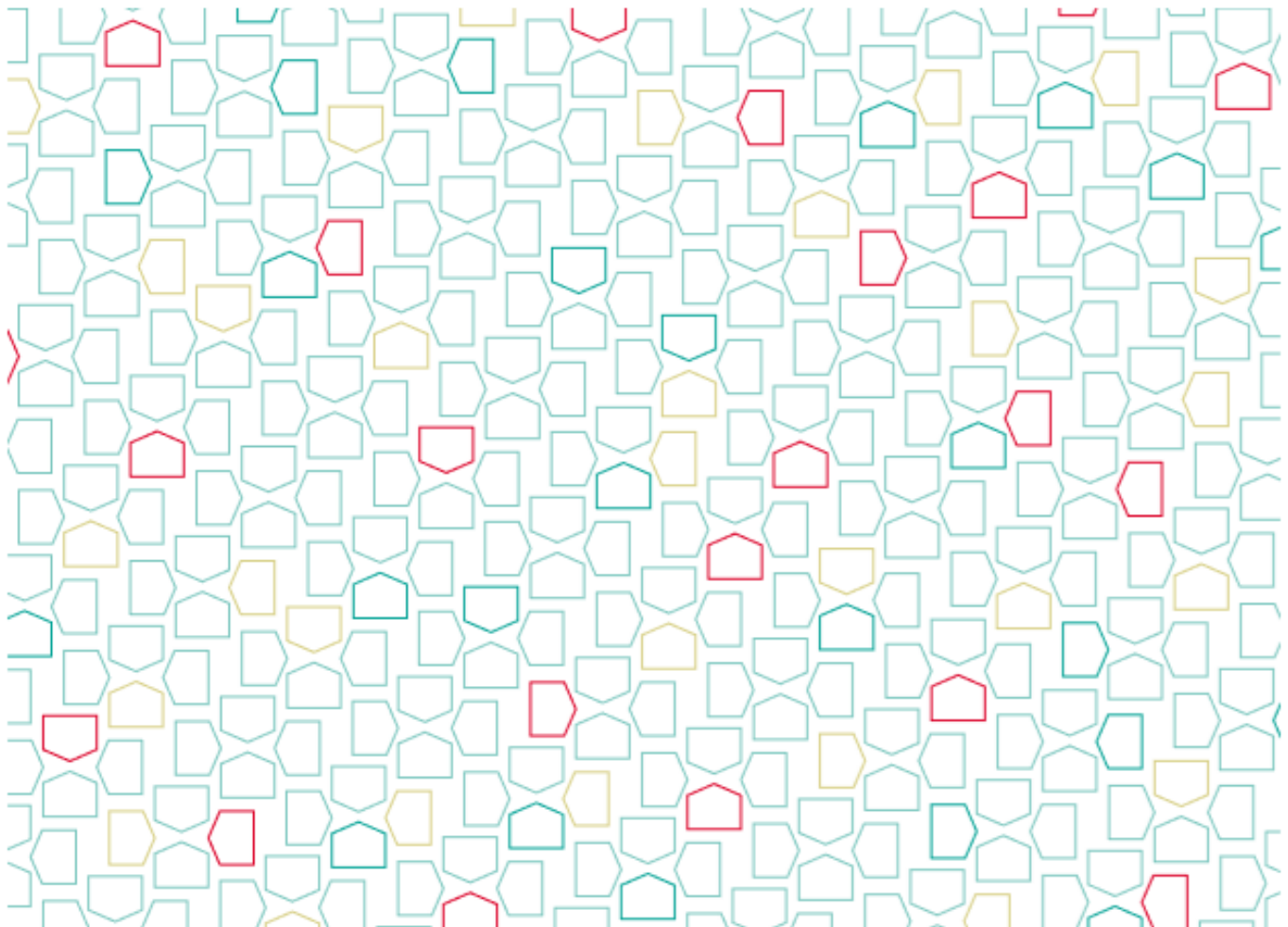


# The effectiveness of behavioural interventions to prevent HIV

A compendium of evidence



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# List of acronyms

<b>ARR</b>	absolute risk reduction
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CI</b>	confidence interval
<b>DALY</b>	disability-adjusted life year
<b>DHS</b>	Demographic and Health Survey
<b>FDA</b>	United States Food and Drug Administration
<b>HPV</b>	human papillomavirus
<b>HSV</b>	herpes simplex
<b>HTC</b>	HIV testing and counselling
<b>HTS</b>	HIV testing services
<b>IMB</b>	information–motivation–behavioural skills model
<b>IR</b>	incidence rate
<b>IRR</b>	incidence rate ratio
<b>NSP</b>	needle and syringe programme
<b>OR</b>	odds ratio
<b>PEP</b>	post-exposure prophylaxis
<b>PITC</b>	provider-initiated testing and counselling
<b>PR</b>	prevalence ratio
<b>PrEP</b>	pre-exposure prophylaxis
<b>PSA</b>	prostate-specific antigen test
<b>PY</b>	person-years
<b>QALY</b>	quality-adjusted life year
<b>RR</b>	relative risk
<b>SMS</b>	short message services
<b>STI</b>	sexually transmitted infection
<b>UN</b>	United Nations
<b>UNFPA</b>	United Nations Population Fund
<b>UNICEF</b>	United Nations Children’s Fund
<b>VCT</b>	voluntary HIV counselling and testing
<b>VMMC</b>	voluntary medical male circumcision
<b>WHO</b>	World Health Organization

# Introduction

Between 1990 and 2016, HIV was the fastest growing communicable disease worldwide. Despite substantial progress made in the response, there is still a long way to go to achieve the global targets set out for 2020 and 2030. The global target of reducing new adult infections by 50% between 2010 and 2015 has been missed: the number of new infections only declined moderately between 2010 and 2017, and approximately 1.6 million new adult HIV infections were recorded in 2017 (1).

Three main targets have been set for the global HIV response for both 2020 and 2030 (Table 1).

**Table 1**  
2020 and 2030 Fast-Track Targets

By 2020	By 2030
Fewer than 500 000 deaths from AIDS-related illness (and 90–90–90 treatment targets) <sup>1</sup>	Fewer than 200 000 deaths from AIDS-related illness (and 95–95–95 treatment targets) <sup>2</sup>
Fewer than 500 000 new infections	Fewer than 200 000 new infections
Zero discrimination	Zero discrimination

*Sources:* Fast-Track: ending the AIDS epidemic by 2030. Geneva: UNAIDS; 2014; AIDS by the numbers. Geneva: UNAIDS; 2016.

.....  
<sup>1</sup> The 90–90–90 targets are that 90% of people living with HIV know their HIV status, 90% of people who know their HIV-positive status are accessing treatment and 90% of people on treatment have suppressed viral loads. If this target is met, 73% of the global population of people living with HIV would have an undetectable viral load by 2020.

<sup>2</sup> Correspondingly, the 95–95–95 targets are that 95% of people living with HIV know their HIV status, 95% of people who know their HIV-positive status are accessing treatment and 95% of people on treatment have suppressed viral loads. This would translate into 86% of all people living with HIV being virally suppressed.

## The role of combination HIV prevention

The 2020 and 2030 targets for reducing new HIV infections correspond to reductions of approximately 70% by 2020 and 90% by 2030 against the number of new infections recorded in 2015. If these targets are to be reached, the scale and effectiveness of HIV prevention programmes must be improved rapidly.

UNAIDS proposes six key steps to make that happen (Figure 1).

**Figure 1**

Six strategic principles of combination prevention responses



*Source:* Fast-Tracking combination prevention: towards reducing new HIV infections to fewer than 500 000 by 2020. Geneva: UNAIDS; 2015.

As no single intervention will eliminate HIV transmission for any population, several key questions emerge for programme planners:

- What interventions should be included in our combination HIV prevention approach?
- How can behavioural interventions complement biomedical and structural approaches to HIV prevention?
- Which interventions are effective for specific types of objectives?

