# Chlamydia and Gonorrhea Infection Rates in Wisconsin, 2010-2022

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**Introduction:** Chlamydia and gonorrhea are the most commonly reported bacterial communicable diseases in Wisconsin, with rising incidence rates despite effective treatments. Examining demographic trends can inform public health strategies.

**Methods:** We analyzed Wisconsin Electronic Disease Surveillance System data (2010-2022) to assess chlamydia and gonorrhea incidence by sex, age, and race.

**Results:** From 2010 through 2022, chlamydia rates in Wisconsin rose 4.9% (415.5 to 435.9 per 100 000), while gonorrhea rates increased 62.8% (90.7 to 147.7 per 100 000). Among females 15 to 24 years old, chlamydia rates declined 12.0% (3308.5 to 2912.8 per 100 000) but increased 30.1% (203.1 to 264.2 per 100 000) among females 25 years old and older. Gonorrhea rates rose 6.3% (574.7 to 610.6 per 100 000) in females 15 to 24 years old but nearly doubled (47.4 to 82.0 per 100 000) for those 25 and older. Among males 15 to 24 years old, chlamydia rates increased 10.7% (1046.4 to 1158.8 per 100 000) and increased 47.7% in males 25 years old and older (130.7 to 193.1 per 100 000). Gonorrhea rates rose 52.2% in males 15 to 24 years old (295.7 to 450.1 per 100 000) and rose 226.8% in males 25 years old and older (40.7 to 133.0 per 100 000). In 2010, chlamydia rates were 14 times higher and gonorrhea rates nearly 40 times higher among Black individuals compared to White individuals, narrowing to 11 and 30 times higher, respectively, by 2022.

**Conclusions:** Chlamydia and gonorrhea incidence rates have risen across most populations in Wisconsin but disproportionately affect Black individuals, with the largest racial disparities seen in the nation. While chlamydia rates remained stable among young females, they increased among males and older adults. Gonorrhea rates surged across nearly all groups. These findings highlight the need for targeted interventions to expand screening, address structural barriers to health care, and reduce disparities.

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## INTRODUCTION

Chlamydia and gonorrhea are sexually transmitted infections (STIs) caused by the bacterium *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. These infections are a public health challenge because they often are asymptomatic, and untreated infections can lead to serious health outcomes in adults, such as pelvic inflammatory disease, infertility, and ectopic pregnancy, as well as conjunctivitis and pneumonia in newborns.[1] Due to their prevalence and potential adverse health outcomes, the United States (US) federal government has mandated reporting since the 1940s for gonorrhea and since the 1980s for chlamydia to track and mitigate disease burden.[1,2] Despite these efforts and the availability of effective treatments, chlamydia and gonorrhea remain the most commonly reported bacterial communicable infections in the US. National rates for both infections continue to rise steadily and, in the Midwest, rates are often higher than in other regions.[3] In addition to being representative of the broader Midwest due to its demographic and geographic characteristics, Wisconsin's notable racial disparities in health care outcomes make it an important case study for understanding trends in STI incidence.[4] In this study, we aimed to analyze the trends in incidence rates of chlamydia and gonorrhea in Wisconsin from 2010 through 2022, examining demographic disparities to inform future research and targeted public health interventions.

## MATERIALS AND METHODS

We conducted a descriptive analysis using data from the Wisconsin

Electronic Disease Surveillance System (WEDSS) from January 2010 through December 2022. The dataset included all unique records of patients positive, confirmed, and reported cases of chlamydia and gonorrhea in Wisconsin during these dates. Records included demographic data (age group, sex, and race) and date of diagnosis. We calculated frequencies and percentages for categorical variables, such as sex, race, and age group. The data collected in WEDSS for ethnicity are reported as a binary, "Hispanic" or "non-Hispanic," characterizing individuals who identify as non-Hispanic Black or non-Hispanic-White together into the more general "non-Hispanic" category. This lack of granularity limited our ability to draw meaningful conclusions from these data, and we therefore focused our demographic analysis using only racial identity. Incidence rates of chlamydia and gonorrhea were calculated per 100 000 population from 2010 through 2022, with population data sourced from the Wisconsin Interactive Statistics on Health Query system for each respective year included. Yearly rates were further stratified by age group, sex, and race. To protect anonymity, counts and rates where the count is less than 5 were suppressed. Only data specific to cisgendered men and women are reported. While Wisconsin collects data on gender-diverse individuals (including transgender, nonbinary, gender nonconforming, or any other identification), counts are too low to report and maintain confidentiality. Additionally, population denominators for gender-diverse individuals are not available at the national or state level, so rates could not be constructed for these groups.

