

Individual and group interventions for social and behaviour change

Key points

- Social and behavioural changes have been important contributors to the decreases in HIV incidence observed in some countries. Individual and group interventions for behaviour change have facilitated some of that change.
- Individual and group interventions for behaviour change can deliver intensive and focused information, motivation and skills for HIV risk avoidance. They can moderately increase condom use and reduce the incidence of STIs and HIV. Interventions that encourage actions (such as HIV testing) or that develop skills (such as condom use) are more likely to be effective, as are those that encourage development of positive attitudes towards condom use or skill-building.
- Individual and group interventions can be expensive to implement, and they are best suited for use with those at elevated risk of HIV. The duration of the interventions, coupled with the level of training needed to administer them, adds to the costs.
- Evidence of the long-term effectiveness of individual and group interventions is limited, with some indication that the effect may deteriorate with time. Continued supportive interventions may be needed to maintain the level of risk avoidance achieved in the shorter term.
- Focused individual and group interventions for priority locations and populations can play an important supporting role in combination prevention.
- Additional evaluation is needed to expand the evidence of short- and long-term effectiveness for these interventions.

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The role of interpersonal communication interventions in HIV prevention

This section will summarize the evidence on interventions involving communication with individuals or small groups (also commonly referred to as “interpersonal communication interventions”). In such interventions, communication is provided to an individual or a small group of up to 20 or 30 people, but also may reach much greater numbers if done simultaneously in different communities.

Although school-based programmes include interpersonal communication, this compendium discusses school-based interventions separately because they are provided in an institutional setting and require specific institutional conditions (see “HIV prevention education and comprehensive sexuality education”). Community-level interventions focusing on changing community structures or norms also are discussed separately. While this separation is made for the sake of presentation, the reality is that social and behavioural change interventions—including mass media and interpersonal-, community- and school-based programmes—often are implemented simultaneously.

In most cases, an individual’s risk of HIV exposure is directly related to his or her sexual behaviour. Specific actions, such as using a condom, can reduce an individual’s risk of acquiring HIV, as can other changes, such as reducing the number of sexual partners. In the early stages of the HIV epidemic, widespread changes in sexual behaviour were observed in settings such as Uganda, Zimbabwe and gay communities in the United States. Some studies have linked those changes to reductions in HIV incidence in those settings and among those populations (70, 71, 152). The cause of the changes that have been observed has been debated for years, but it appears that intentional persuasive social and behavioural change efforts played a key role (112, 153).

The earliest efforts in HIV prevention included a strong focus on behavioural interventions, as psychologists endeavoured to adapt models developed for cardiovascular disease prevention and smoking cessation to the more challenging topic of sexual behaviour change. As this section will show, the evidence on the effectiveness of that approach is mixed. Nevertheless, interpersonal communication interventions—which attempt to inform and change perceptions and social norms about behaviours and attempt to help people adopt new reduced risk behaviours—remain highly relevant to HIV prevention 40 years after the emergence of the epidemic.

While strong attention was paid to behavioural interventions between 1990 and 2010, the focus after 2011 on new biomedical prevention options has reduced the emphasis on interpersonal communication for behaviour change. This is due to modelling suggesting that a massive scale-up of HIV testing and treatment for those living with HIV could reverse the HIV epidemic. These models are based on the assumption that current rates of condom use will not fall and that sexual behaviours will remain constant (57). If condom use rates do decline and numbers of sexual partners do increase, however, the prevention effects of HIV treatment could be lower than assumed in the models. The incidence of other STIs also may increase. As a result, biomedical interventions alone are unlikely to change the underlying causes that make individuals and communities more vulnerable to HIV infection, although HIV treatment may contribute to reducing stigma associated with HIV.

In contrast, social change interventions intend to help communities tackle the causes of HIV and STI infection by challenging cultural norms and practices that stigmatize and disempower certain social groups and populations. Behaviour change interventions seek to improve the ability of individuals to put knowledge and skills into practice. There is therefore a clear

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rationale for interventions that seek to help individuals make changes to their own behaviour while simultaneously encouraging changes in social norms around sexual behaviour. Both approaches are key elements of combination prevention, and they may include measures (also known as “structural approaches”) to change the social structures that influence vulnerability. Taken together, social and behaviour change programmes are therefore essential components of HIV prevention.

Behaviour change interventions may be challenging to implement on a broad scale in some settings. They can require multiple sessions conducted by trained individuals, which may lead to greater expense in contexts where costs for human resources are high and community volunteers are not available. This may limit the widespread use of such interventions, making them more appropriate for specific groups, such as those at highest risk.

The complexity of rigorous evaluation means that social change interventions—and some types of behaviour change interventions—are difficult to evaluate. In randomized controlled trials, for example, the distinction between people exposed and not exposed to specific interventions is less clear due to variable intensities of exposure and the presence of a range of other national or local prevention interventions. Also, many interpersonal communication interventions seek to achieve a change in social norms, which by definition is not restricted to the individuals or community exposed to a particular intervention. Other, less conclusive evidence, however, has suggested that some forms of social and behaviour change intervention have had a positive impact on reducing sexual risk behaviours and the use of non-sterile injecting equipment.

Almost all biomedical interventions have a behavioural component. Individuals have to seek out or decide to accept the offer of services such as HIV testing, PrEP and VMMC. They then must follow certain guidelines associated with the services: for example, men who seek out circumcision services must remain sexually abstinent for six weeks after the procedure, and people taking antiretroviral medications need to maintain good adherence. As a result, the need for interventions to address behaviour has not been obviated; it has, in fact, been expanded.

Identifying the most effective interventions to provide in a particular setting for a given population is a key challenge. The social, political and economic context is crucial, and a programme that is appropriate and effective in one setting may not necessarily be so in different circumstances. This section reviews the latest evidence for some of the most important intervention styles: intensive individual and group interventions, community-wide interventions and behaviour change communication.

Intensive individual and group interventions

What does the evidence say about the effect of intensive individual and group interventions?

- Intensive interpersonal communication interventions were found to have an effect on self-reported condom use.
- Effects on condom use were stronger when sociocultural barriers were addressed.

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- Intensive interpersonal communication interventions also were reported to have an effect on STIs and HIV in specific contexts, particularly when an STI or HIV diagnosis was made when an individual entered the study.
- Active interventions requiring participation and practice were more effective than passive interventions.
- Programmes with attitudinal elements, behavioural skills and condom provision were all associated with significant increases in condom use.

A counsellor or health professional usually delivers intensive behavioural interventions to individuals or small groups, either in an individualized session or in multiple sessions held over a number of weeks or months. The sessions may be designed to help individuals do some or all of the following:

- Gain knowledge about HIV and its transmission.
- Perceive whether they may be at risk of acquiring HIV.
- Increase their motivation to reduce risk.
- Expand control over involvement in high-risk behaviour.
- Improve confidence to discuss sex and sexual health openly.

Many interventions are designed to address more than one of these goals.

These interpersonal communication interventions have an advantage over less intensive mass media interventions because their duration encourages identification of personally relevant issues, reflection on these factors and support in finding acceptable solutions. However, to be effective, interpersonal communication might also need to be combined with community-wide interventions to engage with the wider context in which participants live.

Evidence of effectiveness

Several meta-analyses and systematic reviews have assessed the evidence for the effectiveness of behavioural interventions. A meta-analysis identified 42 studies of 67 interventions that used a randomized controlled or quasi-experimental design to assess condom use, STI incidence or HIV incidence (154). Most of the studies (62%) were conducted in North America, with 17% in Asia, 14% in Africa, 5% in Europe and 2% in South America.

Around half the interventions were provided to groups—usually of approximately 10 participants—that met on a median of four occasions for two hours at a time. The remaining interventions were for individuals, and they typically involved one meeting of around 40 minutes. The range of interventions provided was diverse and included facilitated group discussions, HIV counselling and testing, skills training for negotiating safer sex or condom use, and information provision. The authors did not report on the use of behaviour change theory in the interventions (154).

Pooling results, the interventions significantly increased condom use by 17%, reduced STI incidence by 16% and reduced HIV infection by 46% (although this was only assessed in 13 interventions) (154). Effects on condom use were associated with interventions addressing sociocultural barriers, while effects on STIs were associated with patients being diagnosed

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with HIV or an STI at study entry. The final assessment of behaviour change took place an average of one year after the completion of the intervention. The analysis did not distinguish between the effectiveness of individual or group behavioural interventions.

Interventions that addressed sociocultural barriers (such as poverty or gender norms) had a greater impact on condom use than those that did not ($\beta = 0.32$; $P = 0.02$) (154). The impact was also greater for individuals who had HIV or an STI at the beginning of the intervention: these participants were less likely to have a subsequent STI during the study ($\beta = 0.32$, $P = 0.04$). Contrary to the expectations of the authors of the meta-analysis, interventions that did not include self-management skills training were more likely to have an impact on the incidence of STIs.

Also contrary to widely held assumptions, the meta-analysis did not find that changes in self-reported condom use resulted in changes in biological outcomes. In other words, while numerous studies reported increases in condom use and a few reported decreases in HIV or STIs, there was no clear link between the two, and changes did not necessarily occur in the same people. Expressed more precisely, there was no association between condom use and the incidence of STIs and HIV ($P \geq 0.10$), and regression analyses did not find that condom use predicted changes in HIV incidence (154). This finding may raise significant questions about the way these interventions work: interventions are intended to help individuals make behavioural changes, which should subsequently lower their risk of HIV infection.

It is important to note, however, that accurate measurement of condom use—the basis of this finding—has long been fraught with difficulties. A systematic review of condom measurement identified large variations in how condom use is assessed, raising the possibility that the method used to assess intervention effectiveness may have contributed to the above finding (155).

Characteristics of effective interventions

A meta-analysis of HIV prevention interventions conducted between 1985 and 2003 provided insight into the characteristics of effective interventions (156). This meta-analysis included 354 studies, which is a very large number for a meta-analysis, but it is the result of the analysis having broad inclusion criteria and accepting studies with weak evaluation designs (e.g., those with no control groups). In addition, although 33 countries were represented, three quarters of the studies were conducted in the United States, raising questions about the utility of those findings in other settings.

Around half of the studies in the meta-analysis were so-called active interventions, which required participants to practise a skill (e.g., role play negotiating safer sex or putting on a condom) or some other kind of health-seeking behaviour (such as taking an HIV test). In other programmes—so-called passive programmes—participants merely received information (such as reading information or watching a video).

Overall, active programmes had a greater impact on condom use than passive programmes. The effects observed were strongest for interventions that took place in clinical settings (156).

