

# TRACKING THE HIDDEN EPIDEMICS

Trends in STDs in the United States

# 2000

Magnitude  
of STD  
Epidemics

STDs at a  
Glance

Trends by  
Disease

A Closer  
Look by Race/  
Ethnicity,  
Gender  
and Age

Status of  
STDs by City  
and State



# TRACKING THE HIDDEN EPIDEMICS

Trends in STDs in the United States

Introduction.....	1
Magnitude of the Epidemics Overall.....	2
Answers to the Most Frequently Asked Questions.....	3
<b>TRENDS BY DISEASE</b>	
Chlamydia.....	6
Gonorrhea.....	9
Syphilis.....	14
Human Papillomavirus (HPV).....	18
Herpes.....	20
Hepatitis B.....	22
Trichomoniasis and Bacterial Vaginosis.....	24
Chancroid.....	25
Status of STDs by City And State.....	26
Bibliography.....	30
Notes.....	32

# 2000

**I**n the United States, more than 65 million people are currently living with an incurable sexually transmitted disease (STD). An additional 15 million people become infected with one or more STDs each year, roughly half of whom contract lifelong infections (Cates, 1999). Yet, STDs are one of the most under-recognized health problems in the country today. Despite the fact that STDs are extremely widespread, have severe and sometimes deadly consequences, and add billions of dollars to the nation's healthcare costs each year, most people in the United States remain unaware of the risks and consequences of all but the most prominent STD—the human immunodeficiency virus or HIV.

While extremely common, STDs are difficult to track. Many people with these infections do not have symptoms and remain undiagnosed. Even diseases that are diagnosed are frequently not reported and counted. These “hidden” epidemics are magnified with each new infection that goes unrecognized and untreated.

This document presents the latest available data on the status of the STD epidemics in the United States. By combining data on reported cases of disease with various studies of the level of infection in specific populations, researchers can compile a more complete picture of the magnitude of these diseases.

# Magnitude of the Epidemics Overall

More than 25 diseases are spread primarily through sexual activity, and the trends for each disease vary considerably, but together these infections comprise a significant public health problem.

The latest estimates indicate that there are 15 million new STD cases in the United States each year (Cates, 1999). Approximately one-fourth of these new infections are in teenagers. And while some STDs, such as syphilis, have been brought to all time lows, others, like genital herpes, gonorrhea, and chlamydia, continue to resurge and spread through the population.

Because there is no single STD epidemic, but rather multiple epidemics, discussions about trends over time and populations affected must focus on each specific STD. More is known about the frequency and trends of some STDs than others, since many of the diseases are difficult to track. Not including HIV, the most common STDs in the U.S. are chlamydia, gonorrhea, syphilis, genital herpes, human papillomavirus, hepatitis B, trichomoniasis and bacterial vaginosis. The latest estimates of incidence and prevalence are provided below.

<b>STD</b>	<b>Incidence</b> (Estimated number of new cases every year)	<b>Prevalence*</b> (Estimated number of people currently infected)
Chlamydia	3 million	2 million
Gonorrhea	650,000	Not Available
Syphilis	70,000	Not Available
Herpes	1 million	45 million
Human Papillomavirus (hpv)	5.5 million	20 million
Hepatitis B	120,000	417,000
Trichomoniasis	5 million	Not Available
Bacterial Vaginosis**	Not Available	Not Available
<p>*No recent surveys on national prevalence for gonorrhea, syphilis, trichomoniasis or bacterial vaginosis have been conducted.</p> <p>**Bacterial vaginosis is a genital infection that is not sexually transmitted but is associated with sexual intercourse.</p> <p>Source: CATES, 1999</p>		

# Answers to the Most Frequently Asked Questions

Note: More detailed answers and supporting data are provided in the Trends by Disease section.

## Are STDs increasing or decreasing in the United States?

It depends on the disease. The latest scientific data suggest that chlamydia has declined in areas with screening and treatment programs, but remains at very high levels. For the first time in nearly two decades, gonorrhea is on the rise, increasing more than nine percent from 1997 to 1999, after a 72 percent decline from 1975 to 1997. An increase in drug-resistant gonorrhea has been seen in Hawaii and in small clusters in other states. Syphilis, in both adults and infants, has declined overall and is now at an all time low, presenting an opportunity for elimination of the disease. In October 1999, CDC launched the National Plan to Eliminate Syphilis in the United States. Chancroid also has declined steadily since 1987 (DSTDP, CDC, 2000).

Genital herpes continues to increase, spreading across all social, economic, racial and ethnic boundaries, but most dramatically affecting teens and young adults (Fleming, 1997). With an estimated 20 million people in the United States currently infected with human papillomavirus (HPV), this viral STD also continues to spread. An estimated 5.5 million people become newly infected with HPV each year (Cates, 1999).

## What are the most serious STDs in women?

By far, women bear the greatest burden of STDs, suffering more frequent and more serious complications than men. Ten to 20 percent of women

with gonorrhea and chlamydia develop one of the most serious complications, pelvic inflammatory disease (PID). PID can lead to chronic pelvic pain, infertility, and potentially fatal ectopic pregnancy. Many different organisms can cause PID, but most cases are associated with gonorrhea and chlamydia.

HPV also can result in severe consequences for women. Infection with certain types of HPV place women at increased risk for cervical cancer.

In addition, women who are infected with an STD while pregnant can have early onset of labor, premature rupture of the membranes, or uterine infection before and after delivery. STD-related syndromes—like bacterial vaginosis—may cause harm to infants through their association with premature birth. Preterm birth is the leading cause of infant death and disability in the United States, and there has been no reduction in more than 20 years. It is estimated that 30 to 40 percent of excess preterm births and infant deaths are due to STDs and bacterial vaginosis (Goldenberg, 1996).

## Can the most serious STDs infect babies?

Many STDs can be passed from an infected woman to fetus, newborn, or infant, before, during or after birth. Some STDs—like syphilis—cross the placenta and infect the fetus during its development. Other STDs—like gonorrhea, chlamydia, genital herpes, and genital HPV infection—are transmitted from mother to child as the infant passes through the birth canal. HIV infection can cross the placenta

during pregnancy, can infect the newborn during the birth process, or unlike other STDs, can infect a child as a result of breast feeding.

If an STD in a pregnant woman is detected soon enough, precautions can often be taken so that the disease is not spread to the baby. Newborns infected with syphilis and herpes may suffer severe consequences not completely relieved by treatment, including neurologic damage and death. Gonorrhea and chlamydia can cause prematurity, eye disease, and pneumonia in infants.

### What are the most common STDs among teens?

Teens are at high behavioral risk for acquiring most STDs. Teenagers and young adults are more likely than other age groups to have multiple sex partners, to engage in unprotected sex, and, for young women, to choose sexual partners older than themselves. Moreover, young women are biologically more susceptible to chlamydia, gonorrhea and HIV.

Chlamydia and gonorrhea are the most common curable STDs among teens. Curable STDs are typically caused by bacteria that can be killed with antibiotics. However, if these diseases remain undetected and untreated, they can result in severe health consequences later in life. Among teens, it is not uncommon to see more than five percent of young men and five to 10 percent of young women infected with chlamydia (Mertz, CDC, 1998). Rates of gonorrhea are highest in females 15 to 19 years of age and in males 20 to 24 years of age.

The prevalence of herpes increases with age. Since this disease stays within the body once acquired, the older people are, the more likely they have been infected. The rate of new infections for herpes and HPV—both viral STDs—is typically highest during the late teens and early twenties. Among women under the age of 25, studies have found that 28 to 46 percent are typically infected with HPV. Between 15 to 20 percent of young men and women have become infected with herpes by the time they reach adulthood.

### What are STD trends in teens?

Syphilis, hepatitis B, and chancroid are declining among teens and other age groups. Chlamydia is likely going down in areas where there is screening and treatment among teens at family planning clinics and school-based screening programs. In areas where these services are not available, the disease may be increasing. Herpes was increasing among teens through the early 1990s. Currently, the data are not available to tell us whether HPV, trichomoniasis, or bacterial vaginosis are increasing, but these diseases are extremely widespread.

### What are the most common STDs among men who have sex with men?

Researchers estimate that men who have sex with men (MSM) still account for 42 percent of new HIV infections annually in the United States and for 60 percent of all new HIV infections among men. Several recent studies have pointed to high, and increasing, levels of other STDs among MSM.

One 26-city study, the Gonococcal Isolate Surveillance Project, reported that from 1994 to 1999, the proportion of gonorrhea cases among MSM more than doubled from six to 13 percent. An STD clinic in Washington, D.C., serving a large number of gay and bisexual men reported that gonorrhea cases increased 93 percent from 1993 to 1996, with 82 percent of these cases among MSM.

In King County, Washington—which includes the city of Seattle—researchers reported marked increases in both gonorrhea and syphilis cases among MSM. Most notably, while the county had no cases of early syphilis in 1996, 88 cases were reported between 1998 and the first half of 1999, 85 percent of which were in gay and bisexual men. These men reported having multiple partners and frequently engaging in unprotected anal intercourse.

### What areas of the country have the greatest problems with STDs?

Herpes and HPV are widespread throughout the nation, showing very little regional variation.

Chlamydia is also extremely common across geographic boundaries, but is on the decline in regions where effective screening and treatment programs are in place. Chlamydia remains most widespread among women in the southern region of the country. The south also faces the highest rates of both gonorrhea and syphilis. The high rates of STDs in the south may be due to high rates of poverty and lack of access to quality health care.

### Are STDs more common among racial and ethnic minorities? If so, why?

Although STDs like chlamydia, HPV, and herpes are widespread across racial and ethnic groups, STD rates tend to be higher among African Americans than white Americans. Reported rates of some STDs, like gonorrhea and syphilis, are as much as 30 times higher for African Americans than for whites. This disparity is due, in part, to the fact that African Americans are more likely to seek care in public clinics that report STDs more completely than private providers. However, this reporting bias does not fully explain these differences. Other important factors include the distribution of poverty, access to quality health care, health-seeking behaviors, the level of drug use, and sexual networks with high STD prevalence.

Moreover, the level of prevention education may vary widely across communities. In some areas, community-based efforts may be widespread across social, educational, and religious organizations, but in others, STD prevention may not yet be a high priority. Efforts are underway to increase both public and private sector HIV and STD prevention efforts in communities at risk throughout the nation. Yet, research demonstrates that some groups at very high risk still lack even basic information about STD prevention (Bunel, CDC, 1998).

### What are the economic costs of STDs in the United States?

STDs are associated with both direct and indirect costs. Direct costs include expenditures for medical and non-medical services and materials, such as physician services, laboratory services, hospitalization, transportation, and medical supplies. Indirect costs mainly include lost wages due to illness or premature death. STDs also result in intangible costs related to pain, suffering, and diminished quality of life. In 1994, the direct and indirect costs of the major STDs and their complications were estimated to total almost \$17 billion annually.