## RESULTS

### *Chlamydia Trachomatis*

#### *Case Counts and Incidence Rates in Wisconsin*

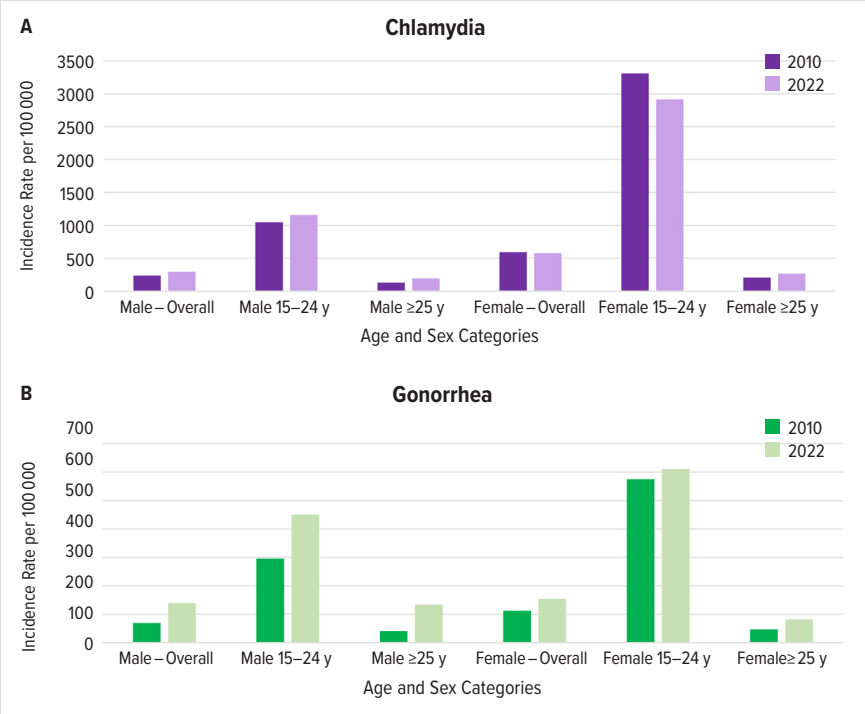
From 2010 through 2022, chlamydia cases in Wisconsin rose from 23 644 cases (415.5 per 100 000 people) in 2010 to 25 684 (435.9 per 100 000) in 2022 – a 4.91% increase. Cases peaked in 2019 at 504.4 per 100 000 and then declined from