Programmes with attitudinal elements (designed to induce a positive attitude about using condoms), behavioural skills (containing verbal training or arguments designed to improve condom-using behaviours among participants) and condom provision were all associated with significant increases in condom use. In contrast, programmes with normative arguments (designed to increase social responsibility or increase perceived peer group or societal

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pressure to use condoms) were associated with decreases in condom use, except among young people under the age of 21. Similarly, interventions that presented HIV as a threat or played on fears (designed to increase awareness of the negative consequences of infection) resulted in less condom use, especially among men (156). The review did not report on the relationship between the intensity or duration of the intervention and subsequent behaviour change.

Evidence for individual interventions in resource-limited settings

What does the evidence say about the effect of individual interventions in resource-limited settings?

- Individual interventions—including counselling, group education and HTC for HIV-negative partners in serodiscordant couples—had positive effects on reported condom use, partner reduction and disclosure of HIV status.
- Individual counselling interventions were partially effective in increasing reported condom use.

A systematic review identified 10 behavioural interventions in developing countries that focused on serodiscordant couples or people living with HIV (85). The interventions included counselling (both for the person diagnosed with HIV and his or her partner), group education and HIV testing.

The greatest benefit of the interventions was seen in terms of condom use, with additional effects observed in relation to reduced numbers of sexual partners and increased disclosure of HIV status. Interventions for couples appeared to be most promising, with one group intervention for women living with HIV in Zambia finding that the inclusion of women's partners in the groups led to improved behavioural outcomes, increasing reported condom use among women after the intensive intervention (157).

A further systematic review of behavioural HIV prevention interventions in low- and middle-income countries identified four randomized controlled trials of individual counselling interventions (158). The authors identified 19 studies that met their inclusion criteria, a third of which were conducted in South Africa. Eight of the studies reported effectiveness in increasing condom use, while interventions to reduce partner numbers were not found to be effective. Those that addressed alcohol use and partner violence had mixed results.

In one South African study, repeat attendees at an STI clinic were randomized to either receive a 20-minute didactic educational session on HIV or a one-hour information–motivation–behavioural (IMB) skills intervention for health behaviour change (159). According to the IMB model, information related to HIV transmission and prevention is a prerequisite to risk reduction. Motivation to change is required to use HIV prevention information actively to reduce risk. Behavioural skills for HIV prevention are a final element that—together with information and motivation for change—contribute to behaviour change. As part of the IMB intervention, the counsellor-facilitated behavioural self-management and sexual communication skills-building exercise explored triggers for unsafe behaviour and provided exercises on communication skills.

Counselling also could be adapted to address the use of alcohol in sexual contexts, a significant factor in the South African epidemic (160). There were no differences in partner numbers at the three-month and six-month follow-ups, but there were significantly fewer occasions of unprotected sex (based on self-report). Reductions in drinking at the time of sex also were observed at the three-month follow-up, but not at the six-month follow-up, leading the authors to suggest that risk reduction behaviour changes also may not be durable and that additional structural interventions to reduce drinking in sexual contexts may be needed.

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One of the other interventions included in the review was developed in the United States (161) and adapted for use in South Africa (162). Called The Options Project, this intervention aims to support people living with HIV to adopt and sustain safer sex practices. Based on the IMB skills model and motivational interviewing techniques, it was a small randomized trial of 152 people. Half of the participants received the intervention and saw a counsellor trained in this approach; the remainder (the control group) continued to receive adherence support from lay counsellors.

Among HIV-positive study participants who received the intervention, the mean number of unprotected vaginal and anal sex events decreased significantly over time (2.64 to 0.40; $P = 0.016$), while there was a marginally significant increase in those events (from 2.26 to 3.85; $P < 0.05$) among individuals in the standard-of-care control condition (162). The observed reduction in high-risk behaviour occurred despite the fact that participants increased their overall sexual activity over the course of the study (probably due to starting antiretroviral therapy and their subsequent improved health). However, as the study relied on self-reported behaviour and the control group did not have an intervention focused on sexual behaviour, individuals in the intervention arm may have felt a greater need to report safer behaviour at follow-up.

Changes observed after intensive interventions might not be durable. During a six-month trial of the spermicide nonoxynol-9 in Cameroon, two thirds of participants reported consistent condom use (163). Fourteen months after the trial and its associated counselling ended, however, participants were interviewed again, and only one third reported consistent condom use.

Small group interventions in resource-limited settings

What does the evidence say about the effect of small group interventions in resource-limited settings?

- Small group interventions can have temporary effects on condom use and partner numbers.
- The Stepping Stones intervention reduced HSV infection and some risk behaviours, including transactional sex, intimate partner violence and problem drinking among men.

The 2013 systematic review of behavioural interventions in low- and middle-income countries referenced above identified four randomized controlled trials of small group interventions, three of which were based on the IMB skills model (158). In these studies, group interventions lasted up to five hours; members of control groups received didactic educational sessions.

The interventions were delivered to varied groups: military personnel in Angola (164), long-distance truck drivers in India (165) and township community members in South Africa (160). The two interventions in Africa had an impact on self-reported condom use, but only at three-month follow-ups, with the effect dissipating by six months. Similarly, changes in partner numbers either did not occur (in Angola) or did not endure (in South Africa) (160, 164). The intervention in India also produced mixed results, with some evidence of increased condom use among both marital and nonmarital partners reported at 10-month follow-ups for participants in the IMB skills model intervention (165). None of these trials included biological outcomes.

The fourth randomized controlled trial included in the systematic review was an evaluation of Stepping Stones, a programme originally developed in Uganda, that has been used in more than 40 countries, adapted for 17 settings and translated into 13 languages (166). In this regard, the programme differs from the other intervention programmes that have not been established with wide coverage and that have not been widely used prior to their evaluation. The Stepping Stones programme aims to improve sexual health by fostering more gender-equitable relationships and communication between sexual partners.

Topics in the Stepping Stones curriculum include the following:

- How we act and what shapes our actions.
- Sex and love.
- Conception and contraception.
- Taking risks and sexual problems.
- Unwanted pregnancy.
- STIs and HIV.
- Safer sex and condoms.
- Gender-based violence.

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- Motivations for sexual behaviour.
- Dealing with grief and loss.
- Communication skills.

The cluster randomized controlled trial, which took place in South Africa, assessed biological outcomes. Young people aged 15 to 26 years either received a three-hour session on HIV and safer sex (the control group) or a 50-hour programme that used participatory learning approaches to develop knowledge, risk awareness, critical reflection and communication skills. Over two years of follow-up, the programme reduced the incidence of HSV-2 (adjusted incidence rate ratio [IRR] = 0.67; 95% CI: 0.47–0.97). It also reduced some risk behaviours in men (intimate partner violence, transactional sex and problem drinking). However, there was no evidence of any of the desired behaviour changes in women; moreover, the intervention had no impact on the incidence of HIV in either men or women (adjusted IRR = 0.95; 95% CI: 0.67–1.35) (166).

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Operational considerations

Data on the applicability and appropriateness of intensive interventions for individuals in higher prevalence settings are limited. The available studies have relied on self-reported behaviour during short periods of follow-up, and they do not provide biological outcomes.

Intensive interventions can be relatively expensive to provide, and they should be prioritized for individuals who are at the greatest risk of acquiring or transmitting HIV. This may mean not just focusing interventions on key populations, but prioritizing individuals within those populations who have particular behaviours. For example, rather than simply focusing on gay men and other men who have sex with men, interventions that reach men who have unprotected sex with multiple partners are likely to have a greater benefit and merit the extra effort and expense. Similarly, individuals may move in and out of periods of higher-risk behaviour as their circumstances and relationships change, so interventions that recognize the changing profile of HIV risk behaviours and adapt accordingly will have a greater HIV prevention impact.

Intensive interventions should not be offered in isolation. Their impact may be greater if there are synergies with other, ongoing programmes (such as condom promotion and regular screening for STIs). The latter may help identify individuals in greatest need of support and provide a referral pathway.

Similarly, there are medical services that are already in contact with many individuals living with HIV. These existing relationships provide opportunities to identify individuals who could benefit from HIV prevention interventions. Clinical providers can conduct regular risk assessments as part of the standard of care and either refer individuals to more specialized services or provide brief information and counselling themselves. While providers do have competing priorities, a short intervention (3–5 minutes) can have an impact on specific outcomes for particular populations. Brief training for health-care providers can support them to provide the right type of information, counselling, services and referrals, while enhancing their motivation, skills and comfort when discussing prevention topics (167).

While most of the studies described thus far have focused on condom use and partner numbers, these kinds of interventions can be used to address a wide range of health behaviours, such as drug use and the use of non-sterile injecting equipment. Moreover, behavioural interventions could be used to support biomedical prevention approaches: for example, they could address sexual abstinence following VMMC and adherence to antiretroviral therapy, or they could reinforce condom use among people taking PrEP.

However, the limitations of this style of intervention must be acknowledged. Evaluated interventions may report reductions in the prevalence of risk behaviours of up to 50% in intervention groups, but that rarely lasts longer than a year after completion of the intervention. Most importantly, the evidence for reduced HIV incidence following these interventions is slight, with clear indications that initial benefits are not sustained over the long term.

There is no evidence to show how these interventions could produce region-wide or countrywide reductions in HIV incidence or prevalence. In fact, there are only a few examples where such intensive programmes ever reached more than a fraction of those who need them due to the cost to health-care providers functioning within already over-stretched health systems.

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One such example in Zimbabwe used a community-based delivery modality to achieve relatively high coverage (168). Using different programme elements, Zimbabwe's national community-based prevention behaviour change programme reached more than 70% of the intended population nationwide (people aged 18 to 44 years) between 2007 and 2012. More than 20 million person exposures were recorded, and more than 700 000 people completed the seven sessions of the Love & Respect community course.

Over the programme period, coverage of HTS increased, as did reported condom use with nonregular partners among young women who had been exposed to the programme (168). HIV prevalence declined over the programme period, but the reduction could not be linked to exposure to the programme. The programme's high coverage was aided by a business-style approach of contracting local nongovernmental organizations, who became responsible for district and community outreach targets that were to be achieved through community facilitators.

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Other issues to be considered

Intensive interpersonal communication programmes require that participants have identified their HIV prevention needs and see them as a priority in order to commit to attending multisession interventions. In fact, efforts to change behaviour are only likely to be successful if they resonate with the intended audience and address its specific needs and values, but we have a limited understanding of the acceptability and cultural relevance of these approaches in diverse settings. It is possible, even likely, that many of those in greatest need of intensive interventions are some of the least likely to engage with them. At the same time, scale-up and broad coverage of affected populations is unlikely to be affordable or feasible in several epidemic settings, suggesting concentrated interventions for those at highest risk.

