20.0-21.2)	13.7 (13.3-14.0)	17.7 (15.1-20.4)	8.0 (6.3-9.9)
Kansas	6.0 (5.7-6.4)	17.3 (16.7-17.9)	11.9 (11.5-12.2)	13.8 (12.2-15.3)	6.4 (5.3-7.4)
Kentucky	16.6 (16.2-17.1)	44.4 (43.6-45.1)	30.6 (30.2-31.1)	29.2 (27.6-30.7)	10.2 (8.3-12.5)
Louisiana	14.0 (13.6-14.4)	34.8 (34.2-35.5)	21.9 (21.5-22.3)	30.8 (30.1-31.6)	6.3 (5.2-7.4)
Maine	4.9 (4.5-5.3)	16.5 (15.7-17.2)	10.7 (10.2-11.1)	--	--
Maryland	6.3 (6.1-6.5)	15.4 (15.1-15.8)	10.3 (10.1-10.6)	12.6 (12.1-13.0)	3.4 (2.9-4.0)
Massachusetts	3.9 (3.8-4.1)	12.9 (12.6-13.2)	8.4 (8.2-8.6)	8.8 (8.0-9.5)	5.8 (5.2-6.4)
Michigan	6.6 (6.4-6.8)	17.8 (17.5-18.1)	12.0 (11.8-12.2)	13.6 (13.1-14.1)	7.9 (7.0-8.8)
Minnesota	2.7 (2.5-2.9)	10.6 (10.3-10.9)	6.7 (6.5-6.9)	5.6 (4.8-6.5)	4.7 (3.7-5.9)
Mississippi	18.9 (18.3-19.4)	48.7 (47.7-49.6)	29.7 (29.1-30.4)	41.1 (40.1-42.1)	7.2 (5.2-9.6)
Missouri	13.2 (12.9-13.5)	35.1 (34.6-35.7)	24.4 (24.1-24.8)	22.8 (21.9-23.8)	10.4 (8.8-11.9)
Montana	3.7 (3.3-4.1)	14.1 (13.2-14.9)	9.0 (8.5-9.4)	--	--
Nebraska	5.0 (4.6-5.4)	16.3 (15.6-17.0)	10.9 (10.5-11.3)	11.1 (9.0-13.1)	5.0 (3.8-6.5)
Nevada	4.1 (3.8-4.4)	12.6 (12.1-13.1)	9.5 (9.1-9.8)	9.1 (8.0-10.2)	4.0 (3.5-4.5)
New Hampshire	3.4 (3.0-3.7)	11.8 (11.1-12.4)	7.6 (7.3-8.0)	5.2 (4.1-12.6)	--
New Jersey	5.4 (5.2-5.6)	15.3 (15.0-15.6)	10.1 (9.9-10.3)	15.2 (14.7-15.8)	5.9 (5.5-6.2)

New Mexico	4.3 (3.9-4.6)	12.1 (11.5-12.7)	8.2 (7.8-8.7)	8.7 (6.4-11.4)	7.9 (7.3-8.4)
New York	5.2 (5.1-5.3)	14.7 (14.5-14.9)	10.1 (10.0-10.3)	11.4 (11.1-11.7)	6.3 (6.1-6.6)
North Carolina	6.9 (6.7-7.1)	19.0 (18.7-19.4)	12.6 (12.4-12.8)	15.1 (14.7-15.6)	3.7 (3.2-4.3)
North Dakota	5.4 (4.7-6.0)	18.5 (17.3-19.7)	12.2 (11.5-12.9)	6.1 (5.8-22.3)	--
Ohio	8.0 (7.8-8.2)	22.7 (22.4-23.0)	15.2 (15.0-15.4)	15.9 (15.4-16.5)	7.0 (6.1-8.0)
Oklahoma	7.3 (7.0-7.6)	18.3 (17.8-18.8)	12.9 (12.5-13.2)	15.5 (14.3-16.8)	6.3 (5.2-7.3)
Oregon	3.8 (3.6-4.0)	11.7 (11.3-12.1)	7.9 (7.7-8.2)	6.3 (4.8-8.0)	4.3 (3.6-5.1)
Pennsylvania	7.4 (7.2-7.6)	21.6 (21.3-21.9)	14.5 (14.3-14.7)	14.6 (14.1-15.2)	8.9 (8.1-9.6)
Rhode Island	5.8 (5.3-6.3)	18.7 (17.8-19.6)	12.4 (11.9-13.0)	13.9 (11.3-16.5)	6.4 (5.1-8.0)
South Carolina	10.5 (10.2-10.8)	32.0 (31.4-32.6)	19.8 (19.4-20.2)	24.8 (24.1-25.6)	7.2 (5.9-8.5)
South Dakota	8.9 (8.1-9.6)	30.9 (29.5-32.3)	20.1 (19.3-20.9)	21.5 (13.3-32.8)	13.4 (8.1-21.0)
Tennessee	12.9 (12.6-13.3)	35.1 (34.5-35.6)	24.2 (23.8-24.5)	23.6 (22.8-24.4)	6.1 (5.0-7.3)
Texas	9.2 (9.0-9.3)	23.2 (22.9-23.4)	16.8 (16.6-17.0)	20.2 (19.8-20.6)	12.8 (12.6-13.0)
Utah	3.2 (2.9-3.5)	11.1 (10.5-11.6)	7.3 (7.0-7.7)	8.9 (5.8-13.2)	4.9 (4.1-5.8)
Vermont	3.1 (2.6-3.6)	10.9 (10.0-11.8)	7.0 (6.5-7.5)	--	--
Virginia	6.6 (6.4-6.8)	18.1 (17.7-18.4)	12.0 (11.8-12.3)	15.0 (14.5-15.5)	3.7 (3.2-4.2)
Washington	4.4 (4.3-4.6)	13.5 (13.2-13.8)	9.0 (8.8-9.2)	10.8 (9.7-11.9)	6.7 (6.0-7.4)
West Virginia	10.2 (9.6-10.7)	24.6 (23.8-25.4)	17.4 (16.9-17.9)	16.9 (14.3-19.6)	5.5 (3.5-10.7)
Wisconsin	6.0 (5.8-6.2)	21.5 (21.1-21.9)	14.0 (13.8-14.3)	12.8 (11.7-13.9)	5.6 (4.7-6.6)
Wyoming	8.7 (7.8-9.7)	26.1 (24.6-27.6)	17.7 (16.8-18.6)	--	14.3 (11.1-18.1)

CI: confidence interval; NH: Non-Hispanic

Rates were suppressed for data showing 0-9 deaths. Rates were not reported when estimates were unreliable for death counts less than 20.