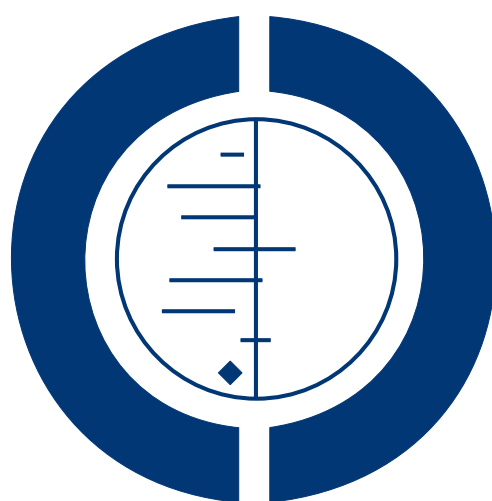


# **Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women (Review)**

Wei C, Herrick A, Raymond HF, Anglemyer A, Gerbase A, Noar SM



**THE COCHRANE  
COLLABORATION®**

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2011, Issue 9

<http://www.thecochranelibrary.com>



---

Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women (Review)  
Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

## TABLE OF CONTENTS

HEADER . . . . .	1
ABSTRACT . . . . .	1
PLAIN LANGUAGE SUMMARY . . . . .	2
BACKGROUND . . . . .	2
Figure 1. . . . .	4
OBJECTIVES . . . . .	5
METHODS . . . . .	5
RESULTS . . . . .	7
Figure 2. . . . .	8
Figure 3. . . . .	9
DISCUSSION . . . . .	10
Figure 4. . . . .	11
AUTHORS' CONCLUSIONS . . . . .	11
ACKNOWLEDGEMENTS . . . . .	12
REFERENCES . . . . .	12
CHARACTERISTICS OF STUDIES . . . . .	14
DATA AND ANALYSES . . . . .	18
Analysis 2.1. Comparison 2 Post vs. Pre intervention (Testing Uptake), Outcome 1 Tested for HIV. . . . .	18
Analysis 2.4. Comparison 2 Post vs. Pre intervention (Testing Uptake), Outcome 4 Tested for STI. . . . .	19
APPENDICES . . . . .	19
HISTORY . . . . .	20
CONTRIBUTIONS OF AUTHORS . . . . .	20
DECLARATIONS OF INTEREST . . . . .	20
SOURCES OF SUPPORT . . . . .	21
DIFFERENCES BETWEEN PROTOCOL AND REVIEW . . . . .	21
INDEX TERMS . . . . .	21

[Intervention Review]

# Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women

Chongyi Wei<sup>1</sup>, Amy Herrick<sup>1</sup>, H Fisher Raymond<sup>2</sup>, Andrew Anglemyer<sup>3</sup>, Antonio Gerbase<sup>4</sup>, Seth M Noar<sup>5</sup>

<sup>1</sup>Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania, USA. <sup>2</sup>San Francisco Department of Public Health, San Francisco, California, USA. <sup>3</sup>Global Health Sciences, University of California, San Francisco, San Francisco, California, USA. <sup>4</sup>Department of HIV/AIDS, World Health Organization, Geneva, Switzerland. <sup>5</sup>Department of Communication, University of Kentucky, Lexington, Kentucky, USA

Contact address: Chongyi Wei, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania, 15261, USA. [chw57@pitt.edu](mailto:chw57@pitt.edu).

**Editorial group:** Cochrane HIV/AIDS Group.

**Publication status and date:** New, published in Issue 9, 2011.

**Review content assessed as up-to-date:** 23 September 2010.

**Citation:** Wei C, Herrick A, Raymond HF, Anglemyer 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. DOI: 10.1002/14651858.CD009337.

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

## ABSTRACT

### Background

Social marketing interventions have been shown to both promote and change many health-related behaviours and issues. As the HIV epidemic continues to disproportionately affect MSM and transgender women around the world, social marketing interventions have the potential to increase HIV/STI testing uptake among these populations.

### Objectives

To assess the impact of social marketing interventions on HIV/STI testing uptake among men who have sex with men and transgender women compared to pre-intervention or control group testing uptake in the same population.

### Search strategy

We searched the following electronic databases for results from 01 January 1980 to the search date, 14 July 2010: Cochrane Central Register of Controlled Trials (CENTRAL), EMBASE, LILACS (Latin America and Brazil), PsycINFO, PubMed, Web of Science/ Web of Social Science, Chinese National Knowledge Infrastructure (CNKI), and CQ VIP (China). We also searched for conference abstracts in the Aegis archive of HIV/AIDS conference abstracts and the CROI and International AIDS Society websites. In addition to searching electronic databases, we searched the following sources of grey literature: Australasian Digital Theses Program, Canadian Evaluation Society, Eastview: China Conference Proceedings, ProQuest Dissertations and Theses, and World Health Organization Library Information System (WHOLIS). We contacted individual researchers, experts working in the field, and authors of major trials for suggestions of any relevant manuscripts that were in preparation or in press. References of published articles from the databases above were searched for additional, pertinent materials. All languages were included in this search.

---

**Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women (Review)**

Copyright © 2011 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

## Selection criteria

Randomized controlled trials and controlled clinical trials that compared social marketing interventions with a control were included. Interrupted time series and pretest-posttest design studies (controlled or uncontrolled) that compared social marketing interventions with no intervention or a control were also included. Posttest-only studies and studies that combined pre-post data were excluded. Interventions that targeted at general public but did not include MSM or transgender women as a segment or did not have outcome data for an MSM or transgender segment were excluded.

## Data collection and analysis

Two authors independently extracted data from each included study and assessed study quality. Meta-analyses were conducted to compare pre- and post-intervention and intervention and control group outcomes of HIV and STI testing uptake. Quality of evidence was assessed using the GRADE approach.

## Main results

Three serial, cross-sectional pretest-posttest study designs (one with a control group and two without) were included in the final analysis. Statistical pooling was conducted for two studies and compared to pre-intervention level testing uptake, which showed that multi-media social marketing campaigns had a significant impact on HIV testing uptake (OR=1.58, 95%CI = 1.40 - 1.77). However, the campaigns were not found to be effective in increasing STI testing uptake (OR=0.94, 95%CI = 0.68 - 1.28). Overall, risk of bias was high and quality of evidence was low. None of the studies were conducted in developing countries or included male-to-female transgender women.

## Authors' conclusions

This review provided limited evidence that multi-media social marketing campaigns can promote HIV testing among MSM in developed countries. Future evaluations of social marketing interventions for MSM should employ more rigorous study designs. Long-term impact evaluations (changes in HIV or STI incidence over time) are also needed. Implementation research, including detailed process evaluation, is needed to identify elements of social marketing interventions that are most effective in reaching the target population and changing behaviours.

## PLAIN LANGUAGE SUMMARY

### Multi-media social marketing campaigns to increase HIV testing uptake among men who have sex with men and transgender women

Men who have sex with men and transgender women are disproportionately affected by HIV/AIDS worldwide. Unrecognized infections could be one of the driving forces of ongoing HIV transmission among these populations. Thus, it is important to promote HIV testing.

Limited evidence suggests that multi-media social marketing campaigns can significantly increase HIV testing uptake among men who have sex with men. Future research should employ more rigorous designs in evaluating social marketing interventions, measure their long-term impact, and identify intervention components that are most effective in reaching the target population and changing behaviours.

## BACKGROUND

Since the beginning of the HIV epidemic over two decades ago, over 60 million individuals have been infected with HIV and 25 million people have died of AIDS (UNAIDS 2005). It was estimated that in 2007 there were 33.2 million people living with

HIV, 2.5 million new infections, and 2.1 million deaths due to AIDS worldwide (UNAIDS 2007). Men who have sex with men (MSM) were the first group of individuals hard-hit by the HIV epidemic and continue to be disproportionately affected by HIV

in many parts of the world (Baral 2007). In Europe, North America, and Latin America, MSM account for the majority of people living with HIV and the majority of all new infections (Sullivan 2009; Beyrer 2010). Meanwhile, newly identified and expanding epidemics of HIV among MSM have been reported in Asia and Africa where HIV incidence is very high and HIV prevalence has increased dramatically (Beyrer 2010; van Griensven 2009).

