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Healthy People 2020: Rural Areas Lag In Achieving Targets For Major Causes Of Death

Sirin Yaemsiri,

senior statistician at the US Government Accountability Office, in Washington, D.C. She was a statistician in the Division of Analysis and Epidemiology, National Center for Health Statistics (NCHS), in Hyattsville, Maryland, at the time this work was conducted.

Johanna M. Alfier,

statistician in the Division of Analysis and Epidemiology, NCHS.

Ernest Moy,

executive director of the Office of Health Equity, Veterans Health Administration, in Washington, D.C.

Lauren M. Rossen,

statistician in the Division of Research and Methodology, NCHS.

Brigham Bastian,

statistician in the Division of Vital Statistics, NCHS.

Jane Bolin,

associate dean for research in the College of Nursing and deputy director of the Southwest Rural Health Research Center at the School of Public Health, both at Texas A&M University, in College Station.

Alva O. Ferdinand,

assistant professor in the Department of Health Policy and Management and director of the Southwest Rural Health Research Center at the School of Public Health, Texas A&M University.

Timothy Callaghan,

assistant professor in the Department of Health Policy and Management and director of evaluation for the Southwest Rural Health Research Center at the School of Public Health, Texas A&M University.

Melonie Heron

health scientist in the Division of Vital Statistics, NCHS.

Abstract

For the period 2007–17 rural death rates were higher than urban rates for the seven major causes of death analyzed, and disparities widened for five of the seven. In 2017 urban areas had met national targets for three of the seven causes, while rural areas had met none of the targets.

Rural America faces numerous public health challenges, including reduced access to health services, poor nutrition, uncontrolled diabetes, mental and substance use disorders, heart disease, and stroke.^{1–4} We evaluated rural and urban progress toward national targets for rates of the seven major causes of death tracked by Healthy People 2020 (exhibit 1). Healthy People 2020 is an initiative led by the Department of Health and Human Services that provides a national framework for setting and tracking public health priorities.⁵ The seven major causes of death analyzed for US decedents were based on the *International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision (ICD-10), underlying cause of death codes: coronary heart disease (I20–I25), cancer (C00–C97), diabetes related (E10–E14 reported as underlying or multiple cause codes), stroke (I60–I69), chronic obstructive pulmonary disease (COPD) among adults ages forty-five and older (J40–J44; excludes asthma), unintentional injury (V01–X59 and Y85–Y86), and suicide (*U03, X60–X84, and Y87.0).

We analyzed age-adjusted death rates for the major causes of death in urban and rural areas using data from the National Vital Statistics System. Nationally, urban areas had met or exceeded the national targets for three of the seven major causes of death (coronary heart disease, cancer, and diabetes related) as of 2017, while rural areas had met none of the targets (exhibit 1). There was variation in target attainment for the other causes of death by rurality and region. Progress toward or movement away from targets occurred at different rates for urban and rural areas. The findings suggest that rural areas lag behind urban areas in improvement toward national targets.

Study Data And Methods

Of the ten leading causes of death in the US,⁶ seven were related to measures tracked by Healthy People 2020.⁷ Because some of the initiative’s measure specifications differ slightly from how the leading causes of death are typically reported, we refer to these seven causes as “major causes of death” rather than “leading causes of death.” Age-adjusted death rates were calculated using the direct method and adjusted to the 2000 US standard population. National death rate targets were set by Healthy People 2020 interagency workgroups based on 2007 national age-adjusted rates. Rurality was based on county of residence, using the Office of Management and Budget’s 2013 county-based classification scheme.⁸ “Urban” refers to counties in metropolitan areas, defined as areas containing an urban core with a population of at least 50,000. All other counties are considered rural. We used SAS, version 9.4, for statistical analyses.

We compared 2007 and 2017 death rates to the Healthy People 2020 national targets for urban counties collectively and for rural counties collectively, and we categorized these areas as having met or exceeded targets, improving, getting worse, or having little or no detectable change. Details of these methods have been published elsewhere.⁹ We also compared death rates in rural and urban areas across census regions. Significance ($p < 0.05$) was assessed using a one-sided z -test.

