

# Effectiveness of interventions for syphilis prevention and control in MSM: A summary of published research findings

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## Introduction

This document provides a brief summary of grey literature and published research literature findings from studies that address the effectiveness of interventions for syphilis epidemics among men who have sex with men (MSM). This body of research generally addresses five main approaches, interventions that: promote safe-sex, increase testing, improve partner notification, modify risks in the social environment, or improve access to treatment. In the recent literature, strategies to increase testing or to improve partner notification are most commonly reported.

The review was developed as a background document for an information exchange event on syphilis prevention. It is based on a more detailed review conducted by the Montreal Department of Public Health in 2012, which was updated in August 2014 by the National Collaborating Centre for Infectious Diseases. Readers interested in the literature search methods, or detailed findings, may contact the authors, or NCCID for more information.

## Health Promotion

### Awareness and information campaigns

Although some studies support the use of social marketing campaigns to promote condom use among MSM for STI/HIV protection (Neville *et al* 2014), a recent study found that a long-term increase in condom use or decrease in the number of partners would be unlikely to be

adopted (McCann *et al* 2011). Thus, recent campaigns do not usually aim to promote safe-sex and reduce the number of partners, since those objectives are considered unrealistic, with negligible impact (Gray *et al* 2011, McCann *et al* 2011).

Most efforts are directed towards promoting testing and early treatment. Campaigns promoting testing are effective to increase testing in the short term, but long-term effects on morbidity, mortality and control of an epidemic have not been shown (HAS 2007).

### Social marketing

A social marketing approach has been adopted by many large cities (Vega *et al* 2005). A number of social marketing campaigns, such as “Healthy Penis” in San Francisco, “Stop the Sores” and “Check Yourself” in Los Angeles. “Drama Downunder”, in Victoria, Australia, aimed to increase among MSM awareness and testing for HIV and STIs, including syphilis. Those campaigns all found that exposure to a campaign or campaign awareness was associated with syphilis (or STI) awareness and testing (Montoya *et al* 2005, Plant *et al* 2010, Pedrana *et al* 2012, Plant *et al* 2014).

On the other hand, some campaigns in San Francisco and in Florida did not lead to changes in awareness, knowledge, or testing (Darrow and Biersteker 2008, Biersteker and Darrow 2010, Stephens *et al* 2010). A Cochrane Review published in 2011 identified only three studies of social marketing campaigns promoting

testing among MSM with a pretest/ post-test design, and found an effect on HIV testing uptake but not on STI testing uptake (Wei *et al* 2011).

One report from a successful campaigns specified having relied on social marketing principles in the design of the campaign, such as formative research, market segmentation, and building a strong brand (Plant *et al* 2014). In the evaluation of “Drama Downunder”, focus group participants “identified attention-grabbing images, a humorous approach, positive and simple tailored messaging, and the use of mainstream media as campaign features crucial in normalizing sexual health testing, driving campaign engagement, and ensuring high message exposure” (Pedrana *et al* 2014).

Investment of time and resources in the evaluation of social marketing campaigns is recognized as critical to success. Evaluation allows not only for assessment of impacts, but builds support to continue the initiative, and translate it to other jurisdictions (Ahrens *et al* 2006, Klausner and Ahrens 2007).

### Community mobilization

Many interventions involve multiple community partners, including the commercial sex industry (Taylor *et al* 2005). However, there are few published reports of initiatives arising from the community.

### Testing and Early Detection

Although there is no direct evidence that syphilis screening is effective in reducing morbidity or mortality (USPSTF 2004, HAS 2007), screening is strongly recommended for high risk groups on the basis that there is adequate evidence of the effectiveness of tests and treatment, leading to the conclusion that potential benefits to patients outweigh potential harms (USPSTF 2004).