Most studies using randomized or quasi-experimental design to assess behavioural interventions were conducted in North America, and few rigorous assessments are available for interventions conducted in low- and middle-income countries. Just as importantly, translation of evidence-informed interventions from research to practice can be challenging: interventions often need to be adapted to local circumstances while maintaining fidelity to their core elements (169).

Existing models of behavioural interventions are based on various cognitive behavioural theories that assume individuals will take steps to avoid risks if they are fully informed and sufficiently motivated. While such so-called rational actor approaches may work well for many people, they are unlikely to address the needs of all of the populations at risk of infection. Because sexuality and drug use are not always subject to cognitive control or mediation, cognitive approaches alone will not produce behaviour change in many people. Many individuals face an exceptionally elevated risk of infection not primarily because of their own behaviour, but as a result of their partner's behaviour or because of the epidemiological context in which they (perhaps unknowingly) live and function. Influencing individual behaviour in such cases will have only a limited impact on infection rates (170).

Current behaviour change theories are essentially individualistic, although HIV is predominantly transmitted within the context of sexual relationships. There is a need for the development of theory and interventions that treat couples or relationships as the unit of change and analysis. Rather than emphasizing personal beliefs and self-efficacy, alternative theories might focus on interpersonal dynamics that contribute to sexual risk behaviour, including power imbalances, communication styles and relationship quality (171).

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Population considerations

Much of the evidence for intensive individual and group interventions has been generated through work with key populations in the United States, including people living with HIV, African Americans and gay men and other men who have sex with men.

People living with HIV

A systematic review of interventions for people living with HIV in the United States identified 48 studies (167). Of those identified, 14 were judged to be high-quality studies, and 11 of those showed a significant positive impact on HIV risk behaviour.

The style of intervention in the studies ranged from brief prevention messages delivered during regular clinic appointments to intensive multisession interventions over several weeks or months. Effective interventions typically addressed behaviour change motivation, HIV misconceptions, treatment adherence, mental health and HIV transmission risk behaviour. A meta-analysis of 15 randomized controlled trials of intensive individual sexual risk reduction interventions for people living with HIV conducted in the United States between 1993 and 2004 found a significant increase in condom use overall, but no effect on partner numbers (172). Interventions had a greater effect on condom use when they focused on young people and populations other than gay men and other men who have sex with men, and when they included both motivational and behavioural skill components. Interventions that did not include both components showed no effect.

Another systematic review and meta-analysis of five randomized studies of individual and group interventions to promote condom use in women living with HIV found that there was no overall increase in condom use at two, six and 12 months after the intervention (173). The authors concluded that condom promotion for women living with HIV needed to be integrated with family planning services and the provision of antiretroviral therapy and broader health services (e.g., mental health). In the context of treatment as prevention, condoms remained an important barrier method because detectable HIV viral load and suboptimal treatment adherence represented a common challenge towards preventing HIV transmission.

Heterosexual men and women

A meta-analysis of individual and group interventions for heterosexual African Americans identified an impact on self-reported behaviours, but not on biological outcomes (174). Programmes that tailored their content to ensure that it was culturally relevant to the audience tended to be more successful than those that did not. Greater effectiveness was also found for interventions that used peer educators and aimed to influence social norms about safer sex. Programmes that provided skills training on the correct use of condoms and training in the communication skills needed for negotiating safer sex also tended to be more effective, as were programmes that had sessions over multiple days, each lasting several hours.

Gay men and other men who have sex with men

A meta-analysis identified six individual and 15 group interventions that focused on gay men and other men who have sex with men (175). Overall, the interventions reduced the odds of participants reporting unprotected anal intercourse for up to one year of follow-up by 43% for individual interventions and 27% for group interventions.

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Group interventions with greater effectiveness included multiple intervention sessions, sessions delivered by other gay men and other men who have sex with men, and those that included skill-building exercises through role playing, live demonstrations or practice. Two economic evaluations estimated that two group interventions were cost-saving; the estimated averted HIV medical care costs exceeded the programme intervention costs (175). However, not enough studies included data on biological outcomes for these to be included in the meta-analysis.

A different review of interventions for gay men and other men who have sex with men had less encouraging results. It found that individual interventions reduced unprotected anal intercourse by around 7%, while group interventions reduced it by 29% (176). However, the studies of individual interventions suggested that they have no long-term impact on HIV incidence. There were no data on group interventions and HIV incidence. The authors concluded that “stand-alone behavioural interventions are not sufficient to reduce HIV transmission in [gay men and other men who have sex with men].”

Data from Project EXPLORE, one of the only studies to use HIV incidence as an outcome, show both the potential and the limitations of intensive behavioural interventions for individuals (30). To assess the effectiveness of this intervention for gay men and other men who have sex with men, nearly 4300 Americans were randomized to one of two conditions: either to receive 10 sessions of intensive, individualized counselling, followed by maintenance sessions every three months (the intervention group), or to receive counselling every six months based on the Project RESPECT model (the control group) (27).

The EXPLORE intervention integrated the approaches of motivational interviewing, the IMB skills model (including training in communication skills) and social learning theory (the normative component of behaviour change). Counsellors and clients assessed circumstances and occasions in which an individual might engage in high-risk behaviour; they then established risk reduction plans (30).

Over four years of follow-up, modest but statistically significant reductions in unprotected anal intercourse were found (OR = 0.86; 95% CI: 0.79–0.94) in the intervention group (30). Similar reductions were found in unprotected anal intercourse with partners of different HIV status. After one year of follow-up, HIV incidence was 39% lower, but this was not sustained. At the end of the four-year trial, HIV incidence was 18% lower, but the change was not statistically significant (OR = 0.82; 95% CI: 0.64–1.05).

Some of the limited impact of the intervention may be due to the fact that while it was effective in modifying some factors (such as communication skills and self-efficacy), it did not affect factors such as drug and alcohol use or depression. Each of these unaddressed risk factors was associated with seroconversion among study participants (30).

The results showed that a complex, theory-based intervention that requires many hours of one-to-one contact time did change behaviour, but that its effect was modest and declined over time. A few years after delivery, the intervention had no discernible impact on HIV infections. This may well be true of other studies that report initially positive results but that have much shorter follow-up periods. These studies are more likely to report positive results and not be able to measure the decay in effect over time.

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Sex workers

Systematic reviews have concluded that risk reduction counselling combined with condom promotion has a beneficial impact on behaviour for sex workers in low- and middle-income countries (178, 179). Perhaps the most encouraging evidence comes from a programme for female sex workers in Mexico that randomized more than 900 participants to two styles of counselling, each delivered during a single 30-minute session (180). In the intervention group, the counselling was based on social cognitive theory and motivational interviewing: it covered motivations for practising safer sex, barriers to condom use, techniques for negotiating safer sex with clients and social support. In the control group, the counselling was more didactic, focusing on information delivery and personal risk assessment.

At the six-month follow-up, women in the intervention group reported greater increases in condom use than did the women in the control condition (180). Moreover, incidence of chlamydia, gonorrhoea, syphilis or HIV was 40% lower in the intervention group (20 cumulative infections versus 38 in the control) (RR = 0.60; 95% CI: 0.36–1.00). Due to small study size leading to low statistical power, no statistically significant differences between individuals in the intervention and control groups were found for individual STIs. The authors noted that a more passive intervention in the control group would likely result in a greater contrast between the intervention and control groups, and that it would likely have generated greater effect sizes.

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Conclusion: individual and group interventions

Individual and group interventions have long been used in HIV prevention. Based on models and experience drawn from other areas of psychology—such as smoking cessation and heart disease prevention—these interventions are typically led by a trained professional and include more than one session, sometimes using many sessions. As a result, the opportunity to personalize strategies for risk avoidance to meet the needs and circumstances of an individual is greater than for other prevention interventions. That scope and customizable approach also contributes to the costs of these interventions, making their use more practical for those at elevated risk of HIV, allowing for a focus on the specific factors influencing HIV transmission within the respective priority population.

Evidence suggests that these interventions can be effective in bringing about behaviour change in some people, but that the changes may not persist over time. Just like other HIV prevention interventions—with the exception of VMMC—individual and group interventions require continued programming and ongoing reinforcement. Coupling these interventions with other elements of HIV prevention that are commonly included in combination prevention may enhance and extend their effect over time.

References

1. UNAIDS 2018 HIV estimates.
2. Combination HIV prevention: tailoring and coordinating biomedical, behavioural and structural strategies to reduce new HIV infections. A UNAIDS discussion paper. Geneva: UNAIDS; 2010.
3. Guidelines on provider-initiated HIV testing and counselling in health facilities. Geneva: World Health Organization; 2007.
4. Consolidated guidelines on HIV testing services. Geneva: World Health Organization; 2015.
5. Fonner V, Denison J, Kennedy CE, O'Reilly K, Sweat M. Voluntary counseling and testing (VCT) for changing HIV-related risk behavior in developing countries. *Cochrane Database Syst Rev*. 2012;9:CD001224.
6. Denison JA, O'Reilly KR, Schmid GP, Kennedy CE, Sweat MD. HIV voluntary counselling and testing and behavioral risk reduction in developing countries: a meta-analysis, 1990–2005. *AIDS Behav*. 2008 May;12(3):363-73. Epub 2007 Dec 27.
7. Corbett E, Makamure B, Cheung YB, Dauya E, Matambo R, Bandason T et al. HIV incidence during a cluster-randomized trial of two strategies providing voluntary counselling and testing at a workplace, Zimbabwe. *AIDS*. 2007;21(4):483-9.
8. Matuvo JK, Gray RH, Makumbi F, Wawer MJ, Serwadda D, Kigozi G et al. Voluntary HIV counselling and testing acceptance, sexual risk behavior and HIV incidence in Rakai, Uganda. *AIDS*. 2005;19(5):503-11.
9. Machekano RW, McFarland W, Mbizvo MT, Bassett MT, Katzenstein D, Latif AS et al. Impact of HIV counselling and testing on HIV seroconversion and reported STD incidence among male factory workers in Harare, Zimbabwe. *Cent Afr J Med*. 1998;44(4):98-102.
10. Arthur GV, Nduba V, Forsythe S, Mutemi R, Odhiambo J, Gilks C et al. Behaviour change in clients of health centre-based voluntary counselling and testing services in Kenya. *Sex Transm Infect*. 2007;83(7):541-6.
11. Rosenberg NE, Hauser BM, Ryan J, Miller WC. The effect of HIV counselling and testing on HIV acquisition in sub-Saharan Africa: a systematic review. *Sex Transm Infect*. 2016 Aug 16. pii: sextrans-2016-052651. doi: 10.1136/sextrans-2016-052651
12. Guidelines on couples HIV testing and counseling—including antiretroviral therapy for treatment and prevention in serodiscordant couples. Geneva: World Health Organization; 2012.