Unrecognized infections, due to lack of HIV testing, could be one of the driving forces of ongoing HIV transmission among MSM. It has been estimated that unrecognized infections account for as much as 50% of new infections among MSM in the US (Marks 2006). Individuals who do not know their HIV testing status may erroneously assume they do not need to use condoms and engage in unprotected sex with partners they know to be HIV negative (Raymond 2008). Moreover, persons who are infected with HIV but unaware of their status may be more infectious than those receiving treatment because of higher viral loads (Gray 2001; Mannheimer 2002; Porco 2004). A recent US nation-wide study found that 44% of HIV-positive men who have sex with men (MSM) were unaware of their status and 55% of these men had not been tested during the past 12 months (CDC 2010). HIV testing has been a cornerstone of HIV prevention since it links HIV-positive MSM to medical care and treatment and has been recommended as a routine test for MSM. Mathematical models and emerging empirical evidence suggest that the “Test and Treat” approach would significantly curtail the HIV epidemic among high-risk populations in various settings (Granich 2009; Montaner 2010; Holgrave 2007; Das 2010). Testing for other sexually transmitted infections (STIs) can be equally important since STIs facilitate the transmission and acquisition of HIV as has been consistently documented in the MSM literature (Fleming 1999; Rothenberg 2000).

The existing MSM interventions are not sufficient for reducing the growing number of HIV infections among MSM. Evidence-based interventions for MSM are scarce. For example, in the US, only a few interventions are identified as Diffusion of Evidence-based Interventions (DEBIs) (<http://www.effectiveinterventions.org/en/home.aspx>). With the exception of a few countries, effective interventions for MSM in developing countries are almost non-exis-

tent. New approaches to preventing HIV infection among MSM such as a large-scale roll-out of evidence-based interventions in different settings are needed. This review will examine the evidence on the impact of social marketing interventions in increasing HIV/STI testing uptake among MSM.

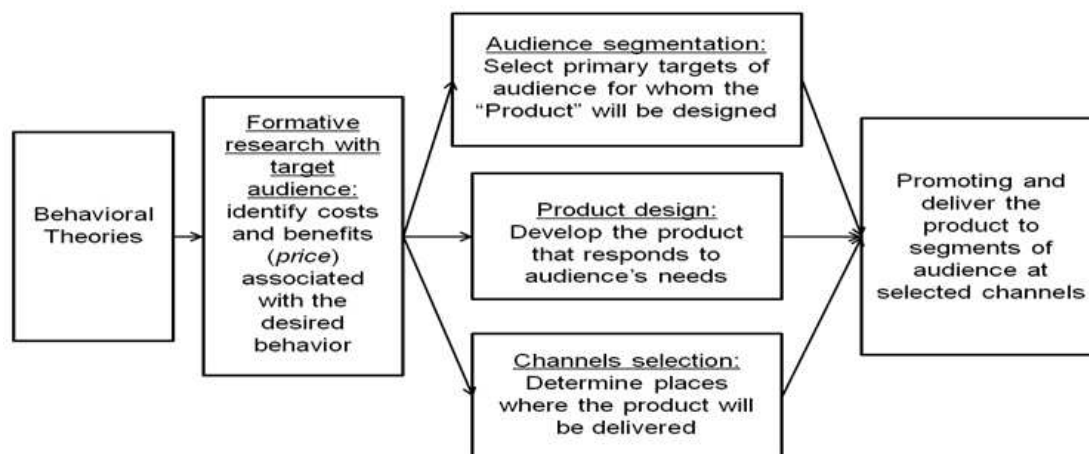
## Description of the intervention

Social marketing is the systematic application of commercial marketing concepts and techniques to the analysis, planning, execution, and evaluation of programs. These programs are designed to influence the voluntary behavior of target audiences in a way that improves their personal welfare (Andreasen 1995). Four key elements of the marketing mix (4 Ps) are fundamental to social marketing practice: 1) Product - the bundle of benefits; 2) Price - reducing the bundle of benefits or costs; 3) Place - delivering the benefits and costs to the right place at the right time; and 4) Promotion - informing and persuading the costs and benefits (Maibach 2002). Taking these elements into consideration, behavior change through social marketing involves elements that go beyond education. Social marketing programs attempt to modify the relative attractiveness of specific behavioral options by using incentives and other benefits that positively reinforce the desired behaviours and by reducing the barriers or costs associated with those behavior (Maibach 2002).

Like other types of behavioral interventions, social marketing uses *behavioral theories* to guide program development. The first step in developing a social marketing program is to conduct *audience research*. Audience research is formative research conducted within the target audience in order to: identify costs and benefits (*price*) associated with the desired behavior; develop marketing offers (*products*) related to the target audience's needs; and identify channels (*place*) for product delivery. By using attributes of the target audience such as demographics, behaviours, or beliefs/attitudes, *segments* (smaller, more homogeneous, and meaningful subgroups) are created which can be used to influence program design and outcome. Finally, the product is delivered (*promotion*) to these *segments* through selected channels (e.g. mass media). See Figure 1.

Figure 1.

Figure 1. Development and implementation of a social marketing intervention



### How the intervention might work

Social marketing interventions have been shown to change or promote health behaviours on a wide range of health issues such as condom use, syphilis testing, smoking, binge drinking, and cancer screening. These interventions have been implemented across various populations and settings (Brown 2000; CDC 1999; Cohen 1999; Gordon 2006; Noar 2009; Vega 2005). For MSM, a multitude of individual, socio-cultural, community, and structural factors may be barriers to obtaining HIV/STI tests. Social marketing interventions intend to remove many of these barriers in order to increase the perceived benefits of changing a certain behavior.

MSM in China present a great example of this type of intervention. HIV voluntary counseling and testing (VCT) is offered free in China yet HIV testing rates remain very low among Chinese MSM; only 30% of MSM report being ever tested and only 10-15% of MSM report being tested in the past year (Choi 2006; He 2009; Ruan 2009). Barriers to utilizing VCT services include: low perceptions of HIV risk and fear of being HIV-positive (Choi 2006; Liu 2005; Zhou 2009); stigma of homosexuality and being HIV-positive; lack of social norms for HIV testing (Choi 2008; Hendriksen 2009); and poor accessibility and few MSM-friendly services at VCT sites (Choi 2006; UNAIDS 2008; Zhou 2009). A social marketing program to promote VCT is likely to increase HIV testing uptake among Chinese MSM by removing some or all of the barriers to testing by instead emphasizing the benefits of HIV testing. This intervention may be a multi-media campaign (*product*) implemented at gay bars (*place/channels*) where young MSM engage in high-risk sexual behaviours (*segment*). Poster advertisements of VCT services (*promotion*) at these gay bars will raise awareness and activate young MSM's "readiness" to get an

HIV test by influencing community norms for HIV testing. In addition, establishing a hotline operated by MSM volunteers (*promotion*) will create a more friendly and culturally sensitive "environment" for young MSM to seek information about HIV testing. A very important characteristic of social marketing is its scalability in that the basic social marketing processes are applicable regardless of the size of the program (e.g. local versus national intervention) or the resources available (e.g. low versus high resource programs) (Maibach 2002).

### Why it is important to do this review

Social marketing interventions to prevent HIV/STI infection have been implemented among high-risk populations and the general public since the early stage of the HIV epidemic. Still, no systematic review has been conducted to evaluate the effectiveness of social marketing interventions among MSM or transgender women. A few recent reviews examining the effectiveness of mass media/communication campaigns on sexual risk behaviours and HIV testing among different populations have found the campaigns to have positive effects (Noar 2009; Vidanapathirana 2005). However, these reviews did not examine the impact of these interventions specifically among MSM or transgender women. In addition, mass media/communication campaigns are not necessarily based on the social marketing model or principles even though they are often considered part of a social marketing intervention (e.g. a mass media campaign is used as a *promotional* tool for a social marketing *product*). As the HIV epidemic continues to disproportionately affect MSM and transgender women around the world, large-scale interventions implemented among and de-

livered to MSM or transgender communities must be based on best practices. Social marketing interventions have the potential to reach large numbers of MSM and transgender women and effect behavioral change across all resource settings (i.e. scalability).

