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Historical and Current Trends in the Epidemiology of Early Syphilis in San Francisco, 1955 to 2016

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Abstract

Background: Seventeen years into a sustained epidemic, early syphilis (ES) rates in San Francisco (SF) are continuing to increase and the demographics of the affected population are changing. We provide a historical overview of ES in SF among men who have sex with men (MSM) and describe trends in the epidemiology and disease investigation outcomes.

Methods: We examined data from the SF Department of Public Health's patient-based registry of integrated STD surveillance, clinical, and field investigation data to describe demographic and behavioral characteristics of ES cases, as well as outcomes of syphilis partner services (PS). χ^2 Tests were performed to examine categorical differences across periods. Analysis of variance was used to examine differences in continuous variables.

Results: In 2016, 1095 ES cases were reported among males in SF, a 219% increase from the 343 cases identified 10 years ago. Between 1996–1999 and 2010–2016, an increasing proportion of ES cases were among MSM younger than 25 years, nonwhite, and HIV negative ($P < 0.05$). A decreasing proportion of ES cases were assigned for PS, among whom a smaller proportion of reported sex partners were identified by name, resulting in an overall decline in the proportion of cases who had at least one named partner treated as a result of PS (Disease Intervention Rate) from 30.5 in 2000–2004 to 14.8 in 2010–2016.

Conclusions: Syphilis case rates continue to increase in SF and the epidemic is expanding beyond a core population. Additional resources and innovative prevention approaches are needed to reduce the burden of syphilis among MSM.

In 1981, more than 2000 early syphilis (ES) cases were reported in San Francisco (SF), resulting in the highest rate for any US city.[1] By 1998, when approximately 90% of persons living with AIDS in SF were men who had sex with men (MSM), more than 17,000 men had died of AIDS.[2] The decreased size of the at-risk population and a shift in sexual norms due to the threat of HIV led to declining syphilis rates; in 1997, only 41 ES cases were reported.[3] Similar decreases seen across the United States, both in MSM and in heterosexual populations, led to a nationwide syphilis elimination plan.[4] However, by the early 2000s,

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syphilis rates began climbing nationally and in SF, and the epidemic became concentrated among MSM.[5,6]

Locating and treating sexual partners, a disease investigation process known as partner notification or partner services (PS), has been a core component of syphilis control activities since the 1940s.[7] Despite efforts to evaluate outcomes of this work,[8,9] its contribution to syphilis prevention remains unclear. Furthermore, the work of partner notification has grown more challenging. Methamphetamine use[10–12] has led to higher numbers of sex partners. Meeting partners through the Internet in the 2000s, and more recently, geosocial networking applications (apps) have led to an increase in partners for whom there is no retrievable locating information and fewer common physical spaces, such as bathhouses, where people meet (and can relocate) partners.[13–15] Outdated technology and tools for disease investigation,[9,16] increasingly interconnected sexual networks,[17] and declining rates of condom use[18] are also likely contributing to ongoing increases in syphilis morbidity in MSM.[19,20]

As the syphilis epidemic continues to expand locally and nationally, we examined data maintained for syphilis surveillance and PS in SF to inform prevention strategies.

MATERIALS AND METHODS

Data Sources

The sexually transmitted disease (STD) program of the SF Department of Public Health (SFDPH) uses an integrated database (ISCHTR) to maintain STD case reports, manage and record work of disease investigation specialists (DIS), record STD test results from SFDPH laboratories, and document clinical encounters from the city's single municipal STD clinic, SF City Clinic (SFCC). ISCHTR is a patient-based registry implemented in 1996 by program staff.

Most syphilis cases are identified through laboratory reports of reactive serologic tests, which are supplemented by investigation and provider reports to inform disease staging, following national surveillance case definitions.[21] Early syphilis includes symptomatic and asymptomatic stages of disease within 12 months of exposure. Multiple tests within 30 days for the same patient are counted as a single case.

Only aggregate, annual syphilis case totals by disease stage are available for 1955 to 1983. Limited demographic data, including age and sex, as well as STD testing and treatment data for SFCC visits, are available beginning in 1984. Additional demographics (e.g., race/ethnicity), diagnosing provider, sex of sex partners, and HIV status were incorporated into ISCHTR beginning in 1996. Complete data-entry into ISCHTR from DIS work, including detailed partner data, began in 1999.

Since 1997, all syphilis serologies identified by the 2 laboratories serving SFDPH outpatient clinics and public hospitals are imported into ISCHTR, including nonreportable nonreactive serologies that could inform disease staging.

The conversion to an SFCC electronic medical record in 2010 expands the available information that enriches ISCHTR data. The SFCC electronic medical record includes sex of sex partners and total sex partners in the past 3 months by sex and type of sex (e.g., receptive or insertive anal sex).

PS Data and Outcomes

Partner Services seeks to interview ES cases and elicit partners with whom the case had sexual contact during the critical period (CP), defined as the time during which the case was likely exposed to syphilis until receiving treatment. Cases are asked about the number of male and female partners they had in the past year and during the CP. Of the total CP partners, cases are asked to provide names and locating information for "named partners," to contact them regarding their need for testing and treatment. Since 2004, cases are also asked about the number of partners for whom they have locating information but decline to provide it (i.e., "partners refused to name"). The number of "unidentifiable partners" is the calculated difference between the total number of partners and the sum of the numbers of named partners and partners refused to name.