<b>Estimated Cost of Selected STDs in the United States, 1994</b>	
<b>STD</b>	<b>Total cost (\$ millions)</b>
Chlamydia	2,013
Gonorrhea	1,051
PID	4,148
Syphilis	106
Chancroid	1
Herpes simplex	237
HPV	3,827
Hepatitis B	156
Cervical cancer	737
Sexually transmitted HIV	6,683
<b>Total</b>	<b>16,638</b>

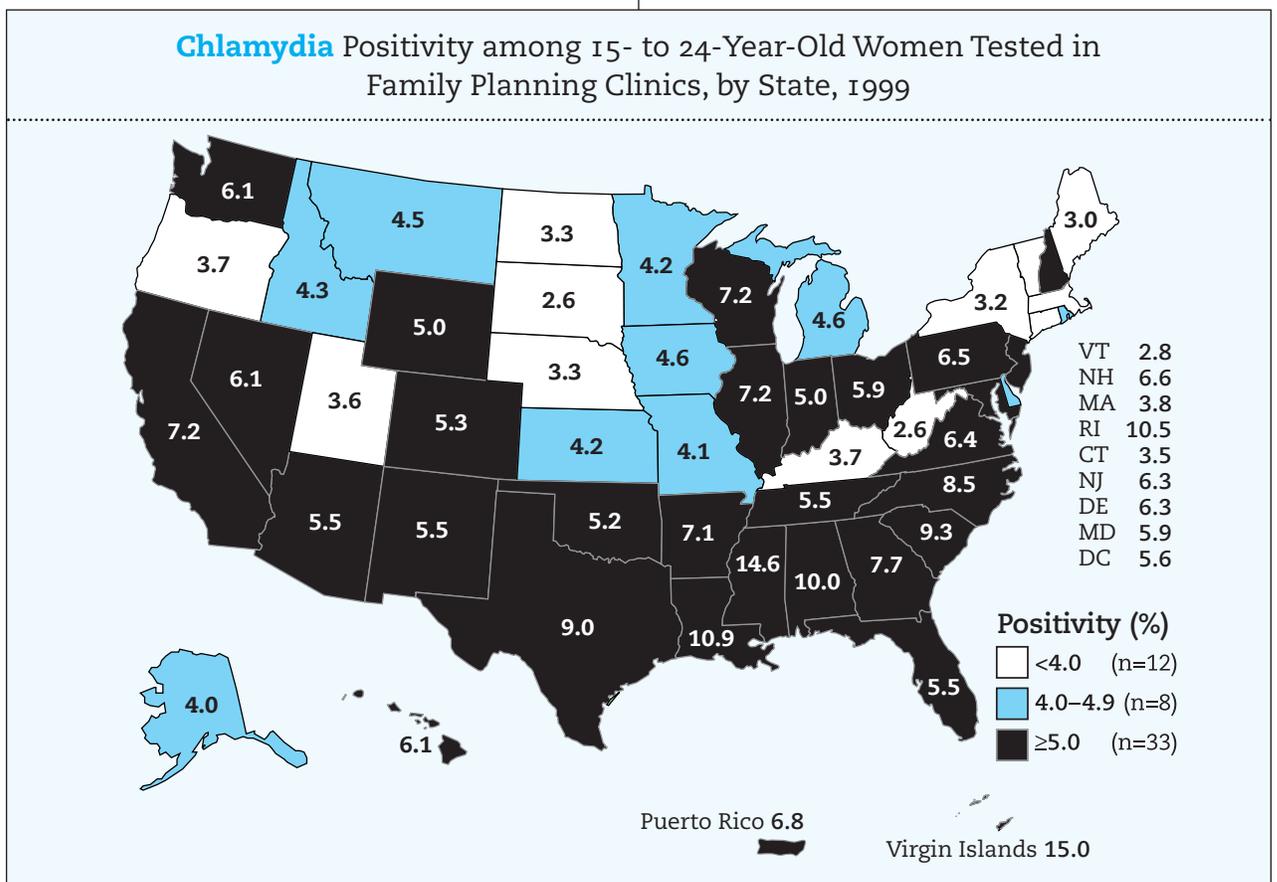
Source: Institute of Medicine. *The Hidden Epidemic: Confronting Sexually Transmitted Diseases*. Washington, D.C.: National Academy Press, 1997.

# Chlamydia

Chlamydia is the most commonly reported infectious disease in the United States and may be one of the most dangerous sexually transmitted diseases among women today. While the disease can be easily cured with antibiotics, millions of cases go unrecognized. If left untreated, chlamydia can have severe consequences, particularly for women. Up to 40 percent of women with untreated chlamydia will develop pelvic inflammatory disease (PID), and one in five women with PID becomes infertile. Chlamydia also can cause prematurity, eye disease, and pneumonia in infants. Moreover, women infected with chlamydia are three to five times more likely to become infected with HIV, if exposed.

Seventy-five percent of women and 50 percent of men with chlamydia have no symptoms. The majority of cases therefore go undiagnosed and unreported. The number of reported cases—about 660,000 cases in 1999—is merely the tip of the iceberg.

- An estimated three million people contract chlamydia each year (Gates, 1999).
- Chlamydia is believed to be declining overall in the United States, primarily because of increased efforts to screen and treat women for chlamydia. Chlamydia is estimated to have declined from well over four million annual infections in the early 1980s to the current level of three million annual infections (Cates, 1999).
- Reported chlamydia rates in women greatly exceed those in men largely because screening programs have been primarily directed at women. True rates are probably far more similar for women and men.
- Since 1994, there has been increased funding available for chlamydia screening in publicly funded family planning and STD clinics. The percentage of women testing positive for chlamydia—chlamydia positivity—in family planning clinics by state provides a good indication of where the disease remains most wide-



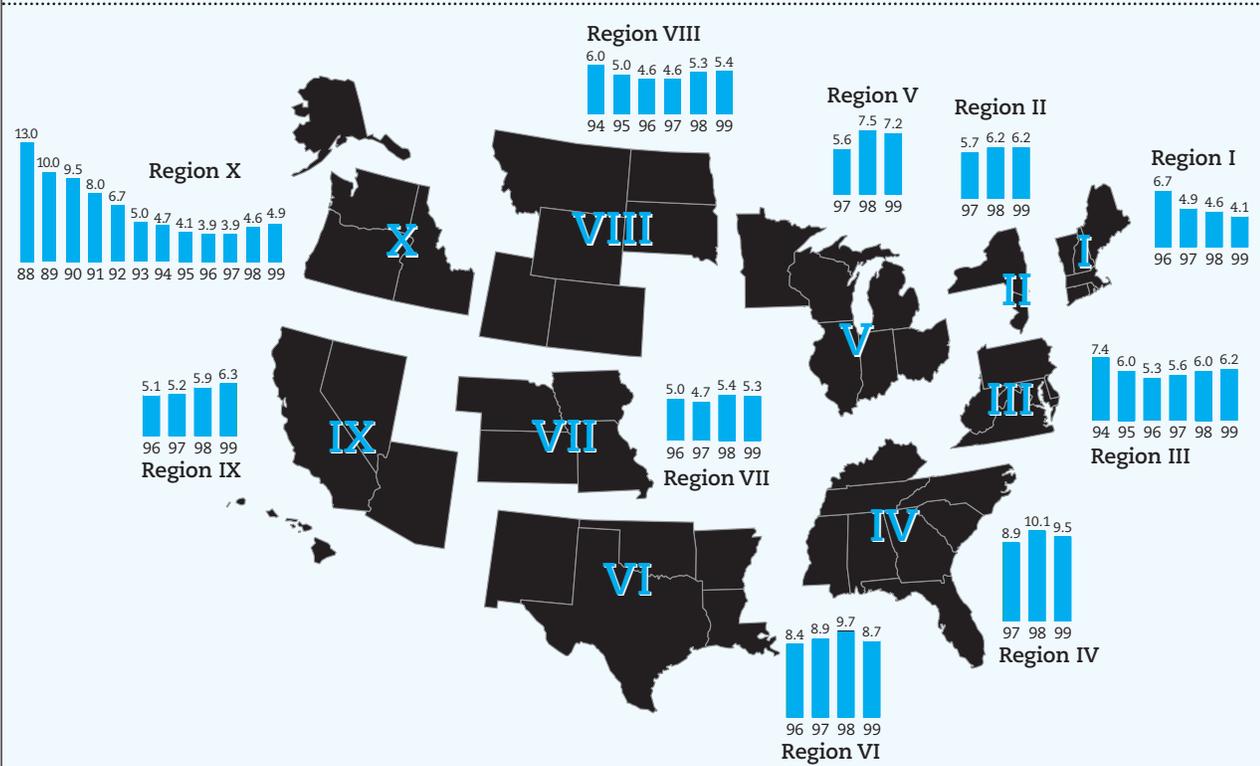
spread. The highest level of infection tends to be seen in areas where screening and treatment have not been as widely implemented. The greatest declines have generally been in areas of the country with the most effective and prolonged screening programs.

- From 1988 to 1999, the Pacific northwest—Washington, Oregon, Idaho, and Alaska—witnessed a 62 percent decline in infection among women tested for chlamydia in family planning clinics.
- In the Mid-Atlantic States—Delaware, Washington, D.C., Maryland, Pennsylvania, Virginia, and West Virginia—similar trends are occurring, with a decline of 16 percent since 1994 (DSTDP, CDC, 2000).
- From 1997 to 1999, chlamydia test positivity in family planning clinics actually increased in eight out of 10 regions. However, these reported increases are most likely due to changes in newly available and better laboratory tests and expanded screening programs to populations with higher levels of disease (DSTDP, CDC, 2000).

Reducing the level of chlamydia will require continued expansion of screening and treatment among women and new efforts to reach men. While men experience symptoms and seek treatment on their own more often than women, half of men with chlamydia are asymptomatic. Reaching these men with treatment is critical to stem the spread of chlamydia and its severe consequences.

It is also critical to reach those at greatest risk, primarily young people, with programs to help reduce their risk of infection through safer sexual behaviors.

**Chlamydia** Positivity among 15- to 44-Year-Old Women Tested in Family Planning Clinics, by HHS Regions, 1999



# A Closer Look at Chlamydia

Chlamydia is widespread among the sexually active population, regardless of race, ethnicity, age, or gender. It is more concentrated among adolescents than any other STD with the highest rates seen among female adolescents. Data on male adolescents also reveal an alarming level of infection.

## BY GENDER AND AGE

Forty percent of chlamydia cases are reported among young people, 15 to 19 years old. Reported prevalence among sexually active women is consistently more than five percent, with prevalence among teenage girls often exceeding 10 percent—more than one in 10. And while the data are more limited for men, studies of adolescent males tested in high schools and other settings have found prevalence of more than five percent (Cohen, 1998; Ku, 1997). Recent studies and screening programs in multiple settings throughout the country come to the same conclusion: chlamydia continues to exact a devastating toll among our nation's young people.

- In 1999, nearly 10 percent (9.9 percent) of 17- to 37-year-old women screened for STDs during their induction into the Army tested positive for chlamydia (DSTDP, CDC, 2000).
- In 1999, 7.2 percent of 15- to 24-year-old females screened in selected prenatal clinics in 22 states were positive for chlamydia (DSTDP, CDC, 2000).
- In 1999, of adolescent women entering juvenile detention facilities where chlamydia screening was routine, 13 percent tested positive for chlamydia (DSTDP, CDC, 2000).
- A 1999 school-based screening program among high school students—ninth to twelfth grade—in New Orleans found that nearly 12 percent of girls and six percent of boys were infected with chlamydia (Cohen, 1999).
- A 1994 household sample of young men 18 to 19 years of age in three Maryland counties found that six percent were infected with chlamydia (Ku, 1996).

- An innovative program in Denver screened high-risk youth in the field—parking lots, parks, and homes—and in non-clinical settings—high schools, recreation centers. The study found a high prevalence of chlamydia among young men—12 percent—screened in the field, compared to young men screened in the facilities—4.4 percent. The study suggests that the prevalence of chlamydia may be much higher among high-risk youth, who are not likely to access STD treatment in traditional health care settings (Rietmeijer, 1997).

## BY RACE/ETHNICITY

Chlamydia is common among all races and ethnic groups, but prevalence is somewhat higher among racial and ethnic minorities, most likely due to the lack of access to screening and treatment programs.

- Data from a pilot household survey of prevalence in ten U.S. counties suggests that chlamydia is widespread. And while prevalence was higher among young minority women, high levels of chlamydia were detected among all adolescents (Mertz, 1999).
- The prevalence of chlamydia was higher in women than in men among African Americans (seven percent vs. six percent), Mexican Americans (five percent versus two percent), and whites (two percent versus one percent).
- Among male and female teens, 15 to 19 years old, prevalence was approximately 12 percent for African Americans, six percent for Mexican Americans, and nearly four percent for whites.

## BY REGION

Chlamydia prevalence remains higher in areas without longstanding screening and treatment programs. The highest rates are reported in the southern states. In 1999, seven out of the 10 states with the highest rates were located in the southern region of the United States. If the level of screening and treatment continues to increase, the disease will most likely decline in women across the nation.

# Gonorrhea

Gonorrhea is a sexually transmitted bacterial disease. Reported gonorrhea rates declined steadily until the late 1990s. From 1985 to 1996, rates of the disease decreased nearly 10 percent annually (Fox, CDC, 1998). However, rates stabilized between 1996 and 1997, and between 1997 and 1999, gonorrhea rates increased by nine percent (DSTDP, CDC, 2000). This increase, combined with signs of an increase in gonorrhea among gay and bisexual men, is reason for concern.

Rates of infection remain high among adolescents, young adults, and African Americans. Gonorrhea remains a major cause of pelvic inflammatory disease (PID) and subsequent infertility and tubal pregnancies in women. Additionally, studies have shown that gonorrhea can facilitate HIV transmission and may be contributing significantly to the spread of HIV in the south. There is a critical need to reach populations that remain at high risk for gonorrhea with intensified prevention and treatment efforts. Gonorrhea can be easily cured, if detected early, and the long-term consequences can be prevented.

