

Sexually Transmitted Infections

(Chlamydia, Gonorrhea, and Syphilis)

Summary (Chlamydia)

Chlamydial infection is the most commonly reported sexually transmitted infection in Washington State and the most commonly reported health condition nationwide. Undetected and untreated chlamydia is a major cause of reproductive health problems for women of childbearing age, including pelvic inflammatory disease, ectopic pregnancy, and infertility. Women infected while pregnant can transmit chlamydia to their infants during childbirth resulting in neonatal eye infections and chlamydial pneumonia. Infections in both males and females are often asymptomatic. For this reason, young women in reproductive health settings are targeted for screening through the federally funded Infertility Prevention Project. In 2006, 17,447 cases of chlamydia were diagnosed and reported in Washington (an annual [crude incidence rate](#) of 274 per 100,000).

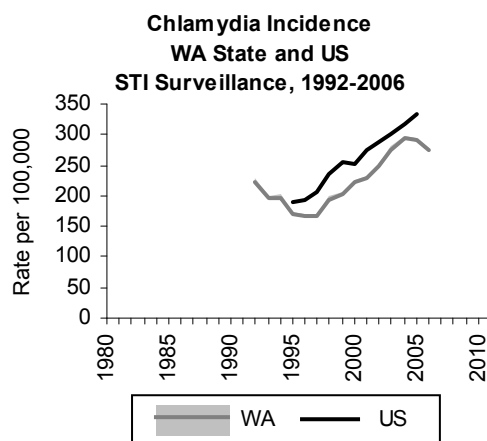
Time Trends

Health care providers in Washington State have been required to report cases of chlamydial infection since 1987, seven years before states were required to report cases to the U.S. Centers for Disease Control and Prevention (CDC). The reported incidence rate of chlamydia in Washington declined sharply from 278 cases per 100,000 in 1988 (the first full year of data available) to a low of 167 cases per 100,000 in 1996.

Annual reported cases and incidence rates increased from 170 per 100,000 in 1997 to 286

Definition: Three of the more than 25 diseases spread primarily through sexual activity. Chlamydia (ICD-9 code 099.5), gonorrhea (ICD-9 code 098), and syphilis (ICD-9 codes 090-091), are all caused by bacteria (*Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and *Treponema pallidum*, respectively). About 70% of women infected with chlamydia have few or no symptoms; symptoms are often mild or absent in men. If symptoms occur, men and women can have abnormal genital discharge or pain during urination in the early stages. Women can also experience abdominal pain. Symptomatic women with gonorrhea often have abnormal vaginal discharge or painful urination; approximately 50% do not experience symptoms. Men usually have discharge from the penis and urination that can be severely painful. Syphilis symptoms are divided into four stages: primary and secondary (highly infectious), latent, and late (no longer contagious). Primary stage symptoms include one or more painless indurated lesions (chancres), and secondary stage symptoms include rashes, swollen lymph nodes, and flu-like symptoms.

per 100,000 in 2004. This represented an average yearly increase of more than 7% during that period. Increased awareness of the importance of testing, widely available screening, and more sensitive test technologies probably contributed to increasing rates during this time. This trend had stabilized by 2005, and in 2006, the incidence rate decreased to 273 per 100,000.



