

STDs in Women and Infants

Public Health Impact

Women and infants disproportionately bear the long term consequences of STDs. Women infected with *Neisseria gonorrhoeae* or *Chlamydia trachomatis* can develop pelvic inflammatory disease (PID), which, in turn, may lead to reproductive system morbidity such as ectopic pregnancy and tubal factor infertility. If not adequately treated, 20% to 40% of women infected with chlamydia¹ and 10% to 40% of women infected with gonorrhea² may develop PID. Among women with PID, tubal scarring will cause involuntary infertility in 20%, ectopic pregnancy in 9%, and chronic pelvic pain in 18%.³ Approximately 70% of chlamydia infections and 50% of gonococcal infections in women are asymptomatic.⁴⁻⁶ These infections are detected primarily through screening programs. The vague symptoms associated with chlamydial and gonococcal PID cause 85% of women to delay seeking medical care, thereby increasing the risk of infertility and ectopic pregnancy.⁷ Data from a randomized controlled trial of chlamydia screening in a managed care setting suggest that such screening programs can reduce the incidence of PID by as much as 60%.⁸

Gonorrhea and chlamydia can also result in adverse outcomes of pregnancy, including neonatal ophthalmia and, in the case of chlamydia, neonatal pneumonia. Although topical prophylaxis of infants at delivery is effective for prevention of ophthalmia neonatorum, prevention of neonatal pneumonia requires prenatal detection and treatment.

Human papillomavirus (HPV) infections are highly prevalent, especially among young sexually active women. While the great majority of HPV infections in women resolve within one year, they are a major concern because persistent infection with specific types (e.g., types 16, 18, 31, 33, 35, and 45), are causally related to cervical cancer; these types also cause Pap smear abnormalities. Other types (e.g., types 6 and 11) cause genital warts, low grade Pap smear abnormalities and, rarely, recurrent respiratory papillomatosis in infants born to infected mothers.⁹

Genital infections with herpes simplex virus are extremely common, may cause painful outbreaks, and may have serious consequences for pregnant women including potentially fatal neonatal infections.¹⁰

When a woman has a syphilis infection during pregnancy, she may transmit the infection to the fetus in utero. This may result in fetal death or an infant born with physical and mental developmental disabilities. Most cases of congenital syphilis are easily preventable if women are screened for syphilis and treated early during prenatal care.¹¹

Observations

- Between 2002 and 2003, the rate of chlamydia infections in women increased from 445.0 to 466.9 per 100,000 females (Figure 6, Table 4). Chlamydia rates

exceed gonorrhea rates among women in all states (Figures A and B, Tables 4 and 14).

- In 2003, the median state-specific chlamydia test positivity among 15- to 24-year-old women screened in selected prenatal clinics in 27 states, Puerto Rico, and the Virgin Islands was 7.4% (range 2.4% to 19.7%) (Figure F).
- In 2003, 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 states and outlying areas was 5.9% (range 2.8% to 18.9%) (Figure 8).
- Gonorrhea rates among women were higher than the overall HP 2010 target of 19.0 cases per 100,000 population¹² in 42 states and two outlying areas in 2003 (Figure B, Table 14). As in previous years, the highest rates of gonorrhea among women in 2003 occurred in the South (Figure B).
- Like chlamydia, gonorrhea is often asymptomatic in women and can only be identified through screening. Large-scale screening programs for gonorrhea in women began in the 1970s. After an initial increase in cases detected through screening, gonorrhea rates for both women and men declined steadily throughout the 1980s and early 1990s (Figure 15, Tables 14 and 15). The gonorrhea rate for women in 2003 (118.8 per 100,000 females) showed a slight decline since 1999. In 2003, the gonorrhea rate among males declined to 113.0 per 100,000 males, below the female gonorrhea rate (Figure 15).
- In 2003, the median state-specific gonorrhea test positivity among 15- to 24-year-old women screened in selected prenatal clinics in 23 states, Puerto Rico, and the Virgin Islands was 1.0% (range 0.0% to 3.7%) (Figure G).
- The HP2010 target for primary and secondary (P&S) syphilis is 0.2 case per 100,000 population. In 2003, 30 states, the District of Columbia, and two outlying areas had rates of P&S syphilis for women that were greater than 0.2 case per 100,000 population (Tables 27 and 31).
- The HP2010 target for congenital syphilis is 1.0 case per 100,000 live births. In 2003, 29 states, the District of Columbia, and two outlying areas had rates higher than this target (Figure 34, Tables 40-42).
- The number of congenital syphilis cases closely follows the trend of P&S syphilis among women (Figure 33). Peaks in congenital syphilis usually occur one year after peaks in P&S syphilis among women. The congenital syphilis rate peaked in 1991 at 107.3 cases per 100,000 live births, and declined by 90.4% to 10.3 cases per 100,000 live births in 2003 (Figure 34, Table 39). The rate of P&S syphilis among women declined 95.4% (from 17.3 to 0.8 cases per 100,000 females) during 1990-2003 (Figure 29).
- The 2003 rate of congenital syphilis for the United States is currently 10 times higher than the HP2010 target of 1.0 case per 100,000 live births. This target is many times greater than the rate of congenital syphilis of most industrialized countries where syphilis and congenital syphilis have nearly been eliminated.
- While most cases of congenital syphilis occur among infants whose mothers have had some prenatal care (Figure E), late or limited prenatal care has been associated with congenital syphilis. Failure of health care providers to adhere to maternal syphilis screening recommendations also contributes to the occurrence of congenital syphilis.¹³