**Table 1.** Demographics for Chlamydia and Gonorrhea Incidence, 2010 and 2022

| | Chlamydia | | | Gonorrhea | | |
|---|---|---|---|---|---|---|
| | STI Count | Population | Incidence Rate | STI Count | Population | Incidence Rate |
| | | | **2010** | | | |
| Total | 23 644 | 5 690 538 | 415.5 | 5162 | 5 690 538 | 90.7 |
| Age Group | | | | | | |
| <5 | 24 | 357 812 | 6.7 | 7 | 357 812 | 2.0 |
| 5–9 | – | 349 757 | – | – | 349 757 | – |
| 10–14 | 273 | 369 838 | 73.8 | 71 | 369 838 | 19.2 |
| 15–19 | 7847 | 399 334 | 1965.0 | 1637 | 399 334 | 409.9 |
| 20–24 | 9055 | 395 451 | 2289.8 | 1757 | 395 451 | 444.3 |
| 25–29 | 3676 | 374 933 | 980.4 | 810 | 374 933 | 216.0 |
| 30–34 | 1483 | 362 950 | 408.6 | 388 | 362 950 | 106.9 |
| 35–39 | 665 | 371 694 | 178.9 | 211 | 371 694 | 56.8 |
| 40–44 | 287 | 332 796 | 86.2 | 113 | 332 796 | 34.0 |
| 45–49 | 152 | 351 958 | 43.2 | 73 | 351 958 | 20.7 |
| 50+ | 117 | 1 923 499 | 6.1 | 83 | 1 923 499 | 4.3 |
| Unknown | 64 | – | – | 12 | – | – |
| Ethnicity | | | | | | |
| Non-Hispanic | 18 697 | 5 352 652 | 349.3 | 4368 | 5 352 652 | 81.6 |
| Hispanic | 1842 | 337 886 | 545.2 | 233 | 337 886 | 69.0 |
| Unknown | 3105 | – | – | 561 | – | – |
| Race | | | | | | |
| White | 9860 | 5 037 561 | 195.7 | 1177 | 5 037 561 | 23.4 |
| Black/AA | 10 175 | 367 725 | 415.0 | 3416 | 367 725 | 929.0 |
| AIAN | 447 | 60 403 | 740.0 | 89 | 60 403 | 147.3 |
| Asian | 353 | 132 830 | 265.8 | 36 | 132 830 | 27.1 |
| NHOPI | 37 | 2522 | 1467.1 | – | 2522 | 158.6 |
| Other | 673 | 89 497 | 752.0 | 177 | 89 497 | 197.8 |
| Unknown | 2099 | – | – | 331 | – | – |
| Sex | | | | | | |
| Female | 16940 | 2 866 332 | 591.0 | 3204 | 28 66 332 | 111.8 |
| Male | 6699 | 2 824 206 | 237.2 | 1957 | 28 24 206 | 69.3 |
| | | | **2022** | | | |
| Total | 25684 | 5 892 539 | 435.9 | 8705 | 5 892 539 | 147.7 |
| Age Group | | | | | | |
| <5 | 13 | 312 622 | 4.2 | – | 312 622 | – |
| 5–9 | – | 339 916 | – | – | 339 916 | – |
| 10–14 | 201 | 363 289 | 55.3 | 94 | 363 289 | 25.9 |
| 15–19 | 6651 | 383 560 | 1734.0 | 1777 | 383 560 | 463.3 |
| 20–24 | 9446 | 411 840 | 2293.6 | 2437 | 411 840 | 591.7 |
| 25–29 | 4448 | 367 885 | 1209.1 | 1566 | 367 885 | 425.7 |
| 30–34 | 2451 | 365 650 | 670.3 | 1160 | 365 650 | 317.2 |
| 35–39 | 1228 | 372 740 | 329.5 | 686 | 372 740 | 184.0 |
| 40–44 | 616 | 370 650 | 166.2 | 399 | 370 650 | 107.6 |
| 45–49 | 271 | 329 307 | 82.3 | 202 | 329 307 | 61.3 |
| 50+ | 358 | 2 275 080 | 15.7 | 380 | 2 275 080 | 16.7 |
| Unknown | – | – | – | – | – | – |
| Ethnicity | | | | | | |
| Non-Hispanic | 21 022 | 5 444 388 | 386.1 | 7663 | 5 444 388 | 140.8 |
| Hispanic | 3546 | 448 151 | 791.3 | 774 | 448 151 | 172.7 |
| Unknown | 1116 | – | – | 268 | – | – |
| Race | | | | | | |
| White | 12 112 | 5 103 755 | 237.3 | 2406 | 5 103 755 | 20.0 |
| Black/AA | 10 182 | 390 428 | 2607.9 | 5557 | 390 428 | 1423.3 |
| AIAN | 530 | 71 555 | 740.7 | 134 | 71 555 | 187.3 |
| Asian | 470 | 190 698 | 246.5 | 76 | 190 698 | 39.9 |
| NHOPI | 65 | 3612 | 1799.6 | 6 | 3612 | 166.1 |
| Other | 1674 | 132 491 | 1263.5 | 399 | 132 491 | 301.2 |
| Unknown | 651 | – | – | 127 | – | – |
| Sex | | | | | | |
| Female | 16 929 | 2 937 233 | 576.4 | 4135 | 2 937 233 | 140.8 |
| Male | 8672 | 2 955 306 | 293.4 | 4549 | 2 955 306 | 153.9 |