Year 2010 Goals

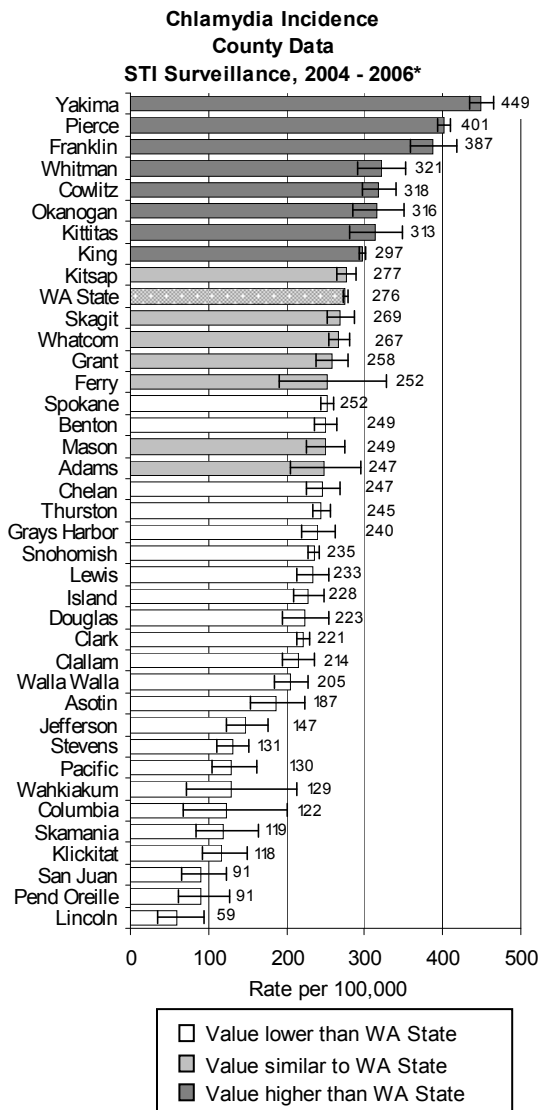
By 1996, Washington had met the national incidence target set in *Healthy People 2000* for chlamydial infection of no more than 170 cases per 100,000.

For *Healthy People 2010*, the target was revised to reflect a greater focus on population-level screening. The new target is an infection rate of no more than 3% among people 15–24 years screened in sexually transmitted infection (STI) and reproductive health clinics. For 2005, the positivity rate for all people 15–24 screened in STI, family planning, and reproductive health clinics participating in the federal

Infertility Prevention Project (IPP) in Washington was over 7%.

IPP screening efforts are specifically targeted to young women and their partners; men are often asymptomatic and do not seek screening at the same rate as women. Intensified efforts to screen and treat men as well as additional resources for screening and treating all potentially exposed women will be required to attain the *Healthy People 2010* goal for chlamydial infection.

Geographic Variation



* One county had too few cases to support a reliable rate estimate.

Chlamydial infection is widely dispersed among all sexually active residents of Washington.

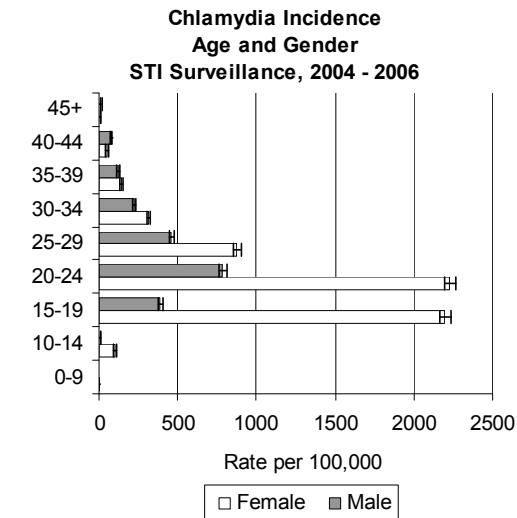
Providers reported cases from all 39 Washington counties during 2004–2006, though too few cases were reported from Garfield County to calculate stable rates.

Based on the average annual incidence rate for 2004–2006, Yakima County had the greatest burden of disease (449 per 100,000). The state's two largest urban counties, King and Pierce, also had higher incidence rates than the overall state rate as did Franklin, Whitman, Cowlitz, Okanogan, and Kittitas counties.

Age and Gender

Men and women have very different reported chlamydia incidence rates. Chlamydia screening initiatives target younger women accessing care in family planning and reproductive health settings. Providers do not routinely screen men in these settings unless they accompany their female partners to the care visit. A large proportion of male partners of infected women remain unscreened, undiagnosed, and/or untreated. This contributes to ongoing chlamydia transmission and re-infection. Given the disparities in screening between men and women, it is probable that the true incidence of chlamydial infection among men is probably similar to the rate among women for all age groups.