- Accurate estimates of pelvic inflammatory disease (PID) and tubal factor infertility resulting from gonococcal and chlamydia infections are difficult to obtain. Definitive diagnosis of these conditions can be complex.
- Hospitalizations for PID have declined steadily throughout the 1980s and early 1990s, but have remained relatively constant between 1995 and 2002 (Figure I). A greater proportion of women diagnosed with PID in the 1990s have been treated in outpatient instead of inpatient settings when compared to women diagnosed with PID in the 1980s.¹⁴
- The reported number of initial visits to physicians' offices for PID through the National Disease and Therapeutic Index (NDTI) has generally declined from 1993 through 2003 (Figure J and Table 47). In 2001, an estimated 187,781 cases of PID were diagnosed in emergency departments among women 15 to 44 years of age; a similar number were estimated in 2002, 189,662 (National Hospital Ambulatory Medical Care Survey, NCHS).
- Evidence suggests that health care practices associated with ectopic pregnancy changed in the late 1980s and early 1990s. Before that time, treatment of ectopic pregnancy usually required admission to a hospital. Hospitalization statistics were therefore useful for monitoring trends in ectopic pregnancy. Beginning in 1989, hospitalizations for ectopic pregnancy have generally declined over time (Figure H). Data suggest that nearly half of all ectopic pregnancies are treated on an outpatient basis.¹⁵

¹ Stamm WE, Guinan ME, Johnson C. Effect of treatment regimens for *Neisseria gonorrhoeae* on simultaneous infections with *Chlamydia trachomatis*. *N Engl J Med* 1984;310:545-9.

² Platt R, Rice PA, McCormack WM. Risk of acquiring gonorrhea and prevalence of abnormal adnexal findings among women recently exposed to gonorrhea. *JAMA* 1983;250:3205-9.

³ Westrom L, Joesoef R, Reynolds G, et al. Pelvic inflammatory disease and fertility: a cohort study of 1,844 women with laparoscopically verified disease and 657 control women with normal laparoscopy. *Sex Transm Dis* 1992;9:185-92.

⁴ Hook EW III, Handsfield HH. Gonococcal infections in the adult. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. *Sexually Transmitted Diseases*, 2nd edition. New York City: McGraw-Hill, Inc, 1990:149-65.

⁵ Stamm WE, Holmes KK. *Chlamydia trachomatis* infections in the adult. In: Holmes KK, Mardh PA, Sparling PF, et al, eds. *Sexually Transmitted Diseases*, 2nd edition. New York City: McGraw-Hill, Inc, 1990:181-93.

⁶ Zimmerman HL, Potterat JJ, Dukes RL, et al. Epidemiologic differences between chlamydia and gonorrhea. *Am J Public Health* 1990;80:1338-42.