## OBJECTIVES

To assess the impact of social marketing interventions on HIV/STI testing uptake among men who have sex with men and transgender women compared to pre-intervention or control group testing uptake in the same population.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

In this assessment we included:

- Randomized controlled trials (RCTs) (individual or cluster) that compared social marketing interventions with a control;
- Controlled clinical trials (CCTs) that compared social marketing interventions with a control;
  - Interrupted time series (ITS) design studies (at least three points of data collection before and after the intervention) that compared social marketing interventions with no intervention;
  - Pretest-posttest design studies (controlled or uncontrolled), i.e., studies in which outcome measurement data were collected before and after the intervention, to assess the effect of social marketing intervention on no intervention or control.

Posttest-only studies and studies that combined pre and post data were excluded.

#### Types of participants

Studies involving men who have sex with men and/or male-to-female transgender women.

#### Types of interventions

This study looked for social marketing interventions aimed at increasing HIV/STI testing among the general public, including MSM or transgender women. Interventions that targeted the general public and either did not include MSM or transgender women as a segment or did not have MSM or transgender women outcome data were excluded.

### Types of outcome measures

The following outcome measures were compared to the rates within the control group or the pre-intervention group:

Primary outcomes:

- HIV infection

Secondary outcomes:

- STI infection
- Quality of life

### Search methods for identification of studies

We followed the same search methods used in reviews by the Cochrane Collaborative Review Group on HIV Infection and AIDS ([Higgins 2008](#))

#### Electronic searches

We formulated a comprehensive and exhaustive search strategy to identify all relevant studies regardless of language or publication status (e.g., published, unpublished, in press and in progress). The search strategy was developed with the assistance of the Cochrane HIV/AIDS Group Trials Search Coordinator. Full details of the Cochrane HIV/AIDS Review Group search methods and the hand-searched journals are published in The Cochrane Library, Collaborative Review Groups section.

#### Journal and trial databases

See: [Appendix 1](#) for search strategies and search terms used in PubMed

We searched for studies dated from 01 January 1980 to the search date (19 July 2010) using the following electronic databases:

- CENTRAL (Cochrane Central Register of Controlled Trials)
  - EMBASE
  - LILACS (Latin America and Brazil)
  - PsycINFO
  - PubMed
  - Web of Science / Web of Social Science
  - Chinese National Knowledge Infrastructure (CNKI)
  - CQ VIP (China)

Along with MeSH terms and relevant keywords, we used the Cochrane Highly Sensitive Search Strategy to identify reports of randomised controlled trials in MEDLINE ([Higgins 2008](#)) and used the existing Cochrane HIV/AIDS Group's strategies to identify references relevant to HIV and STIs. The search strategy was iterative, in references from previous studies were searched for additional references. We allowed studies in all languages in our search. We used the following search terms related to social marketing:

Social marketing, mass media, campaign, 4Ps, marketing mix, audience research, segmentation, mass communication, multimedia,

promotion, and all other relevant terms and synonyms and combinations of terms. These search terms were combined with MSM and transgender related terms.

See [Appendix 1](#) for our PubMed search strategy. This strategy was modified and adapted for use in all databases.

### Conference databases

We searched the Aegis archive of HIV/AIDS conference abstracts ([www.aegis.org](http://www.aegis.org)), which includes abstracts for the following conferences:

- British HIV/AIDS Association, 2001-2008
- Conference on Retroviruses and Opportunistic Infections (CROI), 1994-2008
- European AIDS Society Conference, 2001 and 2003
- International AIDS Society, International AIDS Conference (IAC), 1994-2004
- International AIDS Society, Conference on HIV Pathogenesis, Treatment and Prevention (IAS), 2001-2005
- US National HIV Prevention Conference, 1999, 2003, and 2005

We also searched the CROI and International AIDS Society web sites for abstracts presented at conferences subsequent to those listed above (CROI, 2009-2010; IAC, 2006-2010; IAS, 2007-2009).

### Searching other resources

In addition to searching electronic databases, we searched the following sources of grey literature:

- Australasian Digital Theses Program
- Canadian Evaluation Society
- Eastview: China Conference Proceedings
- ProQuest Dissertations and Theses
- World Health Organization Library Information System (WHOLIS)

We contacted individual researchers, experts working in the field, and authors of major trials to solicit suggestions for relevant manuscripts that were in preparation or in press. The references of published articles found in the above databases were searched for additional pertinent materials.

We searched the [ClinicalTrials.gov](http://ClinicalTrials.gov) website to identify ongoing trials.

### Data collection and analysis

The methodology for data collection and analysis were based on the guidance of the Cochrane Handbook of Systematic Reviews of Interventions ([Higgins 2008](#)).

### Selection of studies

The Cochrane HIV/AIDS Group Trials Search Coordinator performed a broad first cut of all downloaded material from the electronic searches and excluded citations that were plainly irrelevant. Two authors (CW and AH) then independently read the titles, abstracts, and descriptor terms of the remaining downloaded citations to identify potentially eligible reports. Full text articles were obtained for all citations identified as potentially eligible and the two authors independently inspected these to identify articles that met the pre-specified criteria. Where there was uncertainty as to the eligibility of the record, the full article was obtained.

CW and AH independently applied the inclusion criteria. Any criteria disputes were resolved by a neutral arbiter. Studies were reviewed for relevance based on intervention characteristics, study design, types of participants, and outcome measures.

### Data extraction and management

CW and AH independently extracted data into a standardized, pre-piloted data extraction form. The following characteristics were extracted from each included study:

- Administrative details: trial identification number; author(s); published or unpublished; year of publication; number of studies included in paper; year(s) in which study was conducted; details of other relevant papers cited; funding source;
- Study details: study design; type, duration and completeness of follow up; location/orientation of study (e.g. higher-income vs. low or middle-income country; local/regional/national/international);
- Participant details: Number of participants; mean/median age or age range;
- Intervention details: Use of theory; audience research; audience segmentation; channels where intervention is delivered; duration; promotional tools;
- Outcome details: collected and reported outcomes; definitions of reported outcomes; rates of HIV/STI testing.

### Assessment of risk of bias in included studies

CW and AH independently assessed the risk of bias for each study using the criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions ([Higgins 2008](#)). We resolved any disagreement through discussion or by involving a neutral third party to arbitrate.

- Sequence generation (checking for possible selection bias)
- Allocation concealment (checking for possible selection bias)
- Blinding (checking for possible performance bias)
- Incomplete outcome data (checking for possible attrition bias through withdrawals, dropouts, protocol deviations)
- Selective reporting bias
- Other sources of bias

- Overall risk of bias

For blinding and incomplete outcome data, multiple entries were made if more than one outcome (or time points) were involved. Since no RCTs or CCTs were identified for this review, we added an additional domain to assess bias and adjustment for confounding variables (under “Other sources of bias”).

The quality of evidence across the body of evidence was assessed with the GRADE approach (Guyatt 2008). The quality of evidence for each outcome was defined as “the extent to which one can be confident that an estimate of effect or association is close to the quantity of specific interest” (Higgins 2008). The quality rating across studies has four levels: high, moderate, low or very low. Randomized trials are categorized as high quality but can be downgraded; similarly, observational studies can be upgraded. Factors that decrease the quality of evidence include limitations in design, indirectness of evidence, unexplained heterogeneity or inconsistency of results, imprecision of results, or high probability of publication bias. Factors that can increase evidence quality level include: a large magnitude of effect, all plausible confounding reduces a demonstrated effect, and presence of a dose-response gradient.

### Assessment of heterogeneity

We used the  $I^2$  statistic to measure heterogeneity across studies. If we identified substantial heterogeneity ( $I^2$  greater than 50%), we explored it using prespecified subgroup analysis.

### Data synthesis

Meta-analyses were conducted comparing post-intervention HIV and STI testing uptake to pre-intervention or control group uptake. Where multiple outcomes were reported in one study, we chose the outcome that: the intervention primarily intended to change, had a closer relationship with HIV transmission, and had a longer follow-up period. For example, Guy 2009, reported both

HIV and STIs testing rates however we chose HIV testing uptake as the outcome since it had a 2-year follow-up.