Some cases reported very large numbers of total partners. To reduce the influence of these cases on the mean and proportion of partners, the total number of partners was considered missing where the reported total exceeded 300 partners. Where the number of CP partners was missing but the number of partners in the past 12 months was recorded, the 12-month totals were used for the CP totals.

Cases are asked to identify the venues where they meet any sex partners, as well as for each named partner. Venues are categorized into types including bar/club, Internet, and apps. Cases are also asked about any substance use in the prior 12 months and the date and result of their last HIV test. Since mid-2014, HIV-negative cases are asked about their use of preexposure prophylaxis (PrEP) to prevent HIV.

The Centers for Disease Control and Prevention has defined process and disease intervention indicators to measure PS outcomes. We applied select measures with minor modifications to the definitions. The interview rate is defined as the proportion of total ES cases assigned for PS that was interviewed. The treatment rate is the total number of named partners treated as a case of syphilis or prophylactically treated, divided by the total number of named partners assigned for follow-up. The disease intervention rate is the proportion of total ES cases with at least one named partner who was treated.

Data Definitions

The integration of multiple data sources in ISCHTR allows for information on reported cases to be completed or updated when relevant clinical, testing, or investigation data are entered into ISCHTR.

Cases are classified as MSM if they identify as gay or bisexual or if they indicate any male sex partners or anal sex at any time before their syphilis diagnosis. HIV status is based on self-reported or SFCC-based test results, and any positive HIV test result from the enhanced HIV/AIDS Reporting System recorded in ISCHTR as part of systematic reporting from, and

routine data matches with, the SFDPH HIV Surveillance Program (in support of HIV PS conducted by the same DIS team conducting syphilis PS).

Syphilis stage is determined from testing history, findings and exposures reported by the diagnosing provider, and symptoms and exposures reported by cases. The diagnosing provider is the provider who ordered the syphilis test or reported the case.

Analysis

We describe trends in the epidemiology of ES in SF from 1955 through 2016. Although SFDPH has estimated the MSM population in SF, estimates are not available for the complete period of analysis; therefore, we report cases without rates. Because of the changing quality of data over time, for 1955 to 1996, we describe annual totals of syphilis cases by stage and sex, and the corresponding ratio of male-to-female cases. For cases reported since 1996, we analyzed additional demographics and other characteristics of ES among MSM, including age, race/ethnicity, diagnosing provider, syphilis history, and sexual and drug using practices. Analysis of partner data and disease investigation outcomes is limited to cases since 2000.

Data reported in the tables are categorized into 4 relatively equivalent periods (1996–1999, 2000–2004, 2005–2009, and 2010–2016) for ease of comparison. Figures display data by year, beginning when the data displayed were consistently reported.

χ^2 Tests were performed to examine categorical differences in outcomes and in patient demographics over time. Analysis of variance was used to examine differences in continuous variables.

Syphilis case and investigation data collection are a public health surveillance activity. Analysis of these data is routinely conducted for nonresearch program evaluation; the results inform the design and delivery of PS in SF.

RESULTS

Epidemiology of Syphilis in SF, 1955–2016

Early syphilis cases in SF began increasing rapidly in 1967 and reached a peak of more than 2000 cases in both 1981 and 1982 (Fig. 1). Cases then fell as the AIDS epidemic began, but began increasing again in 1999, fluctuating until 2007. Cases increased almost annually since then, surpassing 1000 reported cases in 2013 and reaching 1145 cases in 2016.

Although cases by sex are not available before 1984, the increasing rates in the late 1960s until 1982 were likely following the same trends seen in the United States; in 1967–1979 in the United States, a 2-fold increase in the male-to-female case-ratio and a 32% increase in males with syphilis reporting a male sex partner reflected an increasing burden of syphilis among gay men.[22] Female cases declined in parallel with male cases in the 1980s. Since case totals began rising in 1999, males have accounted for nearly all new reports of syphilis, reflected in the rise in the male-to-female ratio from 10 in 1999 to 180 in 2004 (Fig. 2).

From 2009 to 2016, the number of ES cases increased among females by 222% (from 9 to 29) and among males by 118% (from 503 to 1095).

In 2005–2009, 55 neurosyphilis cases were reported, increasing to 74 in 2010–2016. No congenital syphilis cases were reported from 2010 through 2014, but 3 congenital syphilis cases were identified in 2015–2016.

Since 1999, more than 75% of male ES cases in SF have been among MSM. The remainder of analyses focus on ES MSM cases.

ES Among MSM in SF, 1996 to 2016

Between 1996–1999 and 2010–2016, the proportion of primary syphilis cases among MSM remained consistent. The proportion of secondary syphilis decreased from 57.4% in the earliest period to 28.8% in 2010–2016; conversely, early latent syphilis cases increased from 22.8% in 1996–1999 to 50.7% in 2010–2016 (Table 1).

Although most ES cases among MSM have been white, the proportion decreased significantly over time ($P < 0.05$; Table 1), from 64% in 2000 to 55% in 2016 (Fig. 3). Since 2000, an increasing proportion of ES MSM cases were those 25 years or younger ($P < 0.05$), despite an increase in mean age of cases ($P < 0.05$), from 35.8 years in 1996–1999 to 40.6 years in 2010–2016 (Table 1).

