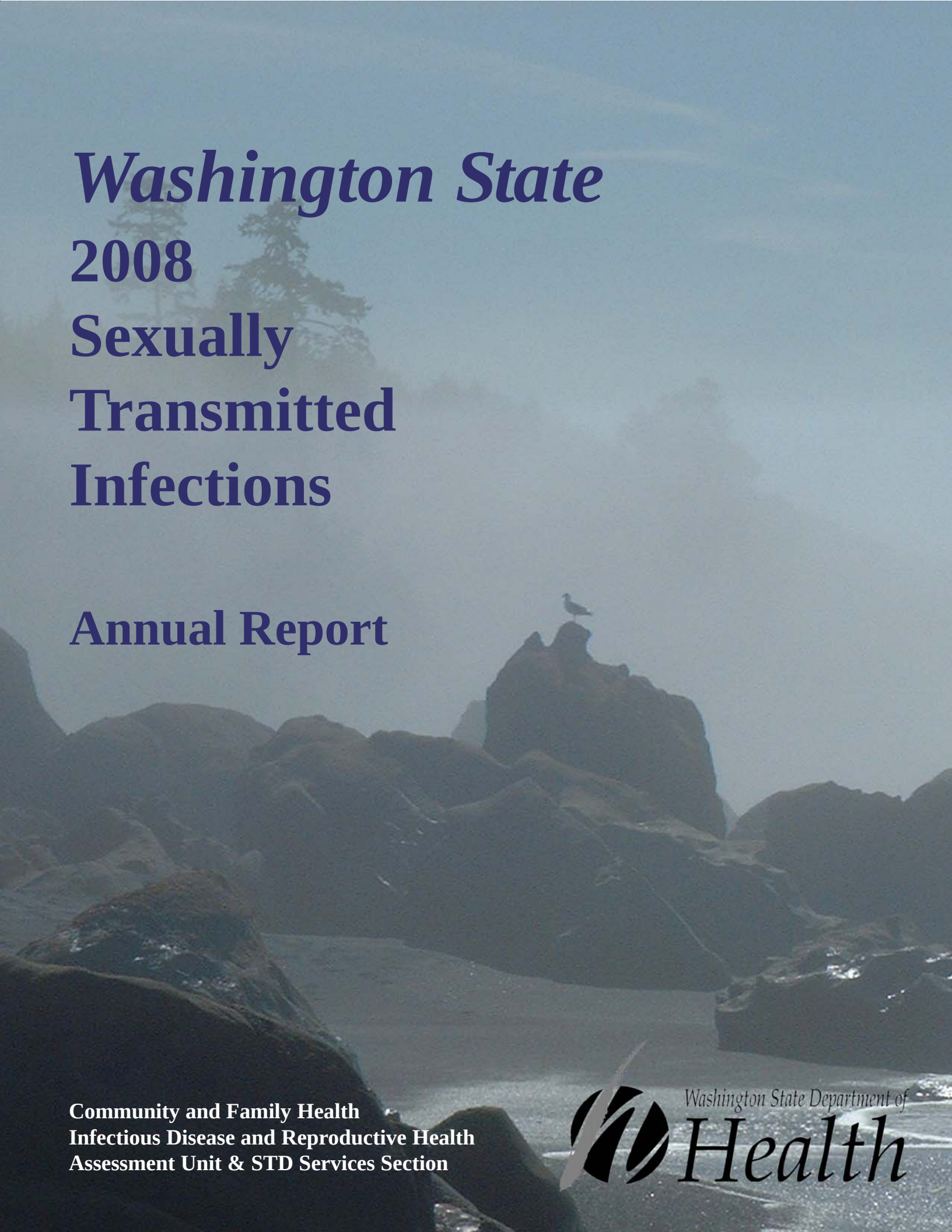

Washington State
2008 Sexually Transmitted Infections

Annual Report

Community and Family Health
Infectious Disease and Reproductive Health
Assessment Unit & STD Services Section

Washington State Department of Health

Washington State
2008
Sexually Transmitted Infection Morbidity

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Washington State Department of Health
Community and Family Health
Infectious Disease and Reproductive Health
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Secretary of Health

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Sexually Transmitted Infections ~ 2008
Washington State
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Field Note

"We recently saw a female patient whose boyfriend had just come back from overseas. They had sex a few times but then (according to the patient), he suddenly refused to have sex and complained of pain and discharge. She became concerned and came in for an exam. She stated that she had "a couple of hundred dollars" to her name and couldn't afford to pay. It was great that we were able to use Infertility Prevention Project funds and help her out."

Clinic Manager
Infertility Prevention Project

EXECUTIVE SUMMARY

The 2008 Annual Sexually Transmitted Infection (STI) Morbidity Report includes reported incidence rates and analyses of trends for Washington State's legally reportable STIs. These include chlamydial infection*, gonorrhea, syphilis, herpes simplex-initial genital infection, neonatal herpes infection, chancroid, lymphogranuloma venereum (LGV), and granuloma inguinale (GI). Sexually transmitted infections are the most commonly reported communicable diseases in Washington State and comprised greater than 75 percent of all notifiable conditions reported to the Department of Health in 2008.

Chlamydial Infection

Chlamydial infection continues to be the most commonly reported STI. In 2008, there were 20,882 cases diagnosed and reported for a statewide crude incidence rate of 317.0 per 100,000 persons. The 2008 incidence rate for females was 458.9 per 100,000, compared to an incidence rate for males of 172.7 per 100,000. The chlamydial infection incidence rate increased in calendar year 2008 by 7.4 percent over the rate observed in 2007. Some of this increase is attributed to improvements in the sensitivity of Washington State's surveillance systems, including intensified local follow-up on positive laboratory reports. However, rates have generally been increasing since the middle of the last decade and some portion of the observed increase likely represents a moderate increase in the burden of disease in the community.

Gonorrhea

In 2008, 3,069 cases were diagnosed and reported compared to 3,582 in 2007. Likewise, the incidence rate of gonorrhea decreased significantly from 55.2 per 100,000 in 2007 to 46.6 per 100,000 in 2008. This 15.6 percent decrease in rates is a promising continuation of declines in gonorrhea morbidity noted since Washington State reached a 15-year high in 2006. The burden of gonorrhea morbidity in 2008 continues to be concentrated geographically in mostly urban settings. Behaviorally, among males over 30, a significant proportion report being men-who-have-sex-with-men (MSM).

Syphilis

There were 177 cases of primary and secondary (P & S) syphilis diagnosed and reported in 2008, a slight increase over the number of cases (172) reported in 2007. The statewide P & S syphilis rate remained statistically stable at 2.7 cases per 100,000. Syphilis appears to have become endemic at unacceptably high levels among MSM in the state's largest urban centers; persistent incidence among this population presents unique challenges to ongoing disease prevention and control efforts, which are particularly important in light of the potential for concurrent HIV infection. No cases of congenital syphilis were reported in 2008.

Other STDs

In 2008, 1,971 cases of initial genital herpes simplex virus (HSV-1 and/or HSV-2) were diagnosed and reported for an incidence rate of 29.9 per 100,000. New genital herpes infections are often difficult to distinguish from old infections; passive case reporting is considered to be a poor measure of the true incidence of disease. However, the reported case rate has been stable over the last decade, suggesting that the rate of new infections is likely stable as well.

Nine cases of suspected neonatal herpes were reported among live births in Washington State in 2008. Efforts to standardize and implement a uniform case definition for neonatal HSV are currently underway. Four cases of lymphogranuloma (LGV) and one case of chancroid were reported in 2008. No cases of granuloma inguinale (GI) were reported in Washington State in 2008.

* Chlamydial infection rather than 'chlamydia' is used throughout this report to indicate infection with *C. trachomatis.*

Data Sources, Methods and Limitations

Public and private health care providers fill out confidential case reports, which are submitted to local health jurisdictions (LHJs). These case reports are subsequently forwarded electronically to the Washington State Department of Health, STD Services Section, and are the primary data source for diagnosed cases of sexually transmitted diseases. Laboratories providing diagnostic or screening services are also required to report positive test results to the local health jurisdiction where the patient resides. Positive laboratory reports are investigated by LHJs to assure that a confidential case report is received from the provider. Chlamydial infection, gonorrhea, and syphilis cases require laboratory confirmation. Genital herpes may be reported without confirmation.

A wide variety of persons and agencies submit confidential case reports to LHJs; the completeness, quality and usefulness of specific data elements can vary widely. Information on race and Hispanic ethnicity are frequently missing on provider case reports, for a variety of reasons. In calculating rates by race and Hispanic ethnicity for this report, these data are treated as separate categories and missing cases were redistributed based on the proportions of known cases.

Beginning in January of 2008, LHJs in Washington State began using a secure, web-based reporting system to report cases to the STD Services Section. This system reduces the reporting delay inherent in paper-based case reporting. Additionally, local disease intervention staff use this system to initiate case investigations immediately upon receipt of laboratory data. This has led to an improvement in the timeliness of partner management and treatment assurance activities. Additional information can be added to patient records and case information is routinely updated as provider reports are received and interviews with patients are conducted. Case reports are also now routinely geocoded, providing assurance that cases are attributed to the appropriate jurisdiction for official reporting purposes and allowing for the calculation of incidence rates at more useful geographic levels.

Crude incidence rates presented in this report are calculated based on cases diagnosed in the calendar year per 100,000 persons. The 2008 disease incidence rates for all Washington counties are calculated by dividing the number of cases diagnosed for that county in 2008 by the estimated 2008 county-specific population and multiplying by 100,000 for the population standard. Official population forecasts were obtained from the Washington State Office of Financial Management, released in November of 2008.

Rates based on very few cases are often statistically unreliable, especially for counties with relatively small populations or where rates are calculated for age, gender or race strata with a very small number of cases. Relative standard errors (RSE) are calculated and rates with RSE values of 30 percent or higher are noted in tables to indicate that these are statistically unstable for comparison purposes. Poisson exact 95 precent confidence intervals are presented for rates in many charts to help assess the significance of changes over time or comparisons between jurisdictions. Crude age and gender specific incidence rates are used for the purposes of this report; age-adjusted rates are not presented because these may mask important trends in statewide data and result in over or under-estimation of the true burden of disease in some age groups.

Record matching between HIV and STI case registries was performed using CDC-developed software called Link Plus and used first and last name, date of birth and gender to identify unique person-matches. Both registries also stored information on alternate patient names (such as change from maiden

to married name) and these were matched as alias records. Potentially matching records were manually reviewed and all ambiguous matches were discarded. Additional information on Link Plus is available from CDC (http://www.cdc.gov/cancer/npcr/tools/registryplus/lp.htm).

Data Limitations

Clinically diagnosed cases of STIs (with laboratory confirmation) may be under-reported through public health surveillance systems. Presumptively diagnosed cases may not be reported. However, clinical practice recommendations from the Centers for Disease Control and Prevention (CDC) state that all bacterial STIs should be laboratory confirmed. Depending upon diagnostic practices, completeness of reporting may vary by source of report, particularly private versus publicly funded sources of care. Care should be exercised in interpreting these data in light of known limitations.

Guidelines to Prevent Misuse of Data

The following guidelines are provided to help prevent data misuse and should always be considered when reviewing data from any source:

1 Data presented in this report represent new cases of infection ***diagnosed*** during 2008 and reported through March of 2009, not unique persons diagnosed with disease (e.g. a person may have repeat infections within a given year).

2 Data presented in this report are based on cases reported to local health jurisdictions and to the STD Services Section, Infectious Disease & Reproductive Health, Washington State Department of Health. These data are representative of infections among persons seeking and receiving care for symptomatic and asymptomatic STIs, reproductive health services, or other care in both public and private care settings.

3 Small increases or decreases in numbers from year to year can look large if the actual number of cases is small. For example, if two cases of chlamydial infection are counted in a particular county in one year and three cases are counted in the next year, this is an increase of 50%. While this may sound significant, a change of one case does not represent a meaningful increase in the burden of disease. Caution in interpreting trends or comparing across jurisdictions is warranted.

We encourage anyone with specific questions about how these data should be interpreted to contact STD Services Section at 360.236.3460.

All of the statistical analyses presented in this report were conducted using SAS 9.1.3 (SAS Institute Inc., Cary, NC), maps were produced with ArcMap 9.2 (ESRI, Redlands, CA) and charts produced using Microsoft Excel 2003 (Microsoft Corp., Redmond, WA). Desktop publishing and page layout was facilitated using PageMaker 7.0, (Adobe Systems, Inc. 2002)

Introduction

This report summarizes and describes findings from disease surveillance activities for sexually transmitted infections (STIs) diagnosed in Washington State through December of 2008. This report is specifically intended to provide public health professionals working at the local and state levels with analysis and interpretation to help steer policy and promote disease prevention program development.

The burden of STIs in a community can be viewed as a reflection of the overall sexual health of the population when considered in context with other community wellness issues. The incidence of STIs can help shed light on broader health inequalities by gender, race, Hispanic ethnicity, age, and other markers of socioeconomic status. Understanding how social inequities emerge in the context of STIs may also provide the public health community with key insights into structural changes needed to address health related consequences of social, cultural, and economic inequalities. These insights may be particularly timely in light of ongoing efforts to restructure health care delivery and to reform health insurance nationally.

Infection with sexually transmitted infections is preventable through the adoption *and consistent use of* healthier sexual practices including; condom use, limiting the number of sexual partners, avoiding concurrent partnerships, and practicing abstinence where appropriate. Testing sexually active patients for STIs regularly and routinely is not always the standard of care in all health care settings and many people may not be aware of their STI status. Higher rates of STIs observed in some communities in Washington should raise questions relating to possible barriers to screening, diagnostic and treatment services as well as a potential lack of educational resources for persons at greatest risk for STIs. These considerations should be kept in mind when comparing rates across jurisdictions where significant differences are observed. There may also be a population level relationship between incidence of human immunodeficiency virus (HIV) and other STIs. Understanding historical incidence trends, risk factors, and the current characteristics of STIs is important in planning disease control efforts and contributes to the broader portrait of the health of Washington State's residents.

Infection with pathogens such as *Chlamydia trachomatis* (CT), genital *human papillomavirus* (HPV), genital *herpes simplex virus* (HSV) and *Trichomonas vaginalis* (Trich) is very common in many communities throughout the world and in Washington State. These STIs are considered to be endemic, in that enough people are infected at any given time in a particular area to sustain ongoing transmission at relatively high levels. Modest annual fluctuations in the incidence of disease are routinely observed. However, changes over many years often reveal broader population-level social, economic, and behavioral trends. Other diseases, such as those caused by HIV, *Neisseria gonorrhoeae* (GC) and *Treponema pallidum* (syphilis), result in far fewer infections on an annual basis. Yet these sometimes occur in sporadic, sustained outbreaks in limited geographic areas or among specific population groups sharing a particular risk factor or characteristic.

Transmission Dynamics

It is particularly important to consider how STI are spread when interpreting or drawing conclusions from the descriptive epidemiology presented in this report. STIs are transmitted through sexual networks, the particular composition and characteristics of which are strongly influenced by cultural and social norms. Partner choice is consciously, and often unconsciously, guided by complex and subtle rules

reflecting cultural beliefs as well as individual preferences. For some individuals and cultural groups, this may limit partner choice to a small network of individuals. Likewise, other groups may have broader partner choices and have access to a much larger network of partners. Smaller networks, with few out-of-network or 'bridging' partnerships and low prevalence of disease, may be somewhat protected from STIs prevalent in the broader population. However, a few infections in these smaller networks can precipitate a cycle of high disease incidence within the network. Characteristics of sexual networks and the burden of prevalent infections within the network are often the most significant contributing factors to higher or lower rates of disease among ethnic, racial, and sexual minority populations. People in these groups do not necessarily have more, or more frequent, sexual contacts than people in other communities, yet they may be considerably more likely to encounter a partner who is infected than those with a broader choice in potential partners.

Biology & Clinical Practice

Biology and clinical practices also play a role in variations observed in STI incidence over time and between populations at risk. These factors can be expressed in different ways, depending on the individual pathogen and on changing trends in medical or public health practice. Some bacteria, such as *Neisseria gonorrhoeae*, also evolve rapidly in the presence of antibiotic pressure to become resistant to commonly used antibiotic medications. Other organisms, such as syphilis and chlamydia, may be genetically conserved in such a way as to remain largely susceptible to commonly available and recommended treatments.

Over the last several decades, gonorrhea strains circulating globally have become resistant to penicillin and, more recently, to another common class of antibiotics called quinolones. One remaining family of antibiotics, cephalosporins, is recommended as the most effective frontline treatment for gonorrhea. When resistant strains become endemic in a geographic area or among a particular population, use of less effective antibiotics to treat infections may lead to treatment failures and subsequent rapid spread of resistant infections in a larger outbreak. Similarly, changes in the medical and pharmaceutical marketplace may also impact disease trends.

Withdrawal from the market of cefixime, an inexpensive, single-dose cephalosporin, in the early part of the decade may have increased quinolone pressure on gonorrhea, preferentially selecting resistant organisms already in circulation. A fifteen-year high in population-level gonorrhea incidence rates was observed in Washington State in 2006. Campaigns to increase provider awareness of specific antibiotic resistance, availability of alternative cephalosporins and intensified public health interventions such as enhanced partner management may have contributed to the relatively dramatic decreases in gonorrhea incidence seen over the last two years. Additional research is needed to fully reveal the relationship between market-based changes in the availability of STI medications and medical services - and how these affect population-level health outcomes.

Behavior

Individual and social level changes in sexual behavior also contribute significantly to trends in STI incidence. In reaction to the AIDS pandemic in the late 1980s, well documented population level decreases in unprotected sexual activity, decreases in the number and frequency of partnerships, a slight increase in the age of sexual debut, and nationally intensified efforts to screen for and diagnose STIs may have led to a broad decline in the rates of all nationally reportable STIs through the middle of

the 1990s. Public awareness of HIV and the accompanying behavior changes may have recently begun to wane. This may be due in part to wide availability and use of highly active antiretroviral therapies, which have dramatically reduced the morbidity associated with HIV infection. The characteristic bowl-shaped incidence curves presented in this report for gonorrhea, chlamydia, and to some extent syphilis are associated in time with these population-level changes in perception of risk and in sexual behavior.

The Bigger Picture

With all STIs, there are three important factors to consider when interpreting the incidence of disease and for planning infection control interventions. The first of these is the ease with which a pathogen infects a suceptible person. Vaccines are an example of interventions that can alter suceptibility to infection and lead to decreased transmission. The second factor is the duration of infection. The longer an individual remains infected and potentially able to spread infection to others, the greater the liklihood that this will happen. Prompt diagnosis and treatment of cases and their partners decreases the duration of infection and helps limit the chance of new infections. Finally, the number of sexual exposures while infected is also directly related to the probability of transmission. Reducing the number of sexual partners and consistent use of condoms can decrease the number of exposures.

Despite generally increasing trends in STI incidence in Washington State over the previous decade, there is considerable cause for optimism. Our communities continue to rank favorably in chlamydial infection and gonorrhea incidence when compared to national rates. The public health community in Washington State is also pursuing a long-term evaluation study of a new and very promising public health intervention for bacterial STIs called expedited partner therapy (EPT) which is intended to increase the proportion of partners who get treated in an appropriate and timely manner.

Additional resources allocated in 2007 by Washington State's legislature to our local partners have also enabled public health agencies to intensify efforts to provide people diagnosed with chlamydial infection or gonorrhea with partner services. These resources, in addition to our EPT initiative, have nearly doubled the number of people with STIs that public health workers have successfully provided services to. Within the framework of these efforts, Washington State is positioned to make significant strides in the prevention and control of STIs.

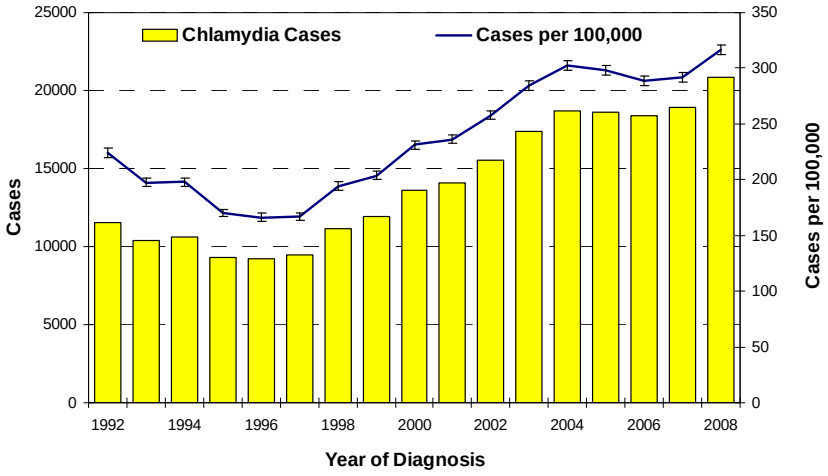
However, there are also challenges which threaten our progress and may even lead to a reversal of recent gains. Over the last decade, the publicly-funded clinical infrastructure specifically focused on diagnosing and treating STIs has seriously eroded. Clinicians practicing in STI-focused settings are more likely to be aware of changing treatment regimens, which in turn decreases the possibility of emergence of resistant strains. Our communities have lost a number of these resources over the last decade as well as essential staff capacity in local health departments to provide partner services.

Finally, this report marks a significant departure from previous annual summaries in scope and comprehension. Attention has been recently focused on integrating clinical services, public health interventions and prevention efforts across the spectrum of STIs, including HIV and viral hepatitis. Given the overlap in populations at risk, this integration makes good sense for maximizing the impact of increasingly scarce public health resources and in reducing overall health care costs. It is our intention by providing additional behavioral data, analyses and interpretation, including for the first time HIV disease, to encourage and inform efforts to collaborate across disease-specific programs.

Chlamydial Infections

The most commonly reported bacterial STI in the United States and in Washington State is *Chlamydia trachomatis*. The Kaiser Family Foundation estimated in 1998 that more than 3 million new chlamydial infections occur in the U. S. each year with only one-third actually being reported to health departments. In 2007, the most recent year for which national data are available, over one million cases of chlamydial infection were reported to CDC with a national annual incidence rate of 370.2 per 100,000 (CDC 2008). In Washington State, 20,882 cases were reported in 2008 for an annual incidence rate of 317 per 100,000. While this compares favorably to the national incidence rate (Washington's rate in 2008 is 14% below the prior year's national rate) chlamydial infection continues to be a major cause of morbidity and a contributing factor to negative reproductive health outcomes, including pelvic inflammatory disease (PID), ectopic pregnancy and involuntary infertility.

Figure 1 - Chlamydia Cases and Incidence Rate*, Washington State, 1992 - 2008



* Crude incidence rate per 100,000 with Poisson exact 95% confidence intervals.

