

## Gonorrhea

Gonorrhea is the second most commonly reported notifiable disease in the United States. Infections due to *Neisseria gonorrhoeae*, like those resulting from *Chlamydia trachomatis*, are a major cause of pelvic inflammatory disease (PID) in the United States. PID can lead to serious outcomes such as tubal infertility, ectopic pregnancy, and chronic pelvic pain. In addition, epidemiologic and biologic studies provide strong evidence that gonococcal infections facilitate the transmission of HIV infection.<sup>1</sup>

From 1975 through 1997, the national gonorrhea rate declined 74.3% following implementation of the national gonorrhea control program in the mid-1970s (Table 1). After a small increase in 1998, the gonorrhea rate has decreased each year since 1999 (Figure 10 and Table 1). True increases or decreases may be masked by changes in screening practices (affected by simultaneous testing for chlamydia), use of diagnostic tests with different sensitivities, and changes in reporting practices.<sup>2</sup>

For most areas, the number of gonorrhea cases reported to CDC is affected by many factors, in addition to the occurrence of the infection within the population. As with reporting of other STDs, reporting of gonorrhea cases to CDC is incomplete.<sup>3</sup> In addition, reporting practices for gonococcal infections may have been biased towards reporting of infections in persons of minority race or ethnicity, who are more likely to attend public STD clinics.<sup>2,4</sup> For such reasons, supplemental data on gonorrhea prevalence in persons screened in a variety of different settings are useful in assessing disease burden in selected populations.

- In 2003, 335,104 cases of gonorrhea were reported in the United States. The rate of reported gonorrhea in the United States was 116.2 cases per 100,000 population in 2003 (Figure 10 and Table 1), which was the lowest rate of reported gonorrhea ever.
- In 2003, 29.9% of gonorrhea cases were reported by STD clinics. This is a change from 1984, when 73.6% of gonorrhea cases were reported by STD clinics (Figure 11). In 2003, similar to previous years, a higher proportion of male gonorrhea cases were reported from STD clinics than were female cases (43.3% and 17.7% respectively).
- As in 2002, in 2003 only 8 states and 1 outlying area had gonorrhea rates below the Healthy People 2010 (HP2010) national target of 19 cases per 100,000 population (Figure 12 and Table 12).<sup>5</sup>
- In 2003, 1,319 (42.0%) of 3,140 counties in the United States had gonorrhea rates at or below the HP2010 national target of 19 cases per 100,000 population. Rates per 100,000 population were between 19 and 100 in 1,112 counties (35.4%), and greater than 100 in 709 counties (22.6%). The majority of counties with greater than 100 cases per 100,000 population were located in the South (Figure 13).

- As in previous years, in 2003 the South had the highest gonorrhea rate among the four regions of the country. However, the gonorrhea rate in the South has declined by 23% from a rate of 195.1 per 100,000 population in 1999 to 149.8 in 2003. In contrast, the gonorrhea rate in the West has increased by 25% from 51.3 cases per 100,000 population in 1999 to 64.0 in 2003. Rates in the Northeast (91.1 in 2003) and the Midwest (136.3 in 2003) have shown minimal change since 1999 (Figure 14 and Table 13).
- Prior to 1996, rates of gonorrhea among men were higher than rates among women. Since then, rates among women and men have remained similar (Figure 15). In 2003 the gonorrhea rate among women was 118.8 and the rate among men was 113.0 cases per 100,000 population (Tables 14 and 15).
- The overall gonorrhea rate in selected large cities was 208.1 cases per 100,000 population in 2003. This rate has decreased slightly each year since 2000 when it was 244.7 cases per 100,000 population. All of these cities had rates higher than the HP2010 target of 19 cases per 100,000 population. In 2003, 44.1% of gonorrhea cases were reported by these selected cities (Table 17). Similar to previous years, in 2003 the total gonorrhea rate among males in these selected large cities (215.9) remained higher than that among females (199.9) (Tables 18 and 19).
- Changes in gonorrhea rates from 1999 through 2003 differed by racial/ethnic group. Gonorrhea rates decreased by 18.9% during this time period for African-Americans from 808.4 to 655.8 cases per 100,000 population. Since 1999, the gonorrhea rate among whites increased 22.5% (32.7 per 100,000 in 2003), Asian/Pacific Islanders increased 17.5% (22.8 per 100,000 in 2003), Hispanics increased 11.0% (71.7 per 100,000 in 2003), and American Indian/Alaska Natives increased 5.5% (103.5 per 100,000 in 2003) (Figure 16 and Table 21B). In 2003, the gonorrhea rate among African-Americans was 20 times greater than the rate for whites, down from 30 times greater in 1999. The 2003 gonorrhea rates for all racial/ethnic groups were above the HP2010 target of 19 per 100,000 population.
- In 2003 the gonorrhea rate was highest for 20- to 24-year-olds (529.0). Among females in 2003, 15- to 19- and 20- to 24-year-olds had the highest rates of gonorrhea (634.7 and 595.2, respectively); among males, 20- to 24-year-olds had the highest rate (465.9) (Figure 17 and Table 20). Since 1999 there has been a 14.7% decrease in the rate of gonorrhea among 15- to 19-year-olds, 11.7% among females and 21.0% among males. The decrease during this time period was greater for the 15- to 19-year-olds than any other age group (Table 20).
- Increases in gonorrhea rates were largest among white men aged 35-54 years old between 1999 and 2003. For white men, rates increased 42.0% among 35- to 39-year-olds, 56.8% among 40- to 44-year-olds, and 46.0% among 45- to 54-year-olds (Table 21B).
- As in recent years, the highest rates of gonorrhea were seen among 15- to 19-year-old African-American women (2,947.8 per 100,000), 20- to 24-year-old African-American women (2,715.5 per 100,000), and 20- to 24-year-old African-American men (2,649.8 per 100,000). However, decreases in gonorrhea rates were seen among African-Americans of both sexes and all age groups (Table 21B).