Since 2001, more than half of MSM with ES are HIV positive. However, the proportion of ES MSM cases who are HIV positive is decreasing ($P < 0.05$), from 69% in 2012 to 55% in 2016 (Fig. 4).

The proportion of ES MSM cases with a history of syphilis has increased. Although only 7.9% of cases in 1996–1998 (and none in 1999) had been previously diagnosed with syphilis, in 2010–2016, 41.2% of MSM with ES had been diagnosed previously as having syphilis; 26.8% had been diagnosed within the past 3 years (Table 1). The proportion of ES cases that were diagnosed at SFCC decreased from 45.5% in 1996–1999 to 20.4% in 2010–2016 (Table 1). At the same time, an increasing proportion of cases were diagnosed at Magnet (19.0% in 2010–2016), a gay men’s community center, and health clinic; 43.6% were diagnosed in private medical provider settings.

Sexual Health Behaviors of ES MSM Cases in SF, 2000 to 2016

The average number of reported male partners during the CP declined from 13.5 in 2000–2004 to 11.1 in 2010–2016 (Table 1).

Places to meet sex partners reported by ES MSM cases have changed since 2000 (Fig. 5). Use of Internet web sites and chat rooms for meeting partners increased from 23% of cases in 2000 to 53% in 2008, but decreased to 29% in 2016. Reported use of apps increased from 1.4% of cases in 2010 (when apps became publically available) to 45% of cases in 2016.

The proportion of ES cases reporting methamphetamine use increased from 11.4% in 2000–2004 to 26.6% in 2010–2016 (Table 1). Since the 2012 Food and Drug Administration approval of Truvada for PrEP, the proportion of HIV-negative MSM ES cases who reported

current PrEP use increased from 16% in the first quarter of 2015 to 42% in the third quarter of 2017.

Outcomes of PS, 2000 to 2016

The proportion of ES cases among MSM assigned for PS declined from 98.1% in 1996–1999 to 66.3% in 2010–2016 ($P < 0.01$). Since 2000, the proportion who refused PS was consistently low (5%–8%).

The proportion of interviewed cases who named at least one sex partner declined from 62.9% in 2000–2004 to 31.7% in 2010–2016 (Table 1, Fig. 6). In parallel, the proportion of partners that the case refused to name increased between the same 2 periods, from 20.2% to 32.0%, as did the proportion of unidentifiable partners (increasing from 16.9% to 36.3%). The proportion of cases that named partners who resided outside SF increased since 2000, reaching 15.7% in 2010–2016.

In 2010–2016, the interview rate was 84.0% and the treatment rate among assigned partners was 51.6%. The disease intervention rate decreased from 30.5% in 2000–2004 to 18.0% in 2010–2016 (Table 1).

DISCUSSION

Although initially highly concentrated among primarily middle-aged, white, HIV-positive MSM, the syphilis epidemic in SF is both growing and expanding to younger, nonwhite, and HIV-negative MSM. Most cases are among MSM diagnosed with their first ES infection (>55% in 2016) and a growing proportion have partners from other health jurisdictions, representing the ongoing introduction of new MSM into the SF syphilis sexual network. Of additional concern, SF is experiencing a small but rising rate of syphilis among women, and increases in complicated syphilis in MSM.[23] Further facilitating the movement of syphilis outside a central network of MSM are biomedical prevention methods for HIV (associated with mixing between HIV-positive and HIV-negative sexual networks)[24] and apps.

Through the identification of individuals with syphilis and prophylactic treatment of exposed partners, PS has likely attenuated the rate of increase in syphilis cases in SF. However, the declining disease intervention rate illustrates that PS alone cannot control the current syphilis epidemic. Flat (effectively decreased) funding, along with outdated technology and tools for investigation, has prevented DIS staffing levels from keeping pace with rising morbidity. Furthermore, DIS who provide PS are tasked also with critical high-impact HIV prevention work, including PS and linkage to care for HIV-positive cases and PrEP for HIV-negative STD cases.[16] The proliferation of ways to meet sex partners reflected in the sharp increase in the proportion of partners who cannot be identified for screening and treatment illustrates the limitations of PS to ensure secondary prevention. With more diagnoses occurring outside the STD clinic setting, more robust and innovative approaches for PS are needed for it to have an impactful role in a multipronged syphilis prevention strategy.

When the MSM syphilis epidemic began in the early 2000s and the Internet emerged as a new venue associated with syphilis acquisition,[25,26] new policies guided DIS on how to

identify and contact Internet partners (i.e., Internet PS).[27,28] Internet PS grew even more challenging with the advent of apps, now the most prevalent way that MSM with ES in SF meet sex partners. App users typically do not maintain a permanent profile with a unique username and the geolocation features do not enable ongoing communication when users are not near each other, thereby leaving an increasing proportion of partners unengaged in STD screening and treatment.

There are other important factors sustaining the current syphilis epidemic. National HIV Behavioral Surveillance data suggest that condom use among MSM has been declining both nationally[18] and in SF[24] since 2005. Ensuring condom availability and developing culturally resonant condom messaging remains an important component of STD prevention efforts. Methamphetamine use, which has been identified as a driver of the MSM syphilis epidemic since 2000,[10–12] is associated with condomless anal sex, multiple partners, increased duration of sex, and unidentifiable partners[14] and remains common among MSM in SF who acquire syphilis.