All studies reported dichotomous outcomes except for McOwan et al. (2002), where we standardized the denominators to allow for statistically pooling with other studies. Odds ratios (ORs) were calculated for the dichotomous outcomes.  $Z$  statistics were used to test for overall effect.

Data were also presented using GRADEPro (GRADEpro) and GRADE Evidence Profile was generated.

## RESULTS

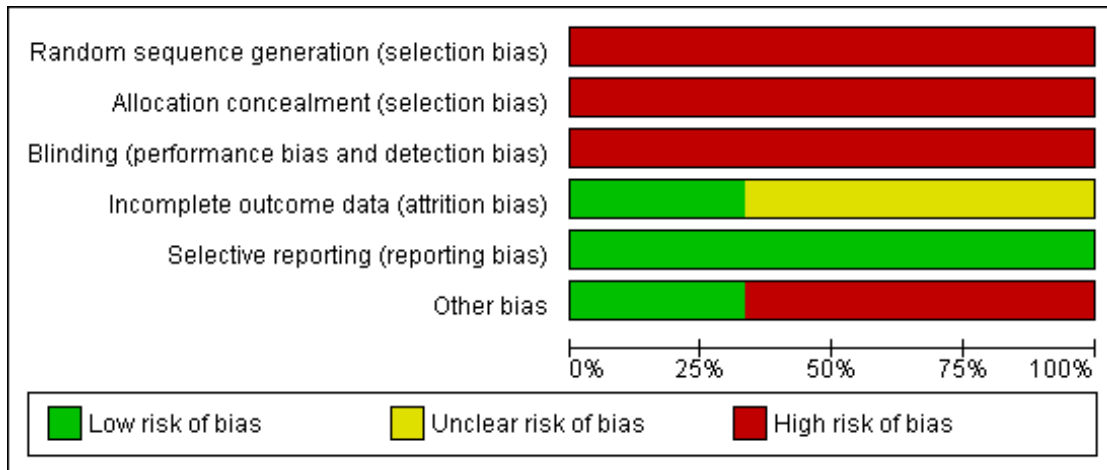
### Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

The electronic searches generated 289 citations. An initial screening excluded 173 citations. Of the remaining 116 citations, 113 were excluded for not meeting the inclusion criteria (Figure 2). No RCTs, CCTs, or ITS design studies were identified. Of the three studies included, two (Darrow 2008; Guy 2009) were serial cross-sectional pretest-posttest design studies without a control, and one (McOwan 2002) was a serial cross-sectional pretest-posttest design study with a control. All three studies were conducted in developed countries and published in English. One was conducted in the United States, one in Australia, and one in the United Kingdom. One study (Darrow 2008) used self-reported syphilis testing; one study (McOwan 2002) used laboratory report; and one study (Guy 2009) used both self-reported HIV testing and laboratory report however laboratory reported outcomes were excluded from data analysis because they included all males). None of the studies measured change in HIV incidence or prevalence attributable to the intervention.

**Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.**



Study participants were convenience samples of MSM in all three studies. None of the studies included male-to-female transgender women. Two studies (Guy 2009; McOwan 2002) did not report sociodemographic characteristics of the participants. Median age of participants in the other study (Darrow 2008) was 37 for the pretest assessment and 36 for the posttest assessment. Length of follow-up for the three studies ranged from 6 to 24 months.

All three social marketing interventions were local- or regional-level multi-media campaigns (including posters, advertisements, in-print publications, hotlines, billboards, alert banners on websites, radio or TV public service announcements) aimed at increasing HIV/STI testing. Two of them (Guy 2009; McOwan 2002) targeted specific segments of MSM while one (Darrow 2008)

targeted populations at risk for syphilis. None of the interventions specified whether or not behavioral theories were used to guide campaign development. Two interventions (Darrow 2008; McOwan 2002) did not conduct audience/formative research as part of campaign development. Campaign duration ranged from 3 to 8 months and were implemented through a variety of channels including gay bars, clubs, gyms, hotels, sex on premise venues, public transportation terminals, and the Internet.

**Risk of bias in included studies**

See: Risk of bias graph (Figure 2) and risk of bias summary (Figure 3)

**Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.**

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding (performance bias and detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Darrow 2008	-	-	-	?	+	-
Guy 2009	-	-	-	?	+	-
McOwan 2002	-	-	-	+	+	+

Overall risk of bias was high. None of the studies allocated participants randomly or used sequence generation, allocation concealment, or blinding. There were missing data on outcome measures in two studies (Darrow 2008; Guy 2009), and it was unclear as to whether or not these incomplete outcome data were addressed. No selective reporting was found in the studies, meaning that data were available for all non-significant and significant outcomes. Possible confounders were present in two studies (Darrow 2008; Guy 2009) and were not addressed (e.g. controlled for in statistical analysis). Comparison groups (posttest vs. pretest or a control) were equivalent on sociodemographics in one study (Darrow 2008), but it was unclear whether they were equivalent in the other two studies (Guy 2009; McOwan 2002). It was unclear if comparison groups were equivalent at baseline on outcome measures

for the one study (McOwan 2002) that had a control group.

### Effects of interventions

Of the three included studies, one (McOwan 2002) concluded that social marketing had a large effect on HIV testing uptake among MSM. A 4.5 fold increase in the total number of MSM testing for HIV was observed after the campaign at the target clinic ( $p < .001$ ). Among the MSM segment, whom the campaign specifically targeted, a 14.0 fold increase was observed among MSM of Southern Europe origin ( $p < .001$ ), 6.5 fold increase among MSM of Black origin ( $p < .003$ ), and 9.5 fold increase among MSM under 25 years of age ( $p < .001$ ). No statistically significant increase in MSM testing for HIV across all segments was found at the control clinics. Statistical pooling was conducted for two

studies (Guy 2009; McOwan 2002) and showed that multi-media social marketing campaigns had a significant impact on HIV testing uptake when compared to pre-intervention testing levels (OR=1.58, 95%CI = 1.40 - 1.77).

None of the studies found a significant increase in STI testing uptake following the intervention. Darrow et al. found no significant increase in self-reported testing for syphilis after a syphilis social marketing campaign (OR=0.94, 95%CI = 0.68 - 1.28). Although there was a statistically significant increase in uptake of STIs testing (anal swab, penile swab, throat swab, and urine sample) compared to pre-intervention level in the other study (Guy 2009), the authors concluded that the increase began a few years before the campaign. Statistical pooling was not conducted for STI testing uptake for Guy et al. (2009) since multiple outcomes were reported and HIV testing uptake was determined to be the primary outcome.

## DISCUSSION

We assessed the effect of social marketing interventions on HIV/STI testing uptake among MSM and male-to-female transgender women in this review. Three pretest-posttest design studies (two without a control and one with a control) were included. We found that multi-media social marketing campaigns had a statistically significant effect on increasing HIV testing uptake among MSM but had no effect on increasing uptake of STI testing. We could not assess the effect of social marketing interventions on HIV prevalence or incidence since no studies measured biological outcomes.

Overall, the included studies employed weak study designs, thus producing low quality of evidence. No RCTs or CCTs were found that evaluated the effectiveness of social marketing interventions among MSM. However, McOwan, et. al. (McOwan 2002) had a more rigorous study design (i.e., included a control group) and found that a multi-media social marketing campaign had large effects on promoting HIV testing uptake. A previous review of the

effectiveness of mass media campaigns in promoting HIV testing (not specific to MSM), included only RCT, CCT and ITS studies and found that mass media campaigns can influence HIV testing uptake (Vidanapathirana 2005). The authors of the Guy et. al. study (Guy 2009) noted that a lack of intervention coverage and intensity could have attributed the failure of their campaign to increase HIV testing uptake. We were not able to compare these two campaigns (Guy 2009; McOwan 2002) because no exposure data were provided and campaign quality was difficult to assess.

We found in one study (Guy 2009) that a syphilis social marketing campaign did not increase syphilis testing uptake. This could be attributed to several reasons including short length of follow-up (6 months), the campaign did not target MSM specifically, and the campaign ended abruptly. However, it was reported that those who were aware of the campaign were significantly more likely to get tested than those who were not aware of the campaign. Several other syphilis social marketing campaigns targeting MSM during the same period in the United States also found statistically significant differences in testing uptake between those who were exposed to a certain campaign and those who were not. These interventions were excluded from this review because they only conducted posttests (Ahrens 2006; Montoya 2005; Plant 2008).