The highest incidence rates for females occur among those ages 15–24. Among males, the highest rate is in the 20–24 year age group.



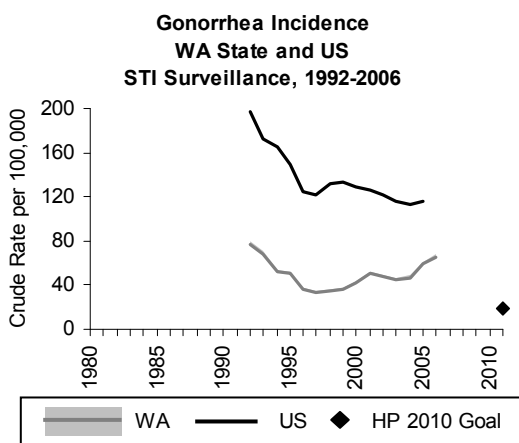
Summary (Gonorrhea)

Since reaching an historic low of 32 cases per 100,000 in 1997, gonorrhea incidence among Washington residents has generally increased.

In 2006, 4,204 cases were diagnosed and reported yielding an annual incidence rate of 66 cases per 100,000. This rate is nearly double the rate observed a decade previously. Untreated or repeat infections among women are a major cause of reproductive health problems including pelvic inflammatory disease, ectopic pregnancy, and infertility. Recent increases among Washington residents are part of a pattern of increasing gonorrhea incidence on the U.S. West Coast that began in 2003. In contrast, other areas of the country have been experiencing historically low rates. With an increasing burden of disease, prompt diagnosis and treatment of gonorrhea cases and active management of their exposed partners becomes critically important.

Time Trends

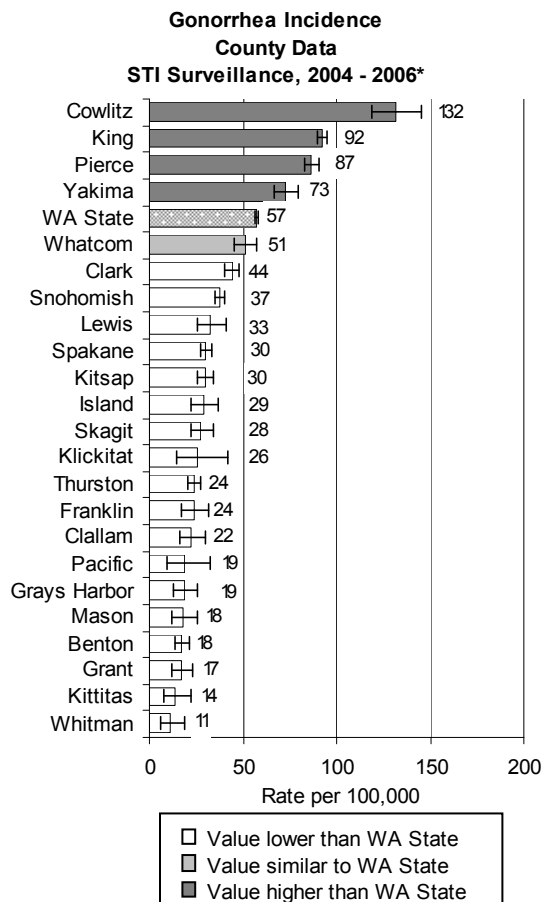
Gonorrhea incidence declined steeply both nationally and in Washington through the middle of the 1990s. Since 1997, gonorrhea incidence among Washington residents has generally risen, although there was a period of slight decline between 2001 and 2003. Steep increases have been noted since 2003; this trend is consistent with trends seen elsewhere on the U.S. West Coast. Increasing incidence in this area of the country is now driving national incidence rates upward.¹



Year 2010 Goals

Healthy People 2010 has a goal of no more than 19 cases of gonorrhea per 100,000. Washington has never met this goal. Annual case rates would have to fall more than 70% from the 2006

rate of 66 cases per 100,000 to meet this target. Additional resources for diagnosis and treatment and to identify, screen, and treat all exposed partners are needed to meet Healthy People 2010 goals.