Modelling studies suggest that targeted testing and increased testing rates could have a substantial impact on reducing rates of syphilis infection among MSM (Gray *et al* 2010, Down *et al* 2012). The most effective approach would be to test high risk groups (MSM who have 10 or more partners per year or who have group sex) every 3 months. Study results found there would be little gain from focusing on increasing coverage only, and it would be inefficient to frequently test men with fewer than 10 partners a year (Gray *et al* 2010). A team modelling syphilis transmission in Toronto in a core group of MSM found that, for the same total number of tests, increasing test frequency among those already accessing screening would have a greater effect on infection rates than increasing testing coverage (Tuite *et al* 2013). Modelling studies also suggest that higher coverage and more frequent syphilis screening of HIV-infected MSM would be highly cost-effective (Tuite *et al* 2014).

Despite these models and despite a considerable increase in testing in many countries, particularly for HIV positive MSM, no country has yet reported a substantial decline in syphilis rates among MSM. The failure of screening may be attributable to concurrent increases in sexual risk taking, including HIV serosorting without condom use; widely varying rates of testing between HIV clinics; and to the necessity for achieving a high level of testing among HIV negative, as well as HIV positive MSM (Fairley *et al* 2014).

Interventions promoting testing for syphilis appear acceptable among gay men (Down *et al* 2012). However, a significant proportion of MSM do not get screened at the recommended frequency. Reasons for not complying with recommendations include low perceived risk, time constraints, and lack of knowledge regarding syphilis transmission, the existence of an asymptomatic stage, and screening recommendations (Guy *et al* 2012, Katz *et al* 2013).

## Interventions to increase testing

In addition to social marketing campaigns, addressed in the previous section, other strategies have been used to increase syphilis testing among MSM.

### Clinic-based interventions

Several clinic-based interventions have been found to increase syphilis testing among MSM: introducing clinical guidelines, integrating syphilis testing in HIV care and blood tests, using provider recall systems such as computer alerts on electronic medical records (EMR), EMR systems to enhance post-treatment testing, and recall systems for patients such as SMS (text messaging) and e-mail messaging to patients (Zou *et al* 2004, Bissessor *et al* 2011, Zou *et al* 2013). Testing for syphilis in HIV clinics can be increased particularly with opt-out, but also opt-in strategies, compared to risk-based policies for screening (Guy *et al* 2013, Callander *et al* 2013).

### Outreach testing

Free, anonymous testing in gay meeting and socialization places reaches people in MSM communities, but tends to have a disadvantageous cost/effectiveness ratio, although it is difficult to evaluate (Lewis *et al* 2011). These approaches are not very effective for improving testing rates, so the potential impact on transmission is negligible (Ciesielski *et al* 2005, Blank *et al* 2005). Highest risk individuals are also less likely to participate (Wohlfeiler and Potterat 2005), although another study found those tested at a 'testing tent' at a gay community event to have more sex partners and use more IV drugs than those tested at a clinic (Read *et al* 2013, abstract only). Outreach testing approaches themselves are unlikely to have an effect on the burden of disease at the population level (Wohlfeiler and Potterat 2005, Kerani *et al* 2007), but are seen as a way to promote testing (Sanchez *et al* 2009).

Combining outreach approaches with use of rapid tests (including an initiative in Edmonton) (Bergman *et al* 2011) and financial incentives (Sanchez *et al* 2009, Gratrix *et al* 2011) is feasible, but there are no evaluation results to show the effect on outbreaks.

### Web-based testing

In some jurisdictions, it is possible for individuals to get a syphilis test requisition form on the internet, and thus get tested for syphilis without getting a prescription from a health care professional. In San Francisco and Amsterdam, there was little utilization by MSM of those systems (i.e. about 10 cases detected after 1 year) (McFarlane *et al* 2005, Koekenbier *et al* 2008). In British-Columbia, focus group research has suggested that there is acceptability and interest from the targeted population (Hottes *et al* 2011). Alberta has also implemented web-based testing (Alberta Health and Wellness 2010).