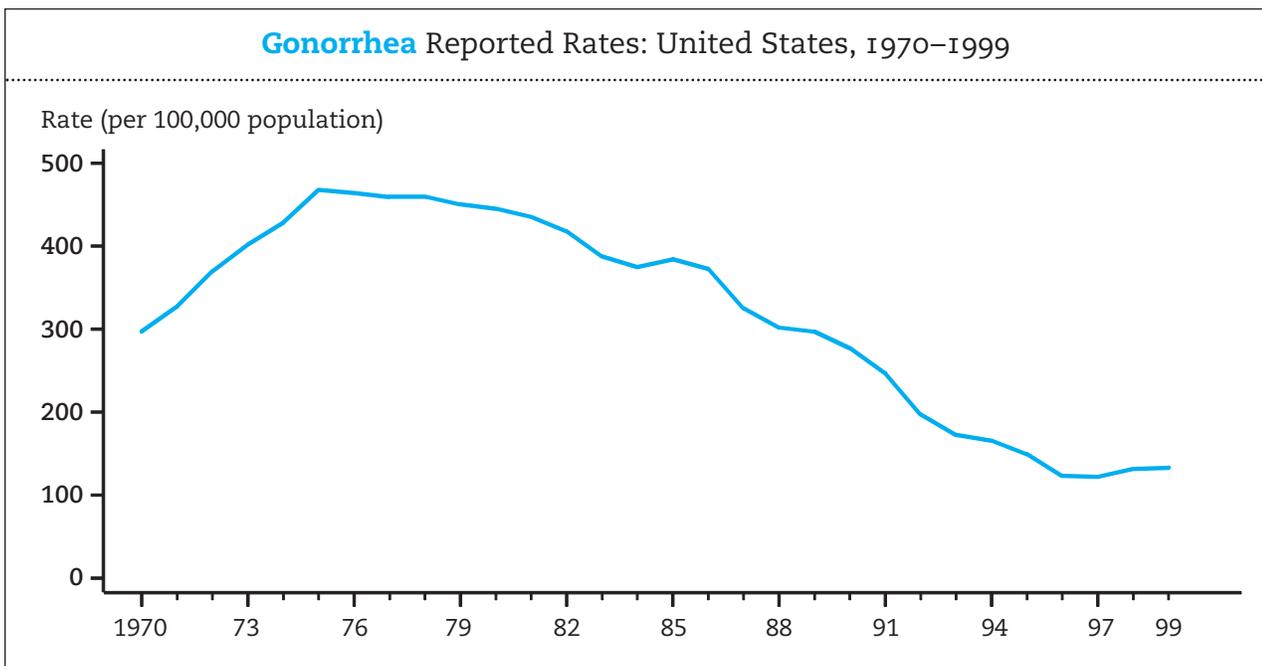
■ An estimated 650,000 cases of gonorrhea occur each year in the United States (Gates, 1999).

■ Cases reported to CDC are believed to represent about half of all annual infections. While an underestimate of actual cases, these reports provide a good indication of trends in the disease.

■ The reported gonorrhea rate in the United States remains the highest of any industrialized country and is roughly 50 times that of Sweden and eight times that of Canada.

■ Researchers have seen alarming indications that gonorrhea may be on the rise among gay and bisexual men—men who have sex with men (MSM). In the mid-1980s, reports of increased condom use and reduced risky sexual practices accompanied dramatic decreases in rectal gonorrhea among MSM in several cities (Fox, CDC, 1998). Yet, data from cities throughout the country suggest that this trend may be reversing, and that gonorrhea cases may be resurging with the prospect of facilitating the spread of HIV in the gay community.

• One 26-city study, the Gonococcal Isolate Surveillance Project, reported that from 1994 to 1999, the proportion of gonorrhea cases among MSM more than doubled from six percent to 13 percent (DSTDP, CDC, 2000).



- In King County, Washington—which includes the city of Seattle—researchers reported marked increases in both gonorrhea and syphilis cases among MSM. Most notably, while the county had no cases of early syphilis in 1996, 88 cases were reported between 1998 and the first half of 1999, 85 percent of which were in gay and bisexual men. These men reported having multiple partners and frequently engaging in unprotected anal intercourse.

- In San Francisco, the incidence of rectal gonorrhea in males increased from 21 cases per 100,000 population in 1994 to 38 cases per 100,000 population in 1997.

This rise in gonorrhea rates should serve as a wake-up call to all people at risk—including gay and bisexual men—that high-risk sexual behaviors continue to have very real consequences.

## A Closer Look at Gonorrhea

### BY GENDER

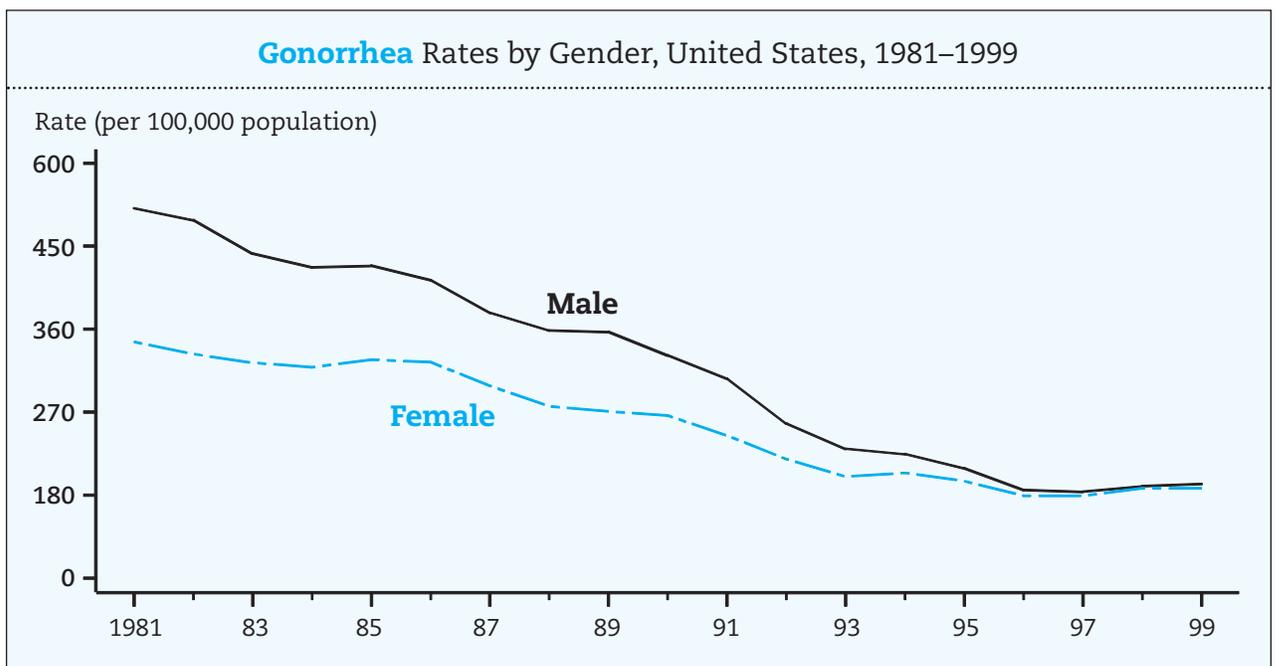
While reported rates of gonorrhea were once substantially higher among men than among women, that gap has narrowed. This is most likely due to increased screening in women. Because women are more likely to be asymptomatic than men, cases in women are less likely to be reported. However, gonorrhea rates have increased overall in both males and females. From 1997 to 1999:

- The gonorrhea rate increased 8.8 percent among men from 124.9 cases per 100,000 population to 136.0 cases per 100,000 population.

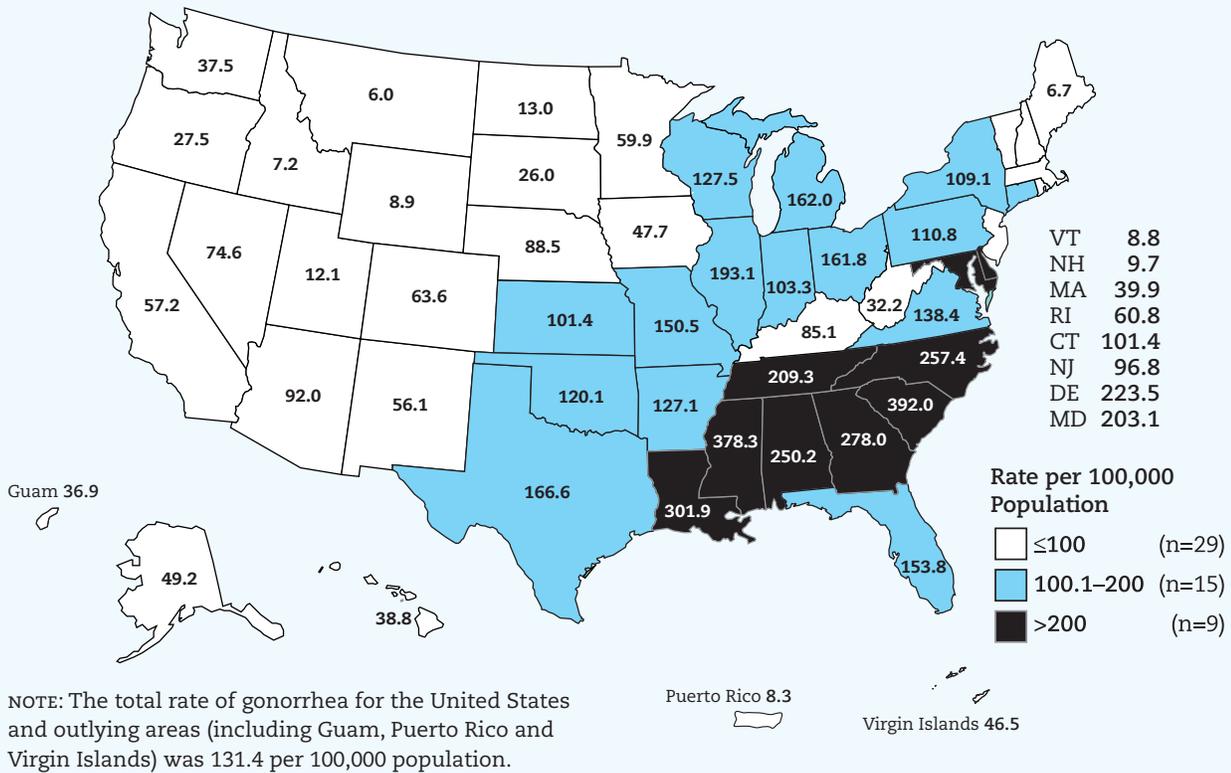
- The gonorrhea rate increased more than nine percent in women from 119.0 cases per 100,000 population to 129.9 per 100,000 population (DSTDP, CDC, 2000).

### BY REGION

Gonorrhea rates increased or remained constant in all regions of the country between 1997 and 1999. The southern states continue to have the highest gonorrhea rates of any region. The reasons for this may include the level of poverty and access to quality health care and preventive services.



## Gonorrhea Rates by State, United States and Outlying Areas, 1999



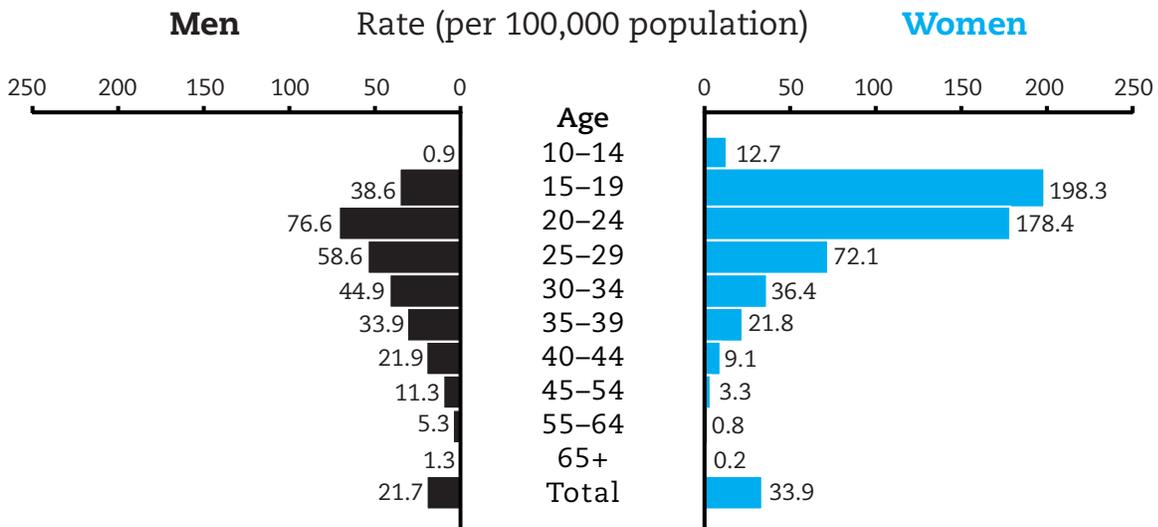
### BY AGE

Gonorrhea most dramatically affects teens and young adults. Gonorrhea rates are highest among females between the ages of 15 and 19 and males between the ages of 20 and 24. This is true regardless of race or ethnicity.