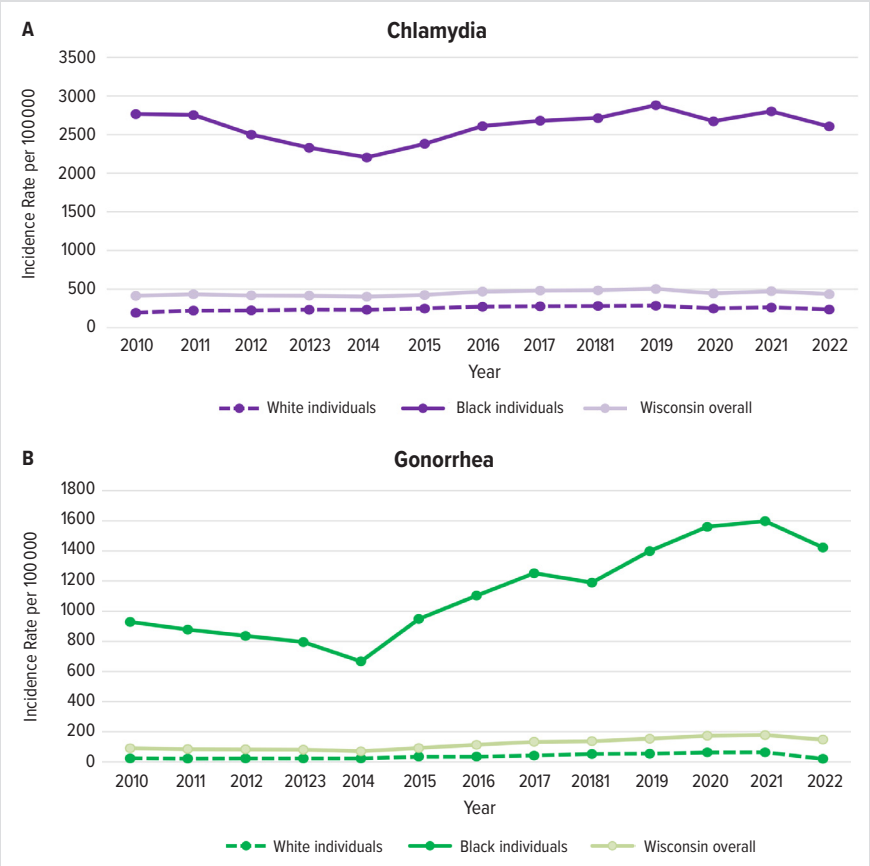
Abbreviations: STI, sexually transmitted infection; AA, African American; AIAN, American Indian and Alaska Native; NHOPI, Native Hawaiian or Other Pacific Islander.
Full demographic data for all years, 2010-2022 available in Supplemental Table 1. Counts <5 were suppressed to protect anonymity. Only data specific to cisgendered men and women are reported.

**Figure 1.** Chlamydia (A) and Gonorrhea (B) Incidence Rates in Wisconsin from 2010 and 2022 by Sex and Age




Abbreviation: y, years.

**Figure 2.** Trends in Chlamydia (A) and Gonorrhea (B) Incidence Rates by Race vs Overall Rates in Wisconsin, 2010-2022




Incidence rates per 100 000 are shown for chlamydia (A) and gonorrhea (B) by race, specifically for Black/African American and White individuals and for the overall Wisconsin population, 2010–2022.

2021 to 2022 (Supplemental Table 1). A breakdown of chlamydia incidence rates in Wisconsin by sex, age group, and race in 2010 and 2022 shows the following trends (Table).

