The **National Profile** section contains figures showing trends and the distribution of nationally reportable STDs (chlamydia, gonorrhea, syphilis and chancroid) by age, sex, race/ethnicity, and location for the United States.
Chlamydia

Background

*Chlamydia trachomatis* infections are the most commonly reported notifiable disease in the United States. They are among the most prevalent of all STDs and, since 1994, have comprised the largest proportion of all STDs reported to CDC (Table 1). Recent studies also demonstrate the high prevalence of chlamydial infections in the general U.S. population. Among young adults (18–26 years of age) participating in the nationally-representative National Longitudinal Study of Adolescent Health (Add Health) from 2001 to 2002, chlamydia prevalence was 4.2%.1

Chlamydial infections are usually asymptomatic and, in women, may result in PID, which is a major cause of infertility, ectopic pregnancy, and chronic pelvic pain. Data from a randomized controlled trial of chlamydia screening in a managed care setting suggested that screening programs can lead to a reduction in the incidence of PID by as much as 60%.2 As with other inflammatory STDs, chlamydial infection can facilitate the transmission of Human Immunodeficiency Virus (HIV) infection.3 In addition, pregnant women infected with chlamydia can pass the infection to their infants during delivery, potentially resulting in neonatal ophthalmia and pneumonia. Because of the large burden of disease and risks associated with infection, CDC recommends annual chlamydia screening of all sexually active women younger than 26 years of age.4

The increase in reported chlamydial infections during the last 20 years reflects the expansion of chlamydia screening activities, use of increasingly sensitive diagnostic tests, an increased emphasis on case reporting from providers and laboratories, and improvements in the information systems for reporting. However, many women who are at risk are still not being tested, reflecting, in part, lack of awareness among some health care providers and limited resources available to support screening. Chlamydia screening and reporting are likely to continue to expand further in response to the Healthcare Effectiveness Data and Information Set (HEDIS) annual measure assessing chlamydia screening coverage of sexually active young women who receive medical care through commercial or Medicaid managed care organizations.5 Among sexually active female enrollees aged 16-25 years (aged 16-26 years during 2000-2002) in commercial and Medicaid health plans in the United States, the annual chlamydia screening rate increased from 25.3% in 2000 to 41.6% in 2007.6

To better monitor trends in disease burden in defined populations during the expansion of chlamydia screening activities, data on chlamydia positivity and prevalence among persons screened in a variety of settings are used. In most instances, test positivity serves as a reasonable approximation of prevalence.7

Chlamydia—United States

In 2008, 1,210,523 chlamydial infections were reported to CDC from 50 states and the District of Columbia (Table 1). This case count corresponds to a rate of 401.3 cases per 100,000 population, an increase of 9.2% compared with the rate of 367.5 in 2007.

Over the past 20 years, from 1989 through 2008, the rate of reported chlamydial infection increased from 102.5 to 401.3 cases per 100,000 population (Figure 1, Table 1).

Chlamydia by Region

Between 1999 and 2008, overall rates were similar in the Midwest, West, and South (Figure 2, Table 3). Rates have consistently remained lowest in the Northeast.

Chlamydia by State

In 2008, chlamydia rates per 100,000 population by state ranged from 160.3 cases in New Hampshire to 728.1 cases in Mississippi (Figure 3, Table 2).
Chlamydia by Metropolitan Statistical Area (MSA)

In 2008, the chlamydia case rate per 100,000 population in the 50 most populous MSAs increased overall, among both women and men (Table 6). Among women, the 2008 case rate of 607.0 was a 7.6% increase over the 2007 case rate of 564.1 (Table 7). The 2008 case rate among men (233.9 per 100,000 population) increased 11.4% from the 2007 case rate (209.9) (Table 8). In 2008, 57.0% of chlamydia cases were reported by these MSAs.

Chlamydia by County

Counties in the United States with the highest chlamydia case rates per 100,000 population were located primarily in the Southeast and West, including Alaska (Figure 4). In 2008, 681 (21.7%) of 3,141 counties had rates greater than 400.0 cases per 100,000 population. Fifty-four counties and independent cities reported 40% of all chlamydia cases in 2008 (Table 9).

Chlamydia by Sex

In 2008, the overall rate of reported chlamydial infection among women in all 50 states and the District of Columbia (583.8 cases per 100,000 females) was almost three times higher than the rate among men (211.1 cases per 100,000 males), likely reflecting a greater number of women screened for this infection (Figure 1, Tables 4 and 5). The lower rates among men also suggest that many of the sex partners of women with chlamydia are not being diagnosed or reported as having chlamydia. However, with the advent of highly sensitive nucleic acid amplification tests (NAATs) that can be performed on urine, symptomatic and asymptomatic men are increasingly being diagnosed with chlamydial infection. From 2004 through 2008, the chlamydial infection rate in men increased by 45.0% (from 145.6 to 211.1 cases per 100,000 males) compared with a 21.5% increase in women during the same period (from 480.6 to 583.8 cases per 100,000 females).

Chlamydia by Age

Among women, the highest age-specific rates of reported chlamydia in 2008 were among those 15 to 19 years of age (3,275.8 cases per 100,000 females) and 20 to 24 years of age (3,179.9 cases per 100,000 females) (Figure 5, Table 10). Age-specific rates among men, while substantially lower than the rates among women, were highest in the 20- to 24-year-old age group (1,056.1 cases per 100,000 males) (Figure 5, Table 10).

Chlamydia by Race/Ethnicity

In 2008, chlamydia rates increased for all racial and ethnic groups (Figure 6, Table 11B). The rate of chlamydia among blacks was over eight times higher than that of whites (1,519.3 and 173.6 cases per 100,000, respectively). The rates among American Indian/Alaska Natives (808.8) and Hispanics (510.4) were 4.7 and 2.9 times higher, respectively, than that of whites.

Chlamydia by Reporting Source

The majority of chlamydia cases reported in 2008 were from venues outside of STD clinics (Table A2). Over time, the proportion of cases reported from non-STD clinic sites has continued to increase (Figure 7). In 2008, among women, only 10.1% of chlamydia cases were reported through an STD clinic (89,943 of 893,004 total cases). In contrast, among men, 30.5% of chlamydia cases were reported from an STD clinic in 2008 (95,798 of 313,779 total cases).

