

Clostridioides difficile

DEATHS AMONG MICHIGAN RESIDENTS 2015-2020

WHAT IS CLOSTRIDIROIDES DIFFICILE?



Clostridioides difficile (*C. difficile*), previously known as *Clostridium difficile*, is a bacterium that causes a range of disease, from asymptomatic colonization to severe diarrhea, colitis, toxic megacolon, bowel perforation, and death. It is the most common type of healthcare-associated infection (HAI) related to antibiotic use, with estimates indicating that almost half a million infections occur in the U.S. each year.^{1,2,4,5} 1 in 11 people over age 65 who are diagnosed with a *C. difficile* infection die within one month.¹

From the years of 2015 to 2020, there were a total of 1,513 deaths for which *C. difficile* played a contributing role. *C. difficile* was the main cause of death for 888 deaths and a related cause of death for 625 deaths.

DATA SOURCES



Data in this fact sheet are taken from the Michigan Resident Death Files for the years 2015-2020, Division of Vital Records and Health Statistics, and the Michigan Department of Health and Human Services (MDHHS). To calculate rates, census data were used from the United States Census Bureau for each respective population and year. To calculate rates for 2020, 5-year estimates were used for 2016-2020 since the Census did not provide 1-year estimates for 2020. To estimate county rates, a 5-year estimate was obtained using data from 2016-2020 for both MDHHS and Census data. Data cleaning, formatting, wrangling, validation, and statistical analysis was done using RStudio, a statistical software.

1

Death Rates of *C. difficile* Infection in Michigan, 2015-2020

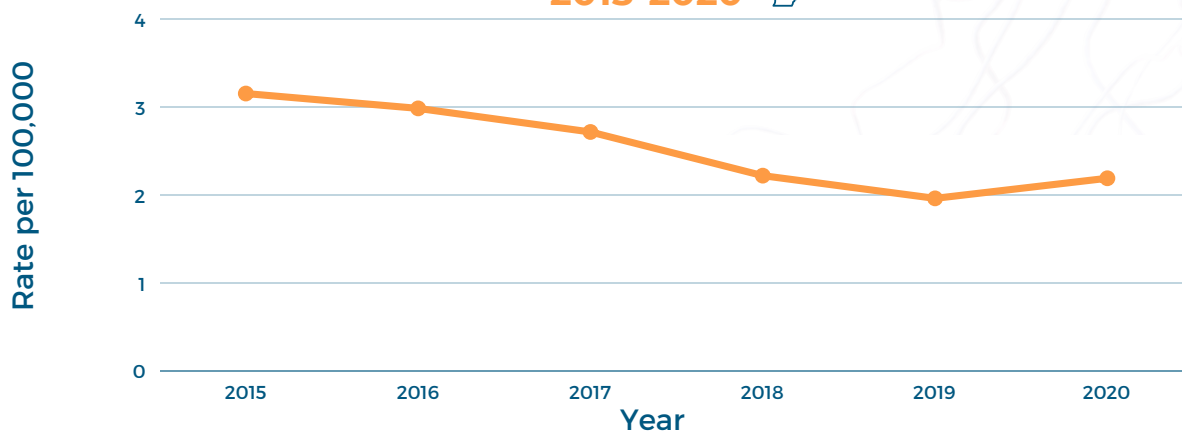


FIGURE 1

C. difficile Death Rates (per 100,000) in Michigan (2015-2020).

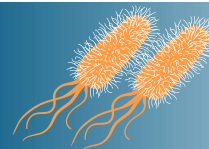
After 5 years of steady decrease in mortality due to *C. difficile*, there was a slight increase in 2020.