More syphilis cases in SF are diagnosed outside SFCC, in community-based settings, HIV clinics, and primary care. Although patients diagnosed at SFCC are counseled about the need for regular STD screening and symptom recognition for prompt testing, those diagnosed outside SFCC might be less likely to receive appropriate counseling about partner notification, repeat screening, and PrEP.[29] STD Programs and HIV/STD Prevention Training Centers play an increasingly critical role in building the capacity of primary care providers to deliver sexual health services.[30,31]

Routine syphilis screening among sexually active MSM remains critical to prevention. Several studies suggest that quarterly syphilis screening in HIV primary care and among PrEP users could decrease population-level syphilis incidence.[19,32,33] The increasing proportion of ES cases in SF that are asymptomatic might be partially due to more routine screening. HIV surveillance data suggest that approximately 70% of sexually active people living with HIV in SF who are in care have been screened for syphilis in the past year.[34] These efforts should be encouraged and screening should be expanded to nonclinical settings such as substance use treatment programs and jails.[35] Targeted implementation of PrEP or postexposure prophylaxis with doxycycline to prevent syphilis has shown potential,[36,37] although the risks and benefits need further evaluation.

Our ability to explain trends in the current syphilis epidemic is limited in the way that all public health surveillance systems are subject to the biases and data errors related to care seeking, testing, and case reporting. Increased screening might partially explain increased case detection, but the increase in asymptomatic syphilis is unlikely to be explained by screening alone. The decreased proportion of ES cases assigned for PS and the refusal or inability of cases to name their partners limit data completion, lead to missed opportunities to appropriately stage cases, and diminish our capacity to describe trends. Despite the data gaps filled by the integrated nature of ISCHTR, the epidemiology of interviewed ES cases might not be generalizable to all MSM with syphilis in SF; some trends might be unique to SF. However the increasing use of apps, number and proportion of unidentifiable partners,

and use of methamphetamines have been reported from multiple jurisdictions with large populations of MSM.[38–42]

Increasingly expanding yet interconnected sexual networks demand that traditional PS evolve to meet the current challenges in syphilis control.[16] Community engagement and qualitative research are needed to help elucidate novel strategies for partner elicitation and notification.[43] Improved data-sharing across local health jurisdictions, as well as a more regional approach to STD prevention, is necessary given the growing radius of sexual networks. Without increased resources for DIS workforce development and improved tools for more efficient and effective sexual health services, public health will need to redefine its STD control priorities. Toward these ends, SFDPH is conducting process reviews, workforce trainings, additional quantitative and qualitative data collection and analysis, and strategic planning to set priorities, increase efficiencies in client care and services, and ensure continuous quality improvement in order to enhance the provision of client-centered sexual health services in SF.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

REFERENCES

1. Centers for Disease Control and Prevention. Syphilis—United States, 1983. MMWR Morb Mortal Wkly Rep 1984; 33:433–436, 441. [PubMed: 6431246]
2. Annual AIDS Surveillance Report. San Francisco: Department of Public Health, AIDS Surveillance Unit, 1998: 12 31, 1998.
3. San Francisco Department of Public Health, Population Health and Prevention Division. San Francisco Sexually Transmitted Disease Annual Summary 2000 11 2001.
4. Centers for Disease Control and Prevention. The National Plan to Eliminate Syphilis from the United States 1999.
5. Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance 2016 2017.
6. Hughes AJ, Chen YH, Scheer S, et al. A novel modeling approach for estimating patterns of migration into and out of San Francisco by HIV status and race among men who have sex with men. J Urban Health 2017; 94:350–363. [PubMed: 28337575]
7. Parran T Shadow on the Land: Syphilis New York, NY: American Social Hygiene Association, 1937.
8. Brewer DD. Case-finding effectiveness of partner notification and cluster investigation for sexually transmitted diseases/HIV. Sex Transm Dis 2005; 32:78–83. [PubMed: 15668612]

