

# Diabetes Mortality in Rural America: 1999-2015

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## Purpose

In this study our primary aim was to understand the scope of diabetes-related mortality in urban and rural America. We analyze mortality caused by diabetes over a sixteen-year period and explore the roles played by rurality and race in this process.

## Background

One of the most important tasks for scholars and policymakers in the arena of public health is to better understand the causes and consequences of diabetes. Over 29 million Americans have the disease – including 8.1 million who have yet to be diagnosed – and another 86 million Americans have prediabetes and are at risk of becoming a Type II diabetic (CDC 2014).

Among the many complications that arise as a result of diabetes, which include neuropathy (nerve damage), nephropathy (kidney disease), and foot damage, perhaps none is more troubling than the high mortality rates seen among diabetics. Our research explores this diabetes-related mortality and, in particular, analyzes differences in diabetes-related mortality based on rurality. With proper diabetes treatment including regular access to medical care, we assess whether rural areas that often have limited access to care see higher mortality rates.

## Methods

To carry out our analysis of diabetes-related mortality we rely on data made available by the Centers for Disease Control and Prevention (CDC) Wonder Database. The CDC Wonder provides publicly available data on health outcomes at the state and local level and, critical for our analysis, provides information about mortality by cause of death and by rurality status.

For our analyses we consider all diabetes-related mortality including insulin-dependent, non-insulin dependent, malnutrition-related, and other types of diabetes-related deaths. Rurality is determined using the 2013 NCHS Urban-Rural Classification Scheme that breaks results down by six levels of rurality.

To fully account for the role of population size in subsequent death rates, we focus our discussion of mortality rates around mortality estimates per 100,000 residents that fit a given rurality classification scheme.

## Key Findings

- ◆ Diabetes affects millions of Americans and has caused 1.2 million deaths since 1999.
- ◆ Diabetes mortality is high across the country but its impact is most felt in rural America.
- ◆ Diabetes mortality is consistently higher in increasingly rural areas of the United States.
- ◆ Diabetes mortality among White Americans is quite similar to aggregated rates for all Americans.
- ◆ Diabetes mortality among Black Americans is much higher than national averages and is particularly pronounced in rural America.
- ◆ Diabetes mortality among Hispanic Americans is much lower than national averages but higher rates are still seen in rural America.

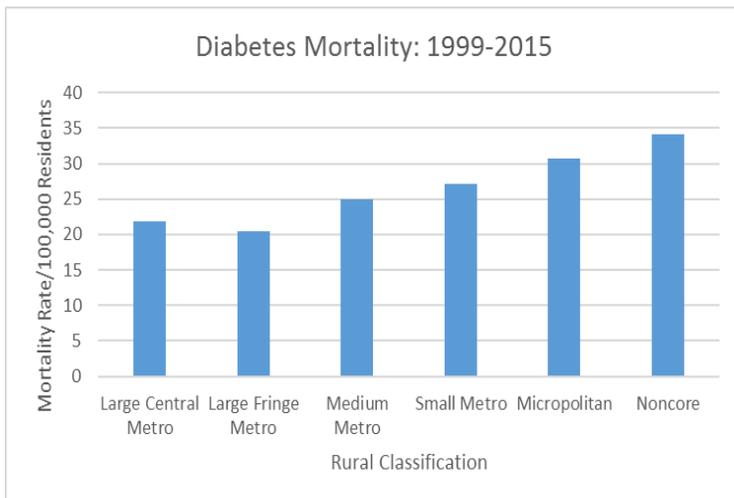
*This policy brief is the second in a series prepared by the Southwest Rural Health Research Center on the topic of diabetes.*

**Results**

Table 1 analyzes diabetes-related mortality for the entire U.S. population and presents results aggregated from 1999-2015. The results in Table 1 present a clear role for rural status in diabetes-related mortality in the United States. As rurality increases in America, so too does diabetes-related mortality. Compared to large central metros, which are comprised of large cities of at least 1 million inhabitants, residents of the noncore – the most rural classification – have a 12.4-point higher mortality rate. Just as important, Table 1 reveals a clear gradation across levels of rurality with smaller metro areas demonstrating higher mortality rates than large metros, but rates that are still far lower than those seen in rural America.