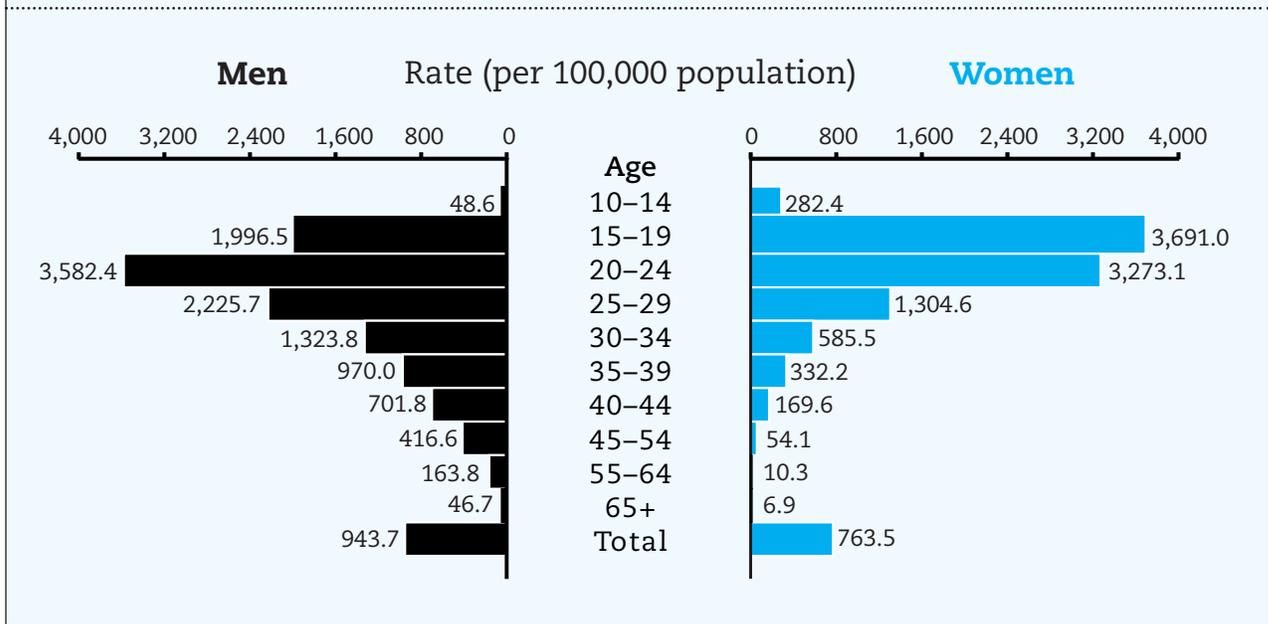
### BY RACE/ETHNICITY

Gonorrhea has been increasing in all races and ethnic groups since 1997 after declining in all races and ethnic groups over the past few decades (Fox, CDC, 1998). Reported rates of gonorrhea among African Americans remain more than 30 times high-

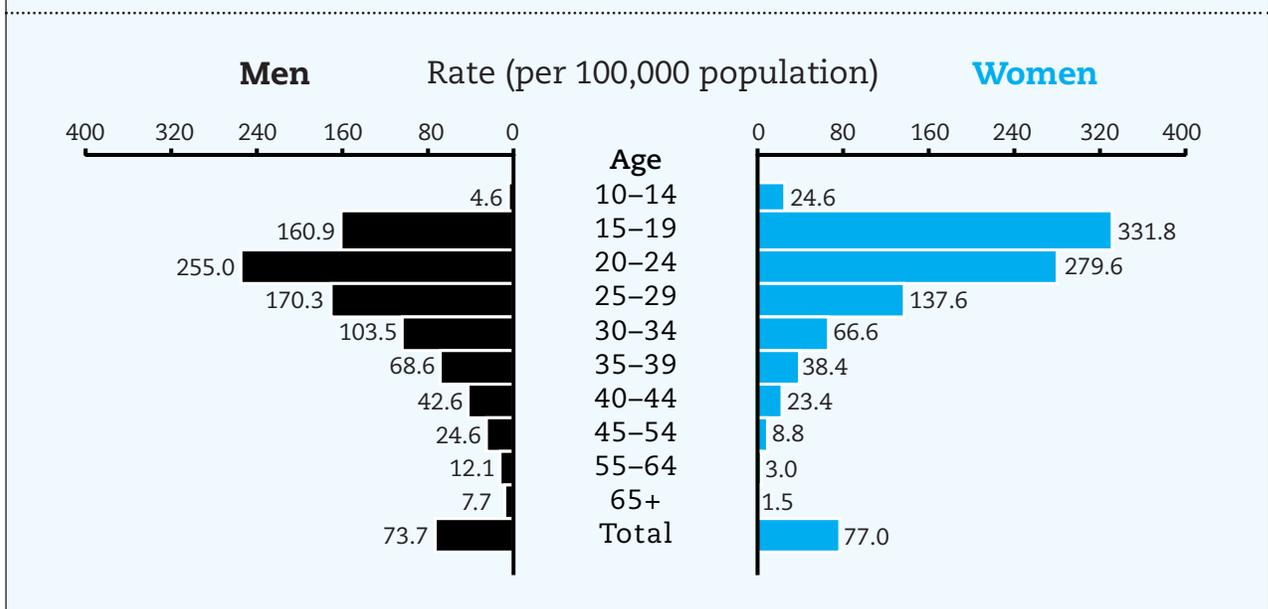
## Gonorrhea, White Non-Hispanic Race/Ethnicity, Age and Gender Specific, United States, 1999



### Gonorrhea, Black Non-Hispanic Race/Ethnicity, Age and Gender Specific, United States, 1999



### Gonorrhea, Hispanic Race/Ethnicity, Age and Gender Specific, United States, 1999

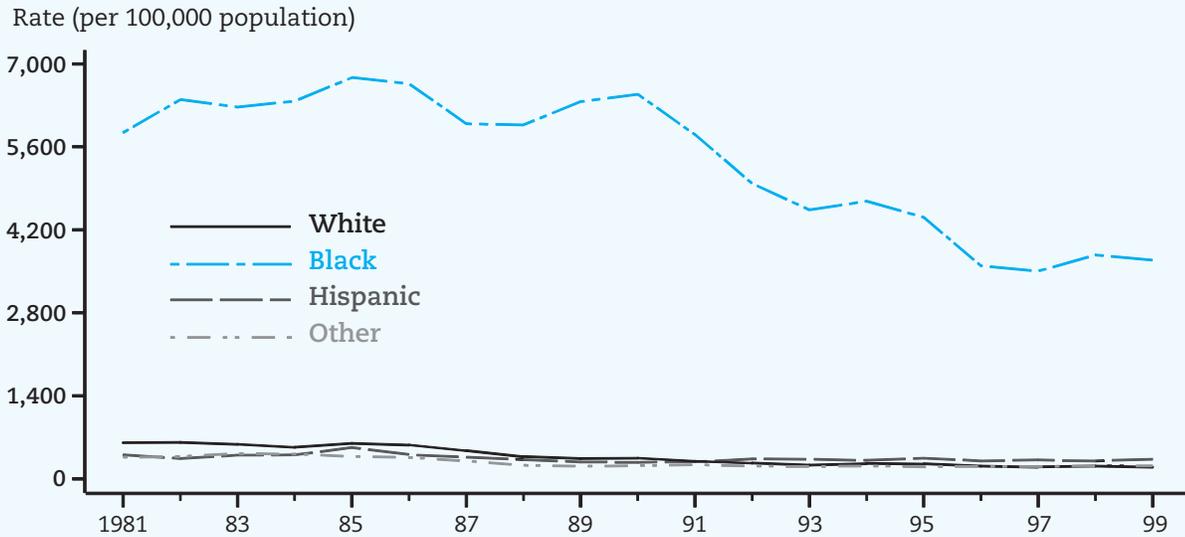


er than rates among whites and more than 11 times higher than rates among Hispanics. This trend most likely reflects differences in access to prevention and treatment services. From 1997 to 1999:

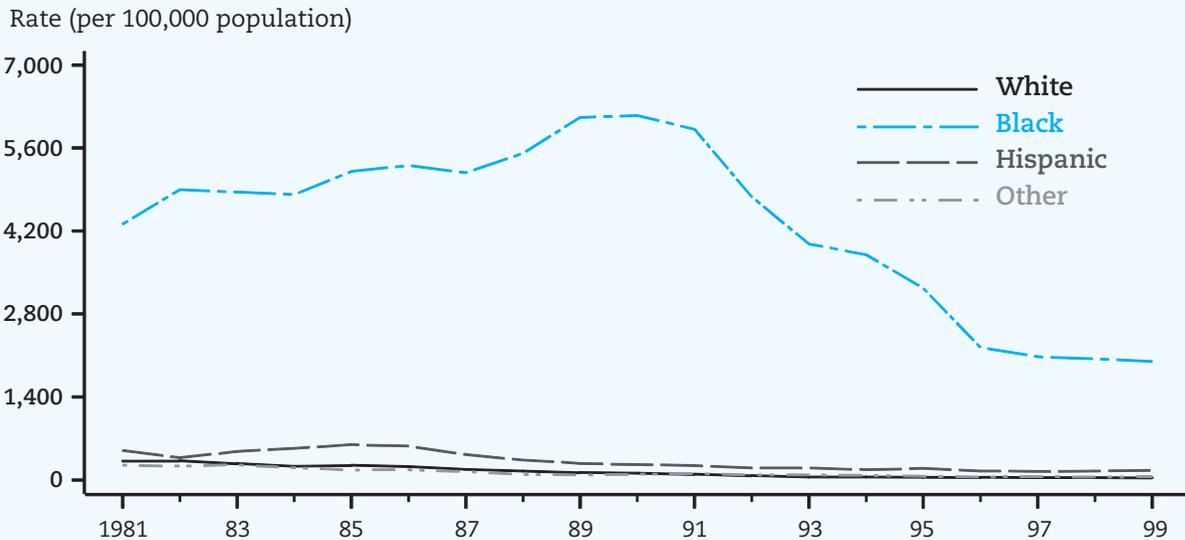
- The gonorrhea rate among African Americans increased from 802.4 to 848.8 cases per 100,000 people.
- The gonorrhea rate among whites increased slightly from 26.2 to 27.9 cases per 100,000 people.

- The gonorrhea rate among Hispanics increased from 67.4 to 75.3 cases per 100,000 people.
- The gonorrhea rate increased for American Indian/Alaska Natives from 99.4 to 110.7 cases per 100,000 people.
- The gonorrhea rate increased for Asian and Pacific Islanders from 19.5 to 22.1 cases per 100,000 people.

**Gonorrhea** Reported Rates for 15- to 19-year-old Females  
By Race/Ethnicity: United States, 1981-1999



**Gonorrhea** Reported Rates for 15- to 19-year-old Males  
By Race/Ethnicity: United States, 1981-1999



**AMONG ADOLESCENTS**

- Among adolescents, gonorrhea increased 13 percent between 1997 and 1999, although 1999 rates were slightly lower than those in 1998. Young African-American women and men remain at extremely high risk.

# Syphilis

Syphilis is a bacterial sexually transmitted disease that progresses in stages. The disease is curable and progression of disease is preventable, but if untreated, it can cause cardiovascular and neurological diseases and blindness. Syphilis causes genital ulcers, which increase the likelihood of sexual HIV transmission two- to five-fold. Untreated, syphilis can be transmitted from a pregnant woman to her fetus.