9. Hogben M, Collins D, Hoots B, et al. Partner Services in sexually transmitted disease prevention programs: A review. Sex Transm Dis 2016; 43(2 Suppl 1):S53–S62. [PubMed: 26779688]
10. Chew Ng RA, Samuel MC, Lo T, et al. Sex, drugs (methamphetamines), and the Internet: Increasing syphilis among men who have sex with men in California, 2004–2008. Am J Public Health 2013; 103:1450–1456. [PubMed: 23153138]
11. Klausner JD, Kent CK, Wong W, et al. The public health response to epidemic syphilis, San Francisco, 1999–2004. Sex Transm Dis 2005; 32(10 Suppl):S11–S18. [PubMed: 16205286]
12. Santos GM, Coffin PO, Das M, et al. Dose-response associations between number and frequency of substance use and high-risk sexual behaviors among HIV-negative substance-using men who have sex with men (SUMSM) in San Francisco. J Acquir Immune Defic Syndr 2013; 63:540–544. [PubMed: 23572012]
13. Internet use and early syphilis infection among men who have sex with men—San Francisco, California, 1999–2003. MMWR Morb Mortal Wkly Rep 2003; 52:1229–1232. [PubMed: 14681596]
14. Taylor M, Aynalem G, Smith L, et al. Correlates of Internet use to meet sex partners among men who have sex with men diagnosed with early syphilis in Los Angeles County. Sex Transm Dis 2004; 31:552–556. [PubMed: 15480117]
15. Sun CJ, Stowers J, Miller C, et al. Acceptability and feasibility of using established geosocial and sexual networking mobile applications to promote HIV and STD testing among men who have sex with men. AIDS Behav 2015; 19:543–552. [PubMed: 25381563]
16. Golden MR, Katz DA, Dombrowski JC. Modernizing field services for human immunodeficiency virus and sexually transmitted infections in the United States. Sex Transm Dis 2017; 44:599–607. [PubMed: 28876325]
17. Spicknall IH, Gift TL, Bernstein KT, et al. Sexual networks and infection transmission networks among men who have sex with men as causes of disparity and targets of prevention. Sex Transm Infect 2017; 93:307–308. [PubMed: 28389442]
18. Paz-Bailey G, Mendoza MC, Finlayson T, et al. Trends in condom use among MSM in the United States: The role of antiretroviral therapy and seroadaptive strategies. AIDS 2016; 30:1985–1990. [PubMed: 27149088]
19. Jenness SM, Weiss KM, Goodreau SM, et al. Incidence of gonorrhea and chlamydia following human immunodeficiency virus preexposure prophylaxis among men who have sex with men: A modeling study. Clin Infect Dis 2017; 65:712–718. [PubMed: 28505240]
20. Scott HM, Klausner JD. Sexually transmitted infections and preexposure prophylaxis: Challenges and opportunities among men who have sex with men in the US. AIDS Res Ther 2016; 13:5. [PubMed: 26793265]
21. Centers for Disease Control and Prevention. Syphilis (Treponema pallidum) 2014 Case Definition 2014; https://wwwn.cdc.gov/nndss/conditions/syphilis-secondary/case-definition/2014/. Accessed February 22, 2018.
22. Fichtner RR, Aral SO, Blount JH, et al. Syphilis in the United States: 1967–1979. Sex Transm Dis 1983; 10:77–80. [PubMed: 6658633]
23. Woolston S, Cohen SE, Fanfair RN, et al. A cluster of ocular syphilis cases—Seattle, Washington, and San Francisco, California, 2014–2015. MMWR Morb Mortal Wkly Rep 2015; 64:1150–1151. [PubMed: 26469141]
24. Chen YH, Snowden JM, McFarland W, et al. Pre-exposure prophylaxis (PrEP) use, seroadaptation, and sexual behavior among men who have sex with men, San Francisco, 2004–2014. AIDS Behav 2016; 20:2791–2797. [PubMed: 26983951]
25. Klausner JD, Wolf W, Fischer-Ponce L, et al. Tracing a syphilis outbreak through cyberspace. JAMA 2000; 284:447–449. [PubMed: 10904507]
26. McFarlane M, Bull SS, Rietmeijer CA. The Internet as a newly emerging risk environment for sexually transmitted diseases. JAMA 2000; 284:443–446. [PubMed: 10904506]
27. Hightow-Weidman L, Beagle S, Pike E, et al. “No one’s at home and they won’t pick up the phone”: Using the Internet and text messaging to enhance partner services in North Carolina. Sex Transm Dis 2014; 41:143–148. [PubMed: 24413497]

28. Moody V, Hogben M, Kroeger K, et al. Internet-based partner services in US Sexually Transmitted Disease Prevention Programs: 2009–2013. J Public Health Manag Pract 2015; 21:526–530. [PubMed: 25602198]

29. Centers for Disease Control and Prevention. Recommendations for partner services programs for HIV infection, syphilis, gonorrhea, and chlamydial infection. MMWR Recomm Rep 2008; 57(RR-9):1–83; quiz CE81–84.

30. Safi AG, Perin J, Mantsios A, et al. Public health detailing to increase routine HIV screening in Baltimore, Maryland: Satisfaction, feasibility, and effectiveness. Public Health Rep 2017; 132:609–616. [PubMed: 29045797]