Chlamydia Prevalence in the Population

NHANES is a nationally-representative survey of the U.S. civilian, non-institutionalized 14- to 39-year old population and provides an important measure of chlamydia disease burden. From 1999 to 2002, the overall prevalence of chlamydia infection was 2.2% and was similar between males and females (2.0% and 2.5%, respectively). Prevalence was higher among non-Hispanic blacks than non-Hispanic whites in all age groups (Figure 8).
Prevalence Monitoring Project

Chlamydia screening and prevalence monitoring activities were initiated in the U.S. Department of Health and Human Services (DHHS) Region X (Alaska, Idaho, Oregon, Washington) in 1988 as a CDC-supported demonstration project. In 1993, chlamydia screening services for women were expanded to three additional DHHS regions (III, VII, and VIII) and, in 1995, to the remaining DHHS regions (I, II, IV, V, VI, and IX). In some regions, federally-funded chlamydia screening supplements local- and state-funded screening programs. Screening criteria and practices vary by region and state.

In 2008, the median state-specific chlamydia test positivity among 15- to 24-year-old women who were screened during visits to selected family planning clinics in all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands was 7.4% (range: 3.1% to 15.0%) (Figures 9 and 10). Since 1997, the median chlamydia positivity rate has increased slightly. This increase is likely because of increasing use of more sensitive test technology. (See Appendix [Chlamydia, Gonorrhea, and Syphilis Prevalence Monitoring section] for details.)

Chlamydia test positivity among 15 to 24-year-old women screened in family planning clinics fluctuated in all 10 DHHS regions between 2004 and 2008 (Figure 11). Positivity has remained fairly stable in five regions (I, II, III, V, X). In the remaining five regions (IV, VI, VII, VIII, IX), positivity rates increased slightly over the five-year time frame from 2004 to 2008. The positivity rates presented in Figure 11 are not adjusted for changes in laboratory test methods and associated increases in test sensitivity. Utilization of more sensitive tests has been shown to impact positivity rates. Use of NAAT technology in family planning clinics to screen women aged 15 to 24 years for chlamydia is widespread (Figure 12). In four regions, NAATs were used nearly exclusively from 2004 to 2008 (I, V, VII, VIII). In two of these regions (I, V), prevalence was stable while in the other two (VII, VIII), prevalence increased. In 2008, three additional regions used NAATs nearly 100% of the time (IV, VI, IX). The remaining three regions used NAATs greater than 60% of the time in 2008.

Chlamydia Among Special Populations

Additional information on chlamydia screening programs for women of reproductive age and chlamydia among adolescents, minority populations, and in corrections facilities is in the Special Focus Profiles.

Chlamydia Summary

Both prevalence and reported cases of genital Chlamydia trachomatis infections remain high across age groups, racial/ethnic groups, geographic locales, and both sexes. The burden of chlamydia appears higher among women, especially those of younger age (15 to 19 and 20 to 24 years of age), but this may be a reflection of screening recommendations. Racial differences also persist; case rates among blacks continue to be substantially higher than rates among other racial/ethnic groups.

Figure 1. Chlamydia—Rates: Total and by sex: United States, 1989–2008

Rate (per 100,000 population)

NOTE: As of January 2000, all 50 states and the District of Columbia had regulations requiring the reporting of chlamydia cases.

Figure 2. Chlamydia—Rates by region: United States, 1999–2008
Figure 3. Chlamydia—Rates by state: United States and outlying areas, 2008

NOTE: The total rate of chlamydia for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 398.5 per 100,000 population. For further information on chlamydia reporting, see Appendix (Chlamydia Morbidity Reporting).

Figure 4. Chlamydia—Rates by county: United States, 2008

Rate per 100,000 population
- ≤300.0  (n=13)
- 300.1–400.0  (n=17)
- >400.0  (n=24)

Rate per 100,000 population
- ≤300.0  (n=2,070)
- 300.1–400.0  (n=390)
- >400.0  (n=681)
Figure 5. Chlamydia—Age- and sex-specific rates: United States, 2008

<table>
<thead>
<tr>
<th>Age</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–14</td>
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<tr>
<td>15–19</td>
<td>701.6</td>
<td>3275.8</td>
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<td>1056.1</td>
<td>3179.9</td>
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<td>25–29</td>
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</tbody>
</table>

Figure 6. Chlamydia—Rates by race/ethnicity: United States, 1999–2008
Figure 7. **Chlamydia—Cases by reporting source and sex: United States, 1999–2008**

Cases (in thousands)

![Graph showing cases by reporting source and sex, 1999–2008.](image)

Figure 8. **Chlamydia—Prevalence by age group and race/ethnicity from a national survey, 1999–2002**

Prevalence, %

![Graph showing prevalence by age group and race/ethnicity, 1999–2002.](image)

**NOTE:** Error bars indicate 95% confidence intervals.

Figure 9. Chlamydia—Median state-specific positivity among 15- to 24-year-old women tested in family planning clinics: United States, 1997–2008

NOTE: As of 1997, all 10 DHHS regions, representing all 50 states, the District of Columbia, and outlying areas, reported chlamydia positivity data. See Appendix for definitions of DHHS regions.


Figure 10. Chlamydia—Positivity among 15- to 24-year-old women tested in family planning clinics by state: United States and outlying areas, 2008

NOTE: Includes states and outlying areas that reported chlamydia positivity data on at least 500 women aged 15–24 years screened during 2008.

Figure 11. Chlamydia—Trends in positivity among 15- to 24-year-old women tested in family planning clinics by HHS region, 2004–2008

Region I
Region II
Region III
Region IV
Region V
Region VI
Region VII
Region VIII
Region IX
Region X

NOTE: See Appendix for definitions of DHHS Regions.


Figure 12. Chlamydia—Percent of tests that were nucleic acid amplification tests (NAATs) in family planning clinics among 15- to 24-year-old women by DHHS region, 2004–2008

Region I
Region II
Region III
Region IV
Region V
Region VI
Region VII
Region VIII
Region IX
Region X

NOTE: See Appendix for definitions of DHHS Regions.