**Table 1. Diabetes Mortality for Entire Population 1999-2015**

Rural Classification	Deaths	Population	Crude Rate Per 100,000
Large Central Metro	339,454	1,559,656,011	21.8
Large Fringe Metro	255,085	1,246,808,033	20.5
Medium Metro	263,544	1,058,334,412	24.9
Small Metro	128,430	471,329,802	27.2
Micropolitan	139,381	453,728,962	30.7
Noncore	110,427	322,761,656	34.2

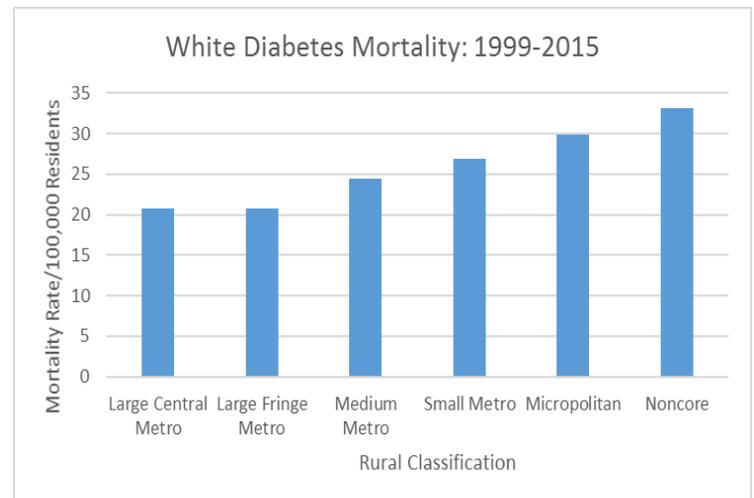


While Table 1 demonstrates that diabetes-related mortality is clearly a problem in rural America, it is also important to explore how this pattern might

change across different subsets of the population. For that reason, we also explore the role of race in the relationship between diabetes-related mortality and rurality. Understanding the role of race is particularly important because an extensive body of research in the social sciences demonstrates disparities across race and these disparities might extend to diabetes mortality in America. We begin to analyze this topic in Table 2 which studies diabetes-related mortality among White Americans. Several noteworthy patterns emerge. First, we continue to see the gradations in diabetes-related mortality that were evident in Table 1. Moving from large metro areas to more rural parts of the U.S. results in much higher diabetes-related mortality among White Americans. Second, even as mortality rates for White Americans are similar to those seen in Table 1, diabetes-related mortality among Whites is typically slightly lower than the rate seen for the population at large.

**Table 2. White Diabetes Mortality for Entire Population 1999-2015**

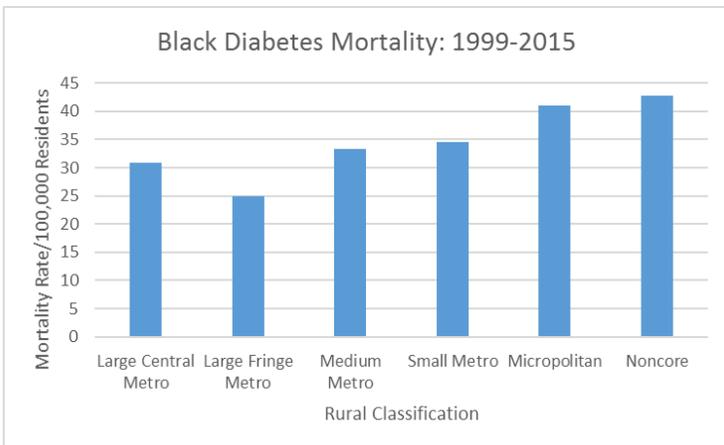
Rural Classification	Deaths	Population	Crude Rate Per 100,000
Large Central Metro	228,195	1,103,956,195	20.7
Large Fringe Metro	211,456	1,023,293,330	20.7
Medium Metro	214,772	880,054,231	24.4
Small Metro	109,604	407,315,501	26.9
Micropolitan	119,382	399,197,626	29.9
Noncore	93,565	281,995,625	33.2



Even as White mortality rates look similar to the population at large, rates for Black and Hispanic Americans are quite different. In Table 3, which looks at diabetes-related mortality among Black Americans, disparities start to emerge. First, Table 3 shows that mortality attributable to diabetes is dramatically higher for Black Americans. The lowest rate of 30.9 in large central metros is nearly as high as the highest rates seen among White Americans. In addition, the crude rate of 42.8 seen in the rural noncore of America is the highest rate seen across our analysis of this topic. Critically, however, while rates are incredibly high in rural America, the disparities across levels of rurality are remarkably similar to those seen in prior tables – moving from most urban to most rural results in a mortality increase of 12.8 points. This suggests that while Black diabetes-related mortality is clearly a problem in rural America and that diabetes in general is a major health issue for Black Americans, it is not a uniquely rural phenomenon.