## Partner Notification

Traditional partner notification is an important aspect of the CDC strategy that is still strongly recommended. Modelling studies suggest that while increasing testing frequency could significantly reduce the rate of infection, increased partner notification would further reduce infections (Down *et al* 2012, abstract only). However, partner notification appears less cost-effective than targeted testing (Reynolds *et al* 2001).

Traditional partner notification has had relatively low feasibility in the context of syphilis outbreaks in MSM communities in industrialized countries, with limited impact (Hourihan *et al* 2004, Hogben *et al* 2005). Limitations include the increasing number of anonymous partners, mistrust of public health authorities, and delayed follow-up (Hogben *et al* 2005), so that a significant proportion of

partners are not notified (Anderson *et al* 2011) and a number of syphilis infections remain undetected (van Aar *et al* 2012). One study found that partner notification was broadly acceptable to gay men in Australia, although perceived stigma presented a potential barrier (Down *et al* 2012, abstract only).

## Approaches to improve partner notification

### Clinic or community-based agent

The use of public health agents working within clinics where diagnoses are made, including specialized HIV clinics (Taylor *et al* 2010), may increase the number of partners identified, reduce mistrust, and reduce delays. Similarly, a Community-Embedded Disease Intervention Specialist (CEDIS) can significantly improve partner notification. In one study, placement of a CEDIS—an employee and peer of the community-based clinic—resulted in a higher percentage of index cases interviewed, fewer delays interviewing index cases, fewer patients giving no partner information, a higher number of contacts reached, and a higher number of contacts diagnosed and treated than prior to their placement (Rudy *et al* 2012). The impact of such approaches on outbreaks has not been documented.

### Notification by email or internet messages

There are a number of reports of public health departments sometimes being able to reach a significant number of otherwise non-notifiable MSM contacts through e-mails or pseudonyms on meeting websites, for syphilis or other STIs (CDC 2003, Vest *et al* 2007, Ehlman *et al* 2010). For instance, in one study, from 361 index cases, 381 out of 888 partners were contacted through the internet, which resulted in 53 more partners (26%) examined, and 7 more index patients (8%) with at least one partner treated (Ehlman *et al* 2010).

### Use of website to send e-cards

inSPOT is a website that provides an online partner notification service, allowing individuals to send e-cards to notify their partners. It is available in several North American cities as well as other cities worldwide. Despite a large initial influence and a high number of e-cards sent (Levine *et al* 2008), use of the site by MSM for actual partner notification appears to be relatively low (Kerani *et al* 2011, Plant *et al* 2012).

### Use of Facebook

Use of Facebook for partner notification remains anecdotal. Facebook was crucial in identifying 2 of 17 individuals with syphilis in a cluster of cases among MSM in Milwaukee (Hunter *et al* 2014).

### Notification based on predictive models

An approach prioritizing notification activities based on a predictive model found only modest improvement in partner notification effectiveness, where the outcome of interest was number of partners treated for syphilis (Marcus *et al* 2010).

### Notification based on social network analysis

Social network analysis for partner notification was effective in a Vancouver outbreak with mainly heterosexual transmission (Ogilvie *et al* 2005).

## Environment Modification

### “High-risk” environments

Modifying “high-risk” environments can include activities such as working with the owners of gay clubs, organizing education activities in clubs or on websites used to meet sexual partners, providing protection supplies, and

offering on-site testing (McFarlane *et al* 2005). More coercive approaches have been used in some jurisdictions, such as regulation and inspection of bath-houses (Los Angeles, San Francisco, New York). There is no evidence of behavior change or impact on syphilis outbreak for these regulatory measures (Taylor *et al* 2005).

### Sociopolitical environment

Social policy interventions can target risk factors or environments associated with syphilis risk factors. For instance, some policy interventions have targeted pharmaceutical companies for misleading advertisement (e.g. overstating benefits of anti-retrovirals, Viagra), especially in jurisdictions where direct-to-consumer advertizing is allowed (Klausner *et al* 2005). Some jurisdictions have considered legislation for condom distribution in alcohol venues (Alberta Health and Wellness 2010). The impact of such measures on syphilis outbreak is unknown.