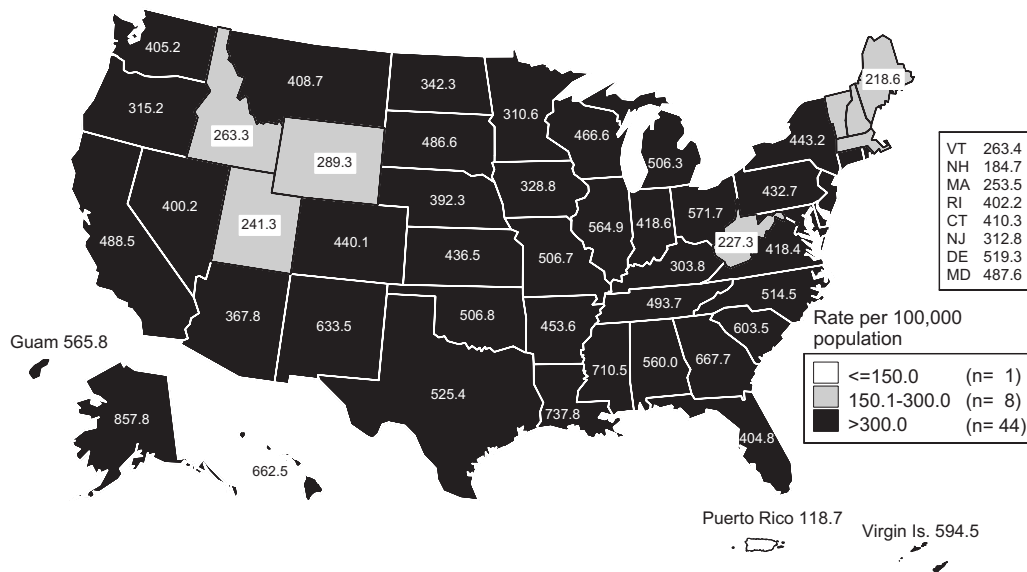
⁷ Hillis SD, Joesoef R, Marchbanks PA, et al. Delayed care of pelvic inflammatory disease as a risk factor for impaired fertility. *Am J Obstet Gynecol* 1993;168:1503-9.

⁸ Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. *N Engl J Med* 1996;34(21):1362-6.

⁹ Division of STD Prevention. *Prevention of Genital HPV Infection and Sequelae: Report of an External Consultants' Meeting*. National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, December 1999.

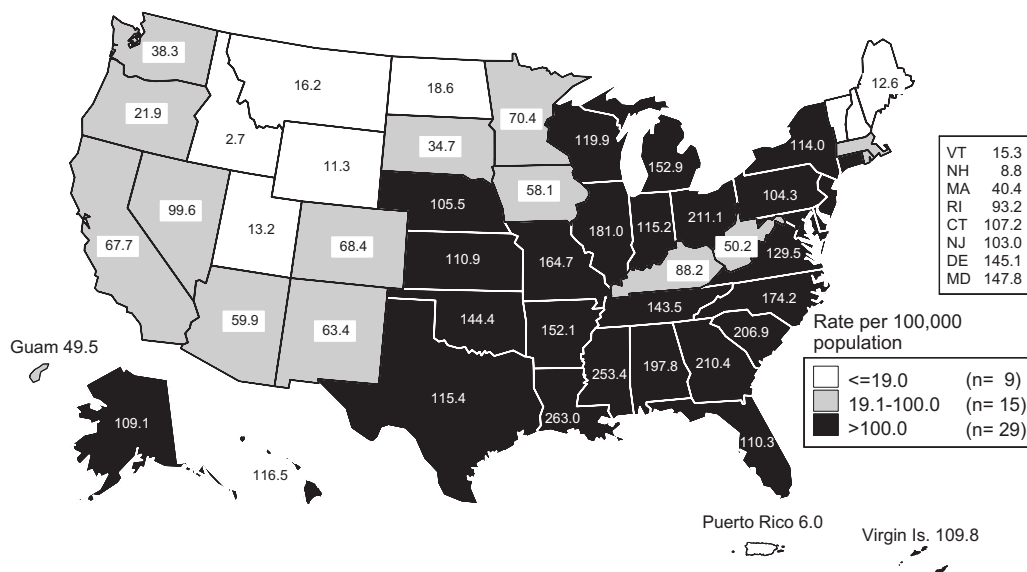
- ¹⁰Handsfield HH, Stone KM, Wasserheit JN. Prevention agenda for genital herpes. *Sex Transm Dis* 1999;26:228-231.
- ¹¹Centers for Disease Control. Guidelines for prevention and control of congenital syphilis. *MMWR* 1988;37(No.S-1).
- ¹²U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.
- ¹³Centers for Disease Control and Prevention. Congenital syphilis – United States, 2002. *MMWR* 2004;53:716-9.
- ¹⁴Rolfs RT, Galaid EI, Zaidi AA. Pelvic inflammatory disease: trends in hospitalization and office visits, 1979 through 1988. *Am J Obstet Gynecol* 1992;166:983-90.
- ¹⁵Centers for Disease Control and Prevention. Ectopic pregnancy in the United States, 1990-1992. *MMWR* 1995;44:46-8.