Gonorrhea

Background

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 PID in the United States. PID can lead to serious outcomes in women 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.1

From 1975 through 1997, the national gonorrhea rate declined 74% following implementation of the national gonorrhea control program in the mid-1970s (Figure 13). For the past 12 years, however, gonorrhea rates appear to have reached a plateau (Figure 14 and Table 1).

Increases in gonorrhea rates in eight western states from 2000 to 2005 have been described among a wide variety of populations in the affected states.2 Increases in quinolone resistant Neisseria gonorrhoeae (QRNG) in 2007 led to changes in national guidelines that now limit the recommended treatment of gonorrhea to a single class of drugs, the cephalosporins.3 The combination of increases in gonorrhea morbidity in some populations with increases in resistance and decreased treatment options have reinforced the need for better understanding of the epidemiology of gonorrhea.

Although gonorrhea case reporting is useful for monitoring trends in gonorrhea, true increases or decreases in disease burden may be masked by changes in screening practices (affected by concomitant testing for chlamydia and broader use of urine-based testing), use of diagnostic tests with differing test performance, and changes in reporting practices.4

For most states, 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.5 For these reasons, supplemental data on gonorrhea prevalence in persons screened in a variety of different settings are useful in assessing disease burden in selected populations.

Gonorrhea—United States

In 2008, 336,742 cases of gonorrhea were reported in the United States, a rate of 111.6 cases per 100,000 population (Figure 13 and Table 1), reflecting a small decrease of 5.4% since 2007. Gonorrhea rates have remained relatively stable over the past 12 years.

Gonorrhea by Region

As in previous years, in 2008 the South had the highest gonorrhea rate among the four regions of the country (152.4 cases per 100,000 population). Rates in the South and Midwest have remained substantially higher than rates in the Northeast and West. Rates in all regions over the last year have shown little change (Figure 15 and Table 13).

Gonorrhea by State

In 2008, gonorrhea rates per 100,000 population by state ranged from 6.0 cases in Vermont to 256.8 cases in Mississippi (Figure 16, Table 12).

Gonorrhea by Metropolitan Statistical Area (MSA)

The overall gonorrhea rate in the 50 most populous MSAs was 121.5 cases per 100,000 population in 2008. This is decreased from the rate of 128.3 cases per 100,000 population in 2007. In 2008, 58.7% of gonorrhea cases were reported by these MSAs (Table 16). Similar to previous years, in 2008 the total gonorrhea rate among females in these MSAs (123.5) remained similar to that among males (118.8) (Tables 17 and 18).
Gonorrhea by County
In 2008, 1,305 (41.6%) of 3,141 counties in the United States had gonorrhea rates at or below the HP2010 national target of 19 cases per 100,000 population. (See the Appendix [Interpreting STD Surveillance Data section] for an explanation of HP2010 target setting methods.) Rates per 100,000 population were between 19 and 100 in 1,136 counties (36.2%), and greater than 100 in 700 counties (22.3%). The majority of counties with greater than 100 cases per 100,000 population were located in the South (Figure 17).

In 2008, 50% of reported gonorrhea cases occurred in just 71 counties or independent cities (Table 19).

Gonorrhea by Sex
Prior to 1996, rates of gonorrhea among men were higher than rates among women. For the eighth consecutive year, however, gonorrhea rates among women and men were similar (Figure 14). In 2008, the gonorrhea rate among women was 119.4 and the rate among men was 103.0 cases per 100,000 population (Tables 14 and 15).

Gonorrhea by Age
In 2008, gonorrhea rates continued to be highest among adolescents and young adults. Among females in 2008, 15- to 19- and 20- to 24-year-old women had the highest rates of gonorrhea (636.8 and 608.6, respectively). Among males, the rate was highest in those 20 to 24 years of age (433.6) (Figure 18 and Table 20).

From 2004 to 2008, increases in gonorrhea rates were seen among 15- to 24- year olds (7.4% among those 15 to 19 years of age and 5.3% among those 20 to 24 years of age) and decreases in rate were seen among those 25 to 44 (3.8% among those 25 to 29 years of age, 4.7% among those 30 to 34 years of age, 17.6% among those 35 to 39 years of age, and 17.3% among those 40-44 years of age) (Table 20).

From 2004 to 2008, similar trends were seen by sex; increases occurred in gonorrhea rates in females and males between 15 and 19 years of age (5.6% and 11.2%, respectively) and in females and males between 20 and 24 years of age (8.1% and 2.0%, respectively). During the same time period, decreases in gonorrhea rates were seen in females and males between 35 and 39 years of age (10.2% and 21.1%, respectively) and in females and males between 40 and 44 years of age (11.9% and 19.6%, respectively) (Figures 19 and 20, and Table 20).

Gonorrhea by Race/Ethnicity
In 2008, gonorrhea rates remained highest among blacks (625.0 cases per 100,000 population, Figure 21 and Table 21B). Similar to recent years, the rate among blacks was 20.2 times greater than the rate among whites (31.0 cases per 100,000 population). Gonorrhea rates were 3.6 times greater among American Indian/Alaska Natives (110.2 cases per 100,000 population), and 2.2 times greater among Hispanics (66.8 cases per 100,000 population) than among whites in 2008. Rates among whites were 1.6 times higher than those among Asian/Pacific Islanders (20.0 cases per 100,000 population) in 2008 (Figure 21).

Between 2004 and 2008, gonorrhea rates showed no marked changes for any racial or ethnic group. (Figure 21 and Table 21B). Additional information on gonorrhea among minority populations can be found in the Special Focus Profiles.

Gonorrhea by Region and Sex
Between 2004 and 2008, gonorrhea rates among women increased 1.4% in the Midwest and 14.4% in the South. During the same time period, rates among women decreased 13.3% in the Northeast and 14.0% in the West (Table 14).

Between 2004 and 2008, gonorrhea rates among men decreased in the West, Northeast, and Midwest (15.3%, 8.9%, and 8.1%, respectively). During the same time period, rates among men in the South remained essentially the same (Table 15).