## Treatment and Follow-up

### Mass treatment

In British Columbia, mass treatment with azithromycin 1.8 g po was offered during a heterosexual outbreak in the Downtown Eastside neighbourhood. However, no sustained effect was observed, as there was a rebound in prevalence (Rekart *et al* 2003, Pourbohloul *et al* 2003).

### Preventive treatment for partners

In San Francisco, in 2003, preventive oral treatment (azithromycin 1 g po) was distributed by patients to their partners. It was deemed acceptable by communities, but it was not adopted widely enough to have an effect on the syphilis outbreak. There were also fears of antimicrobial resistance. The initiative stopped in 2004 (Klausner *et al* 2005, CDC 2004).

### Follow-up after first syphilis episode

Increased follow-up after a syphilis episode, especially for those with multiple partners, could be considered (Cohen *et al* 2012). Follow-up algorithms have been developed (Marcus *et al* 2011) but not evaluated.

## References

- Ahrens K, et al. Healthy Penis: San Francisco's Social Marketing Campaign to Increase Syphilis Testing among Gay and Bisexual Men. *PLoS Med*, 2006. 3(12): p. e474.
- Alberta Health and Wellness. The Syphilis Outbreak in Alberta. 2010, Office of the Chief Medical Officer of Health, Government of Alberta.
- Anderson H, et al. P1-S1.50 A decade of early syphilis in East and inner city London. *Sexually Transmitted Infections*, 2011. 87(Suppl 1): p. A119.
- Bergman J, et al. LBP-1.08 Preliminary report on experience with point of care syphilis and HIV testing in hard-to-reach populations in outreach settings in Edmonton, Canada. *Sexually Transmitted Infections*, 2011. 87(Suppl 1): p. A355.
- Biersteker S, Darrow WW. Dogs Are Talking: What Are They Saying? Who Is Listening? *Sexually Transmitted Diseases*, 2010. 37(8): p. 530.
- Bissessor M, et al. P2-S6.02 Use of a computer alert increases detection of early, asymptomatic syphilis among higher risk men who have sex with men. *Sexually Transmitted Infections*, 2011. 87(Suppl 1): p. A249.
- Blank S, et al. Reaching Out to Boys at Bars: Utilizing Community Partnerships to Employ a Wellness Strategy for Syphilis Control Among Men Who Have Sex With Men in New York City. *Sex Transm Dis*, 2005. 32: p. S65-S72.
- Callander D, Baker D, Chen M, Guy R. Including syphilis testing as part of standard HIV management checks and improved syphilis screening in primary care. *Sex Transm Dis*. 2013 Apr;40(4):338-40.
- CDC, Internet use and early syphilis infection among men who have sex with men--San Francisco, California, 1999-2003. *MMWR*, 2003. 52: p. 1229-1232.

