

# Opioid Overdose Mortality Trends in Wisconsin, 1999-2018

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## **Abstract**

**Background:** Opioid-related mortality in Wisconsin by race differs from national trends: in 2017, Black Wisconsinites were 87% more likely than whites to die by opioid overdose. Little attention has been paid to this disparity and the increase in mortality in the Black community.

**Methods:** We characterize trends in mortality due to opioid overdose in Wisconsin using CDC Wonder data for 1999-2018 by race, age, and gender. ICD-10 codes were selected per national guidelines for identifying opioid-related overdose deaths.

**Results:** Opioid overdose mortality increased 956% during the study period. Black populations had consistently higher risk than white populations, with an older age distribution.

**Conclusion:** We identify a disparity in opioid overdose mortality that has persisted over time in Wisconsin, indicating a possible gap in services.

## Introduction

Opioid-related mortality represents a global public health crisis<sup>1</sup>. The domestic response to the crisis has included a wide array of public health interventions, particularly those aimed at preventing overdose deaths. Understanding trends in mortality due to opioid overdose is key in targeting these services.

Drug overdose deaths have been rising across the United States, up over 20% in one year, between 2015 and 2016<sup>2</sup>. In Wisconsin, these deaths have been rising as well, attributed to both prescription and illicit opioid use<sup>3</sup>. A detailed look at these trends over time in Wisconsin is warranted.

Despite ranking highly in health outcomes overall, Wisconsin has consistently performed among the worst in the nation in terms of racial health disparities<sup>3</sup>, and opioid-related mortality is no exception. In 2017, Black Wisconsinites were 87% more likely than White Wisconsinites to die by opioid overdose<sup>3</sup>. This diverges from national data, where Whites have a higher mortality rate than Blacks<sup>2</sup>. Racialized narratives of an opioid epidemic among White Americans and overall mobilization of treatment opportunities also contrasts with the historic criminalization of Black and Latino drug users and highlights the “moral economy of whiteness” and differentials of privilege and power that exist in the United States<sup>4</sup>. However, recent national trends have shown the highest increase in mortality to be among Black Americans<sup>5</sup>. Despite this, little attention has been paid to this steep increase on a national or state-wide basis<sup>6</sup>.

In this study, we aim to characterize the trends in mortality due to opioid overdose in Wisconsin, compare rates between racial and ethnic groups, and compare these trends to the US as a whole.

## **Methods**

This was a descriptive study analyzing trends in opioid-related overdose mortality in Wisconsin compared to the U.S. Data for this analysis was obtained from CDC WONDER for 1999-2018<sup>7</sup>. All ages, genders, and races were included. Mortality related to opioid overdose was identified using International Classification of Disease (ICD)-10 codes based on Substance Abuse and Mental Health Services Administration's (SAMHSA) Center for the Application of Prevention Technologies "Using International Classification of Diseases (ICD) Codes to Assess Opioid-Related Overdose Deaths"<sup>8</sup>.

Deaths were included in this study if they had both an underlying cause of mortality of accidental poisoning (X40-44), intentional self-poisoning (X60-64), assault (X85), or poisoning of undetermined intent (Y10-14) as well as an opioid-related contributing cause of overdose death (T40.0-40.4, T40.6). The exposures analyzed were age, race/ethnicity, gender, place (Wisconsin vs U.S.), and year.

Descriptive statistics were calculated by CDC WONDER or in Microsoft Excel. Age-adjusted or age-specific mortality rates were calculated for each age, race, and gender subgroup, and bivariate analyses were also conducted. Subgroup analyses and age-adjustment were done in order to address potential confounding.

## **Results**

### *Wisconsin data*

The age-adjusted mortality rate due to opioid overdose in Wisconsin has increased in recent years, from 1.6 in 1999 to 15.3 in 2018, an increase of 956%. The same trend was true for

all age groups and races/ethnicities in the state. These trends mirror an overall increase in opioid overdose mortality in the United States during this time period.

Black Wisconsinites have had a consistently higher mortality rate due to opioid overdose over this time period, with both White and Black populations experiencing a sharp increase in mortality rate in recent years, with a plateau or slight decrease from 2017 to 2018 (Figure 1).