## Purpose of this document

This compendium presents a review of the evidence of the effectiveness of behavioural components of combination prevention in relation to the following:

- HIV testing services (HTS).
- Male and female condoms (including their promotion).
- Mass media programmes.
- Individual and group interventions.
- HIV prevention education and comprehensive sexuality education.
- Community-wide interventions.

Behavioural interventions are only one dimension of HIV prevention programmes: like biomedical and structural dimensions, they cannot be expected to achieve impact targets on their own. Instead, behavioural interventions overlap and complement behavioural and structural components of HIV prevention by generating demand for biomedical interventions or increasing knowledge and risk perception within structural approaches (Figure 2).

In the context of the review, definitions from an earlier UNAIDS publication on combination prevention (2) were adapted as follows:

**Behavioural interventions** for HIV prevention are applied to promote change in sexual behaviour, and to increase HIV service utilization and adherence to HIV services and behaviours. To achieve this, they commonly address knowledge, attitudes, risk perception, norms, HIV service demand and skills. Interventions mostly include interpersonal and media communication, but they may also include financial and other incentives. Platforms for implementation can be community outreach, schools, health facilities, workplaces or other settings.

**Biomedical interventions** use a mix of clinical and medical approaches and tools to reduce HIV transmission. These include condoms, needle and syringe distribution, opioid substitution therapy, voluntary medical male circumcision (VMMC), antiretroviral therapy for prevention, pre-exposure prophylaxis (PrEP) and HTS.

**Structural interventions** are activities designed to address the underlying environmental vulnerabilities of HIV infection, including political, legal, economic, physical, social and cultural barriers such as inequitable gender norms or HIV-related stigma and discrimination. Interventions include measures to increase community empowerment, promote human rights and remove punitive laws, policies and practices.

For the purpose of this review of behavioural interventions, condom programmes were included because of their close reliance on consistent behaviours. Although HTS are primarily aimed at diagnosis, they were often implemented with the objective of changing behaviour and therefore are included in this review.



**Figure 2**

What is an HIV prevention intervention?

**Current Perspective**

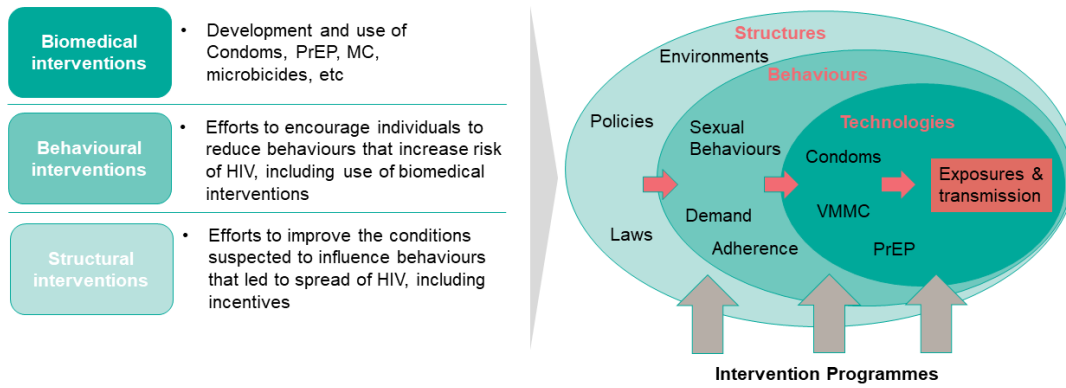
*Types of interventions are independent and trade-offs are made between which to invest in:*

- Biomedical interventions**
  - Development and use of Condoms, PrEP, MC, microbicides, etc
- Behavioural interventions**
  - Efforts to encourage individuals to reduce behaviours that increase risk of HIV, including use of biomedical interventions
- Structural interventions**
  - Efforts to improve the conditions suspected to influence behaviours that led to spread of HIV, including incentives

**Holistic Perspective**

*Holistic view recognizing the interdependencies across levels in a causal pathway:*

Interventions act to change the risk of exposure or transmission during exposure



Source: Bill & Melinda Gates Foundation (internal document)

This document attempts to provide a technical basis for the inclusion of behavioural interventions in a combination HIV prevention framework and to support the prioritization of specific behavioural prevention activities for specific populations. The strength of evidence is discussed and, when appropriate, the need for more evidence is highlighted.

This document aims to reach policy-makers, programme managers and implementers, civil society advocates, United Nations (UN) system staff, and other individuals and groups with an interest in developing effective and comprehensive HIV prevention programmes. It is intended to summarize the evidence of effectiveness regarding the packaging and combination of essential HIV prevention activities, and to identify the key operational and population considerations for implementation.

**Approach**

This compendium has been developed by UNAIDS in consultation with experts in the field of HIV prevention. It summarizes evidence from systematic reviews and meta-analyses, as well as randomized controlled trials that may not have been included in the former studies. Trials that have been included in reviews may be presented here as an example, with their inclusion in previously mentioned systematic reviews highlighted.

The review presents evidence of effectiveness in achieving a range of outcomes. This includes biological outcomes, particularly decreases in HIV and sexually transmitted infection (STI) incidence, which are generally considered to be the ultimate impact-level goals of prevention interventions.

Due to the large sample size required to measure biological outcomes and their associated costs, studies are not available for all behavioural HIV prevention interventions. This review therefore also presents evidence on behavioural outcomes, such as increasing condom use and adopting reduced risk behaviours (e.g., decreased numbers of sexual partners).

Self-reported sexual behaviours may be affected by different types of biases related to reporting, recall and desirability. Nevertheless, behavioural outcomes represent an essential step on the pathway from coverage to impact, and the effect of different interventions on outcomes must be understood.

Operational considerations also are presented. In doing so, reference is made to reviews of qualitative research or individual qualitative studies that illustrate important operational considerations.

When there is sufficient evidence, the effectiveness of interventions is presented for specific populations that are important to the response.

### **Outcome measures considered in this compendium**

All HIV prevention interventions reviewed here may have various effects. They may raise levels of awareness and knowledge about HIV, both in general and on a personal level, by making people aware that HIV is real and that it may affect them personally. The interventions may link people living with HIV to services that provide care and treatment, and if they are successful, they can lead to viral suppression and reduced risk of transmission. They also can increase personal preventive behaviours, such as condom use, reduction in the number of sexual partners or the use of PrEP. These actions or intermediate outcomes may lead to reduced incidence of HIV in those who are uninfected; they also may result in reductions in STIs, both for people living with HIV and those who are HIV-negative.

While the ultimate outcome desired from all such interventions is a reduction in HIV incidence, capturing that information in a clear and unassailable way is complex, expensive and time-consuming, and it is usually beyond the capabilities of most researchers or studies reviewed here. As a result, few of the reviewed studies present HIV incidence information.

Despite that, important information can be derived from outcomes that support the effectiveness of interventions to prevent HIV, even if those outcomes are not the ultimate proof of it. For that reason, this review will present all outcomes of interest, but the reader should be aware that it contains an implied hierarchy: more weight is placed on changes in HIV incidence, followed by changes in STI incidence, changes in key preventive behaviours (such as condom use or a reduction in the number of sexual partners) and finally changes in knowledge. The implied hierarchy of results is based on both the results chain logic and the strength of evidence for behavioural interventions.

Biological outcomes can be directly measured, and they are therefore subject to fewer biases if laboratory procedures are correctly followed. While achieving behavioural outcomes—such as increased condom use and the adoption of reduced risk behaviours—can be expected to reduce HIV incidence, self-reported sexual behaviours may be affected by different types of biases related to reporting, recall and desirability. Self-reported data on sexual behaviour or use of HIV prevention tools cannot be considered to be as reliable as biological outcome measures, but sexual behaviour and prevention service use are an essential condition for reducing HIV incidence. Lower level outcomes of prevention programmes (such as knowledge, attitudes and norms) do not lead directly to reduced HIV or STI incidence, but they can facilitate safer sexual behaviour and HIV prevention service use.