1 in 11 people over 65 years
old die within one month

0.5M

Almost half a million
infections each year



Contagious

2

Death Rates of *C. difficile* Infection in Michigan by Sex, 2015-2020

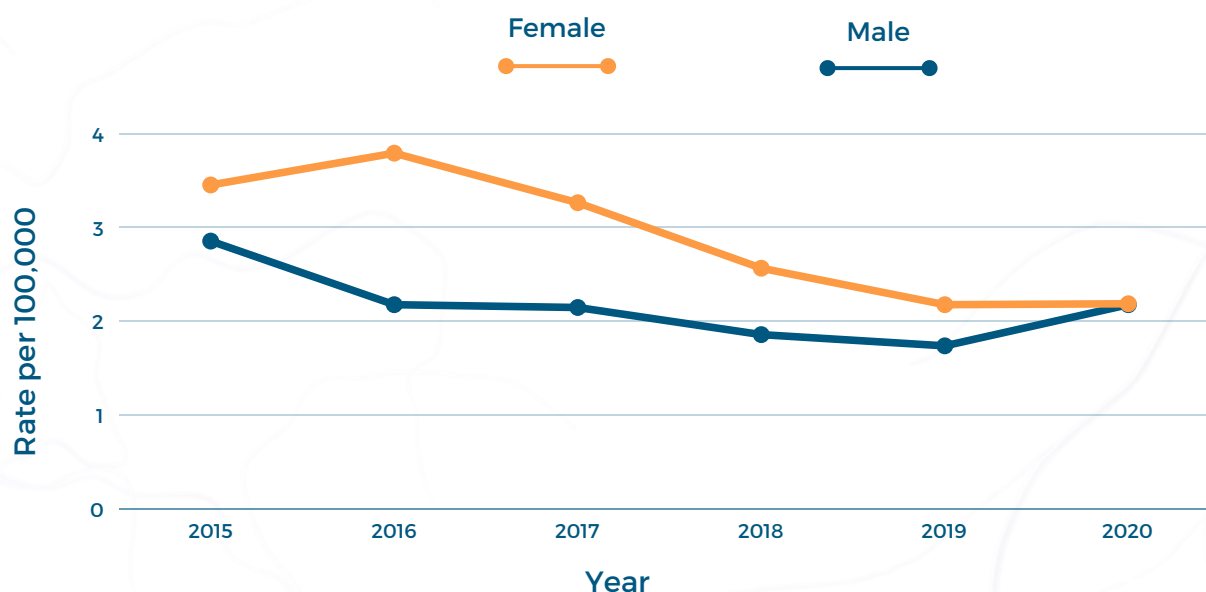


FIGURE 2

C. difficile Death Rates by Sex (per 100,000) in Michigan (2015-2020).

Mortality due to *C. difficile* remained higher among females compared to males. Rates for males almost reached that of females in 2020 to 2.17 per 100,000 Michigan residents, representing a 25% increase from the year prior.

