Elimination and Reintroduction of Primary and Secondary Syphilis

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ABSTRACT

Objectives. This study was conducted to define factors associated with the epidemic spread, elimination, and reintroduction of primary and secondary syphilis in King County, Washington, from 1987 through 1998.

Methods. Reports of primary and secondary syphilis in King County from 1987 through 1998 were reviewed retrospectively.

Results. During the epidemic spread of syphilis, only 15.8% of cases were imported. A total of 24.0% of patients reported cocaine use, and 18.3% of female patients reported having commercial sex. During the elimination of syphilis, significantly higher percentages of cases were imported and lower percentages of patients reported cocaine use or female commercial sex. During the reintroduction of syphilis in 1997–1998, 68% of patients were men who reported sex with men; of this 68%, 66% were seropositive for HIV. Most men reporting sex with men were 30 years or older and recruited many anonymous partners.

Conclusions. As syphilis wanes, local control must focus on outbreaks following its reintroduction. Resurgence of syphilis among men reporting sex with men recapitulates the epidemiology of syphilis before the historical advent of AIDS, warranting immediate attention to this problem. (*Am J Public Health.* 1999;89:1093–1097)

In 1990, the annual incidence of reported primary and secondary syphilis in the United States reached its highest level since 1949, at 20.3 cases per 100 000 population. Its incidence then declined steadily, to 3.2 cases per 100 000 population in 1997, the lowest level since World War II.[1] Seventy-five percent of all US counties reported no primary or secondary syphilis in 1997. These trends have encouraged the Centers for Disease Control and Prevention to call for the elimination of syphilis in the United States.[2] Syphilis remains an important disease because of its potential for causing complications in pregnancy, in neonates, and in adults and because of the role of early syphilis as a cofactor in the transmission and acquisition of HIV.[3]

In King County, Washington, including Seattle, the annual incidence of primary and secondary syphilis per 100 000 population increased from 8.6 in 1987 to a peak of 20.6 in 1989, after which it decreased steadily to 0.06 per 100 000 in 1996. This was followed, however, by the reintroduction and local spread of infectious syphilis during 1997–1998.

To characterize the epidemiology of syphilis in King County and to understand factors associated with the epidemic spread, elimination, and subsequent reintroduction of the disease, we compared sociodemographic and behavioral characteristics of cases representing locally acquired or imported primary and secondary syphilis from 3 successive periods, each featuring distinctive epidemiologic patterns. Period I, the epidemic phase of the disease, extended from 1987 to 1991 and encompassed the 2 years before and after the 1989 local peak. Period II, the elimination phase, extended from 1992 to 1996, when rates of primary and secondary syphilis steadily declined. Period III, in 1997–1998, represented a period of reintroduction of primary and secondary syphilis.

Methods

Data Source

To obtain information on demographics, sexual behavior, and recent partners, we reviewed all Seattle–King County Department of Public Health (SKCDPH) records of reported cases of primary and secondary syphilis from 1987 through 1998. Interviews of infected individuals by disease intervention specialists from 1987 through 1996 included collection of data on sexual orientation, exchange of sex for drugs or money, and travel. Beginning in 1997 with the reintroduction of syphilis, disease intervention specialist interviewers also recorded the HIV infection status and partnership characteristics of patients with primary and secondary syphilis, including venues in which partners met.

Classification of Cases as Locally Acquired or Imported

Cases of syphilis were classified as locally acquired or imported according to the residence of the individual who was the likely source of infection. Imported cases were those involving individuals who had an infected source partner (i.e., the duration of the partner's syphilis was longer than that of the index patient's syphilis) residing outside King County or who had exposure to a nonresident of King County within the preceding 90 days and no exposure to a King County resident known to be infected. Locally acquired cases included those in which there was local first-generation spread of infection from a source contact as defined above or those in which there was known sexual exposure to an infected King County resident or only to King County residents. Anonymous partners whom patients met locally were assumed to reside locally. Available information was insufficient to classify 11 (1.7%) of