Unlike trends in the U.S. overall, the highest mortality rate due to these causes in Wisconsin is seen among American Indian/Native Americans (AIAN), followed by Blacks. Black Wisconsinites are more than twice as likely to die from opioid-related overdose compared to White Wisconsinites (Table 1). Trends for AIAN Wisconsinites by year were unavailable due to small sample size. Epidemiologic trends for opioid overdose in Wisconsin from 1999-2018 by gender, race/ethnicity, and age are described in Table 1.

Distribution of mortality rates among different age groups differs by race in Wisconsin, with Black Wisconsinites having the highest mortality rate among those ages 45-54, and White Wisconsinites having the highest mortality rate among those ages 25-34. Indeed, it is only among those ages 15-34 that the mortality among the White population exceeded that of the Black/African American population. Otherwise, the mortality rate for Black Wisconsinites exceeded that of White Wisconsinites for all age groups (Figure 2).

### *Comparison to national trends*

The relative risk of mortality for Blacks compared to Whites by state is shown in Figure 3. Wisconsin and other upper Midwest states (shown in orange) differ from the remainder of the country in that the relative risk of mortality for Blacks exceeds that of Whites. The relative risk of mortality was lowest for Blacks compared to Whites in Mississippi (RR 0.13). In contrast, the

relative risk for Blacks compared to Whites was highest in Minnesota (RR 2.49). In Wisconsin, the relative risk of death due to opioid overdose is higher for Blacks, at 1.79 times the risk of Whites.

## **Discussion**

### *Relevance*

Overall, mortality due to opioid overdose increased in Wisconsin from 1999 to 2018, with the sharpest increase in the years following 2014. This rise parallels a national trend in opioid-related mortality and has been attributed to the increase in prescription opioid use and increased availability of synthetic opioids<sup>2</sup>.

Mortality by opioid overdose affects different age groups, racial groups, and genders at different rates. Our findings are consistent with previous analyses of poisoning mortality rates in the U.S. from 1999-2006<sup>9</sup>. In particular, the burden of opioid overdose mortality falls heavier on Black Wisconsinites than White Wisconsinites.

This analysis reveals a different distribution of age-specific mortality rates between White and Black Wisconsinites. For Whites in Wisconsin, the highest mortality rate by opioid-related overdose mortality was among 25-34 year olds. For Blacks, this mortality rate peaks in the 55-64 age group (Figure 2). This is consistent with previous research done by Miech and colleagues, in which mortality rates in the U.S. due to accidental poisoning between 1968 and 2007 were analyzed<sup>10</sup>. The study found that for black Americans, the mortality rate due to accidental poisoning increased drastically in the 50-54 age group compared to the other age groups.

Overall, this data may indicate gaps in treatment of opioid use disorder and support an

urgent call for increased outreach and services aimed at treating opioid use disorder among Black communities in Wisconsin. The authors echo the call by James and Jordan for culturally appropriate outreach and service delivery to Black communities<sup>6</sup>.

### *Limitations*

This study is not without limitations. While we believe that this analysis provides an overview of mortality related to opioids, we were unable to obtain additional data on the type of drug related to each death; future research could utilize this data to more narrowly analyze mortality trends and further inform targeting of services.

Furthermore, yearly data for age-adjusted mortality rates in Wisconsin is only available for the Black and White populations due to small sample sizes in other races/ethnicities. Although the current analysis focused on the disparity between Black and white communities in Wisconsin, significant disparities also exist in the Native American population, both nationally and within the state<sup>11</sup>. Trends over time in these data were not available for this analysis.