3

Death Rates of *C. difficile* Infection in Michigan by Age Group, 2015-2020

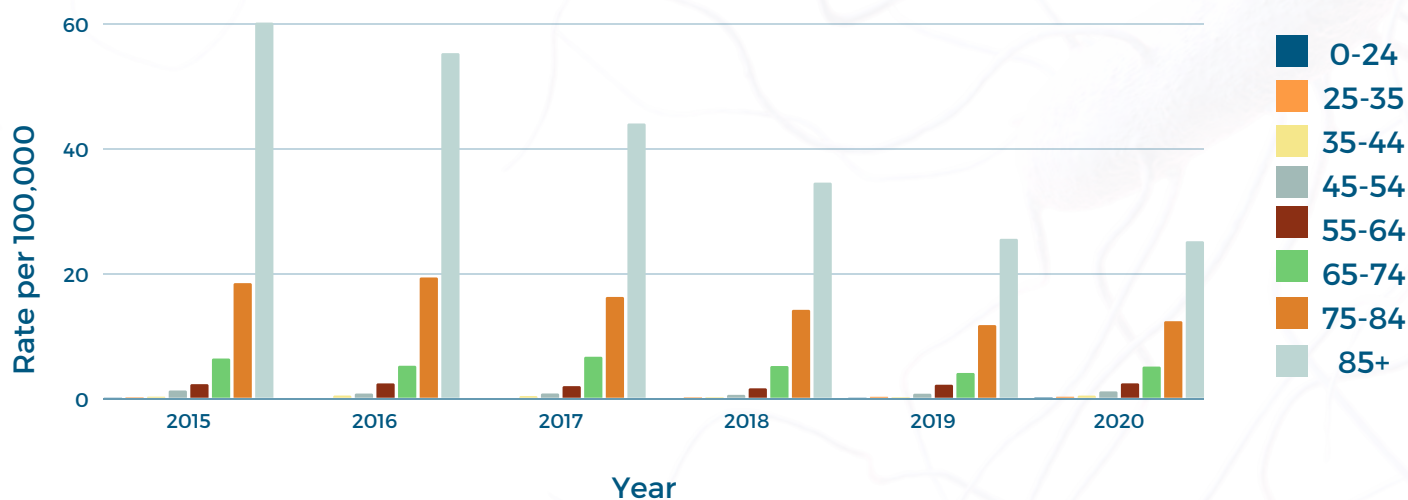


FIGURE 3

C. difficile Death Rates by Age (per 100,000) in Michigan (2015-2020).

Mortality due to *C. difficile* was higher among persons 85+. Some risk factors include increased exposure to healthcare settings, increased antibiotic use, and impaired immune response.⁵

4

Death Rates of *C. difficile* Infection in Michigan by Race, 2015-2020

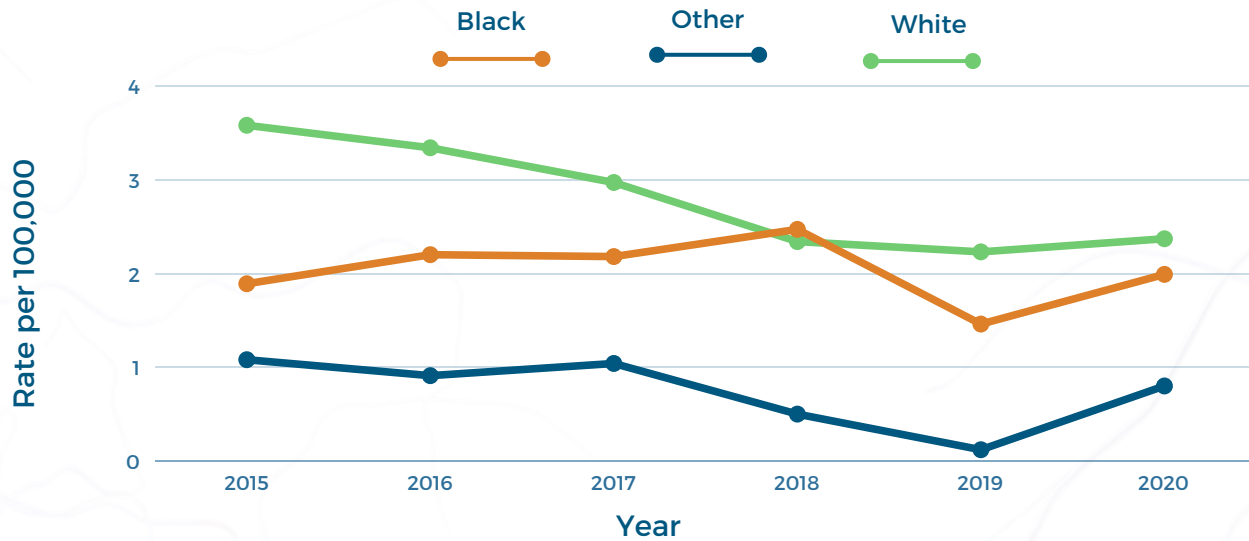


FIGURE 4

C. difficile Death Rates by Race (per 100,000) in Michigan (2015-2020).

For the years observed, mortality due to *C. difficile* was higher among the White population in Michigan, except for 2018, where a slight increase in *C. difficile* deaths in the Black population exceeded the rate of the White population.