Outcomes in relation to biomedical HIV interventions—such as VMMC, antiretroviral therapy or PrEP—can be influenced by behavioural interventions, but they also heavily depend on the

## Introduction

availability, delivery modality and quality of these services. Holistically assessing the efficacy and effectiveness of these biomedical tools is therefore beyond the scope of this publication; it is covered in other publications.<sup>3</sup>

Behavioural interventions also are part of some structural HIV prevention interventions, which aim to address underlying social, economic and cultural factors influencing HIV transmission. Structural interventions with behavioural components are not covered in detail in this report; they also are covered in other publications.

HTS are a critical entry point for various HIV interventions, particularly antiretroviral therapy. A discussion of these services was included in this publication because HIV testing has also been seen as a prevention strategy, and in specific circumstances, it has been shown to have effects on sexual behaviour (see “HIV testing services,” below). Male and female condoms are prevention technologies, and they could also have been defined as biomedical interventions, but since their laboratory efficacy was proven early in the epidemic, condoms have been part of behavioural HIV interventions and are commonly delivered in a range of settings (not just health services). For that reason, condoms are covered in a separate section of this compendium.

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<sup>3</sup> Biomedical AIDS research. Recent and upcoming advances. Geneva: UNAIDS; 2015. ([https://www.unaids.org/sites/default/files/media\\_asset/JC2723\\_Biomedical\\_AIDS\\_research\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/JC2723_Biomedical_AIDS_research_en.pdf))

# HIV testing services

## Key points

- Studies have found that many individuals who undergo HIV testing and counselling (HTC) and discover they are HIV-positive change their risk behaviours to avoid transmitting HIV to others. People living with HIV have fewer sexual partners on average and make greater use of condoms after their diagnosis than before.
- Programmes where couples test and are counselled together help couples adopt HIV preventive behaviours.
- The effect of HTC may be more pronounced for those who learn that they are in a serodiscordant partnership. Nonetheless, some of these changes may still be modest or temporary.
- Most studies have been unable to detect large changes in risk behaviours or decreased incidence of new infections for individuals who receive an HIV-negative test result. Nevertheless, some studies have reported positive effects of HTC on sexual risk reduction. The impact may vary according to the population, setting, style of counselling and modality of the testing intervention.

The majority of HTC followed the voluntary counselling and testing (VCT) model until 2007, when the World Health Organization (WHO) published guidelines on provider-initiated testing and counselling (PITC) (3). Both models will be discussed below.

Further discussion will highlight evidence on the specific contribution that pretest and post-test counselling make to behaviour change beyond providing a test and results. After that, the emerging evidence for HIV self-testing and the effects of HIV-positive test results on behaviour will be discussed, followed by operational and population-specific evidence.

In 2015, WHO launched consolidated guidance on HTS (4). The term has since been used as the overarching name for this field of work, describing the full range of services that should be provided together with HIV testing. “HTC” is used to refer to modalities that provide both testing and counselling.

For the purposes of this document, the term “HTS” will be used unless reference is made to specific types of HIV testing interventions, in which case the appropriate term will be used.

## The effect of voluntary HIV counselling and testing on sexual behaviour

### What does the evidence say about the effect of VCT on sexual behaviour?

- It can contribute to reductions in the number of sexual partners.
- It increases the odds of condom use among those testing HIV-positive.
- It is associated with fewer sexual partners and increased use of condoms in serodiscordant couples.
- Couples testing in serodiscordant couples shows decreases in unprotected sex.
- Community-based HTC programmes can affect prevention outcomes if they are focused on populations where positivity in HIV testing is high.

### The voluntary counselling and testing model

VCT consists of the provision of counselling and risk evaluation by a trained counsellor prior to HIV testing. It requires an individual to seek testing, either at a VCT facility or a mobile VCT site. An HIV test is then administered and the result is delivered by the counsellor.

The next step in VCT is post-test counselling, which contains an element of risk reduction counselling. The duration of counselling may vary, and the test result may either be given on the same day (rapid testing) or individuals may return to the clinic another day to receive their test result. While post-test counselling is intended to be used both for those who are HIV-negative and those who are HIV-positive, it is often truncated or less intense for people who test HIV-negative.

One of the main intentions of VCT has been preventive: it can help people change their sexual behaviour to avoid acquiring or transmitting HIV, and it can help to keep HIV-negative partners in serodiscordant couples from acquiring HIV. Studies have reported a reduction in the number of sexual partners and an increase in condom use, including among serodiscordant couples, following couples testing (5).

A 2012 meta-analysis updating a previous meta-analysis from 1990–2005 identified 17 studies conducted in low- or middle-income countries that reported on behavioural outcomes following a VCT intervention (5). In the systematic review, the analysis focused on a number of reported outcomes: HIV incidence, STI incidence or prevalence, and positive and negative life events. A meta-analysis of eight of these studies was conducted on two outcomes: condom use/protected sex and number of sex partners.

Main findings from the meta-analysis showed that the participants who received VCT were approximately 30% less likely to report an increased number of sexual partners compared to those who did not receive the intervention (odds ratio [OR] = 0.69; 95% confidence interval [CI]: 0.53–0.90;  $P < 0.01$ ). There was a significant increase in the odds of condom use/protected sex among participants receiving a VCT intervention after stratification by HIV status, with HIV-positive participants having 3.24 times higher odds of reporting condom use/protected sex compared to HIV-negative participants (95% CI: 2.29–4.58;  $P < 0.001$ ).

A previous meta-analysis included many of the earlier studies in the 2012 review, but it reached partially different conclusions (6). Similar to the 2012 analysis, findings showed that study participants receiving VCT interventions were less likely to report unprotected sex compared to participants who had not received VCT. This finding was not stratified by HIV status (OR = 1.69; 95% CI: 1.25–2.31;  $P < 0.01$ ). Unlike the 2012 analysis, however, VCT had no significant effect on the number of sex partners (OR 1.22; 95% CI: 0.89–1.67;  $P > 0.05$ ). However, the analysis in the earlier review included VCT interventions covering researcher-, client- and provider-initiated methods, as the distinction between those models of HTS delivery had not yet been made so clearly.

Most of the studies in the 2012 review were conducted in clinic-based settings, although a few reported on testing conducted in a workplace, by mobile outreach teams or at home. Eleven of these studies were conducted in African countries, with the remainder in the Asia-Pacific region and the Caribbean. Generally, follow-up was for a year or less, so the findings reflect risk behaviours in the short term (5).

### **Little measurable effect of voluntary counselling and testing on HIV or STI incidence or prevalence**

Three studies included in the 2012 review attempted to measure changes in HIV incidence before and after HIV testing, or by contrasting those who received HTC in different venues or under different circumstances (5). Corbett et al. compared participants in Zimbabwe receiving rapid on-site HIV tests through places of employment to those receiving vouchers for HIV testing through an external provider (7). No difference in HIV incidence was found, although the uptake of VCT was much higher in the on-site testing group than in the group receiving vouchers (70.7% versus 5.2%).

In Uganda, Matovu et al. found no difference in HIV incidence between those accepting VCT (incidence rate [IR] = 1.6 per 100 person-years [PY]) and those refusing it (IR = 1.4 per 100 PY;  $P = 0.6$ ) (8). In another study in Zimbabwe, Machekano et al. followed a cohort of male factory workers (9). They discovered that men who completed VCT and chose to get their test results had higher HIV incidence (IR = 3.29 per 100 PY; 95% CI: 2.31–4.56) than those who chose not to receive their results (IR = 1.76 per 100 PY; 95% CI: 1.01–2.86). Among those who did receive their test results, however, HIV incidence was lower in the period after obtaining the results (IR = 3.04 per 100 PY; 95% CI: 1.86–4.70) than the period before (IR = 4.82 per 100 PY; 95% CI: 2.75–7.81) (9).

Five studies included in the review also assessed changes in STI incidence or prevalence. Arthur et al. found that reported STI symptoms were 60% lower across all clinics six months after individuals received VCT compared to the baseline (10). Other studies generally found no difference, except Machekano et al., who reported an increase in STI incidence among those who went through HCT and received their test results compared to those who did not receive their test results (9).

In addition, three studies included in the 2012 review by Fonner et al. measured the effects of VCT on subsequent positive and negative life events (5). All three studies found that the effects on life events were limited, that positive life events were more common and that negative life events were rare. Disclosure of negative test results was more common than disclosure of positive test results in all three studies.