Gonorrhea by Race/Ethnicity and Sex
From 2004 to 2008, overall gonorrhea rates decreased among white, black, American Indian/Alaska Native, and Hispanic men (by 12.6%, 5.0%, 4.2%, and 2.6%, respectively). During the same time period, rates increased only among Asian/Pacific Islander males (1.6%) (Table 21B).
From 2004 to 2008 overall gonorrhea rates decreased among Asian/Pacific Islander, American Indian/Alaska Native, Hispanic, and white women (by 7.1%, 6.1%, 3.3%, and 3.0% respectively). During the same time period, rates increased only among black women (5.9%) (Table 21B).

In 2008, 15- to 19-year-old black women again had the highest gonorrhea rate of any group (2,934.6 per 100,000 population), closely followed by 20- to 24-year-old black women (2,777.0), and 20- to 24-year-old black men (2,340.3).

**Gonorrhea by Reporting Source**

In 2008, 23.0% of gonorrhea cases were reported by STD clinics (Table A2). This is a decrease from 2004, when 30.0% of gonorrhea cases were reported by STD clinics. In 2008, a higher proportion of male gonorrhea cases were reported from STD clinics than female cases (32.3% and 15.2% respectively) (Figure 22 and Table A2).

**Prevalence Monitoring**

Gonorrhea test positivity data are primarily available from family planning clinic settings. Screening criteria and practices may vary by state and over time.

In 2008, the median state-specific gonorrhea test positivity among 15- to 24-year-old women screened in selected family planning clinics in 43 states, the District of Columbia, Puerto Rico, and the Virgin Islands was 0.9% (range: 0.0% to 3.8%) (Figure 23).

**Gonococcal Isolate Surveillance Project (GISP)**

Antimicrobial resistance remains an important consideration in the treatment of gonorrhea. In 1986, GISP, a national sentinel surveillance system, was established to monitor trends in antimicrobial susceptibilities of strains of *Neisseria gonorrhoeae* in the United States among selected STD clinics in approximately 25–30 GISP sentinel sites and 4-5 regional laboratories (Figure 24). Information on the GISP antimicrobial susceptibility criteria used is in the GISP section of the Appendix (Interpreting STD Surveillance Data).

**Susceptibility to Ceftriaxone**

Susceptibility testing for ceftriaxone began in 1987. Figure 25 shows the distribution of Minimum Inhibitory Concentrations (MICs) to ceftriaxone among GISP isolates from 2004 to 2008. There was a small increase in the proportion of GISP isolates with MICs of 0.06 µg/ml since 2006 but no increases were observed at higher MIC values.

There have been four isolates with decreased susceptibility to ceftriaxone in GISP; all four had MICs of 0.5 µg/ml. Their locations and years were: San Diego-1987, Cincinnati-1992 and 1993, and Philadelphia-1997. No isolates with decreased susceptibility to ceftriaxone were seen in 2008.

**Susceptibility to Azithromycin**

GISP began monitoring azithromycin susceptibility in 1992. Figure 26 shows the distribution of MICs to azithromycin among GISP isolates from 2004 to 2008. The proportion of GISP isolates at MICs of 0.5 µg/ml and 1.0 µg/ml for azithromycin has been increasing since 2004.

**Susceptibility to Spectinomycin**

All isolates were susceptible to spectinomycin in 2008. There have been five spectinomycin-resistant isolates in GISP; their locations and years were: St. Louis-1988, Honolulu-1989, San Francisco-1989, Long Beach-1990, and West Palm Beach-1994.

**Susceptibility to Ciprofloxacin**

Resistance to ciprofloxacin (a fluoroquinolone in the quinolone family of antimicrobials) was first identified in GISP sites in 1991. However since 1999, quinolone resistant *Neisseria gonorrhoeae* (QRNG) prevalence has steadily increased, first in Hawaii and the Pacific Islands, then in the Western states, and then among MSM. In 2008, 775 (13.5%) of 5,723 GISP isolates collected were identified as QRNG, a decrease from 2007, when 891/6,009 (14.8%) isolates were identified as QRNG (Figure 27).
**QRNG by Sexual Behavior**

The prevalence of QRNG in isolates from MSM slightly decreased from 36.1% in 2007 to 33.6% in 2008. During the same time period, the prevalence of QRNG in isolates from heterosexuals also decreased from 8.7% in 2007 to 8.2% in 2008.

**QRNG by Region**

The number of isolates submitted from Honolulu demonstrating ciprofloxacin-resistance increased from 20 (28.6%) of 70 isolates in 2007 to 32 (40.5%) of 79 isolates in 2008. Other Western sites reporting increases in QRNG prevalence from 2007 to 2008 include: Phoenix (8.7% in 2007 to 16.5% in 2008); Portland (28.6% to 51.6%); and Seattle (29.3% to 31.3%). In contrast, a number of Western sites reported a decrease in QRNG prevalence from 2007 to 2008, including Albuquerque (16.7% in 2007 to 6.9% in 2008), Denver (17.0% to 10.7%), Las Vegas (18.7% to 17.7%), Los Angeles (22.4% to 16.8%), Orange County (41.0% to 33.3%), San Diego (36.3% to 29.1%) and San Francisco (31.3% to 26.1%).

In the South from 2007 to 2008, a few sites continued to observe increases in the prevalence of QRNG, including Atlanta (from 2.6% in 2007 to 10.3% in 2008), Baltimore (2.0% in 2007 to 5.4%) and Richmond (17.9% to 21.8%). Southern sites reporting a decrease in the prevalence of QRNG from 2007 to 2008 include Birmingham (from 9.4% in 2007 to 8.3% in 2008), Dallas (7.5% to 7.1%), Greensboro (5.3% to 3.6%), Miami (19.6% to 16.2%), New Orleans (18.1% to 14.9%), and Oklahoma City (6.0% to 4.4%).

A majority of the Midwestern sites reported decreases in QRNG prevalence including Chicago (from 8.6% in 2007 to 5.3% in 2008), Detroit (1.7% to 1.1%), Kansas City (16.4% to 7.5%), and Minneapolis (10.7% to 7.6%). The sites that showed an increase in QRNG prevalence were Cincinnati (from 1.2% in 2007 to 2.2% in 2008) and Cleveland (0.7% to 4.1%).

In the Northeast, New York City reported a slight increase in QRNG prevalence from 14.9% in 2007 to 15.5% in 2008. In Philadelphia, the prevalence of resistant isolates to ciprofloxacin decreased from 29.1% in 2007 to 20.6% in 2008.