We were unable to conduct any subgroup analysis. Also, the effectiveness of social marketing interventions on HIV/STI testing uptake among MSM in developing countries could not be assessed because all three studies were conducted in developed countries. Additional comparisons, such as intervention coverage, intensity, duration, indicators for intervention development (e.g. theory used and inclusion of formative research), that could result in differential effects of social marketing campaigns also could not be assessed due to the small number of studies included in this review.

## Quality of the evidence

See: GRADE Evidence Profile (Figure 4)

**Figure 4. GRADE Evidence Profile**

**Author(s):** Chongyi Wei, Amy Herrick, H. Fisher Raymond, Andrew Anglemyer, Antonio Gerbase, Seth M. Noar  
**Date:** 2010-08-25  
**Question:** Should social marketing interventions vs no social marketing interventions be used in increasing uptake of HIV/STI testing in MSM and transgender women?  
**Settings:** Australia, UK, USA  
**Bibliography:** Darrow WW, Biersteker S. Short-term impact evaluation of a social marketing campaign to prevent syphilis among men who have sex with men. *Am J Public Health.* 2008;98:337-343. | Guy R, Goller J, Thorpe R, Grierson J, Batrouney C, Kennedy M, Lewis J, Fairley C, Ginige S, Zabolotska I, Hellard M. No Increase in HIV or sexually transmissible infection testing following a social marketing campaign among men who have sex with men. *J Epidemiol Community Health.* 2009;63:391-396. | McOwan A, Gilleece Y, Chislett L, Mandalia S. Can targeted HIV testing campaigns alter healthseeking behavior? *AIDS Care.* 2002;14:385-390.

Quality assessment							Summary of findings				Quality	Importance
No of studies	Design	Limitations	Inconsistency	Indirectness	Imprecision	Other considerations	No of patients		Effect			
							social marketing interventions	no social marketing interventions	Relative (95% CI)	Absolute		
<b>HIV infection (measured as HIV testing) (follow-up 24 months)</b>												
2	observational studies	serious <sup>1</sup>	serious <sup>2</sup>	serious <sup>3</sup>	no serious imprecision	none	1339/2692 (49.7%) <sup>4</sup>	1126/2760 (40.8%) <sup>4</sup>	OR 1.58 (1.4 to 1.77)	113 more per 1000 (from 83 more to 142 more)	⊖○○○ VERY LOW	CRITICAL
<b>STI infection (measured as STI testing) (follow-up mean 6 months; survey)</b>												
1	observational studies	serious <sup>1</sup>	no serious inconsistency	serious <sup>5</sup>	serious <sup>6</sup>	none	138/398 (34.7%)	107/296 (36.1%)	OR 0.94 (0.68 to 1.28)	14 fewer per 1000 (from 84 fewer to 59 more)	⊖○○○ VERY LOW	IMPORTANT
<b>Quality of life - not reported</b>												
0	-	-	-	-	-	none	0/0 (0%)	0/0 (0%)	-	-		IMPORTANT

<sup>1</sup> Serial cross-sectional pre-post study, no control  
<sup>2</sup> McOwan 2002 showed a strong effect; Guy 2009 did not.  
<sup>3</sup> HIV testing is intermediate to the outcomes of interest.  
<sup>4</sup> Denominators from McOwan 2002 were standardised (not from text) in order to calculate relative effect.  
<sup>5</sup> Syphilis testing is intermediate to the outcomes of interest.  
<sup>6</sup> CI crosses 1.0

There was very low quality of evidence from two studies (Guy 2009; McOwan 2002) that showed HIV testing uptake increased significantly following multi-media social marketing campaigns. The quality of evidence was downgraded by the study designs (i.e., not RCTs), inconsistent study results, and lack of biological outcomes (HIV prevalence or incidence) to measure the effect attributable to the interventions (indirectness).

There was also very low quality of evidence from one study (Darrow 2008) that found STI testing uptake did not increase following a multi-media social marketing campaign promoting syphilis testing. Similar to the other two studies, the quality of evidence was downgraded due to the study design, indirectness, and imprecision.

**AUTHORS' CONCLUSIONS**

**Implications for practice**

This review provided limited evidence that multi-media social marketing campaigns can promote HIV testing among MSM in developed countries. Although no studies assessed potential harms, it appears that the benefits may outweigh harms. Community-

wide social marketing campaigns have the potential to reach large numbers of MSM. Hence, even a small effect could have a high impact at the population level. In developing countries where HIV prevention services, including outreach activities, have only begun to target MSM communities, incorporating social marketing campaigns into existing HIV prevention services or building some of these services on social marketing models could potentially increase uptake of services.

The three studies included in this review did not specify any use of theory and two of them did not conduct formative research with MSM. Like all other types of interventions, social marketing campaigns should be guided by behavioral theories and should involve the target community in campaign development. Furthermore, communication theories should be used to develop more effective campaign messages.

**Implications for research**

Future evaluations of social marketing interventions for MSM should employ more rigorous study designs such as cluster randomised trials. Long-term impact evaluations are also needed, especially to assess changes in HIV or STI incidence attributable to

social marketing interventions. New research studies on the effectiveness of social marketing interventions should also be conducted among MSM in low- and middle-income countries and among male-to-female transgender populations. Finally, implementation research, including detailed process evaluation, is needed to identify elements of social marketing interventions that are most effective in reaching the target population and changing behaviours.

## ACKNOWLEDGEMENTS

We would like to thank Tara Horvath for conducting the literature search and providing technical support; Gail Kennedy, the Cochrane HIV/AIDS group, and the editorial base of the Cochrane HIV/AIDS group for their support in preparing this review.

## REFERENCES

### References to studies included in this review

#### Darrow 2008 *{published data only}*

Darrow WW, Biersteker S. Short-term impact evaluation of a social marketing campaign to prevent syphilis among men who have sex with men. *Am Journal of Public Health* 2008; **98**:337–343.

#### Guy 2009 *{published data only}*

Guy R, Goller J, Thorpe R, Grierson J, Batrouney C, Kennedy M, Lewis J, Fairley C, Ginige S, Zabolotska I, Hellard M. No Increase in HIV or sexually transmissible infection testing following a social marketing campaign among men who have sex with men. *Journal of Epidemiology and Community Health* 2009; **63**:391–396.

#### McOwan 2002 *{published data only}*

McOwan A, Gillette Y, Chislett L, Mandalia S. Can targeted HIV testing campaigns alter health-seeking behavior?. *AIDS Care* 2002; **14**:385–390.

### References to studies excluded from this review

#### Ahrens 2006 *{published data only}*

Ahrens K, Kent CK, Montoya JA, Rotblatt H, McCright J, Kerndt P, Klausner JD. Healthy Penis: San Francisco's social marketing campaign to increase syphilis testing among gay and bisexual men. *PLoS Medicine* 2006; **3**:e474.

#### Burnside 2006 *{unpublished data only}*

Burnside HC. Evaluation of Montana's HIV prevention social marketing campaign: A descriptive study. 2006.

#### Dawson 1996 *{published data only}*

Dawson C, Hartfield K. Developing a cost-effective media campaign addressing unprotected anal sex among gay men. *AIDS Education and Prevention* 1996; **8**(4):285–293.

#### Fontes 2006 *{published data only}*

Fontes M, Studart C, Roach P, Homolova B, Ramirez L, Dantas M. Condom social marketing for men who have sex with men (MSM) in the city of São Paulo, Brazil: an ex-ante and post-ante statistical evaluation analysis. XVI International AIDS Conference Abstract no. THPE0477. 2006.

#### Katzman 2007 *{published data only}*

Katzman J, Gulati H, Higa DH, Welch Q, Wood RW. A "Community Manifesto" for gay and bisexual men: An appeal to control HIV/AIDS. *Journal of Public Health Management and Practice* 2007; **13**:244–251.

#### Lombardo 2007 *{published data only}*

Lombardo AP, Leger YA. Thinking about "Think Again" in Canada: Assessing a social marketing HIV/AIDS prevention campaign. *Journal of Health Communication* 2007; **12**:377–397.