- Gonorrhea test positivity data are available from a variety of settings. In 2003, the median state-specific gonorrhea test positivity among 15- to 24-year-old women screened in selected family planning clinics in 39 states, Puerto Rico, District of Columbia, and the Virgin Islands was 0.8% (range 0.1% to 4.0%) (Figure 18). For women in this age group attending selected prenatal clinics in 23 states, Puerto Rico, and the Virgin Islands, the median positivity was 1.0% (range 0.0% to 3.7%) (Figure G). For 16- to 24-year-old women entering the National Job Training Program in 34 states and Puerto Rico in 2003, the median state-specific gonorrhea prevalence was 2.1% (range 0.0% to 6.3%) in 2003 (Figure Q). Among men entering the program from 10 states from July through December 2003, the median state-specific gonorrhea positivity was 2.8% (range 1.4% to 6.3%) (Figure R). The median positivity for gonorrhea in women entering 28 juvenile corrections facilities was 5.7% (range 0.5% to 15.9%), and in men entering 35 juvenile corrections facilities was 1.3% (range 0.3% to 4.5%) (Figures LL and MM). See **Special Focus Profiles**.
- Antimicrobial resistance remains an important consideration in the treatment of gonorrhea.<sup>6-8</sup> Overall, 16.4% of isolates collected in 2003 in 30 STD clinics by the Gonococcal Isolate Surveillance Project (GISP) were resistant to penicillin, tetracycline, or both (Figure 20).
- Resistance to ciprofloxacin (a fluoroquinolone) was first identified in GISP in 1991. From 1991 through 1998, fewer than nine ciprofloxacin-resistant isolates were identified each year and such isolates were identified in only a few GISP clinics. In 2000, similar to 1999, 19 (0.4%) ciprofloxacin-resistant GISP isolates were identified in 7 GISP clinics. In 2001, 38 (0.7%) ciprofloxacin-resistant GISP isolates were identified in 6 clinics; in 2002, 116 (2.2%) such isolates were identified in 13 clinics (Figure 21) and in 2003, 270 (4.1%) were identified in 21 clinics.
- In Honolulu, the proportion of GISP isolates that were resistant to ciprofloxacin remained high in 2003 at 13.3%. This was higher than in 2002 (11.7%), but lower than in previous years (20.3% in 2001 and 14.3% in 2000). At Tripler Army Medical Center, in Hawaii, 4.2% of isolates tested demonstrated resistance to ciprofloxacin. This high proportion of ciprofloxacin-resistant isolates in Hawaii continues to reinforce the recommendation made by CDC in 2000 that fluoroquinolones not be used to treat gonococcal infections acquired in Hawaii.<sup>6</sup>
- In California, significant increases in the proportions of GISP isolates resistant to ciprofloxacin were identified in 3 out of 5 California GISP sites (for Long Beach, 19.4% in 2003 compared with 7.2% in 2002; for Orange County, 31.5% for 2003 compared with 11.4% in 2002; for San Francisco, 19.2% in 2003 compared with 6.7% in 2002). San Diego saw a slight decrease in ciprofloxacin-resistant isolates, down to 13.2% in 2003 from 16.5% in 2002. In 2003, Los Angeles reported to GISP for the first time and 12.4% of isolates from that location were resistant to ciprofloxacin. In 2002, the California STD Program recommended that fluoroquinolones no longer be used for gonorrhea treatment in California.
- The proportion of GISP isolates that were ciprofloxacin-resistant at other GISP clinics where such isolates were identified in 2003 were: Baltimore – 0.4%, Chicago – 2.1%, Cincinnati – 0.4%, Cleveland – 0.3%, Dallas – 2.0%, Denver – 0.7%, Las Vegas 2.5%, Miami – 2.1%, Minneapolis – 2.3%, New Orleans – 0.4%, Philadelphia – 1.3%, Phoenix – 2.6%, Portland – 3.0%, and Seattle 7.0%. Overall,

outside of Hawaii and California, 1.2% of isolates were ciprofloxacin-resistant. Additional information on antimicrobial susceptibility data and treatment recommendations from state and local health departments may be found in the 2003 GISP report<sup>7</sup> or the GISP website (<http://www.cdc.gov/std/gisp>).