For each trend in the period 2007–17, the average annual percentage change was calculated as the slope of the weighted least-squares regression on the log-transformed death rates.

Negative slope estimates indicated decreasing death rates, while positive slope estimates indicated increasing death rates.

We compared rural to urban death rates by dividing the rural death rate by the urban death rate for each cause of death. Increasing ratios indicated a widening disparity between urban and rural death rates, while decreasing ratios indicated a narrowing disparity. A ratio of 1 indicated parity between the rural and urban rates. We assessed changes in rate ratios and differences in the average annual percentage changes described above, using published formulas.¹⁰

Data for the exhibits are provided in online appendix exhibits A1–A5.¹¹

This analysis had several limitations. First was the use of a two-level urban and rural classification scheme versus a scheme with more granular definitions of rurality.¹² We used the two-level measurement scheme because the numbers of deaths from some causes were too low in a single year when examined by both region and more granular categories of rurality.

Second, rural and racial disparities may be confounded—especially in the South, where the majority of the non-Hispanic black rural population resides. We examined death rates for non-Hispanic white and non-Hispanic black decedents separately and found that rural disparities persisted in the US as a whole and in the South (appendix exhibit A6).¹¹ Hence, race does not explain the rural disparities we present.

Finally, variation in death rates may also exist in urban and rural census tracts within counties. That would not be captured by this analysis, as the county of residence was the smallest geographic unit for which data were available.

Study Results

Age-adjusted death rates for the period 2007–17 were higher in rural than in urban areas for all seven major causes of death tracked by Healthy People 2020 (appendix exhibit A1).¹¹ Rural areas had not met national targets for death rates from any of the seven causes.

In rural areas, mortality rates for coronary heart disease and cancer were improving toward targets while diabetes-related death rates were getting worse, and in urban areas, national targets had been met for those three causes (exhibit 1). In both urban and rural areas, stroke death rates were improving, while unintentional injury death and suicide rates were getting worse. COPD death rates were improving in urban areas and getting worse in rural areas. In rural areas, progress toward national targets varied greatly by region for diabetes-related and COPD death rates. For instance, while diabetes-related death rates were getting worse in rural areas nationally, rates were improving in the Northeast and Midwest, getting worse in the South, and showing little or no detectable change in the West.

Nationally, the average annual percentage changes during the period 2007–17 in rural areas were less favorable than those in urban areas for five of the seven causes (exhibit 2). In rural areas compared to urban areas, annual decreases in coronary heart disease, cancer, and

diabetes-related death rates were smaller, and average annual percentage changes were greater for COPD death and suicide rates. In rural areas the changes ranged from a 2.4 percent decrease in coronary heart disease death rates to a 2.9 percent increase in suicide rates.

When we compared rural to urban death rates nationally, we found that disparities widened (that is, there were increasing ratios) over the study period for five causes of death: COPD, suicide, diabetes related, coronary heart disease, and cancer (exhibit 3). In 2017 COPD death and suicide rates were 45 percent higher in rural than in urban areas. Disparities narrowed over time for unintentional injury and stroke death rates. Stroke death rates were 8 percent higher in rural than in urban areas in 2017, having been 16 percent higher in 2007.

When we focused on rural areas, we found regional differences in the average annual percentage changes for diabetes-related, COPD, and unintentional injury death rates (exhibit 4). Diabetes-related rates decreased by 1.6 percent in rural areas in the Northeast, while there was virtually no change in the Midwest and West. COPD death rates increased by 0.8 percent and 1.0 percent in the Midwest and South, respectively, while the rates decreased by 0.7 percent in the Northeast and West. Unintentional injury death rates increased by 3.3 percent in the Northeast, 2.0 percent in the Midwest, and less than 1 percent in the South and West.

Discussion

As of 2017, rural areas had not met national death rate targets for any of the seven major causes of death tracked by Healthy People 2020. Death rates for all seven causes were higher in rural than urban areas. Furthermore, the changes in trends were less favorable in rural than urban areas for coronary heart disease, cancer, diabetes-related, COPD, and suicide death rates, leading to widening disparities between rural and urban areas. In rural areas, progress and changes in death rates varied by census region for diabetes-related, COPD, and unintentional injury death rates.