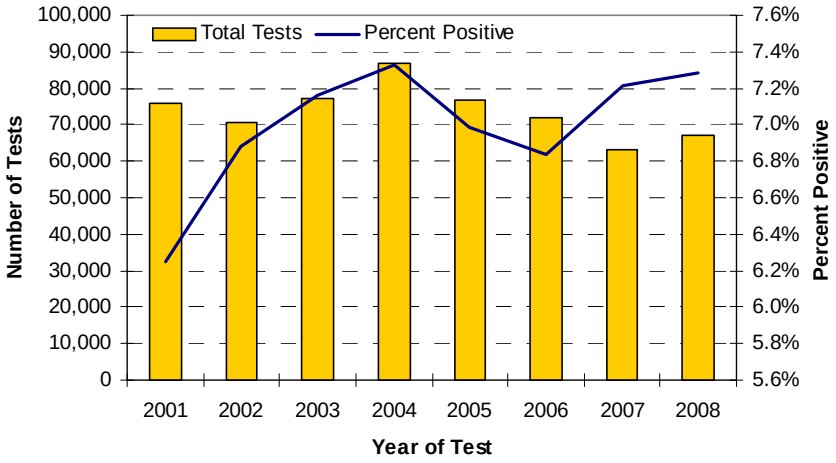
Chlamydial infections are often asymptomatic. A large proportion of infected individuals have little or no reason to seek screening and/or treatment. This fact, coupled with less-than-desirable rates of routine chlamydial infection screening, diagnosis and treatment in many health care settings, contributes to ongoing transmission among sexually active people. With a majority of infected persons unaware of their infection, there is a high probability that they will infect their partners and become links in an ongoing chain of transmission.

Figure 1 shows the annual incidence rate of chlamydial infections in Washington State from 1992 through 2008. Rates declined through 1997 as screening programs identified and treated large numbers of prevalent cases. Cases and rates increased steadily through 2004, were stable through 2007, and have reached a 17-year high of 317 per 100,000 in 2008. Some of the more recent increases can be attributed to enhanced case surveillance activities and comprehensive follow-up of laboratory-confirmed chlamydial infections. However, a real, though modest, increase in the burden of disease is likely occurring as well.

Since 1988, Washington State has participated in chlamydia screening and prevalence monitoring activities through the federally-funded Infertility Prevention Project (IPP). Women who meet a selective screening criteria (sexually active, 24 years of age and younger) at categorical STI clinics, reproductive health clinics, and in other facilities are targeted for chlamydia screening through the IPP. Screening efforts are directed specifically at the female population in hopes of reducing negative reproductive health outcomes. These data also provide Washington State with a potential prevalence monitoring platform. **Figure 2** shows the total number of tests and the percent positive by year for tests conducted through the IPP from 2001 through 2008. Positivity in 2008 increased significantly from 6.8% in 2006

to 7.2% of all tests in 2008. While overall test positivity within the IPP has increased over the last several years, male positivity is consistently higher than for females (10.9% versus 6.1%, respectively in 2008). The volume of male tests has increased, contributing to the overall increase in positivity. The largest proportion of males testing through the IPP are seeking services at the state's largest STD clinic and are more likely to test positive than males screened in other health care settings.

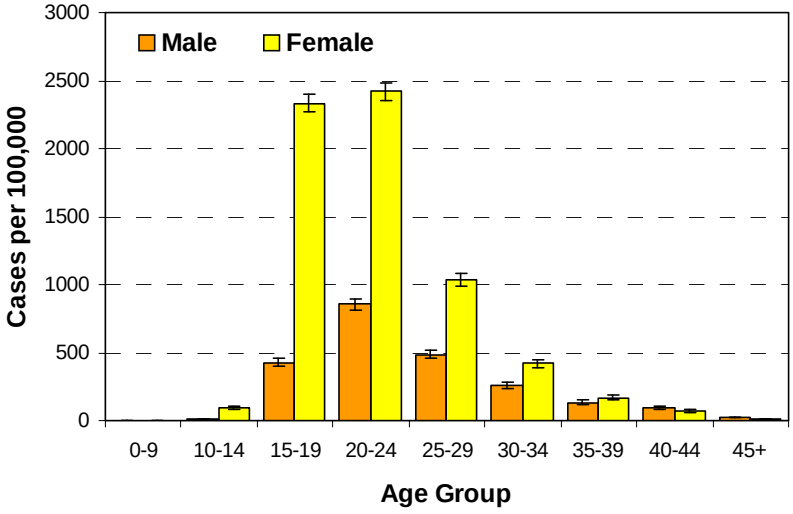
Figure 2 - Chlamydia Tests and Percent Positive, Infertility Prevention Project, Washington State, 2001 - 2008



Case rates per 100,000 also vary significantly between genders. **Figure 3** shows age and gender specific rates for cases diagnosed in 2008. The marked difference in case rates between males and females is primarily an artifact of screening efforts which target females in reproductive health settings. To a lesser extent, this difference may also reflect the natural history of chlamydial infections; males may be less suceptible to infection, are less likely than females to be symptomatic, less likely to seek screening for STIs, and are less likely to access health services and be routinely screened. As a result of these factors, the burden of chlamydial infections among males remains largely undiagnosed, untreated and unreported. Trends in incidence by gender are presented in **Figure 4**.

Potentially more significant inequalities in incidence exist by Hispanic ethnicity and by race. **Figures 5 and 6** show trends in case rates by Hispanic ethnicity and by race respectively. A significant proportion of cases - approximately 25 percent annually - are reported without race and ethnicity indicated. To correct for these missing data, unknown cases have been redistributed for this report based on the proportions of cases reported with the race and ethnicity of the patient identified.

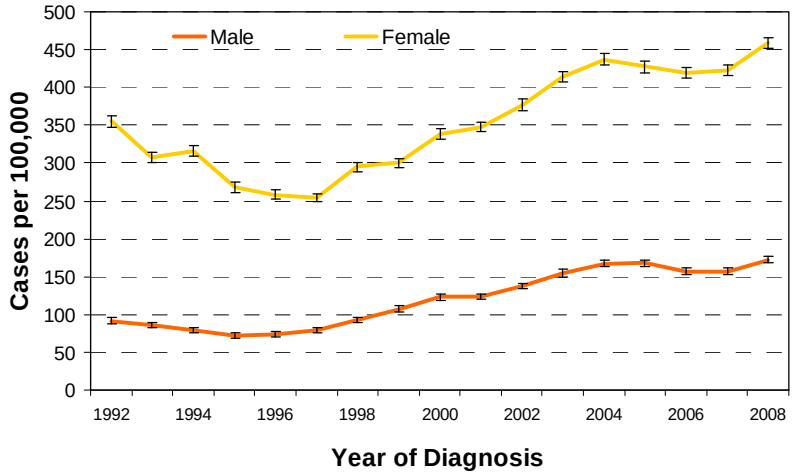
Figure 3 - Chlamydia Incidence Rate*, by Gender and Age Group, Washington State, 2008



* Crude age and gender specific incidence rate with Poisson exact 95% confidence intervals.

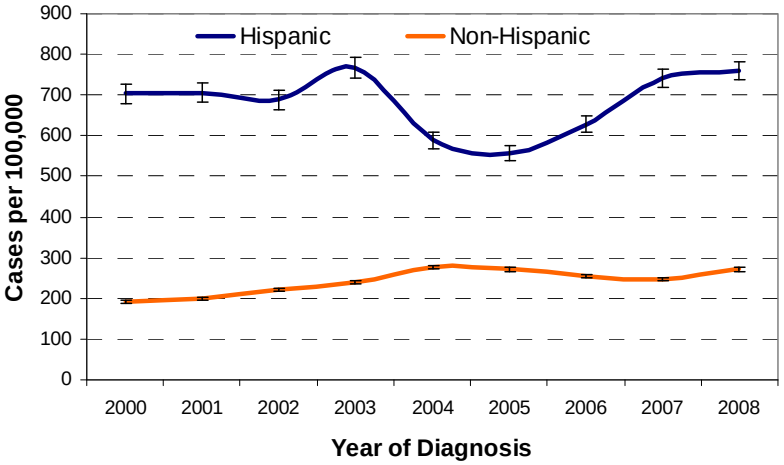
Inequities in the burden of disease by Hispanic ethnicity have persisted throughout the last decade with Hispanics experiencing, on average, rates consistently between two and three times those of non-Hispanics. Similarly, rates for Blacks, American Indians/Alaska Natives, and Asians/Other Pacific Islanders have been persistently higher than those observed for Whites. Inequality by race in 2008 was

Figure 4 - Chlamydia Incidence Rate* by Gender, Washington State, 1992 - 2008



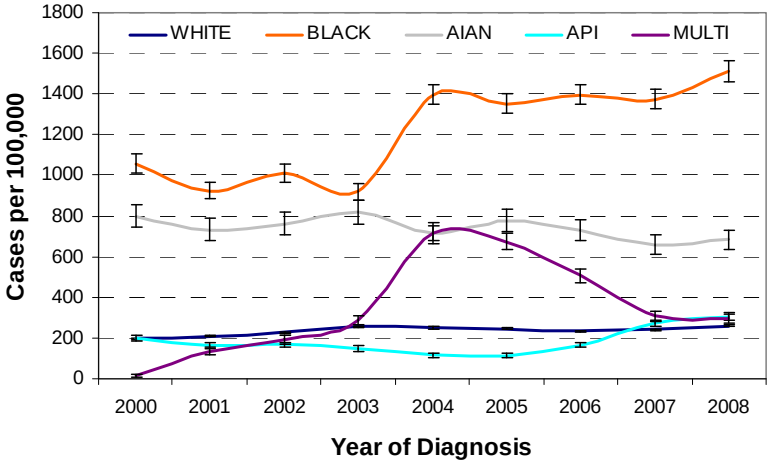
* Crude, gender specific incidence rate with Poisson exact 95% confidence intervals.

Figure 5 - Chlamydia Incidence Rate* by Hispanic Ethnicity, Washington State, 2000 - 2008**



* Crude incidence rate with Poisson exact 95% confidence intervals.
** Unknown Hispanic ethnicity redistributed by proportion of known cases.

Figure 6 - Chlamydia Incidence Rate* by Race, Washington State, 2000 - 2008**



* Crude incidence rate with Poisson exact 95% confidence intervals.
** Unknown Race and Hispanic ethnicity redistributed by proportion of known cases.

most acute between Whites and Blacks with cases rates of 260.7 per 100,000 and 1510.2 per 100,000, respectively. Multiple factors likely contribute to differences in rates by race and ethnicity, including differences in access to health care, screening services as well as sexual network characteristics and geographic considerations.

Inequalities in disease burden by race and ethnicity should be viewed in a broader perspective than individual behavioral or economic characteristics. Higher rates for non-Whites and for Hispanics are likely a reflection of an array of population-level determinants. Income and social status inequalities at the population level as well as the relative magnitude of these differences have been shown to have an impact on a wide variety of health outcomes, including rates of sexually transmitted infections.

Rates also vary geographically in Washington State. **Figure 7** shows chlamydial infection incidence rates and rankings by county. Yakima and Pierce counties lead the state in chlamydial infection incidence with rates of 494.7 and 475.8 per 100,000, respectively. Along with Franklin and Spokane counties, these four jurisdictions have case rates significantly higher than the overall state rate of 317 per 100,000.

Care should be used in comparing across counties. For less populated jurisdictions with relatively few cases in any given year, incidence

rates fluctuate considerably from year to year. Ninety-five percent confidence intervals for each jurisdiction have been included in **Figure 7** help to illustrate this rate instability. Where upper and lower confidence intervals overlap, the differences between jurisdictions are not considered meaningful. Moreover, comparative rates at the county level, while useful, can often mask significant variation in incidence of cases within jurisdictions. **Figure 8** shows chlamydial infection rates for Washington State at the census tract level. This map reveals significant variation within counties and demonstrates that while a county may have higher or lower incidence rates than the state average, there may be specific areas within the county that experience much greater or lower incidence. These data can be very useful in helping state and local public health workers target resources for disease prevention and assist in identifying specific gaps in access to STI screening, diagnosis, and treatment services at the local level.

The geographic distribution of incidence can also reveal differences in the burden of disease in several other important ways. Markers of socioeconomic status such as median income, educational attainment, and household poverty vary considerably across the landscape and can be measured at the neighborhood level using U.S. Census data. Analysis of chlamydial infection in Washington State by census tract demonstrates that higher than average disease incidence is associated with lower than average median income and lower than average educational attainment as measured by the proportion of the

Figure 7 - Chlamydial Infection Incidence Rate* by County, Washington State, 2008

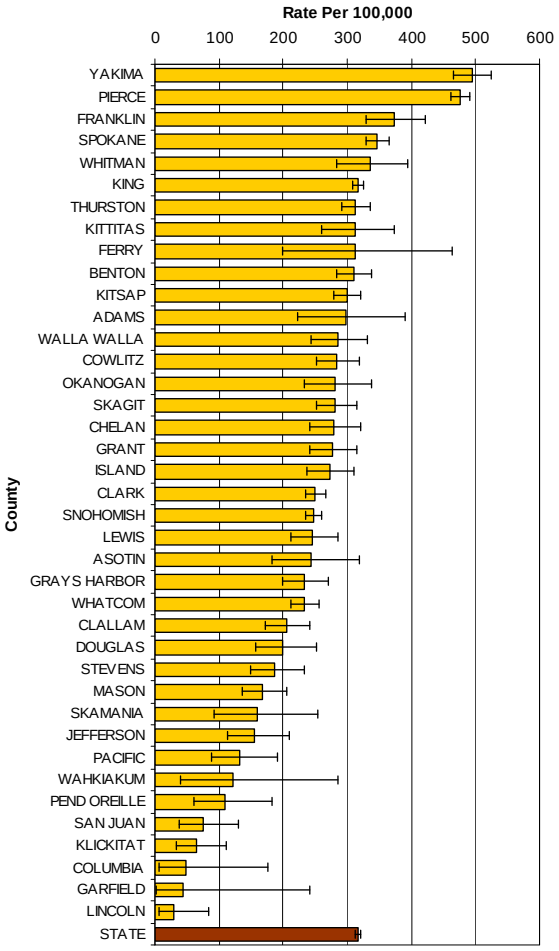
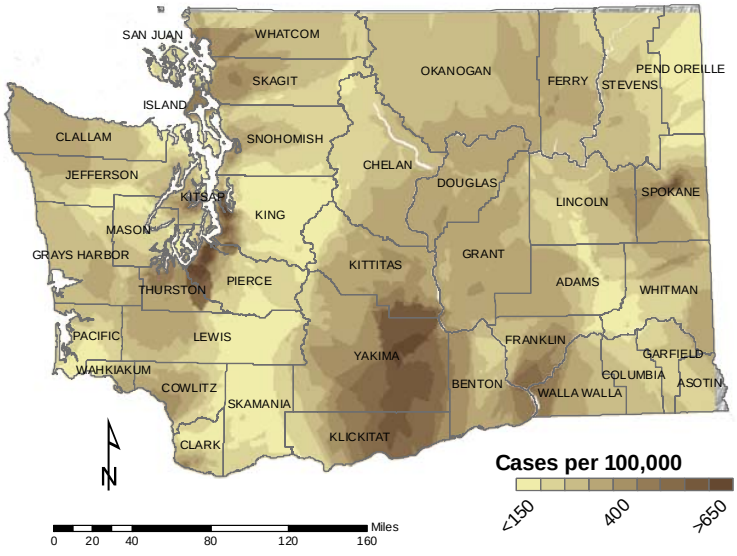


Figure 8 - Chlamydia Incidence Rate* by Census Tract, Washington State, 2008



* 2008 incidence rate per 100,000 by Census Tract based on residence of patient at diagnosis. Rate smoothed by Kriging method.

Figure 9 - Proportion of Chlamydia Cases with Treatment Reported by Year of Diagnosis, Washington State, 1992 - 2008

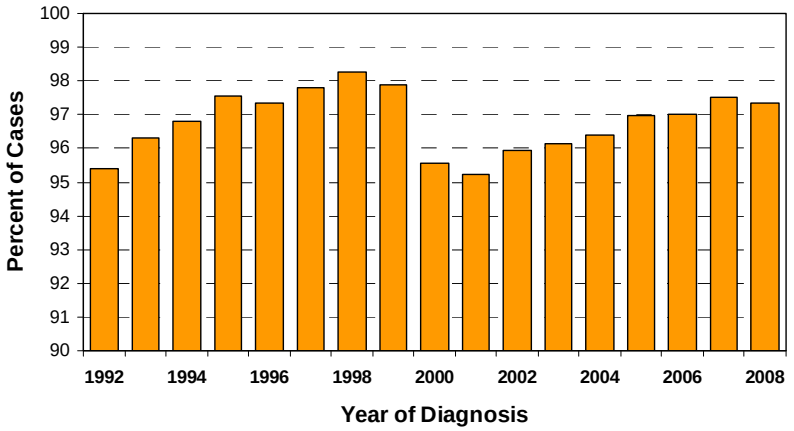
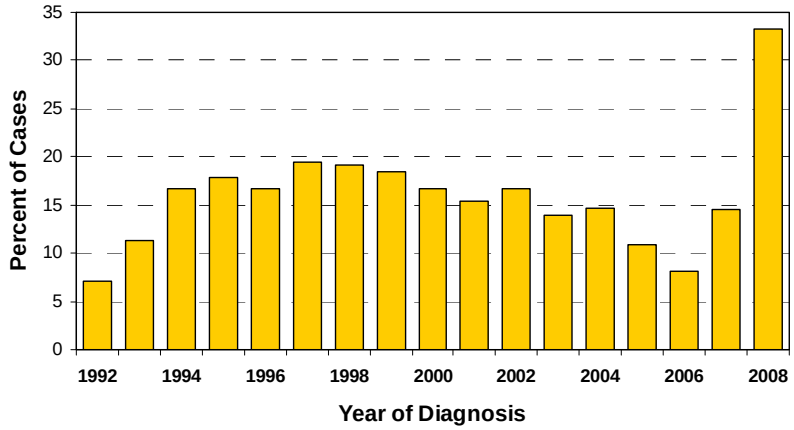


Figure 10 - Proportion of Chlamydia Cases Interviewed for Partner Management by Year of Diagnosis, Washington State, 1992 - 2008



adult population completing high school. Other factors, such as population density, housing characteristics, and density of venues for social mixing may also be associated with variations in disease incidence.

These and other factors may help explain the variations in chlamydial infection by geography. Efforts by all local jurisdictions to assure appropriate treatment of reported cases, which reduces the duration of infection and helps prevent ongoing transmission, have been met with considerable success. As of 2008, over 97 percent of chlamydial infections reported in Washington State were treated. **Figure 9** shows the proportion of cases with treatment indicated by year of diagnosis. While there has been some variation in this measure, antibiotic treatment has been assured for over 95% of cases diagnosed each year.

Figure 10 shows the proportion of cases interviewed for partner management by year of diagnosis. Each jurisdiction establishes their own criteria for prioritizing cases for interview in an attempt to maximize the utility of these efforts. Additional legislative resources and a statewide initiative to evaluate the population benefit of EPT allowed jurisdictions to double the proportion of cases interviewed for partner management, which accounts for the dramatic increase seen in this measure between 2007 and 2008.

In summary, chlamydial infection continues to be the most frequently reported STI in Washington State. Incident infections and trends can be further characterized by a number of specific observations:

√ **Reported chlamydial infection incidence declined significantly through the middle of the 1990s, increased through 2004, plateaued through 2007 and increased slightly in 2008**

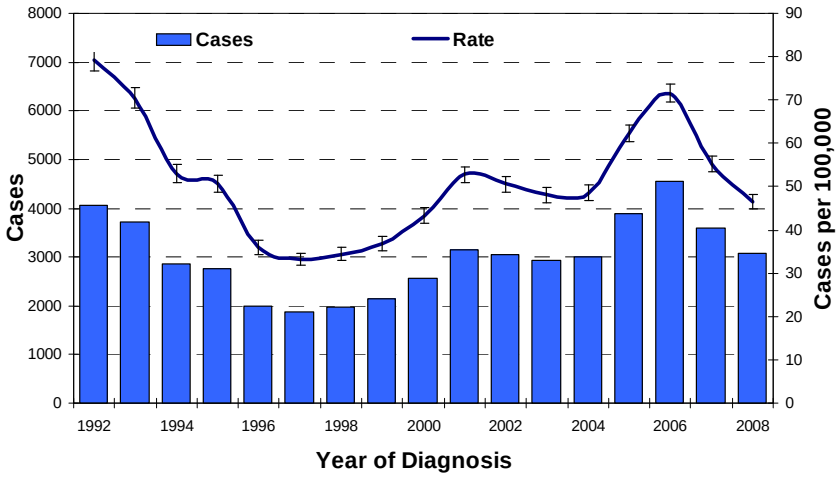
√ **Recent trends in chlamydia positivity among tests collected at clinics participating in the Infertility Prevention Project generally reflect trends in reported case incidence; positivity increased through 2004 to 7.3% of all tests, fluctuated through 2006 and have rebounded to 7.3% in 2008**

√ **The highest reported case incidence of chlamydial infections in 2008 is among females 20 to 24 years of age; the highest incidence for males is in the same age group and marked disparities between males and females is considered an artifact of screening practices**

Gonorrhea

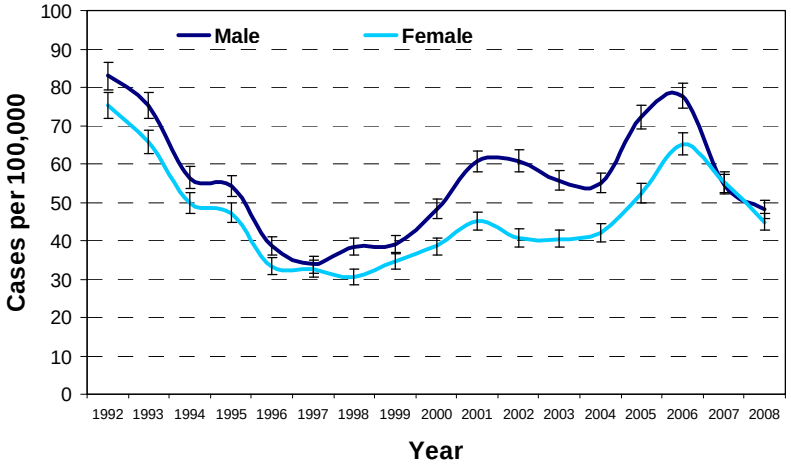
Infections due to *Neisseria gonorrhoeae* (GC) are an important cause of morbidity in the United States and are the second most frequently reported STI in Washington State. Similar to chlamydial infections, negative consequences of gonorrhea infection may include pelvic inflammatory disease (PID), infertility, ectopic pregnancy, and chronic pelvic pain. Because many of these negative reproductive health consequences can occur long after chlamydial or gonococcal infections have been treated or naturally healed, the exact cause is often unclear and the relative contribution of either bacterial infection to overall rates of PID and ectopic pregnancy cannot be clearly ascertained. However, gonococcal infections are more likely to cause symptoms than chlamydial infections. This is particularly true for males. This is reflected in gender-specific case rates.

Figure 11 - Gonorrhea Cases and Incidence Rate* per 100,000, Washington State, 1992 - 2008



* Crude incidence rate with Poisson exact 95% confidence intervals.