Figure A. Chlamydia — Rates among women by state: United States and outlying areas, 2003



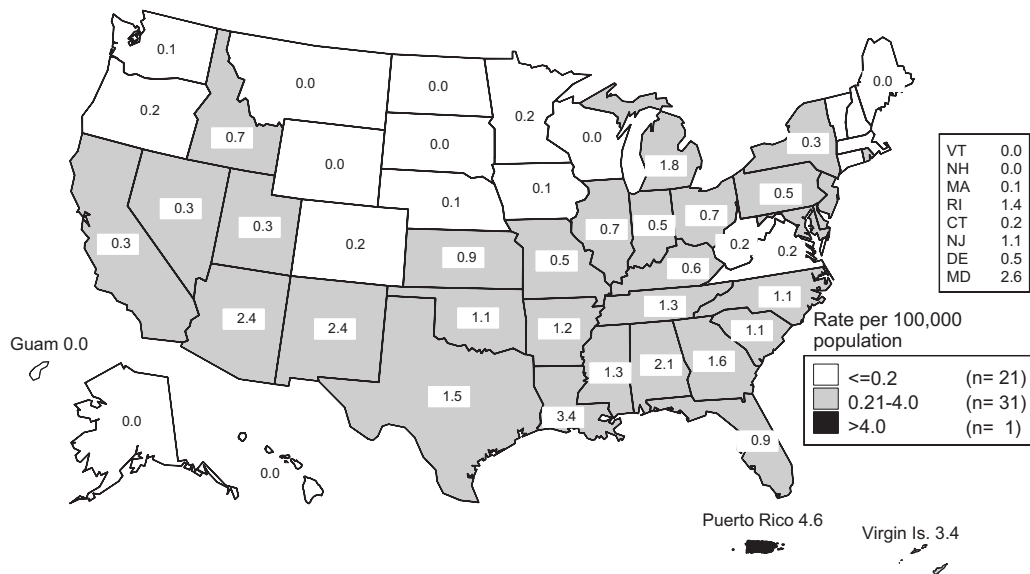
Note: The total chlamydia infection rate among women in the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 462.3 per 100,000 female population.

Figure B. Gonorrhea — Rates among women by state: United States and outlying areas, 2003