Poverty and race may modify rural disparities. Gopal Singh and Mohammad Siahpush found that the gap between urban and rural death rates that existed between 1969 and 2009 began widening in the late 1980s.¹³ Poverty levels only partially accounted for rural-urban differences in all-cause and premature mortality. When the authors considered the contributions of rural residence, poverty, and race in combination, they found that black residents in poor rural areas had death rates two to three times higher than those for white or black residents of affluent urban areas.

Examining average annual percentage changes enhances understanding of progress toward meeting national targets, quantifying both the size and the direction of progress. For diabetes-related death rates in rural areas, progress categories indicate that rates were improving in the Midwest and getting worse in the South (exhibit 1), while the average annual percentage changes in both regions were smaller than 1 percent (exhibit 4). Furthermore, the average annual percentage change provides insight into disparity trends. For example, rural-urban disparities in unintentional injury death rates seem to have

narrowed (exhibit 3). However, these changes were due to the fact that urban rates were increasing faster than rural rates (exhibit 2), rather than to an improvement toward the target for either rate.

Examining changes and disparities over time by both rurality and region can augment national health initiatives such as Healthy People 2020 and Healthy People 2030, which is under development. Understanding how progress varies by rurality and region can help federal, state, local, and tribal health officials identify urban or rural areas where progress is lagging and improvement is needed, as they determine the public health priorities that are most relevant to different communities.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position or policy of the National Center for Health Statistics (NCHS), the Centers for Disease Control and Prevention (CDC), the Department of Veterans Affairs, or the United States government. The authors acknowledge Robert Francis, Deborah D. Ingram, Florence Lee, and Donald Malec from the NCHS and Macarena Garcia from the CDC for their statistical consultation and guidance.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

NOTES

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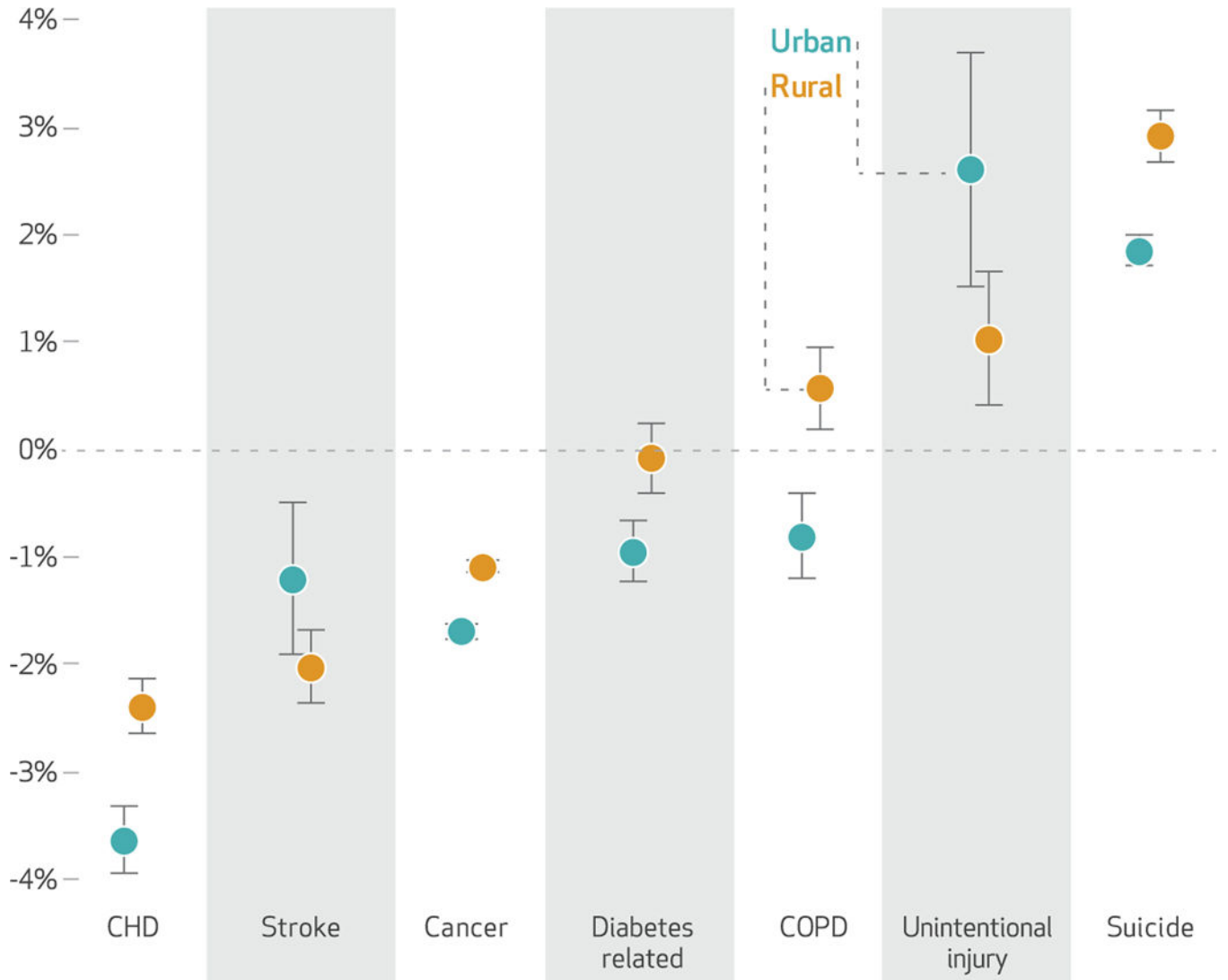