#### Martinez-Donate 2009 *{published data only}*

Martinez-Donate AP, Zellner JA, Fernandez-Cerdeno A, Sanudo F, Hovell MF, Sipan CL, Engelberg M, Ji M. Hombres Sanos: Exposure and response to a social marketing HIV prevention campaign targeting heterosexually identified Latino men who have sex with men and women. *AIDS Education and Prevention* 2009; **21** (Supplement B):124–136.

#### Montoya 2005 *{published data only}*

Montoya JA, Kent CK, Rotblatt H, McCright J, Kerndt PR, Klausner JD. Social marketing campaign significantly associated with increases in syphilis testing among gay and bisexual men in San Francisco. *Sexually Transmitted Diseases* 2005; **32**:395–399.

#### Plant 2010 *{published data only}*

Plant A, Montoya JA, Rotblatt H, Kerndt PR, Mall KL, Pappas LG, Kent CK, Klausner JD. Stop the Sores: The making and evaluation of a successful social marketing campaign. *Health Promotion Practice* 2010; **11**:23–33.

#### Schmitt 2005 *{published data only}*

Schmitt K, Bulecza S, George D, Burns TE, Jordahl L. Florida's multifaceted response for increases in syphilis among MSM: The Miami-Ft. Lauderdale Initiative. *Sexually Transmitted Diseases* 2005; **32**(Supplement 10): S19–23.

#### Sherr 1999 *{published data only}*

Sherr L, Nardone A, Leaity S, Wells H, Mercey D, Elford J. "Try this HIV test" - an evaluation of a mass media campaign targeting homosexual men. *Sexually Transmitted Infections* 1999; **75**:273.

#### Stephens 2010 *{published data only}*

Stephens SC, Bernstein KT, McCright JE, Klausner JD. Dogs are Talking: San Francisco's social marketing campaign to increase syphilis screening. *Sexually Transmitted Diseases* 2010; **37**:173–176.

### Additional references

**Andreasen 1995**

Andreasen A. *Marketing social change: Changing behavior to promote health, social development, and the environment*. San Francisco: Jossey-Bass, 1995.

**Baral 2007**

Baral S, Sifakis F, Cleghorn F, Beyrer C. Elevated risk for HIV infection among men who have sex with men in low- and middle-income countries 2000-2006: a systematic review. *PLoS Medicine* 2007;**4**:e339.

**Beyrer 2010**

Beyrer C, Baral SD, Walker D, Wirtz AL, Johns B, Sifakis F. The expanding epidemics of HIV type 1 among men who have sex with men in low- and middle-income countries: diversity and consistency. *Epidemiological Review* 2010;**32**: 137-151.

**Brown 2000**

Brown KM, Bryan CA, Forthofer MS, Perrin KM, Quinn GP, Wolper M, Lindenberger JH. *Florida Cares for Women* Social Marketing Campaign: A Case Study. *American Journal of Health Behavior* 2000;**24**:44-52.

**CDC 1999**

Centers for Disease Control AIDS Community Demonstration Projects Research Group. Community-level HIV intervention in five cities: Final outcome data from the CDC AIDS Community Demonstration Projects. *American Journal of Public Health* 1999;**89**:336-345.

**CDC 2010**

Centers for Disease Control and Prevention. Prevalence and awareness of HIV infection among men who have sex with men? 21 cities, United States, 2008. *MMWR Morbidity and Mortality Weekly Report* 2010;**59**:1201-1207.

**Choi 2006**

Choi KH, Liu H, Guo Y, Han L, Mandel JS. Lack of HIV testing and awareness of HIV infection among men who have sex with men, Beijing, China. *AIDS Education and Prevention* 2006;**18**:33-43.

**Choi 2008**

Choi KH, Hudes ES, Steward WT. Social discrimination, concurrent sexual partnerships, and HIV risk among men who have sex with men in Shanghai, China. *AIDS and Behavior* 2008;**12**(Supplement 4):1-7.

**Cohen 1999**

Cohen DA, Farley TA, Bedimo-Etame JR, Scribner R, Ward W, Kendall C, Rice J. Implementation of condom social marketing in Louisiana, 1993 to 1996. *American Journal of Public Health* 1999;**89**:204-208.

**Das 2010**

Das M, Chu PL, Santos GM, Scheer S, Vittinghoff E, McFarland W, Colfax GN. Decreases in community viral load are accompanied by reductions in new HIV infections in San Francisco. *PLoS One* 2010;**5**:e11068.

**Fleming 1999**

Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission

of HIV infection. *Sexually Transmitted Infections* 1999;**75**: 3-17.

**Gordon 2006**

Gordon R, McDermott L, Stead M, Angus K. The effectiveness of social marketing interventions for health improvement: What's the evidence?. *Public Health* 2006; **120**:1133-1139.

**GRADEpro**

Brozek J, Oxman A, Schunemann H, The GRADE Working Group. GRADEpro [Computer program]. 2009.

**Granich 2009**

Granich RM, Gilks CF, Dye C, De Cock KM, Williams BG. Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model. *Lancet* 2009;**9657**: 48-57.

**Gray 2001**

Gray RH, Wawer MJ, Brookmeyer R, Sewankambo NK, Serwadda D, Wabwire-Mangen F, Lutalo T, Li X, vanCott T, Quinn TC, Rakai Project Team. Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1-discordant couples in Rakai, Uganda. *Lancet* 2001; **357**:1149-1153.

**Guyatt 2008**

Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, Schünemann HJ, GRADE Working Group. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *British Medical Journal* 2008;**336**:924-926.

**He 2009**

He Q, Wang Y, Lin P, Raymond HF, Li Y, Yang F, Zhao J, Li J, Ling L, McFarland W. High prevalence of risk behaviour concurrent with links to other high-risk populations: a potentially explosive HIV epidemic among men who have sex with men in Guangzhou, China. *Sexually Transmitted Infections* 2009;**85**:383-390.

**Hendriksen 2009**

Hendriksen ES, Hlubinka D, Chariyalertsak S, Chingono A, Gray G, Mbwambo J, Richter L, Kulich M, Coates TJ. Keep talking about it: HIV/AIDS-related communication and prior HIV testing in Tanzania, Zimbabwe, South Africa, and Thailand. *AIDS and Behavior* 2009;**13**:1213-1221.

**Higgins 2008**

Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions*. Chichester: John Wiley & Sons Ltd, 2008.

**Holtgrave 2007**

Holtgrave DR, Pinkerton SD. Can increasing awareness of HIV seropositivity reduce infections by 50% in the United States?. *Journal of Acquired Immune Deficiency Syndromes* 2007;**44**:360-363.

**Liu 2006**

Liu H, Yang H, Li X, Wang N, Liu H, Wang B, Zhang L, Wang Q, Stanton B. Men who have sex with men and human immunodeficiency virus/sexually transmitted disease