- CDC, Evaluation of the Acceptance of Patient-Delivered Partner-Therapy for Incubating Syphilis Among Men who have Sex with Men in San Francisco, CA. 2004.
- Ciesielski C, et al. Control of Syphilis Outbreaks in Men Who Have Sex With Men: The Role of Screening in Nonmedical Settings. *Sexually Transmitted Diseases*, 2005. 32: p. S37-S42 10.1097/01.olq.0000181148.80193.91.
- Cohen SE, et al. Repeat Syphilis Among Men Who Have Sex With Men in California, 2002–2006: Implications for Syphilis Elimination Efforts. *American Journal of Public Health*, 2012. 102(1): p. e1-e8.
- Darrow WW, Biersteker S. Short-Term Impact Evaluation of a Social Marketing Campaign to Prevent Syphilis Among Men Who Have Sex With Men. *American Journal of Public Health*, 2008. 98(2): p. 337-343.
- Down I, Wilson DP, McCann PD, Gray R, Hoare A, Bradley J, Donovan B, Prestage G. Increasing gay men's testing rates and enhancing partner notification can reduce the incidence of syphilis. *Sex Health*. 2012 Nov;9(5):472-80. (abstract only)
- Ehlman DC, Jackson M, Saenz G, et al. Evaluation of an innovative internet-based partner notification program for early syphilis case management, Washington, DC, January 2007–June 2008. *Sex Transm Dis* 2010; 37:478–485
- Fairley CK, Law M, Chen MY. Eradicating syphilis, hepatitis C and HIV in MSM through frequent testing strategies. *Curr Opin Infect Dis*. 2014 Feb;27 (1):56-61.
- Gratrix J, et al. P5-S4.05 The use of financial compensation as an incentive for infectious syphilis case finding among vulnerable populations in Edmonton, Canada. *Sexually Transmitted Infections*, 2011. 87(Suppl 1): p. A323-A324.
- Gray RT, et al. Frequent testing of highly sexually active gay men is required to control syphilis. *Sexually Transmitted Diseases*, 2010. 37(5): p. 298-305.
- Gray RT, et al. Will Changes in Gay Men's Sexual Behavior Reduce Syphilis Rates? *Sexually Transmitted Diseases*, 2011. 38(12): p. 1151-1158 10.1097/OLQ.0b013e318238b85d.
- Guy R, El-Hayek C, Fairley CK, Wand H, Carr A, McNulty A, Hoy J, Bourne C, McAllister J, Tee BK, Baker D, Roth N, Stooze M, Chen M. Opt-out and opt-in testing increases syphilis screening of HIV-positive men who have sex with men in Australia. *PLoS One*. 2013 Aug 23;8(8):e71436.
- Guy R, Wand H, Holt M, Mao L, Wilson DP, Bourne C, Drummond F, Honnor G, Keen P, Donovan B, Prestage G. High annual syphilis testing rates among gay men in Australia, but insufficient retesting. *Sex Transm Dis*. 2012 Apr;39(4):268- 75.
- Haute autorité de santé. Évaluation a priori du dépistage de la syphilis en France – Recommandation en santé publique. 2007, Service évaluation médico-économique et santé publique, HAS.
- Hogben M, et al. Syphilis Partner Notification With Men Who Have Sex With Men: A Review and Commentary. *Sexually Transmitted Diseases*, 2005. 32: p. S43-S47 10.1097/01.olq.0000180565.54023.bf.
- Hottes TS, et al. LBP-1.02 Acceptability and appeal of internet-based STI and HIV testing among a sample of gay men and clients attending STI clinics in British Columbia. *Sexually Transmitted Infections*, 2011. 87(Suppl 1): p. A353.
- Hourihan M, et al. Lessons from the syphilis outbreak in homosexual men in east London. *Sexually Transmitted Infections*, 2004. 80(6): p. 509-511.
- Hunter P, Oyervides O, Grande KM, Prater D, Vann V, Reitl I, Biedrzycki PA. Facebook-augmented partner notification in a cluster of syphilis cases in Milwaukee. *Public Health Rep*. 2014 Jan-Feb;129 Suppl 1:43-9.
- Katz KA, Raymond HF, Bernstein KT, Klausner JD. Knowledge, attitudes, and practices regarding syphilis screening among men who have sex with men in San Francisco. *Sex Transm Dis*. 2013 Apr;40(4):318-22.
- Kerani RP, et al. Rising rates of syphilis in the era of syphilis elimination. *Sexually Transmitted Diseases*, 2007. 34(3): p. 154-161.
- Kerani RP, Fleming M, DeYoung B, et al. A randomized, controlled trial of inSPOT and patient delivered partner therapy for gonorrhea and chlamydial infection among men who have sex with men. *Sex Transm Dis* 2011; 38:941–946.
- Klausner JD, Ahrens K. Case Study: A Healthy Response to Increases in Syphilis in San Francisco, in *Infectious Disease Surveillance*, N.M. M'ikanatha, Editor. 2007, Wiley-Blackwell: Oxford.
- Klausner JD, et al. The Public Health Response to Epidemic Syphilis, San Francisco, 1999-2004. *Sexually Transmitted Diseases*, 2005. 32: p. S11-S18 10.1097/01.olq.0000180456.15861.92.
- Koekenbier RH, et al. Online-mediated syphilis testing: feasibility, efficacy, and usage. *Sexually Transmitted Diseases*, 2008. 35(8): p. 764-769.