**Other Antimicrobial Susceptibility Testing**

Overall in 2008, 24.4% of isolates collected from GISP sites were resistant to penicillin, tetracycline, ciprofloxacin, or some combination of those antibiotics (Figure 28). With the renewed availability of cefixime, susceptibility testing for this antibiotic was restarted in 2009. Additionally, susceptibility testing for cefpodoxime was started in 2009.

**Antimicrobial Treatments Given for Gonorrhea**

The antimicrobial agents given to GISP patients for gonorrhea therapy are shown in Figure 29. The proportion of GISP patients treated with cephalosporins has increased again from 81.0% in 2007 to 95.1% in 2008. Specifically, 75.1% were treated with ceftriaxone in 2008 compared with 61.5% in 2007. Conversely, the proportion of GISP patients being treated with fluoroquinolones (ciprofloxacin, ofloxacin or levofloxacin) has continued to decrease from 17.1% in 2007 to 2.2% in 2008. Treatment with azithromycin has slightly increased from 0.8% in 2007 to 1.2% in 2008.

Additional information on 2008 GISP data may be found on the GISP website: [http://www.cdc.gov/std/GISP](http://www.cdc.gov/std/GISP)

**Gonorrhea Among Special Populations**

Additional information about gonorrhea in racial and ethnic minority populations, women of reproductive age, adolescents, MSM, and other at risk populations can be found in the Special Focus Profiles.

**Gonorrhea Summary**

In summary, the national gonorrhea rate has remained relatively unchanged for more than ten years. Of particular concern are the persistent high rates in some geographic areas, adolescents and young adults, and some racial/ethnic groups.

GISP continues to monitor for the emergence of decreased susceptibility and resistance to cephalosporins and for increases in decreased susceptibility to azithromycin.


Centers for Disease Control and Prevention. Fluoroquinolone-resistant *Neisseria gonorrhoeae*–Hawaii and California, 2001 *MMWR* 2002;51:1041–1044.


Figure 13.  Gonorrhea—Rates: United States, 1941–2008

Figure 14.  Gonorrhea—Rates: Total and by sex: United States, 1989–2008
Figure 15. Gonorrhea—Rates by region: United States, 1999–2008

Rate (per 100,000 population)

Figure 16. Gonorrhea—Rates by state: United States and outlying areas, 2008

Note: The total rate of gonorrhea for the United States and outlying areas (Guam, Puerto Rico, and Virgin Islands) was 110.3 per 100,000 population.
Figure 17. Gonorrhea—Rates by county: United States, 2008

Figure 18. Gonorrhea—Age- and sex-specific rates: United States, 2008
Figure 19. Gonorrhea—Age-specific rates among women 15 to 44 years of age:
United States, 1999–2008

Rate (per 100,000 population)

Figure 20. Gonorrhea—Age-specific rates among men 15 to 44 years of age:
United States, 1999–2008

Rate (per 100,000 population)
Figure 21. Gonorrhea—Rates by race/ethnicity: United States, 1999–2008

Rate (per 100,000 population)

0 200 400 600 800 1,000

- American Indian/AK Native
- Asian/Pacific Islander
- Black
- Hispanic
- White


Figure 22. Gonorrhea—Cases by reporting source and sex: United States, 1999–2008

Cases (in thousands)

0 40 80 120 160 200

- Non-STD Clinic Male
- Non-STD Clinic Female
- STD Clinic Male
- STD Clinic Female

Figure 23. Gonorrhea—Positivity among 15- to 24-year-old women tested in family planning clinics by state: United States and outlying areas, 2008

* States/areas not meeting minimum inclusion criteria.

NOTE: Includes states and outlying areas that reported positivity data on at least 500 women aged 15–24 years screened during 2008.

DATA SOURCE: Prevalence Monitoring (Regional Infertility Prevention Projects), Office of Population Affairs, Local and State STD Control Programs, Centers for Disease Control and Prevention.

Figure 24. Gonococcal Isolate Surveillance Project (GISP)—Location of participating sentinel sites and regional laboratories in the United States, 2008
Figure 25. Gonococcal Isolate Surveillance Project (GISP)—Distribution of MICs to ceftriaxone among GISP isolates, 2004—2008

Figure 26. Gonococcal Isolate Surveillance Project (GISP)—Distribution of MICs to azithromycin among GISP isolates, 2004—2008
Figure 27. Gonococcal Isolate Surveillance Project (GISP)—Percent of *Neisseria gonorrhoeae* isolates with resistance or intermediate resistance to ciprofloxacin, 1990–2008

Percent

![Gonococcal Isolate Surveillance Project (GISP)—Percent of Neisseria gonorrhoeae isolates with resistance or intermediate resistance to ciprofloxacin, 1990–2008](image)

**NOTE:** Resistant isolates have ciprofloxacin MICs ≥ 1 µg/ml. Isolates with intermediate resistance have ciprofloxacin MICs of 0.125–0.5 µg/ml. Susceptibility to ciprofloxacin was first measured in GISP in 1990.

Figure 28. Gonococcal Isolate Surveillance Project (GISP)—Penicillin, tetracycline, and ciprofloxacin resistance among GISP isolates, 2008

![Gonococcal Isolate Surveillance Project (GISP)—Penicillin, tetracycline, and ciprofloxacin resistance among GISP isolates, 2008](image)

**NOTE:** PenR=penicillinase producing *N. gonorrhoeae* and chromosomally mediated penicillin-resistant *N. gonorrhoeae*; TetR=chromosomally and plasmid mediated tetracycline-resistant *N. gonorrhoeae*; QRNG=ciprofloxacin-resistant *N. gonorrhoeae*.
Figure 29. Gonococcal Isolate Surveillance Project (GISP)—Drugs used to treat gonorrhea in GISP patients, 1988–2008

Note: For 2008, “Other” includes no therapy (1.3%), azithromycin 2g (1.2%), levofloxacin (0.02%), and other less frequently used drugs.
Background
Syphilis, a genital ulcerative disease, causes significant complications if untreated and facilitates the transmission of HIV. Untreated early syphilis in pregnant women results in perinatal death in up to 40% of cases and, if acquired during the four years preceding pregnancy, may lead to infection of the fetus in 80% of cases.\(^1\)