Figure 12 - Gonorrhea Incidence Rate* per 100,000, by Gender, Washington State, 1992 - 2008



* Crude, gender-specific incidence rate with Poisson exact 95% confidence intervals.

The most recent year for which incidence data are available for the entire country is 2007 with a national gonorrhea case incidence rate of 118.9 per 100,000. Washington State's overall case rate in 2008 (46.6 per 100,000) compares favorably to the national case rate. **Figure 11** presents cases diagnosed annually and the incidence rate per 100,000 from 1992 through 2008.

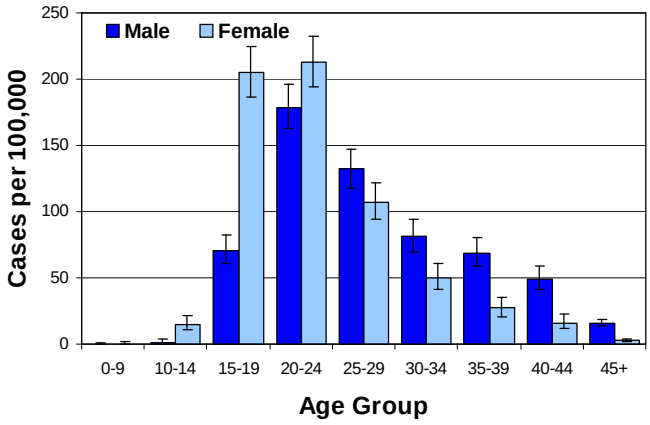
Of particular interest in this figure is the decline in cases and rates seen through the middle of the 1990s to a low of 33.2 cases per 100,000 in 1997 with a return to higher levels by 2002. The shape of the epidemic curve between 1992 and 2002 is seen in many other STIs in Washington State, and to some extent nationally. This may reflect population-level changes in transmission dynamics associated with the public attention given the growing HIV epidemic. However, rates and cases increased through 2006 to a 15 year high of 71.4 cases per 100,000 and have since decreased to the current rate of 46.6 per 100,000. The emergence of fluoroquinolone resistance early in the decade, as well as clearly identified outbreaks in specific high-risk communities, provide plausible explanations for the increases observed through 2006. A strong public health response, new interventions such as EPT, and

outreach to clinical providers with information about appropriate antibiotic choices may have contributed to the reduction in cases and incidence rate observed over the last two years.

Gonorrhea incidence is considerably more concentrated in behaviorally and geogrpahically distinct sexual networks than chlamydial infections. Gonorrhea incidence in Washington State may also have two possibly separate epidemic patterns. The first of these involves heterosexual transmission among men and women under the age of 30. The second epidemic pattern involves gonorrhea transmission among MSM over 30 years of age.

Figure 12 shows the gender-specific trend in gonorrhea incidence from 1992 through 2008. Male and female rates began to diverge significantly in 2000, supporting behavioral evidence from patient interviews suggesting a sharp increase in MSM gonorrhea transmission. However, along with decreases in overall gonorrhea incidence, male and female rates have recently converged. This may be promising evidence of a decrease in gonorrhea incidence among MSM. Yet inequalities by gender remain, especially among older males; this pattern is consistent with continuing higher-than-expected burden of incidence among MSM (**Figure 13**).The relative contribution of MSM to overall male gonorrhea morbidity is roughly 25% of all male cases diagnosed in 2008. As shown in **Figure 14**, this proportion varies by age group and exceeds 33% for males 30 to 35 years old.

Figure 13 - Gonorrhea Incidence Rate by Gender and Age Group, Washington State, 2008



* Crude, age and gender specific incidence rate with Poisson exact 95% confidence intervals.

Figure 14 - Male Gonorrhea Cases Diagnosed by Age Group and MSM Status, Washington State, 2008

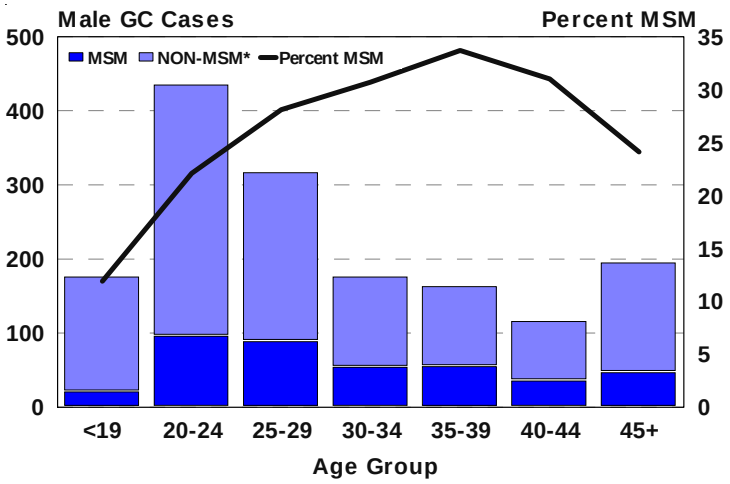
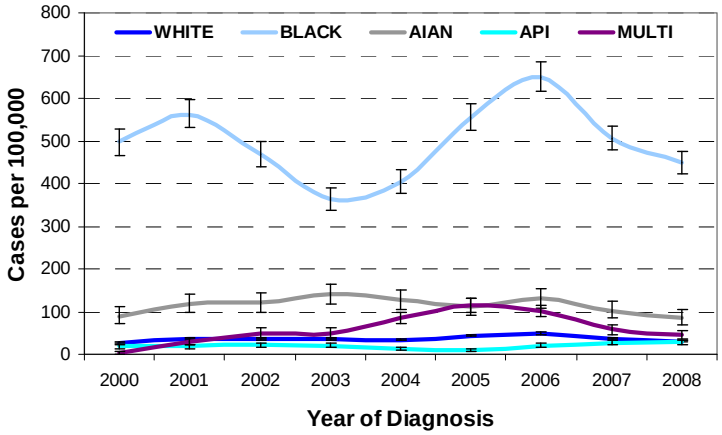
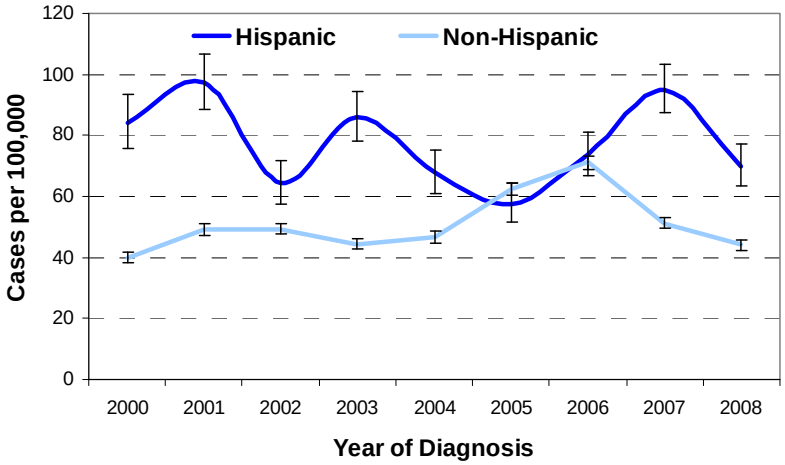


Figure 15 - Gonorrhea Incidence Rate* by Race, Washington State, 2000 - 2008**



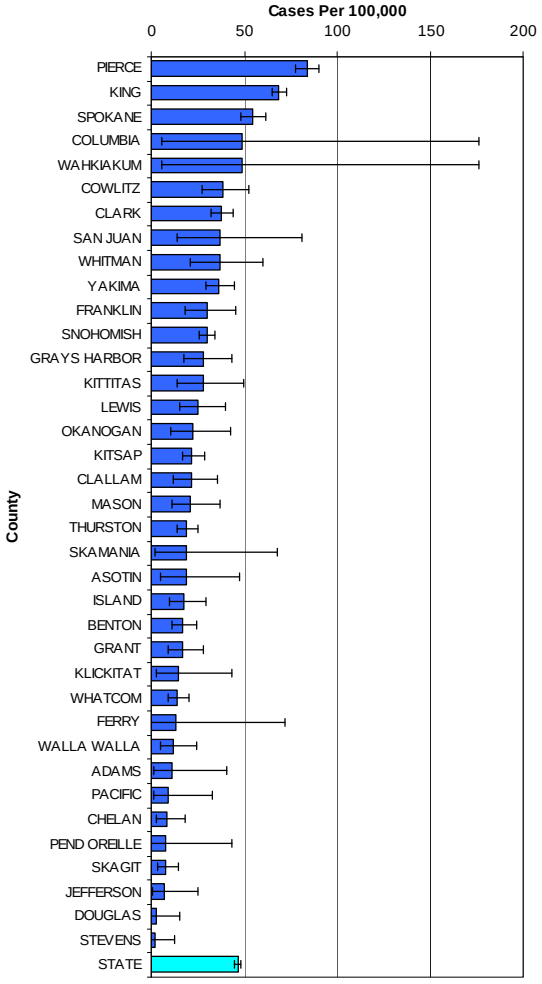
* Crude incidence rate with Poisson exact 95% confidence intervals.
** Unknown Race redistributed by proportion of known cases.

Figure 16 - Gonorrhea Incidence Rate* by Hispanic Ethnicity, Washington State, 2000 - 2008



* Crude incidence rate with Poisson exact 95% confidence intervals.
** Unknown Hispanic ethnicity redistributed by proportion of known cases.

Figure 17 - Gonorrhea Incidence Rate* by County, Washington State, 2008



* Crude incidence rate with Poisson exact 95% confidence intervals.

Of particular concern given MSM transmission patterns, there is evidence that co-infection with bacterial STIs, including gonorrhea, may facilitate HIV transmission through a number of different mechanisms. In an epidemic context including significant incidence of gonorrhea among MSM, many of whom are HIV positive, the possibility of ongoing HIV transmission warrants additional monitoring and evaluation by the public health community.

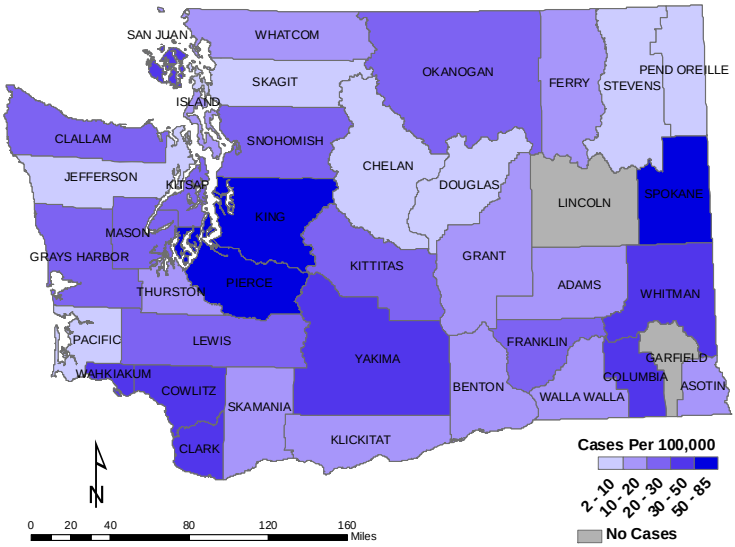
A recent analysis of gonorrhea incidence among HIV-positive males in Washington State between 1996 and 2007 found significant inequality in rates between presumed HIV-negative men and those known to be HIV-positive at the time of their diagnosis with gonorrhea. This difference was most pronounced in 2005 where the incidence of gonorrhea among HIV-positive males reached 2,848 per 100,000 compared to a case incidence rate of 85.9 per 100,000 for presumed HIV-negative men. In addition to clear implications for HIV prevention, these data also demonstrate a significant inequality in the burden of gonorrhea among HIV-positive persons and among MSM versus the general male population.

Health inequities are also manifest in gonorrhea incidence by race and Hispanic ethnicity. **Figure 15** presents trends in gonorrhea incidence by race for 2000 through 2008. Similar to chlamydial infection, disparities are observed between Blacks and other races with an average 5-fold difference persisting from the beginning of this decade. With respect to Hispanic ethnicity (**Figure 16**), the

disparity is not as pronounced, with a less than 2-fold difference in rates between non-Hispanics and persons of Hispanic ethnicity. Between 2005 and 2006, gonorrhea incidence rates were roughly equal between Hispanics and non-Hispanics. This parity in incidence rates is partly explained by the outbreak among MSM as well as a three-year decline noted in gonorrhea incidence among Hispanics. The 2008 incidence among Hispanics was 70.0 per 100,000 versus 44.2 per 100,000 for non-Hispanics.

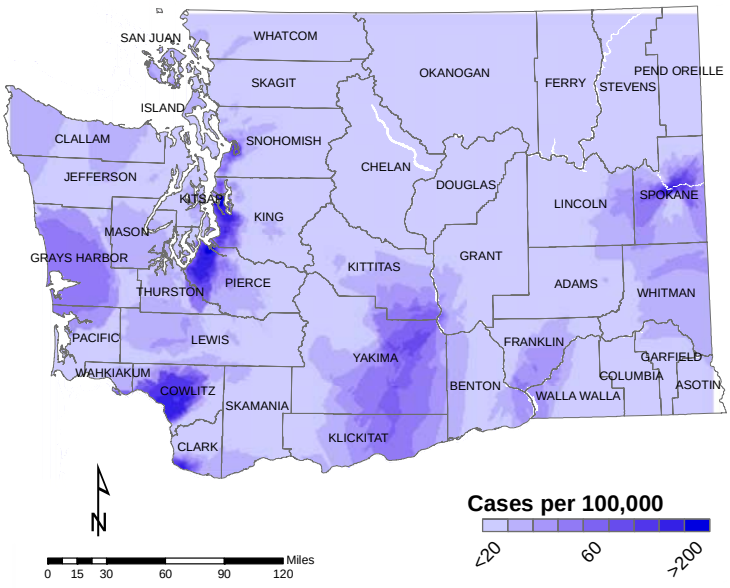
Unlike chlamydial infection, gonorrhea incidence tends to be more concentrated in densely populated urban corridors. Rates and rankings by county for 2008 are presented in **Figure 17**. Three jurisdictions, Pierce, King and Spokane counties, significantly exceeded the state rate of 46.6 per 100,000. While eastern Washington is considered primarily rural, some census tracts have many urban characteristics shared by western Washington counties.

Figure 18 - Gonorrhea Incidence Rate* by County, Washington State 2008



* Crude incidence rate with Poisson exact 95% confidence intervals.

Figure 19 - Gonorrhea Incidence Rate* by Census Tract, Washington State, 2008



2008 incidence rate per 100,000 by Census Tract based on residence of patient at diagnosis. Smoothed by Kriging method.

Figure 19 shows the gonorrhea incidence rate by census tract for 2008. Of note in this figure is that while there are many similarities with the county-level map (**Figure 18**), much more detail is revealed at the census tract level indicating specific areas within counties that have much higher morbidity. These data indicate a relatively small number of census tracts with significantly higher incidence which should be considered as 'core' morbidity areas for targeting prevention and disease intervention resources.

Similarly, the distribution of cases by type of diagnosing facility is also useful for interpreting disease trends. **Figure 20** shows the proportion of gonorrhea cases diagnosed in 2008 by major provider type. The largest proportion of cases (25 percent) were diagnosed in private health care settings such as physicians in private practice or facilities serving major private insurance plans. Of

Figure 20 - Proportion of Gonorrhea Cases Diagnosed by Provider Type, Washington State, 2008

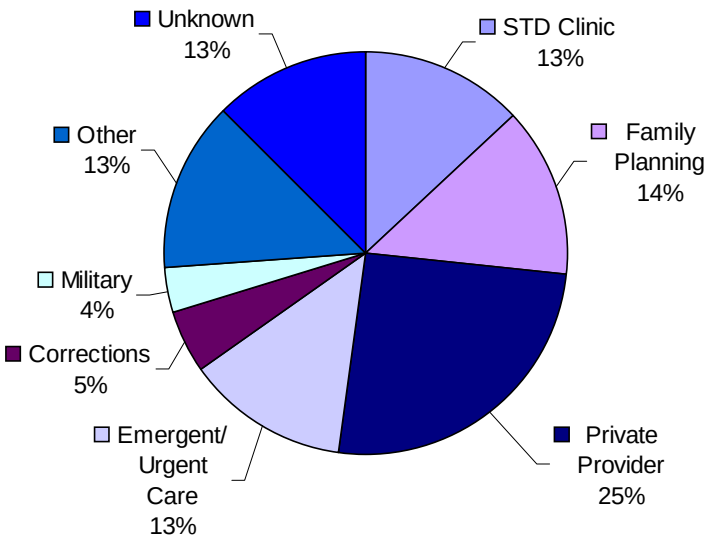


Figure 21 - Proportion of Gonorrhea Cases with Treatment Reported by Year of Diagnosis, Washington State, 1992 - 2008

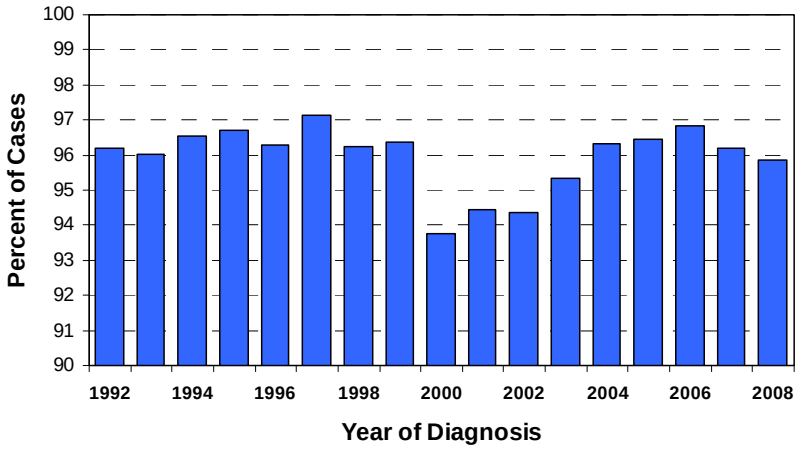
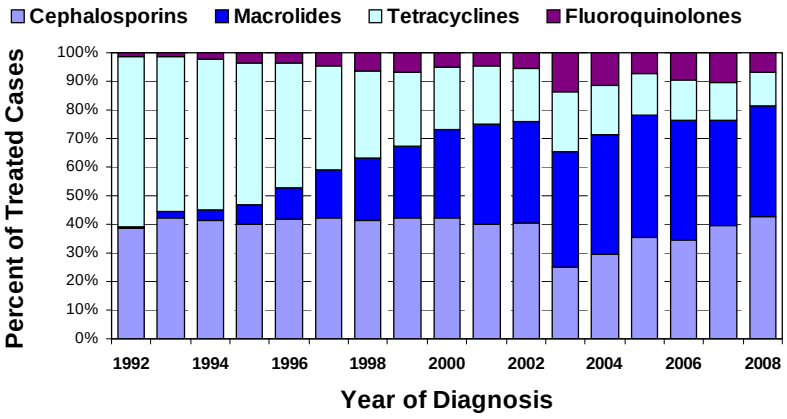


Figure 22 - Proportion of Gonorrhea Cases Treated by Antibiotic Class and Year of Diagnosis, Washington State, 1992 - 2008



note as well, a significant proportion of cases were diagnosed in emergent/urgent care settings.

In light of the potential emergence of strains of gonorrhea resistant to commonly used antibiotics, monitoring information on the treatment provided to patients continues to be important. **Figure 21** shows the proportion of cases with treatment reported by year of diagnosis 1992 through 2008. In 2008, nearly 96 percent of cases were reported with treatment information provided. The proportion with treatment indicated fluctuated between 93 percent and 98 percent across this time period.

The relatively high proportion of cases with treatment known allows analyses of trends in antibiotic use. Changes in case incidence should be interpreted in light of known issues with reduced antibiotic susceptibility. **Figure 22** illustrates the proportion of cases treated by antibiotic class and clearly demonstrates an increase in quinolone use between 2002 and 2003, the same time period in which the gonorrhea incidence rate increased and which also coincided with an interruption in the availability of Cefixime, a low-cost oral cephalosporin, which was the first tier treatment recommendation at the time. A reduction in susceptibility to cephalosporins in the future is a distinct possibility given the robust ability of *Neisseria gonorrhoeae* to develop resistance to a broad array of antibiotics. The Gonococcal Isolate Surveillance Project monitors a sentinel population of males patients

diagnosed with gonorrhea in categorical STD clinics around the U.S., including the STD clinic at Harborview Medical Center in Seattle, for antibiotic susceptibility. These data continue to be invaluable for informing the public health community of emergent gonorrhea treatment issues and in providing appropriate treatment guidance to clinicians.

In summary, infections due to *Neisseria gonorrhoeae* have decreased recently in Washington State. Incident infections and trends can be further characterized by a number of specific observations:

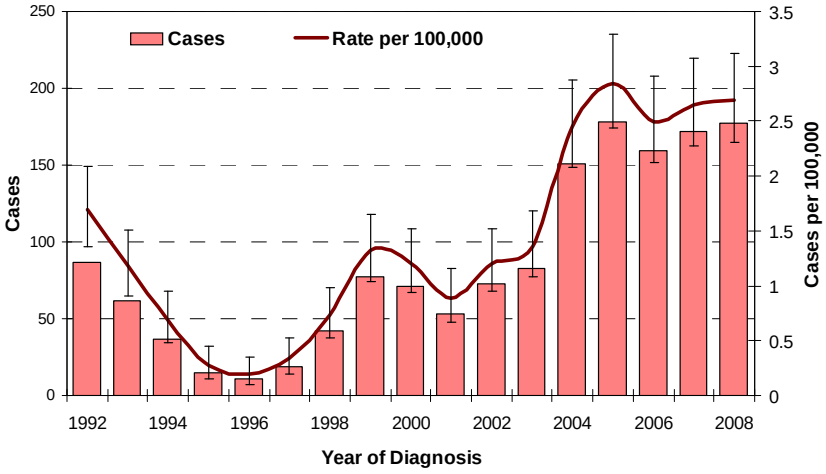
- √ **Gonorrhea incidence rate per 100,000 declined 15 percent in 2008 from the case rate observed in 2007**
- √ **The highest reported case incidence of gonorrhea infections in 2008 is among females 20 to 24 years of age; the highest incidence for males is in the same age group**
- √ **The burden of disease in 2008 continues to be higher among Black, Hispanics and American Indian/ Alaska Natives than among Whites, Asians, non-Hispanics and Asians**
- √ **The highest overall observed case incidence rate at the county level in 2008 is for Pierce County with a case incidence rate of 88.3 cases per 100,000**
- √ **The male-to-female case ratio converged in 2008, though a significant proportion of males over the age of 30 continue to report MSM risk**
- √ **Concerns continue over the emergence of antibiotic resistant strains of gonorrhea; clinicians are urged to be vigilant for treatment failure and to assure appropriate treatment**

Syphilis

Syphilis is caused by infection with *Treponema pallidum*, a slender, spiral-shaped, highly mobile bacteria known as a spirochete. Syphilis infection is chronic, systemic, and exhibits four clinically distinct stages - primary, secondary, early latent, and late latent depending on the time elapsed from initial infection. A painless genital ulcer that resolves spontaneously without treatment characterizes primary syphilis infection. Secondary stage indicates disseminated infection, which most commonly presents as general malaise with a rash of varying duration and location, which may be recurrent.