References

13. The Voluntary HIV-1 Counseling and Testing Efficacy Study Group. Efficacy of voluntary HIV-1 counselling and testing in individuals and couples in Kenya, Tanzania, and Trinidad: a randomised trial. *Lancet*. 2000;356:103-12.
14. Allen S, Meinzen-Derr J, Kautzman M, Zulu I, Trask S, Fideli U et al. Sexual behavior of HIV discordant couples after HIV counseling and testing. *AIDS*. 2003;17(5):733-40.
15. Rosenberg NE, Pettifor AE, De Bruyn G, Westreich D, Delany-Moretlwe S, Behets F et al. HIV testing and counseling leads to immediate consistent condom use among South African stable HIV-discordant couples. *J Acquir Immune Defic Syndr*. 2013;62(2):226-33.
16. Coates TJ, Kulich M, Celentano DD, Zelaya CE, Chariyalertsak S, Chingono A et al. Effect of community-based voluntary counselling and testing on HIV incidence and social and behavioural outcomes (NIMH Project Accept; HPTN 043): a cluster-randomised trial. *Lancet Glob Health*. 2014;2(5):e267-77.
17. Doherty T, Tabana H, Jackson D, Naik R, Zembe W, Lombard C et al. Effect of home based HIV counselling and testing intervention in rural South Africa: cluster randomised trial. *BMJ*. 2013;346:f3481. doi: <https://doi.org/10.1136/bmj.f3481>
18. Kennedy C, Fonner VA, Sweat MD, Okero FA, Baggaley R, O'Reilly KR et al. Provider-initiated HIV testing and counseling in low- and middle-income countries: a systematic review. *AIDS Behav*. 2013;17:1571-90.
19. van't Hoog AH, Mbori-Ngacha DA, Marum LH, Otieno JA, Misore AO, Nganga LW et al. Preventing mother-to-child transmission of HIV in Western Kenya: operational issues. *J Acquir Immune Defic Syndr*. 2005 Nov 1;40(3):344-9.
20. Chandisarewa W, Stranix-Chibanda L, Chirapa E, Miller A, Simoyi M, Mahomva A et al. Routine offer of antenatal HIV testing ("opt-out" approach) to prevent mother-to-child transmission of HIV in urban Zimbabwe. *Bull World Health Organ*. 2007;85(11):843-50.
21. Stringer JSA, Sinkala M, Stout JP, Goldenberg RL, Acosta EP, Chapman V et al. Comparison of two strategies for administering nevirapine to prevent perinatal HIV transmission in high-prevalence, resource-poor settings. *J Acquir Immune Defic Syndr*. 2003;32(5):506-13.
22. Allen S, Serufilira A, Bogaerts J, Van de Perre P, Nsengumuremyi F, Lindan C et al. Confidential HIV testing and condom promotion in Africa. Impact on HIV and gonorrhea rates. *JAMA*. 1992;268:3338-43.
23. Desgrées-Du-Loû A, Brou H, Djohan G, Becquet R, Ekouevi DK, Zanou B et al. Beneficial effects of offering prenatal HIV counselling and testing on developing a HIV preventive attitude among couples. Abidjan, 2002–2005. *AIDS Behav*. 2009;13(2):348-55.
24. Xu F, Kilmarx PH, Supawitkul S, Manopaiboon C, Yanpaisarn S, Limpakarnjanarat K et al. Incidence of HIV-1 infection and effects of clinic-based counseling on HIV preventive behaviors among married women in northern Thailand. *J Acquir Immun Defic Syndr*. 2002;29(3):284-8.

References

25. Kiene SM, Bateganya M, Wanyenze R, Lule H, Nantaba H, Stein MD et al. Initial outcomes of provider-initiated routine HIV testing and counseling during outpatient care at a rural Ugandan hospital: risky sexual behavior, partner HIV testing, disclosure and HIV care seeking. *AIDS Patient Care STDS*. 2010;24:117-26.
26. Bentley ME, Spratt K, Shepherd ME, Gangakhedkar RR, Thilikavathi S, Bollinger RC et al. HIV testing and counseling among men attending sexually transmitted disease clinics in Pune, India: changes in condom use and sexual behavior over time. *AIDS*. 1998;12:1869-77.
27. Kamb ML, Fishbein M, Douglas JM Jr, Rhodes F, Rogers J, Bolan G et al. Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases. *JAMA*. 1998;280(13):1161-7.
28. Metsch LR, Feaster DJ, Gooden L, Schackman BR, Matheson T, Das M et al. Effect of risk-reduction counseling with rapid HIV testing on risk of acquiring sexually transmitted infections: the AWARE randomized clinical trial. *JAMA*. 2013;310:1701-10.
29. Dilley JW, Woods WJ, Sabatino J, Lihathsh T, Adler B, Casey S et al. Changing sexual behavior among gay male repeat testers for HIV: a randomized, controlled trial of a single-session intervention. *J Acquir Immune Defic Syndr*. 2002;30(2):177-86.
30. Koblin B, Chesney M, Coates T; EXPLORE Study Team. Effects of a behavioral intervention to reduce acquisition of HIV infection among men who have sex with men: the EXPLORE randomised controlled study. *Lancet*. 2004;364:41-50.
31. Metsch LR, Feaster DJ, Gooden L, Matheson T, Mandler RN, Haynes L et al. Implementing rapid HIV testing with or without risk-reduction counseling in drug treatment centers: results of a randomized trial. *Am J Public Health*. 2012;102:1160-7.
32. Schackman BR, Metsch LR, Colfax GN, Leff JA, Wong A, Scott CA et al. The cost-effectiveness of rapid HIV testing in substance abuse treatment: results of a randomized trial. *Drug Alcohol Depend*. 2013;128:90-7.
33. Anaya HD, Hoang T, Golden JF, Goetz MB, Gifford A, Bowman C et al. Improving HIV screening and receipt of results by nurse-initiated streamlined counseling and rapid testing. *J Gen Intern Med*. 2008;23(6):800-7.
34. Figueroa C, Johnson C, Verster A, Baggaley R. Attitudes and acceptability on HIV self-testing among key populations: a literature review. *AIDS Behav*. 2015 Nov;19(11):1949-65.
35. Johnson CC, Kennedy C, Fonner V, Siegfried N, Figueroa C, Dalal S et al. Examining the effects of HIV self-testing compared to standard HIV testing services: a systematic review and meta-analysis. *J Int AIDS Soc*. 2017;20(1):21594.
36. Masters SH, Agot K, Obonyo B, Napierala Mavedzenge S, Maman S, Thirumurthy H. Promoting partner testing and couples testing through secondary distribution of HIV self-tests: a randomized clinical trial. *Plos Med*. 2016;13(11):e1002166.

References

37. Wang Z, Lau J, Ip M, Ho S. A randomized controlled trial evaluating efficacy of promoting a home-based HIV self-testing with online counseling on increasing HIV testing among men who have sex with men. *AIDS Behav.* 2018;22(1):190-201.
38. Jamil MS, Prestage G, Fairley CK, Grulich AE, Smith KS, Chen M et al. Effect of availability of HIV self-testing on HIV testing frequency in gay and bisexual men at high risk of infection (FORTH): a waiting-list randomised controlled trial. *Lancet HIV.* 2017;4(6):e241-50.
39. Katz D, Golden M, Hughes J, Farquhar C, Stekler J. HIV self-testing increases HIV testing frequency in high-risk men who have sex with men: a randomized controlled trial. *J Acquir Immune Defic Syndr.* 2018;78(5):505-12.
40. Balan IC, Carballo-Diéguez A, Frasca T, Dolezal C, Ibitoye M. The impact of rapid HIV home test use with sexual partners on subsequent sexual behavior among men who have sex with men. *AIDS Behav.* 2014;18:254-62.
41. Kumwenda M, Munthali A, Phiri M, Mwale D, Gutteberg T, MacPherson E et al. Factors shaping initial decision-making to self-test amongst cohabiting couples in urban Blantyre, Malawi. *AIDS Behav.* 2014;18(Suppl 4):S396-404.
42. Marks G, Crepaz N, Senterfitt JW, Janssen RS. Meta-analysis of high-risk sexual behaviour in persons aware and unaware they are infected with HIV in the United States. *J Acquir Immune Defic Syndr.* 2005;39:446-53.
43. Turner A, Miller WC, Padian NS, Kaufman JS, Behets FM, Chipato T et al. Unprotected sex following HIV testing among women in Uganda and Zimbabwe: short- and long-term comparisons with pre-test behaviour. *Int J Epidemiol.* 2009;38:997-1007.
44. Venkatesh K, de Bruyn G, Mayer KH, Cheng H, Blanchard K, Ramjee G et al. Changes in sexual risk behavior before and after HIV seroconversion in southern African women enrolled in a HIV prevention trial. *J Acquir Immune Defic Syndr.* 2011;57:435-41.
45. McClelland R, Hassan WM, Lavreys L, Richardson BA, Mandaliya K, Ndinya-Achola J et al. HIV-1 acquisition and disease progression are associated with decreased high-risk sexual behaviour among Kenyan female sex workers. *AIDS.* 2006;20:1969-73.
46. Rietmeijer CA. Risk reduction counselling for prevention of sexually transmitted infections: how it works and how to make it work. *Sex Transm Infect.* 2007;83:2-9.
47. Hao C, Huan X, Yan H, Yang H, Guan W, Xu X et al. A randomized controlled trial to evaluate the relative efficacy of enhanced versus standard voluntary counseling and testing on promoting condom use among men who have sex with men in China. *AIDS Behav.* 2012;16(5):1138-48.
48. Yang C, Tobin K, Latkin C. Perceived serosorting of injection paraphernalia sharing networks among injection drug users in Baltimore, MD. *AIDS Behav.* 2001;15:16-21.