The rate of P&S syphilis reported in the United States decreased during the 1990s; in 2000, the rate was the lowest since reporting began in 1941 (Figure 30). The low rate of infectious syphilis and the concentration of the majority of syphilis cases in a small number of geographic areas in the United States led to the development of the CDC’s National Plan to Eliminate Syphilis, which was announced by Surgeon General David Satcher in October 1999 and revised in May 2006.\(^2\)

Although the rate of P&S syphilis in the United States declined 89.7% between 1990 and 2000, the rate of P&S syphilis increased annually between 2001 and 2008. Overall increases in rates between 2001 and 2008 were observed primarily among men (increasing from 3.0 cases per 100,000 population to 7.6 cases per 100,000 population). After persistent declines from 1992 to 2003, the rate of P&S syphilis among women increased from 0.8 cases per 100,000 population in 2004 to 1.5 cases per 100,000 population in 2008.

Syphilis remains an important problem in the South and in urban areas in other regions of the country. Increases in cases among MSM (including men who have sex with women and men) have occurred and have been characterized by high rates of HIV co-infection and high-risk sexual behaviors.\(^3\)\(^-\)\(^7\)

The estimated proportion of P&S syphilis cases attributable to MSM increased from 4% in 2000 to 62% in 2004.\(^8\)\(^-\)\(^9\) In 2005, CDC requested that all state health departments report sex of sex partners for persons with syphilis. In 2008, 63% of those P&S syphilis cases in 44 states and Washington, D.C. with available information were among MSM. Of reported male cases with P&S syphilis, sex of partner information in 2008 was available for 80%.

Syphilis—All Stages (P&S, Early Latent, Late, Late Latent, Congenital)
Between 2007 and 2008, the number of cases of early latent syphilis reported to CDC increased 15.2% (from 10,768 to 12,401), while the number of cases of late and late latent syphilis increased 9.3% (from 18,256 to 19,945) (Table 1). The total number of cases of syphilis (all stages: P&S, early latent, late, late latent, and congenital syphilis) reported to CDC increased 13.1% (from 40,921 to 46,277) between 2007 and 2008 (Table 1).

P&S Syphilis—United States
In 2008, P&S syphilis cases reported to CDC increased to 13,500 from 11,466 in 2007, an increase of 17.7%. The rate of P&S syphilis in the United States in 2008 (4.5 cases per 100,000 population) was 18.4% higher than the rate in 2007 (3.8 cases per 100,000 population) (Figure 30, Table 1).

P&S Syphilis by Region
The South accounted for 49.7% of the P&S syphilis cases in 2008 and 48.8% in 2007. Between 2007 and 2008, rates increased 19.6% in the South (from 5.1 to 6.1 cases per 100,000 population), 8.8% in the Northeast (from 3.4 to 3.7), 7.5% in the West (from 4.0 to 4.3) and 36.8% in the Midwest (from 1.9 to 2.6) (Figure 32, Table 25).

P&S Syphilis by State
In 2008, P&S syphilis rates in three states were less than or equal to the HP 2010 target of 0.2 case per 100,000 population (Figure 33, Table 24). Four states reported five or fewer cases of P&S syphilis in 2008 (Table 24) (See the Appendix [Interpreting STD Surveillance Data section] for an explanation of HP2010 target setting methods).
National Profile: Syphilis STD Surveillance 2008

P&S Syphilis by Metropolitan Statistical Area (MSA)
The rate of P&S syphilis in 2008 for the 50 most populous MSAs (6.2) exceeded the HP 2010 target of 0.2 case per 100,000 population (Table 28).

P&S Syphilis by County
In 2008, 2,180 of 3,141 counties (69.3%) in the United States reported no cases of P&S syphilis compared with 2,275 (72.4%) in 2007. Of 966 counties reporting at least one case of P&S syphilis in 2008, four (0.4%) had rates at or below the HP2010 target of 0.2 cases per 100,000 population. Rates of P&S syphilis were above the HP2010 target for 962 counties in 2008 (Figure 34). These 962 counties (30.6% of the total number of counties in the United States) accounted for over 99.9% of the total P&S syphilis cases reported in 2008. In 2008, half of the total number of P&S syphilis cases were reported from 26 counties and two cities (Table 31).

P&S Syphilis by Sex
The rate of P&S syphilis increased 15.2% among men (from 6.6 cases to 7.6 cases per 100,000 men) between 2007 and 2008 (Figure 31, Table 27). During this time, the rate increased 36.4% among women from 1.1 to 1.5 cases per 100,000 women (Figure 31, Table 26).

P&S Syphilis by Age
In 2008, the rate of P&S syphilis was highest in persons in the 20- to 24-year-old and 25- to 29-year-old age groups (11.4 and 10.7 cases per 100,000 population, respectively) (Table 33 and Figure 35–37).

Between 2007 and 2008, P&S syphilis rates in most age groups among men and women increased (Table 33 and Figures 35–37).

P&S Syphilis by Race/Ethnicity
From 2007 to 2008, the rate of P&S syphilis increased in all racial and ethnic groups except American Indian/Alaska Natives (Figure 38). The rate increased 10.0% among non-Hispanic whites (from 2.0 to 2.2 cases per 100,000 population), 25.4% among blacks (from 3.8 to 4.7), and 25.0% among Asian/Pacific Islanders (from 1.2 to 1.5). The rate decreased 32.4% (from 3.4 to 2.3 cases per 100,000 population) among American Indian/Alaska Natives (Table 34B).

P&S Syphilis by Sex and Sex Behavior
The male-to-female rate ratio for P&S syphilis has risen steadily since 1996, when it was 1.2, consistent with an increase in MSM (Figure 31). In 2008, however, the rate of P&S syphilis in males was 5.1 times that in females, a small decrease from 6.0 in 2007.

In 2005, CDC began collecting information on sex partners of patients with P&S syphilis. In 2008, this information was available for 80% of male cases.

In 2008, the stage of disease was reported as follows: among heterosexual men (men who have sex with women exclusively) with P&S syphilis, 41.6% had primary syphilis and 58.4% had secondary syphilis. Among female patients, 16.6% had primary syphilis and 83.4% had secondary syphilis. Among MSM with P&S syphilis, 24.5% had primary syphilis and 75.5% had secondary syphilis (Figure 39).