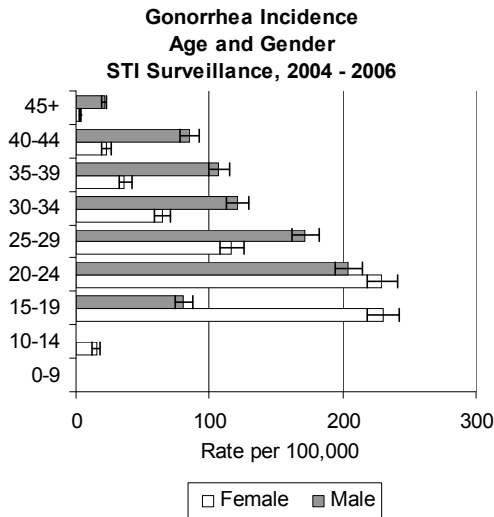
* Sixteen counties had too few cases to support a reliable rate estimate

Geographic Variation

Gonorrhea cases have historically been concentrated in urban areas in Washington. But Cowlitz County had the highest average annual incidence rate in 2004–2006, illustrating that outbreaks can occur in less urbanized areas. Three other counties—King, Pierce, and Yakima—had gonorrhea incidence rates higher than the overall state rate. Sixteen counties had too few cases for calculating reliable rates, and the remaining counties had incidence rates equal to or lower than the statewide average incidence rate of 57 cases per 100,000.

Age and Gender

The number of gonorrhea cases reported among males and females is roughly equal. The overall male-to-female case ratio in 2006 was 1.2 males for every female case. The disparity observed in male-to-female cases in age groups 25 and older occurs because there is a higher incidence of gonorrhea among men who have sex with men (MSM) in urban areas. Among males, older men bear a disproportionately higher burden of disease. Among women, the highest burden of disease is among those 24 and younger.



Gonorrhea incidence among males 15–19 years is less than half that of females in the same age group, suggesting that younger men might be less likely to access screening and diagnostic services.

Summary (Syphilis)

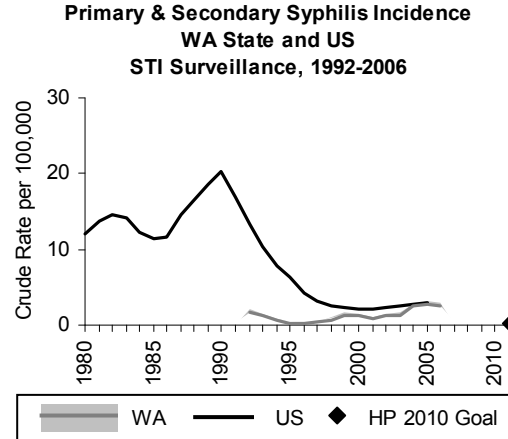
Syphilis is the oldest recognized sexually transmitted infection, and its prevention has been an historic focus of public health activity. Cases of primary and secondary syphilis, the infectious stages of disease, decreased steadily in Washington during the first half of the 1990s to all-time lows. Syphilis has recently reemerged among certain populations, however. In 2006, 156 cases of primary or secondary syphilis were diagnosed statewide (an incidence rate of 2.9 per 100,000). All but three of these cases were in men. More than 90% of those newly infected reported men having sex with men as a risk factor. The annual incidence rate of primary and secondary syphilis in

Washington does not meet the *Healthy People 2010* goal of 0.2 cases per 100,000. Untreated primary and secondary syphilis infection can have serious health consequences including heart abnormalities, mental disorders, blindness, neurological problems, and death. Among pregnant women, trans-placental transmission of syphilis is a potential cause of congenital abnormalities and fetal loss.