- The number of fluoroquinolone resistant *Neisseria gonorrhoeae* (QRNG) isolates from MSM more than doubled from 77 (7.2%) in 2002 to 188 (15%) in 2003. During the same time period, the number of QRNG isolates from heterosexuals doubled, from 38 (0.9%) in 2002 to 79 (1.5%) in 2003 (Figure 22). In 2004, CDC recommended that fluoroquinolones no longer be used to treat gonorrhea among MSM.<sup>9</sup>
- To date, cephalosporin resistance has not been identified in GISP and the proportion of GISP isolates demonstrating decreased susceptibility to ceftriaxone or cefixime has remained very low over time. In 2001, three GISP isolates with decreased susceptibility to cefixime were also found to be resistant to penicillin, tetracycline, and ciprofloxacin; such multi-drug resistance in combination with decreased susceptibility to cefixime had not previously been identified in the United States.<sup>10</sup> In 2003, no GISP isolates had decreased susceptibility to ceftriaxone.
- The proportion of GISP isolates demonstrating elevated minimum inhibitory concentrations (MICs) to azithromycin has been increasing since GISP began monitoring azithromycin susceptibility in 1992. In 1992, there were no isolates with azithromycin MIC  $\geq 1.0$   $\mu\text{g/ml}$  but in 2003 there were 26 (0.4%) such isolates.
- Additional information about gonorrhea in racial and ethnic minority populations, adolescents, men who have sex with men, and other at risk populations can be found in the **Special Focus Profiles**.

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<sup>1</sup> Cohen MS, Hoffman IF, Royce RA, et al. Reduction of concentration of HIV-1 in semen after treatment of urethritis: implications for prevention of sexual transmission of HIV-1. *Lancet* 1997;349:1868-73.

<sup>2</sup> Centers for Disease Control and Prevention. Gonorrhea – United States, 1998. *MMWR* 2000;49:538-42.

<sup>3</sup> Sexually Transmitted Diseases in America: How Many Cases and At What Cost? Prepared for the Kaiser Family Foundation by: American Social Health Association, December 1998, ASHA: Research Triangle Park, NC, Kaiser Family Foundation: Menlo Park, CA 94025.

<sup>4</sup> Fox KK, Whittington W, Levine WC, Moran JS, Zaidi AA, Nakashima AN. Gonorrhea in the United States, 1981-1996: demographic and geographic trends. *Sex Transm Dis* 1998;25(7):386-93.

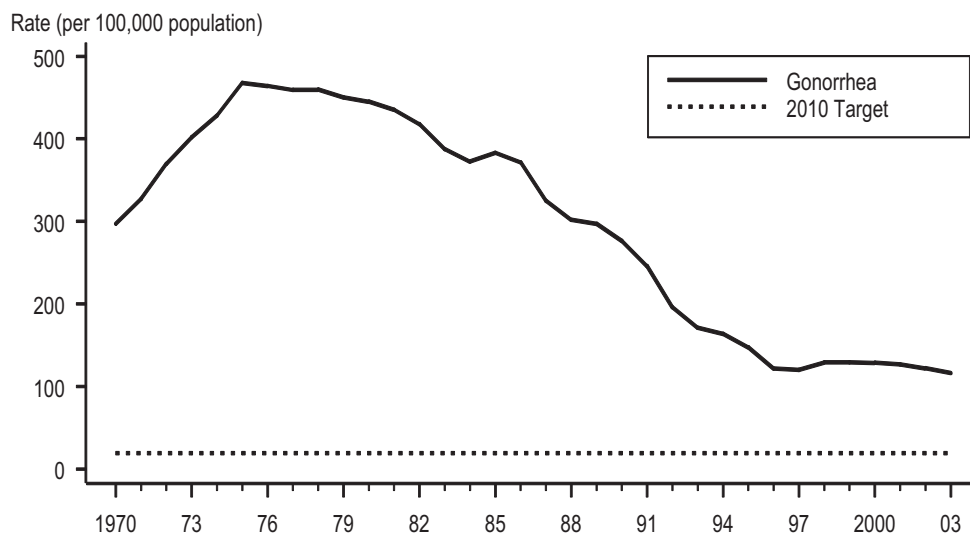
<sup>5</sup> U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.