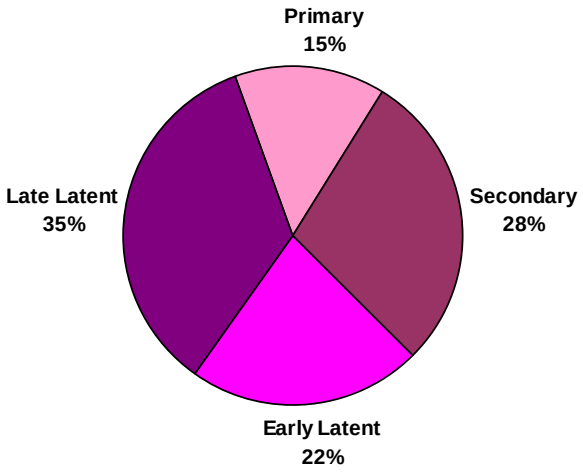
Primary and secondary syphilis are the infectious stages of disease and epidemiologic analyses often focus on primary and secondary cases because of the potential for ongoing transmission. **Figure 23** shows cases diagnosed and incidence rate per 100,000 in Washington State for primary and secondary syphilis from 1992 to 2008. Most notable in this figure is the abrupt and precipitous rise in incidence from 1997 through 2004, following a period of sharp decline. Since 2004, incidence has been stable at between 2.4 and 2.9 cases per 100,000. While Washington State's incidence rate remains somewhat below the national incidence rate reported in 2007 of 3.8 per 100,000, specific characteristics of syphilis morbidity in Washington State also reflect broader trends in case incidence seen elsewhere in the U.S..

Figure 23 - Primary & Secondary Syphilis Cases and Incidence Rate*, Washington State, 1992 - 2008



* Crude incidence rate with Poisson exact 95% confidence intervals.

Figure 24 - Syphilis Cases by Stage at Diagnosis, Washington State, 2008



An infected person who does not get treatment may infect others during the first two stages (primary, secondary), however, all infections regardless of disease progression have potential for very serious health consequences. Early latent syphilis is defined as an asymptomatic stage of infection less than one year from initial exposure. A relapse to secondary symptoms within a year of infection would still be considered an early latent infection. Infections beyond that time are considered late latent infections which can have persistent clinical impacts for life if the patient remains untreated.

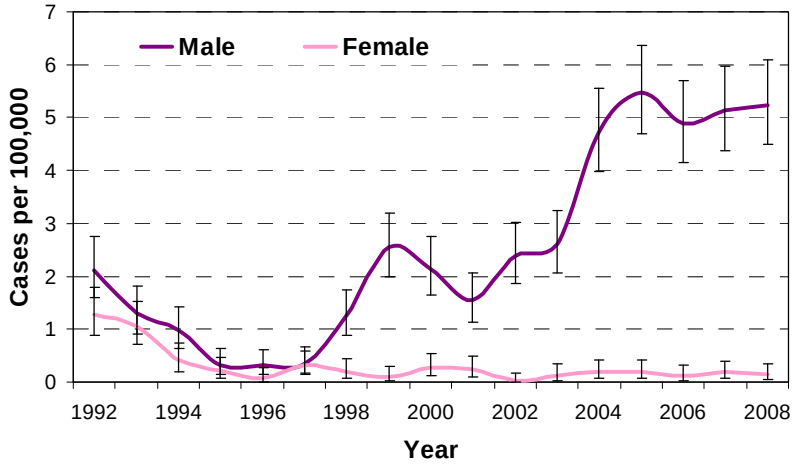
Figure 24 shows the proportion of cases reported by stage of syphilis infection in Washington State in 2008.

Patients with an initial diagnosis of primary or secondary syphilis who are treated, then subsequently exposed at a later time, may become reinfected. These repeat infections may be more likely to present with very mild or subclinical primary or secondary symptoms and may be more likely to be diagnosed as early latent infections. The proportion of overall syphilis cases initially diagnosed as early latent has increased from 12 percent of all cases in 2000 to 22 percent in 2008. As time passes from the initial resurgence of syphilis among MSM, it is possible that additional cases of neurosyphilis, or other complications of untreated latent infections, may increase.

Transplacental transmission of syphilis from pregnant women to their unborn babies is a potential cause of fetal loss. Serious congenital abnormalities can occur at any stage of infection for pregnant patients if not promptly treated. No cases of congenital syphilis were reported in Washington State in 2008, reflecting that the overwhelming proportion of cases reported in the last decade have been among males as illustrated by **Figures 25 & 26**.

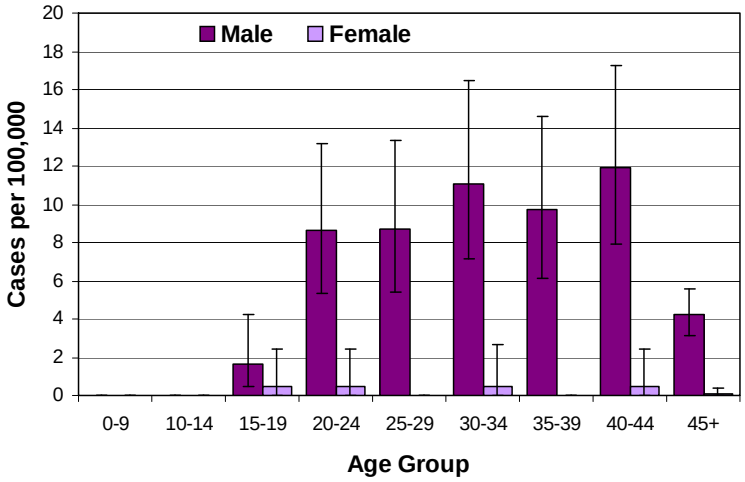
This pattern of case incidence is quite different from that observed in the late 1980s and early 1990s where cases were primarily diagnosed among heterosexuals.

Figure 25 - Primary & Secondary Syphilis Incidence Rate* by Gender, Washington State, 1992 - 2008



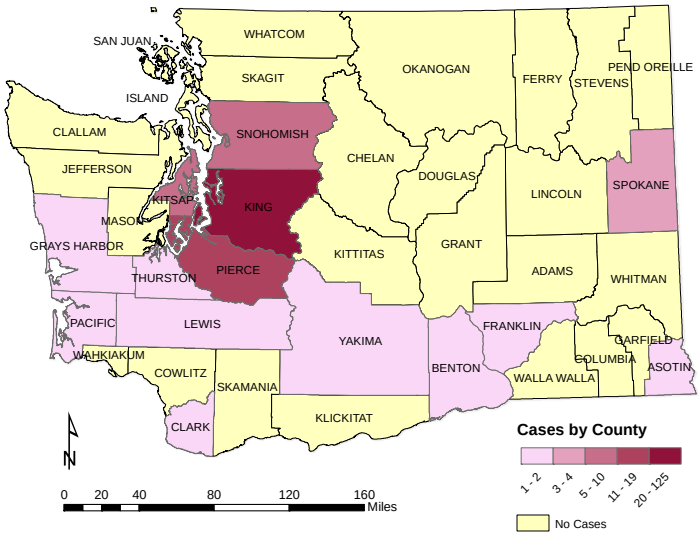
* Crude, gender-specific incidence rate with Poisson exact 95% confidence intervals.

Figure 26 - Primary & Secondary Syphilis Incidence Rate* by Gender and Age Group, Washington State, 2008



* Crude, age and gender-specific incidence rate with Poisson exact 95% confidence intervals.

Figure 27 - Primary & Secondary Syphilis Cases Reported by County, Washington State, 2008



The incidence among women at that time was roughly comparable to that among men. More recent trends however demonstrate the reemergence of syphilis among urban MSM. This reflects a pattern similar to the endemic levels of syphilis observed among MSM in the late 1970s which foreshadowed, and may even have facilitated the rapid spread of HIV early in the epidemic.

The majority of cases reported in 2008 were among patients resident in King, Pierce, Kitsap and Snohomish counties (**Figure 27**). Local public health agencies in jurisdictions with the highest incidence have historically mounted a robust and comprehensive response to reported syphilis cases; in 2008, 166 out of 177 (94 percent) cases were interviewed to assure treatment and to manage as many potentially exposed partners as can be elicited and located. Among cases interviewed, 411 potentially exposed partners were elicited with an adjusted mean of 2.5 partners per case (range of 1 - 34). Seven cases (4 percent) accounted for 25 percent of the potentially exposed partners. Among partners elicited, 175 were contacted and prophylactically treated to prevent or cure incubating infections.

In summary, syphilis infection in Washington State in 2008 is primarily affecting urban MSM populations, reflecting broader trends in syphilis infection on the U.S. West coast. General characteristics of syphilis morbidity in 2008 include:

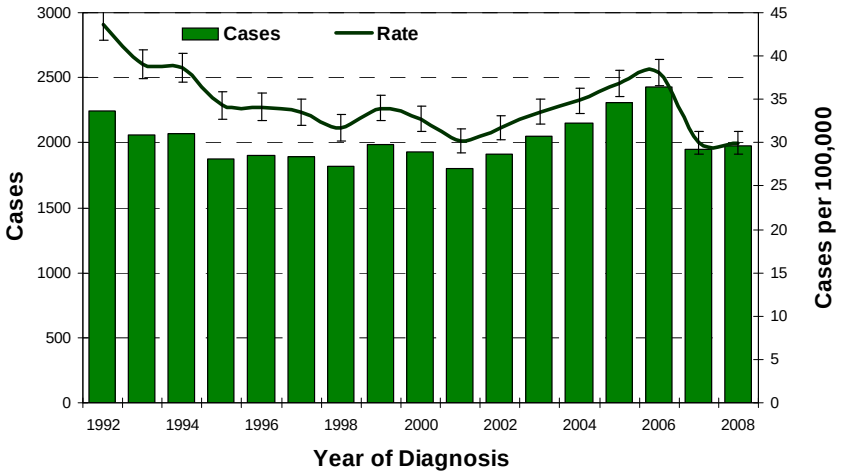
- √ **Primary and secondary syphilis incidence has been statistically stable in Washington State at between 2.4 and 2.9 cases per 100,000 since 2004**
- √ **The overwhelming majority (97 percent) of primary and secondary cases were diagnosed among males, the majority of whom report MSM risk behaviors**
- √ **Seventy percent of primary and secondary cases were diagnosed among residents of King County**
- √ **No cases of congenital syphilis were reported**
- √ **Incidence of primary and secondary syphilis was highest among males 40 - 44 years of age at 11.9 cases per 100,000**
- √ **Seventy-eight percent of primary and secondary syphilis cases were diagnosed among non-Hispanic Whites**
- √ **Black and Hispanic cases accounted for 13 percent and 10.7 percent of cases compared to being 3.6 percent and 9.3 percent of the population, respectively, demonstrating inequality in the burden of disease**

Genital Herpes Simplex Virus (HSV)

Two species of the *Herpesviridae* family, HSV 1 and 2, cause disease in humans and are characterized by lifelong infections. HSV infections have been implicated in a variety of illnesses and may be cofactors in certain cancers. Initial genital infections with HSV are reportable in Washington State, with the majority of genital infections thought to be caused by HSV 2, though either type may infect genital regions and cause the blister-like lesions typical of genital herpes outbreaks. It is estimated that as many as 45 million people over the age of 12 have genital HSV infections in the U.S. Some proportion may never know they are infected but many other persons experience a moderately severe initial outbreak of symptoms with sporadic and decreasing outbreaks over the following months and years.

Herpes infections may be much more pathogenic among persons with suppressed immune systems and is has been suggested that this highly prevalent viral infection may play a role in the ongoing transmission of HIV. People with HSV infections may be more susceptible to HIV infection and, similarly, people with HIV may be more likely to shed virus and infect others if they are also coinfected with HSV.

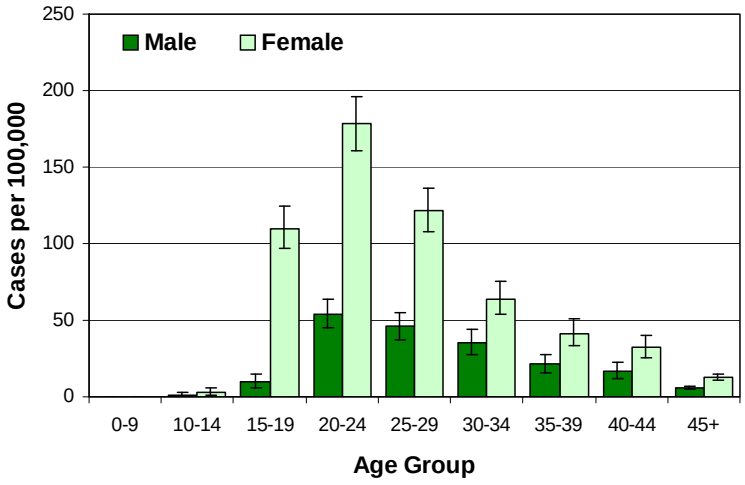
Figure 28 - Initial Genital HSV Cases and Incidence Rate* by Year of Diagnosis, Washington State, 1992 - 2008



* Crude incidence rate with Poisson exact 95% confidence intervals.

Initial infections are often not recognized, for a variety of reasons. Conversely, long-standing infections may be mistaken for newly acquired infection. Thus, data on the incidence of initial genital infections based on provider diagnoses is systematically un-representative of the true incidence of HSV in the population. **Figure 28** shows the cases reported and case incidence rate per 100,000 for Washington State 1992 through 2008.

Figure 29 - Initial Genital HSV Cases and Incidence Rate* by Year of Diagnosis, Washington State, 1992 - 2008



* Crude, age and gender-specific incidence rate with Poisson exact 95% confidence intervals.

Neonatal herpes infections (nHSV) result from an initial episode of genital infection among women late in pregnancy and can lead to severe and long term complications for newborns; these infections are of sufficient urgency and seriousness to warrant ongoing surveillance. Nine cases of neonatal herpes were reported in Washington State in 2008.

Less Commonly Diagnosed STIs

Granuloma Inguinale

Granuloma inguinale (GI) is a sexually transmitted bacterial infection that is endemic in many developing countries but is relatively rare in the United States. Caused by infection with *Klebsiella granulomatis*, GI is an ulcerative disease causing genital lesions. No cases of GI have been reported in Washington State over the last two decades.

Lymphogranuloma Venereum

Lymphogranuloma venereum (LGV) is an ulcerative STI caused by three variants of *Chlamydia trachomatis*. Usually rare in the United States, recent outbreaks of LGV have occurred among MSM in northern Europe and in large urban centers in this county. LGV is often difficult to diagnose as the symptoms may be quite similar to other ulcerative STIs like syphilis, genital herpes, and chancroid. Four cases of LGV were reported in Washington State in 2008.

Chancroid

Chancroid is genital ulcer disease caused by the streptobacillus *Haemophilus ducreyi* and is found commonly in the developing world but remains relatively uncommon in developed countries. Many of the cases identified and reported in the United States are among immigrants or among people with a history of recent travel in developing nations. One case was reported in Washington State in 2008 and a total of 14 cases have been reported since 1992.

Selected Behavioral Characteristics of STIs

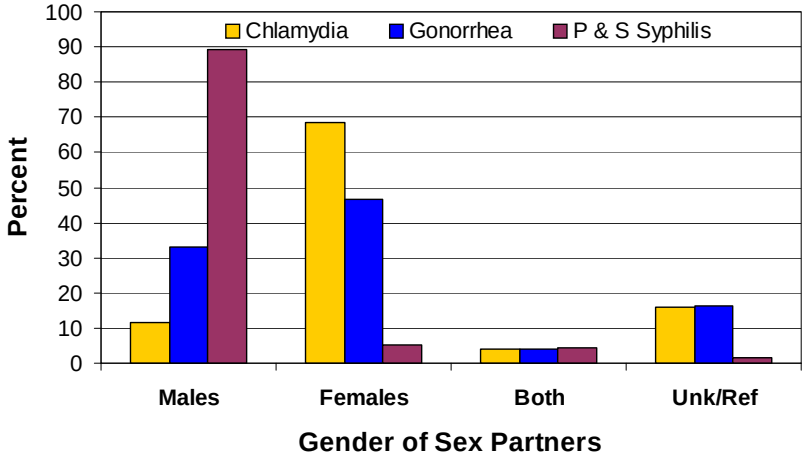
Washington State participates in CDC-sponsored and other initiatives to collect enhanced behavioral information from patients interviewed in the course of partner management. These data are collected as an integral part of routine public health activities focused on assuring appropriate and prompt treatment of patients and their sex partners. Behavioral risk information can be useful in planning interventions and in better understanding how STIs reflect other issues of public health importance such as illicit drug use, incarceration, venues for meeting sex partners, and number of partners reported in the disease exposure period.

Some domains of behavioral data are available for all cases reported, such as gender of sex partners, while supplemental information on other behavioral risks are available only for the subset of patients interviewed for partner management and evaluation purposes. The data presented below describe characteristics of patients completing interviews with public health staff (**Figure 30**). While these data may not be fully representative of all cases diagnosed in 2008, they do provide insight into behaviors often seen associated at the individual and aggregate level with the incidence of STIs.

Figure 30 - Proportion of Cases Completing Interviews by Diagnosis, Washington State, 2008

	Cases Diagnosed	Cases Interviewed	%
Chlamydial Infection	20882	6940	33.2%
Gonorrhea	3069	1374	44.8%
P&S Syphilis	177	166	93.8%

Figure 31 - Gender of Sex Partners Reported by Male Patients by STI for Cases Diagnosed and Interviewed in Washington State, 2008



Gender of Sex Partners

Figures 31 and 32 show the gender of sex partners reported by male and female patients, respectively, by STI in 2008. Of note, only 11 percent of men diagnosed with chlamydial infection report having male sex partners. In contrast, over 36 percent of males with gonorrhea and almost 90 percent of men with primary or secondary syphilis report same-sex partners. The difference between men with gonorrhea and men with chlamydial infection is statistically significant; men diagnosed and reported with gonorrhea are over 4 times as likely to report being MSM (OR 4.5, p <0.001, 95 percent CI 3.6 - 5.7) versus men diagnosed with chlamydial infection. This reflects

Figure 32 - Gender of Sex Partners Reported by Female Patients by STI, Cases Diagnosed and Interviewed in Washington State, 2008

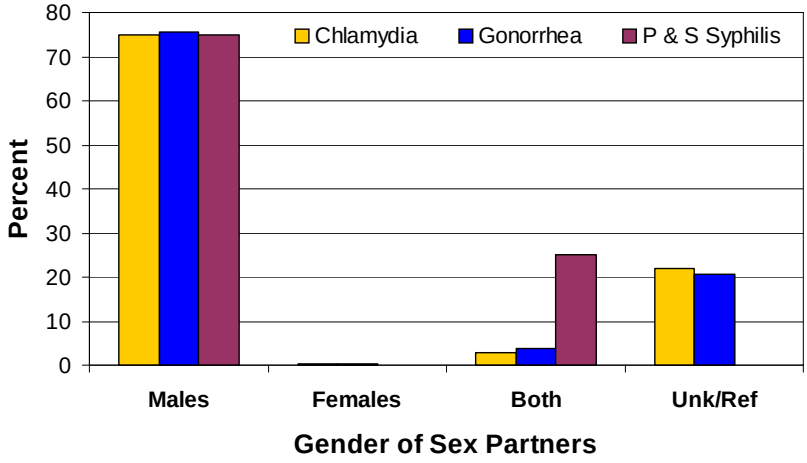
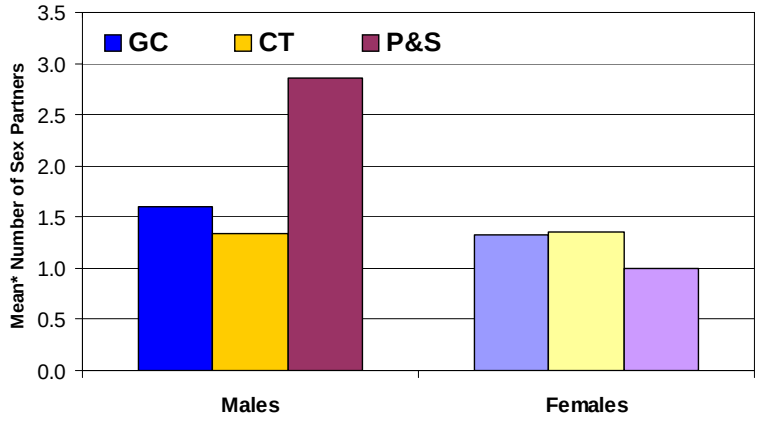
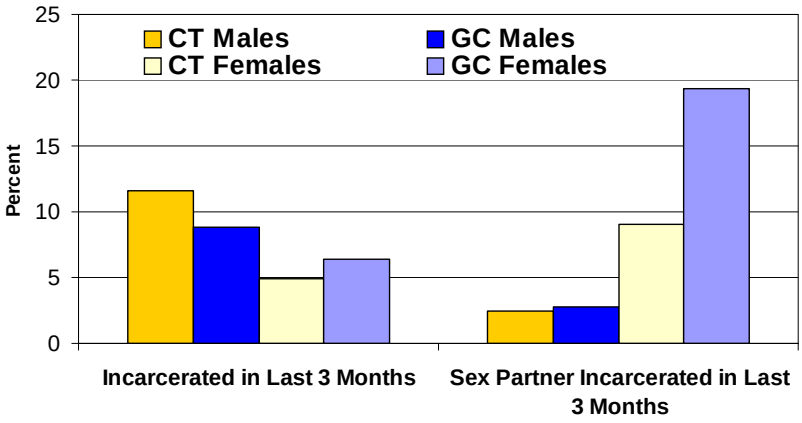


Figure 33 - Mean Number of Sex Partners Reported by Disease and Sex of Index Patient, Cases Diagnosed and Interviewed in Washington State, 2008



* Winsorized mean - an estimator of central tendancy which corrects for outlying and extreme

Figure 34 - Proportion of Patients Reporting Recent Incarceration and Sex with Recently Incarcerated Person by STI, Washington State, 2008



trends noted in previous sections of this report and provides additional evidence of higher gonorrhea incidence among MSM. The majority (89 percent) of men diagnosed with primary or secondary syphilis also report same-sex partnerships, reflecting the fact that the burden of syphilis in Washington State is primarily among MSM.