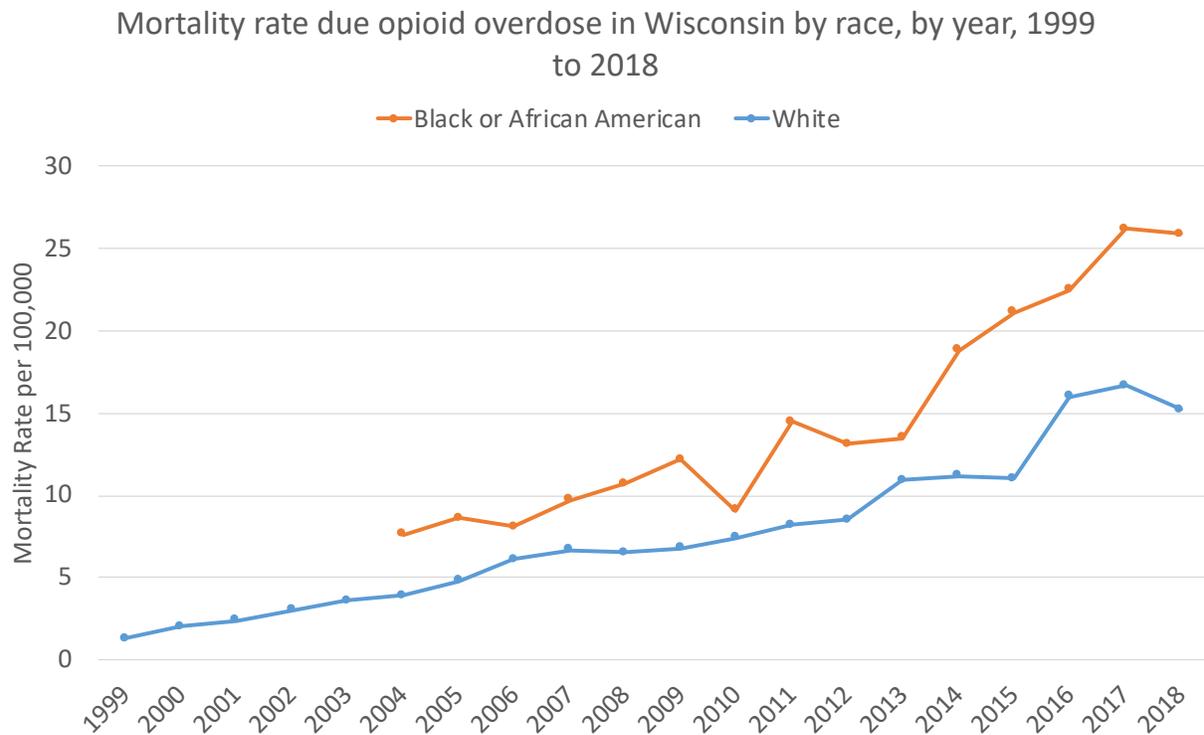
### *Future Directions*

Mortality data is key in informing policy and targeting services. In particular, our analysis indicates a disparity in opioid-related mortality and a possible gap in existing services. Further analysis should be done to identify the precise substances involved as well as the geographic distribution of deaths. Close monitoring of mortality data is important to inform ongoing efforts to mitigate the opioid crisis.

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## Tables and Figures



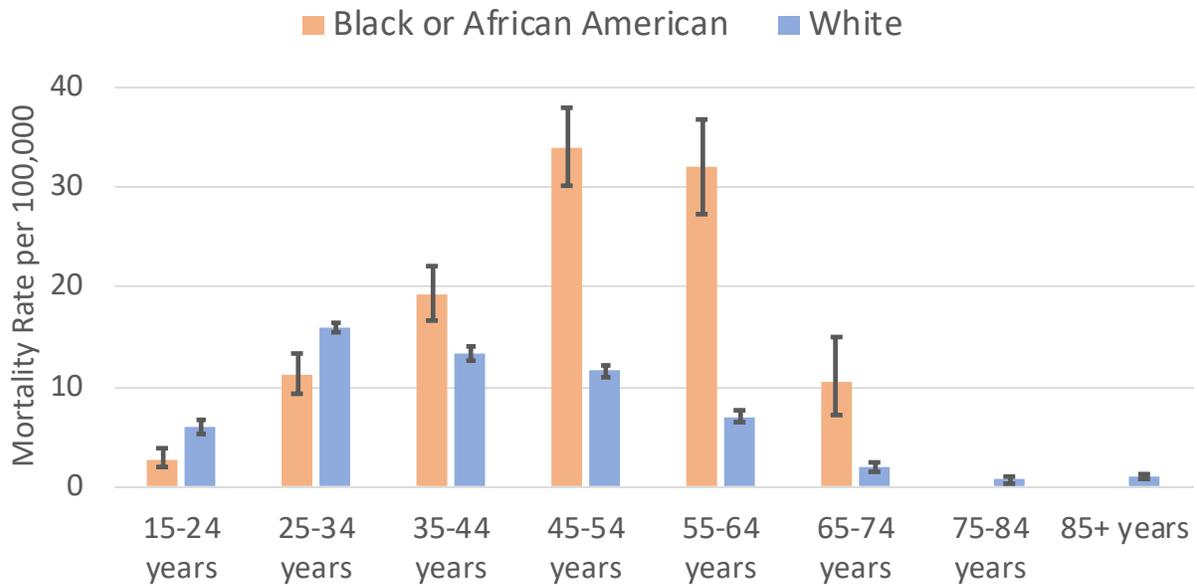
**Figure 1.** Opioid-related overdose mortality rates in Wisconsin by race, 1999-2018. For the Black or African American population, data prior to 2004 are suppressed due to small sample size.