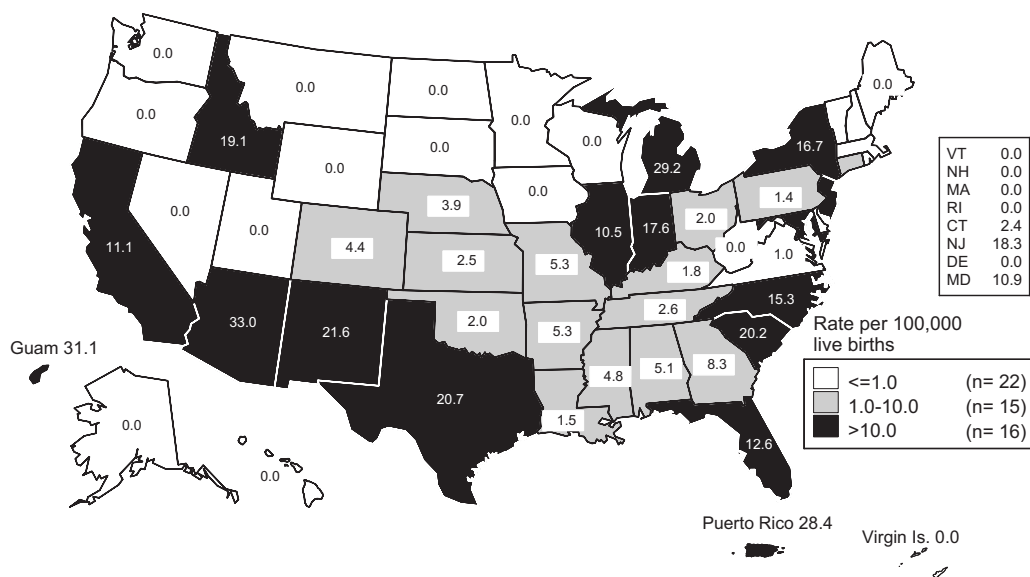
Note: The total gonorrhea infection rate among women in the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 117.2 per 100,000 female population.

Figure C. Primary and secondary syphilis — Rates for women by state: United States and outlying areas, 2003



Note: The total rate of P&S syphilis among women in the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 0.9 per 100,000 female population.

Figure D. Congenital syphilis — Rates for infants <1 year of age by state: United States and outlying areas, 2003



Note: The total rate of congenital syphilis for infants <1 year of age for the United States and outlying areas (Guam, Puerto Rico and Virgin Islands) was 10.5 per 100,000 live births. The Healthy People 2010 target is 1.0 case per 100,000 live births.

Figure E . Congenital syphilis — Cases by prenatal care utilization: United States, 1995-2003

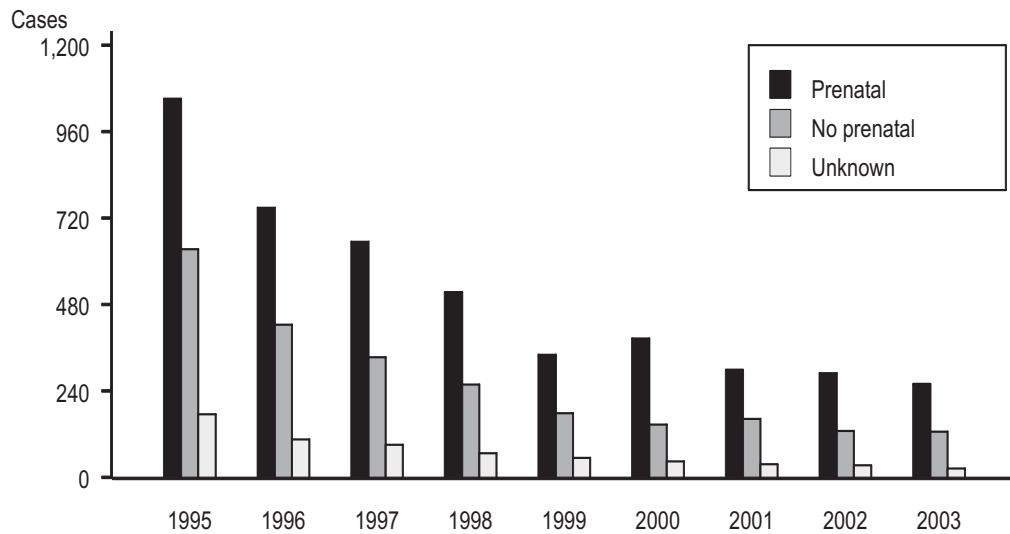
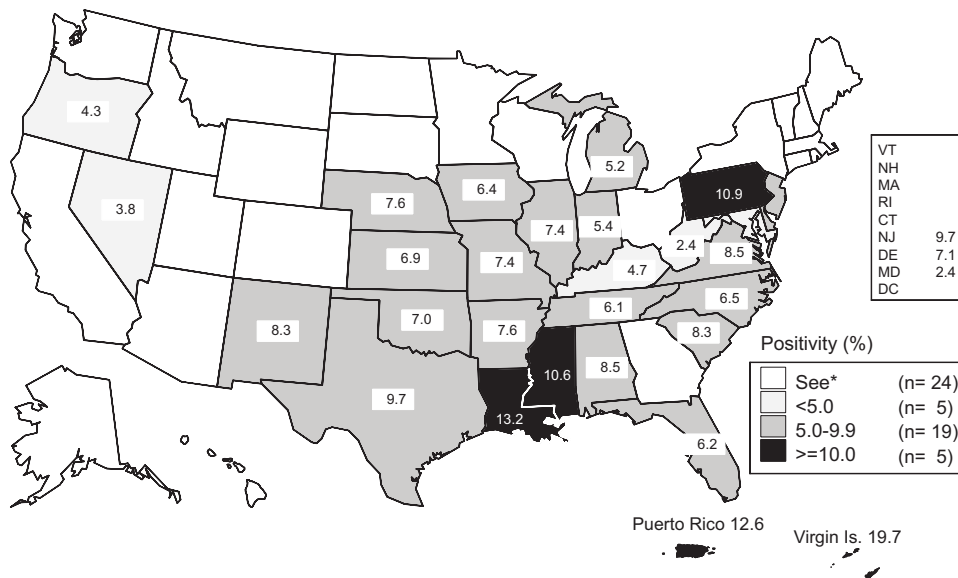