Number of Sex Partners

A critical component of partner management interventions is to elicit contact information for partners who may have been exposed to infection, or may have been the source of the index patient's infection. Public health staff work with the patient to assure that their partners are evaluated and treated as appropriate. The number of partners reported also provides insight into the patient's overall risk of repeat or reinfection and helps direct partner management and risk reduction counseling. Persons reporting relatively large numbers of recent sex partners may occupy key positions in wider sexual networks and be critical in helping limit the spread of infection. **Figure 33** shows the mean number of sex partners reported by patients with chlamydial infection, gonorrhea, and primary & secondary syphilis by gender in 2008. Males generally report the same mean number of partners as females for chlamydial infections. The higher mean number of partners reported by men with gonorrhea or syphilis also reflects the higher proportion of males who are MSM. Among male cases with all diagnoses, MSM report significantly more partners than their heterosexual counterparts with a mean number of partners of 1.99 versus 1.31, respectively.

Recent Incarceration

Patients reporting incarceration in the previous three months or sex with a partner who had recently been incarcerated reveals an interesting difference by diagnosis (**Figure 34**). Women diagnosed with gonorrhea are significantly more likely to report having a recently incarcerated sex partner than women with chlamydial infection. These data suggest that screening males for GC in correctional settings in higher morbidity areas may be a productive case finding activity.

Exchange of Money or Drugs for Sex

The proportion of patients reporting exchange of money or drugs for sex in 2008 remains quite low (**Figure 35**); males diagnosed with gonorrhea report the highest rate of exchange with 5.3 percent of men reporting exchanging money for sex. The exchange of sex for drugs, money, housing, food, or other survival goods may contribute to the ongoing spread of STIs and act as a bridge between otherwise separate sexual networks. This has especially been true for heterosexual outbreaks of syphilis in the past. As the sexual marketplace continues to change and evolve, monitoring the proportion of cases associated with prostitution or other forms of exchange such as survival sex, continues to be important.

Venue for Meeting Sex Partners

There are significant differences by disease, gender and MSM-status with respect to where people report meeting their sex partners. These data may have implications for venue-based interventions and provide insight into the characteristics of specific sexual networks. Geographic distribution of cases based on their residence at the time of diagnosis is used to calculate rates by county and other geographic units, yet another crucial concept in characterizing transmission dynamics of STIs is the notion of 'risk space'. Understanding venues and places where people meet their sex partners and have sex with others provides important clues into the characteristics of sexual networks which are often anchored in physical space as well as within prescribed social and cultural groupings. Specific types of venues such as bath houses and other public sex venues are frequently associated

Figure 35 - Proportion of Patients Interviewed Reporting Exchange of Money or Drugs for Sex by Diagnosis and Gender, Washington State, 2008

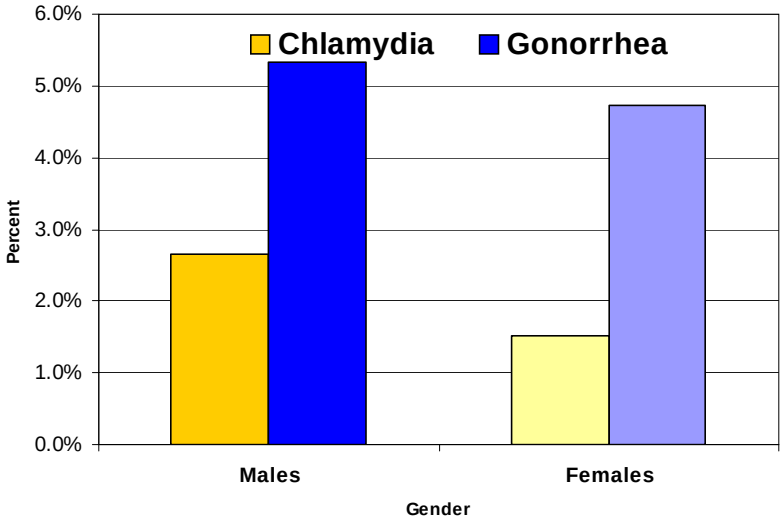


Figure 36 - Venues For Meeting Partners in the Last Year, Chlamydial Infection Patients Interviewed, Washington State 2008

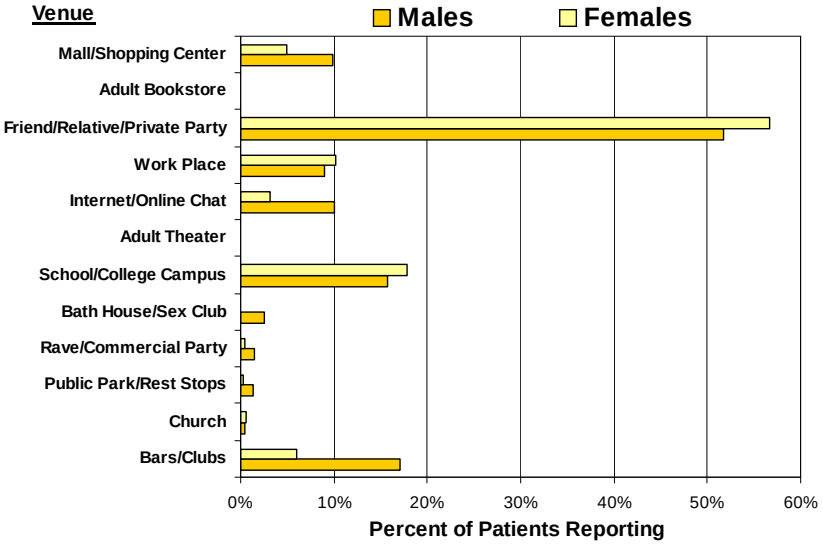


Figure 37 - Venues For Meeting Partners in the Last Year, Gonorrhea Patients Interviewed, Washington State 2008

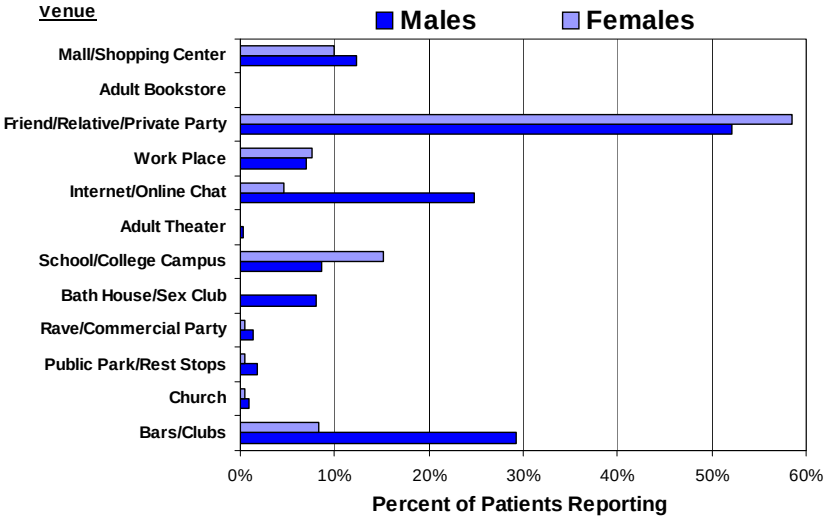


Figure 38 - Venues For Meeting Partners in the Last Year, Male Primary & Secondary Syphilis Cases Interviewed, Washington State 2008

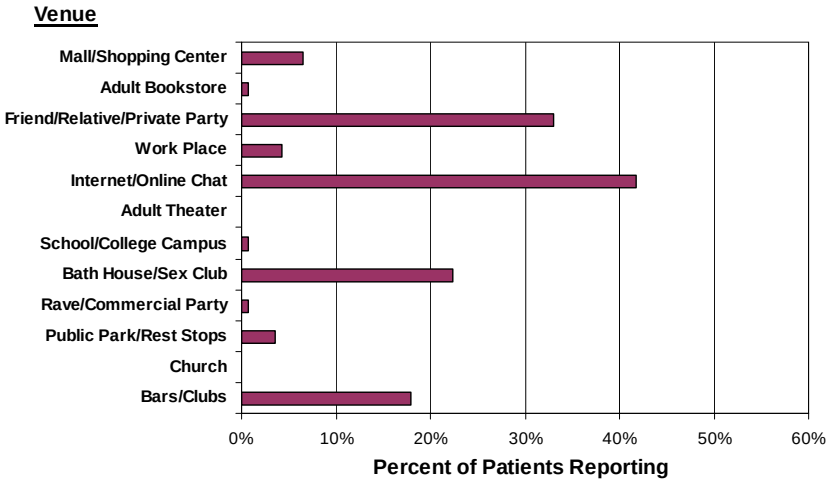


Figure 39 - Drug Use/Risk Reported in Last Year, Chlamydial Infection Patients Interviewed, Washington State 2008

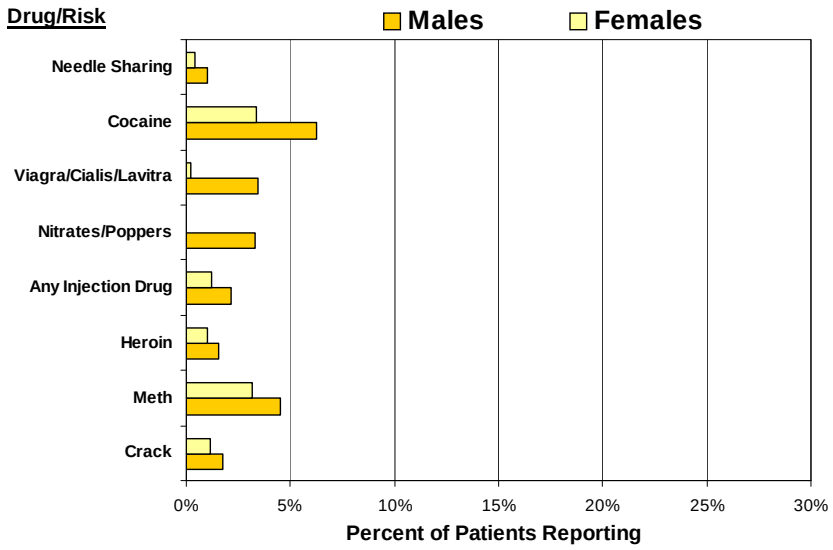
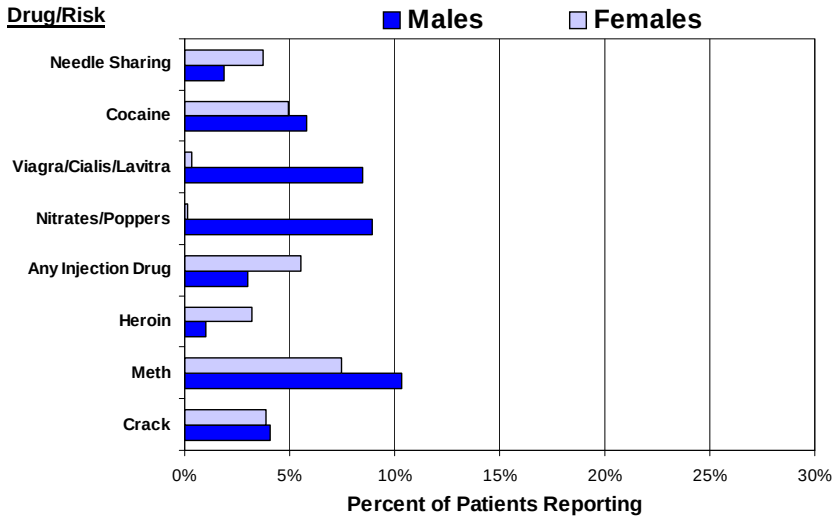


Figure 40 - Drug Use/Risk Reported in Last Year, Gonorrhea Patients Interviewed, Washington State 2008



with higher STI risk behavior and can serve as a focul point in facilitating transmissive interactions in the sexual marketplace.

Knowing the place and type of venue where partners are met may reveal significant outreach opportunities for risk reduction, active case finding, and prevention activities. **Figures 36 - 38** show the proportion of male and female cases reporting meeting partners by venue type for chlamydia, gonorrhea, and for male primary and/or secondary syphilis cases in 2008. Among chlamydial infection and gonorrhea cases, the most frequently reported venue for meeting sex partners was at a friend or relative's house or private party with slightly over 50 percent of both males and females reporting meeting partners in this setting in the previous year. Males were more likely than females to report meeting partners at bars/clubs, malls, or to use the internet to meet partners. Among male primary and secondary syphilis cases, use of the internet is most frequently reported, followed by bath house/sex club, and bars/clubs. MSM were significantly more likely to report use of the internet to meet partners than heterosexual men, suggesting that this channel of communication might also present continuing opportunities for STI education and risk reduction counseling targeted specifically to MSM.

Illicit Drug Use

Illicit drug use may be a key characteristic of certain social and sexual networks. Some well-documented outbreaks of STIs in Washington State and elsewhere have been associated with illicit drug use in tightly defined drug and sex partner networks.

In addition to being a characteristic element defining social networks, illicit drug use, especially among younger persons, is suggestive of overall risk-taking behaviors - another expression of which may be unprotected sexual activity. Multiple factors may be associated with increased risk of illicit drug use, some of which may also be determinants of sexual health. **Figures 39 - 41** show the proportion of cases interviewed by gender and diagnosis reporting illicit drug use and other associated HIV and STI risks. This list also includes erectile dysfunction medications, which have anecdotally been reported as being used recreationally by MSM. Our data support this hypothesis, with over 20 percent of men with primary or secondary syphilis reporting use of performance enhancing drugs (**Figure 41**). While the overall proportion of chlamydial infection and gonorrhea cases reporting drug use or risk in the previous year is relatively small (less than 7 and 9 percent of all cases, respectively), the proportion of men diagnosed with primary or secondary syphilis reporting drug use or risk is considerably higher with over 22 percent reporting some risk in the past year.

HIV Status and Testing

In light of the heightened risk for HIV infection among people diagnosed with bacterial and other viral STIs, the proportion of patients knowledgable about their HIV status and sufficiently aware of their risks to seek HIV testing becomes relevant. **Figures 42 - 44** present the proportion of cases self-reporting HIV-positive status, reporting ever having had an HIV test and reporting testing for HIV at their most recent STI diagnosis.

Among primary and secondary syphilis cases, 48.9 percent report

Figure 41 - Drug Use/Risk Reported in Last Year, Male Primary & Secondary Syphilis Cases Interviewed, Washington State 2008

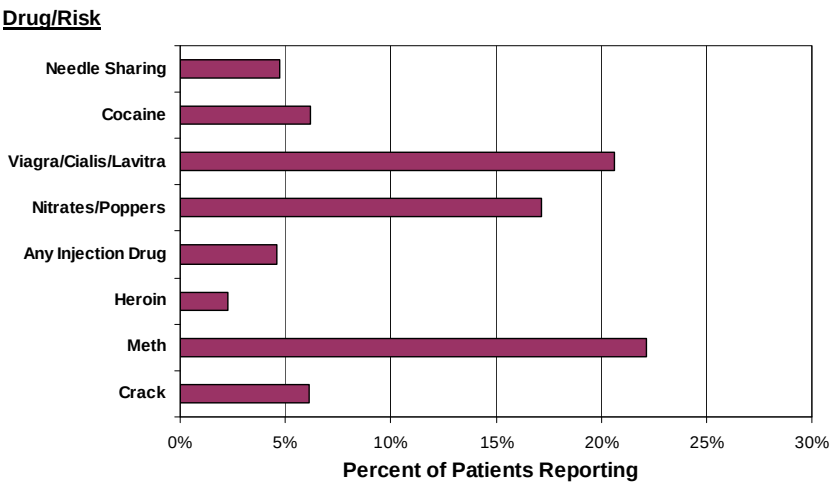


Figure 42 - Self-Reported HIV-Positive by STI Diagnosis, Patients Diagnosed and Interviewed, Washington State 2008

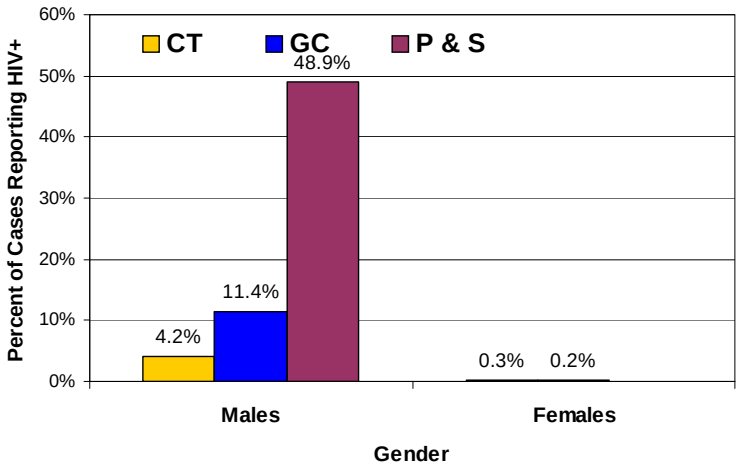


Figure 43 - History of Ever Having Had an HIV Test by STI Diagnosis, Patients Diagnosed and Interviewed, Washington State 2008

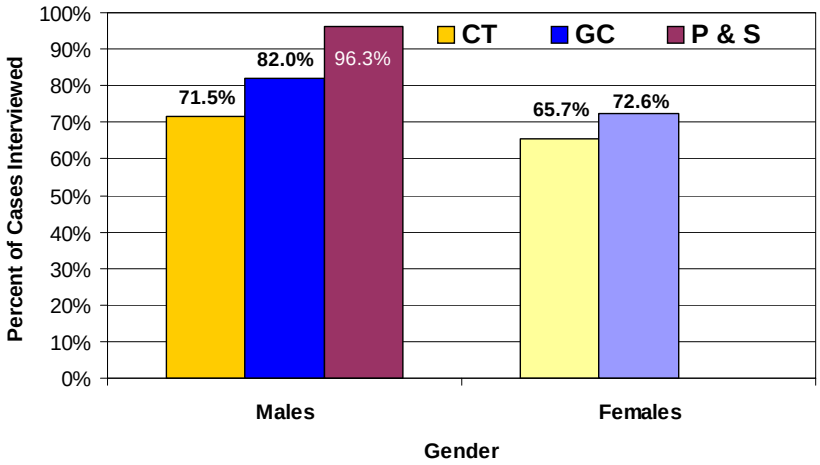
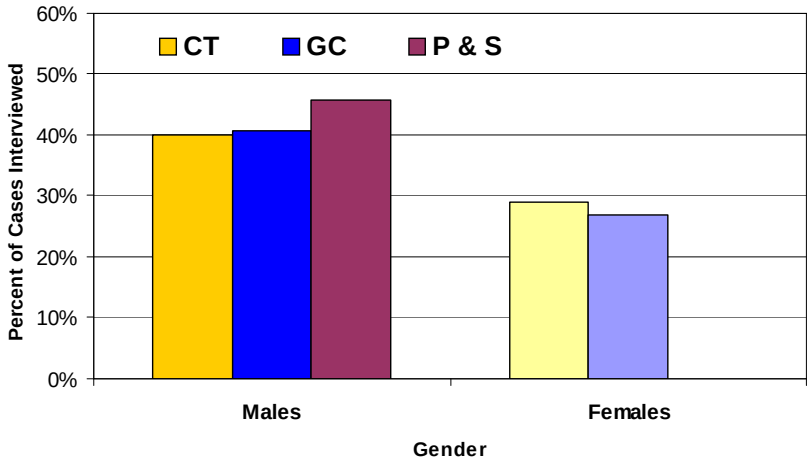


Figure 44 - HIV Testing at Most Recent STI Diagnoses, Patients Diagnosed and Interviewed, Washington State 2008



being HIV positive, which reflects the fact that the majority of cases are diagnosed among urban MSM who have the highest prevalence of HIV of any behavioral or demographic group in Washington State. Likewise, among men interviewed who were diagnosed with gonorrhea in 2008, over 11 percent report being HIV-positive, likely also reflecting the disproportionate burden of disease among MSM. For chlamydial infections, the proportion of males reporting being HIV-positive is 4.2 percent; for male and female CT cases combined, self reported HIV-positive status is lower than the estimated HIV prevalence among all high-risk heterosexuals of 2.2 percent.

In light of the comparatively higher HIV prevalence among people being diagnosed with chlamydial infection, gonorrhea or syphilis, it is encouraging that a majority report a history of having been tested for HIV. Yet these data are mute with respect to how recently patients tested for HIV and whether they returned for their results. More revealing is the proportion of patients who were offered testing at the time they were diagnosed with their most recent STI. Over 40 percent of males report an HIV test at their recent STI diagnosis while fewer than 30 percent of females report being tested.

Behavioral data collected in the course of routine public health follow-up of STI cases to assure appropriate and timely treatment and manage potential exposure of sex partners provides a wealth of information useful for better understanding the population being diagnosed with STIs. In general, risk behaviors differ by STI being diagnosed; primary or secondary syphilis cases report the highest levels of many behavioral risks including number of partners, drug use, anonymous venues for meeting partners and self-reported HIV status. Persons with chlamydial infection report the lowest level of behavioral risk and persons with gonorrhea report slightly higher risks, in part reflecting the different demographic profile of persons being diagnosed with these three STIs.

Trends in HIV/STI Co-Infection

The prevalence of HIV among persons being diagnosed with STIs can be assessed through self-reported HIV status for those patients interviewed in the course of routine partner services activities. However, matching of disease registries provides a more comprehensive basis for assessing trends in HIV/STI coinfection. Separate surveillance registries are maintained for HIV disease and for other STIs, yet both of these registries are person-based and contain sufficient data to match patients across registries. Once matched, information in the HIV surveillance system on date of initial HIV infection can be used to determine if the patient was HIV-positive at the time they were diagnosed with chlamydial infection, gonorrhea, syphilis, or other STIs. These data are valuable in helping assess the risk of ongoing HIV infection. STIs among HIV-positive persons also provides biologic evidence of unprotected sexual behavior, creating risk potential HIV transmission if their sex partners are uninfected. Moreover, STIs among persons with HIV may be more complicated to treat, present more frequently with complications and, at the population level, demonstrate a higher burden of disease in a medically fragile population.

Figures 46 - 48 show the prevalence of HIV among people diagnosed with chlamydial infection, gonorrhea, and primary or secondary syphilis from 1992 through 2008. Data for these charts are based on registry matching for patients reported with HIV through June of 2009 and for STI cases diagnosed through December 2008. There are often delays in reporting to the HIV and STI surveillance registries, so matching data for the most recent complete year may underestimate co-infection by a modest amount. Additionally, patient records are matched on a number of data elements, including name, date of birth, and gender. While every effort is made to account for misspellings and other inconsistencies in the underlying data, matching methods may miss a small number of true matches. STI and HIV matches have been manually reviewed to exclude possible false matches so the direction of error is to underestimate incidence of STIs among HIV-positive people and prevalence of HIV among reported STI cases. The data presented here should be viewed as minimum estimates of co-infection.