A systematic review in sub-Saharan Africa found that there was no consistent evidence for the effect of individual HTC on HIV acquisition, but that couples testing and counselling was more effective (11).

### **Voluntary counselling and testing reduces sexual partners**

Although none of the studies in the 2012 Fonner et al. review were able to show reductions in HIV incidence, other changes in preventive behaviours were found (5). Changes in both the number of sexual partners and condom use were examined in the meta-analysis.

Six studies in the review reported on changes in the number of sexual partners following VCT, either comparing the same individual over time or comparing those receiving VCT to those who did not (5). Five of these studies were meta-analysed and the pooled random effects OR was 0.69 (95% CI: 0.53–0.90;  $P = 0.007$ ). This indicates that individuals who did not receive VCT in these studies had more sexual partners than those who did. When the effect was stratified by serostatus, the pooled random effects OR was 0.61 (95% CI: 0.37–0.997;  $P = 0.048$ ) for those who were HIV-positive, and 0.90 (95% CI: 0.77–1.10;  $P = 0.195$ ) for those who were HIV-negative. No statistically significant difference was found between males and females. All studies showed a trend towards a reduced number of partners following VCT; none showed the opposite effect (5).

### **Voluntary counselling and testing increases the odds of condom use, especially for people who are HIV-positive**

Thirteen of the studies analysed in the Fonner et al. review reported changes in condom use or protected sex following VCT (5). Seven reported on similar measures, allowing for a meta-analysis.

The overall effect across all studies was positive but not statistically significant. No effect was found by gender: men and women were equally likely to use condoms following VCT. When stratified by HIV status, however, the overall effect of VCT on condom use was positive and statistically significant (OR = 3.24; 95% CI: 2.29–4.58;  $P < 0.49$ ). Individuals who received VCT and a positive test result had a greater chance of using condoms than HIV-positive individuals who did not receive VCT, although Fonner et al. caution that this finding is based on only two studies. One study in the meta-analysis found that condom use decreased, but self-selection bias appears to be a factor (8).

The authors of the Fonner et al. review conclude that “results from this review and meta-analysis bolster the growing evidence that VCT reduces risky behaviors related to HIV by significantly reducing the number of sex partners of participants” (5). They further observed that “people living with HIV who received VCT exhibited increased odds of using condoms and engaging in protected sex than people living with HIV who did not receive VCT” (5). As summarized in the conclusions for HTS below, results are more consistent for people who test HIV-positive than for those who do not.

### **Couples testing can decrease unprotected sex if couples are serodiscordant**

Couples testing programmes invite couples to be counselled and tested together; they also promote mutual disclosure of test results and allow the counsellor to explore the implications of test results with the couple (12). The available evidence shows that this approach may be more effective than individual VCT.

In one study, those who were tested as couples had less unprotected sex with their partner if they were serodiscordant (OR = 0.72; 95% CI: 0.53–0.99) (13). For those testing as individuals, however, no differences in condom use were found, but a weak effect was found in the intervention communities for individuals living with HIV who reported fewer sexual partners and a lower likelihood of having multiple partners than individuals without HIV. These effects were more pronounced among men.

A similar effect can be seen in data from a programme in Zambia that followed 963 heterosexual couples after couples testing revealed that the partnership was serodiscordant (14). Before testing, less than 3% of couples reported current condom use with each other. While the frequency of sex did not change one year after VCT exposure, the proportion reporting condom use was greater than 80%, and it remained stable at that level over one year of follow-up. In contrast, among couples where both partners were HIV-negative, reported condom use was lower (28%). A biological measure (testing of vaginal smears for sperm), however, suggests that condom use among serodiscordant couples was partially inconsistent.

A study in South Africa found that behaviour change among serodiscordant couples occurred as rapidly as within a week of diagnosis (15).

### **Community-based HIV testing can modestly affect prevention outcomes**

Two large cluster randomized trials of community-based testing interventions in low- and middle-income countries have appeared since the publication of the 2012 Fonner et al. review (5). Both suggest that intensive, community-based HIV testing interventions can have a modest impact on prevention outcomes (15, 16). Importantly, both trials assessed the diffusion of testing behaviours, measuring their outcomes through community surveys once the interventions were over. People taking part in the surveys had not necessarily had any prior contact with the intervention, but they had lived in a community where it had been provided and promoted.

Project Accept—a multisite effort that enrolled 48 communities in South Africa, Thailand, the United Republic of Tanzania and Zimbabwe—provided community-based mobile VCT as part of a wide-ranging package of activities focused on the whole community (16). The services provided included community mobilization and post-test support services. Communities were randomized to receive either the package of community-based VCT that included support services after testing (the intervention group) or the standard clinic-based counselling and testing (the control group). A post-intervention behavioural survey was conducted with 56 683 people aged 18 to 32 years (the peak age range for HIV infection in those settings).

The intervention's primary outcome measure was HIV incidence, estimated through anonymous testing during the behavioural survey. In the intervention groups, it was 1.52% per year, compared to 1.81% in the control communities (16). The relative risk (RR) of infection was 14% lower, although the difference was not statistically significant (RR = 0.86; 95% CI: 0.73–1.02).

In sub-group analysis, the intervention had the greatest impact on women aged 25 to 32 years: their incidence was 30% lower, a significant difference (RR = 0.70; 95% CI: 0.54–0.90). HIV infections did not decrease in younger women or men (those aged 18 to 24 years) (16).



## HIV testing services

Project Accept also found no differences in condom use, but individuals living with HIV in the intervention communities did report fewer sexual partners, and they were less likely to have multiple partners (16). These effects were most pronounced among men.

The second study was a cluster randomized controlled trial of a home-based counselling and testing intervention in rural South Africa (17). This trial was conducted in a low-income district where many men had left in order to seek work, leaving most households headed by women. Clusters of households were randomized and offered either home-based testing (intervention group) or clinical-based HTC (control group).

The impact was measured through a household survey, which was conducted at the end of the project with 4154 local residents, two thirds of whom were female (17). The researchers reported an overall beneficial impact on sexual behaviour and HIV testing rates. Individuals in intervention communities were 45% less likely to report having had a casual partner in the past three months (prevalence ratio [PR] = 0.55; 95% CI: 0.42–0.73). Moreover, they were 55% less likely to report multiple partners (PR = 0.45; 95% CI: 0.33–0.62). The intervention had no measurable effect on condom use or HIV knowledge, which were similar in both arms of the study after the intervention. The effect of the intervention on HIV incidence was not measured in this study.

## The effect of provider-initiated testing and counselling on sexual behaviour

### What does the evidence say about the effect of PITC?

- It results in increased testing coverage by a large degree.
- It led to a modest increase in condom use in some studies.
- It encourages women to discuss sexual health with partners.
- It leads to participants minimizing high-risk sexual behaviour (i.e., unprotected sex with a partner of different or unknown HIV status).

Since 2007, a clear distinction has been made between the VCT model discussed above and PITC (3). In PITC, HIV testing is included as part of the clinical services that individuals may receive when seeking care. Seeking out a testing facility is no longer a necessary step, so facilitating individual decision-making to be tested also may not be needed. Provider-initiated testing is more commonly provided in regions or among populations where HIV prevalence is high. As a result, the effects of PITC are likely to differ from those of standard VCT.

### Provider-initiated testing and counselling increases testing coverage

A systematic review of PITC was published in 2012 by Kennedy et al. (18). This review considered whether testing provided in health-care settings at the initiative of providers had an effect on subsequent preventive behaviours (compared to testing sought at the initiative of the person being tested). The authors concluded that PITC increased the coverage of testing, often by a large degree, and that it also had a high positivity in HIV testing. As PITC is a gateway into extended treatment, care and prevention services, this outcome is valuable in and of itself.

### Provider-initiated testing and counselling has modest effects on behaviour change

As with VCT, however, the evidence of the effect of PITC on other outcomes is mixed. Rates of reported condom use appeared to increase in some studies analysed, but not all of them (18). Acceptance of nevirapine (for the prevention of mother-to-child transmission of HIV) improved in one study (19), but not in two others that followed PITC (20, 21). Rates of partner testing apparently did not change.