***By Sex and Age Group:*** From 2010 through 2022, the incidence of chlamydia in Wisconsin was consistently higher in females than males, though the rate for females decreased by 2.49% (from 591.0 per 100 000 in 2010 to 576.3 per 100 000) during this period, while the rate for males increased by 23.69% (from 237.2 per 100 000 in 2010 to 293.4 per 100 000) (Figure 1). Among females aged 15 to 24 – the age group for which the Centers for Disease Control and Prevention (CDC) recommends routine screening[5] – chlamydia rates decreased by 11.96% (from 3308.5 to 2912.8 per 100 000), while rates increased by 30.08% (from 203.1 to 264.2 per 100 000) in those 25 and older (Figure 1). For males, chlamydia incidence rates increased in both age groups but with a steeper rise among those 25 and older. The rate rose by 10.7% in males aged 15 to 24 (from 1046.4 to 1158.8 per 100 000) and by 47.7% in males 25 and up (from 130.7 to 193.1 per 100 000) (Figure 1).

***By Race and Ethnicity:*** When examining chlamydia rates by race, the largest differences observed in infection rates were consistently between Black or African American and White individuals (Figure 2). In 2010, chlamydia rates for Black or African American individuals (2767.0 per 100 000) were 14 times higher than for White individuals (195.7 per 100 000). By 2022, this gap narrowed to 11 times higher, driven by a 5.75% decline in rates for Black or African American individuals (2607.9 per 100 000) and a 21.26% increase in rates for White individuals (237.3 per 100 000).

### *Neisseria gonorrhoeae*

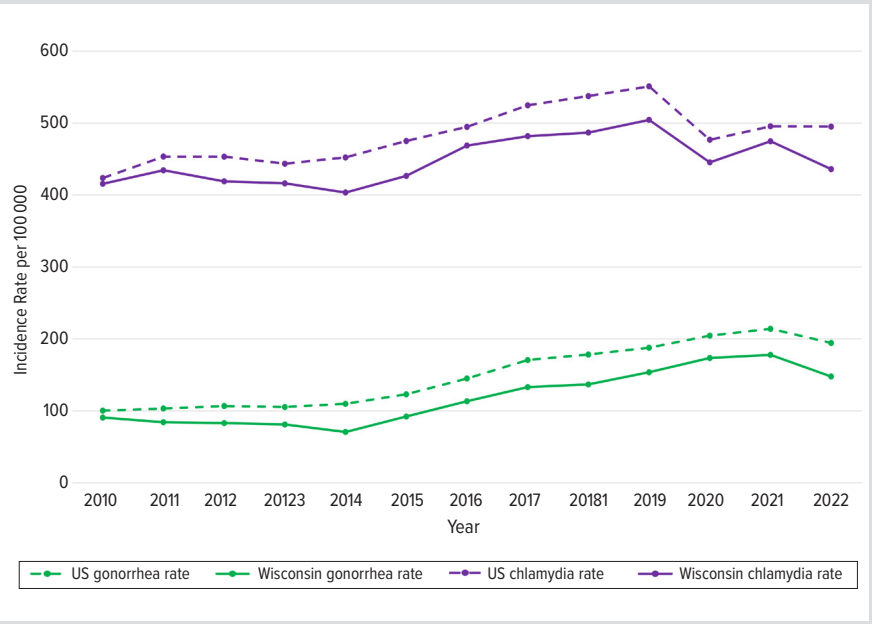
#### *Case Counts and Incidence Rates in Wisconsin*

From 2010 through 2022, gonorrhea cases in Wisconsin rose from 5162

reported cases (90.7 per 100 000 people) in 2010 to 7009 (147.7 per 100 000) in 2022 – a 62.84% increase. The highest case count and incidence rate was in 2021, with 10 456 reported cases (177.8 per 100 000), followed by a decline in 2022 to 8705 cases (147.7 per 100 000). A demographic breakdown of gonorrhea infections by sex, age group, and race from 2010 through 2022 shows the following trends (Table).