The lowest prevalence of HIV is observed among persons being diagnosed with chlamydial infection in 2008 at 0.5 percent. This HIV

Figure 46 - Total Chlamydia Cases and Percent HIV+ by Year of Diagnosis, Washington State 1992 - 2008

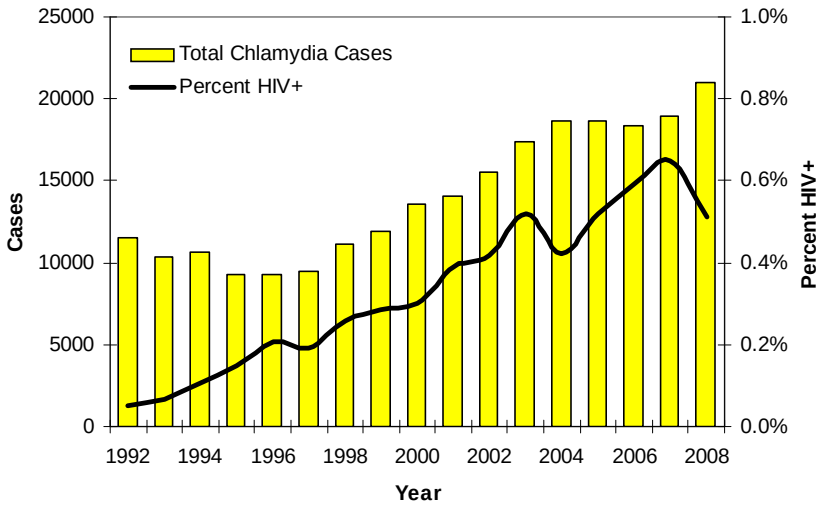


Figure 47 - Total Gonorrhea Cases and Percent HIV+ by Year of Diagnosis, Washington State 1992 - 2008

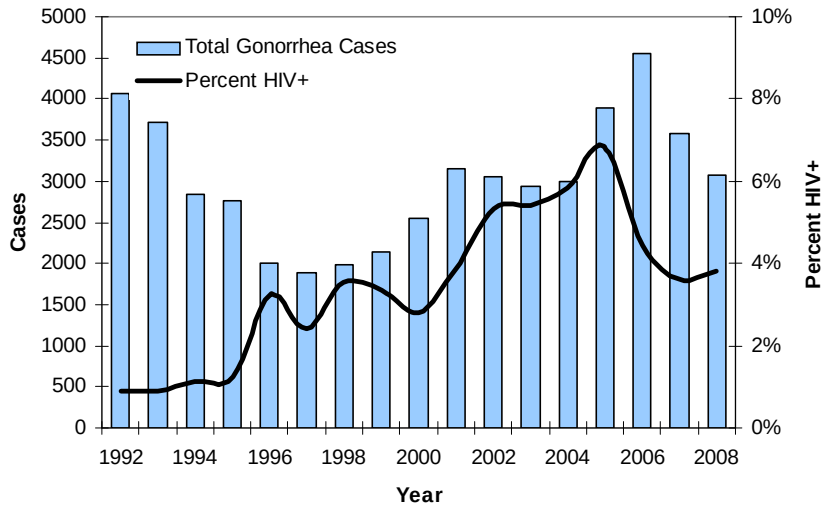


Figure 48 - Total P & S Syphilis Cases and Percent HIV+ by Year of Diagnosis, Washington State 1992 - 2008

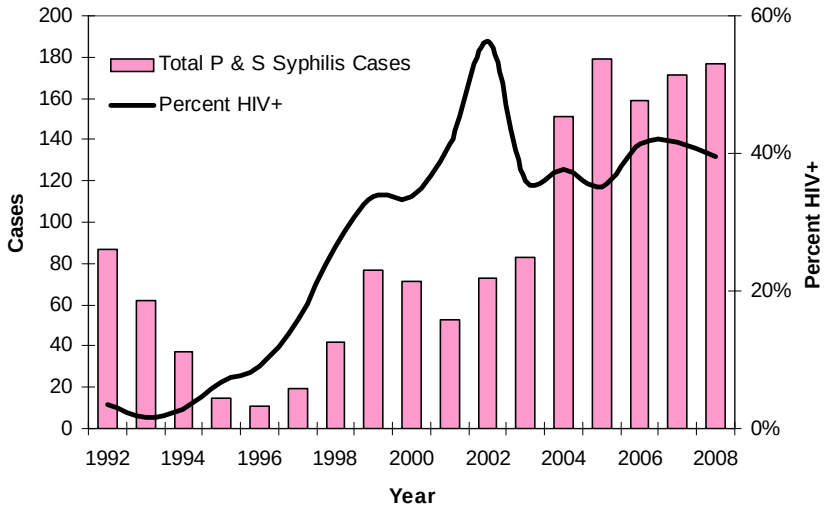
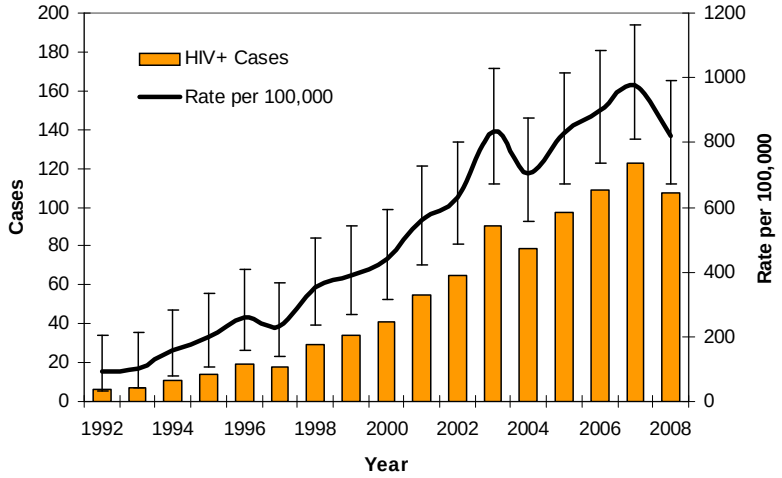
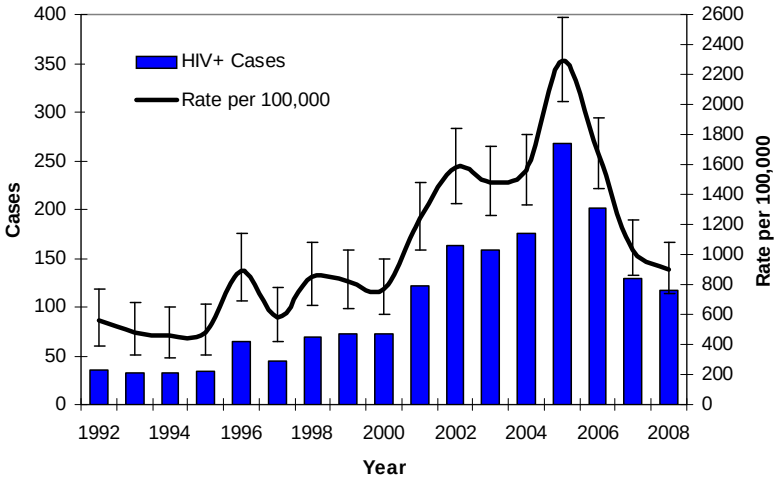


Figure 49 - Chlamydial Infection Cases and Incidence Rate Among People Living with HIV by Year, Washington State 1992 - 2008



* Crudeincidence rate per 100,000 with Poisson exact 95% confidence intervals.

Figure 50 - Gonorrhea Cases and Incidence Rate Among People Living with HIV by Year, Washington State 1992 - 2008



* Crudeincidence rate per 100,000 with Poisson exact 95% confidence intervals.

prevalence rate is twice that estimated among Washington State residents without any other specific risk factors (~0.2 percent).

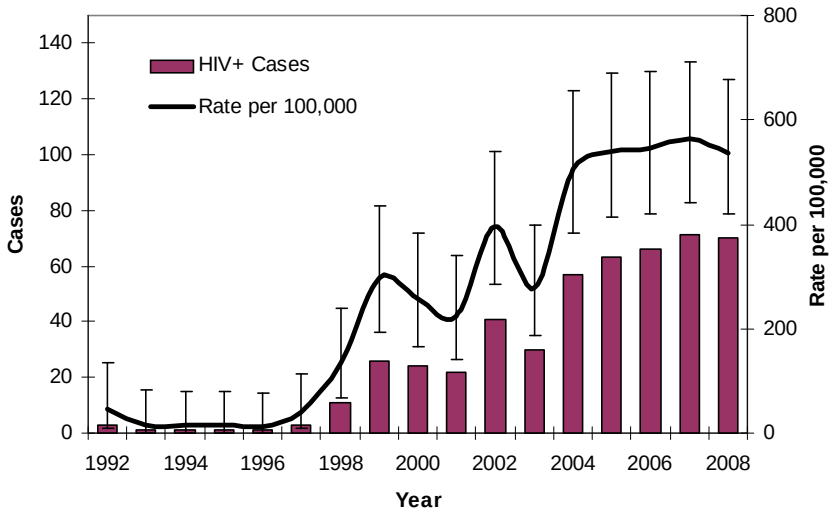
Among people diagnosed with gonorrhea, the HIV prevalence is considerably higher; 3.8 percent of gonorrhea cases diagnosed in 2008 were found to be HIV-positive at the time of their gonorrhea diagnosis. In part, as previously noted, this level of HIV prevalence reflects the proportion of men diagnosed with gonorrhea who are MSM. Among all MSM, HIV prevalence is estimated to be approximately 11 percent. The incidence of gonorrhea is considerably higher among MSM than for heterosexual males.

The highest prevalence of HIV is found among people diagnosed with primary or secondary syphilis with 40 percent found to be HIV-positive in 2008. In contrast, 48.9 percent of cases report being HIV-positive on partner management interviews. This difference is likely due to HIV reporting delays and sensitivity issues with the matching algorithm used. The proportion of cases found to be HIV-positive at the time of their syphilis diagnosis steadily increased through 2002 to a high of 56 percent. Since then, the prevalence of HIV among primary or secondary syphilis cases has been stable at around 40 percent of diagnosed cases.

People living with HIV are disproportionately affected by incident STIs and represent a population with special prevention and partner management needs. **Figures 49 - 51** show the incidence of chlamydial infection, gonorrhea, and primary or secondary syphilis among persons with HIV. By comparison, the rate of these STIs among HIV-positive persons is several orders of magnitude

higher than among persons not known to be infected with HIV. This is perhaps best illustrated by the incidence of gonorrhea among persons with HIV. The gonorrhea rate among HIV-positive persons in 2008 was 897 per 100,000 versus 46.6 per 100,000 in the general population, *an almost 20-fold difference*.

Figure 51 - Primary or Secondary Syphilis Cases and Incidence Rate Among People Living with HIV by Year, Washington State 1992 - 2008



* Crudeincidence rate per 100,000 with Poisson exact 95% confidence intervals.

Among persons with HIV disease, the incidence of STIs appears to be decreasing or stabilizing in recent years following a decade of steady increases. A welcome development, these moderate declines in STI incidence may reflect recent programmatic emphasis on prevention for HIV-positives and a more comprehensive partner services infrastructure for newly diagnosed HIV cases.

However, optimism should be tempered by the knowledge that the number of persons living with HIV in Washington State continues to grow by approximately 5 percent annually; prompt diagnosis, treatment, and prevention of STIs among this population must continue to be a very high priority for public health agencies in order to prevent ongoing HIV transmission. Reducing inequality in the burden of gonorrhea and other STIs among persons with HIV disease is also fundamentally important given the mounting evidence for synergy between the HIV epidemic and incidence of other STIs.

Guidance on the Use of Tabular Data

Tabular data are provided in hopes that community, agency, and local government partners will use these historical data as a valuable resource for future health planning and to provide state-level data to inform comparisons with STI incidence at the local level. Tables include case counts and rates for the current year as well as historical data back through 1992 for a variety of STIs and by age group and gender. Users of these data should keep in mind that small numbers often produce rates that can be unstable from year to year and may not be reliable when comparing across strata within a particular year.

Missing data, such as cases reported without date of birth, race, Hispanic heritage or where the gender of the case is not definatively known (see Table 2), can affect case rates presented throughout this report and in the tabular data. Caution should be used in comparing across categories; additional data may be available from the Washington State Department of Health, STD Services Section, for many of the categories presented in these tables; researchers, public health workers, and others are encouraged to contact us for clarification or additional information.

Table 1 - Notifiable STI Cases Diagnosed and Reported by Disease in Washington State, 2007 - 2008 with Annual Percent Change

STI	2007 Cases*	2008 Cases*	Annual % Change
Chlamydia (CT)	18,915	20,882	**10.4%**
Gonorrhea (GC)	3,582	3,069	**-14.3%**
Primary & Secondary Syphilis	172	177	**2.9%**
Early and Late Latent Syphilis	225	244	**8.4%**
Congenital Syphilis	2	0	**N/A**
Herpes, Initial Infection	1,946	1,971	**1.3%**
Neonatal Herpes	1	9	**800.0%**
Lymphogranuloma Venereum	1	4	**300.0%**
Chancroid/GI	0	1	**N/A**
Total Reportable STIs	**24,844**	**26,357**	**6.1%**

*Cases diagnosed in the calendar year and reported as of March 2009

Table 2 - STI Cases Reported with Missing Demographic Data by Disease and Data Element, Washington State, 2008

	Missing Data Element			
Disease	Date of Birth	Race	Hispanic Ethnicity	Gender
	%	%	%	%
Chlamydia (CT)	0.5%	20.8%	30.9%	0.2%
Gonorrhea (GC)	0.3%	17.9%	32.7%	0.1%
Primary & Secondary Syphilis	0.0%	1.7%	9.6%	0.0%
Herpes, Initial Infection	1.8%	34.3%	42.3%	1.2%
Total	**0.5%**	**21.3%**	**31.8%**	**0.3%**

*Cases diagnosed in the calendar year and reported as of March 2009

Table 3 - Chlamydia and Gonorrhea Cases Diagnosed and Incidence Rate with Rankings by County, 2008

County	2008 Population*	Chlamydia			Gonorrhea		
		Cases†	Rate‡	Rank	Cases†	Rate‡	Rank
Adams	17800	53	297.8	12	2	11.2	30
Asotin	21400	52	243.0	23	4	18.7	22
Benton	165500	513	310.0	10	28	16.9	24
Chelan	72100	201	278.8	17	6	8.3	32
Clallam	69200	142	205.2	26	15	21.7	18
Clark	424200	1062	250.4	20	160	37.7	7
Columbia	4100	2	48.8	37	2	48.8	4
Cowlitz	99000	281	283.8	14	38	38.4	6
Douglas	37000	74	200.0	27	1	2.7	36
Ferry	7700	24	311.7	9	1	13.0	28
Franklin	70200	262	373.2	3	21	29.9	11
Garfield	2300	1	43.5	38	0	0.0	38
Grant	84600	234	276.6	18	14	16.5	25
Grays Harbor	70900	165	232.7	24	20	28.2	13
Island	79300	216	272.4	19	14	17.7	23
Jefferson	28800	45	156.2	31	2	6.9	35
King	1884200	5959	316.3	6	1295	68.7	2
Kitsap	246800	739	299.4	11	54	21.9	17
Kittitas	39400	123	312.2	8	11	27.9	14
Klickitat	20100	13	64.7	36	3	14.9	26
Lewis	74700	184	246.3	22	19	25.4	15
Lincoln	10400	3	28.8	39	0	0.0	38
Mason	56300	95	168.7	29	12	21.3	19
Okanogan	40100	113	281.8	15	9	22.4	16
Pacific	21800	29	133.0	32	2	9.2	31
Pend Oreille	12800	14	109.4	34	1	7.8	33
Pierce	805400	3832	475.8	2	675	83.8	1
San Juan	16100	12	74.5	35	6	37.3	8
Skagit	117500	331	281.7	16	9	7.7	34
Skamania	10700	17	158.9	30	2	18.7	21
Snohomish	696600	1722	247.2	21	208	29.9	12
Spokane	459000	1593	347.1	4	250	54.5	3
Stevens	43700	82	187.6	28	1	2.3	37
Thurston	245300	767	312.7	7	46	18.8	20
Wahkiakum	4100	5	122.0	33	2	48.8	5
Walla Walla	58600	167	285.0	13	7	11.9	29
Whatcom	191000	444	232.5	25	27	14.1	27
Whitman	43000	144	334.9	5	16	37.2	9
Yakima	235900	1167	494.7	1	86	36.5	10
State Total	**6587600**	**20882**	**317.0**	**-**	**3069**	**46.6**	**-**

*Official Washington State population estimates (OFM, April 2009)

†Cases diagnosed in 2008 and reported as of March 2009

‡ Incidence rates based on small numbers are unstable; rates in small font exceed 30% relative standard error

Table 4 - Chlamydia - Cases Diagnosed and Incidence Rate by Gender and County, 2008

County	2008 Population*		Chlamydia Cases & Rates†			
	Male	Female	Male	Rate‡	Female	Rate‡
Adams	9103	8697	5	54.9	48	551.88
Asotin	10204	11196	8	78.4	44	393.01
Benton	82443	83057	86	104.3	424	510.49
Chelan	35961	36139	45	125.1	154	426.13
Clallam	34282	34918	29	84.6	113	323.61
Clark	210883	213317	211	100.1	850	398.47
Columbia	2003	2097	0	0.0	2	95.39
Cowlitz	49145	49855	63	128.2	218	437.27
Douglas	18376	18624	22	119.7	52	279.21
Ferry	4007	3693	12	299.5	12	324.94
Franklin	36685	33515	63	171.7	198	590.77
Garfield	1143	1157	0	0.0	1	86.39
Grant	43324	41276	52	120.0	179	433.66
Grays Harbor	35306	35594	44	124.6	121	339.94
Island	39773	39527	66	165.9	149	376.96
Jefferson	14337	14463	9	62.8	36	248.92
King	938660	945540	2003	213.4	3956	418.39
Kitsap	125317	121483	162	129.3	568	467.56
Kittitas	19609	19791	35	178.5	88	444.64
Klickitat	10065	10035	1	9.9	12	119.58
Lewis	37098	37602	40	107.8	142	377.64
Lincoln	5167	5233	2	38.7	1	19.11
Mason	29123	27177	24	82.4	71	261.25
Okanogan	20063	20037	17	84.7	96	479.12
Pacific	10829	10971	4	36.9	25	227.87
Pend Oreille	6462	6338	4	61.9	10	157.78
Pierce	401080	404320	1061	264.5	2762	683.12
San Juan	7898	8202	4	50.6	8	97.54
Skagit	58300	59200	72	123.5	257	434.12
Skamania	5400	5300	4	74.1	13	245.27
Snohomish	348904	347696	477	136.7	1236	355.48
Spokane	225488	233512	424	188.0	1169	500.62
Stevens	21838	21862	21	96.2	61	279.02
Thurston	120427	124873	175	145.3	589	471.68
Wahkiakum	2054	2046	1	48.7	4	195.55
Walla Walla	29843	28757	31	103.9	135	469.45
Whatcom	94314	96686	128	135.7	315	325.80
Whitman	21798	21202	41	188.1	103	485.80
Yakima	117807	118093	225	191.0	937	793.45
State Total	**3284518**	**3303082**	**5671**	**172.7**	**15159**	**458.94**

*Official Washington State population estimates (OFM, April 2009)

†Crude incidence rate per 100,000, based on cases diagnosed in 2008 and reported as of March 2009

‡ Rates based on small numbers can be unstable; rates in small font exceed 30% relative standard error

Table 5 - Gonorrhea - Cases Diagnosed and Incidence Rate by Gender and County, 2008

County	2008 Population*		Gonorrhea Cases & Rates†			
	Male	Female	Male	Rate‡	Female	Rate‡
Adams	9103	8697	1	11.0	1	11.50
Asotin	10204	11196	0	0.0	4	35.73
Benton	82443	83057	14	17.0	14	16.86
Chelan	35961	36139	1	2.8	5	13.84
Clallam	34282	34918	3	8.8	12	34.37
Clark	210883	213317	76	36.0	83	38.91
Columbia	2003	2097	2	99.8	0	0.00
Cowlitz	49145	49855	10	20.3	28	56.16
Douglas	18376	18624	1	5.4	0	0.00
Ferry	4007	3693	0	0.0	1	27.08
Franklin	36685	33515	10	27.3	11	32.82
Garfield	1143	1157	0	0.0	0	0.00
Grant	43324	41276	6	13.8	7	16.96
Grays Harbor	35306	35594	11	31.2	9	25.28
Island	39773	39527	5	12.6	9	22.77
Jefferson	14337	14463	2	13.9	0	0.00
King	938660	945540	813	86.6	482	50.98
Kitsap	125317	121483	16	12.8	37	30.46
Kittitas	19609	19791	4	20.4	7	35.37
Klickitat	10065	10035	0	0.0	3	29.90
Lewis	37098	37602	8	21.6	11	29.25
Lincoln	5167	5233	0	0.0	0	0.00
Mason	29123	27177	9	30.9	3	11.04
Okanogan	20063	20037	3	15.0	6	29.94
Pacific	10829	10971	1	9.2	1	9.11
Pend Oreille	6462	6338	0	0.0	1	15.78
Pierce	401080	404320	306	76.3	368	91.02
San Juan	7898	8202	1	12.7	5	60.96
Skagit	58300	59200	3	5.1	6	10.14
Skamania	5400	5300	0	0.0	2	37.73
Snohomish	348904	347696	98	28.1	110	31.64
Spokane	225488	233512	100	44.3	150	64.24
Stevens	21838	21862	0	0.0	1	4.57
Thurston	120427	124873	26	21.6	20	16.02
Wahkiakum	2054	2046	1	48.7	1	48.89
Walla Walla	29843	28757	3	10.1	4	13.91
Whatcom	94314	96686	10	10.6	17	17.58
Whitman	21798	21202	7	32.1	9	42.45
Yakima	117807	118093	32	27.2	54	45.73
State Total	**3284518**	**3303082**	**1583**	**48.2**	**1482**	**44.87**

*Official Washington State population estimates (OFM, April 2009)

†Crude incidence rate per 100,000, based on cases diagnosed in 2008 and reported as of March 2009

‡ Rates based on small numbers are unstable; rates in small font exceed 30% relative standard error

Table 6 - Chlamydia Cases Diagnosed and Incidence Rate by Age Group and Gender, 1997 - 2008