5

C. difficile Death Rates in Michigan by County per 100,000 – 2016-2020

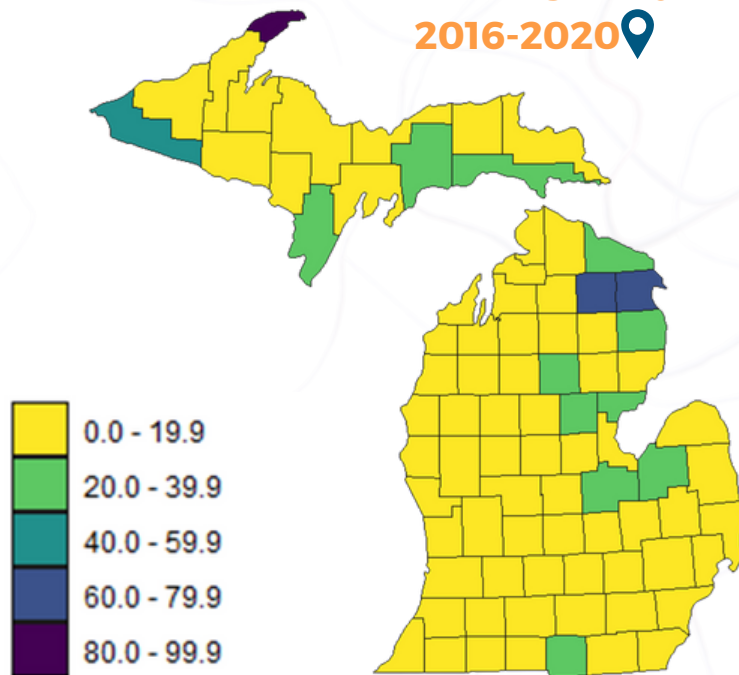


FIGURE 5

C. difficile Death Rates (per 100,000) by Michigan County (2016-2020).

Mortality rates due to *C. difficile* are shown by County. Ottawa County, for example, would experience 0 to 19.9 *C. difficile* deaths per 100,000 people in a 5-year span. In contrast, Mackinac County would see 20-39.9 deaths per 100,000 people over the period of 5 years.

Key Findings

C. difficile deaths were shown to be higher in the following demographics:

- Female
- White
- Older adults

Other risk factors related to *C. difficile* death include hospitalization or extended hospitalization as well as greater access to healthcare, which resulted in increased antimicrobial exposure (e.g., antibiotics).⁶ Further analysis is needed to identify the determinants of *C. difficile* mortality.

Despite the decrease of *C. difficile* cases throughout the U.S. and in Michigan, *C. difficile* related deaths saw a slight increase in 2020. The Centers for Disease Control and Prevention (CDC) manages the National Healthcare Safety Network (NHSN), functioning as a reporting platform to track HAIs, including *C. difficile* infections.³ Healthcare facilities that report HAIs to this tool, such as acute care hospitals (ACHs), critical access hospitals (CAHs), inpatient rehabilitation facilities (IRFs), and long-term acute care hospitals (LTACHs), demonstrated that some HAIs have decreased in recent years, including *C. difficile* infections.³ NHSN data from Michigan facilities also noted this decrease in *C. difficile* infections in ACHs, but not in LTACHs and IRFs between 2019 and 2020.³

In addition to data from NHSN, Michigan hospitalization data also demonstrated an overall decrease in *C. difficile* cases. Further research is warranted to identify the discrepancy between the increase in *C. difficile* death rate in 2020 and decrease in infection from data sources such as NHSN and Michigan hospitalizations. It is not known if the lower *C. difficile* hospitalization rates in 2020 are due a decrease in access to care (hospitals overwhelmed with COVID-19 patients) or less infections (either following the rate decrease trend over the last few years or as a consequence of COVID-19 mitigation strategies). This infection remains an urgent threat and further progress is possible to prevent disease, healthcare costs, and death. To this end, it is essential to improve antibiotic prescribing and use, as well as practice adequate infection prevention and control practices.

Limitations

1. Rates are crude rates (total number of deaths, divided by the total population of interest, and multiplied by 100,000) and do not adjust for age.
2. The limited data did not allow for analysis of other factors known to be related to *C. difficile* morbidity and mortality.
3. There were missing/unknown values for some demographic variables.

References

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6. Centers for Disease Control and Prevention. *Your Risk of C. diff*. Centers for Disease Control and Prevention. Retrieved June 8, 2022, from <https://www.cdc.gov/cdiff/risk.html>.

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