References

49. Smith B, Jewett A, Burt RD, Zibbell JE, Yartel AK, DiNenno E. "To share or not to share?" Serosorting by hepatitis C status in the sharing of drug injection equipment among NHBS-IDU2 participants. *J Infect Dis.* 2013;208:1934-42.
50. Weller SC, Davis-Beaty K. Condom effectiveness in reducing heterosexual HIV transmission. *Cochrane Database Syst Rev.* 2002;1:CD003255.
51. Smith DK, Herbst JH, Zhang X, Rose CE. Condom effectiveness for HIV prevention by consistency of use among men who have sex with men in the United States. *J Acquir Immune Defic Syndr.* 2015;68(3):337-44.
52. Gallo M, Kilbourne-Brook M, Coffey PS. A review of the effectiveness and acceptability of the female condom for dual protection. *Sexual Health.* 2012;9:18-26.
53. Rehle TM, Hallett TB, Shisana O, Pillay-van Wyk V, Zuma K, Carrara H et al. A decline in new HIV infections in South Africa: estimating HIV incidence from three national HIV surveys in 2002, 2005 and 2008. *PLoS One.* 2010;5(6):e11094.
54. Charania MR, Crepaz N, Guenther-Gray C, Henny K, Liao A, Willis LA et al. Efficacy of structural-level condom distribution interventions: a meta-analysis of U.S. and international studies, 1998–2007. *AIDS Behav.* 2011;15(7):1283-97.
55. The business case for female condoms. *Global Health Visions: New York; 2014.*
56. Johnson LJ, Hallett TB, Rehle TM, Dorrington RE. The effect of changes in condom usage and antiretroviral treatment coverage on human immunodeficiency virus incidence in South Africa: a model-based analysis. *J R Soc Interface.* 2012;9(72):1544-54.
57. Phillips AN, Cambiano V, Nakagawa F, Brown AE, Lampe F, Rodger A et al. Increased HIV incidence in men who have sex with men despite high levels of ART-induced viral suppression: analysis of an extensively documented epidemic. *PLoS ONE.* 2013;8(2):e55312.
58. World Health Organization, United Nations Population Fund. *Male latex condom: specification, prequalification and guidelines for procurement.* Geneva: World Health Organization; 2013.
59. Carey F, Lytle CD, Cyr WH. Implications of laboratory tests of condom integrity. *Sex Transm Dis.* 1999;26(4):216-20.
60. *Scientific evidence on condom effectiveness for sexually transmitted disease (STD) prevention.* Bethesda (MD): National Institute of Allergy and Infectious Diseases; 2000.
61. Worth D. Sexual decision-making and AIDS: why condom promotion among vulnerable women is likely to fail. *Stud Fam Plan.* 1989;20:297-307.
62. Liu H, Morisky DE, Lin X, Ma E, Jiang B, Yin Y. Bias in self-reported condom use: association between over-reported condom use and syphilis in a three-site study in China. *AIDS Behav.* 2016;20(6):1343-52.

References

63. Detels R, English P, Visscher BR, Jacobson L, Kingsley LA, Chmiel JS et al. Seroconversion, sexual activity, and condom use among 2915 HIV seronegative men followed for up to 2 years. *J Acquir Immune Defic Syndr*. 1989;2:77-83.
64. Johnson WD, O'Leary A, Flores SA. Per-partner condom effectiveness against HIV for men who have sex with men. *AIDS*. 2018;32(11):1499-505).
65. De Vincenzi I. A longitudinal study of human immunodeficiency virus transmission by heterosexual partners. European Study Group on Heterosexual Transmission of HIV. *N Engl J Med*. 1994;331:341-6.
66. How to use a femidom. In: Terrence Higgins Trust [website]. London (UK): Terrence Higgins Trust; 8 June 2016 (<http://www.tht.org.uk/sexual-health/Improving-your-sexual-health/Condoms/Using-a-femidom>, accessed 3 April 2018).
67. Post-exposure prophylaxis. In: Terrence Higgins Trust [website]. London (UK): Terrence Higgins Trust; 7 April 2016 (<http://www.tht.org.uk/sexual-health/about-hiv/post-exposure-prophylaxis>, accessed 3 April 2018).
68. Pinkerton SD, Abramson PR. Effectiveness of condoms in preventing HIV transmission. *Soc Sci Med*. 1997;44(9):1303-12.
69. Ahmed S, Lutalo T, Wawer M, Serwadda D, Sewankambo NK, Nalugoda F et al. HIV incidence and sexually transmitted disease prevalence associated with condom use: a population study in Rakai, Uganda. *AIDS*. 2001 Nov 9;15(16):2171-9.
70. Stoneburner RL, Low-Beer D. Population-level HIV declines and behavioural risk avoidance in Uganda. *Science*. 2004;304(5671):714-8.
71. Halperin D, Mugurungi O, Hallett TB, Muchini B, Campbell B, Magure T et al. A surprising prevention success: why did the HIV epidemic decline in Zimbabwe? *PLoS Med*. 2011;8(2):e1000414.
72. Rojanapithayakorn W. The 100% condom use programme in Asia. *Reprod Health Matters*. 2008;14(28):41-52.
73. Kumar R, Jha P, Arora P, Mony P, Bhatia P, Millson P et al. Trends in HIV-1 in young adults in South India from 2000 to 2004: a prevalence study. *Lancet*. 2006;367:1164-72.
74. The gap report. Geneva: UNAIDS; 2014.
75. Frasca T. AIDS in Latin America. New York: Palgrave Macmillan (US); 2005.
76. Catania J, Coates TJ, Stall R, Bye L, Kegeles SM, Capell F et al. Changes in condom use among homosexual men in San Francisco. *Health Psychol*. 1991;10(3):190-9.
77. Hunt AJ, Weatherburn P, Hickson FC, Davies PM, McManus TJ, Coxon AP. Changes in condom use by MSM. *AIDS Care*. 1993;5(4):439-48.

References

78. Michielsen K, Chersich MF, Luchters S, De Koker P, Van Rossem R, Temmerman M. Effectiveness of HIV prevention for youth in sub-Saharan Africa: a systematic review of randomized and non-randomized studies. *AIDS*. 2010;25(4):1193-1202.
79. Foss AM, Hossain M, Vickerman PT, Watts CH. A systematic review of published evidence on intervention impact on condom use in sub-Saharan Africa and Asia. *Sex Transm Infect*. 2007;83(7):510-6.
80. Halli SS, Ramesh BM, O'Neil J, Moses S, Blanchard JF. The role of collectives in STI and HIV/AIDS prevention work among female sex workers in Karnataka, India. *AIDS Care*. 2006;18(7):739-49.
81. Adamchak S, Janowitz B, Liku J, Munyambanza E, Grey T, Keyes E. Study of family planning and HIV integrated services in five countries: final report. Research Triangle Park (NC): Family Health International; 2010.
82. Penman-Aguilar A, Hall J, Artz L, Crawford MA, Peacock N, van Olphen J et al. Presenting the female condom to men: a dyadic analysis of effect of the woman's approach. *Women Health*. 2002;35(1):37-51.
83. Ankrah EM, Attika SA. Adopting the female condom in Kenya and Brazil: perspectives of women and men. A synthesis. Arlington (VA): Family Health International; 1997.
84. World Health Organization, United Nations Office for Disarmament Affairs, UNAIDS. Effectiveness of interventions to manage HIV in prisons—provision of condoms and other measures to decrease sexual transmission. Geneva: World Health Organization; 2007.
85. Kennedy C, Medley AM, Sweat MD, O'Reilly KR. Behavioural interventions for HIV-positive prevention in developing countries: a systematic review and meta-analysis. *Bull World Health Org*. 2010;88:615-23.
86. Smoak ND, Scott-Sheldon LA, Johnson BT, Carey MP. Sexual risk reduction interventions do not inadvertently increase the overall frequency of sexual behavior: a meta-analysis of 174 studies with 116,735 participants. *J Acquir Immune Defic Syndr*. 2006;41(3):374-84.
87. Comprehensive condom programming: a guide for resource mobilization and country programming. New York: United Nations Population Fund; 2011.
88. Reece M, Herbenick D, Dodge B. Penile dimensions and men's perceptions of condom fit and feel. *Sex Transm Infect*. 2009;85:127-31.
89. Crosby RA, Yarber WL, Sanders SA, Graham CA, McBride K, Milhausen RR et al. Men with broken condoms. Who and why? *Sex Transm Infect*. 2007 Feb;83(1):71-5.
90. Schiller B. 8 amazing condom concepts that actually feel good, funded by the Gates Foundation. In: Fast Company [Internet]. 20 November 2013 (<https://www.fastcompany.com/3021941/8-amazing-condom-concepts-that-actually-feel-good-funded-by-the-gates-foundation>, accessed 3 April 2018).

References

91. Braunstein S, Van de Wijgert J. Preferences and practices related to vaginal lubrication: implications for microbicide acceptability and clinical testing. *J Womens Health (Larchmt)*. 2005;14(5):324-33.
92. Albert AE, Warner DL, Hatcher RA, Trussell J, Bennett C. Condom use among female commercial sex workers in Nevada's legal brothels. *Am J Public Health*. 1995;85:1514-20.
93. Javanbakht M, Murphy R, Gorbach P, LeBlanc MA, Pickett J. Preference and practices relating to lubricant use during anal intercourse: implications for rectal microbicides. *Sex Health*. 2010;7:193-8.
94. Golombok S, Harding R, Sheldon J. An evaluation of a thicker versus a standard condom with MSM. *AIDS*. 2001;15(2):245-50.
95. Wang L, Schnaare RL, Dezzutti C, Anton PA, Rohan LC. Rectal microbicides: clinically relevant approach to the design of rectal specific placebo formulations. *AIDS Res Ther*. 2011;8:12.
96. Dezzutti CS, Brown ER, Moncla B, Russo J, Cost M, Wang L et al. Is wetter better? An evaluation of over-the-counter lubricant gels for safety and anti-HIV-1 activity. *PLoS ONE*. 2012;7(11):e48328.
97. Use and procurement of additional lubricants for male and female condoms: WHO/UNFPA/FHI360. Advisory note. Geneva: WHO; 2012.
98. Sweat MD, Denison J, Kennedy C, Tedrow V, O'Reilly K. Effects of condom social marketing on condom use in developing countries: a systematic review and meta-analysis, 1990–2010. *Bull World Health Organ*. 2012;90:613-22A.
99. Babalola S, Figueroa ME, Krenn S. Association of mass media communication with contraceptive use in sub-Saharan Africa: a meta-analysis of Demographic and Health Surveys. *J Health Commun*. 2017;22:11:885-95.
100. Telles Dias PR, Souto K, Page-Shafer K. Long-term female condom use among vulnerable populations in Brazil. *AIDS Behav*. 2006;10:S67-75.
101. Dowdy DW, Sweat MD, Holtgrave DR. Country-wide distribution of the nitrile female condom (FC2) in Brazil and South Africa: a cost-effectiveness analysis. *AIDS*. 2006;20(16):2091-8.
102. UK Department for International Development (DfID). Making markets for health services work better: the contribution of social marketing. Notes of a meeting, April 22–23, 2004. London: DfID Health Systems Resource Centre; 2004.
103. Honeyman SW. One size doesn't fit all: why different implementation models are needed for different social marketing health interventions. PSP-One Online Social Marketing Conference, 10–17 March 2008.
104. Chapman S, Jafa K, Longfield K, Vielot N, Buszin J, Ngamkitpaiboon L et al. Condom social marketing in sub-Saharan Africa and the total market approach. *Sex Health*. 2012;9(1):44-50.