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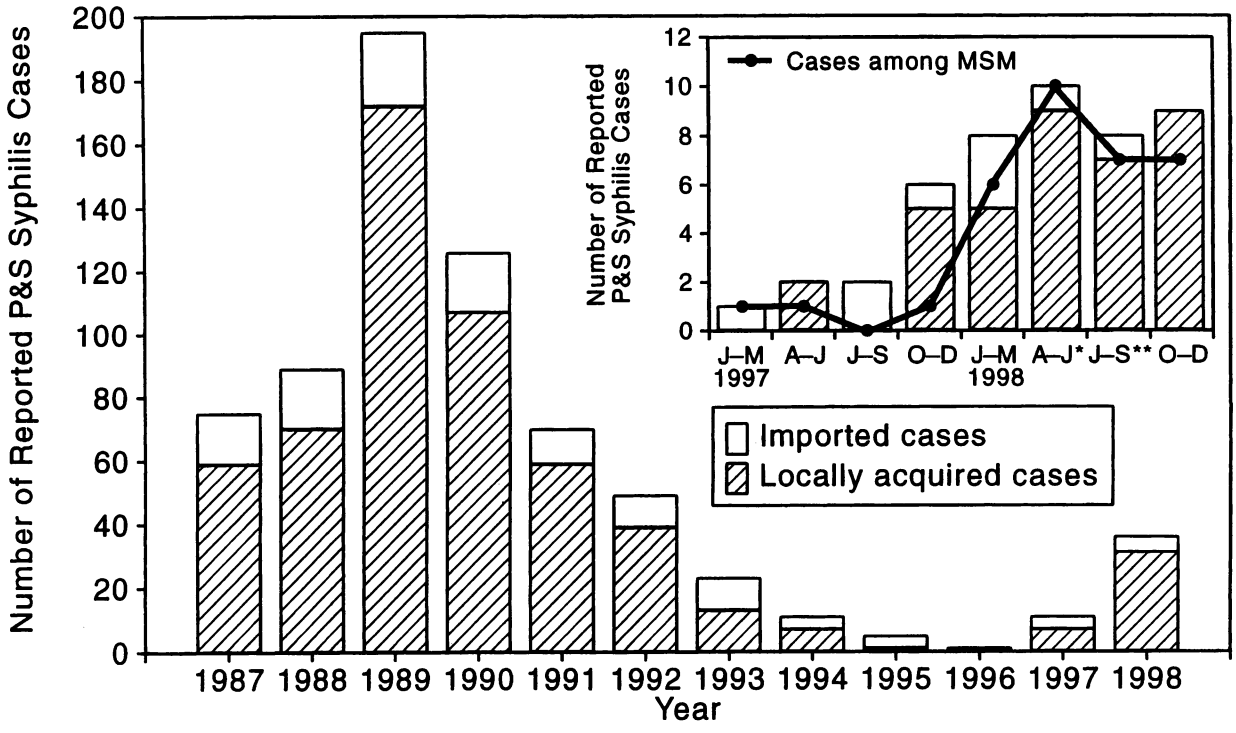
This paper was accepted January 1, 1999.

Editor's Note. Please see related editorial by Aral (p 995) in this issue.



Note. MSM = men reporting sex with men; J–M = January–March; A–J = April–June; J–S = July–September; O–D = October–December.
*Importation status unknown for 2 cases.
**Importation status and sexual orientations unknown for 1 case.

FIGURE 1—Imported and locally acquired cases of primary and secondary (P&S) syphilis by year: King County, Washington, 1987–1998.

655 cases during periods I and II and 4 (8.5%) of 47 cases during period III.

Statistical Analysis

We used SPSS-PC (SPSS Inc, Chicago, Ill) and Epi Info Version 6.02 (Centers for Disease Control and Prevention, Atlanta, Ga) software systems and the χ^2 or Fisher exact test to compare frequencies of dichotomous variables. We used parametric or nonparametric methods, as appropriate, to assess continuous variables and stratified analyses to adjust for covariates (e.g., period of report).