**Table 3. Black Diabetes Mortality for Entire Population 1999-2015**

Rural Classification	Deaths	Population	Crude Rate Per 100,000
Large Central Metro	92,953	300,642,370	30.9
Large Fringe Metro	37,339	150,160,827	24.9
Medium Metro	40,914	122,585,570	33.4
Small Metro	16,120	46,712,619	34.5
Micropolitan	15,508	37,832,028	41.0
Noncore	12,791	29,867,211	42.8

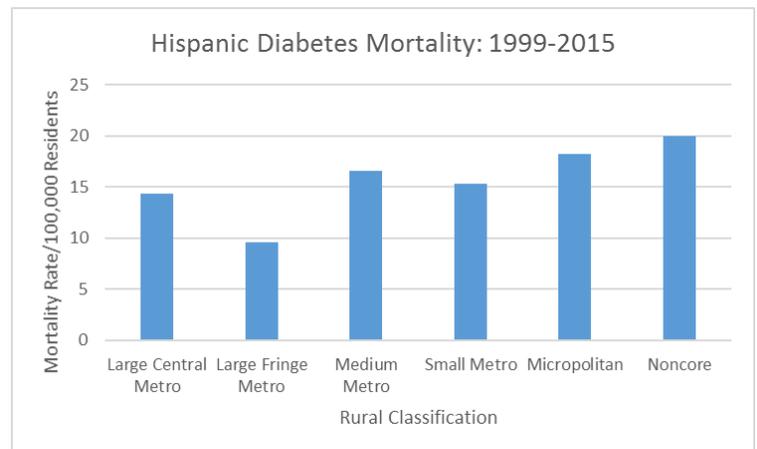


Our analysis also presents important information about disparities across race in Table 4, which analyzes

Hispanic mortality attributable to diabetes. There we see a remarkably different pattern of results. Not only is Hispanic diabetes-related mortality lower than Black mortality, it is also dramatically lower than mortality seen among Whites. The crude rate of 20.0 seen in the noncore is actually lower than the lowest mortality rate seen in even urban American in our other tables. This finding suggests that Hispanic health outcomes related to diabetes are far better than those seen for other races. Even with this lower rate however, urban and rural differences emerge. Mortality rates in urban America are lower than rates in rural American even as the rates across rurality are quite low.

**Table 4. Hispanic Diabetes Mortality for Entire Population 1999-2015**

Rural Classification	Deaths	Population	Crude Rate Per 100,000
Large Central Metro	55,304	386,692,199	14.3
Large Fringe Metro	13,473	140,507,007	9.6
Medium Metro	25,839	155,840,491	16.6
Small Metro	6,545	42,752,799	15.3
Micropolitan	6,555	36,029,952	18.2
Noncore	3,449	17,284,012	20.0



**Discussion**

This brief highlights the impact of diabetes on mortality across the United States over a sixteen-year period. Its analysis identifies not only high rates of diabetes-related mortality nationwide, but also clear discrepancies based on rurality and race.

Discrepancies in mortality based on rurality provide clear evidence that in rural areas, important health outcomes are rendered. Additionally, findings related to race emphasize the importance of accounting for the characteristic in studies of diabetes and diabetes-related mortality. The difference in mortality rates between White and Black Americans fits well with existing literature on racial disparities but remains shocking. The low mortality rates seen among Hispanic Americans is perhaps even more surprising – but fits well within research on the Latino mortality paradox. Even as Hispanics have lower socioeconomic status than White Americans, our findings fit well within a body of research that suggests that Hispanics have lower mortality rates as a result of better health behaviors prior to acculturation (Abraido-Lanza et al. 2005).

## Implications

Even as this study provides critical information about diabetes-related mortality, it is very much a first step in understanding the impact of diabetes on health outcomes, particularly in rural areas.

With clear discrepancies based on rurality and race, future funding and subsequent research should be directed at understanding the causes of discrepancies across each characteristic. Through a multi-disciplinary effort, which should include health policy and health promotion experts as well as scholars from other disciplines like sociology, political science, economics, and psychology, we can better understand the root causes of these discrepancies and develop potential interventions to resolve them. Just as important, future research needs to take a close look at the intersectionality of rurality and race; as well as connections to other individual measures like income, education, and knowledge of appropriate care.

Above all, this study should serve as a warning signal to policy makers and other key stakeholders about discrepancies in health outcomes between urban and rural America. Adequately funding efforts to target improved health access and, in turn, diabetes mortality in rural areas will be important to eliminating the clear differences that currently exist.

## Recommendations

Continued monitoring and analysis of diabetes-related mortality and its impact on rural America is recommended to both assess how the problem evolves over time and to better allow for subsequent interventions. Additionally, resources should be specifically devoted to better understanding the causes and consequences of the health issue and to develop effective interventions aimed at eliminating clear disparities based on rurality and race. Finally, given the particularly high prevalence of diabetes related mortality among Black Americans, specific efforts should be made to improve outreach and education on the topic to Black Americans.

## References

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