***By Sex and Age Group:*** In 2010, gonorrhea incidence rates were 1.61 times higher in females (111.8 per 100 000) compared to males (69.3 per 100 000). By 2014, rates equalized between females (70.4 per 100 000) and males (70.5 per 100 000) and have remained higher in males since. In 2022, rates were 1.09 times higher in males (153.9 per 100 000) following a 122.08% increase in infection rates, while female rates decreased by 25.94% to 140.8 per 100 000. (Figure 1). Gonorrhea rates among females 24 and under rose 6.25% (574.7 to 610.6 per 100 000) from 2010 to 2022 and nearly doubled for those aged 25 and older, increasing by 73.0% (47.4 to 82.0 per 100 000) over the same time frame. For males aged 15 to 24, gonorrhea rates increased by 52.2% (295.7 per 100 000 to 450.1 per 100 000) and 226.8% (40.7 per 100 000 to 133.0 per 100 000) for males 25 and older from 2010 to 2022.

**Figure 3.** United States and Wisconsin Rates of Chlamydia and Gonorrhea, 2010–2022




Incidence rates per 100 000 for chlamydia (purple) and gonorrhea (green) in Wisconsin (solid line) and in the United States (dashed line) from 2010 through 2022.

***By Race and Ethnicity:*** The largest differences in gonorrhea infection rates by race observed were consistently between Black or African American and White individuals. In 2010, gonorrhea incidence rates for Black or African American individuals (929.0 per 100 000) were nearly 40 times higher than for White individuals (23.4 per 100 000). By 2022, this gap narrowed to 30 times higher, driven by a 101.3% rise in rates for White individuals (47.1 per 100 000) and a 53.2% increase in rates for Black or African American individuals (1423.3 per 100 000) (Figure 2).

## DISCUSSION

We found that overall rates for both chlamydia and gonorrhea in Wisconsin rose over the study period, 2010-2022. Rates did not rise equally for all demographics; rates for females aged 15 to 24 – those recommended for routine screening by the CDC[5] – stayed stable, while rates for all other demographics showed substantial increases. The racial disparities in Wisconsin between Black and White individuals were particularly notable for both infections and, in 2022, were the largest in the nation. The underlying factors driving these changes are likely multifactorial and reflect both true shifts in infection prevalence and changes in screening practices and access. For example, the 2010 CDC recommendation for annual chlamydia and gonorrhea screening for sexually active females under 25, as well as expanded health care access following open enrollment for the Affordable Care Act in 2014, likely contributed to increased diagnoses nationally due to heightened screening efforts.[5,6] In contrast, the COVID-19 pandemic in 2020 disrupted national health care services and decreased access to routine STI screening, leading to a temporary decline in reported cases and rates.[7-10]

Wisconsin gonorrhea and chlamydia STI trends mirror national patterns, but the state consistently reports lower overall rates compared to national averages (Figure 3, Supplemental Table 3). These lower rates may be due to a genuinely lower disease prevalence, potentially influenced by factors such as differences in population density and the impact of targeted public health initiatives. However, variations in testing access and practices also may play a role. Wisconsin was 1 of only 10 states that didn't expand Medicaid under the Affordable Care Act, which limited health care coverage for low-income individuals and reduced access to routine testing.[11] In addition to health care coverage constraints, public health funding plays a critical role in supporting STI prevention initiatives. Investing in preventive interventions reduces STI rates at the population level.[12-17] The CDC serves as the primary source of such funding for state and local health departments, and for Wisconsin, the CDC is the only source of funding as there are no state funds allocated

to STI prevention. Wisconsin ranked 34th out of 51 states and districts in per capita funding allocated by the CDC for STI prevention and control (Supplemental Table 2). This lower CDC funding level – coupled with limited health care coverage – limits Wisconsin's testing and prevention efforts, exacerbating barriers to timely diagnosis and treatment.

Demographic differences in chlamydia and gonorrhea rates by age, sex, and race in Wisconsin align with national trends but are more pronounced for race.[3] Chlamydia and gonorrhea rates show stable or slower increases among females under 25 – a group prioritized for routine screening – indicating effective early detection in this demographic. In contrast, higher rates of increase among males and individuals over 25 point to potential gaps in screening.[3] Expanding routine screening to these groups may enhance early detection, reduce undiagnosed cases, and curb infection spread. While age- and sex-based trends highlight important gaps in screening coverage, the stark racial disparities in STI rates represent an even more pressing public health challenge in Wisconsin.