References

105. Creese A, Floyd K, Alban A, Guinness L. Cost-effectiveness of HIV/AIDS interventions in Africa: a systematic review of the evidence. *Lancet*. 2002;359(9318):1635-43.
106. Katz MH, Schwarcz SK, Kellogg TA, Klausner JD, Dilley JW, Gibson S et al. Impact of highly active antiretroviral treatment on HIV seroincidence among men who have sex with men: San Francisco. *Am J Public Health*. 2002;92(3):388-94.
107. Centers for Disease Control and Prevention. HIV testing and risk behaviours among gay, bisexual and other men who have sex with men—United States. *MMWR*. 2013;62(47):958-62.
108. Wellings K. Evaluating AIDS public education in Europe: a cross-national comparison. In: Hornik RC, editor. *Public health communication: evidence for behavior change*. Hillsdale (NJ): Lawrence Erlbaum Associates; 2002:131-46.
109. Noar SM, Zimmerman RS. Health behavior theory and cumulative knowledge regarding health behaviours: are we moving in the right direction? *Health Educ Res*. 2005;20(3):275-90.
110. Bertrand JT, O'Reilly K, Denison J, Anhang R, Sweat M. Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviors in developing countries. *Health Educ Res*. 2006;21:567-97.
111. Freimuth VS, Hammond SL, Edgar T, Monahan JL. Reaching those at risk: a content-analytic study of AIDS PSAs. *Communication Research*. 1990;17(6):775-91.
112. Green EC, Halperin DT, Nantulya V, Hogle JA. Uganda's HIV prevention success: the role of sexual behavior change and the national response. *AIDS Behav*. 2006;10(4):335-46.
113. Slavin S, Batrouney C, Murphy D. Fear appeals and treatment side-effects: an effective combination for HIV prevention? *AIDS Care*. 2007 Jan;19(1):130-7.
114. LaCroix JM, Snyder LB, Huedo-Medina TB, Johnson BT. Effectiveness of mass media interventions for HIV prevention, 1986–2013: a meta-analysis. *J Acquir Immune Defic Syndr*. 2014;66:S329-40.
115. Piotrow PT, Kincaid DL, Rimon JG II, Rinehart W, Cline RJ. *Health communication: lessons from family planning and reproductive health*. Westport (CT): Praeger; 1997.
116. Noar S, Palmgreen P, Chabot M, Dobransky N, Zimmerman RS. A 10-year systematic review of HIV/AIDS mass communication campaigns: have we made progress? *J Health Commun*. 2009;14:15-42.
117. Bekalu MA, Eggermont S. Advancing HIV/AIDS combination prevention through mass media: a review practices in sub-Saharan Africa. *Information Development*. 2012;28(3):189-98.
118. Head R, Murray J, Sarrassat S, Snell W, Meda N, Ouedraogo M et al. Can mass media interventions reduce child mortality? *Lancet*. 2015;386(9988):97-100.

References

119. Hutton G, Wyss K, Diekhor YN. Prioritization of prevention activities to combat the spread of HIV/AIDS in resource constrained settings: a cost-effectiveness analysis from Chad, Central Africa. *Int J Health Plann Manage.* 2003;18:117-36.
120. Hogan DR, Baltussen R, Hayashi C, Lauer JA, Salomon JA. Achieving the millennium development goals for health: cost effectiveness analysis of strategies to combat HIV/AIDS in developing countries. *BMJ.* 2005. doi:10.1136/bmj.38643.368692.68
121. Kim YM, Kols A, Nyakauru R, Marangwanda C, Chibatamoto P. Promoting sexual responsibility among young people in Zimbabwe. *International Family Planning Perspectives.* 2001;27:11-19.
122. Ross MW, Chatterjee NS, Leonard L. A community level syphilis prevention programme: outcome data from a controlled trial. *Sex Transm Infect.* 2004;80:100-4.
123. Vaughan PW, Rogers EM, Singhal A, Swalehe RM. Entertainment–education and HIV/AIDS preventions: a field experiment in Tanzania. *J Health Commun.* 2000;5(Suppl):81-100.
124. Xiaoming S, Yong W, Choi K, Lurie P, Mandel J. Integrating HIV prevention education into existing family planning services: results of a controlled trial of a community-level intervention for young adults in rural China. *AIDS Behav.* 2000;4:103-10.
125. Zimmerman RS, Palmgreen P, Noar SM, Lustria MLA, Lu HY, Horosewski ML. Effects of a televised two-city safer sex mass media campaign targeting high sensation-seeking and impulsive decision-making young adults. *Health Educ Behav.* 2007;34:810-26.
126. Schopper D, Doussantousse S, Ayiga N, Ezatirale G, Idro WJ, Homsy J. Village-based AIDS prevention in a rural district in Uganda. *Health Policy Plan.* 1995;10:171-80.
127. Vernon R, Ojeda G, Murad R. Incorporating AIDS prevention activities into family planning organization in Colombia. *Stud Fam Plann.* 1990;21:335-43.
128. Post-intervention survey report: HIV/AIDS/STI knowledge, attitudes and practice (KAP) survey among commercial sex workers, military and youth in Port Loko, Sierra Leone. Refugee Studies Centre. Freetown (Sierra Leone) and Minneapolis: American Refugee Committee International; 2003.
129. The One Love campaign in southern Africa. What has been achieved so far? Interim evaluation. Johannesburg: Soul City Institute; 2012.
130. Astatke H, Greiner K, Costenbader E, Meyanathan S. Multiple and concurrent sexual partnerships in generalized HIV epidemics in southern and East Africa: a desk review of communication interventions to identify lessons learned for strengthening future HIV behavioral prevention programs. Washington (DC): C-Change Project, FHI 360; 2012.
131. Figueroa ME, Kincaid DL. Evaluating the impact of a communication campaign on multiple sex partnerships in Mozambique. Final report. February 2014. Baltimore: USAID, Project SEARCH, Research to Prevention; 2013.

References

132. Sood S, Shefner-Rogers CL, Sengupta M. The impact of a mass media campaign on HIV/AIDS knowledge and behavior change in North India: results from a longitudinal study. *Asian J Commun.* 2006;16:231-50.
133. Tian L, Tang S, Cao W, Zhang K, Li V, Detels R. Evaluation of a web-based intervention for improving HIV/AIDS knowledge in rural Yunnan, China. *AIDS.* 2007;21(Suppl 8):S137-42.
134. Bekalu MA, Eggermont S, Ramanadhan S, Viswanath K. Effect of media use on HIV-related stigma in sub-Saharan Africa: a cross-sectional study. *PLoS ONE.* 2014;9(6):e100467.
135. Kerr JC, Valois RF, DiClemente RJ, Carey MP, Stanton B, Romer D et al. The effects of a mass media HIV-risk reduction strategy on HIV-related stigma and knowledge among African American adolescents. *AIDS Patient Care STDS.* 2015 Mar;29(3):150-6.
136. Vidanapathirana J, Abramson MJ, Forbes A, Fairley C. Mass media interventions for promoting HIV testing. *Cochrane Database of Syst Rev.* 2005;20:CD004775.
137. French RS, Bonell C, Wellings K, Weatherburn P. An exploratory review of HIV prevention mass media campaigns targeting men who have sex with men. *BMC Public Health.* 2014;14:616.
138. Hilliam A, Fraser L, Turner L. HIV Wake-Up campaign. Edinburgh: NHS Health Scotland; 2011.
139. Hartfield K, Burt R, Thiede H. "It's the little prick you can deal with"—evaluation of an HIV testing promotion campaign. Washington State: Seattle and King County; 2009.
140. Katzman J, Gulati H, Higa DH, Welch Q, Wood RW. A "community manifesto" for gay and bisexual men: an appeal to control HIV/STDs. *J Public Health Manage Pract.* 2007;13(3):244-51.
141. McOwan A, Gilleece Y, Chislett L, Mandalia S. Can targeted HIV testing campaigns alter health-seeking behavior? *AIDS Care.* 2002;14:385-90.
142. 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. *Sex Transm Inf.* 1999;75(4):273.
143. Griffith R, Mandalia S, Beck EJ, Kenny C, Watkins P, Claydon E et al. HIV media campaigns and HIV-1 testing trends at a London genitourinary medicine clinic, 1985–1993. *AIDS.* 1995;9(12):1367-72.
144. Sgaier SK, Reed JB, Thomas A, Njeuhmeli E. Achieving the HIV prevention impact of voluntary medical male circumcision: lessons and challenges for managing programs. *PLoS Med.* 2014;11(5):e1001641.
145. Wei C, Herrick A, Raymond HF, Anglemyer A, Gerbase A, Noar SM et al. 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 Syst Rev.* 2011;9:CD009337.