Results

Locally acquired cases accounted for 467 (84%) of 555 cases of primary and secondary syphilis during period I. The incidence of locally acquired cases then declined during period II to 0% in 1996 (Figure 1). Of 43 cases of primary and secondary syphilis classifiable as locally acquired or imported during period III, 5 (42%) of 12 cases in 1997 were imported, vs 5 (16%) of 31 cases in 1998.

Characteristics of Persons With Primary and Secondary Syphilis

Younger individuals accounted for higher proportions of cases of primary and secondary syphilis during periods I and II than during period III, and African Americans accounted for 62% and 56% of cases during periods I and II, respectively, but only 4% of cases during period III (Table 1). Annual rates of disease per 100 000 African Americans declined from 297.9 in period I to 33.1 in period II and to 7.0 in period III.

During period I, cocaine use was reported by the patients in 24% of all cases, a significantly greater proportion than during period II (6%) and a greater proportion than during period III (9%). The proportion of female patients who acknowledged having commercial sex was higher during period I than during period II ($P = .09$). Men accounted for a higher proportion of cases during period III than during periods I or II, and 32 (84%) of 38 male patients who reported their sexual orientation during period III reported having sex with men, as compared with only 16% and 21% of male patients during periods I and II, respectively ($P < .001$ for both comparisons). Of the 32 men who reported sex with men during period III, 25 (78%) were aged 30 years or older.

During period III, 43 patients provided information about partners to assist with sex partner referral, acknowledging 400 sexual partnerships from the time (mean = 4.5 months) at which syphilis may have been acquired and could have been transmitted to the time at which it was treated. Of these 400 partnerships, 318 (80%) involved anonymous partners encountered in high-risk venues such as bathhouses who could not be located through traditional contact-tracing methods. Follow-up of the remaining 82 partners revealed or led to medical evaluation of 52, of whom 10 (19%) were syphilis seropositive. During period III, 36 patients, including 32 men who had sex with men, underwent HIV testing. Of these 36 patients, 21 (58%) were HIV seropositive. Of the 32 men reporting sex with men, 21 (66%) were HIV seropositive.

Comparison of Imported and Locally Acquired Cases

During periods I and II, patients with imported cases of primary and secondary syphilis differed from those with locally acquired cases in more often being 40 years or older, male, and of racial groups other than African American ($P<.05$ for each comparison) (Table 2). Patients in imported cases reported cocaine use significantly less often than did those in locally acquired cases. During period III, patients with imported cases again were more often 40 years or older (7 of 10 imported vs 8 of 33 locally acquired cases, $P=.02$).

Of 29 patients with primary and secondary syphilis imported during period II, 19 (68%) reported no sexual contact with King County residents before treatment; the remaining 10 patients reported no more than 1 local sexual contact before treatment. Of the 5 patients with imported cases of syphilis during 1997, 4 reported at least 1 local sexual contact before treatment.

Discussion

Changing rates of primary and secondary syphilis depend on multiple factors that influence the average rates of exposure of susceptible persons to infected ones, the rates of acquisition of infection by those exposed, and the duration of infectiousness among those infected. In King County during period I of our study, the rate of primary and secondary syphilis peaked in 1989, reaching a level unmatched since the late 1970s. This increase in the disease rate largely involved the heterosexual transmission of syphilis among African Americans, apparently fueled by illicit drug use and related commercial sex. The subsequent dramatic decline in the disease rate during period II represented a historic achievement, with the elimination, at least in 1996, of endemic transmission of syphilis in King County. During period II, reduced use of crack cocaine on the West Coast during the 1990s,[4] probably coupled with less frequent unprotected sexual exposure resulting from AIDS-related risk-reduction programs as well as with greater public health efforts to control syphilis, may have contributed to elimination of the disease.[5]