Of females with P&S syphilis, 22.4% were white, 64.4% were black, 9.7% were Hispanic, and 3.6% were of other races/ethnicities. Of heterosexual men, 16.9% were white, 65.8% were black, 13.4% were Hispanic, and 3.9% were of other races/ethnicities. Of MSM, 41.2% were white, 33.6% were black, 18.8% were Hispanic, and 6.4% were of other races/ethnicities (Figure 40).

P&S Syphilis by Race/Ethnicity and Sex
From 2007 to 2008, the P&S syphilis rate among non-Hispanic white males increased 8.1% (from 3.7 to 4.0), and increased among non-Hispanic white females as well (from 0.4 to 0.5). The rate increased 22.3% among black males (from 22.9 to 28.0) and 38.2% among black females (from 5.5 to 7.6). The rate increased 12.3% among Hispanic males (from 7.3 to 8.2), and 25.0% among Hispanic females (from 0.8 to 1.0). The rate increased 25.0% for Asian/Pacific Island males (from 2.4 to 3.0), but remained unchanged for Asian/Pacific Island females (0.1). The rate decreased 23.8% among American Indian/Alaska
Native males (from 4.2 to 3.2) and decreased 46.2% among American Indian/Alaska Native females (from 2.6 to 1.4) (Table 34B).

**P&S Syphilis by Race/Ethnicity, Age, and Sex**

In 2008, the rate of P&S syphilis among blacks was highest among women 20 to 24 years of age (25.3–a 59.1% increase from 15.3 in 2007) and among men 20 to 24 years of age (75.1–a 31% increase from 57.2 in 2007) and 25 to 29 years of age (65.6–an 18% increase from 55.5 in 2007). For non-Hispanic whites, the rate was highest among women 20 to 24 years of age (1.4) and among men 40 to 44 years of age (9.8). For Hispanics, the rate was highest among women 20 to 24 years of age (2.8) and among men 35 to 39 years of age (16.3). For Asian/Pacific Islanders, the rate was highest among women 25 to 29 years of age (0.7) and among men 30 to 34 years of age (7.5). For American Indian/Alaska Natives, the rate was highest among women 30 to 34 years of age (4.0) and among men 25 to 29 years of age (11.7) (Table 34B).

**P&S Syphilis by Reporting Source**

In 1990, 25.6% of P&S syphilis cases were reported from sources other than STD clinics; this figure increased to 39.2% in 1998. Between 1998 and 2008, the proportion of P&S syphilis cases reported from sources other than STD clinics increased from 39.2% to 66.0% (Figure 41 and Table A2). Between 2001 and 2008, the number of cases among males reported from non-STD clinic sources increased sharply while the number from STD clinics increased only slightly (Figure 41).

During 2008, patients with P&S syphilis primarily sought care with private physicians or STD clinics. More cases of syphilis among MSM were reported from private physicians (36.9%) than STD clinics (30.2%) (Figure 42). More cases among women and heterosexual men were reported from STD clinics than private physicians.

**Congenital Syphilis—United States**

The rate of congenital syphilis remained unchanged between 2007 and 2008 (10.1 cases per 100,000 live births) although there was a 16% rate increase between 2006 and 2007 (Table 40). In 2008, 431 cases were reported (the same number reported in 2007), an increase from 372 in 2006. The increase in the rate of congenital syphilis since 2005 when the rate reached a nadir at 8.2 cases per 100,000 live births may relate to the increase in the rate of P&S syphilis among women that has occurred since 2004 (Figure 43).

In 2008, 27 states and one outlying area had one or more cases of congenital syphilis (Tables 39 and 40).

**Syphilis among Special Populations**

Additional information about syphilis and congenital syphilis in racial and ethnic minority populations, adolescents, MSM, and other at-risk populations is found in the *Special Focus Profiles*.  

**Syphilis Summary**

In recent years, MSM have accounted for an increasing number of syphilis cases in the United States; 963% of reported P&S syphilis cases in the United States are among MSM, based on information from 44 states and Washington, D.C. Although the majority of U.S. syphilis cases have occurred among MSM, syphilis among heterosexuals is an emerging problem.10


Figure 30. Syphilis—Reported cases by stage of infection: United States, 1941–2008

Figure 31. Primary and secondary syphilis—Rates: Total and by sex and male-to-female rate ratios: United States, 1989–2008
Figure 32. Primary and secondary syphilis—Rates by region: United States, 1999–2008

Figure 33. Primary and secondary syphilis—Rates by state: United States and outlying areas, 2008

NOTE: The total rate of P&S syphilis for the United States and outlying areas (Guam, Puerto Rico, and Virgin Islands) was 4.5 per 100,000 population.
**Figure 34.** Primary and secondary syphilis—Rates by county: United States, 2008

NOTE: In 2008, 2,180 (69.3%) of 3,141 counties in the United States reported no cases of P&S syphilis.

**Figure 35.** Primary and secondary syphilis—Age- and sex-specific rates: United States, 2008

<table>
<thead>
<tr>
<th>Age</th>
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<tr>
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<td>Rate (per 100,000 population)</td>
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</table>
Figure 36.  Primary and secondary syphilis—Age-specific rates among women 15 to 44 years of age: United States, 1999–2008

Rate (per 100,000 population)

Figure 37.  Primary and secondary syphilis—Age-specific rates among men 15 to 44 years of age: United States, 1999–2008

Rate (per 100,000 population)
Figure 38.  Primary and secondary syphilis—Rates by race/ethnicity: United States, 1999–2008

Figure 39.  Primary and secondary syphilis—Reported cases* by stage and sexual orientation, 2008

* 20% of reported male cases of P&S syphilis were missing sex of sex partner information.
† MSM denotes men who have sex with men.
Figure 40.  Primary and secondary syphilis—Reported cases* by sexual orientation and race/ethnicity, † 2008

Cases

* 20% of reported male cases of P&S syphilis were missing sex of sex partner information; 2% of reported male cases with sex of partner data were missing race/ethnicity data.
† No imputation was done for race/ethnicity.
‡ MSM denotes men who have sex with men.