Despite these mixed outcomes, few negative effects were found, making PITC on balance seem like a valuable way to increase testing coverage. This led Kennedy et al. to conclude that “in general, PITC appears to lead to at least as much behavior change as VCT” (18).

### Some evidence of lower incidence of HIV and increased condom use, and more discussion among partners concerning sexual health

Much of the evidence for PITC comes from antenatal and reproductive clinics. An early study from Rwanda in the 1980s found that providing testing, an educational video and group discussion to women recruited from prenatal and paediatric clinics led to a significant

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reduction of HIV incidence in women whose male partners also tested. There were also improvements in terms of gonorrhoea rates and condom use (22).

A programme offering testing to pregnant women in Côte d'Ivoire found that condom use with regular partners rose among both HIV-negative women (from 36.4% to 58.7%) and HIV-positive women (from 23.2% to 48.8%) after a postpartum period of 18 months (23). Those who chose not to test showed no such differences over time. The study also found that tested women were more likely to discuss sexual health with their partners after being tested, regardless of the test result.

However, changes in condom use may not always be durable, as shown by a study that offered testing and counselling to women in family planning clinics and a postpartum ward in Thailand. The proportion of women reporting any condom use was 6% prior to HIV testing, 41% six months later and 21% at 12 months total follow-up period (24).

A study examining sexual behaviour before and after PITC in a rural Ugandan outpatient clinic found that high-risk sex (unprotected sex with a partner of a different or unknown HIV status) was reported by fewer people three months after testing (25). Increased condom use appeared to play little role, most often because couples shared test results and found that they had the same HIV status, or because people newly diagnosed with HIV were not having sex at all.

As already highlighted, STI clinics may raise awareness among clients on ways to minimize high-risk sexual behaviour. PITC may be especially important in STI clinics. In a non-randomized study conducted among 1628 heterosexual men attending an STI clinic in Pune, India, men received pretest counselling that included the demonstration of correct methods of condom use. After the counselling, the study observed a decline in visits to female sex workers and an increase in consistent condom use among those who did visit sex workers (26).

## The effect of pre-test and post-test counselling on sexual behaviour

### What does the evidence say about pretest and post-test counselling on sexual behaviour?

- There are modest changes in sexual behaviour, especially among gay men and other men who have sex with men.

As the PITC model has spread and increased the coverage of HIV testing, it offers the opportunity to unpack the effects that testing, knowledge of test results, and pretest and post-test counselling have on subsequent behaviour. Disentangling the effects and benefits of the two key components of HTC would be useful, and it perhaps may provide a basis for a rational allocation of effort and expense in providing this intervention.

As the preceding review of the evidence indicates, HTC approaches have a stronger effect on the behaviour of those who test positive than on those who test negative. However, definitive studies that conclusively answer the question of whether it is the knowledge of the test result, the counselling or a combination of the two that most affects post-test behaviour have not—and probably cannot—be conducted due to ethical concerns. As a result, the best answer to this question may come from examining the few studies that have experimented with pretest and post-test counselling. Due to the very heterogeneous quality and intensity of counselling, the findings presented here need to be interpreted cautiously, with consideration of the types of counselling provided in the respective studies.

### Prevention counselling at the time of HIV testing has increased condom use and lowered STI incidence—but not always

In the 1990s, the Project Respect trial in the United States of America showed that prevention counselling at the time of HIV testing can have a positive impact on sexual risk behaviours and the incidence of new STIs (27). In this trial, more than 5700 self-reported heterosexual individuals who were HIV negative and attended STI clinics in the United States were randomized to one of three interventions: brief didactic messages, brief prevention counselling (two 20-minute sessions before and after the test) or more intensive prevention counselling (four sessions with a total duration of more than three hours).

At follow-up, self-reported condom use was somewhat higher among those who received counselling than those who received the brief didactic messages. After one year of follow-up, STI incidence was lower in the counselling groups: the rate was 11.5% among those who received enhanced counselling and 12.0% among those who received brief counselling, as opposed to 14.6% among participants who received the didactic messages (RR = 0.81; 95% CI: 0.67–0.98) (27).

The two counselling interventions were of similar effectiveness, which lent support to the use of the briefer intervention, and this was the model of risk reduction counselling subsequently promoted by the Centers for Disease Control and Prevention (CDC). Lowering STI incidence offers an appropriate indication of protected sex practices, suggesting that STI clinics could be an ideal gateway for VCT to affect HIV incidence through STI incidence, but further research is needed.

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In a study conducted in the United States in 2010 and 2011, no apparent benefit of counselling was found (28). More than 5000 people attending STI clinics who took an HIV test were randomized to receive either a brief explanation of the HIV testing process or a 30-minute risk reduction counselling session, based on an evidence-informed model. Six months later, no statistically significant differences in STIs were found between the two groups, and new STI infections were actually higher among men who have sex with men who had received counselling. An analysis of the costs estimated that adding counselling more than doubled the per-patient costs (from US\$ 23 to US\$ 56).

The Voluntary HIV-1 Counselling and Testing Efficacy Study conducted in Kenya, Trinidad and the United Republic of Tanzania placed considerable emphasis on a similar model of risk reduction counselling in its intervention arm (13). Although it showed some benefits, especially for couples, it was not possible to separate the effects of testing and knowledge of serostatus from the effects of counselling in this study: those in the intervention arm received both, while those in the control arm received neither (13).

Two positive outcomes of pretest and post-test counselling, however, come from a pair of randomized studies among gay men and other men who have sex with men in the United States. These studies provided men in control groups with the more intensive counselling used in Project Respect; the intervention groups received an even more intensive approach. Both studies observed changes in sexual behaviour, and one of the studies reported a short-term reduction in HIV incidence in the intervention group (29, 30).

Similarly, a study of different models of HIV testing provision in drug and alcohol treatment centres found counselling had no impact on sexual risk behaviours, but that it was effective in reducing multiperson use of injecting equipment (31). A cost-effectiveness analysis found that the streamlined testing procedure increased life expectancy for people with HIV at a cost of US \$60 300 per quality-adjusted life year (QALY), which is cost-effective in the United States. Another study found that adding risk reduction counselling increased testing costs without bringing additional benefits (32).

A trial conducted in primary care clinics in the United States found that streamlined counselling procedures (typically providing seven minutes of pretest counselling) facilitated a greater uptake of HIV testing than provision of more in-depth counselling, but that they made no difference to self-reported sexual risk behaviours four weeks after the test (33).

While certainly not definitive, these two studies suggest that in a setting in the United States, greater investment in counselling could achieve a larger effect than no counselling (32, 33). Evidence on the required level of intensity of counselling is not conclusive, however, and it may vary between settings.

## Self-testing

### What does the evidence say about the effect of self-testing on sexual behaviour?

- Self-testing may increase uptake of HTS and increase knowledge of HIV status.
- There is no indication of harm attributable to self-testing.
- Potential increases in risk-taking behaviours appear to be minimal.
- More research is needed on the effect of self-testing on sexual behaviour.

Self-testing technologies allow people to take a sample of blood or oral fluid, use a test kit and interpret the result themselves. Limited data are available on the impact that self-test use has on sexual behaviour, but some initial data indicate that the method could be preferred by some populations (34). It is possible that self-testing will be used by potential sexual partners or within established couples to see if the partners have the same HIV status.

In a 2017 meta-analysis, it was found from three randomized controlled trials that self-testing doubled uptake of HIV testing among men (RR = 2.12; 95% CI: 1.51–2.98) (35–37). Consideration of two randomized controlled trials among men who have sex with men showed that the frequency of testing nearly doubled (rate ratio = 1.88; 95% CI: 1.17–3.01), resulting in two more tests over a period of 12 to 15 months (mean difference = 2.13; 95% CI: 1.59–2.66) (38, 39). The same meta-analysis of two randomized controlled trials showed HIV self-testing also doubled the likelihood of an HIV-positive diagnosis (rate ratio = 2.02; 95% CI: 0.76–5.32). Across all randomized controlled trials, there was no indication of harm attributable to HIV self-testing, and potential increases in risk-taking behaviour appeared to be minimal.