Levine D, Woodruff AJ, Mocello AR, et al. inSPOT: The first online STD partner notification system using electronic postcards. *PLoS Med* 2008; 5:e213.

Lewis FM, et al. Needle in a haystack: the yield of syphilis outreach screening at 5 US sites-2000 to 2007. *Journal of public health management and practice* : JPHMP, 2011. 17(6): p. 513-521.

Marcus JL, et al. Prediction model to maximize impact of syphilis partner notification-San Francisco, 2004-2008. *Sexually Transmitted Diseases*, 2010. 37(2): p. 109-114.

Marcus JL, et al. Syphilis Testing Behavior Following Diagnosis With Early Syphilis Among Men Who Have Sex With Men—San Francisco, 2005–2008. *Sexually Transmitted Diseases*, 2011. 38(1): p. 24-29  
10.1097/OLQ.0b013e3181ea170b.

McCann PD, et al. Would Gay Men Change Their Sexual Behavior to Reduce Syphilis Rates? *Sexually Transmitted Diseases*, 2011. 38(12): p. 1145-1150  
10.1097/OLQ.0b013e318238b846.

McFarlane M, et al. Internet-Based Health Promotion and Disease Control in the 8 Cities: Successes, Barriers, and Future Plans. *Sexually Transmitted Diseases*, 2005. 32: p. S60-S64.

Montoya JA, et al. Social Marketing Campaign Significantly Associated With Increases in Syphilis Testing Among Gay and Bisexual Men in San Francisco. *Sex Transm Dis*, 2005. 32(7): p. 395-399.

Neville S, Adams J, Holdershaw J. Social marketing campaigns that promote condom use among MSM: a literature review. *Nurs Prax N Z*. 2014 Mar;30(1):5-16. (abstract only)

Ogilvie G, et al. Incorporating a social networking approach to enhance contact tracing in a heterosexual outbreak of syphilis. *Sexually Transmitted Infections*, 2005. 81(2): p. 124-127.

Pedrana A, et al. Stop the Drama Downunder: A Social Marketing Campaign Increases HIV/Sexually Transmitted Infection Knowledge and Testing in Australian Gay Men. *Sex Transm Dis*, 2012. 39(8): p. 651-658.

Pedrana AE, Hellard ME, Higgs P, Asselin J, Batrouney C, Stooovè M. No drama: key elements to the success of an HIV/STI-prevention mass-media campaign. *Qual Health Res*. 2014 May;24(5):695-705.

Plant A, et al. Stop the sores: the making and evaluation of a successful social marketing campaign. *Health promotion practice*, 2010. 11(1): p. 23-33.

Plant A, Rotblatt H, Montoya JA, Rudy ET, Kerndt PR. Evaluation of inSPOTLA.org: an Internet partner notification service. *Sex Transm Dis*. 2012 May;39(5):341-5.

Plant A, Javanbakht M, Montoya JA, Rotblatt H, O'Leary C, Kerndt PR. Check Yourself: a social marketing campaign to increase syphilis screening in Los Angeles County. *Sex Transm Dis*. 2014 Jan;41(1):50-7.

Pourbohloul B, Rekart ML, Brunham RC. Impact of mass treatment on syphilis transmission: a mathematical modeling approach. *Sex Transm Dis*, 2003. 30(4): p. 297-305.

Read PJ, Knight V, Bourne C, Guy R, Donovan B, Allan W, McNulty AM. Community event-based outreach screening for syphilis and other sexually transmissible infections among gay men in Sydney, Australia. *Sex Health*. 2013 Aug;10 (4):357-62.