In the United States, the reported rate of syphilis is at the lowest level since reporting began in 1941. In 1999, 79 percent of the 3,115 counties in the United States reported no cases of primary and secondary syphilis (P&S syphilis). The unprecedented low rate of syphilis overall, combined with cases concentrated in only 20 percent of U.S. counties, has created a unique but narrow window of opportunity to eliminate syphilis in the United States. In October 1999, CDC launched the National Plan to Eliminate Syphilis in the United States.

Since the introduction of penicillin and the organization of a national STD control program in the 1940s, the initial near elimination of syphilis in 1957 has been followed by cyclic national epidemics every seven to 10 years (St. Louis, CDC, 1998).

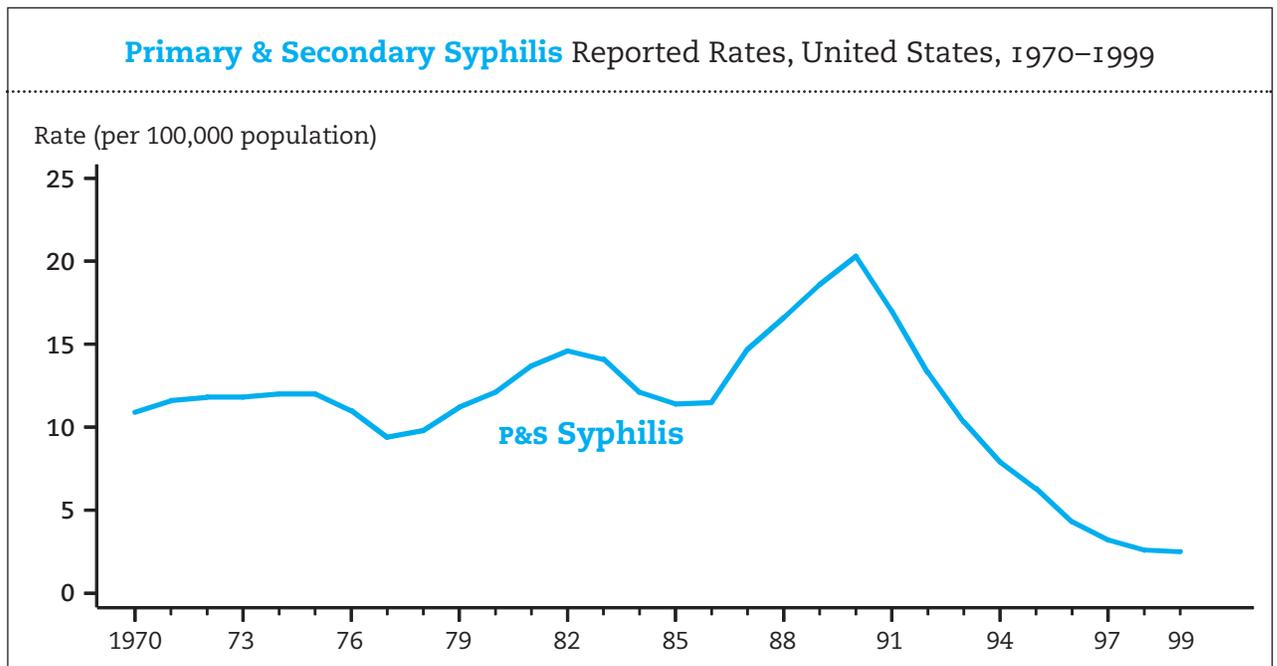
The most recent epidemic peaked in 1990 at 20.3 per 100,000 people. Since 1990, syphilis rates have declined 88 percent to 2.5 cases per 100,000 people in 1999 (CDC, 2000).

In 1999, 6,657 cases of P&S syphilis were reported to CDC, a decline of 22.2 percent from 1997 when 8,556 cases were reported. Cases of P&S syphilis reported to CDC are believed to represent about 80 percent of all recently acquired cases (Cates, 1999).

## Congenital Syphilis

In 1999, 556 cases of congenital syphilis—infants acquiring infection from their mothers during pregnancy or delivery—were reported. Rates of congenital syphilis closely follow trends in P&S syphilis in women. Peaks in congenital syphilis usually occur one year after peaks in P&S syphilis in women. The congenital syphilis rate in the United States peaked in 1991 at 107.3 cases per 100,000 live births and declined 87 percent to 14.3 cases per 100,000 live births in 1999.

**Primary & Secondary Syphilis** Reported Rates, United States, 1970–1999



# A Closer Look at Syphilis

## BY GENDER

In 1999, the overall male-to-female ratio of P&S syphilis was 1.5, with 50 percent more cases among men than women. Increases in the male-to-female rate ratio in 1999 were observed in certain cities corresponding to an increase in syphilis among men who have sex with men (MSM). Recently, outbreaks of syphilis among MSM have been reported, possibly reflecting an increase in risk behavior in this population associated with the availability of highly active antiretroviral therapy for HIV infection.

## BY RACE/ETHNICITY

Syphilis continues to disproportionately affect African Americans. Syphilis has been cited as one of the most glaring examples of existing gaps in minority health status. Despite the fact that the disease can be easily treated and cured with basic medical care, reported rates of P&S syphilis are 30 times higher for African Americans than for white Americans (CDC, 2000). With increased awareness and access to acceptable health care, this health disparity could be largely eliminated.

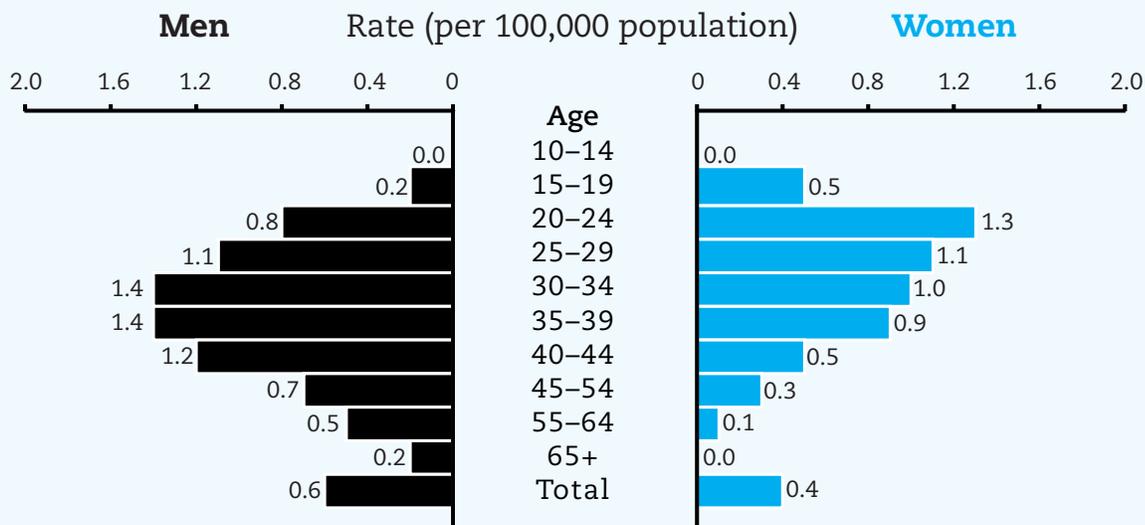
From 1997 to 1999, rates of P&S syphilis were stable for white Americans, declined 29 percent in African Americans and increased 20 percent in Hispanics. The increase in Hispanic rates occurred among males.

In 1999, the rate of congenital syphilis among African Americans was 57.9 cases per 100,000 live births and among Hispanics, 20.4 cases per 100,000 live births. While these rates reflect a 52.7 percent decline for African Americans and a 38.9 percent decline for Hispanics from 1997 to 1999, they remain considerably higher than the rate for whites, which was two cases per 100,000 live births.

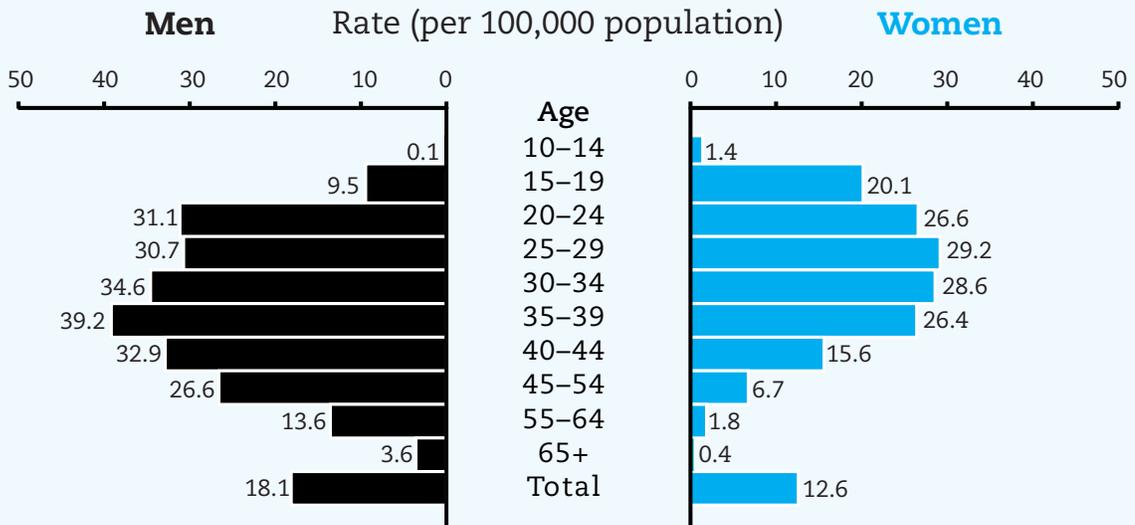
## BY AGE

P&S syphilis rates in 1999 were highest among women ages 20 to 29 years old and among men ages 35 to 39 years old. However, the age groups at highest risk vary by race and ethnicity.

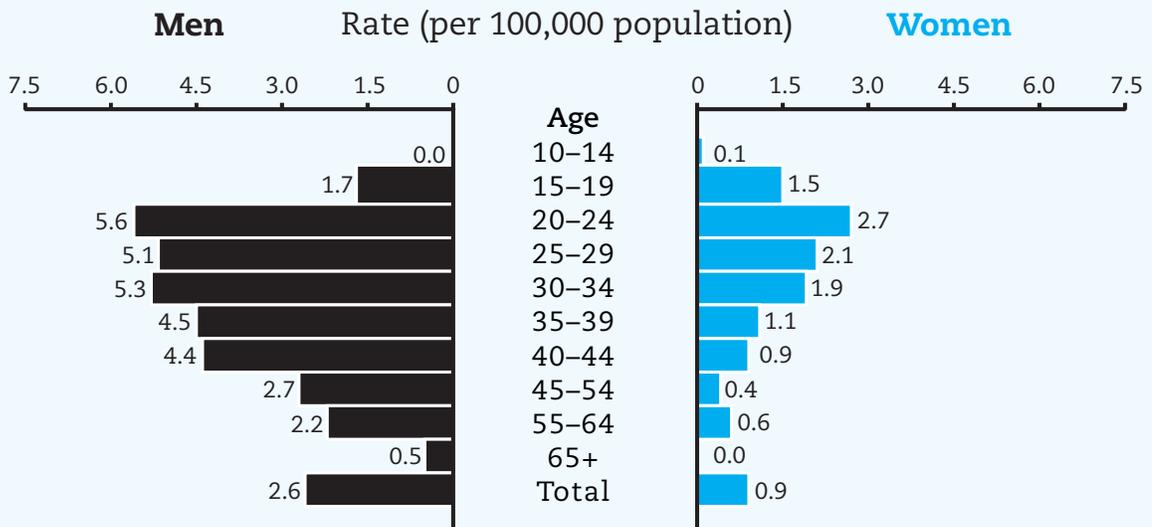
**Syphilis, White Non-Hispanic** Race/Ethnicity, Age and Gender Specific, United States, 1999