A project in New York offered self-testing kits to men who regularly have sex with casual male partners without condoms (40). Concordant negative results were associated with some occasions of sex without condoms, but participants said that using the tests made them more aware of HIV risks. Sexual encounters ended whenever a potential partner received an HIV-positive results, thus potentially reducing exposure to HIV.

A potential limitation associated with the use of self-tests to assess HIV risks is that in the absence of counselling, users who have just received a negative test result may not always know about the window period and the possibility of recent acute HIV infections. Some users who do not receive counselling or support through other channels might therefore not consider the possibility of acute infection in their interpretation of results.

Due to high viral load during the acute infection stage, the risk of transmission is relatively high.

In Malawi, interviews with couples who had used self-tests demonstrated that the use of the test was often motivated by questions about the couple's relationship and sexual behaviour (including suspicions of infidelity). Self-testing sometimes provided one partner with an opportunity to disclose a previously known but concealed HIV status (41).

One randomized controlled trial in Hong Kong evaluated the effect of promoting home-based HIV self-testing with online counselling on increasing HIV testing uptake among 430 gay men

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and other men who have sex with men. Among men in the intervention group who received home-based HIV self-testing with online counselling in the last six months, the prevalence of condomless anal intercourse (Month 6 vs. baseline:  $P < 0.01$ ) and multiple male sexual partnerships (Month 6 vs. baseline:  $P < 0.05$ ) declined significantly compared to the control group (which received standard testing) (37). More research on the effects of self-testing on sexual behaviour and the uptake of HIV services is required.

## Cohort studies: sexual behaviour change after an HIV-positive diagnosis

### What does the cohort study evidence say about observed changes in sexual behaviour after an HIV-positive diagnosis?

- It is associated with an increase in condom use, especially among women.
- It can decrease high-risk sexual behaviour.

Cohorts can provide useful context about the process of behaviour change after knowledge of HIV infection. These studies can describe the natural history of subsequent behaviours, but it would be incorrect to assume that the behaviour changes they describe were caused by the knowledge of HIV-positive serostatus. While the temporal correlation could lead to this conclusion, it is possible that other secular and temporal trends also affect the behaviour, meaning that causal relations cannot be established.

A number of cohort studies provide insight into patterns of behaviour after people have been diagnosed with HIV. These studies generally suggest that many individuals who learn that they are living with HIV make some modifications to their behaviour, even over several years, although it is unclear whether these changes are a result of learning their serostatus.

### Trends toward reduced high-risk sexual behaviours

A meta-analysis identified eight studies that examined the behaviour of individuals in the United States, with most data collected in the 1980s and 1990s (42). The pooled analysis found that the frequency of unprotected anal sex was more than 53% lower in persons aware of their HIV-positive status than it was among those who were unaware. Once it was adjusted to rule out sex with other people living with HIV, the average reduction in serodiscordant (or possibly serodiscordant) unprotected intercourse was 68%.

### Evidence of increased condom use in cohort studies

In Uganda and Zimbabwe, a cohort assessing risks for HIV infection included 151 women who seroconverted while in the cohort (43). Twelve to 16 months after diagnosis, the proportion reporting consistent condom use increased from 26% to 44% (OR = 1.99; 95% CI: 1.12–3.53). Women who seroconverted reported fewer sexual acts after diagnosis, although women who did not acquire HIV did not report similar changes.

A South African trial of an HIV prevention intervention provides data on 327 women before and after their diagnosis with HIV (44). Significant decreases in several measures of sexual risk behaviour after seroconversion were reported, and these differences were maintained for the average of 18 months that the women remained in the study. While these differences were statistically significant in a multivariate model, the changes in absolute figures were modest. The authors noted that the overall levels of risk behaviour remained high in this cohort, highlighting a need for more effective HIV prevention interventions.

A follow-up of around five years for a cohort of female sex workers in Kenya (265 of whom acquired HIV while in the study) allowed for observations on the durability of behaviour changes (45). Incidence of unsafe sex declined by 44% postdiagnosis; this decrease was



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maintained over time. After adjustment, the researchers found a long-lasting decline in unsafe sex of 31% postdiagnosis, independent of age. The proportion of women who maintained consistent condom use increased from 59% pre-diagnosis to 67% postdiagnosis.

## **Operational considerations**

### **Balancing numbers tested and intensity of counselling**

Some discussion or counselling is necessary in the context of HIV testing to ensure informed consent. However, counselling sessions also may actively be used to promote behaviour change in those tested. There are a number of different models of risk reduction counselling, but they frequently involve an individualized risk assessment, target behaviours the client is willing to disclose and change, and work with the client to develop an achievable risk reduction plan.

Most counselling is based on the premise that change is a dynamic process in which small steps may ultimately lead to the desired outcome. It is usually recognized that the progression through stages is influenced by factors that must be specific for each stage, and that they need to be tailored to each client's capabilities and circumstances (46). This process can be time-consuming and may pose operational challenges in busy clinics. At the same time, as discussed previously, there is no clear evidence that confirms that intensive counselling is more effective than streamlined counselling over the periods studied. Operational considerations of staff time therefore may influence testing approaches applied in a specific setting.

Programme managers may be motivated by a desire to maximize the potential behavioural impact of HIV testing, leading them to emphasize the provision of risk reduction counselling. However, extra counselling increases costs, and the evidence on its additional benefit is mixed at best. Furthermore, as many health-care providers see risk reduction counselling as difficult to provide, they may feel limited in expanding HTS due to constraints in providing counselling, thereby creating a barrier to increasing the number of people who test by a significant amount. Too much emphasis on counselling therefore may distract from the current primary purpose of HIV testing, which is to diagnose individuals living with HIV and link them to care, treatment and prevention services. At the same time, testing services remain an important entry point for reaching people engaging in higher risk practices, and opportunities for increasing risk perception for these populations through counselling and referral to other HIV prevention services need to be utilized.

### **Improving positivity rates in HIV testing: diagnosing serodiscordant couples and people who are HIV-positive**

The more modest behavioural impact that testing has on people receiving an HIV-negative result reinforces the need for HIV testing programmes that focus on individuals who are at elevated risk of infection. Doing so would promote behaviour change in people who learn that they are living with HIV and allow them access to antiretroviral therapy.

In contexts where few people living with HIV know their status, testing modalities such as PITC can reach large numbers of people, particularly women, who are more likely to access other health services (such as contraception or maternal health services). In settings where the majority of people living with HIV already know their status, testing modalities need to focus on reaching groups that have not yet tested (such as adult men, who do not commonly seek health services).

Depending on local epidemiology, individuals at elevated risk of acquiring HIV may belong to specific key populations. In order to engage them effectively, it may be necessary to provide outreach or mobile testing services, locate services in suitable locations or involve community

members in planning and delivery so that services are appropriate and accessible. The inclusion of this local knowledge in the provision HTC to those most at risk of acquiring HIV is a key component of the UNAIDS approach to Fast-Track combination prevention.

The promising data on couples testing programmes and the behavioural impact for people who learn that they are in a serodiscordant relationship suggest that HTC may have its greatest behavioural impact with couples. Programmes could capitalize on this by giving greater emphasis to interventions that help couples learn and discuss their status together. Although a substantial proportion of new infections occur within primary relationships in many settings, implementation of couples testing has generally been limited to heterosexual couples in African settings. Emerging data indicate that the approach is acceptable to gay men and other men who have sex with men in some settings, but the potential for couples-based testing has not been sufficiently explored for other populations. Furthermore, the partners of people diagnosed with HIV are a priority group for testing and behavioural support: programmes need to create mechanisms to promote repeat testing and help partners maintain risk reduction strategies.

It is vital that post-test counselling for people with HIV addresses their health needs in a holistic manner that challenges stigma, rather than being focused on concerns about onward transmission.

### **The 5 Cs: consent, confidentiality, counselling, correct test results and connection to care**

Regardless of the model of service delivery, WHO has outlined the “five Cs” that all HTS must follow in all circumstances: consent, confidentiality, counselling, correct test results and connection to care (4).