Rekart ML, et al. Targeted mass treatment for syphilis with oral azithromycin. *Lancet*, 2003. 361(9354): p. 313-4.

Reynolds SL, et al. Examining the direct costs and effectiveness of syphilis detection by selective screening and partner notification. *J Public Health Med*, 2001. 23(4): p. 339-45.

Rudy ET, Aynalem G, Cross J, Ramirez F, Bolan RK, Kerndt PR. Community-embedded disease intervention specialist program for syphilis partner notification in a clinic serving men who have sex with men. *Sex Transm Dis*. 2012 Sep;39(9):701-5.

Sanchez JP, et al. A syphilis control intervention targeting black and Hispanic men who have sex with men. *Journal of health care for the poor and underserved*, 2009. 20(1): p. 194-209.

Stephens SC, et al. Dogs are talking: San Francisco's social marketing campaign to increase syphilis screening. *Sexually Transmitted Diseases*, 2010. 37(3): p. 173-176.

Taylor M, et al. Interventions in the Commercial Sex Industry During the Rise in Syphilis Rates Among Men Who Have Sex With Men (MSM). *Sexually Transmitted Diseases*, 2005. 32: p. S53-S59  
10.1097/01.olq.0000180453.31255.2d.

Taylor MM, et al. Improving partner services by embedding disease intervention specialists in HIV-clinics. *Sexually Transmitted Diseases*, 2010. 37(12): p. 767-770.

Tuite AR, Burchell AN, Fisman DN. Cost-Effectiveness of Enhanced Syphilis Screening among HIV-Positive Men Who Have Sex with Men: A Microsimulation Model. *PLoS One*. 2014 Jul 1;9(7):e101240.

Tuite AR, Fisman DN, Mishra S. Screen more or screen more often? Using mathematical models to inform syphilis control strategies. *BMC Public Health*. 2013 Jun 24;13:606.

U.S. Preventive Services Task Force. *Screening for Syphilis Infection: Recommendation Statement*. July 2004. <http://www.uspreventiveservicestaskforce.org/3rduspstf/syphilis/syphilirs.htm>

van Aar F, Schreuder I, van Weert Y, Spijker R, Götz H, Op de Coul E, Partner Notification Group. Current practices of partner notification among MSM with HIV, gonorrhoea and syphilis in the Netherlands: an urgent need for improvement. *BMC Infect Dis*. 2012 May 14;12:114.

Vega MY, Roland EL. Social Marketing Techniques for Public Health Communication: A Review of Syphilis Awareness Campaigns in 8 US Cities. *Sexually Transmitted Diseases*, 2005. 32: p. S30-S36  
10.1097/01.olq.0000180461.30725.f4.

Vest JR, Valadez AM, Hanner A, et al. Using e-mail to notify pseudonymous e-mail sexual partners. *Sex Transm Dis* 2007; 34:840–845.

Wei C, Herrick A, Raymond HF, Anglemeyer A, Gerbase A, Noar SM. Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women. *Cochrane Database of Systematic Reviews* 2011, Issue 9. Art. No.: CD009337.

Wohlfeiler D, Potterat JJ. Using Gay Men's Sexual Networks to Reduce Sexually Transmitted Disease (STD)/Human Immunodeficiency Virus (HIV) Transmission. *Sex Transm Dis*, 2005. 32: p. S48-S52  
10.1097/01.olq.0000175394.81945.68.

Zou H, Fairley CK, Guy R, Bilardi J, Bradshaw CS, Garland SM, Sze JK, Afrizal A, Chen MY. Automated, computer generated reminders and increased detection of gonorrhoea, chlamydia and syphilis in men who have sex with men. *PLoS One*. 2013 Apr 17;8(4):e61972.

Zou H, Fairley CK, Guy R, Chen MY. The efficacy of clinic-based interventions aimed at increasing screening for bacterial sexually transmitted infections among men who have sex with men: a systematic review. *Sex Transm Dis*. 2012 May;39(5):382-7.

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