Time Trends

Syphilis transmission in Washington was virtually eliminated following a heterosexual epidemic outbreak of syphilis in the late 1980s and early 1990s. Only 11 cases of primary and secondary syphilis were reported in 1996, and most of these were infections acquired out of the state.

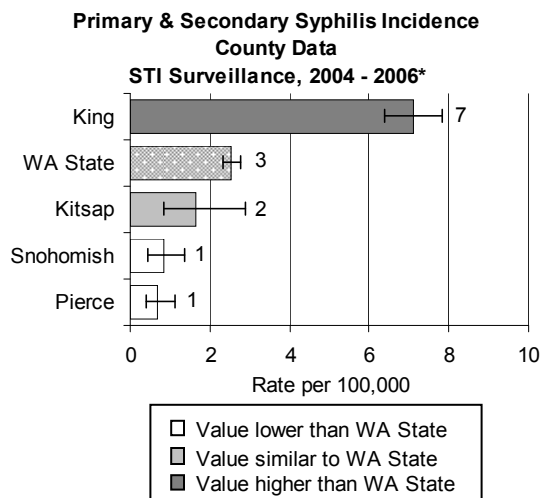
Infectious syphilis reemerged among urban MSM in Washington starting in 1997. Incidence rates doubled each year through 2000. Following a brief leveling-off of incidence in that year, Washington's incidence of primary and secondary syphilis increased to a high of 2.8 cases per 100,000 in 2005. The 2006 incidence rate of 2.5 indicates that the outbreak continues.



In 2000, national incidence rates for primary and secondary syphilis fell to their lowest rate (2.1 cases per 100,000) since reporting began in 1941. Because of these dramatic reductions in disease, the CDC launched the National Syphilis Elimination Project. Despite considerable programmatic effort to reduce transmission in selected high-incidence populations nationwide, syphilis continues to be endemic in the southern United States and in urban MSM populations.

Year 2010 Goals

The *Healthy People 2010* target is to reduce the national incidence of primary and secondary syphilis to 0.2 cases per 100,000. Washington achieved this benchmark for only one year in the past decade, 1996. The 2006 incidence rate of primary and secondary syphilis (2.5 cases per 100,000) is more than ten times the *Healthy People 2010* target. Public health agencies are working to control the current outbreak. Additional resources will be needed if Washington is to meet the goal for primary and secondary syphilis incidence.



* Only four counties reported enough cases to support a reliable rate estimate.

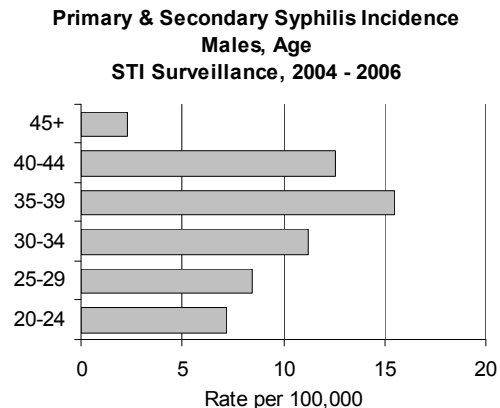
Geographic Variation

Primary and secondary syphilis transmission is mainly an urban phenomenon affecting MSM populations in King County or those who travel to King County to find sex partners. King County reported more than 80% of all cases in 2006 and had an incidence rate of 8.0 cases per 100,000. This was considerably higher than the statewide rate of 2.5 cases per 100,000 that year. Three additional counties reported sufficient cases to calculate stable rates for this period. Two of these counties, Snohomish and Pierce, have rates lower than the statewide rate (0.9 and 0.7 cases per 100,000, respectively).

Age and Gender

Too few female syphilis cases were reported in Washington for 2004–2006 from all age groups to reliably calculate age-specific incidence rates. But male case rates by age are distributed in a pattern characteristic of STIs among MSM, with

the highest [crude incidence rate](#) found among those 35–39 years old (15.5 cases per 100,000).