Exhibit 2.

Average annual percent changes from 2007 to 2017 in death rates for the major causes of death tracked by Healthy People 2020, by rurality. **SOURCE** Authors' analysis of age-adjusted death rates for 2007–17 from the National Vital Statistics System, National Center for Health Statistics. **NOTES** Negative slope estimates indicate decreasing death rates, while positive slope estimates indicate increasing death rates. The error bars represent 95% confidence intervals. Appendix exhibit A3 contains the data for average annual percent changes in rural and urban area death rates for the major causes of death (see note 11 in text). CHD is coronary heart disease. COPD is chronic obstructive pulmonary disease among people ages forty-five and older.

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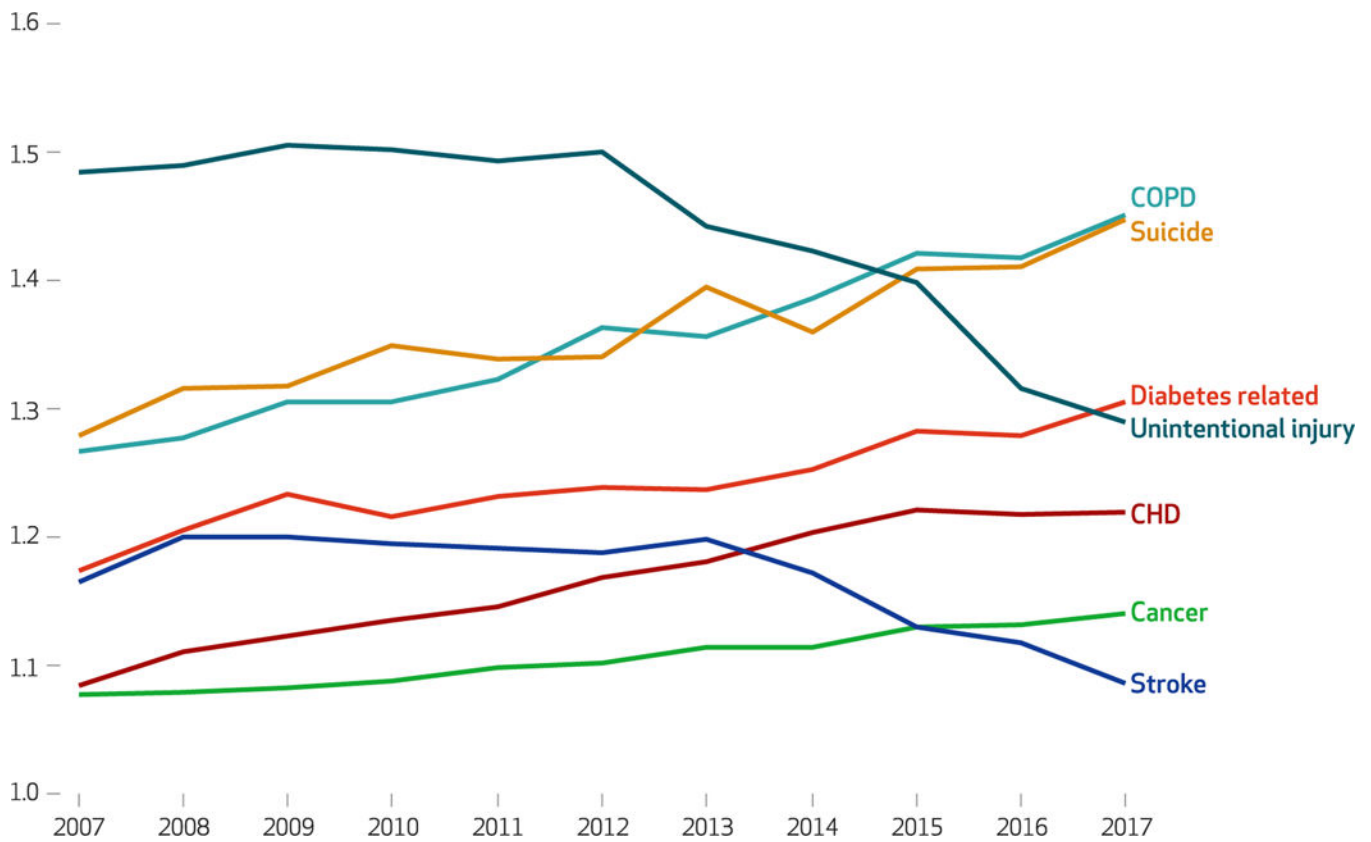