- control in China. *Sexually Transmitted Diseases* 2006;**33**: 68–76.
- Maibach 2002**  
Maibach EW, Rothchild ML, Novelli WD. Social marketing. In: Glanz K, Rimer BK, Lewis FM editor(s). *Health Behavior and Health Education*. 3rd Edition. San Francisco: Jossey-Bass, 2002:437–461.
- Mannheimer 2002**  
Mannheimer S, Friedland G, Matts J, Child C, Chesney M. The consistency of adherence to antiretroviral therapy predicts biologic outcomes for human immunodeficiency virus-infected persons in clinical trials. *Clinical Infectious Diseases* 2002;**34**:1115–1121.
- Marks 2006**  
Marks G, Crepaz N, Janssen RS. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. *AIDS* 2006;**20**: 1447–1450.
- Montaner 2010**  
Montaner JS, Lima VD, Barrios R, Yip B, Wood E, Kerr T, Shannon K, Harrigan PR, Hogg RS, Daly P, Kendall P. Association of highly active antiretroviral therapy coverage, population viral load, and yearly new HIV diagnoses in British Columbia, Canada: a population-based study. *Lancet* 2010;**9740**:532–539.
- Noar 2009**  
Noar SM, Palmgreen P, Chabot M, Dobransky N, Zimmerman RS. A 10-year systematic review of HIV/AIDS mass communication campaigns: Have we made progress?. *Journal of Health Communication* 2009;**14**:15–42.
- Porco 2004**  
Porco TC, Martin JN, Page-Shafer KA, Cheng A, Charlebois E, Grant RM, Osmond DH. Decline in HIV infectivity following the introduction of highly active antiretroviral therapy. *AIDS* 2004;**18**:81–88.
- Raymond 2008**  
Raymond HF, Bingham T, McFarland W. Locating unrecognized HIV infections among men who have sex with men: San Francisco and Los Angeles. *AIDS Education and Prevention* 2008;**20**:408–419.
- Rothenberg 2000**  
Rothenberg RB, Wasserheit JN, St Louis ME, Douglas JM. The effect of treating sexually transmitted diseases on the transmission of HIV in dually infected persons: a clinic-based estimate. Ad Hoc STD/HIV Transmission Group. *Sexually Transmitted Diseases* 2000;**27**:411–416.
- Ruan 2009**  
Ruan Y, Luo F, Jia Y, Li X, Li Q, Liang H, Zhang X, Li D, Shi W, Freeman JM, Vermund SH, Shao Y. Risk factors for syphilis and prevalence of HIV, hepatitis B and C among men who have sex with men in Beijing, China: Implications for HIV prevention. *AIDS and Behavior* 2009;**13**:663–670.
- Sullivan 2009**  
Sullivan PS, Hamouda O, Delpech V, Geduld JE, Prejean J, Semaille C, Kaldor J, Folch C, Op de Coul E, Marcus U, Hughes G, Archibald CP, Cazein F, McDonald A, Casabona J, van Sighem A, Fenton KA, Ancey MSM Epidemiology Study Group. Reemergence of the HIV epidemic among men who have sex with men in North America, Western Europe, and Australia, 1996–2005. *Annals of Epidemiology* 2009;**19**:423–431.
- UNAIDS 2005**  
UNAIDS. *AIDS epidemic update: December 2005*. Geneva, Switzerland, 2005.
- UNAIDS 2007**  
UNAIDS. *AIDS epidemic update: December 2007*. Geneva, Switzerland, 2007.
- UNAIDS 2008**  
Commission on AIDS in Asia. *Redefining AIDS in Asia: Crafting an effective response*. New Dehli, India, 2008.
- van Griensven 2009**  
van Griensven F, de Lind van Wijngaarden JW, Baral S, Grulich A. The global epidemic of HIV infection among men who have sex with men. *Current Opinion in HIV and AIDS* 2009;**4**:300–307.
- Vega 2005**  
Vega MY, Roland E. Social marketing techniques for public health communication: A review of syphilis awareness campaigns in 8 US cities. *Sexually Transmitted Diseases* 2005;**32**:30–36.
- Vidanapathirana 2005**  
Vidanapathirana J, Abramson MJ, Forbes A, Fairley C. Mass media interventions for promoting HIV testing. *Cochrane Database of Systematic Reviews* 2005, Issue 3. [DOI: 10.1002/14651858.CD004775.pub2]
- Zhou 2009**  
Zhou L, Guo J, Fan L, Tian J, Zhou B. Survey of motivation for use of voluntary counseling and testing services of HIV in a high risk area of Shenyang, China. *BMC Health Services Research* 2009;**9**:23.
- \* Indicates the major publication for the study

## CHARACTERISTICS OF STUDIES

### Characteristics of included studies [ordered by study ID]

#### Darrow 2008

Methods	Serial cross-sectional pre-post study.
Participants	Men who have sex with men.
Interventions	Multi-media (posters, advertisements in print publications, billboards, alert banners on gay web sites, radio and Television) campaign to reduce syphilis infection in South Florida
Outcomes	Have tested for syphilis $\geq$ 1 time in the past 12 months (Yes/No);
Notes	For pre-post comparison, effect estimates are based on data of Florida residents

#### *Risk of bias*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Not used.
Allocation concealment (selection bias)	High risk	Not used.
Blinding (performance bias and detection bias) All outcomes	High risk	Not used.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear.
Selective reporting (reporting bias)	Low risk	All reported.
Other bias	High risk	Confounders.

#### Guy 2009

Methods	Serial cross-sectional pre-post study.
Participants	Men who have sex with men.
Interventions	'Check-It-Out' multi-media (posters, hotline, a dedicated web site, Internet chat room, radio and local publications and newspapers) campaign to increase HIV/STI testing and promote sexual health in Victoria, Australia
Outcomes	Have had a blood test for HIV in the past 12 months (Yes/No)

**Guy 2009** (Continued)

Notes	Testing data from lab records were not used for analysis because they included all males	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Random sequence generation (selection bias)	High risk	Not used.
Allocation concealment (selection bias)	High risk	Not used.
Blinding (performance bias and detection bias) All outcomes	High risk	Not used.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear.
Selective reporting (reporting bias)	Low risk	All reported.
Other bias	High risk	Confounders.

**McOwan 2002**

Methods	Serial cross-sectional pre-post study with control.	
Participants	Men who have sex with men.	
Interventions	'Gimme 5 Minutes' peer-image based multi-media (posters, advertisements in gay newspapers, leaflets and palm cards) campaign to increase HIV testing in central London, UK	
Outcomes	Number of MSM tested for HIV at Victoria Clinic for Sexual Health compared with West London Center for Sexual Health and John Hunter Clinic;	
Notes	Denominators (estimates that were imputed from the text: the clinic saw about 1,200 gay men a month) were standardized in order to calculate relative effect	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Random sequence generation (selection bias)	High risk	Not used.
Allocation concealment (selection bias)	High risk	Not used.

**McOwan 2002** (Continued)

Blinding (performance bias and detection bias) All outcomes	High risk	Not used.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Complete outcome data.
Selective reporting (reporting bias)	Low risk	All reported.
Other bias	Low risk	

**Characteristics of excluded studies** [ordered by study ID]

Study	Reason for exclusion
Ahrens 2006	Posttest design study
Burnside 2006	No outcome data for MSM reported
Dawson 1996	Impact evaluation was not conducted
Fontes 2006	Outcomes did not include HIV/STI testing uptake
Katzman 2007	Outcomes did not include HIV/STI testing uptake
Lombardo 2007	Outcomes did not include HIV/STI testing uptake; posttest design study
Martinez-Donate 2009	6 waves of data were combined
Montoya 2005	Posttest design study
Plant 2010	Posttest design study
Schmitt 2005	Impact evaluation was not conducted
Sherr 1999	Posttest design study
Stephens 2010	Posttest design study

## DATA AND ANALYSES

### Comparison 2. Post vs. Pre intervention (Testing Uptake)

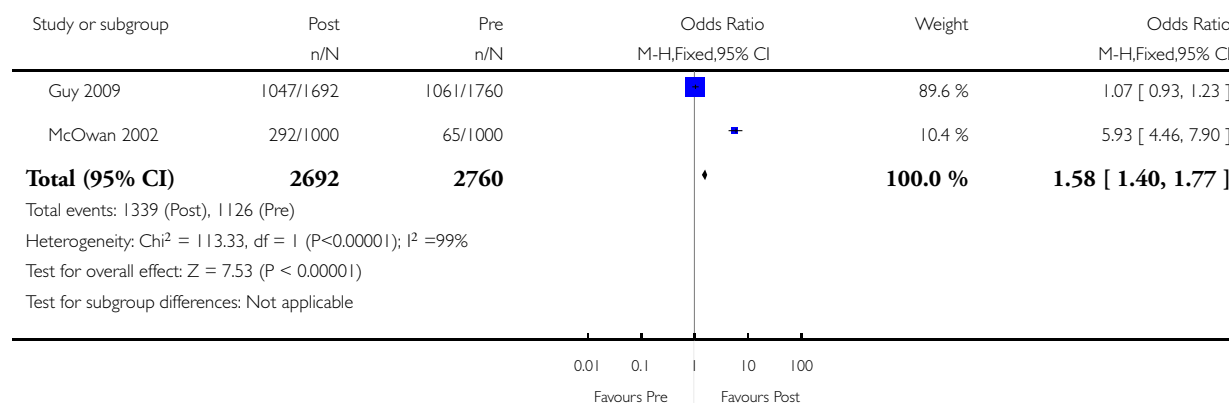
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Tested for HIV	2	5452	Odds Ratio (M-H, Fixed, 95% CI)	1.58 [1.40, 1.77]
4 Tested for STI	1	694	Odds Ratio (M-H, Fixed, 95% CI)	0.94 [0.68, 1.28]