<sup>6</sup> Centers for Disease Control and Prevention. Fluoroquinolone-resistance in *Neisseria gonorrhoeae*, Hawaii, 1999, and decreased susceptibility to azithromycin in *N. gonorrhoeae*, Missouri, 1999. *MMWR* 2000;49:833-837.

<sup>7</sup> Centers for Disease Control and Prevention. *Sexually Transmitted Disease Surveillance 2003 Supplement: Gonococcal Isolate Surveillance Project (GISP) Annual Report 2003*. Atlanta, GA: U.S. Department of Health and Human Services (in press).

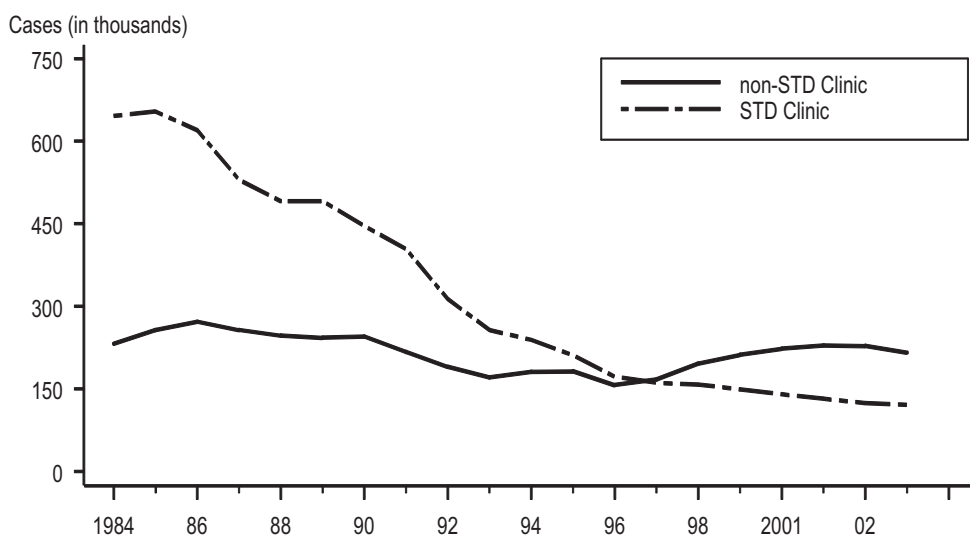
- <sup>8</sup> Centers for Disease Control and Prevention. Increases in fluoroquinolone-resistant *Neisseria gonorrhoeae* – Hawaii and California, 2001. *MMWR* 2002;51:1041-1044.
- <sup>9</sup> Centers for Disease Control and Prevention. Increases in fluoroquinolone-resistant *Neisseria gonorrhoeae* among men who have sex with men – United States, 2003, and revised recommendations for gonorrhea treatment, 2004. *MMWR* 2004;53:335-338.
- <sup>10</sup> Wang SA, Lee MV, Iverson CJ, Ohye RG, Whitticar PM, Hale JA, Trees DL, Knapp JS, Effler PV, Weinstock HS. Multi-drug resistant *Neisseria gonorrhoeae* with decreased susceptibility to cefixime, Hawaii, 2001. *CID* 2003;37:849-52.

**Figure 10. Gonorrhea — Rates: United States, 1970–2003 and the Healthy People 2010 target**



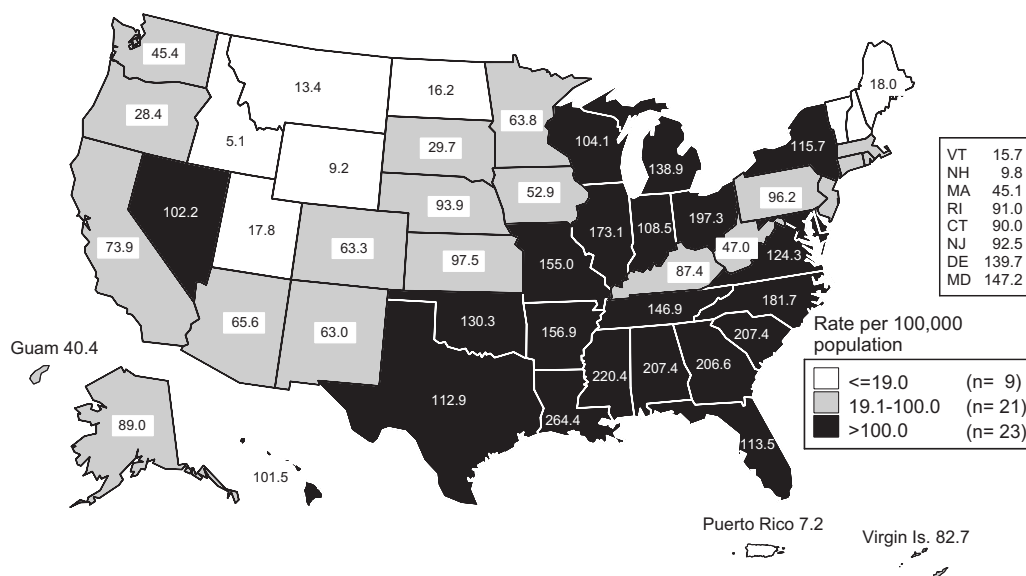
Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