Exhibit 3. Ratios of rural annual death rates to urban annual death rates for the major causes of death tracked by Healthy People 2020, 2007–17. **SOURCE** Authors’ analysis of age-adjusted death rates for 2007–17 from the National Vital Statistics System, National Center for Health Statistics. **NOTES** Appendix exhibit A4 contains the data for the ratios of rural to urban rates for the major causes of death (see note 11 in text). CHD is coronary heart disease. COPD is chronic obstructive pulmonary disease among people ages forty-five and older.

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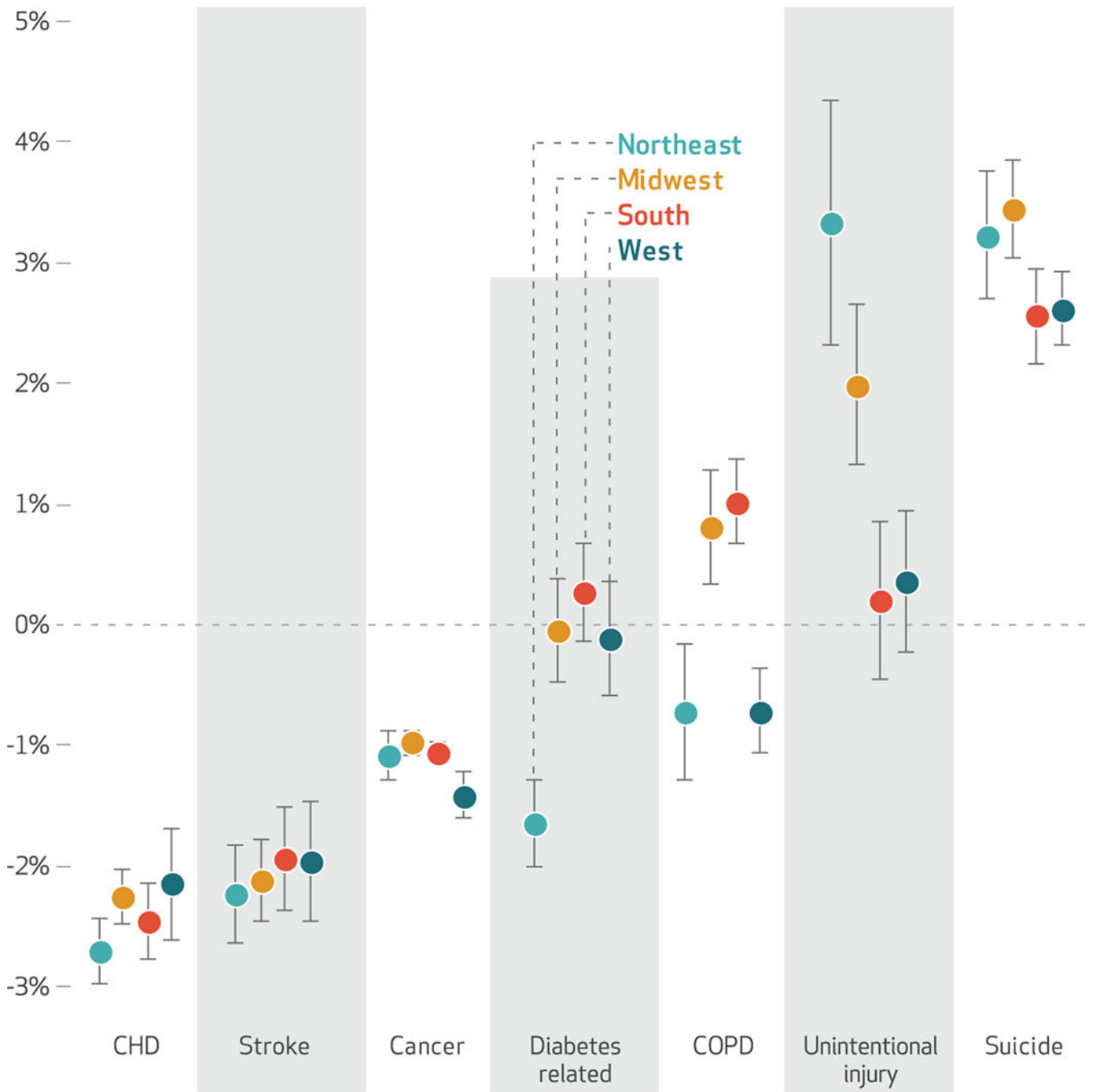


Exhibit 4. Average annual percent changes from 2007 to 2017 in death rates in rural areas for the major causes of death tracked by Healthy People 2020, by census region. SOURCE Authors’ analysis of age-adjusted death rates for 2007–17 from the National Vital Statistics System, National Center for Health Statistics. NOTES Negative slope estimates indicate decreasing death rates, while positive slope estimates indicate increasing death rates. The error bars represent 95% confidence intervals. Appendix exhibit A5 contains the data for the average annual percent changes in rural areas for the major causes of death by census region (see