Figure F. Chlamydia — Positivity in 15- to 24-year-old women tested in prenatal clinics by state: United States and outlying areas, 2003

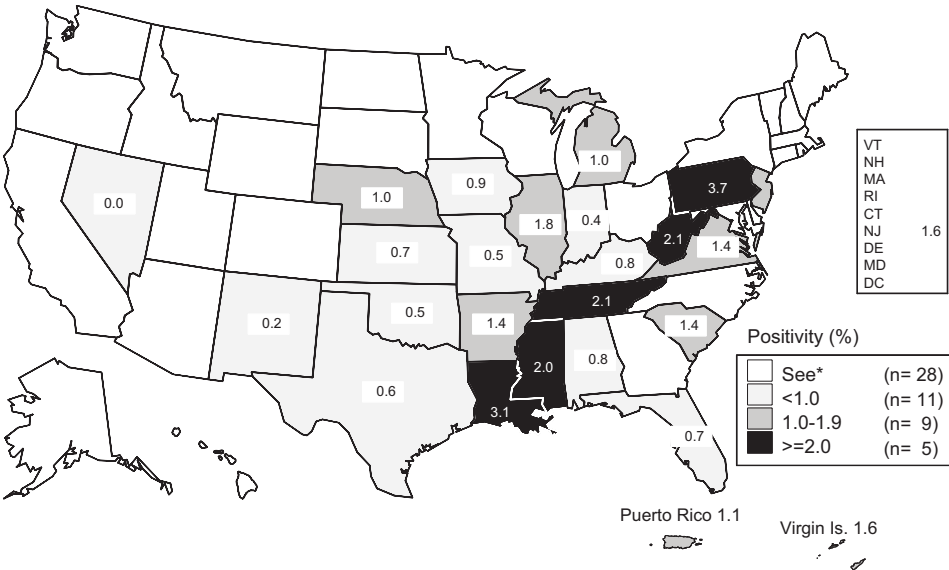


*States not reporting chlamydia positivity data in prenatal clinics.

Note: Includes states and outlying areas that reported chlamydia positivity data on at least 100 women aged 15-24 years during 2003.

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

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



*States not reporting gonorrhea positivity data in prenatal clinics.
 Note: Includes states and outlying areas that reported gonorrhea positivity data on at least 100 women aged 15-24 years during 2003.