**Syphilis, Black Non-Hispanic** Race/Ethnicity, Age and Gender Specific, United States, 1999



**Syphilis, Hispanic** Race/Ethnicity, Age and Gender Specific, United States, 1999



**BY REGION**

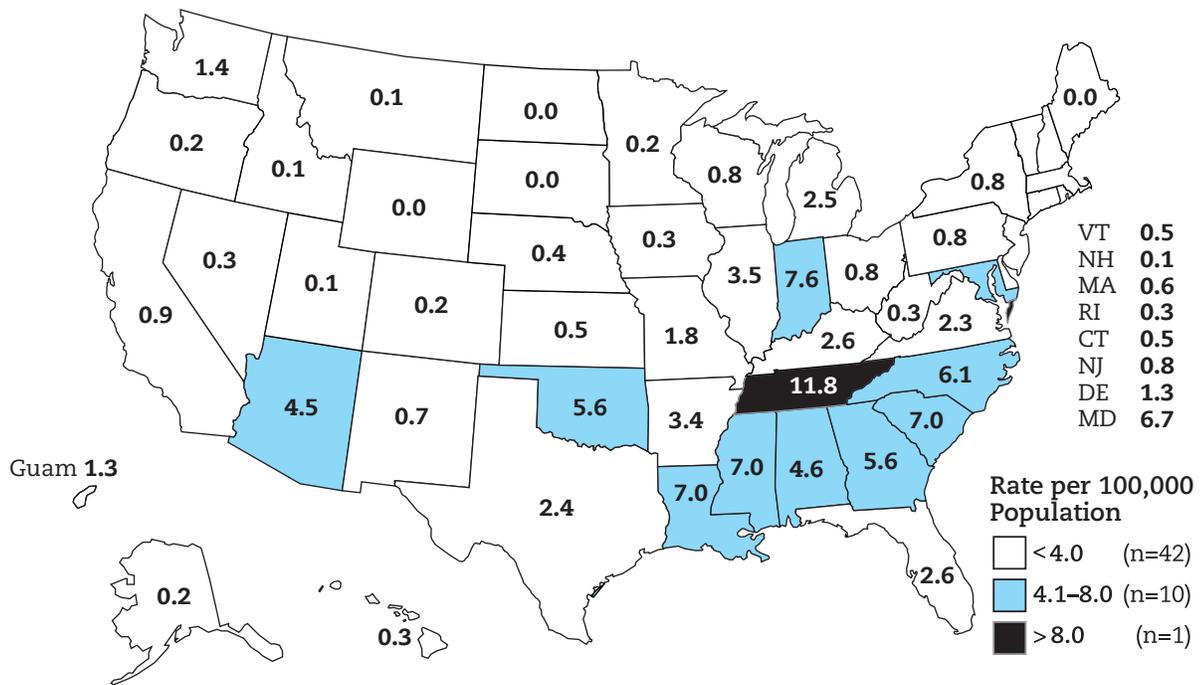
Syphilis continues to be concentrated in the southern region of the United States. In 1999, the rate of syphilis in the south—4.5 cases per 100,000 people—was higher than any other region in the country.

In 1999, three independent cities—Baltimore, Md.; Danville, Va.; and St. Louis, Mo.—and 22 counties accounted for half of the total number of p&s syphilis cases reported.

**Primary & Secondary Syphilis** Counties with Rates Above and Counties with Rates Below the Healthy People Year 2000 Objective, United States, 1999



**Primary & Secondary Syphilis** Rates by State: United States and Outlying Areas, 1999



NOTE: The total rate of syphilis for the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 2.5 per 100,000 population.

Puerto Rico 3.8

Virgin Islands 0.9

# Human Papillomavirus (HPV)

Human papillomavirus (HPV) is a virus that sometimes causes genital warts but in many cases infects people without causing noticeable symptoms. Concern about HPV has increased in recent years after studies showed that some types of HPV infection cause cervical cancer. HPV is likely the most common STD among young, sexually active people and is of increasing public health importance. At any one time, an estimated 20 million people in the United States have genital HPV infections that can be transmitted to others. Every year, about 5.5 million people acquire a genital HPV infection.

While there is no way to know for sure if HPV is increasing, there are no signs of a significant decline. With improved testing technology, researchers have been able to get a much clearer picture of the true extent of HPV in certain groups in recent years, and the infection is even more common than originally believed.

There are 30 distinct types of HPV that can infect the genital area. Of these, some types cause genital warts, and others cause subclinical infections, noted as such because they are invisible or cannot be seen. Genital warts are extremely common, but can be treated and cured. Subclinical HPV infection is much more common than genital warts, and there is currently no treatment. The disease can lead to cervical, penile and anal cancer.

Most HPV infections appear to be temporary and are probably cleared up by the body's immune system. One study in college students showed that in 91 percent of women with new HPV infections, HPV became undetectable within two years (Ho, 1998). However, reactivation or reinfection is possible.

Persistent cervical infection with certain types of HPV is the single most important risk factor for cervical cancer. HPV type 16 accounts for more than 50 percent of cervical cancers and high-grade dysplasia—abnormal cell growth. HPV type 16, along with types 18, 31, and 45 account for 80 percent of cervical cancers (Bosch, 1995; Shah, 1997).

## A Closer Look at HPV Infection

- An estimated 5.5 million people become infected with HPV each year in the United States, and an estimated 20 million Americans are currently infected (Cates, 1999).
- An estimated 75 percent of the reproductive-age population has been infected with sexually transmitted HPV (Koutsky, 1997).
- An estimated 15 percent of Americans ages 15 to 49 are currently infected (Koutsky, 1997).
- Studies repeatedly show high levels of HPV infection in women, with the highest levels among young women.
- A recent U.S. study among female college students found that an average of 14 percent became infected with genital HPV each year. About 43 percent of the women in the study were infected with HPV during the three-year study period (Ho, 1998).
- Typical prevalence of HPV for women under the age of 25 is between 28 and 46 percent (Burk, 1996; Bauer, 1991).
- Although less data are available on HPV among men, levels of current infection in men appear to be similar to those in women (DSTD HPV Report, CDC, 1999).

■ HPV may be an even greater problem for HIV-positive men and women. HIV-positive individuals have a higher prevalence of HPV infection and precancerous lesions on the cervix and anus than HIV-negative individuals. Co-infection with HIV and HPV is most likely due to shared risk behaviors for both diseases, as well as an increased susceptibility to HPV because of a compromised immune system.

- A San Francisco study of gay and bisexual men found that 60 percent of HIV-negative men had HPV, with almost universal HPV infection among HIV-positive individuals with severely compromised immune systems (Palefsky, unpublished data).

- Similarly, a six-city study among high risk and HIV-infected women found that 26 percent of HIV-negative women were infected with HPV, but 70 percent of HIV-positive women with severely compromised immune systems were infected with HPV (Palefsky, 1998).

## Genital Warts

Research indicates that approximately one percent of sexually active adults in the United States have genital warts. These estimates are based on select studies demonstrating levels of infection ranging from 1.5 percent among female college students treated in student health centers to 13 percent in some STD clinics (Koutsky, 1997).

# Herpes

Genital herpes—herpes simplex virus type two (HSV-2)—is one of the most common sexually transmitted diseases in the United States, with as many as one million people in the United States becoming infected each year. While genital herpes continues to spread across all social, economic, racial and ethnic boundaries, prevalence of infection increased most dramatically in teens and young adults in the late 1980s and early 1990s (Fleming, 1997). The disease is potentially fatal in newborns and can be particularly severe in people with HIV infection.

Symptoms of herpes—recurrent painful ulcers—can be treated, but the infection cannot be cured. Most people with herpes have no symptoms and are unaware of their infection. In a national household survey, less than 10 percent of people who tested positive with herpes knew they were infected (Fleming, 1997). With or without visible symptoms, the disease can be transmitted between sex

partners, from mothers to newborns, and can increase a person's risk of becoming infected with HIV. Genital herpes can also make HIV-infected individuals more infectious and is believed to play a role in the heterosexual spread of HIV in the United States. Preventing the spread of herpes may help slow both epidemics.

- More than one in five Americans—45 million people—are infected with genital herpes (Fleming, 1997).
- From the late 1970s to the early 1990s, herpes prevalence increased 30 percent (Fleming, 1997).
- Preliminary 1999 data from the National Health and Nutrition Examination Survey (NHANES) suggest that the prevalence of HSV-2 has remained relatively stable over the 1990s. In 1999, the estimated prevalence was 19 percent among the general U.S. population ages 14 to 49 years old (McQuillan, 2000).

---

## A Closer Look at Herpes

### BY GENDER

Herpes is more common in women than men, infecting approximately one out of four women, versus one out of five men. This difference in gender may be because male-to-female transmission is more efficient than transmission from females to males.

### BY REGION

Herpes is common in all regions of the country and in both urban and rural areas. There are no significant differences in prevalence by geographic location.

### BY AGE

The percent of people infected with herpes increases with age because, once infected, people remain infected with this incurable disease throughout their lives. Herpes infection is believed to be acquired most commonly during adolescence and young adulthood, as individuals become sexually active and may have multiple partners.

According to two national surveys between the 1970s and the 1990s, genital herpes increased fastest among white teens ages 12 to 19 years old (Fleming, 1997). Herpes prevalence among white teens ages 12 to 19 years old in the 1990s was five times greater than the prevalence in the 1970s. Among young white adults 20 to 29 years of age, herpes prevalence increased two-fold over that period.

## BY RACE/ETHNICITY

Although genital herpes is increasing among young whites, the infection is more common among African Americans, who have a seroprevalence of more than 45 percent, as compared to whites, who have a seroprevalence of approximately 17 percent (Fleming, 1997).

<b>Herpes Seroprevalence</b> Race/Ethnicity and Age Specific, United States			
		NHANES II (1976-1980)* Percent Seroprevalence**	NHANES III (1988-1994)* Percent Seroprevalence**
Whites	12-19	1.0	4.5
	20-29	7.7	14.7
Blacks	12-19	5.7	8.8
	20-29	19.5	33.3
Mexican Americans	12-19	not available	5.4
	20-29	not available	14.8

\*Seroprevalence has been adjusted to the 1980 census.  
\*\*Rounded to the nearest tenth.

<b>Herpes Seroprevalence</b> Race/Ethnicity and Gender Specific, United States			
Category of Subjects	NHANES II (1976-1980)* Age-Adjusted Percent Seroprevalence	NHANES III (1988-1994)* Age-Adjusted Percent Seroprevalence	Percent Relative Increase
<b>All Races and Ethnic Groups**</b>			
Both sexes	16.0	20.8	30
Men	13.4	17.1	27
Women	18.4	24.2	32
<b>Whites</b>			
Both sexes	12.7	16.5	30
Men	10.7	14.1	32
Women	14.5	18.7	29
<b>Blacks</b>			
Both sexes	43.6	47.6	9
Men	34.1	37.5	10
Women	51.4	55.7	8

\*Seroprevalence has been adjusted to the 1980 census. The age range is ≥ 12 years.  
\*\*Totals differ from the numbers for whites and blacks because other races and ethnic groups are included in the category of all races and ethnic groups.

# Hepatitis B

Hepatitis B (HBV) virus is a serious viral disease that attacks the liver, and can cause extreme illness and even death. An acute HBV infection is a newly acquired, symptomatic infection. In some people, the infection resolves and the virus is cleared. However, many will remain chronically infected with the virus after the symptoms associated with their new infection have subsided. People chronically infected with HBV face an increased risk of developing chronic liver disease, including cirrhosis (scarring) and liver cancer, and for transmitting HBV infection to others.

- According to the Third National Health and Nutrition Examination Survey (NHANES III), about five percent of the U.S. population has ever been infected with hepatitis B, with an estimated 200,000 infections occurring each year (Coleman, 1998). Of these, it is believed that 120,000 infections are acquired through sexual transmission annually, mostly among young adults. An estimated 417,000 people are currently living with chronic sexually acquired HBV infection.
- Infants and young children have the highest risk of chronic infection.
- An estimated 5,000 to 6,000 deaths occur each year from chronic hepatitis B-related liver disease.
- Hepatitis B vaccinations have been recommended for people with risk factors for HBV infection since the vaccine became available in 1981. However, many teens and young adults at risk through sexual or drug-related behavior have not been vaccinated for HBV. Intensified efforts to vaccinate high-risk groups are urgently needed.
- In 1997, 10,416 cases of acute hepatitis B were reported to CDC. However, reported cases dramatically underestimate the actual number of people who are infected with hepatitis B virus each year—an estimated 200,000.
- A recent study demonstrates the high degree of under-vaccination among those at high risk. Among acute hepatitis B cases reported by sentinel counties in 1996, 70 percent had a missed opportunity for vaccination in the past. Of these, 42 percent had been treated for an STD in the past, 31 percent had been in prison or jail at some time in their lifetime, and 25 percent reported sexual or household contact with an HBV-infected person (Mast, CDC, 1998).