Race and Hispanic Origin (chlamydia, gonorrhea, syphilis)

Data on race and Hispanic origin of people who have chlamydia and gonorrhea in Washington are incomplete. In 2006, 25% of all case reports did not identify the race of the patient, and 29% were missing information about Hispanic origin. Incidence rates based only on cases with available data would be unreliable and so are not calculated.

National data suggest racial and Hispanic origin disparities exist in rates of chlamydia and gonorrhea.² This disparity does not suggest major differences in behavior between individual people of different races and ethnicities. Rather, these differences might occur because of limited partner choices. Small or culturally isolated groups might have higher rates of STIs because fewer culturally acceptable potential sex partners are available. If this were the case, a relatively small number of infections could lead to much higher rates than would be seen in populations with a dramatically larger potential partner pool.³ Socioeconomic status or other risks may also vary by race and Hispanic ethnicity; additional research is necessary to explain disparities in disease rates.

Income and Education

Providers are not required to report the income level and educational attainment of patients diagnosed with STIs. But incidence rates for chlamydia cases diagnosed during 2004–2006 are available at the census tract level. Comparing these rates to information from Census 2000 on educational attainment and median household income at the

census tract level can shed light on the relationship between income and education and disease rates.

Cases diagnosed during 2004–2006 show an inverse relationship between disease rates and educational attainment (measured as the percentage of adults ages 25 and older who have attained at least a high school diploma) at the census tract level. Chlamydia rates are higher in census tracts with a lower proportion of people with at least a high school diploma. Census tracts with lower median household incomes also have higher rates of chlamydia than those with higher median incomes.

Other Measures of Impact and Burden

Resistance to antibiotics. Beginning in 1991, gonorrhea strains resistant to fluoroquinolones, a commonly used class of antibiotics, appeared in cities on the U.S. West Coast, including Seattle. By 2004, 16% of isolates from the Gonococcal Isolate Surveillance Project collected in Seattle's primary STI clinic from men with gonorrhea showed resistance to this class of drugs.⁴ As a result, local and national gonorrhea treatment guidelines no longer recommend the use of fluoroquinolones for treating gonococcal infections, especially among men who have sex with men. MSM also constitute a growing proportion of male gonorrhea cases in Washington.

Disseminated gonococcal infection. A very few individuals will have gonococcal infections that spread beyond the genital, oral, or anal tracts. These infections are called disseminated gonococcal infections (DGI). They typically present as infections of the blood, joints, or heart and result in arthritis-like symptoms as well as systemic malaise. Disseminated infections usually require hospitalization and are often difficult to treat. DGI cases have been very rare in Washington for the past several decades. But in 2006, 13 cases were reported, 12 in Seattle and surrounding urban areas and one in Spokane.

HIV and STI co-infection. HIV and STI surveillance registries were matched, and the prevalence of HIV among gonorrhea cases was found to have increased from 2.4% in 2000 to 6.2% in 2005. Infection with bacterial STIs might facilitate HIV transmission.⁵ Likewise, incidence

of gonorrhea among HIV-positive people is rising faster than the incidence among the general population. In 2005, 258 cases of gonorrhea per 10,000 HIV-positive people were diagnosed compared to six cases per 10,000 for all Washington residents.⁶

More than half of the cases of syphilis among MSM diagnosed during 2004–2006 were among people who were also HIV positive. Syphilis co-infection among HIV-positive people is of particular concern because ulcerative lesions are characteristic of primary syphilis infection and may considerably promote transmission of or susceptibility to HIV infection.

But data also suggest that HIV-positive people actively seek sexual partners of the same HIV infection status,⁷ a pattern that could reduce transmission of HIV. This behavior, known as serosorting, might in part explain the relatively stable HIV incidence rates observed in Washington concurrent with a sharply increasing incidence rate of sexually transmitted infections among HIV-positive people.