During period III, the reintroduction of infectious syphilis led to its sustained transmission among men who have sex with men, who often reported anonymous sex with many male partners encountered in high-risk venues. This provides a disturbing parallel to the epidemiology of primary and secondary syphilis during the pre-AIDS era in Washington State, when the proportion of men with primary and secondary syphilis who reported having male sex partners increased from 31% in 1960 to about 81% in 1973 but then fell to a low of 8% in 1988.[6]

TABLE 1—Comparison of Sociodemographic and Behavioral Characteristics of Primary and Secondary Syphilis Cases During 1987–1991, 1992–1996, and 1997–1998: King County, Washington

	Proportion of Case Patients With Each Characteristic (%)		
	Period I: 1987–1991, No. (%)	Period II: 1992–1996, No. (%)	Period III: 1997–1998, No. (%)
Total cases	565	90	47
Gender, male	337/563 (59.9)	57/90 (63.3)	39/47 (83.0)**
Age, y			
<30	314/563 (55.8)	52/89 (58.4)	15/47 (31.9)
30–39	170/563 (30.2)	28/89 (31.5)	16/47 (34.0)
≥40	79/563 (14.0)	9/90 (10.0)	16/47 (34.0)**
Race/ethnicity			
African American	347/563 (61.6)	50/90 (55.6)	2/47 (4.3)**
White	142/563 (25.2)	20/90 (22.2)	35/47 (74.5)**
Hispanic	52/563 (9.2)	11/90 (12.2)	6/47 (12.8)
American Indian/ Alaskan Native	16/563 (2.8)	5/90 (5.6)	1/47 (2.1)
Asian/Pacific Islander	6/563 (1.1)	4/90 (4.4)	4/47 (8.5)
Female sex workers	40/226 (17/7)	1/27 (3.7)*	2/8 (25.0)
Cocaine use	116/484 (24.0)	5/79 (6.3)***	4/43 (9.3)
MSM	51/337 (15.1)	12/57 (21.1)	32/38 (84.2)**
Imported[a]	88/555 (15.9)	29/89 (32.6)***	10/43 (23.3)

Note. Female sex workers = proportion (%) of females reporting commercial sex; MSM = proportion (%) of men reporting sex with men.
*$P=.09$, period II compared with period I.
**Period III differed significantly ($P<.05$) from both period I and period II.
***$P<.001$, period II compared with period I.
[a]See text for definition.

TABLE 2—Sociodemographic and Behavioral Characteristics of Imported vs Locally Acquired Cases of Primary and Secondary Syphilis: King County, Washington, 1987–1996

	Proportion of Case Patients With Each Characteristic (%)	
	Imported	Locally Acquired
Total cases	117	527
Age, y		
<29	59/116 (50.9)	303/526 (57.6)
30–39	35/116 (30.2)	161/526 (30.6)
≥40	22/116 (19.0)*	62/526 (11.8)
Gender, male	95/117 (81.2)*	292/527 (55.4)
Race/ethnicity		
African American	42/117 (35.9)*	350/526 (66.5)
White	45/117 (38.5)*	114/526 (21.7)
Hispanic	19/117 (16.2)*	42/526 (8.0)
American Indian/ Alaskan Native	7 (6.0)	14/526 (2.7)
Asian/Pacific Islander	4 (3.4)	6/526 (1.1)
Female sex workers	3/20 (15.0)	38/224 (17.0)
Cocaine use	7/99 (7.0)*	114/476 (24.0)
MSM	22/94 (23.4)*	40/290 (13.8)

Note. Female sex workers = proportion (%) of females reporting commercial sex; MSM = proportion (%) of men reporting sex with men.
*$P<.05$, imported vs locally acquired, with adjustment for time period (analysis limited to periods I and II).