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2008	0-9	15	1.7	2	0.5	13	3.1
	10-14	225	51.8	19	8.5	206	97.2
	15-19	6390	1,353.5	1037	427.7	5353	2,330.9
	20-24	7678	1,617.6	2075	853.4	5603	2,420.3
	25-29	3524	753.4	1170	487.1	2354	1,034.4
	30-34	1434	339.1	565	260.9	869	421.2
	35-39	697	150.6	316	133.4	381	168.6
	40-44	381	82.1	213	90.7	168	73.3
	45+	395	15.6	248	20.5	147	11.1
	Missing	91	0.0	26	0.0	65	0.0
	All Ages	20882	317.0	5671	172.7	15159	458.9
2007	0-9	10	1.2	7	1.6	3	0.7
	10-14	207	47.4	16	7.1	191	89.8
	15-19	5735	1,226.1	920	383.3	4815	2,114.0
	20-24	6893	1,468.5	1807	750.2	5086	2,225.8
	25-29	3145	698.9	1019	441.8	2126	969.3
	30-34	1267	304.5	526	246.9	741	364.9
	35-39	685	147.1	319	133.8	366	161.1
	40-44	327	69.2	183	76.7	144	61.6
	45+	338	13.7	209	17.8	129	10.0
	Missing	216	0.0	63	0.0	153	0.0
	All Ages	18915	291.5	5069	156.7	13754	422.7
2006	0-9	9	1.1	3	0.7	6	1.5
	10-14	213	48.4	15	6.7	198	92.5
	15-19	5685	1,237.6	854	362.6	4831	2,158.5
	20-24	6700	1,452.0	1768	745.1	4932	2,200.4
	25-29	2973	688.7	1043	471.5	1930	917.1
	30-34	1233	296.5	528	248.1	705	347.2
	35-39	711	154.6	324	137.9	387	172.0
	40-44	360	74.6	214	87.9	146	61.0
	45+	315	13.2	190	16.6	125	10.0
	Missing	193	0.0	56	0.0	137	0.0
	All Ages	18397	288.6	4995	157.2	13397	418.9
2005	0-9	12	1.5	3	0.7	9	2.3
	10-14	246	55.7	14	6.2	232	107.8
	15-19	5880	1,305.5	941	407.7	4939	2,249.1
	20-24	6966	1,551.8	1970	853.4	4996	2,291.1
	25-29	2910	706.1	1088	514.2	1822	908.5
	30-34	1185	280.4	482	223.0	703	340.6
	35-39	615	136.6	296	129.0	319	144.6
	40-44	326	66.4	206	83.4	120	49.2
	45+	262	11.3	160	14.5	102	8.4
	Missing	232	0.0	67	0.0	165	0.0
	All Ages	18644	298.0	5227	167.7	13407	427.1
2004	0-9	9	1.1	3	0.7	6	1.5
	10-14	271	60.8	21	9.2	250	115.3
	15-19	6149	1,388.5	987	435.1	5162	2,389.7
	20-24	6990	1,589.5	1916	846.7	5074	2,377.1
	25-29	2739	683.9	964	468.7	1775	911.0
	30-34	1158	267.4	521	235.2	637	301.2
	35-39	593	132.7	294	129.4	299	136.2
	40-44	317	64.0	192	77.1	125	50.8
	45+	255	11.3	182	17.0	73	6.2
	Missing	183	0.0	52	0.0	131	0.0
	All Ages	18674	302.8	5132	167.0	13532	437.1
2003	0-9	11	1.4	5	1.2	6	1.5
	10-14	284	63.6	19	8.3	265	122.0
	15-19	5866	1,335.4	896	397.7	4970	2,322.7
	20-24	6483	1,512.6	1772	803.1	4711	2,265.3
	25-29	2392	609.0	895	444.4	1497	782.0
	30-34	1065	241.0	455	201.0	610	283.1
	35-39	528	116.8	286	124.8	242	108.5
	40-44	238	48.1	129	51.9	109	44.2
	45+	221	10.1	149	14.3	72	6.3
	Missing	270	0.0	85	0.0	185	0.0
	All Ages	17358	284.6	4691	154.5	12667	413.8

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2002	0-9	18	2.2	13	3.1	5	1.3
	10-14	262	58.8	14	6.1	248	114.4
	15-19	5363	1,224.9	845	375.5	4518	2,123.1
	20-24	5645	1,354.6	1516	708.1	4129	2,037.7
	25-29	2247	575.3	791	395.1	1456	764.9
	30-34	959	214.2	431	187.8	528	241.9
	35-39	463	100.2	236	100.9	227	99.4
	40-44	238	47.9	126	50.5	112	45.2
	45+	184	8.6	116	11.5	68	6.1
	Missing	190	0.0	45	0.0	145	0.0
	All Ages	15569	257.7	4133	137.4	11436	377.1
2001	0-9	13	1.6	5	1.2	8	2.0
	10-14	252	57.2	18	8.0	234	109.1
	15-19	5062	1,164.0	747	333.5	4315	2,046.3
	20-24	4976	1,230.9	1324	637.6	3652	1,857.3
	25-29	1943	493.0	691	342.2	1252	651.6
	30-34	865	194.4	372	163.4	493	226.7
	35-39	438	92.4	232	96.8	206	87.9
	40-44	216	43.6	128	51.5	88	35.6
	45+	164	7.9	105	10.7	59	5.4
	Missing	182	0.0	53	0.0	129	0.0
	All Ages	14111	236.2	3675	123.5	10436	347.9
2000	0-9	22	2.7	6	1.4	16	4.0
	10-14	298	68.5	15	6.7	283	133.6
	15-19	5042	1,178.1	828	375.7	4214	2,030.3
	20-24	4608	1,181.0	1263	628.9	3345	1,766.4
	25-29	1849	458.1	670	324.0	1179	598.9
	30-34	821	187.7	375	167.8	446	208.3
	35-39	436	90.1	205	84.0	231	96.3
	40-44	204	41.5	107	43.4	97	39.6
	45+	153	7.6	89	9.4	64	6.1
	Missing	189	0.0	53	0.0	136	0.0
	All Ages	13622	231.1	3611	123.1	10011	338.2
1999	0-9	18	2.2	5	1.2	13	3.2
	10-14	252	58.8	12	5.4	240	115.3
	15-19	4408	1,029.2	698	315.7	3710	1,790.4
	20-24	3924	1,048.0	1073	556.5	2851	1,569.5
	25-29	1629	398.2	582	277.7	1047	524.9
	30-34	734	168.4	347	155.0	387	182.5
	35-39	353	72.2	174	70.6	179	73.9
	40-44	170	35.0	85	35.0	85	35.0
	45+	139	7.1	78	8.5	61	5.9
	Missing	263	0.0	58	0.0	205	0.0
	All Ages	11890	203.9	3112	107.1	8778	300.0
1998	0-9	19	2.3	9	2.1	10	2.5
	10-14	283	66.8	13	6.0	270	131.4
	15-19	4262	1,022.0	595	276.6	3667	1,816.4
	20-24	3584	988.7	938	501.8	2646	1,507.1
	25-29	1481	352.7	534	248.0	947	462.9
	30-34	609	138.7	233	103.8	376	175.3
	35-39	349	71.5	144	58.6	205	84.6
	40-44	159	33.1	65	27.1	94	39.1
	45+	146	7.7	65	7.3	81	8.1
	Missing	273	0.0	57	0.0	216	0.0
	All Ages	11165	194.2	2653	92.6	8512	294.9
1997	0-9	19	2.3	8	1.9	11	2.7
	10-14	248	58.8	12	5.5	236	115.2
	15-19	3663	912.0	562	271.3	3101	1,594.4
	20-24	2939	827.3	754	411.8	2185	1,269.1
	25-29	1198	283.4	367	169.1	831	404.0
	30-34	566	126.2	238	103.9	328	149.3
	35-39	284	58.4	121	49.5	163	67.3
	40-44	116	24.5	51	21.6	65	27.4
	45+	105	5.8	44	5.1	61	6.3
	Missing	310	0.0	57	0.0	253	0.0
	All Ages	9448	166.8	2214	78.5	7234	254.4

Table 7 - Gonorrhea - Cases Diagnosed and Incidence Rate by Age Group and Gender, 1997 - 2008

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2008	0-9	3	0.3	1	0.2	2	0.5
	10-14	35	8.1	3	1.3	32	15.1
	15-19	642	136.0	172	70.9	470	204.7
	20-24	928	195.5	435	178.9	493	213.0
	25-29	561	119.9	317	132.0	244	107.2
	30-34	280	66.2	176	81.3	104	50.4
	35-39	225	48.6	163	68.8	62	27.4
	40-44	153	33.0	116	49.4	37	16.1
	45+	229	9.1	195	16.2	34	2.6
	Missing	9	0.0	5	0.0	4	0.0
	All Ages	3069	46.6	1583	48.2	1482	44.9
2007	0-9	1	0.1	0	0.0	1	0.2
	10-14	42	9.6	7	3.1	35	16.4
	15-19	789	168.7	230	95.8	559	245.4
	20-24	1006	214.3	429	178.1	577	252.5
	25-29	660	146.7	367	159.1	293	133.6
	30-34	361	86.8	219	102.8	142	69.9
	35-39	272	58.4	195	81.8	77	33.9
	40-44	197	41.7	133	55.8	64	27.4
	45+	205	8.3	173	14.7	32	2.5
	Missing	32	0.0	15	0.0	17	0.0
	All Ages	3582	55.2	1768	54.7	1797	55.2
2006	0-9	3	0.4	0	0.0	3	0.7
	10-14	38	8.6	4	1.8	34	15.9
	15-19	858	186.8	243	103.2	615	274.8
	20-24	1196	259.2	556	234.3	640	285.5
	25-29	804	186.3	490	221.5	314	149.2
	30-34	502	120.7	318	149.4	184	90.6
	35-39	401	87.2	275	117.0	126	56.0
	40-44	346	71.7	262	107.7	84	35.1
	45+	368	15.4	304	26.6	64	5.1
	Missing	37	0.0	18	0.0	19	0.0
	All Ages	4555	71.4	2470	77.7	2083	65.1
2005	0-9	2	0.2	1	0.2	1	0.3
	10-14	38	8.6	2	0.9	36	16.7
	15-19	723	160.5	205	88.8	518	235.9
	20-24	1081	240.8	530	229.6	551	252.7
	25-29	631	153.1	407	192.3	224	111.7
	30-34	430	101.8	288	133.3	142	68.8
	35-39	361	80.2	287	125.1	74	33.5
	40-44	305	62.1	256	103.7	49	20.1
	45+	297	12.8	262	23.7	35	2.9
	Missing	28	0.0	14	0.0	14	0.0
	All Ages	3900	62.3	2252	72.2	1644	52.4
2004	0-9	4	0.5	3	0.7	1	0.3
	10-14	38	8.5	5	2.2	33	15.2
	15-19	603	136.2	147	64.8	456	211.1
	20-24	758	172.4	394	174.1	364	170.5
	25-29	465	116.1	272	132.2	193	99.1
	30-34	330	76.2	238	107.4	92	43.5
	35-39	311	69.6	240	105.6	71	32.3
	40-44	230	46.4	180	72.3	50	20.3
	45+	230	10.2	204	19.0	26	2.2
	Missing	18	0.0	7	0.0	11	0.0
	All Ages	2991	48.5	1690	55.0	1297	41.9
2003	0-9	2	0.2	0	0.0	2	0.5
	10-14	35	7.8	1	0.4	34	15.7
	15-19	507	115.4	125	55.5	382	178.5
	20-24	733	171.0	353	160.0	380	182.7
	25-29	488	124.2	311	154.4	177	92.5
	30-34	391	88.5	266	117.5	125	58.0
	35-39	293	64.8	241	105.1	52	23.3
	40-44	220	44.4	181	72.9	39	15.8
	45+	232	10.6	200	19.2	32	2.8
	Missing	29	0.0	14	0.0	15	0.0
	All Ages	2930	48.0	1692	55.7	1238	40.4

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2002	0-9	2	0.2	0	0.0	2	0.5
	10-14	29	6.5	1	0.4	28	12.9
	15-19	593	135.4	187	83.1	406	190.8
	20-24	856	205.4	444	207.4	412	203.3
	25-29	481	123.2	314	156.8	167	87.7
	30-34	372	83.1	296	129.0	76	34.8
	35-39	316	68.4	251	107.3	65	28.5
	40-44	195	39.2	160	64.1	35	14.1
	45+	195	9.2	161	15.9	34	3.0
	Missing	18	0.0	13	0.0	5	0.0
	All Ages	3057	50.6	1827	60.7	1230	40.6
2001	0-9	4	0.5	1	0.2	3	0.8
	10-14	37	8.4	3	1.3	34	15.9
	15-19	653	150.2	181	80.8	472	223.8
	20-24	889	219.9	479	230.7	410	208.5
	25-29	481	122.1	295	146.1	186	96.8
	30-34	387	87.0	278	122.1	109	50.1
	35-39	306	64.5	243	101.4	63	26.9
	40-44	190	38.3	151	60.7	39	15.8
	45+	171	8.3	151	15.4	20	1.8
	Missing	35	0.0	20	0.0	15	0.0
	All Ages	3153	52.8	1802	60.6	1351	45.0
2000	0-9	2	0.2	1	0.2	1	0.3
	10-14	28	6.4	4	1.8	24	11.3
	15-19	528	123.4	145	65.8	383	184.5
	20-24	658	168.6	305	151.9	353	186.4
	25-29	391	96.9	249	120.4	142	72.1
	30-34	338	77.3	229	102.5	109	50.9
	35-39	261	53.9	200	82.0	61	25.4
	40-44	150	30.5	121	49.1	29	11.8
	45+	172	8.6	147	15.5	25	2.4
	Missing	25	0.0	13	0.0	12	0.0
	All Ages	2553	43.3	1414	48.2	1139	38.5
1999	0-9	4	0.5	0	0.0	4	1.0
	10-14	27	6.3	3	1.4	24	11.5
	15-19	526	122.8	127	57.4	399	192.6
	20-24	557	148.8	265	137.4	292	160.8
	25-29	375	91.7	243	115.9	132	66.2
	30-34	247	56.7	185	82.6	62	29.2
	35-39	187	38.3	134	54.4	53	21.9
	40-44	114	23.5	94	38.7	20	8.2
	45+	76	3.9	65	7.1	11	1.1
	Missing	35	0.0	17	0.0	18	0.0
	All Ages	2148	36.8	1133	39.0	1015	34.7
1998	0-9	4	0.5	1	0.2	3	0.7
	10-14	31	7.3	1	0.5	30	14.6
	15-19	427	102.4	113	52.5	314	155.5
	20-24	503	138.8	216	115.5	287	163.5
	25-29	389	92.6	287	133.3	102	49.9
	30-34	248	56.5	180	80.2	68	31.7
	35-39	169	34.6	140	57.0	29	12.0
	40-44	93	19.4	80	33.4	13	5.4
	45+	62	3.3	54	6.1	8	0.8
	Missing	49	0.0	26	0.0	23	0.0
	All Ages	1975	34.3	1098	38.3	877	30.4
1997	0-9	1	0.1	0	0.0	1	0.2
	10-14	22	5.2	3	1.4	19	9.3
	15-19	539	134.2	132	63.7	407	209.3
	20-24	475	133.7	226	123.4	249	144.6
	25-29	298	70.5	188	86.6	110	53.5
	30-34	216	48.1	155	67.7	61	27.8
	35-39	131	26.9	106	43.3	25	10.3
	40-44	77	16.3	54	22.9	23	9.7
	45+	75	4.1	63	7.3	12	1.2
	Missing	46	0.0	25	0.0	21	0.0
	All Ages	1880	33.2	952	33.8	928	32.6

Table 8 - Primary & Secondary Syphilis Cases Diagnosed and Incidence Rate by Age Group and Gender, 1997 - 2008

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2008	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	5	1.1	4	1.6	1	0.4
	20-24	22	4.6	21	8.6	1	0.4
	25-29	21	4.5	21	8.7	0	0.0
	30-34	25	5.9	24	11.1	1	0.5
	35-39	23	5.0	23	9.7	0	0.0
	40-44	29	6.2	28	11.9	1	0.4
	45+	52	2.1	51	4.2	1	0.1
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	177	2.7	172	5.2	5	0.2
2007	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	6	1.3	4	1.7	2	0.9
	20-24	12	2.6	12	5.0	0	0.0
	25-29	16	3.6	16	6.9	0	0.0
	30-34	29	7.0	29	13.6	0	0.0
	35-39	36	7.7	35	14.7	1	0.4
	40-44	25	5.3	24	10.1	1	0.4
	45+	48	1.9	46	3.9	2	0.2
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	172	2.7	166	5.1	6	0.2
2006	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	5	1.1	5	2.1	0	0.0
	20-24	10	2.2	9	3.8	1	0.4
	25-29	18	4.2	17	7.7	1	0.5
	30-34	24	5.8	23	10.8	1	0.5
	35-39	27	5.9	27	11.5	0	0.0
	40-44	32	6.6	32	13.2	0	0.0
	45+	41	1.7	40	3.5	1	0.1
	Missing	2	0.0	2	0.0	0	0.0
	All Ages	159	2.5	155	4.9	4	0.1
2005	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	5	1.1	5	2.2	0	0.0
	20-24	24	5.3	22	9.5	2	0.9
	25-29	23	5.6	22	10.4	1	0.5
	30-34	17	4.0	17	7.9	0	0.0
	35-39	47	10.4	45	19.6	2	0.9
	40-44	37	7.5	37	15.0	0	0.0
	45+	24	1.0	23	2.1	1	0.1
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	178	2.8	171	5.5	6	0.2
2004	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	2	0.5	0	0.0	2	0.9
	20-24	18	4.1	18	8.0	0	0.0
	25-29	19	4.7	17	8.3	2	1.0
	30-34	32	7.4	32	14.4	0	0.0
	35-39	36	8.1	36	15.8	0	0.0
	40-44	29	5.9	27	10.8	2	0.8
	45+	15	0.7	15	1.4	0	0.0
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	151	2.4	145	4.7	6	0.2
2003	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	3	0.7	3	1.3	0	0.0
	20-24	7	1.6	7	3.2	0	0.0
	25-29	13	3.3	12	6.0	1	0.5
	30-34	22	5.0	21	9.3	1	0.5
	35-39	19	4.2	18	7.9	1	0.4
	40-44	10	2.0	10	4.0	0	0.0
	45+	9	0.4	8	0.8	1	0.1
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	83	1.4	79	2.6	4	0.1

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2002	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	1	0.2	1	0.4	0	0.0
	20-24	4	1.0	3	1.4	1	0.5
	25-29	11	2.8	11	5.5	0	0.0
	30-34	10	2.2	10	4.4	0	0.0
	35-39	21	4.5	21	9.0	0	0.0
	40-44	16	3.2	16	6.4	0	0.0
	45+	10	0.5	10	1.0	0	0.0
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	73	1.2	72	2.4	1	0.0
2001	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	4	0.9	1	0.4	3	1.4
	20-24	7	1.7	5	2.4	2	1.0
	25-29	8	2.0	8	4.0	0	0.0
	30-34	15	3.4	14	6.2	1	0.5
	35-39	9	1.9	9	3.8	0	0.0
	40-44	6	1.2	6	2.4	0	0.0
	45+	4	0.2	3	0.3	1	0.1
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	53	0.9	46	1.5	7	0.2
2000	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	3	0.7	1	0.5	2	1.0
	20-24	5	1.3	4	2.0	1	0.5
	25-29	11	2.7	11	5.3	0	0.0
	30-34	14	3.2	13	5.8	1	0.5
	35-39	14	2.9	12	4.9	2	0.8
	40-44	10	2.0	9	3.7	1	0.4
	45+	14	0.7	13	1.4	1	0.1
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	71	1.2	63	2.1	8	0.3
1999	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	1	0.2	1	0.5	0	0.0
	20-24	2	0.5	2	1.0	0	0.0
	25-29	15	3.7	15	7.2	0	0.0
	30-34	20	4.6	19	8.5	1	0.5
	35-39	18	3.7	17	6.9	1	0.4
	40-44	15	3.1	14	5.8	1	0.4
	45+	6	0.3	6	0.7	0	0.0
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	77	1.3	74	2.5	3	0.1
1998	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	3	0.7	2	0.9	1	0.5
	20-24	2	0.6	2	1.1	0	0.0
	25-29	11	2.6	7	3.3	4	2.0
	30-34	8	1.8	8	3.6	0	0.0
	35-39	7	1.4	7	2.8	0	0.0
	40-44	5	1.0	4	1.7	1	0.4
	45+	6	0.3	6	0.7	0	0.0
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	42	0.7	36	1.3	6	0.2
1997	0-9	0	0.0	0	0.0	0	0.0
	10-14	0	0.0	0	0.0	0	0.0
	15-19	2	0.5	1	0.5	1	0.5
	20-24	6	1.7	3	1.6	3	1.7
	25-29	3	0.7	0	0.0	3	1.5
	30-34	1	0.2	0	0.0	1	0.5
	35-39	1	0.2	1	0.4	0	0.0
	40-44	2	0.4	1	0.4	1	0.4
	45+	4	0.2	4	0.5	0	0.0
	Missing	0	0.0	0	0.0	0	0.0
	All Ages	19	0.3	10	0.4	9	0.3

Table 9 - Initial Genital Herpes Cases Diagnosed and Incidence Rate by Age Group and Gender, 1997 - 2008

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2008	0-9	0	0.0	0	0.0	0	0.0
	10-14	8	1.8	2	0.9	6	2.8
	15-19	277	58.7	24	9.9	253	110.2
	20-24	542	114.2	130	53.5	412	178.0
	25-29	386	82.5	110	45.8	276	121.3
	30-34	208	49.2	76	35.1	132	64.0
	35-39	144	31.1	50	21.1	94	41.6
	40-44	112	24.1	38	16.2	74	32.3
	45+	239	9.5	69	5.7	170	12.9
	Missing	31	0.0	8	0.0	23	0.0
	All Ages	1971	29.9	507	15.4	1440	43.6
2007	0-9	4	0.5	0	0.0	4	1.0
	10-14	8	1.8	1	0.4	7	3.3
	15-19	291	62.2	32	13.3	259	113.7
	20-24	559	119.1	148	61.4	411	179.9
	25-29	351	78.0	114	49.4	237	108.1
	30-34	182	43.7	61	28.6	121	59.6
	35-39	148	31.8	49	20.6	99	43.6
	40-44	110	23.3	38	15.9	72	30.8
	45+	203	8.2	47	4.0	156	12.1
	Missing	72	0.0	22	0.0	50	0.0
	All Ages	1946	30.0	512	15.8	1416	43.5
2006	0-9	3	0.4	1	0.2	2	0.5
	10-14	6	1.4	0	0.0	6	2.8
	15-19	330	71.8	34	14.4	296	132.3
	20-24	733	158.8	169	71.2	564	251.6
	25-29	477	110.5	139	62.8	338	160.6
	30-34	240	57.7	68	32.0	172	84.7
	35-39	162	35.2	53	22.6	109	48.4
	40-44	122	25.3	37	15.2	85	35.5
	45+	296	12.4	75	6.6	221	17.6
	Missing	55	0.0	18	0.0	37	0.0
	All Ages	2424	38.0	594	18.7	1830	57.2
2005	0-9	3	0.4	1	0.2	2	0.5
	10-14	9	2.0	0	0.0	9	4.2
	15-19	361	80.2	35	15.2	326	148.4
	20-24	676	150.6	157	68.0	519	238.0
	25-29	393	95.4	141	66.6	252	125.7
	30-34	249	58.9	92	42.6	157	76.1
	35-39	176	39.1	57	24.8	119	53.9
	40-44	138	28.1	46	18.6	92	37.7
	45+	246	10.6	65	5.9	181	14.9
	Missing	54	0.0	19	0.0	35	0.0
	All Ages	2305	36.8	613	19.7	1692	53.9
2004	0-9	2	0.2	1	0.2	1	0.3
	10-14	7	1.6	0	0.0	7	3.2
	15-19	381	86.0	46	20.3	335	155.1
	20-24	645	146.7	146	64.5	499	233.8
	25-29	370	92.4	97	47.2	273	140.1
	30-34	192	44.3	76	34.3	116	54.8
	35-39	161	36.0	57	25.1	104	47.4
	40-44	126	25.4	53	21.3	73	29.6
	45+	206	9.1	61	5.7	145	12.3
	Missing	58	0.0	17	0.0	41	0.0
	All Ages	2148	34.8	554	18.0	1594	51.5
2003	0-9	0	0.0	0	0.0	0	0.0
	10-14	11	2.5	0	0.0	11	5.1
	15-19	358	81.5	33	14.6	325	151.9
	20-24	588	137.2	128	58.0	460	221.2
	25-29	381	97.0	122	60.6	259	135.3
	30-34	208	47.1	83	36.7	125	58.0
	35-39	149	32.9	51	22.2	98	43.9
	40-44	92	18.6	33	13.3	59	23.9
	45+	182	8.3	53	5.1	129	11.2
	Missing	76	0.0	16	0.0	60	0.0
	All Ages	2045	33.5	519	17.1	1526	49.9