Figure 41.  Primary and secondary syphilis—Reported cases by reporting source and sex: United States, 1999–2008

Cases (in thousands)
Figure 42. Primary and secondary syphilis—Percentage of reported cases* by sexual orientation and selected reporting sources, 2008

* 20% of reported male cases of P&S syphilis were missing sex of sex partner information; 3% of reported male cases with sex of partner data were missing source of information data.
† MSM denotes men who have sex with men.

Figure 43. Congenital syphilis (CS)—Reported cases for infants <1 year of age and rates of primary and secondary syphilis among women: United States, 1999–2008
Other Sexually Transmitted Diseases (STDs)

Chancroid
Since 1987, reported cases of chancroid declined steadily until 2001. Since then, the number of cases reported has fluctuated (Figure 44, Table 1). In 2008, 25 cases of chancroid were reported in the United States. Only nine states reported one or more cases of chancroid in 2008 (Table 42). Although the overall decline in reported chancroid cases most likely reflects a decline in the incidence of this disease, these data should be interpreted with caution since Haemophilus ducreyi, the causative organism of chancroid, is difficult to culture and, as a result, this condition may be substantially under-diagnosed.1,2

Human Papillomavirus (HPV)
Persistent infection with high-risk human papillomavirus (HPV) can lead to development of anogenital cancers (i.e., cervical cancer). In June 2006, a quadrivalent HPV vaccine was licensed for use in the United States. The vaccine provides protection against types 6, 11, 16, and 18. Types 6 and 11 are associated with genital warts while types 16 and 18 are oncogenic types associated with anogenital cancers.

Sentinel surveillance for cervical infection with high-risk HPV types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, or 68 was conducted in 26 STD, family planning and primary care clinics in six locations (Boston, Baltimore, New Orleans, Denver, Seattle and Los Angeles) as part of an effort to estimate national burden of disease and inform prevention efforts such as vaccine programs in the United States. Testing was performed using a commercially available test for high-risk HPV DNA (Hybrid Capture 2, Qiagen, Gaithersburg, MD). Results from 2003–2005 document an overall high-risk HPV prevalence of 23%. Prevalence in STD clinics was 27%, 26% in family planning clinics, and 15% in primary care clinics. Prevalence by age group was 35% in those 14 to 19 years of age; 29% in those 20 to 29 years of age; 13% in those 30 to 39 years of age; 11% in those 40 to 49 years of age; and 6.3% in those 50 to 65 years of age.3 National population-based data were also obtained from NHANES, examining prevalence in the civilian, non-institutionalized female population of the United States, 2003–2004, of both high-risk HPV and low-risk HPV including types 6 and 11, which are responsible for approximately 90% of anogenital warts (Figure 45). The overall HPV prevalence of high- and low-risk types, was 26.8% (95% confidence interval (CI): 23.3–30.9) among U.S. females 14 to 59 years of age. HPV vaccine preventable types 6 or 11 (low-risk types) or 16 or 18 (high-risk types) were detected in 3.4% of female participants; HPV-6 was detected in 1.3% (95% CI: 0.8–2.3), HPV-11 in 0.1% (95% CI: 0.03–0.3), HPV-16 in 1.5% (95% CI: 0.9–2.6), and HPV-18 in 0.8% (95% CI: 0.4–1.5) of female participants.4

Pelvic Inflammatory Disease (PID)
For data on PID, see the Special Focus Profile on Women and Infants.

Herpes Simplex Virus (HSV)
Case reporting data for genital HSV are not available. Trend data are based on estimates of the initial office visits in physicians’ offices, may be increasing. The NHANES 1999–2004 survey years demonstrated that 5.6% (95% CI: 4.9–6.4) of sexually active 18–59 year olds self-reported a history of a genital wart diagnosis.5
years 1976–1980, indicate that blacks had higher seroprevalence than whites for each survey period and age group\(^7\) (Figure 48). In 1999–2004, the overall percentage of survey participants who reported having been diagnosed with genital herpes was 3.8\%.\(^6\)

While HSV-2 seroprevalence is decreasing, most persons with HSV-2 have not been diagnosed. Increasing visits for genital herpes, as suggested by NDTI data, may indicate increased recognition of infection.

**Trichomoniasis**

Case reporting data are not available for trichomoniasis and trend data for this infection is limited to estimates of initial physician office visits from NDTI (Figure 49 and Table 43). NHANES data from 2001–2004 demonstrated an overall prevalence of 3.1\% (95\% CI: 2.3–4.3), with the highest prevalence observed among blacks 13.3\% (95\% CI: 10.0–17.7).\(^7\)

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Figure 44.  Chancroid—Reported cases: United States, 1981–2008

Figure 45.  Human papillomavirus (HPV)—Prevalence of high-risk and low-risk types among females 14 to 59 years of age from a national survey, 2003–2004

NOTE: Error bars indicate 95% confidence intervals. Both high-risk and low-risk HPV types were detected in some females.

SOURCE: National Health and Nutrition Examination Survey. JAMA, 2007;297:813–819. © 2007 American Medical Association. All rights reserved.
Figure 46.  Genital warts—Initial visits to physicians’ offices: United States, 1966–2008

Visits (in thousands)

NOTE: See Appendix (Other Data Sources) and Table 43. The relative standard error for genital warts estimates range from 18% to 30%.


Figure 47.  Genital herpes—Initial visits to physicians’ offices: United States, 1966–2008

Visits (in thousands)

NOTE: See Appendix (Other Data Sources) and Table 43. The relative standard error for genital herpes estimates range from 18% to 30%.


* Age-adjusted using the 2000 U.S. Census civilian, noninstitutionalized population aged 14 to 49 years as the standard.

NOTE: Error bars indicate 95% confidence intervals.

SOURCE: National Health and Nutrition Examination Survey. JAMA 2006;296:964–973. © 2006 American Medical Association. All rights reserved.
Figure 49. Trichomoniasis and other vaginal infections in women—Initial visits to physicians’ offices: United States, 1966–2008

Visits (in thousands)

Note: See Appendix (Other Data Sources) and Table 43. The relative standard error for trichomoniasis estimates range from 16% to 27% and for other vaginitis estimates range from 8% to 13%.