**Figure 11. Gonorrhea — Reported cases by reporting source: United States, 1984-2003**



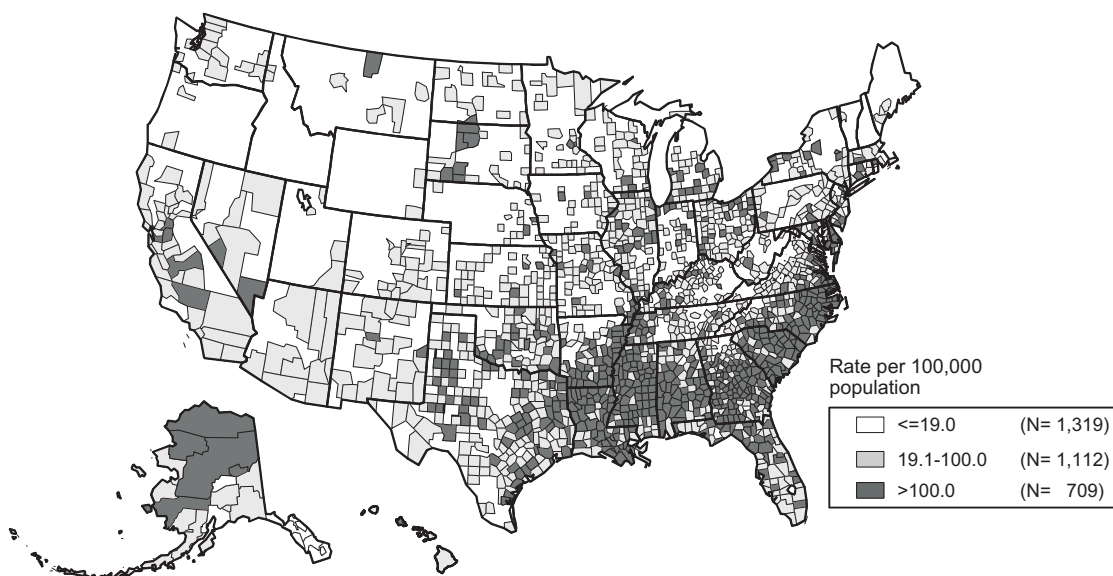
Note: Prior to 1996, the STD clinic source of report corresponded to public (clinic) source of report, and the non-STD clinic category corresponded to private source of report. See Appendix (Reporting Sources). After 1996, as states began reporting morbidity data electronically, the specific source of report (i.e., STD clinic) became available from an increasing number of states.

**Figure 12. Gonorrhea — Rates by state: United States and outlying areas, 2003**



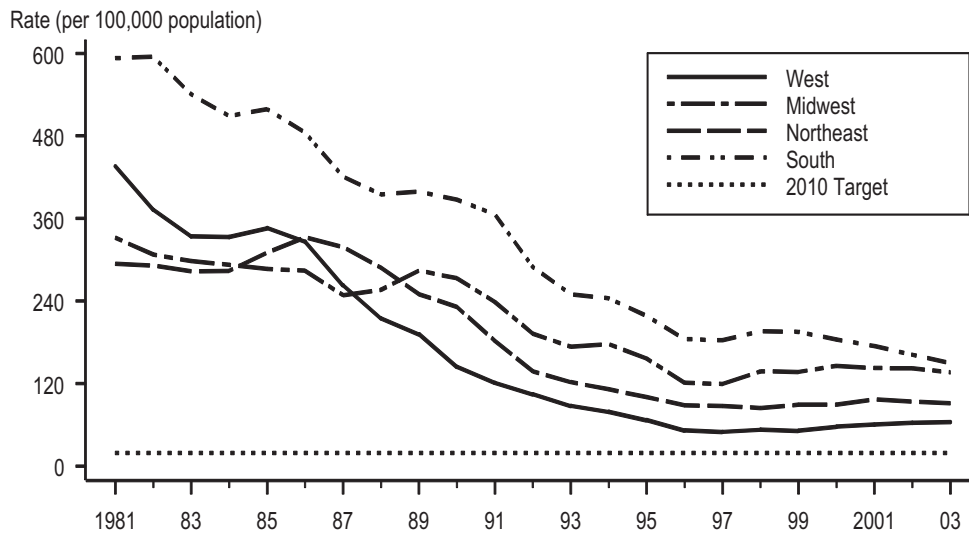
Note: The total rate of gonorrhea for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 114.7 per 100,000 population. The Healthy People 2010 target is 19.0 cases per 100,000 population.