# A Closer Look at Hepatitis B

## BY GENDER

The incidence of acute hepatitis B is higher among men than women. This difference is believed to reflect a higher prevalence of behavioral risk factors among males.

## BY AGE

In the United States, adults and adolescents account for the majority of reported cases of acute hepatitis B, with the highest incidence rates observed among 25 to 39 year olds. Sexual transmission is the most common mode of transmission of HBV among adults and adolescents. According to data reported by sentinel counties in 1996, 40 percent of acute hepatitis B were attributed to high-risk heterosexual practices—more than one partner in the prior six months, history of other STDs—and 18 percent were associated with homosexual activity. Other risk factors associated with acute hepatitis B include injecting drug use (15 percent), household contact with another person infected with HBV (three percent), and health care employment (two percent) (Mast, CDC, 1998).

An estimated 20,000 infants are born to mothers infected with hepatitis B each year. Providing the infant with treatment immediately after birth can prevent infection in 90 to 95 percent of cases. Pregnant women should be screened for HBV to detect infection and ensure the best treatment for themselves and their infants.

## BY RACE/ETHNICITY

According to seroprevalence data for the general U.S. population from NHANES III, the prevalence of Hepatitis B is higher among African Americans—12 percent—than among whites—three percent— or Mexican Americans—4.4 percent.

# Trichomoniasis and Bacterial Vaginosis (BV)

Trichomoniasis, which affects both men and women, is caused by a microscopic parasite. While bacterial vaginosis is caused by an imbalance in the bacteria normally found in the vagina, and as such only affects women. Currently, there are no national surveillance data on trichomoniasis, bacterial vaginosis, and related vaginal infections, but these infections are among the most common

conditions found in women in health care settings. While these diseases are treatable, untreated bacterial vaginosis is associated with pelvic inflammatory disease, and both trichomoniasis and bacterial vaginosis may increase the risk of HIV infection. In pregnant women, these diseases may also cause babies to be born prematurely or with low birth weights. However, the biomedical mechanisms for these outcomes are just beginning to be understood.

---

## A Closer Look at Trichomoniasis And Bacterial Vaginosis (BV)

- An estimated five million cases of trichomoniasis occur each year in the United States (Cates, 1999).
- Scientific studies suggest bacterial vaginosis is common in women of reproductive age. In the United States, as many as 16 percent of pregnant women have BV. This varies by race and ethnicity from six percent in Asians and nine percent in whites to 16 percent in Hispanics and 23 percent in African Americans (CDC, 2000).
- Diagnoses of other vaginal infections—of which bacterial vaginosis is the most common cause—increased dramatically over the decade, but now have begun to decline. In 1997, more than three million women were diagnosed with vaginitis in private doctors' offices. Because these cases do not include women diagnosed in public health care settings or who are not diagnosed at all, these are minimum numbers of infection.

# Chancroid

Chancroid is caused by a bacterial infection that produces genital ulcers. Reported cases of chancroid declined steadily from 4,986 cases in 1987 to 143 reported cases in 1999. While chancroid is not widespread, it is believed to be substantially under-diagnosed and underreported. Moreover, chancroid has the potential to cause large outbreaks. It is difficult to diagnose without a specif-

ic laboratory test, which most health care providers and laboratories do not have the capability to perform (Beck-Sague, CDC, 1996). Even large outbreaks may go unrecognized despite a large burden of disease in the community. The disease causes genital ulcers and is of concern because it may contribute to increased HIV transmission in some communities (Mertz, CDC, 1998).

## A Closer Look at Chancroid

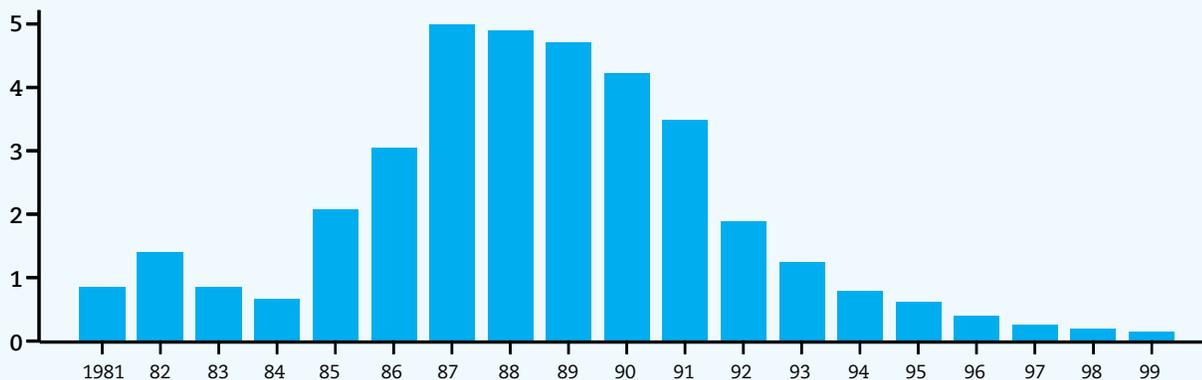
- In 1999, only 16 states and one outlying area reported one or more cases of chancroid and three of these states—New York, South Carolina, and Texas—accounted for nearly 72 percent of the 143 reported cases.
- A 1996 10-city study demonstrated substantial levels of unrecognized chancroid in some cities. In both Chicago and Memphis, Tenn., a significant percentage of patients with genital ulcers in STD clinics had evidence of chancroid—12 percent and 20 percent, respectively. In Memphis, none of

the patients had been diagnosed with chancroid, and few had received the appropriate treatment. In Chicago, the disease had been suspected, but not confirmed. Fortunately, most of these patients were treated appropriately for chancroid (Mertz, CDC, 1998).

- In the above study, more men were found to be infected with chancroid than women. This study also found that 60 percent of chancroid cases were diagnosed in people 35 years of age or older (Mertz, CDC, 1998).

Chancroid Reported Cases, United States, 1981–1999

Cases (in thousands)



# Status of STDs by City and State, 1999

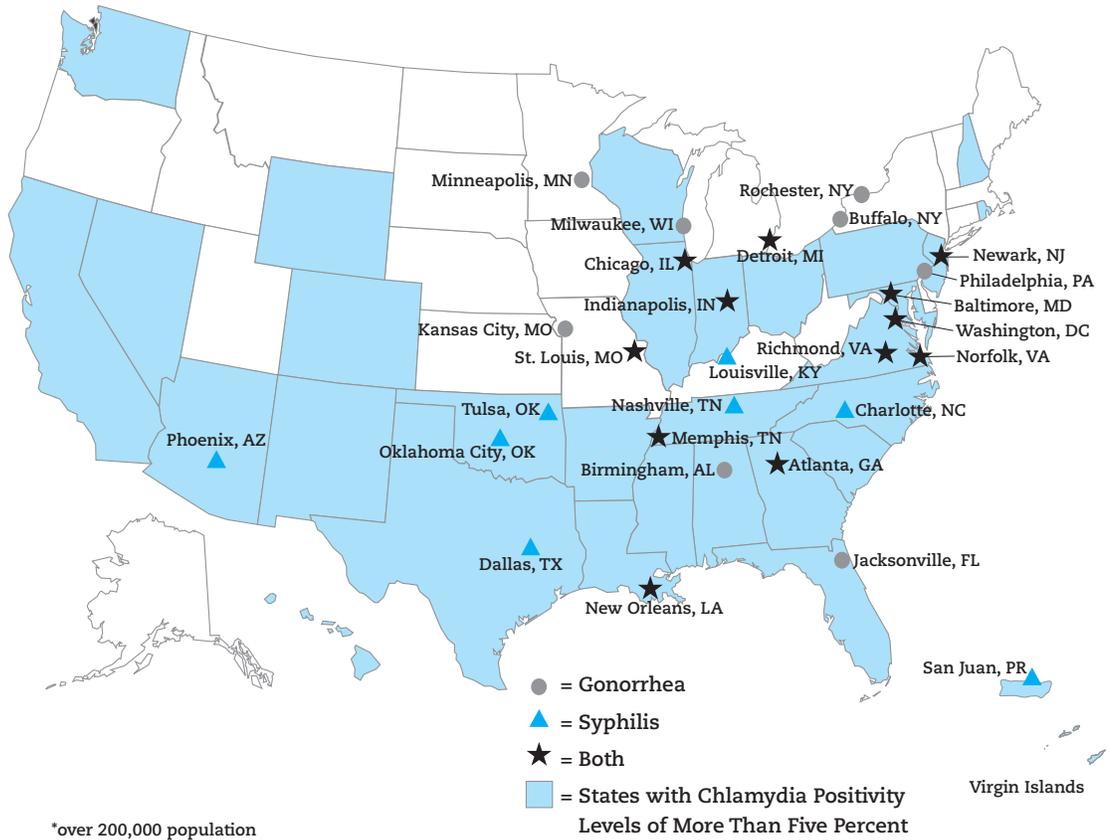
Detailed national data by city and state are only available for nationally notifiable STDs. And while chlamydia became nationally notifiable in 1995, the data are currently more representative of trends in screening than of trends in disease. Because chlamydia often has no symptoms, cases are frequently identified only through screening. Therefore, high rates of chlamydia and gonorrhea may indicate more effective screening programs and the introduction of more sensitive tests, rather

than higher incidence of disease. This section will therefore present the status of gonorrhea and syphilis by city and state. To provide an indication where chlamydia is currently the most common, data on the percentage of women who tested positive for chlamydia in family planning clinics also are provided on the overview maps. Other STDs, like genital herpes and HPV are known to be widespread across all states and communities.

<b>Gonorrhea</b>			<b>Syphilis</b>		
City	Cases	Rate per 100,000 Population	City	Cases	Rate per 100,000 Population
1. Baltimore, MD	6,124	948.6	1. Indianapolis, IN	407	50.0
2. Richmond, VA	1,827	940.9	2. Nashville, TN	250	46.8
3. St. Louis, MO	2,876	847.6	3. Baltimore, MD	246	38.1
4. Rochester, NY	2,037	846.6	4. Memphis, TN	258	29.7
5. Atlanta, GA	5,631	761.6	5. Atlanta, GA	213	28.8
6. Washington, DC	3,536	675.9	6. Oklahoma City, OK	114	28.0
7. Detroit, MI	7,900	626.8	7. Detroit, MI	189	15.0
8. Newark, NJ	1,741	612.3	8. St. Louis, MO	51	15.0
9. Norfolk, VA	1,291	599.9	9. Tulsa, OK	45	11.8
10. Memphis, TN	5,038	579.9	10. New Orleans, LA	51	11.0
11. New Orleans, LA	2,687	577.2	11. Louisville, KY	67	10.0
12. Philadelphia, PA	7,775	541.3	12. Chicago, IL	282	9.5
13. Milwaukee, WI	4,884	535.7	13. Norfolk, VA	20	9.3
14. Chicago, IL	14,488	486.4	14. Washington, DC	45	8.6
15. Kansas City, MO	1,956	432.8	15. Charlotte, NC	53	8.4
16. Minneapolis, MN	1,558	427.4	16. Newark, NJ	22	7.7
17. Jacksonville, FL	2,981	405.2	17. Dallas, TX	151	7.4
18. Buffalo, NY	1,233	389.2	18. Phoenix, AZ	195	7.0
19. Birmingham, AL	2,492	377.8	19. Richmond, VA	13	6.7
20. Indianapolis, IN	3,045	374.4	20. San Juan, PR	61	5.8
<b>Rate for United States: 133.2</b>			<b>Rate for United States: 2.5</b>		



Cities\* on the Top 20 List for Rates of Gonorrhea and Syphilis, and States with Chlamydia Positivity Levels of More Than Five Percent Among 15- to 24-year-old Women Tested in Family Planning Clinics, United States, 1999