References

146. Guy R, Goller J, Thorpe R, Grierson J, Batrouney C, Kennedy M et al. 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;63:391-6.
147. 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;98:337-43.
148. Guse K, Levine D, Martins S, Lira A, Gaarde J, Westmorland W et al. Interventions using new digital media to improve adolescent sexual health: a systematic review. *J Adolesc Health*. 2012;51(6):535-43.
149. Tortolero SR, Markham CM, Peskin MF, Shegog R, Addy RC, Escobar-Chaves SL et al. It's Your Game: Keep It Real: delaying sexual behavior with an effective middle school program. *J Adolesc Health*. 2010;46:169-79.
150. Schnall R, Travers J, Rojas M, Carballo-Diéguez A. eHealth interventions for HIV prevention in high-risk men who have sex with men: a systematic review. *J Med Internet Res*. 2014;16:e134.
151. Hirshfield S, Chiasson MA, Joseph H, Scheinmann R, Johnson WD, Remien RH et al. An online randomized controlled trial evaluating HIV prevention digital media interventions for men who have sex with men. *PLoS ONE*. 2012;7:e46252.
152. King E. *Safety in numbers: safer sex and gay men*. London (UK): Routledge; 1994.
153. Asiimwe-Okiror G, Opio A, Musinguzi J, Madraa E, Tembo G, Carael M. Change in sexual behaviour and decline in HIV infection among young pregnant women in urban Uganda. *AIDS*. 1997;11(14):1757-63.
154. Scott-Sheldon L, Huedo-Medina TB, Warren MR, Johnson BT, Carey MP. Efficacy of behavioral interventions to increase condom use and reduce sexually transmitted infections: a meta-analysis, 1991 to 2010. *J Acquir Immune Defic Syndr*. 2011;15:489-98.
155. Fonner VA, Kennedy CE, O'Reilly KR, Sweat MD. Systematic assessment of condom use measurement in evaluation of HIV prevention interventions: need for standardization of measures. *AIDS Behav*. 2014;18(22):2374-86.
156. Albarracin D, Gillette JC, Earl AN, Glasman LR, Durantini MR, Ho MH. A test of major assumptions about behavior change: a comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. *Psychol Bull*. 2005;131(6):856-97.
157. Jones D, Ross D, Weiss SM, Bhat G, Chitalu N. Influence of partner participation on sexual risk behavior reduction among HIV-positive Zambian women. *J Urban Health*. 2005;82(3 Suppl 4):iv92-100.
158. Townsend L, Matthews C, Zembe Y. A systematic review of behavioural interventions to prevent HIV infection and transmission among heterosexual adult men in low- and middle-income countries. *Prev Sci*. 2013;14(1):88-105.

References

159. Simbayi LC, Kalichman S, Skinner D, Jooste S, Cain D, Cherry C et al. Theory-based HIV risk reduction counselling for sexually transmitted infection clinic patients in Cape Town, South Africa. *Sex Transm Dis.* 2004;31:727-33.
160. Kalichman S, Simbayi LC, Vermaak R, Cain D, Jooste S, Peltzer K. HIV/AIDS risk reduction counselling for alcohol using sexually transmitted infections clinic patients in Cape Town, South Africa. *J Acquir Immune Defic Syndr.* 2007;44:594-600.
161. Fisher J, Fisher WA, Cornman DH, Amico RK, Bryan A, Friedland GH. Clinician-delivered intervention during routine clinical care reduces unprotected sexual behaviour among HIV-infected patients. *J Acquir Immune Defic Syndr.* 2006;41:44-52.
162. Cornman D, Kiene SM, Christie S, Fisher WA, Shuper PA, Pillay S et al. Clinic-based intervention reduces unprotected sexual behavior among HIV-infected patients in KwaZulu-Natal, South Africa: results of a pilot study. *J Acquir Immune Defic Syndr.* 2008;48:553-60.
163. Wong E, Roddy RE, Tucker H, Tamoufé U, Ryan K, Ngampoua F et al. Use of male condoms during and after randomized, controlled trial participation in Cameroon. *Sex Transm Dis.* 2005;32(5):300-07.
164. Bing EG, Cheng KG, Ortiz DJ, Ovalle-Bahamón RE, Ernesto F, Weiss RE et al. Evaluation of a prevention intervention to reduce HIV risk among Angolan soldiers. *AIDS Behav.* 2008;12(3):384-95.
165. Cornman D, Schmiege SJ, Bryan A, Benziger TJ, Fisher JD. An information–motivation–behavioral skills model-based HIV prevention intervention for truck drivers in India. *Soc Sci Med.* 2007;64(8):1572–84.
166. Jewkes R, Nduna M, Levin J, Jama N, Dunkle K, Puren A et al. Impact of Stepping Stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster randomised control trial. *BMJ.* 2008;337:a506.
167. Crepaz N, Tungol-Ashmon MV, Higa DH, Vosburgh W, Mullins MM, Barham T et al. A systematic review of interventions for reducing HIV risk behaviors among people living with HIV in the United States, 1988–2012. *AIDS.* 2014;28(5):633-56.
168. Impact assessment of the expanded support programme: Zimbabwe. Harare: Health Partners International; 2011
(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197475/SP-Impact-Assessment-zimb-11.pdf, accessed 8 July 2016).
169. Solomon J, Card JJ, Malow RM. Adapting efficacious interventions: advancing translational research in HIV prevention. *Eval Health Prof.* 2006;29:162-94.
170. Behavior change and HIV prevention: (re)considerations for the 21st century. Global HIV Prevention Working Group; 2008.
171. Burton J, Darbes LA, Operario D. Couples-focused behavioral interventions for prevention of HIV: systematic review of the state of evidence. *AIDS Behav.* 2010;14(1):1–10.

References

172. Johnson TB, Carey MP, Chaudoir SR, Reid AE. Sexual risk reduction for persons living with HIV: research synthesis of randomized controlled trials, 1993–2004. *J Acquir Immune Defic Syndr*. 2006;41(5):642-50.
173. Carvalho FT, Gonçalves TR, Faria ER, Shoveller JA, Piccinini CA, Ramos MC et al. Behavioral interventions to promote condom use among women living with HIV. *Cochrane Database Syst Rev*. 2011;(9):CD007844.
174. Darbes L, Crepaz N, Lyles C, Kennedy G, Rutherford G. The efficacy of behavioral interventions in reducing HIV risk behaviors and incident sexually transmitted diseases in heterosexual African Americans. *AIDS*. 2008;22(10):1177–94.
175. Herbst J, Beeker C, Mathew A, McNally T, Passin WF, Kay LS et al. The effectiveness of individual-, group-, and community-level HIV behavioral risk-reduction interventions for adult men who have sex with men: a systematic review. *Am J Prev Med*. 2007;32(4 Suppl):S38-67.
176. Sullivan P, Carballo-Diéguez A, Coates T, Goodreau SM, McGowan I, Sanders EJ et al. Successes and challenges of HIV prevention in men who have sex with men. *Lancet*. 2012;380(9839):388-99.
177. Koblin B, Husnik MJ, Colfax G, Huang Y, Madison M, Mayer K et al. Risk factors for HIV infection among men who have sex with men. *AIDS*. 2006;20(5):731-9.
178. Shahmanesh M, Patel V, Mabey D, Cowan F. Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting: a systematic review. *Trop Med Int Health*. 2008;13(5):659-79.
179. Wariki W, Ota E, Mori R, Koyanagi A, Hori N, Shibuya K. Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries. *Cochrane Database Syst Rev*. 2012;2:CD005272.
180. Patterson T, Mausbach B, Lozada R, Staines-Orozco H, Semple SJ, Fraga-Vallejo M et al. Efficacy of a brief behavioral intervention to promote condom use among female sex workers in Tijuana and Ciudad Juarez, Mexico. *Am J Public Health*. 2008;98(11):2051-7.
181. Mavedzenge S, Luecke E, Ross DA. Effectiveness of HIV prevention, treatment and care interventions among adolescents: a systematic review of systematic reviews. New York: United Nations Children's Fund; 2013.
182. Underhill K, Montgomery P, Operario D. Sexual abstinence only programmes to prevent HIV infection in high income countries: systematic review. *BMJ*. 2007. ;335(7613):248.
183. Underhill K, Operario D, Montgomery P. Systematic review of abstinence-plus HIV prevention programs in high-income countries. *PLoS Med*. 2007;4(9):e275.
184. Ross DA, Chagalucha J, Obasi AI, Todd J, Plummer ML, Cleophas-Mazige B et al. Biological and behavioural impact of an adolescent sexual health intervention in Tanzania: a community-randomized trial. *AIDS*. 2007;21(14):1943-55.

References

185. Doyle AM, Ross DA, Maganja K, Baisley K, Masesa C, Andreasen A et al. Long-term biological and behavioural impact of an adolescent sexual health intervention in Tanzania: follow-up survey of the community-based MEMA kwa Vijana trial. *PLoS Med.* 2010;7:e1000287.
186. Wight D, Plummer M, Ross D. The need to promote behaviour change at the cultural level: one factor explaining the limited impact of the MEMA kwa Vijana adolescent sexual health intervention in rural Tanzania. A process evaluation. *BMC Public Health.* 2012;12:788.
187. Dupas P. Do teenagers respond to HIV risk information? Evidence from a field experiment in Kenya. *American Economic Journal: Applied Economics.* 2011;3(1):1–34.
188. Fonner VA, Armstrong KS, Kennedy CE, O'Reilly KR, Sweat MD. School based sex education and HIV prevention in low- and middle-income countries: a systematic review and meta-analysis. *PLoS ONE.* 2014;9(3):e89692.
189. Medley A, Kennedy CE, O'Reilly KR, Sweat MD. Effectiveness of peer education interventions for HIV prevention in developing countries: a systematic review and meta-analysis. *AIDS Educ Prev.* 2009;21:181-206.
190. Simoni J, Nelson KM, Franks JC, Yard SS, Lehavot K. Are peer interventions for HIV efficacious? A systematic review. *AIDS Behav.* 2011;15:1589-95.
191. Tolli MV. Effectiveness of peer education interventions for HIV prevention, adolescent pregnancy prevention and sexual health promotion for young people: a systematic review of European studies. *Health Educ Res.* 2012;27;904-13.
192. Stephenson J, Strange V, Allen E, Copas A, Johnson A, Bonell C et al. The long-term effects of a peer-led sex education programme (RIPPLE): a cluster randomised trial in schools in England. *PLoS Med.* 2008;5(11):e224.
193. Sweat M, Morin S, Celentano D, Mulawa M, Singh B, Mbwapo J et al. Community-based intervention to increase HIV testing and case detection in people aged 16–32 years in Tanzania, Zimbabwe, and Thailand (NIMH Project Accept, HPTN 043): a randomised study. *Lancet Infect Dis.* 2011;11(7):525–32.
194. Cowan F, Pascoe SJ, Langhaug LF, Mavhu W, Chidiya S, Jaffar S et al. The Regai Dzive Shiri Project: results of a randomized trial of an HIV prevention intervention for youth. *AIDS.* 2010;24:2541-52.
195. Palmateer N, Kimber J, Hickman M, Hutchinson S, Rhodes T, Goldberg D. Evidence for the effectiveness of sterile injecting equipment provision in preventing hepatitis C and human immunodeficiency virus transmission among injecting drug users: a review of reviews. *Addiction.* 2010;105:844.
196. Haberland NA. The case for addressing gender and power in sexuality and HIV education: a comprehensive review of evaluation studies. *Int Perspect Sex Reprod Health.* 2015 Mar;41(1):31–42.