- People taking an HIV test must give informed **consent** to be tested and counselled; they should be informed of the process involved and their right to decline testing. Services must be attentive to situations of coerced testing, especially among vulnerable populations or within couples.
- Services must be **confidential**, meaning that discussions between the person testing and the service provider are not disclosed to anyone else without the expressed consent of the client. Local laws, regulations and policies must protect the rights of individuals in relation to consent and confidentiality.
- HTS should be accompanied by appropriate, high-quality pretest information and post-test **counselling**. Quality assurance mechanisms and supportive supervision and mentoring systems should be in place to ensure the high quality of counselling. WHO and UNAIDS guidelines recommend that post-test counselling be provided regardless of test result, and that it should include an explanation of the test result, advice on risk reduction and the provision of condoms and referrals. For those testing HIV-positive, counselling also should include emotional support, discussion of the patient’s safe disclosure of his or her HIV status, and referral of the patient’s partners and children for testing.
- Quality assurance mechanisms should be in place to ensure the provision of **correct test results**. For example, services need a reliable supply of quality-assured test kits and a testing algorithm that outlines the confirmatory testing required before an individual is given an HIV-positive diagnosis. One of the key ways that HIV testing may encourage behaviour change is by giving people

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information about their HIV status and that of their partners; that information must be accurate if it is not to be harmful.

- Testing services must provide adequate and robust **connections** to prevention, care and treatment services. Individuals who are informed that they may have HIV but who then disengage from care and lose contact with services may be having difficulty adjusting to their diagnosis in the absence of support. Moreover, while the treatment cascade is well-described for people who are diagnosed with HIV, many people who receive HIV-negative results might benefit from referrals to prevention services (such as VMMC or PrEP), reminders to repeat their test and ongoing monitoring.

These principles should also apply to self-testing technologies. The relationship between self-testing and behaviour change remains unclear at this early stage, and it likely will vary according to setting, population, delivery mechanism (e.g., through established health services or commercial outlets) and messages in social marketing. If studies do show that the use of self-tests help people make better-informed sexual decisions that are free from harms such as coercion, violence or misinterpretation of results, then the delivery and social marketing of self-tests could be focused on groups that are at the greatest risk of infection.

## Population considerations

Due to the limited evidence available, the previously cited systematic reviews by Fonner et al., Kennedy et al. and Marks et al. were only able to compare outcomes by gender or serostatus (5, 18, 42). They were unable to compare outcomes among different key populations or to draw any conclusions about the impact of HTC in different groups. In almost all cases, the modality studied was VCT with pretest and post-test counselling. Table 2 summarizes data from studies in specific populations.

**Table 2**

Evidence of the impact of HIV counselling and testing on sexual behaviour change, by population

Population group	Effects
<b>People receiving positive results</b>	Evidence from multiple settings of behavioural changes (condom use and fewer sexual partners) during the first year after diagnosis (5, 13, 42).
<b>People in serodiscordant relationships</b>	Behavioural changes following positive diagnosis, more so for people in serodiscordant relationships (13, 14).
<b>People receiving negative results</b>	No impact on behaviour or new infections in most studies (5, 13).
<b>Women</b>	Mixed evidence, but some data suggest more behaviour change in women than men (17, 52).
<b>Men who have sex with men</b>	Sexual behavioural changes following positive diagnosis, including selecting other partners living with HIV (serosorting) (42).
<b>Other key populations</b>	Data are limited and more research is needed.

### Gender differences

Two reviews did analyse outcomes by gender and found no statistically significant differences (5, 42). Nonetheless, there are some suggestions that testing can sometimes have a greater impact on women than men. Fonner et al. did observe a nonsignificant trend for women to have a greater reduction in partner numbers than men (5). Two randomized trials of community-based HTC showed positive results on some key indicators, especially among women (16, 17). Some cohort studies among women in African countries suggest sustained behaviour change after HIV diagnosis through VCT (43–45).

Apart from these observations, the available evidence offers little insight into the effect of HTC, specifically on young women and adolescent girls.

### Couples testing

The literature also suggests that VCT interventions for couples may have more impact than individual testing when it comes to effecting behaviour change for heterosexual couples, especially those learning that their relationship is serodiscordant (13–15, 22).

### Gay men and other men who have sex with men

The only data concerning gay men and other men who have sex with men come from western countries and China. A few studies raise questions about the benefits of the

established model of risk reduction counselling for gay men and other men who have sex with men, suggesting that alternative counselling approaches (29, 30) or information alone could possibly be more effective (28). A randomized study conducted in China that compared an enhanced counselling intervention (including use of video) with a standard counselling intervention observed a reduction in condomless anal intercourse six months after testing, regardless of HIV status, but there was no impact on HIV incidence (47).

### **People who inject drugs**

For people who inject drugs, one study in the United States found that risk reduction counselling had no impact on sexual risk behaviour, but that it did lead to reduced multiperson use of injecting equipment (31). While more reliable studies are lacking, cross-sectional data suggest that some people who inject drugs may practise serosorting, avoiding multiperson use of injecting equipment with people who have a different HIV or hepatitis C status (48, 49). Testing could therefore have a behavioural impact on this population.

### **Sex workers**

The three systematic reviews did not identify any studies specifically conducted with sex workers, although one of the cohort studies that suggested long-term behaviour change after diagnosis was conducted with female sex workers (45).

## **Conclusion: HIV testing services**

HTC is an indispensable element of a combination HIV prevention approach. It plays a central role as the gateway into HIV services, both for those living with HIV and those who are HIV-negative, and it increasingly provides access to more enhanced biomedical prevention (including PrEP). As the review of the evidence has shown, HTC contributes to behaviour changes—particularly among people who test HIV-positive—that may decrease the risk of HIV transmission, but it is not sufficient on its own. It is therefore a necessary but not sufficient component of an HIV prevention response.

# Male and female condoms

## Key points

- Male condoms were the first mass intervention adopted for HIV prevention. Robust evidence gathered over three decades confirms that they remain a highly cost-effective method of preventing HIV. Condoms are an essential component of HIV prevention.
- Despite their effectiveness, condoms do not offer perfect protection. They can be used incorrectly, causing them to slip or tear; they also are used inconsistently, meaning people have unprotected sex. But studies show that the use of male condoms for vaginal sex effectively reduced HIV transmission by 80% (50). For anal sex, there are fewer studies, but the most recent meta-analysis found that male condoms had an efficacy of 70% (51).
- For female condoms, limited evidence suggests that they are 80% effective (52). While their use is low across all groups in developed countries, female condom use has been shown to be more common in certain countries, including Brazil, Ghana, South Africa and Zimbabwe.
- Condom acceptance in key populations rises sharply after media and counselling promote condom use (53). This happens even in populations with strong cultural objections and low historical use. Usage rates may decline in some settings after the initial sharp rise, but they remain significantly higher than historical levels.
- Studies confirm that HIV incidence drops when condoms are combined with other changes (such as frequency of sexual relations) (50). Modelling has shown that condom use was a key factor in containing the spread of the epidemic.
- Programmes that provide access to free or subsidized condoms increase condom use (54). Condoms also protect against unwanted pregnancy and STIs. Where HIV stigma is an issue, the contraceptive benefits can be emphasized to increase usage.
- Promoting condom use through counselling and media interventions has (on average) a neutral impact on incidence, but it is more effective when directed at specific populations. Key populations in which HIV is spread primarily through casual and commercial sex respond well to condom provision and promotion. Compared to the general population, rates of male condom use are higher among gay men and other men who have sex with men, people in casual sexual relationships and people involved in commercial sex.
- The cost per disability-adjusted life year (DALY) averted has been estimated as slightly more than US\$ 100 for male condoms and just less than US\$ 200 for



**female condoms (55). This compares favourably with the cost of approximately US\$ 550 per DALY averted for first-line antiretroviral therapy.**

Male condoms were the first tool adopted for HIV prevention in the early 1980s; the female condom was first launched in the early 1990s. They are inexpensive and cost-effective, and their use does not require the assistance of health-care workers. Together, they remain the most frequently used intervention to prevent HIV infection in many settings.