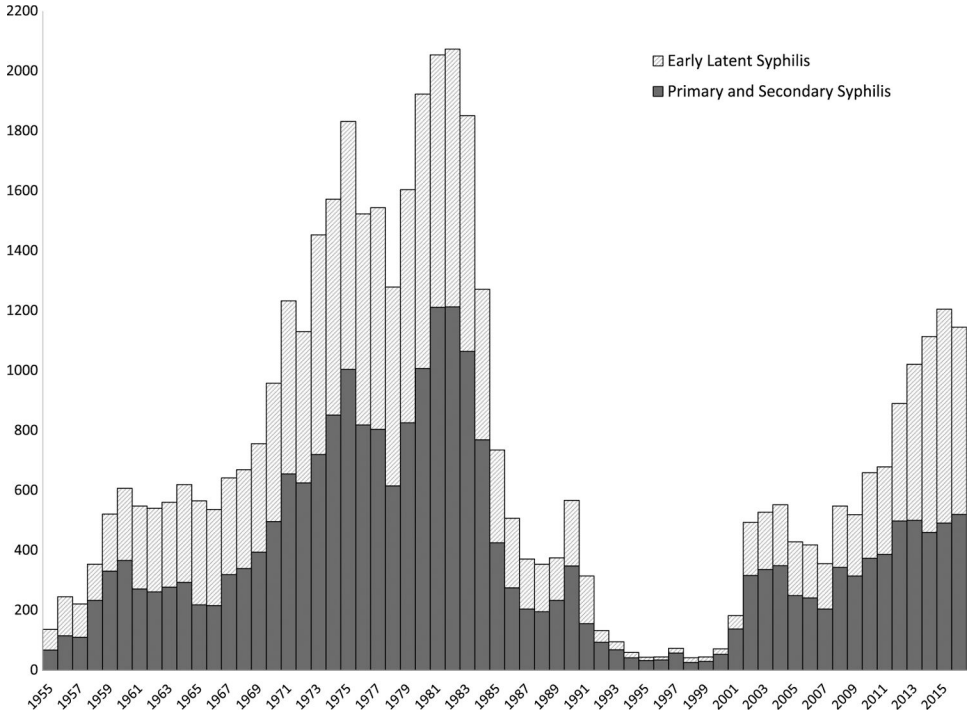

Figure 1.
Reported early syphilis cases by stage of disease, San Francisco, 1955 to 2016.

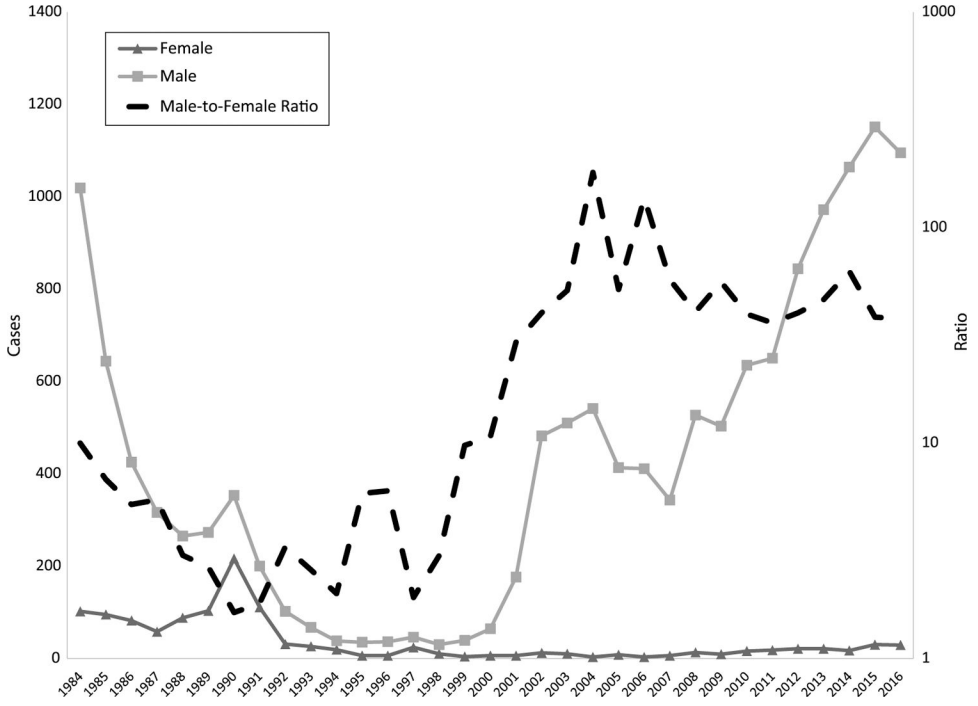

Figure 2.

Total early syphilis cases by sex and ratio of male-to-female cases on log scale, San Francisco, 1984 to 2016.

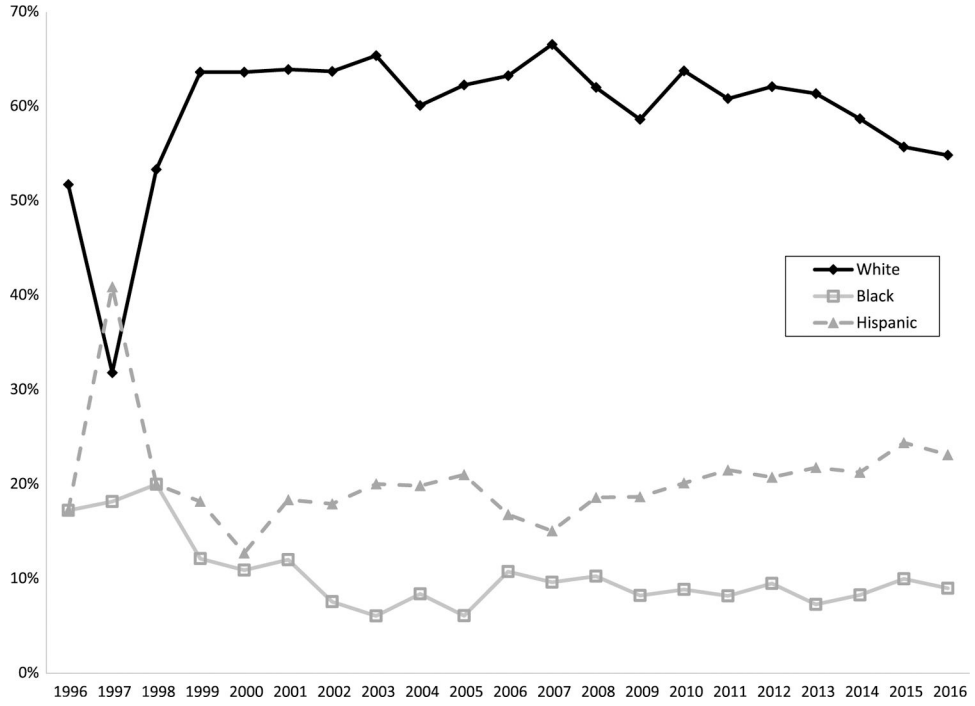

Figure 3.