References

197. Hallett TB, Gregson S, Lewis JJ, Lopman BA, Garnett GP. Behaviour change in generalised HIV epidemics: impact of reducing cross-generational sex and delaying age at sexual debut. *Sex Transm Infect.* 2007 Aug;83(Suppl 1):i50-54.
198. Luke N. Confronting the "sugar daddy" stereotype: age and economic asymmetries and risky sexual behavior in urban Kenya. *Int Fam Plan Perspect.* 2005;31(1):6-14.
199. De Neve JW, Fink G, Subramanian SV, Moyo S, Bor J. Length of secondary schooling and risk of HIV infection in Botswana: evidence from a natural experiment. *Lancet Glob Health.* 2015;3(8):e470-7.
200. Pettifor A. Unpacking the results of HPTN 068: a randomized controlled cash transfer trial to prevent HIV infection in young women in South Africa [presentation] (<http://strive.lshtm.ac.uk/sites/strive.lshtm.ac.uk/files/HIV%20prevention%20for%20young%20South%20African%20women%20Lessons%20from%20Swa%20Koteka.pdf>, accessed 28 March 2018).
201. Hargreaves JR, Bonell CP, Boler T, Boccia D, Birdthistle I, Fletcher A et al. Systematic review exploring time trends in the association between educational attainment and risk of HIV infection in sub-Saharan Africa. *AIDS.* 2008 Jan 30;22(3):403-14.
202. Campbell C, Cornish F. Towards a "fourth generation" of approaches to HIV/AIDS management: creating contexts for effective community mobilisation. *AIDS Care.* 2010;22:1569-79.
203. Guidelines for second generation HIV surveillance: an update: Know Your Epidemic. Geneva: World Health Organization; 2013.
204. World Health Organization, UNAIDS. Prevention and treatment of HIV and other sexually transmitted infections for sex workers in low- and middle-income countries. Geneva: World Health Organization; 2012.
205. NIMH Collaborative HIV/STD Prevention Trial Group. Results of the NIMH collaborative HIV/sexually transmitted disease prevention trial of a community popular opinion leader intervention. *J Acquir Immune Defic Syndr.* 2010;54:204-14.
206. Kelly JA, St. Lawrence JS, Diaz YE, Stevenson LY, Hauth AC, Brasfield TL et al. HIV risk behavior reduction following intervention with key opinion leaders of population: an experimental analysis. *Am J Public Health.* 1991 Feb;81(2):168-71.
207. Rogers E. Diffusion of innovations, fourth edition. New York: The Free Press, 2010.
208. NIMH Collaborative HIV/STD Prevention Trial Group. Formative study conducted in five countries to adapt the community popular opinion leader intervention. *AIDS.* 2007;21:S91-8.
209. Cornish F, Priego-Hernandez J, Campbell C, Mburu G, McLean S. The impact of community mobilisation on HIV prevention in middle and low income countries: a systematic review and critique. *AIDS Behav.* 2014;18(11):2110-34.
210. Padian N, McCoy SI, Balkus JE, Wasserheit JN. Weighing the gold in the gold standard: challenges in HIV prevention research. *AIDS.* 2010;24:621-35.

References

211. Sweat MD, Denison JA. Reducing HIV incidence in developing countries with structural and environmental interventions. *AIDS*. 1995;9 Suppl A:S251-7.
212. Tawil O, Verster AD, O'Reilly KR. Enabling approaches in HIV/AIDS prevention: influencing the social and environmental determinants of risk. *AIDS*. 1995;9:1299-306.
213. Bastagli F, Hagen-Zanker J, Harman L, Sturge G, Barca V, Schmidt T, et al. Cash transfers: what does the evidence say? A rigorous review of impacts and the role of design and implementation features. London: Overseas Development Institute; 2016.
214. Pettifor A, MacPhail C, Nguyen N, Rosenberg M. Can money prevent the spread of HIV? A review of cash payments for HIV prevention. *AIDS Behav*. 2012;16:1729-38.
215. Baird S, Garfein RS, McIntosh CT, Ozler B. Effect of a cash transfer programme for schooling on prevalence of HIV and herpes simplex type 2 in Malawi: a cluster randomised trial. *Lancet*. 2012;379:1320–1329.
216. Handa S, Halpern CT, Pettifor A, Thirumurthy H. The Government of Kenya's cash transfer program reduces the risk of sexual debut among young people age 15–25. *PLoS ONE*. 2014;9:e85473.
217. Cluver L, Boyes M, Orkin M, Pantelic M, Molwena T, Sherr L. Child-focused state cash transfers and adolescent risk of HIV infection in South Africa: a propensity-score-matched case-control study. *Lancet Glob Health*. 2013;1(6):e362-70.
218. Pettifor A, MacPhail C, Hughes JP, Selin A, Wang J, Gómez-Olivé F et al. The effect of a conditional cash transfer on HIV incidence in young women in rural South Africa (HPTN 068): a phase 3, randomised controlled trial. *Lancet Glob Health*. 2016;4(12):e978-88.
219. Abdool Karim Q, Leask K, Kharsany AB, Humphries H, Ntombela F, Samsunder N et al. Impact of conditional cash incentives on HSV-2 and HIV prevention in rural South African high school students: results of the CAPRISA 007 cluster randomized controlled trial. Eighth International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention. Vancouver, British Columbia, Canada, 19–22 July 2015. Abstract TUAC0101LB.
220. Björkman-Nyqvist M, Corno L, de Walque D, Svensson J. Using lotteries to incentivize safer sexual behavior: evidence from a randomized controlled trial on HIV prevention. Policy research working paper 7215. Washington (DC): World Bank Group, Development Research Group; 2015.
221. de Walque D, Dow WH, Nathan R, Abdul R, Abilahi F, Gong E et al. Incentivising safe sex: a randomised trial of conditional cash transfers for HIV and sexually transmitted infection prevention in rural Tanzania. *BMJ Open*. 2012;2:e000747.
222. de Walque D, Dow W, Nathan R, Abudl R, Abilahi F, Gong E et al. Evaluating conditional cash transfers for HIV/STI prevention in rural Tanzania: one-year post-intervention follow-up. Population Association of America 2012 Annual Meeting. San Francisco, United States, 2012.

References

223. Packer L, Keller A, Dow WH, de Walque D, Nathan R, Mtenga S. Evolving strategies, opportunistic implementation: HIV risk reduction in Tanzania in the context of an incentive-based HIV prevention intervention. *PLoS One*. 2012;7:e44058.
224. Practical guidelines for intensifying HIV prevention: towards universal access. Geneva: UNAIDS; 2007.
225. McCoy SI, Kangwende RA, Padian NS. Behavior change interventions to prevent HIV among women living in low and middle income countries. New Delhi: International Initiative for Impact Evaluation (3ie); 2009.
226. Jana S, Basu I, Rotheram-Borus MJ, Newman PA. The Sonagachi project: a sustainable community intervention program. *AIDS Educ Prev*. 2004;16(5):405–14.
227. Jana S, Singh S. Beyond medical model of STD intervention—lessons from Sonagachi. *Indian J Public Health*. 1995;39:125–31.
228. Campbell C. Letting them die: how HIV/AIDS prevention programmes often fail. London: James Currey; 2003.
229. Heise L, Lutz B, Ranganathan M, Watts C. Cash transfers for HIV prevention: considering their potential. *J Int AIDS Soc*. 2013;16:18615.
230. Lagarde M, Haines A, Palmer N. The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. *Cochrane Database Syst Rev*. 2009;7:CD008137.
231. Prendergast M, Podus D, Finney J, Greenwell L, Roll J. Contingency management for treatment of substance use disorders: a meta-analysis. *Addiction*. 2006;101:1546–60.
232. Lee R, Cui RR, Muessig KE, Thirumurthy H, Tucker JD. Incentivizing HIV/STI testing: a systematic review of the literature. *AIDS Behav*. 2014;18:905–12.
233. Gregson S, Adamson S, Papaya S, Mundondo J, Nyamukapa CA, Mason PR et al. Impact and process evaluation of integrated community and clinic-based HIV-1 control: a cluster-randomised trial in eastern Zimbabwe. *PLoS Med*. 2007;4:e102.
234. Celentano D, Bond KC, Lyles CM, Eiumtrakul S, Go VF, Beyrer C et al. Preventive intervention to reduce sexually transmitted infections: a field trial in the Royal Thai Army. *Arch Intern Med*. 2000;160:535–40.
235. Chandrasekaran P, Dallabetta G, Loo V, Mills S, Saidel T, Adhikary R et al. Evaluation design for large-scale HIV prevention programmes: the case of Avahan, the India AIDS initiative. *AIDS*. 2008;22:S1-15.
236. Deering KN, Boily MC, Lowndes CM, Shoveller J, Tyndall MW, Vickerman P et al. A dose-response relationship between exposure to a large-scale HIV preventive intervention and consistent condom use with different sexual partners of female sex workers in southern India. *BMC Public Health*. 2011;11:S8.

References

237. Boily MC, Pickles M, Lowndes CM, Ramesh BM, Washington R, Moses S et al. Positive impact of a large-scale HIV prevention programme among female sex workers and clients in South India. *AIDS*. 2013;27:1449–60.
238. Rajaram SP, Banandur P, Thammattoor UK, Thomas T, Mainkar MK, Paranjape R et al. Two cross-sectional studies in South India assessing the effect of an HIV prevention programme for female sex workers on reducing syphilis among their clients. *Sex Transm Infect*. 2014;90:556-62.
239. Ng M, Gakidou E, Levin-Rector A, Khera A, Murray CJ, Dandona L. Assessment of population-level effect of Avahan, an HIV-prevention initiative in India. *Lancet*. 2011;378:1643–52.
240. Goswami P, Rachakulla HK, Ramakrishnan L, Mathew S, Ramanathan S, George B et al. An assessment of a large-scale HIV prevention programme for high-risk men who have sex with men and transgenders in Andhra Pradesh, India: using data from routine programme monitoring and repeated cross-sectional surveys. *BMJ Open*. 2013;3:e002183.
241. Subramanian T, Ramakrishnan L, Aridoss S, Goswami P, Kanguswami B, Shajan M et al. Increasing condom use and declining STI prevalence in high-risk MSM and TGs: evaluation of a large-scale prevention program in Tamil Nadu, India. *BMC Public Health*. 2013;17:857.