Table 1: Opioid overdose mortality in Wisconsin, 1999-2018.

	# Deaths	Mortality Rate per 100,000 per year (95% CI)	Relative Risk (95% CI)
<b>Gender</b>			
Women	3,018	5.3 (5.1-5.5)	Ref.
Men	5,512	9.9 (9.6-10.2)	1.9 (1.9-1.9)
<b>Race</b>			
White	7,485	7.5 (7.4-7.9)	Ref.
Black	855	13.4 (12.5-14.3)	1.8 (1.7-1.8)
Am Indian/Alaska Native	166	13.9 (11.7-16.0)	1.9 (1.6-2.0)
Asian/Pacific Is	24	0.9 (0.6-1.4)	0.1 (0.1-0.2)
<b>Age group</b>			
15-24 years	882	5.6 (5.2-6.0)	7.0 (5.5-8.7)
25-34 years	2,147	15.1 (14.5-15.8)	18.9 (14.4-24.2)
35-44 years	2,086	13.6 (13.0-14.2)	17.0 (12.9-21.7)
45-54 years	2,070	12.8 (12.2-13.3)	16.0 (12.1-20.3)
55-64 years	1,043	8.0 (7.5-8.5)	10.0 (7.7-12.5)
65-74 years	203	2.4 (2.1-2.8)	3.0 (2.5-3.5)
75-84 years	42	0.8 (0.6-1.1)	Ref.
85+	23	1.0 (0.6-1.5)	1.3 (1.0-1.4)

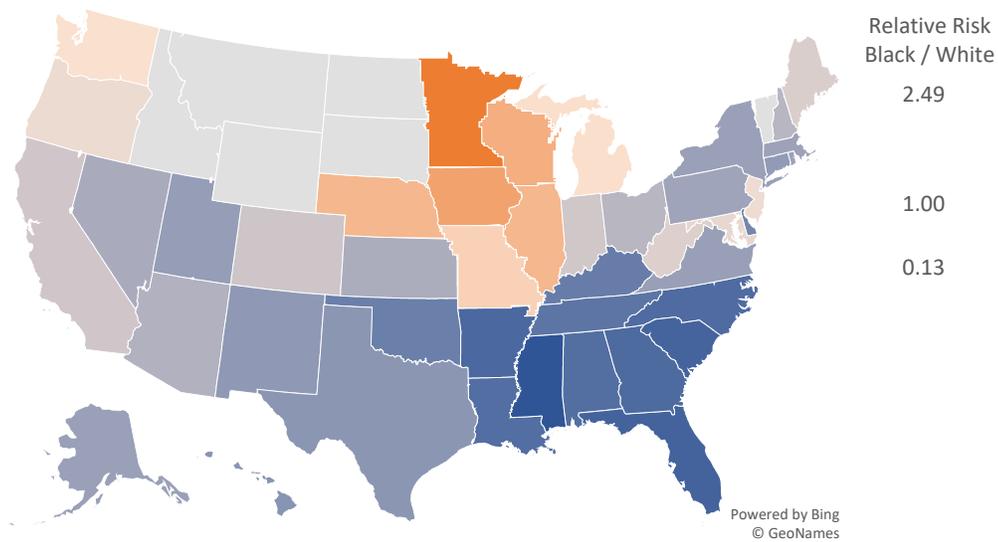
Data are from CDC Wonder. Gender and race mortality rates are age-adjusted.

## Mortality by race and age group in Wisconsin per year, 1999-2018



**Figure 2.** Mortality rate per 100,000 per year by age group and race/ethnicity in Wisconsin for white and Black populations from 1999-2018. Data for the Black or African American population is suppressed above age 74 due to small sample size.

### Relative risk of mortality due to opioid overdose by race in the United States, 1999-2018



**Figure 3.** Map of the United States with colors indicating relative risk of mortality by opioids or other drugs by race/ethnicity for Black or African American populations compared to white populations. Orange states in the above figure had a higher relative risk for Black residents compared to white residents, whereas blue states had a lower relative risk among Black residents compared to white residents. States with unreliable or suppressed mortality data by race are shown in light gray.