Our study, based on reported cases of syphilis, could have underestimated the total disease burden in the community. In Washington State, however, clinical laboratories must report positive serologic tests for syphilis and forward positive serum samples to public health laboratories for confirmatory testing. Therefore, the reporting of patients seropositive for syphilis during the time covered by our study was probably complete. Physician permission for public health workers to contact patients with syphilis is seldom withheld. In 1997–1998, for example, permission was granted to contact all 47 reported individuals with primary and secondary syphilis, and 43 (91%) of these patients were contacted and interviewed.

Infectious syphilis in the United States increasingly includes unique and often distinctive patterns of transmission of the disease in different parts of the country. For example, the current profile of syphilis in King County does not resemble that recently reported for an outbreak predominantly involving heterosexual African Americans in Baltimore.[7] Nonetheless, the shifting patterns of transmission of syphilis in King County, including the newly emerging pattern among men reporting sex with men, have several important implications for preventing and controlling the disease in the United States, particularly in view of the contemplated elimination of syphilis.[2]

First, the inverse relationship between the rate of syphilis in the United States and the level of federal funding for syphilis control, known as "Brown's Law," emphasizes the importance of sustaining efforts to control sexually transmitted diseases (STDs).[8] In this regard, several reports have cited the effect of STD program interventions on the control of epidemics of early syphilis.[9–12] The SKCDPH STD program provides low-cost, confidential clinical services to individuals who are or may be infected, with sensitivity to alternative lifestyles. The program also provides counseling of persons at risk, partner notification and treatment, and health education. During period II of our study, the high proportion of imported cases for which there were no additional local sexual contacts before treatment suggests that during that period, most patients with imported primary and secondary syphilis were identified at an early stage of the disease.

Second, with the progressive elimination of syphilis throughout much of the United States and other industrialized countries, many regions of the United States, such as King County, must reorient their syphilis-prevention activities away from such traditional interventions as nontargeted screening, which has a diminishing yield, and toward the early detection and rapid control of outbreaks arising from newly imported infections. In the past, preventing the endemic transmission of syphilis required screening of high-risk populations in many settings (e.g., STD clinics, jails, juvenile detention facilities, and sites of prenatal care).

By contrast, future screening done for the rapid control of small outbreaks of imported disease might best be focused on mobile populations or subpopulations directly involved in the outbreak, although even such focused screening may have a low yield. During 1998, screening of 550 asymptomatic men reporting sex with men, in STD clinics or through outreach activities in Seattle sex clubs or bathhouses, yielded no newly identified infections (W. L. H. Whittington, unpublished data, 1998). Greater emphasis must be given to ensuring access to care for symptomatic persons with early infection and to identifying sexual networks involved in outbreaks in order to rapidly detect and treat exposed sexual contacts of infected persons. The need for outbreak-response plans, better methods for identifying sexual and social networks that may be involved in the spread of syphilis, and targeted community outreach programs is particularly important in the elimination phase of the disease.[13]

Additionally, the reemergence of local transmission of syphilis among men reporting sex with men, 66% of whom in our study were HIV infected, and which follows on the heels of the recent resurgence of gonorrhea among men reporting sex with men in the western United States,[14] has implications beyond the epidemiology of syphilis and gonorrhea. Available data do not directly indicate whether resurgent syphilis and gonorrhea represent chance reintroductions of these bacterial STDs into populations with stable levels of unsafe practices over time or, alternatively, whether the resurgence represents increasing levels of unsafe sex among some men reporting sex with men. At least 1 recent report has suggested that some men now more frequently use anonymous venues in which to recruit sex partners than was the case in the recent past.[15]

Explanations for relapsing sexual risk-taking practices among men reporting sex with men could include (1) diminished fear of having or transmitting HIV infection, as a result of the availability of more potent antiretroviral therapies[16]; (2) diminished fear of unprotected sexual intercourse, due to the availability of postexposure preventive treatment; and (3) a lower perceived level of risk or less concern among younger men who have sex with men, who know few HIV-infected older men who have sex with men. Our finding that in the outbreak we investigated 78% of syphilis-infected men who have sex with men were 30 years or older is noteworthy evidence that renewed risk-taking is not confined to younger men who have sex with men. Efforts to prevent unsafe sexual activity, especially by HIV-seropositive men who report sex with men, must be redoubled. □