Total early syphilis cases among men who have sex with men by race, San Francisco, 1996 to 2016.

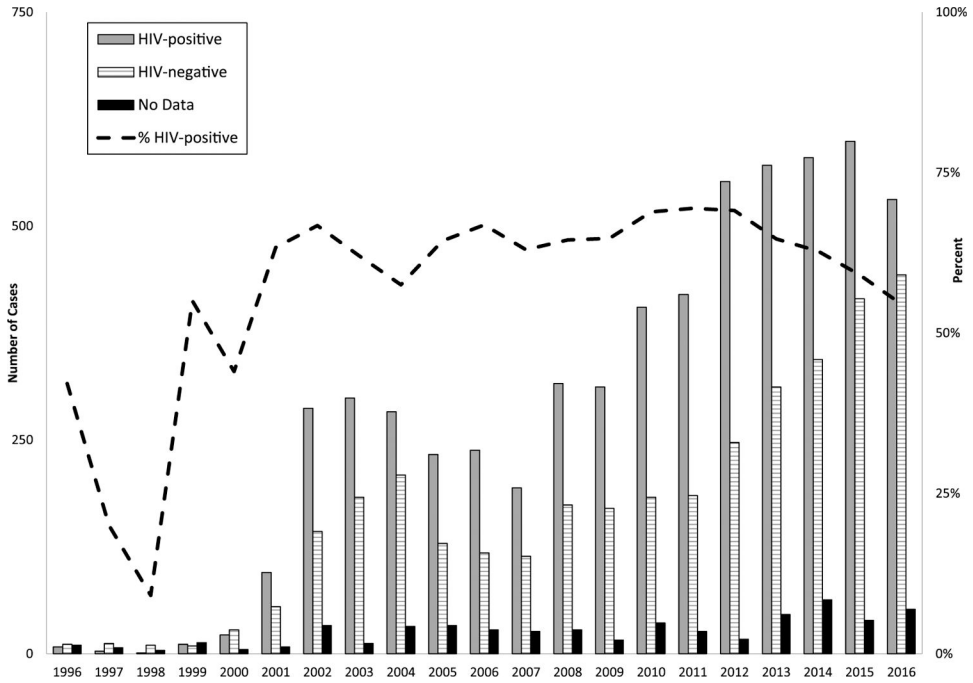

Figure 4.

Number of early syphilis cases among men who have sex with men by known HIV status and proportion of early syphilis cases living with HIV, San Francisco, 1996 to 2016.

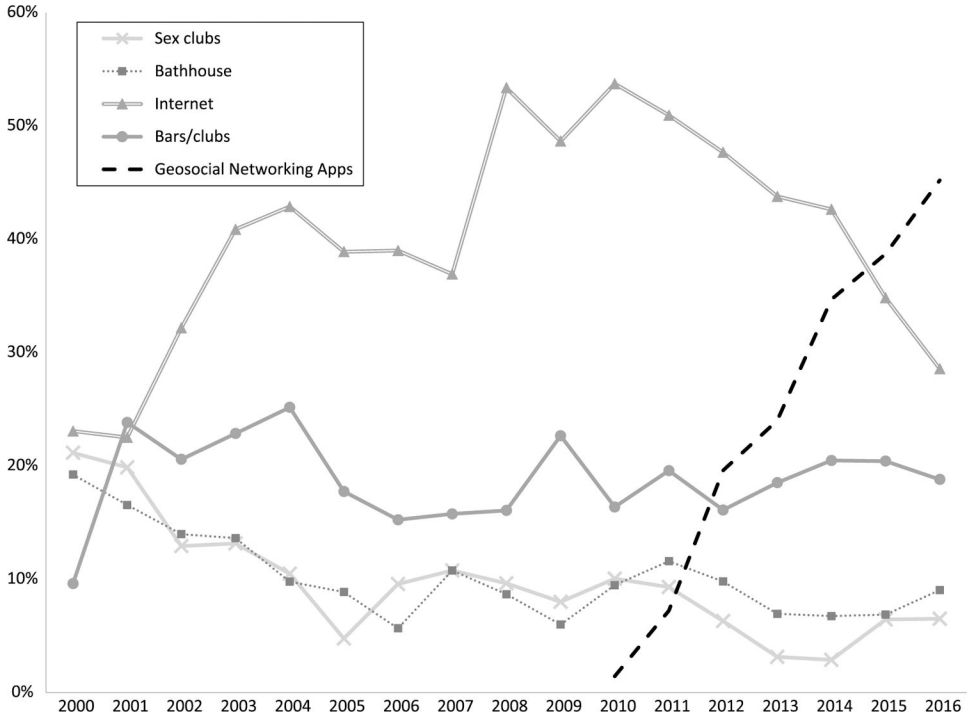

Figure 5.

Venues for meeting sexual partners reported by interviewed early syphilis cases among men who have sex with men, San Francisco, 2000 to 2016.