STIs and reproductive health. Ectopic pregnancy and pelvic inflammatory disease in women are strongly associated with untreated or repeat chlamydia or gonorrhea infections. Women with pelvic inflammatory disease have infections of the uterus, fallopian tubes, or other reproductive organs. Nationwide, an estimated one million women annually will have pelvic inflammatory disease, which is a leading cause of female infertility. In rare cases, severe pelvic infections can cause premature death.⁸

Economic burden. The diagnosis, treatment, and longer-term medical and reproductive health consequences of STIs consume both public and private health care resources in direct costs to society in terms of lost wages and productivity. Recent national estimates indicate that bacterial STIs might cost as much as half a billion dollars annually⁹ in Washington.

Risk and Protective Factors

The sole risk factor for chlamydia, gonorrhea, and syphilis infection is unprotected vaginal, oral, or anal intercourse. The most effective method to prevent these STIs is abstinence. But most people will become sexually active at some time in their lives. Barriers, such as male and female condoms, can prevent the transmission of STIs.

Among people screened in the Infertility Prevention Project, those who had multiple sex partners, a new sex partner, or did not use condoms at their most recent sexual encounters were most likely to have chlamydia or gonorrhea.¹⁰

Intervention Strategies

Three key factors determine ongoing transmission of STIs:

- The rate at which uninfected people have unprotected sexual contact with infected people (exposure)
- The probability that an uninfected person will become infected if exposed (transmissibility)
- The length of time an infected person is infectious and able to transmit the pathogen (duration).

To reduce STIs, programs should support behavior change both at the individual and population levels to modify one or more of these factors. Public health interventions can influence only exposure and duration factors for non-vaccine preventable STIs.

Encouraging people to adopt preventive strategies such as abstinence from sexual activity, consistent and correct use of latex condoms, regular screening if sexually active, and prompt treatment if infected can limit exposure. Prompt identification and treatment of infected people reduces duration, which consequently reduces the risk of exposure to the sexual partners of infected people.

When people are screened and STI infection is detected, public health approaches to STI control—such as prompt treatment with antibiotics, interviewing infected individuals to identify people potentially exposed through sexual activity, and contacting these exposed partners—are an effective foundation for limiting the spread of disease.

Timely identification and prompt response to STI outbreaks by the public health community can also interrupt the chain of transmission in sexual networks and limit the extent of the outbreak. While often resource-intensive, these interventions can be highly effective.

In light of the mounting evidence that inflammatory and ulcerative STIs can facilitate transmission of HIV infection, STI control efforts

also can prevent HIV transmission especially among people at the greatest risk for infection.

Resources for STI control programs are declining. Public health is exploring additional methods for ensuring the treatment of potentially exposed partners. One important new disease control method is known as Expedited Partner Treatment (EPT). EPT refers to the practice of allowing potentially exposed partners of infected cases to be treated without a clinical evaluation. This model recognizes that an increasing proportion of partners are not being evaluated and therefore not being treated if infected.

A recent clinical trial demonstrated that EPT reduced the likelihood of reinfection of patients with chlamydia or gonorrhea and resulted in a higher proportion of potentially exposed partners being treated than traditional partner management methods.¹¹ In light of this and similar studies, the CDC recently released comprehensive guidance to STI programs nationwide recommending EPT as an additional strategy for reducing the rate of STIs.^{12,13}

In 2006, the increasing volume of chlamydial and gonococcal infections in Washington led to an initiative to implement and evaluate comprehensive EPT strategies for people diagnosed with STIs. But this strategy is not currently considered suitable for people with syphilis infections because of the higher potential for HIV co-infection among people diagnosed with syphilis. The sex partners of patients with syphilis infection should continue to be clinically evaluated for STIs, including HIV, and be treated appropriately.