**Figure 13. Gonorrhea — Rates by county: United States, 2003**



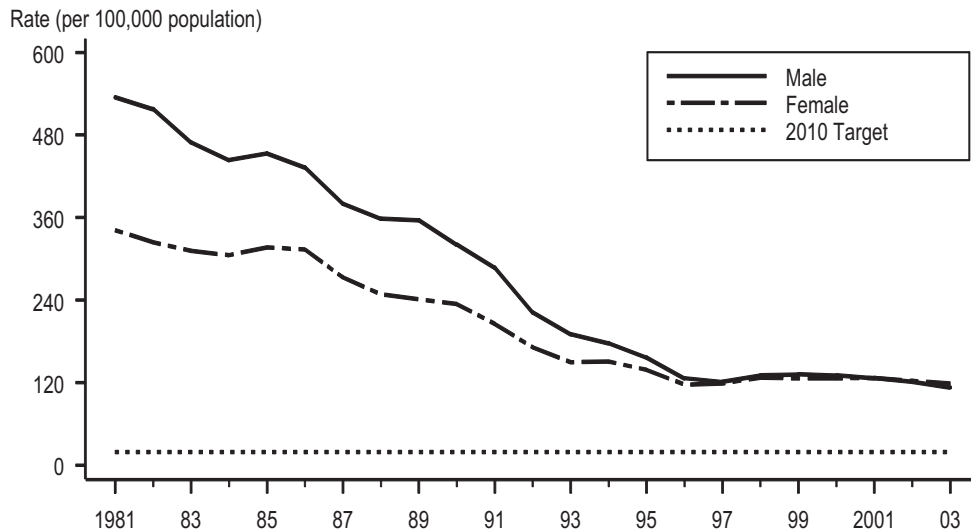
Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

**Figure 14. Gonorrhea — Rates by region: United States, 1981–2003 and the Healthy People 2010 target**



Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

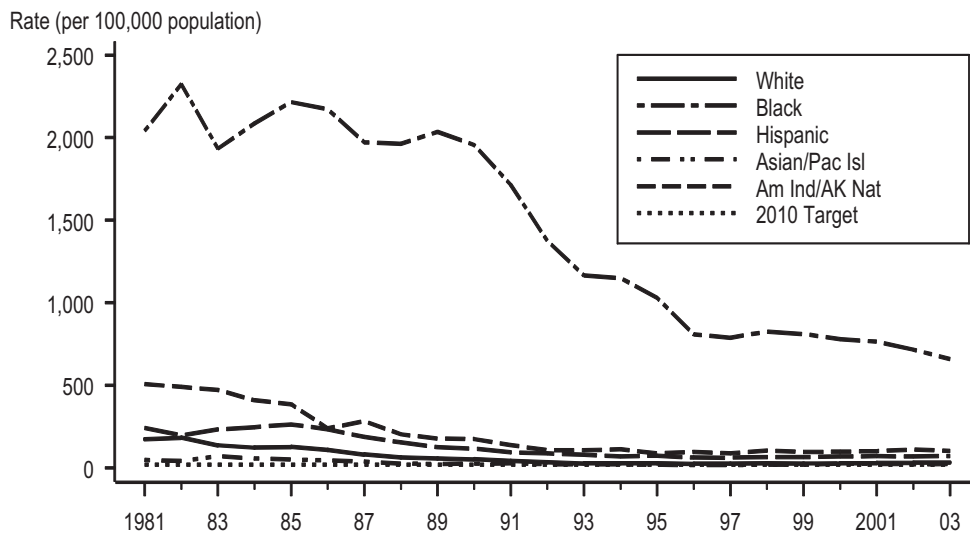
**Figure 15. Gonorrhea — Rates by sex: United States, 1981–2003 and the Healthy People 2010 target**



Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

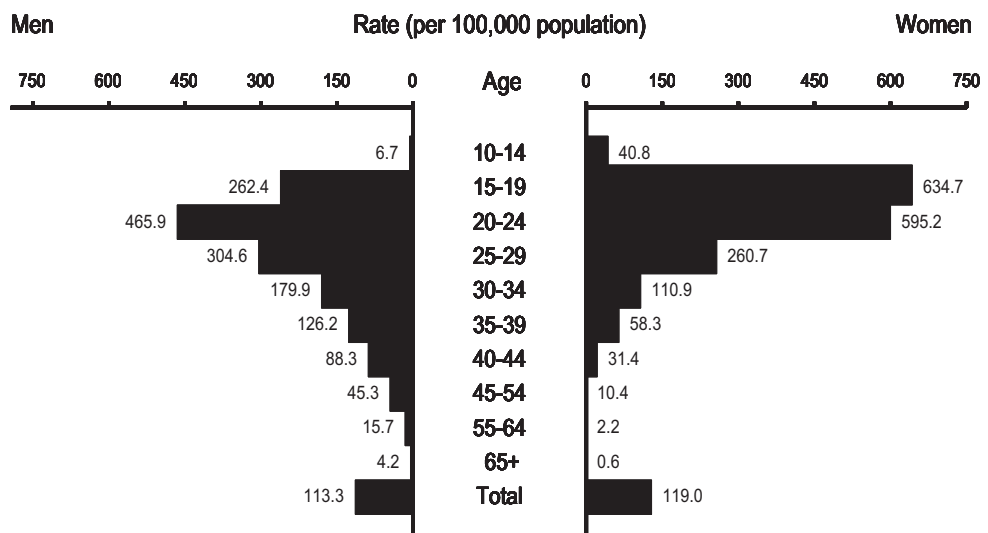


**Figure 16. Gonorrhea — Rates by race and ethnicity: United States, 1981–2003 and the Healthy People 2010 target**



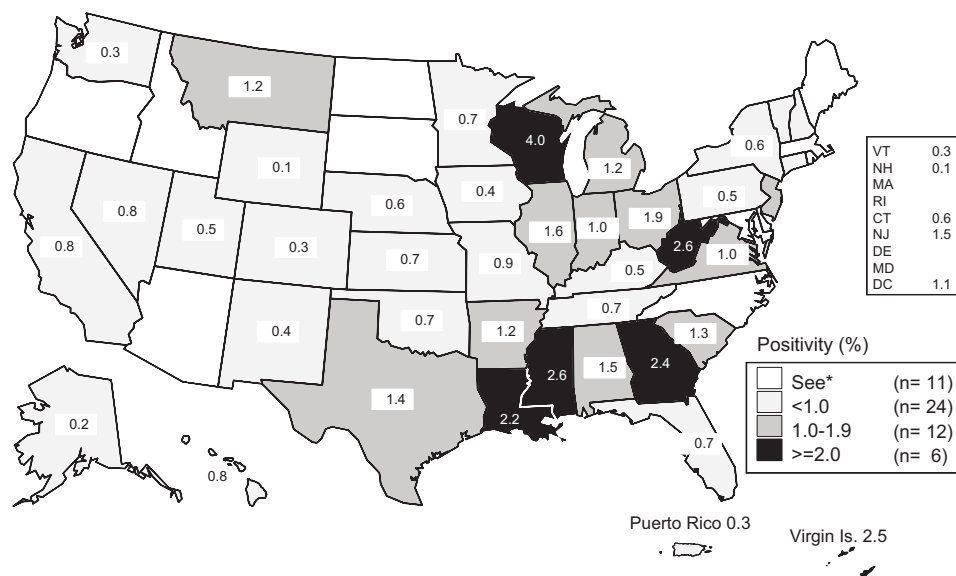
Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

**Figure 17. Gonorrhea — Age- and sex-specific rates: United States, 2003**



Note: See Table 20.

**Figure 18. Gonorrhea — Positivity among 15- to 24-year-old women tested in family planning clinics by state: United States and outlying areas, 2003**

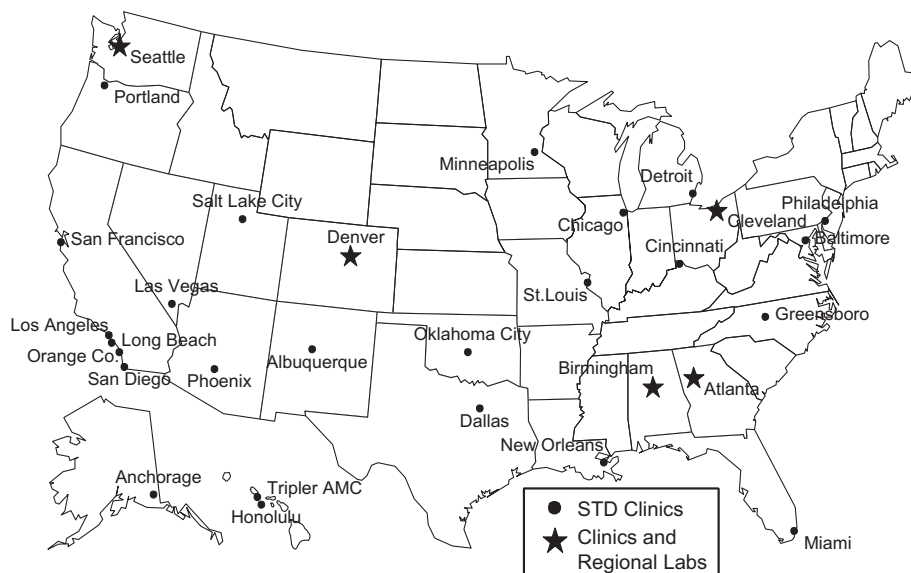


\*States reported gonorrhea positivity data on less than 500 women aged 15-24 years during 2003.