	Age Group	Total		Males		Females	
		Cases	Rate	Cases	Rate	Cases	Rate
2002	0-9	0	0.0	0	0.0	0	0.0
	10-14	5	1.1	0	0.0	5	2.3
	15-19	318	72.6	46	20.4	272	127.8
	20-24	560	134.4	156	72.9	404	199.4
	25-29	305	78.1	104	51.9	201	105.6
	30-34	219	48.9	76	33.1	143	65.5
	35-39	143	30.9	62	26.5	81	35.5
	40-44	113	22.7	43	17.2	70	28.3
	45+	191	9.0	65	6.4	126	11.3
	Missing	60	0.0	15	0.0	45	0.0
	All Ages	1914	31.7	567	18.8	1347	44.4
2001	0-9	0	0.0	0	0.0	0	0.0
	10-14	10	2.3	1	0.4	9	4.2
	15-19	276	63.5	37	16.5	239	113.3
	20-24	497	122.9	122	58.8	375	190.7
	25-29	306	77.6	107	53.0	199	103.6
	30-34	206	46.3	75	32.9	131	60.3
	35-39	156	32.9	62	25.9	94	40.1
	40-44	111	22.4	36	14.5	75	30.4
	45+	182	8.8	48	4.9	134	12.3
	Missing	57	0.0	17	0.0	40	0.0
	All Ages	1801	30.1	505	17.0	1296	43.2
2000	0-9	3	0.4	2	0.5	1	0.3
	10-14	15	3.4	0	0.0	15	7.1
	15-19	346	80.8	37	16.8	309	148.9
	20-24	538	137.9	136	67.7	402	212.3
	25-29	362	89.7	116	56.1	246	125.0
	30-34	187	42.7	53	23.7	134	62.6
	35-39	171	35.3	68	27.9	103	42.9
	40-44	108	22.0	34	13.8	74	30.2
	45+	150	7.5	45	4.7	105	9.9
	Missing	48	0.0	13	0.0	35	0.0
	All Ages	1928	32.7	504	17.2	1424	48.1
1999	0-9	1	0.1	0	0.0	1	0.2
	10-14	13	3.0	0	0.0	13	6.2
	15-19	326	76.1	57	25.8	269	129.8
	20-24	563	150.4	133	69.0	430	236.7
	25-29	346	84.6	124	59.2	222	111.3
	30-34	227	52.1	86	38.4	141	66.5
	35-39	146	29.9	51	20.7	95	39.2
	40-44	117	24.1	44	18.1	73	30.0
	45+	159	8.2	38	4.1	121	11.8
	Missing	83	0.0	22	0.0	61	0.0
	All Ages	1981	34.0	555	19.1	1426	48.7
1998	0-9	2	0.2	1	0.2	1	0.2
	10-14	7	1.7	0	0.0	7	3.4
	15-19	275	65.9	34	15.8	241	119.4
	20-24	452	124.7	95	50.8	357	203.3
	25-29	376	89.5	122	56.7	254	124.2
	30-34	214	48.7	74	33.0	140	65.3
	35-39	138	28.3	52	21.2	86	35.5
	40-44	92	19.2	29	12.1	63	26.2
	45+	159	8.4	43	4.8	116	11.7
	Missing	107	0.0	26	0.0	81	0.0
	All Ages	1822	31.7	476	16.6	1346	46.6
1997	0-9	5	0.6	2	0.5	3	0.7
	10-14	6	1.4	1	0.5	5	2.4
	15-19	304	75.7	34	16.4	270	138.8
	20-24	506	142.4	144	78.7	362	210.3
	25-29	403	95.3	130	59.9	273	132.7
	30-34	218	48.6	81	35.4	137	62.4
	35-39	140	28.8	56	22.9	84	34.7
	40-44	72	15.2	22	9.3	50	21.1
	45+	138	7.6	47	5.5	91	9.4
	Missing	103	0.0	37	0.0	66	0.0
	All Ages	1895	33.5	554	19.6	1341	47.2

Summary of 2006 Treatment Guidelines

DISEASE	RECOMMENDED RX	DOSE/ROUTE	ALTERNATIVES
CHLAMYDIAL INFECTIONS[1] Adults or Adolescents with uncomplicated infection of the cervix, urethra or rectum. Pregnant women[7]	Azithromycin[2] OR Doxycycline[3]	1 g orally in a single dose 100 mg orally 2x/day for 7 days	Erythromycin base 500 mg orally 4x/day for 7 days OR Erythromycin ethylsuccinate 800 mg orally 4x/day for 7 days OR Ofloxacin[3] 300 mg orally 2x/day for 7 days OR Levofloxacin[3] 500 mg orally once daily for 7 days Note[4]
GONOCOCCAL INFECTIONS[5] Adults or Adolescents with uncomplicated infection of the cervix, urethra or rectum. [Drugs with * designation are recommended for treatment of pharyngeal infection with *Neisseria gonorrhoeae*] Pregnant women[7]	*Ceftriaxone OR Cefpodoxime [8] OR Cefixime PLUS, IF CHLAMYDIAL INFECTION IS NOT RULED OUT Azithromycin[2] OR Doxycycline[3]	125 mg IM in a single dose 400 mg orally in a single dose 400 mg orally in a single dose 1 g orally in a single dose 100 mg orally 2x/day for 7 days	Ofloxacin 400 mg orally in a single dose[**] OR Levofloxacin 250 mg orally in a single dose[**] OR Spectinomycin[6] 2 g IM in a single dose OR *Ciprofloxacin 500 mg orally in single dose[**] **Since March 2, 2004, Health care providers in Washington State should no longer use fluoroquinolones as first line therapy due to increased prevalence of quinolone-resistant *Neisseria gonorrhoeae* (QRNG) in Washington state. If quinolones are used due to patient allergy or other contraindications, follow treatment with a test of cure.
NONGONOCOCCAL URETHRITIS (NGU)	Azithromycin OR Doxycycline	1 g orally in a single dose 100 mg orally 2x/day for 7 days	Erythromycin base 500 mg orally 4x/day for 7 days OR Erythromycin ethylsuccinate 800 mg orally 4x/day for 7 days OR Ofloxacin 300 mg orally 2x/day for 7 days OR Levofloxacin 500 mg orally once daily for 7 days
EPIDIDYMITIS[10]	Ceftriaxone PLUS Doxycycline (For acute epididymitis most likely caused by gonococcal or chlamydial infection)	250 mg IM in a single dose 100 mg orally 2x/day for 10 days	Ofloxacin 300 mg orally 2x/day for 10 days OR Levofloxacin 500 mg orally once daily for 10 days (For acute epididymitis most likely caused by enteric organisms or for patients allergic to cephalosporins and/or tetracyclines)
PELVIC INFLAMMATORY DISEASE[7,9,10] **Outpatient management** Pregnant women[7]	Ofloxacin[3,9] WITH OR WITHOUT Metronidazole[11] OR Levofloxacin[3,9] WITH OR WITHOUT Metronidazole[11] OR Ceftriaxone PLUS Doxycycline[3] WITH OR WITHOUT Metronidazole[11] OR Cefoxitin AND Probenecid PLUS Doxycycline[3] WITH OR WITHOUT Metronidazole[11]	400 mg orally 2x/day for 14 days 500 mg orally 2x/day for 14 days 500 mg orally once daily for 14 days 500 mg orally 2x/day for 14 days 250 mg IM in a single dose 100 mg orally 2x/day for 14 days 500 mg orally 2x/day for 14 days 2 g IM in a single dose 1 g orally in a single dose concurrently 100 mg orally 2x/day for 14 days 500 mg orally 2x/day for 14 days	
SYPHILIS[7] Early-primary, secondary or latent < 1 year	Benzathine penicillin G	2.4 million units IM in a single dose	Doxycycline[3,12,13] 100 mg orally 2x/day for 14 days OR Tetracycline[3,12,13] 500 mg orally 4x/day for 14 days
Latent > 1 year, latent of unknown duration, tertiary (cardiovascular, gummatous)	Benzathine penicillin G	2.4 million units IM for 3 doses at 1 week intervals (7.2 million units total)	Doxycycline[3,12,13] 100 mg orally 2x/day for 28 days OR Tetracycline[3,12,13] 500 mg orally 4x/day for 28 days
HUMAN PAPILLOMAVIRUS External genital and perianal warts Pregnant women[7]	<u>Patient Applied</u> Podofilox 0.5%[14] solution or gel OR Imiquimod 5%[14] cream OR <u>Provider Applied</u> Cryotherapy with Liquid nitrogen or cryoprobe OR Podophyllin resin 10%-25%[14] OR Trichloroacetic acid or Bichloroacetic acid 80%-90% OR Surgical removal	 Apply to visible warts 2x/day for 3 days, rest 4 days, 4 cycles max. Apply once daily at bedtime, wash off with soap after 6-10 hours. Use 3x/week for up to 16 weeks. Repeat application every 1-2 weeks. Apply small amount, dry, wash off in 1-4 hours. Repeat weekly if necessary. Apply small amount, dry. Apply weekly if necessary.	Intralesional interferon OR Laser surgery
TRICHOMONIASIS	Metronidazole[11] OR Tinidazole[11]	2 g orally in a single dose 2 g orally in a single dose	Metronidazole[11] 500 mg 2x/day for 7 days
BACTERIAL VAGINOSIS Pregnant women[7]	Metronidazole[11] OR Metronidazole gel 0.75%	500 mg orally 2x/day for 7 days One full applicator (5 g) intravaginally once a	Clindamycin 300 mg orally 2x/day for 7 days OR

These guidelines for the treatment of patients with STDs reflect the 2006 <u>CDC Sexually Transmitted Diseases Treatment Guidelines</u>. They are intended as a brief source of clinical guidance; they are <u>not</u> a comprehensive list of all effective regimens, and should not be construed as standards. The focus is primarily on STDs encountered in office practice and treatment regimens for infants, children, HIV infected patients, or pregnant women are not included (see complete Guidelines). The complete guidelines are available from the STD Program at (360) 236-3460 or the website <u>www.doh.wa.gov/cfh/STD</u>. Confidential notification of sexual partners is an important component of STD treatment.

BACTERIAL VAGINOSIS	Metronidazole[11]	OR	500 mg orally 2x/day for 7 days	Clindamycin 300 mg orally 2x/day for 7 days
Pregnant women[7]	Metronidazole gel 0.75%		One full applicator (5 g) intravaginally once a day for 5 days	OR Clindamycin ovules[15] 100 g intravaginally once at bedtime for 3 days
	Clindamycin cream 2%[15]	OR	One full applicator (5 g) intravaginally at bedtime for 7 days	
VULVOVAGINAL CANDIDIASIS	Butoconazole[15]	OR	2% cream 5 g intravaginally for 3 days	
Uncomplicated – see complete guidelines for recurrent, severe or nonalbicans	Butoconazole[15]	OR	2% cream 5 g (Butaconazole1-sustained release), single intravaginal application	
Pregnant women[7]	Clotrimazole[15]	OR	1% cream 5 g intravaginally for 7-14 days	
	Clotrimazole[15]	OR	100 mg vaginal tablet for 7 days	
	Clotrimazole[15]	OR	100 mg vaginal tablet, 2 tablets for 3 days	
	Miconazole[15]	OR	2% cream 5 g intravaginally for 7 days	
	Miconazole[15]	OR	100 mg vaginal suppository, one suppository for 7 days	
	Miconazole[15]	OR	200 mg vaginal suppository, one suppository for 3 days	
	Miconazole [15]	OR	1200 mg vaginal suppository, one suppository a day	
	Nystatin[15]	OR	100,000 U vaginal tablet, 1 tablet for 14 days	
	Tioconazole[15]	OR	6.5% ointment 5 g intravaginally in a single application	
	Terconazole[15]	OR	0.4% cream 5 g intravaginally for 7 days	
	Terconazole[15]	OR	0.8% cream 5 g intravaginally for 3 days	
	Terconazole[15]	OR	80 mg vaginal suppository, one suppository for 3 days	
	Fluconazole[3]		150 mg oral tablet, one tablet in a single dose	
GENITAL HERPES SIMPLEX	Acyclovir[14]	OR	400 mg orally 3x/day for 7-10 days[16]	
First clinical episode of genital herpes	Acyclovir[14]	OR	200 mg orally 5x/day for 7-10 days[16]	
	Famciclovir[14]	OR	250 mg orally 3x/day for 7-10 days[16]	
	Valacyclovir[14]		1 g orally 2x/day for 7-10 days[15]	
Episodic recurrent infection	Acyclovir[14]	OR	400 mg orally 3x/day for 5 days	
	Acyclovir[14]	OR	800 mg orally 3x/day for 2 days	
	Acyclovir[14]	OR	800 mg orally 2x/day for 5 days	
	Famciclovir[14]	OR	125 mg orally 2x/day for 5 days	
	Famciclovir [14]	OR	1000mg orally 2x/day for 1 day	
	Valacyclovir[14]	OR	500 mg orally 2x/day for 3 days	
	Valacyclovir[14]		1 g orally once a day for 5 days	
Suppressive therapy[17]	Acyclovir[14]	OR	400 mg orally 2x/day	
	Famciclovir[14]	OR	250 mg orally 2x/day	
	Valacyclovir[14]	OR	500 mg orally once a day	
	Valacyclovir[14]		1 g orally once a day	
PEDICULOSIS PUBIS	Permethrin 1% creme rinse	OR	Apply to affected area, wash off after 10 minutes	Malathion .5% lotion applied for 8-12 hours and washed off OR Ivermectin 250 ug/kg repeated in 2 weeks
	Pyrethrins with Piperonyl Butoxide		Apply to affected area, wash off after 10 minutes	
SCABIES	Permethrin 5% cream	OR	Apply to all areas of body from neck down, wash off after 8-14 hours	Lindane 1%[18] 1 oz. of lotion or 30 g of cream, applied thinly to all areas of the body from the neck down, wash off after 8 hours
	Ivermectin		200ug/kg orally, repeated in 2 weeks	

1. Providers should advise all women with chlamydial infection to be rescreened 3 months after treatment, to rule out subsequent reinfection.
2. Clinical experience and studies suggest that azithromycin is safe and effective for use in pregnant women.
3. **Contraindicated during pregnancy.**
4. Quinolones other than ofloxacin and levofloxacin are not reliably effective against chlamydial infection or have not been adequately evaluated.
5. Patients with gonococcal infection should be tested or presumptively treated for chlamydial infection.
6. For patients who cannot tolerate cephalosporins or quinolones.
7. Please refer to the complete 2006 CDC Guidelines for recommended regimens.
8. Washington State STD guidelines recommend cefpodoxime as first line of therapy due to quinolone-resistant *Neisseria gonorrhoeae* (QRNG) and limited supply of cefixime.
9. Quinolones should not be used for gonococcal infections in MSM or in those with a history of recent foreign travel or partners' travel, infections acquired in California or Hawaii, or in other areas including Washington State with increased QRNG prevalence.
10. Patients who do not respond to oral therapy (within 72 hours for PID or epididymitis) should be re-evaluated.
11. Patients should be advised to avoid consuming alcohol during treatment.
12. No alternatives to penicillin have been proven effective for treatment of syphilis during pregnancy. Close serological and clinical follow-up should be undertaken with these therapies
13. Patients with penicillin allergy whose compliance with therapy and/or clinical and serological follow-up cannot be ensured should be desensitized and treated with benzathine penicillin.
14. Safety during pregnancy not established.
15. These creams and suppositories are oil-based and may weaken latex condoms and diaphragms. Refer to product labeling for further information.
16. Treatment may be extended if healing is incomplete after 10 days of therapy.
17. During suppressive treatment (e.g., once a year) discontinuation of therapy should be discussed with patient to reassess the need for continued therapy.
18. Should not be used immediately after a bath or shower, and should not be used by persons who have extensive dermatitis, pregnant or lactating women, or children aged <2 years.

Updated recommended treatment regimens for gonococcal infections in the United States, April 2007

Ongoing data from CDC 's Gonococcal Isolate Surveillance Project, including preliminary findings from 2006, demonstrate that fluoroquinolone-resistant gonorrhea is continuing to spread and is now widespread in the United States. As a consequence, and as reported in the MMWR, April 13, 2007, this class of antibiotics is no longer recommended for the treatment of gonorrhea in the United States. Treatment recommendations have been updated accordingly, and are provided below.

Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum*

Recommended Regimens

Ceftriaxone 125 mg IM in a single dose **OR**
Cefixime 400 mg orally in a single dose or 400 mg by suspension (200 mg/5ml)

PLUS

TREATMENT FOR CHLAMYDIA IF CHLAMYDIAL INFECTION IS NOT RULED OUT

Alternative Regimens

Spectinomycin† 2 g in a single intramuscular (IM) dose **OR**
Single-dose cephalosporin regimens

Other single-dose cephalosporin therapies that are considered alternative treatment regimens for uncomplicated urogenital and anorectal gonococcal infections include ceftizoxime 500 mg IM; or cefoxitin 2 g IM, administered with probenecid 1 g orally; or cefotaxime 500 mg IM. Some evidence indicates that cefpodoxime 400 mg and cefuroxime axetil 1 g might be oral alternatives.

Uncomplicated Gonococcal Infections of the Pharynx*

Recommended Regimens

Ceftriaxone 125 mg IM in a single dose

PLUS

TREATMENT FOR CHLAMYDIA IF CHLAMYDIAL INFECTION IS NOT RULED OUT

* These regimens are recommended for all adult and adolescent patients, regardless of travel history or sexual behavior. Source: CDC/NCHHSTP/DSTDP http://www.cdc.gov/STD/treatment/ 4/12/2007

†Spectinomycin is currently not available in the United States.

Disseminated Gonococcal Infection (DGI)

Recommended Regimen

Ceftriaxone 1 g IM or IV every 24 hours

Alternative Regimens

Cefotaxime 1 g IV every 8 hours **OR**
Ceftizoxime 1 g IV every 8 hours **OR**
Spectinomycin † 2 g IM every 12 hours

A cephalosporin-based intravenous regimen is recommended for the initial treatment of DGI. This is particularly important when gonorrhea is detected at mucosal sites by nonculture tests. Spectinomycin is not currently available in the United States; updated information regarding its availability can be found at http://www.cdc.gov/std/gonorrhea/arg. Treatment should be continued for 24–48 hours after clinical improvement, at which time therapy may be switched to one of the following regimens to complete at least 1 week of antimicrobial therapy.

Cefixime 400 mg orally twice daily **OR**
Cefixime suspension 400 mg by suspension (200 mg/5ml) twice daily **OR**
Cefpodoxime 400 mg orally twice daily

Fluoroquinolones may be an alternative treatment option if antimicrobial susceptibility can be documented by culture. With use of nonculture tests to diagnose *N. gonorrhoeae* increasing and with local data on antimicrobial susceptibility less available, laboratories should maintain the capacity to conduct such testing or form partnerships with laboratories that can.

†Spectinomycin is currently not available in the United States.

Bibliography

Centers for Disease Control And Prevention, *Sexually Transmitted Disease Surveillance 2006 Supplement, Gonococcal Isolate Surveillance Project (GISP), Annual Report 2006*, Atlanta, GA; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, April 2008 http://www.cdc.gov/std/stats/

Centers for Disease Control And Prevention, *Sexually Transmitted Disease Surveillance 2007*, Atlanta, GA; U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, December 2008
http://www.cdc.gov/std/stats/

Principles and Practices of Public Health Surveillance, ed. S. M. Teutsch and R. E. Churchill, 270. New York: Oxford University Press.

Groseclose SL, Samuel MC, Weinstock H. "Surveillance for Sexually Transmitted Diseases" in *Infectious Disease Surveillance*; Nkuchia M'ikanatha, Ruth Lynfield, Chris Van Beneden & Henriette de Valk, editors. Blackwell, London, United Kingdom, 2007

Heymann, D. L. 2004. *Control of Communicable Diseases Manual.* 18th Edition, Washington, DC: American Public Health Association.

Last, JM., ed. A Dictionary of Epidemiology, Oxford University Press, 2001

Holmes, KK, Mardh, PA, Sparling, PF, Lemon, SM, Stamm, WE, Piot, P, Wasserheit, JN, eds. S*exually Transmitted Diseases*, 3rd Edition, McGraw-H[il]l, 1999

Eng, TR, Butler, W, ed. *The Hidden Epidemic, Confronting Sexually Transmitted Diseases*, National Academy Press, Washington DC, 1997

Page, RM, Cole, GE, Timmreck, TC, *Basic Epidemiological Methods and Biostatistics*, Jones and Bartlett, Sudbury, MA, 1995

An Integrated Approach to Communicable Disease Surveillance *Weekly Epidemiological Record* 75: 1 1 - 7, 2000

Sexually Transmitted Diseases in America: How Many Cases and at What Cost. Kaiser Family Foundation, Menlo Park, California, December 1998.

Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. Sex Transm Infect 1999;75:3-17.

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For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY 1-800-833-6388)

Field Note

"We... had a case of newborn chlamydial infection, lab confirmed. It occurred in a situation not too uncommon here in [our]County. The mother had received some prenatal care, had tested negative in early pregnancy, then developed an unusual discharge which she told her primary care provider about and was dismissed as typical in pregnancy.

She was not rescreened in late pregnancy, and so delivered an infant who was ill, and subsequently treated for chlamydial infection. At no time was the partner offered treatment...so the re-treatment of the mother and treatment of partner was done by the STD program at our Local Health Jurisdiction.

Although we don't have much newborn chlamydia, the pattern of not treating partners of women with lab positive chlamydia is very common, from the ERs to primary care providers, and OB's seem most reluctant to treat male partners of their patients. This means that our STD staff facilitate treatment for partners, and often re-treat the index cases due to the delay of partner treatment."

Public Health Nurse
Local Health Jurisdiction

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