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

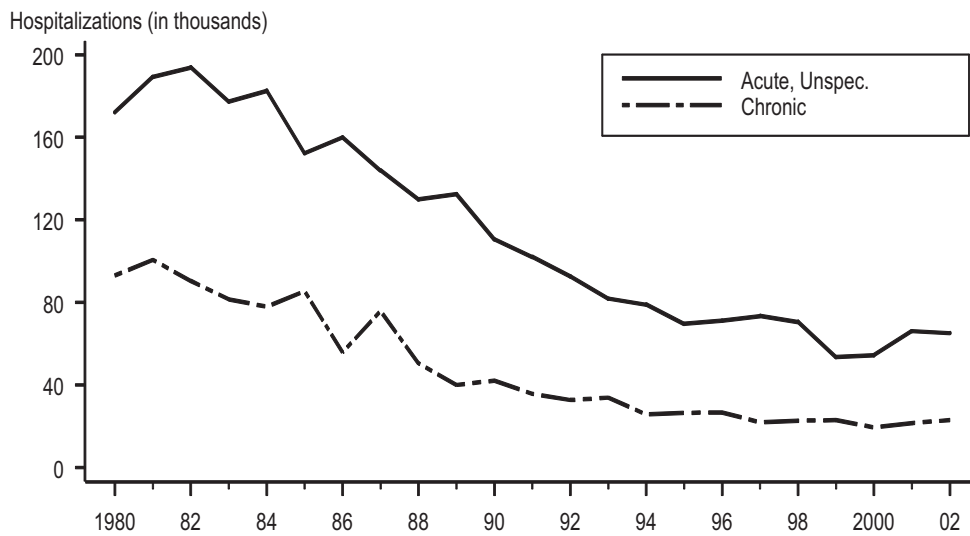
Figure H. Ectopic pregnancy — Hospitalizations of women 15 to 44 years of age: United States, 1980-2002



Note: Some variations in 1981 and 1988 estimates may be due to changes in sampling procedures. The relative standard error for these estimates ranges from 8% to 12%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

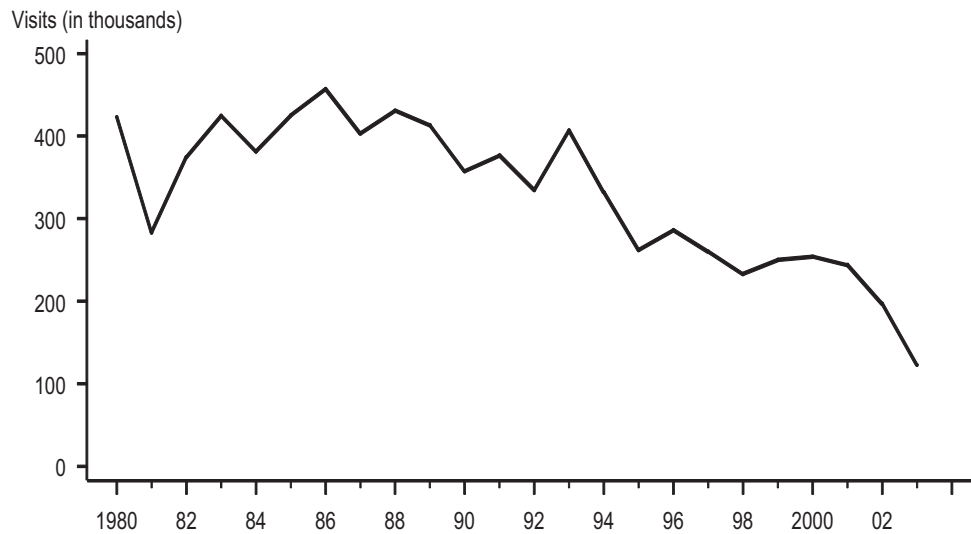
Figure I. Pelvic inflammatory disease — Hospitalizations of women 15 to 44 years of age: United States, 1980–2002



Note: The relative standard error for the estimates of the overall total number of PID cases range from 6% to 18%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

Figure J. Pelvic inflammatory disease — Initial visits to physicians' offices by women 15 to 44 years of age: United States, 1980–2003



Note: See Appendix (Other Data Sources) and Table 47.

SOURCE: National Disease and Therapeutic Index (IMS Health)