See Related Chapters: [Sexual Behavior](#), [Social and Economic Determinants of Health](#), [HIV/AIDS](#)

Data Sources

STI Surveillance Data: Washington State Department of Health, Community and Family Health, Infectious Disease and Reproductive Health, STD/TB Services Section

Infertility Prevention Project Data: Center for Health Training, Seattle, WA

For More Information

Washington State Department of Health, Infectious Disease and Reproductive Health, STD/TB Services Section, (360) 236-3460
<http://www.doh.wa.gov/cfh/STD/>

U.S. Department of Health and Human Services, U.S. Centers for Disease Control and Prevention:
<http://www.cdc.gov/STD/default.htm>

Henry J Kaiser Family Foundation:
<http://www.kaisernetwork.org/index.cfm>

American Social Health Association:
<http://www.ashaSTD.org/>

Technical Notes

The number of cases and rates of chlamydia, gonorrhea, and syphilis are based on providers' reports to local health jurisdictions. These reports are forwarded to the State Department of Health and maintained in a confidential STI case registry. Data for this report are based on cases diagnosed through December 31 2006 and reported to the Department of Health as of January 31 2007.

The Infertility Prevention Project (IPP) is a collaborative initiative between the U.S. Centers for Disease Control and Prevention and the Office of Population Affairs, providing funds to screen women for chlamydial infection. For additional information see:
<http://www.cdc.gov/STD/infertility/ipp.htm>

Endnotes

¹ U.S. Centers for Disease Control and Prevention. (2007, March 17). Gonorrhea in the West. *Morbidity and Mortality Weekly Report*, 59, (in press).

² U.S. Centers for Disease Control and Prevention. (2006, November). *Sexually Transmitted Disease Surveillance 2005*. Atlanta, GA: U.S. Department of Health and Human Services.

³ U.S. Centers for Disease Control and Prevention. (2001, November). *Tracking the Hidden Epidemics, Trends in STIs in the United States, 2000*. Atlanta, GA: U.S. Department of Health and Human Services.

⁴ U.S. Centers for Disease Control and Prevention. (2005, December). *Sexually Transmitted Disease Surveillance 2004 Supplement: Gonococcal Isolate Surveillance Project (GISP) Annual Report-2004*. Atlanta, GA: U.S. Department of Health and Human Services.

⁵ Fleming, D. T., & Wasserheit, J. N. (1999). From Epidemiological Synergy to Public Health Policy and Practice: the Contribution of Other Sexually Transmitted Diseases to Sexual Transmission of HIV Infection. *Sexually Transmitted Diseases*, 1, 3-17.

⁶ Unpublished data, Washington State Department of Health, Infectious Disease and Reproductive Health Assessment Unit.

⁷ Truong, M., Kellogg, T., Klausner, J. D., Katz, M. H., Dilley, J., Knapper, K., et al. (2006). Increases in sexually transmitted infections and sexual risk behaviour without a concurrent increase in HIV incidence among men who have sex with men in San Francisco: a suggestion of HIV serosorting? *Sexually Transmitted Infections*, 82, 461-466.

⁸ U.S. Centers for Disease Control and Prevention, Department of Health and Human Services,
<http://www.cdc.gov/STI/PID/STIFact-PID.htm>. Accessed January 2007.

⁹ Chesson, H. W., Blanford, J. M., Gift, T. L., Tao, G., & Irwin, K. L. (2004). The Estimated Direct Medical Cost of Sexually

Transmitted Diseases Among American Youth, 2000. *Perspectives on Sexual and Reproductive Health*, 36(1), 11-19.

¹⁰ Unpublished data, Washington State Department of Health, Infectious Disease and Reproductive Health Assessment Unit.

¹¹ Golden, M. R., Whittington, W. L., Handsfield, H. H., Hughes, J. P., Stamm, W. E., Hogben, M., et al. (2005). Effect of expedited treatment of sex partners on recurrent or persistent gonorrhea or chlamydial infection. *New England Journal of Medicine*, 352(7), 676-685.

¹² U.S. Department of Health and Human Services, U.S. Centers for Disease Control and Prevention,
<http://www.cdc.gov/STI/DearColleagueEPT5-10-05.pdf>.

¹³ U.S. Department of Health and Human Services, U.S. Centers for Disease Control and Prevention,
<http://www.cdc.gov/STI/treatment/EPTFinalReport2006.pdf>.