#### Analysis 2.1. Comparison 2 Post vs. Pre intervention (Testing Uptake), Outcome 1 Tested for HIV.

Review: Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women

Comparison: 2 Post vs. Pre intervention (Testing Uptake)

Outcome: 1 Tested for HIV

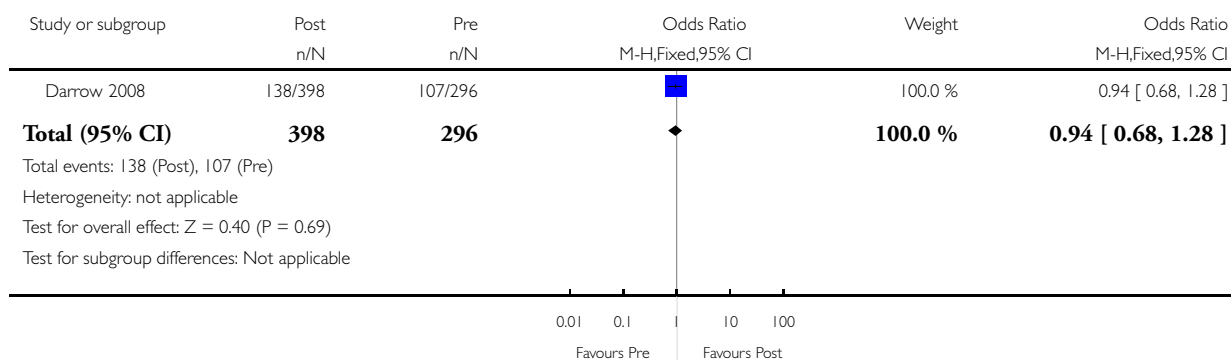


## Analysis 2.4. Comparison 2 Post vs. Pre intervention (Testing Uptake), Outcome 4 Tested for STI.

Review: Social marketing interventions to increase HIV/STI testing uptake among men who have sex with men and male-to-female transgender women

Comparison: 2 Post vs. Pre intervention (Testing Uptake)

Outcome: 4 Tested for STI



## APPENDICES

### Appendix I. Search strategy and search terms used in PubMed

Search #	PubMed, 14 July 2010
#1	Search randomized controlled trial [pt] OR controlled clinical trial [pt] OR randomized controlled trials [mh] OR random allocation [mh] OR double-blind method [mh] OR single-blind method [mh] OR clinical trial [pt] OR clinical trials [mh] OR ("clinical trial" [tw]) OR ((singl* [tw] OR doubl* [tw] OR trebl* [tw] OR tripl* [tw]) AND (mask* [tw] OR blind* [tw])) OR (placebos [mh] OR placebo* [tw] OR random* [tw] OR research design [mh:noexp] OR comparative study [mh] OR evaluation studies [mh] OR follow-up studies [mh] OR prospective studies [mh] OR control* [tw] OR prospectiv* [tw] OR volunteer* [tw] ) OR non-randomi*[tw] OR before after study[tw] OR time series[tw] OR case control[tw] OR prospective cohort[tw] OR retrospective cohort[tw] OR cross-section*[tw] OR prospective[tw] OR retrospective[tw] OR research design [mh:noexp] OR comparative study[mh] OR evaluation studies[mh] OR follow-up studies[mh] OR prospective studies[mh] OR control*[tw] OR prospectiv*[tw] OR volunteer*[tw] OR longitud*[tw] OR descripti*[title/abstract] OR study[title/abstract] OR evaluat*[title/abstract] OR pre-post[tw] OR (pre-test[tw] AND post-test[tw]) NOT (animals [mh] NOT human [mh])
#2	Search HIV Infections[MeSH] OR HIV[MeSH] OR hiv[title/abstract] OR hiv-1*[title/abstract] OR hiv-2*[title/abstract] OR hiv1[title/abstract] OR hiv2[title/abstract] OR hiv infect*[title/abstract] OR human immunodeficiency virus[title/abstract] OR human immunodeficiency virus[title/abstract] OR human immuno-deficiency virus[title/abstract] OR human immune-deficiency virus[title/abstract] OR ((human immun*) AND (deficiency virus[title/abstract])) OR acquired immunodeficiency syndrome[title/abstract] OR acquired immunodeficiency syndrome[title/abstract] OR acquired immuno-deficiency syndrome[title/abstract] OR acquired immune-deficiency syndrome[title/abstract] OR ((acquired immun*) AND (deficiency syndrome[title/abstract])) HIV Infections[MeSH] OR HIV[MeSH] OR hiv[title/abstract] OR

(Continued)

	hiv-1*[title/abstract] OR hiv-2*[title/abstract] OR hiv1[title/abstract] OR hiv2[title/abstract] OR hiv infect*[title/abstract] OR human immunodeficiency virus[title/abstract] OR human immunodeficiency virus[title/abstract] OR human immunodeficiency virus[title/abstract] OR human immunodeficiency virus[title/abstract] OR ((human immun*) AND (deficiency virus[title/abstract])) OR acquired immunodeficiency syndrome[title/abstract] OR acquired immunodeficiency syndrome[title/abstract] OR acquired immunodeficiency syndrome[title/abstract] OR acquired immunodeficiency syndrome[title/abstract] OR ((acquired immun*) AND (deficiency syndrome[title/abstract])) OR Sexually Transmitted Diseases[Mesh] OR sexually transmitted[title/abstract] OR Syphilis[Mesh] OR syphilis[title/abstract]
#3	Homosexuality, Male[Mesh] OR Bisexuality[Mesh] OR Transsexualism[Mesh] OR homosexual*[title/abstract] OR gay[title/abstract] OR homosexual*[title/abstract] OR MSM[tw] OR “men who have sex with men”[title/abstract] OR “same-sex”[title/abstract] OR queer[title/abstract] OR bisexual[title/abstract] OR transgender[title/abstract] OR transsexual[title/abstract] OR transsexual[title/abstract]
#4	Social Marketing[Mesh] OR social marketing[title/abstract] OR mass media[title/abstract] OR (marketing[title/abstract] AND campaign[title/abstract]) OR 4Ps[title/abstract] OR 4P[title/abstract] OR marketing mix[title/abstract] OR audience research[title/abstract] OR segmentation[title/abstract] OR mass communication[title/abstract] OR (multimedia[title/abstract] AND marketing[title/abstract]) OR promotional[title/abstract]
#5	#1 and #2 and #3 and #4 (1980-2010)

## HISTORY

Review first published: Issue 9, 2011

## CONTRIBUTIONS OF AUTHORS

Wei C - Protocol development, Review of abstracts, Follow up with authors, Data abstraction, Data entry, Data analysis, GRADEing, Contribution to the text of the review

Herrick A - Protocol development, Review of abstracts, Data abstraction, Data entry, Contribution to the text of the review

Raymond HF - Protocol development, Contribution to the text of the review

Anglemyer A - Data analysis, GRADEing

Gerbase A - Protocol development, Contribution to the text of the review

Noar SM - Protocol development, Contribution to the text of the review

All six reviewers contributed to conceptualisation and interpretation.

## DECLARATIONS OF INTEREST

No known conflicts of interest.

## SOURCES OF SUPPORT

### Internal sources

- No sources of support supplied

### External sources

- World Health Organization, Switzerland.  
Toward the development of guidance for the prevention and treatment of HIV and other sexually transmitted infections among men who have sex with men and transgender people.

## DIFFERENCES BETWEEN PROTOCOL AND REVIEW

None.

## INDEX TERMS

### Medical Subject Headings (MeSH)

\*Homosexuality, Male; \*Social Marketing; \*Transsexualism; Cross-Sectional Studies [methods]; Developed Countries; HIV Infections [\*diagnosis]; Sexually Transmitted Diseases [\*diagnosis]

### MeSH check words

Humans; Male