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note 11 in text). CHD is coronary heart disease. COPD is chronic obstructive pulmonary disease among people ages forty-five and older.

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Exhibit 1.

Progress as of 2017 toward national targets for rates of the seven major causes of death tracked by Healthy People 2020, by census region and rurality.

	<u>National</u>		<u>Northeast</u>		<u>Midwest</u>		<u>South</u>		<u>West</u>	
	U	R	U	R	U	R	U	R	U	R
CHD	✓	+	✓	✓	✓	+	✓	+	✓	✓
Cancer	✓	+	✓	+	✓	+	✓	+	✓	✓
Diabetes related	✓	-	✓	+	+	+	+	-	+	○
Stroke	+	+	✓	✓	+	+	+	+	+	+
COPD	+	-	✓	○	○	-	○	-	✓	+
Unintentional injury	-	-	-	-	-	-	-	○	-	○
Suicide	-	-	✓	-	-	-	-	-	-	-

SOURCE: Authors' analysis of age-adjusted death rates for 2007 and 2017 from the National Vital Statistics System, National Center for Health Statistics.

NOTES: A checkmark signifies that the target has been met or exceeded. A plus sign signifies improving performance. A circle signifies little or no detectable change. A minus sign signifies worsening performance. The causes of death and Healthy People 2020 progress categories are explained in the "Study Data and Methods" section. U is urban. R is rural. CHD is coronary heart disease. COPD is chronic obstructive pulmonary disease among people ages forty-five and older.

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