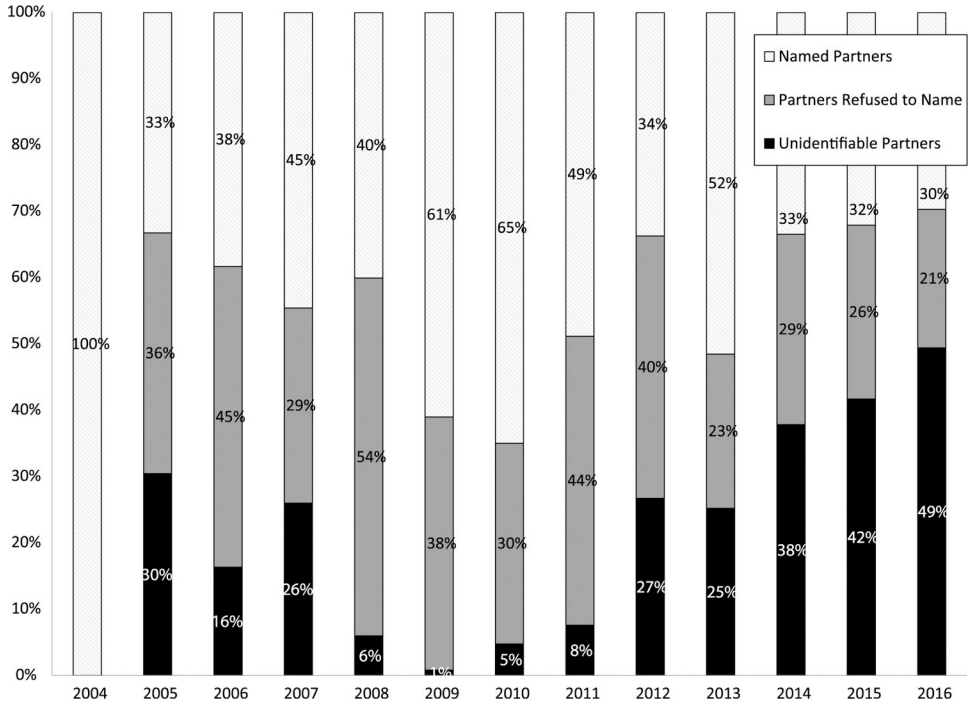

Figure 6.

Proportion of total reported partners who were named, refused to name, or counted as unidentifiable by early syphilis cases among men who have sex with men, San Francisco, 2004 to 2016.

TABLE 1.

Total Early Syphilis Cases Among San Francisco MSM, 1996 to 2016

	1996–1999	2000–2004	2005–2009	2010–2016
Total Early Syphilis Cases	**101**	**1694**	**2129**	**6069**
Stage, n (%)				
Primary	20 (19.8)	386 (22.8)	440 (20.7)	1249 (20.6)
Secondary	58 (57.4)	735 (43.4)	835 (39.2)	1745 (28.8)
Early latent	23 (22.8)	573 (33.8)	854 (40.1)	3075 (50.7)
Age				
Mean (median), y	35.8 (35.0)	38.0 (38.0)	40.0 (40.0)	40.6 (41.0)
Range, y	19–58	16–77	17–79	15–78
Proportion ages 25 y and under, %	10.9	4.9	6.8	7.8
Race, %				
White	51.5	63.1	62.0	58.5
African American/Black	15.8	7.9	9.0	8.7
Hispanic	22.8	19.0	18.1	21.8
Other	9.9	10.0	10.9	11.0
Diagnosing provider, %				
SF City Clinic	45.5	33.2	25.9	20.4
Magnet	—	3.0	10.2	19.0
Private clinics/hospitals	40.6	48.4	49.6	43.6
Other	13.9	15.4	14.3	17.0
Syphilis history, %				
Previously reported with at least one early syphilis diagnosis	7.9	15.6	30.5	41.2
Previously reported with at least one early syphilis diagnosis (3 y)	6.9	12.7	19.4	26.8
Previously reported with at least one diagnosis of primary or secondary syphilis (past 3 y)	5.0	8.6	11.0	14.3
Reported sexual and risk behaviors				
Mean no. male partners in the CP	—	13.5	10.4	11.1
Proportion of total CP partners who cases named	—	62.9	49.5	31.7
Proportion of total CP partners who cases refused to name	—	20.2	39.6	32.0
Proportion of total CP partners who were unidentifiable	—	16.9	10.9	36.3

	1996–1999	2000–2004	2005–2009	2010–2016
Total Early Syphilis Cases	**101**	**1694**	**2129**	**6069**
Proportion of cases who reported any named partners who were not SF residents	—	11.1	12.4	15.7
Use of methamphetamine in past year, %	—	11.4	19.4	26.6
Disease investigation, %				
Proportion of total cases assigned for Partner Services	100	98.1	86.2	66.3
Proportion of assigned cases who refused Partner Services	1.0	5.8	8.3	5.4
Interview rate among assigned cases *	49.5	86.9	79.0	84.0
Treatment rate among assigned partners †	—	54.5	33.4	51.6
Disease intervention rate ‡	—	30.5	18.8	18.0

*Interview rate: proportion of total early syphilis cases assigned for Partner Services that were interviewed.

†Treatment rate: proportion of named partners assigned for follow-up that were treated as a case of syphilis or prophylactically treated, divided by the total number of named partners assigned for follow-up.

‡Disease intervention rate: proportion of total early syphilis cases with at least one named partner who was treated as a result of Partner Services. CP indicates critical period; MSM, men who have sex with men.