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, Bisessor 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 advertising 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.

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