Contributors

L. A. Williams initiated the research, designed the data collection system, and wrote the initial drafts of the manuscript. J. D. Klausner was responsible for further analysis of the data, contributed to the design of the approach that integrated periods I and II, and contributed to preparation of the manuscript. W. L. H. Whittington designed data collection methods for period III, contributed to the reanalysis of data from all periods, and participated in manuscript preparation. H. H. Handsfield participated in the initial design, in subsequent analyses of all data, and in manuscript preparation. C. Celum participated in design of period III activities, in data analysis, and in manuscript preparation. K. K. Holmes participated in design and supervision of the research, in all phases of data analysis, and in manuscript preparation. All 6 authors are guarantors of the integrity of the research.

Acknowledgments

This study was supported by STD/AIDS Postdoctoral Research Training grant A107140 from the National Institute of Allergy and Infectious Disease (NIAID) and by NIAID grant A131448 to the University of Washington STD Cooperative Research Center.

The authors thank Shirley Desmon, Tim Wolfe, and the staff at Harborview STD Clinic for assistance with record review and data collection and William Lafferty, MD, for access to King County population data resources.

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Name-Based Reporting of HIV-Positive Test Results as a Deterrent to Testing

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ABSTRACT

Objectives. This study evaluated attitudes toward name-based reporting of HIV.

Methods. One hundred thirty high-risk, male repeat testers received information on the public health benefits of name-based reporting and reported their intentions to test.

Results. Of the 67 men who were randomly selected and asked their intentions before hearing the benefits, 63% said they would not test if reporting were required. After hearing the benefits, 19% changed their minds ($P < .014$). Of the 63 men who were asked only after hearing the benefits, 44% would not test.

Conclusions. Implementing name-based reporting without working beforehand to change attitudes could undermine the benefits of both testing and HIV surveillance. (*Am J Public Health.* 1999;89:1097–1100)

Standard public health procedures for disease control include name-based reporting of infected individuals. This procedure requires medical providers and laboratories to report patients' names to local health departments.[1] Name-based reporting of persons with HIV infection has been widely debated since the HIV antibody test was first licensed.[2–9] Recent improvements in the treatment of HIV infection and the benefits of early treatment of HIV have generated a call for a reevaluation of this issue.[9–11]

One recent study,[12] conducted in several states, found that participants were not likely to know their states' laws regarding name-based reporting, although 62% said that they would seek HIV testing even if the only testing option involved name-based reporting. Another recent study[13] found that people in high-risk groups did present for testing after states implemented name-based reporting. However, these studies were primarily based on data from states with low rates of HIV prevalence and did not measure the level of risk taken by subjects included in the samples. Earlier studies would suggest that the deterrent effect of name-based reporting is greatest in areas of high prevalence among individuals at highest risk for HIV infection.[14–17] Nevertheless, the Centers for Disease Control and Prevention have urged all states and territories to adopt HIV case surveillance[18] and have suggested using a name-based reporting procedure.[19]

We report data collected from a cohort of men who recently had unprotected anal intercourse with men, testing for HIV in one of the United States' largest AIDS epicenters. Data were collected while enthusiasm about new treatments was high and the death rate from AIDS was declining.

Methods

Participants

Study participants (n = 130) were a subgroup from a larger counseling intervention study of high-risk repeat testers, conducted through a confidential HIV antibody test site in San Francisco, Calif. Recent high-risk sex was defined as unprotected anal intercourse in the past 12 months with a man who was of either unknown or positive HIV serostatus. Repeat testing was defined as at least 1 previous negative test result from

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This paper was accepted January 21, 1999.