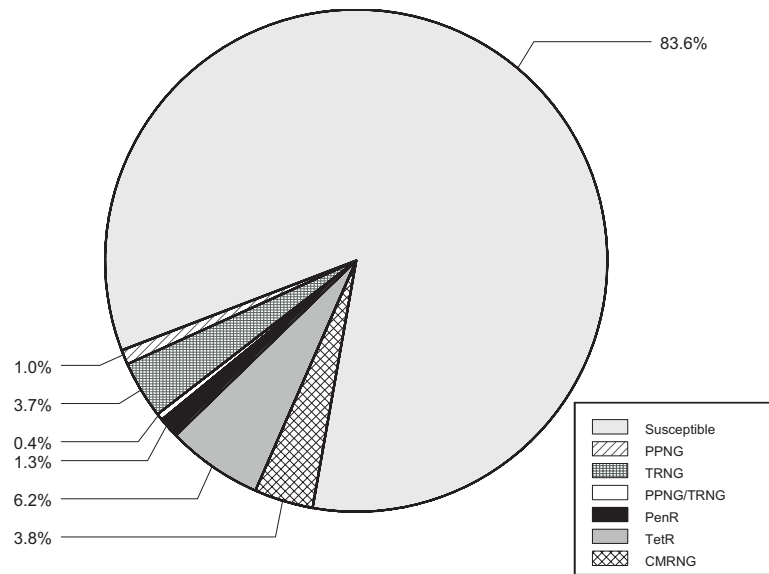
Note: Includes states that reported gonorrhea positivity data on at least 500 women aged 15-24 years screened during 2003 except for Minnesota which submitted gonorrhea positivity data for July-December 2003 only.

SOURCE: Regional Infertility Prevention Projects; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

**Figure 19. Gonococcal Isolate Surveillance Project (GISP) — Location of participating clinics and regional laboratories: United States, 2003**

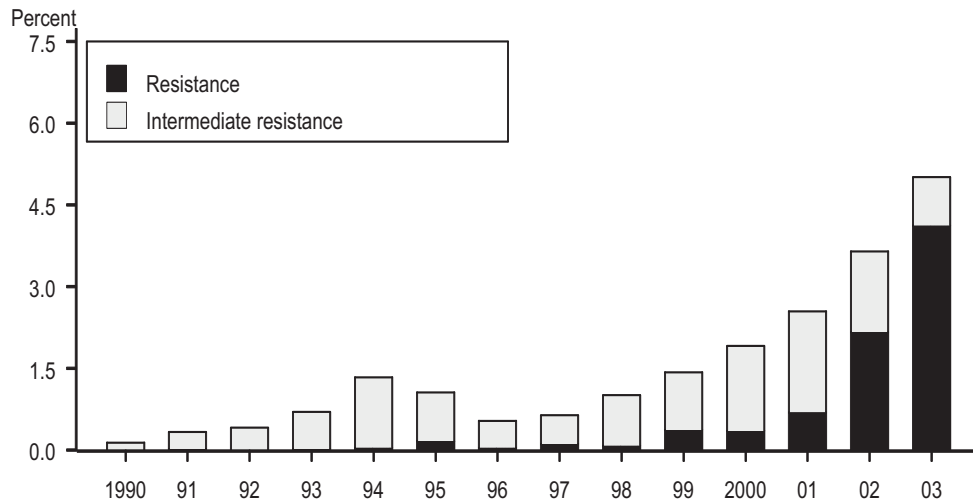


**Figure 20. Gonococcal Isolate Surveillance Project (GISP) — Penicillin and tetracycline resistance among GISP isolates, 2003**



Note: PPNG=penicillinase-producing *N. gonorrhoeae*; TRNG=plasmid-mediated tetracycline-resistant *N. gonorrhoeae*; PPNG-TRNG=plasmid-mediated penicillin and tetracycline-resistant *N. gonorrhoeae*; PenR=chromosomally mediated penicillin resistant *N. gonorrhoeae*; TetR=chromosomally mediated tetracycline-resistant *N. gonorrhoeae*; CMRNG=chromosomally mediated penicillin and tetracycline-resistant *N. gonorrhoeae*.

**Figure 21. Gonococcal Isolate Surveillance Project (GISP) — Percent of *Neisseria gonorrhoeae* isolates with resistance or intermediate resistance to ciprofloxacin, 1990–2003**



Note: Resistant isolates have ciprofloxacin MICs  $\geq 1 \mu\text{g/ml}$ . Isolates with intermediate resistance have ciprofloxacin MICs of 0.125 - 0.5  $\mu\text{g/ml}$ . Susceptibility to ciprofloxacin was first measured in GISP in 1990.

**Figure 22. Gonococcal Isolate Surveillance Project (GISP) — Percent of *Neisseria gonorrhoeae* isolates with resistance to ciprofloxacin by sexual behavior, 2001–2003**