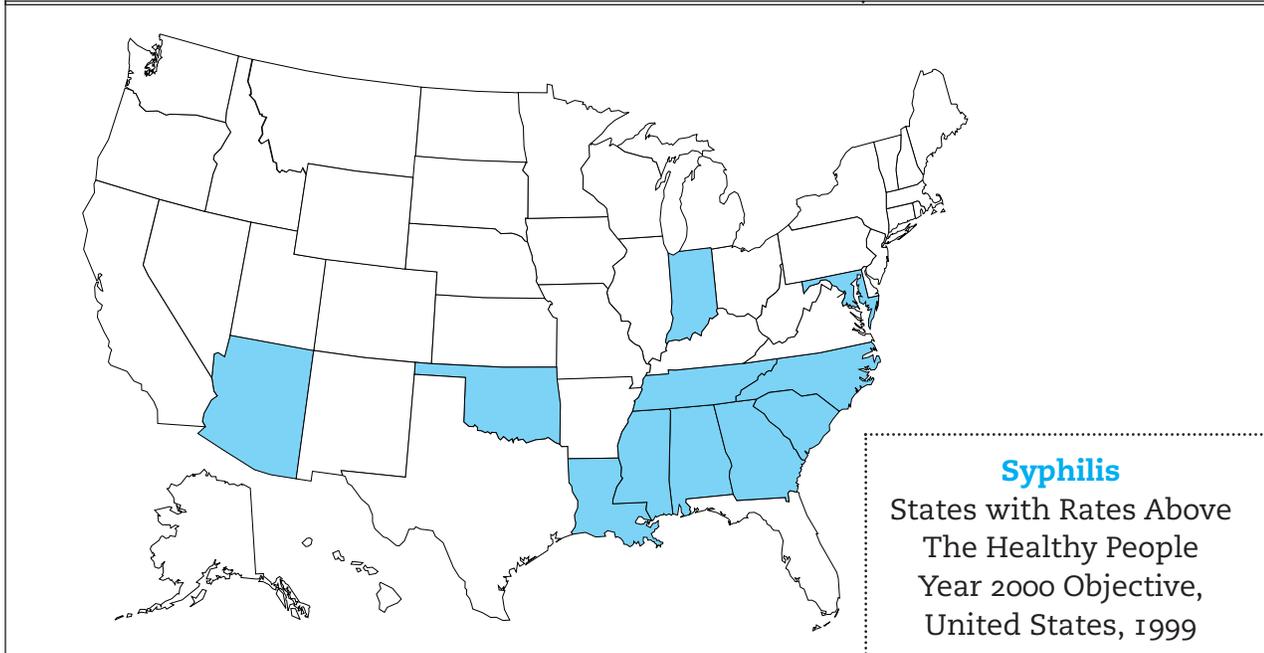
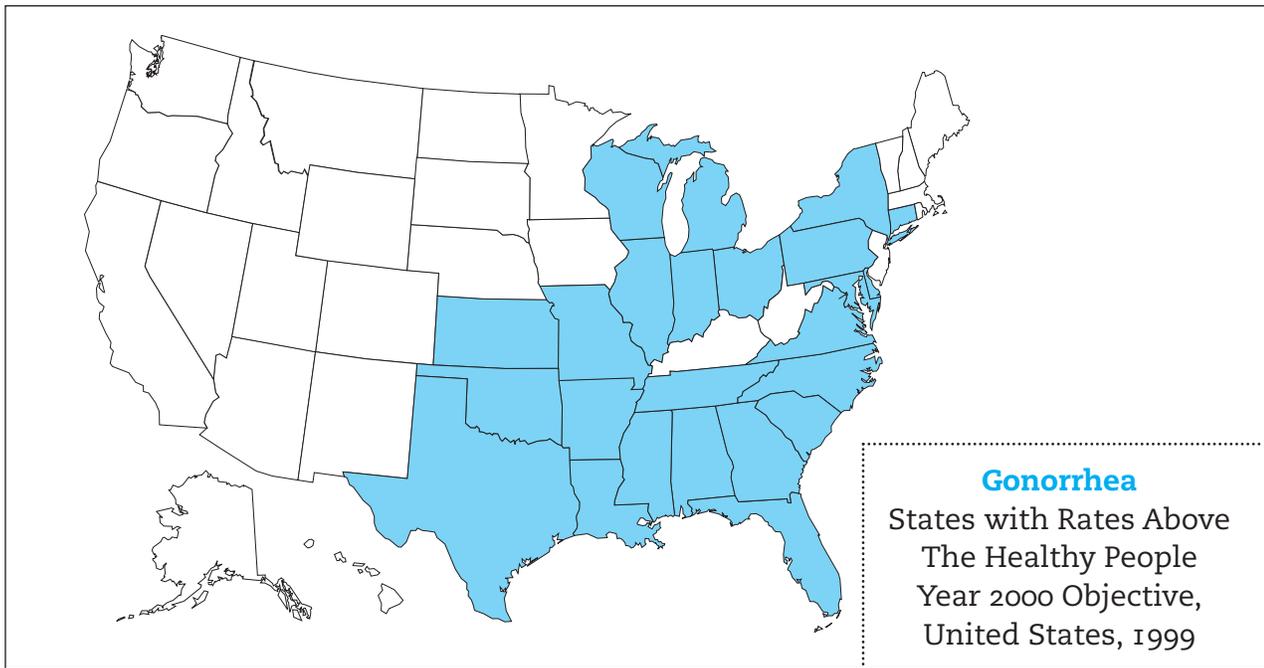


## STATES WITH HIGHEST RATES OF GONORRHEA AND SYPHILIS

Twenty-four states now have rates of gonorrhea that exceed the Healthy People 2000 goals for the nation, including the following states in order by rates per 100,000 people: *South Carolina (392), Mississippi (378.3), Louisiana (301.9), Georgia (278), North Carolina (257.4), Alabama (250.2), Delaware (223.5), Tennessee (209.3), Maryland (203.1), Illinois (193.1), Texas (166.6), Michigan (162), Ohio (161.8), Florida (153.8), Missouri (150.5), Virginia (138.4), Wisconsin (127.5), Arkansas (127.1), Oklahoma (120.1), Pennsylvania (110.8), New York (109.1),*

*Indiana (103.3), Connecticut (101.4) and Kansas (101.4).* From 1997 to 1999, gonorrhea increased in the 18 states italicized above.

*p&S Syphilis* now exceeds the Healthy People 2000 goal for the nation in 11 states in order by rates per 100,000 people: *Tennessee (11.8), Indiana (7.6), Louisiana (7.0), Mississippi (7.0), South Carolina (7.0), Maryland (6.7), North Carolina (6.1), Georgia (5.6), Oklahoma (5.6), Alabama (4.6) and Arizona (4.5).* From 1997 to 1999, rates increased in the three states italicized above.



# Bibliography

Baur HM, Ting Y, Greer CE, et al. Genital Human Papillomavirus Infection in Female University Students as Determined by a PCR-Based Method. *JAMA* 1991;265(4):472-7.

Bosch FX, et al. Prevalence of Human Papillomavirus in Cervical Cancer: A Worldwide Perspective. *J Natl Cancer Inst* 1995;87:796-802.

Bunnell R, Dahlberg L, Stone K, et al. Misconceptions about STD Prevention and Associations with STD Prevalence and Incidence in Adolescent Females in a Southeastern City [abstract]. In: Program and Abstracts of the 1998 National STD Prevention Conference; December 1998.

Burk RD, Ho GY, Beardseely L, Lempa M, et al. Sexual Behavior and Partner Characteristics are the Predominant Risk Factors for Genital Human Papillomavirus Infection in Young Women. *J Infect Dis* 1996;174(4):679-89.

Cates W et al. Estimates of the Incidence and Prevalence of Sexually Transmitted Diseases in the United States. *Sex Trans Dis* 1999;26(suppl):S2-S7.

CDC. Increases in Unsafe Sex and Rectal Gonorrhea Among Men Who Have Sex with Men—San Francisco, 1994-1997. *MMWR* 1999;48(No. 35):773-777.

CDC. Resurgent Bacterial Sexually Transmitted Disease Among Men Who Have Sex With Men — King County, Washington, 1997-1999. *MMWR* 1999; 48(No. 3):773-777

CDC. Gonorrhea—United States, 1998. *MMWR* 2000; 49(No. 24):538-42.

CDC. Fluoroquinolone-Resistance in *Neisseria gonorrhoeae*, Hawaii, 1999, and Decreased Susceptibility to Azithromycin in *N. gonorrhoeae*, Missouri, 1999, *MMWR*. 2000;49(No. 37):833-7.

CDC. 1998 Guidelines for Treatment of Sexually Transmitted Diseases. *MMWR* 1998;47(No:RR-1): [inclusive page numbers].

Coleman PJ, McQuillan GM, Moyer LA, et al. Incidence of Hepatitis B Virus Infection in the United States, 1976-1994: Estimates from the National Health and Nutrition Examination Surveys. *J Infect Dis* 1998;178:954-60.

Cohen DA et al. Repeated School-based Screening for Sexually Transmitted Diseases: A Feasible Strategy for Reaching Adolescents. *Pediatrics* 1999;104(6):1281-5.

Division of STD Prevention. The National Plan to Eliminate Syphilis from the United States, National Center for HIV, STD, and TB Prevention, Atlanta: Centers for Disease Control and Prevention (CDC), October 1999.

Division of STD Prevention. Prevention of Genital HPV Infection and Sequelae: Report of an External Consultants Meeting, Department of Health and Human Services, Atlanta: Centers for Disease Control and Prevention (CDC), December 1999.

Division of STD Prevention. Sexually Transmitted Disease Surveillance, 1999. U.S. Department of Health and Human Services, Atlanta: Centers of Disease Control and Prevention (CDC), September 2000.

Fleming DT, McQuillian GM, Johnson RE, et al. Herpes Simplex Virus Type 2 in the United States, 1976 to 1994. *N Engl J Med* 1997;337(16):1105-11.

Fox KK, Whittington WL, Levine WC, et al. Gonorrhea in the United States, 1981-1996. Demographic and Geographic Trends. *Sex Trans Dis* 1998;26(7):386-93.

Ho GYF, Bierman R, Beardsley L, et al. Natural History of Cervicovaginal Papillomavirus Infection in Young Women. *N Engl J Med* 1998;338(7):423-8.

Goldenberg RL, Andrews WW, Yuan AC, et al. Sexually Transmitted Diseases and Adverse Outcomes of Pregnancy. *Clin Perinatal* 1997;March;2491:23-41.

Holmes KK, Sparling PF, Mardh PA, Lemon SM, Stamm WE, Piot P, Wasserheit JN eds. *Sexually Transmitted Diseases*. New York, McGraw Hill, 1999.

Klausner, JD et al. Tracing a Syphilis Outbreak Through Cyberspace. *JAMA* 2000;284:447-449.

Koutsky L. Epidemiology of Genital Human Papillomavirus Infection. *Am J Med* 1997;102(suppl 5A):3-8.

Ku L, Sonenstein FL, Turner CF, et al. The Promise of Integrated Representative Surveys About Sexually Transmitted Diseases and Behavior. *Sex Transm Dis* 1997;May:299-309.

Martinez J, Smith R, Farmer M, et al. High Prevalence of Genital Tract Papillomavirus Infection in Female Adolescents. *Pediatrics* 1988;82:604-8.

Mast EE, Mahony FJ, Alter MJ, Margolis HS. Progress Toward Elimination of Hepatitis B Virus Transmission in the United States. *Vaccine* 1998;(suppl): S48-S51.

Mertz KJ, McQuillan GM, Levine WC, et al. A pilot study of the prevalence of Chlamydial infection in a National household survey. *Sex Trans Dis* 1998; May:225-228.

McQuillan GM. Implications of a National Survey for STDs: Results from the NHANES Survey. Presentation at 2000 Infectious Disease Society of America Conference. September 7-10, 2000, New Orleans.

Mertz KJ, Trees D, Levine WC, et al. Etiology of Genital Ulcers and Prevalence of Human Immunodeficiency Virus Coinfection in 10 U.S. Cities. *J Infect Dis* 1998;178.

National Committee for Quality Assurance (NCQA). HEDIS 2000: Technical Specifications, Washington, DC, 1999, pp. 68-70, 285-286.

Palefsky JM. Human Papillomavirus Infection and Anogenital Neoplasia in Human Immunodeficiency Virus-Positive Men and Women. *Monogr Natl Cancer Inst* 1998;23:15-20.

Reitmeijer CA, Yamaguchi KJ, Ortiz CG, et al. Feasibility and Yield of Screening Urine for Chlamydia trachomatis by Polymerase Chain Reaction Among High-Risk Male Youth in Field-Based and Other Nonclinic Settings. A New Strategy for Sexually Transmitted Disease Control. *Sex Transm Dis* 1997;24(7):429-35.

Shah KV. Human Papillomaviruses and Genital Cancers. *N Engl J Med* 1997;337:1386-8.

St. Louis ME and Wasserheit JN. Elimination of Syphilis in the United States. *Science* 1998;281:353-4.

# Notes