Racial disparities in chlamydia and gonorrhea incidence are well-documented.[3,18-20] In 2022, US chlamydia rates among Black or African American individuals were 6.04 times higher than those among White individuals, while gonorrhea rates were 8.05 times higher.[20,21] Wisconsin recorded the largest racial disparities in the nation for both chlamydia and gonorrhea infection rates in 2022, with chlamydia rates 12.5 times higher among Black or African American individuals than among White individuals and gonorrhea rates 34.5 times higher. Notably, these disparities were nearly double the rates observed in the states with the next highest rates, underscoring the extreme and disproportionate burden faced by Black communities in Wisconsin.[18,19] These racial disparities and state comparisons were calculated using all reported cases from CDC data aggregated by the Kaiser Family Foundation, hence the racial disparities do not match perfectly the rates we reported in our results because we used suppressed data to protect anonymity.[18,19] While some of this gap may be due to differences in screening practices, the magnitude of Wisconsin's disparity suggests more complex, underlying social and economic factors. Racial disparities in STIs have long been linked to issues such as poverty, limited access to health care, and differences in sexual health behaviors shaped by social networks.[21,22] These disparities are rooted not only in differences in health care access but in broader manifestations of structural racism, including residential segregation, economic deprivation, and inadequate health services that disproportionately affect Black communities.[23]

Given Wisconsin's uniquely high racial disparity, further research is critical to understanding these inequities, making the state an important case study for addressing structural drivers of STI disparities. Addressing these disparities will require a combination of targeted funding, expanded access to health care, and community-specific interventions to improve screening and treatment. Wisconsin's lower per capita public health funding for STI prevention may represent a critical opportunity for intervention. Increasing targeted public health spending has been shown to effectively reduce STI rates at the population level.[12-17] Focused investment in Wisconsin's most affected communities could play a pivotal role in mitigating these racial disparities.

### Strengths and Limitations

This study has several strengths. The longitudinal analysis (2010-2022) provides a robust assessment of trends over more than a decade, offering insights into both long-term patterns and demographic variations and disparities. The use of WEDSS data ensures reliability, as it includes all laboratory-confirmed cases of chlamydia and gonorrhea reported in the state.

However, limitations must be acknowledged. As a descriptive analysis, this study is unable to establish causation between observed trends and specific policy changes or behavioral shifts. Surveillance data also rely on passive case reporting, which is influenced by screening practices and health care access. For instance, increases in reported cases may reflect greater testing availability rather than true increases in disease prevalence. Additionally, racial and ethnic classifications in WEDSS are limited, preventing a more granular analysis of disparities beyond broad racial categories. Lastly, data for gender-diverse individuals were not reportable due to small sample sizes and the lack of reliable population denominators, underscoring the need for improved surveillance efforts in this population.

## CONCLUSIONS

Chlamydia and gonorrhea infections continue to pose public health challenges in Wisconsin, with rates for both infections rising over the past decade. The burden of these diseases is distributed unevenly across different demographic groups: while younger females historically have exhibited higher incidence rates, the most rapid increases recently have been observed in males and individuals over the age of 25. The stable rates of infection among females under 25 – likely due to CDC routine screening recommendations – contrast with rising rates across other groups, underscoring the potential benefit of expanding universal screening to include males and those over 25. Future work could focus on narrowing the age ranges with the most benefit from universal screening. Additionally, the striking racial disparities in chlamydia and gonorrhea incidence in Wisconsin, which far exceed national averages, highlight the urgent need for focused attention, resources, and research to understand and address factors that drive these inequities. These research findings support the need for expanded screening and targeted investigations and interventions to better control the spread of STIs and promote health equity across all demographic groups in Wisconsin and beyond.

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**Appendices:** Available at www.wmjonline.org

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