Condoms have also found a place in combination HIV prevention. Several models have shown that condoms can have a strong impact on disease incidence when used alongside other interventions. For example, modelling in South Africa suggests that from 2000 to 2008, HIV-incidence in adults declined by approximately 31%, with between 23% and 37% of this decline attributed to condom use (56). Models from the United Kingdom of Great Britain and Northern Ireland also credit condoms with preventing a quadrupling of cases that would have otherwise occurred (57).

What follows is an examination of the effectiveness of condom protection against HIV among heterosexual couples and gay men and other men who have sex with men. Both male and female condoms are covered. After that, a summary of the effectiveness of condom programmes on enhancing the acceptability, availability and accessibility of condoms is presented.

## **A note on outcome measures for condoms**

The specific measurable amount of protection that condoms provide against HIV infection can only be estimated—it is not possible to run randomized controlled trials (51). While efficacy and effectiveness are ideally tested in a randomized controlled trial with strong measures adopted to capture adherence levels, ethical considerations prohibit the exposure of infection-free people to a serious illness like HIV. It is therefore necessary to use observational studies where condom use (or the lack thereof) is examined alongside observed HIV prevalence and incidence rates that are confirmed by serology.

## Biological rationale for effectiveness

### What does the evidence say about the biological efficacy of condoms?

- Condoms made of latex or polyurethane form an impermeable barrier for HIV.

Condoms are made from latex or polyurethane, and they are required to meet manufacturing standards that make them impermeable to microorganisms (58). WHO and the United Nations Population Fund (UNFPA) operate a prequalification and specification scheme for male condoms. The United States Food and Drug Administration (FDA) and the European Medicines Agency have comparable specifications for female condoms.

It is beyond doubt that condoms act as an effective and reliable barrier. Laboratory studies and product testing have shown that condoms from recognized suppliers are completely impermeable to microorganisms as small as viruses when tested in the laboratory (59). The risk of exposure to semen due to condom breakage is 1 per 166 sex acts, a physical reliability of 99.4% (60).

Condoms are therefore highly effective in preventing unintended pregnancy and the transmission of microorganisms. When they fail, it is either because of device failure or user failure. Objections to condom use frequently conflate these two characteristics. User failure takes two forms: either condoms are used inconsistently, which leads to episodes of unprotected sex, or they are used incorrectly, which leads to slippage or breakage. Such device failure is uncommon on its own; it is usually an outcome of user failure. Around 75% of users fail to use condoms for every penetrative sex act, but when they are used consistently and correctly, they are highly effective.

## Efficacy of condoms in preventing HIV infection

### What does the evidence say about the effectiveness of condoms when they are self-reported to be used consistently?

- Male condoms used consistently for all acts of penetrative sex are 80% effective in preventing HIV transmission through vaginal sex and 70% effective for anal sex.

### Considerations in determining condom efficacy

The efficacy of an intervention describes how well it works in a scientific trial or when used as indicated (i.e., consistently). Its effectiveness indicates how well it works to prevent disease or infection in a particular population given actual levels of use.

Studies of condom efficacy have compared HIV incidence or prevalence among people who claim 100% consistent use of condoms against people who use them inconsistently or not at all (50). Because these studies involve private behaviours that investigators cannot observe directly, it is difficult to determine accurately whether an individual is a condom user and whether condoms are used consistently and correctly.

The evidence we have is based on three types of trials, and each has potential weaknesses.

- For the efficacy of condoms against HIV and other chronic STIs, prospective studies of the incidence of HIV—or human papillomavirus (HPV) or herpes simplex (HSV)—in monogamous serodiscordant couples provide the best evidence. Large or long-lasting studies provide more reliable estimates of efficacy.
- Evidence also has been derived from prospective cohort studies that look at the association between self-reported condom use and HIV incidence over time.
- Retrospective cohort studies have correlated levels of reported condom use and other behavioural data with HIV prevalence to determine the association between condom use and HIV infection.

All of these methods are prone to bias due to their reliance on self-reported condom use. Research early in the epidemic showed that 40–70% of men falsely claimed they always use condoms (61). Similarly, one study found that 77% of female sex workers reported consistent condom use with clients, but a prostate-specific antigen (PSA) test established that only 52% actually used condoms consistently (62). These findings indicate that people overestimate condom usage and find it difficult to sustain 100% use.

### Condom efficacy: heterosexuals

The most comprehensive meta-analysis of the efficacy of condoms in heterosexuals was issued as one of the Cochrane Collaboration series of meta-analyses (50). The meta-analysis evaluated 14 longitudinal cohort studies that contained 13 groups of serodiscordant heterosexual couples who said they “always” used condoms and 10 groups who said they “never” used them. There were 587 HIV-negative partners in the “always” group and 276 in the “never” group. The average length of follow-up in the studies was 2.17 years.

The annual incidence of HIV infection in the HIV-negative partners was 6.68% in partners who said they “never” used condoms (40 infections in 276 people) and 1.14% in partners who said they “always” used them (11 HIV infections in 587 people) (50). This represents an 83% reduction in the risk of HIV transmission.

Among the “always” users, the 95% CI for annual HIV incidence was 0.56–2.04%; among those who “never” used condoms, 95% CI for annual incidence was estimated at 3.16–9.66% (50).

### **Condom efficacy: anal intercourse between men**

There have been limited data on the efficacy of condom use in preventing HIV transmission through anal intercourse. A study conducted in 1989 and a meta-analysis of two longitudinal studies published in 2013 each estimated an efficacy of 70% for reported condom use during anal intercourse between gay men and other men who have sex with men: men who said they used condoms 100% of the time were 70% less likely to acquire HIV than men who never used condoms, and they were 68% less likely than men who said they sometimes used them (51, 63). This is somewhat lower than the rates seen in studies among heterosexuals, probably because the risk of transmission through anal intercourse is higher than it is through vaginal intercourse, and because there is a higher risk of condom breakage during anal intercourse.

The 1989 study was part of the Multicenter-AIDS Cohort Study (MACS), the oldest HIV cohort study in the world. The study found that the six-month IR among 2914 initially HIV-negative gay men and other men who have sex with men was 0.7% among those who claimed 100% condom use and 2.9% among those who never used condoms. This also yields a condom efficacy of approximately 70%.

A recent systematic review, published in 2018, found that HIV incidence was 91% lower among gay men and other men who have sex with men who used condoms consistently, contributing to the evidence base of condom effectiveness against HIV (64).

### **Condom efficacy: anal intercourse in heterosexual couples**

The only analysis of condom efficacy for anal intercourse in heterosexuals was a small one published in 1994 (65). There were no seroconversions in 124 couples who always used condoms for vaginal and anal intercourse, compared to 12 in the group of 132 people who used condoms inconsistently.

Anal intercourse was already a minority behaviour among heterosexual couples, and unprotected anal intercourse was even rarer, so the researchers could not directly compare seroconversion rates between women who used condoms for anal sex and those who did not.

### **Condom efficacy: male and female condoms**

Available data reviewed by the CDC in a recent meta-study suggest that female condoms (or an alternating mixture of female and male condoms) may provide degrees of protection against pregnancy and STIs that are similar to those of latex male condoms alone (51). According to the authors, however, this conclusion has not been demonstrated to a level that can lead to an unequivocal recommendation. The uncertainty of this conclusion is reflected in

the FDA labelling for female condoms, which supports their use for disease protection only in mitigating circumstances (i.e., when a latex male condom will not be used). Data from randomized trials designed to quantify the equivalence between the two condom types are not available (52).

The key benefit of the female condom is that it provides women with an option over which they have control. In most settings, uptake of female condoms has been very low, and female condom use globally is less than 1% of male condom use, with notable exceptions (such as Brazil, Ghana, South Africa and Zimbabwe). In light of the uncertainty surrounding their effectiveness and low usage rates, the female condom will be a tool in well-defined settings. Male and female condoms should not be used at the same time. This is because friction between the condoms can increase the likelihood that the condoms will split (66).

### **Condom failure or misuse: recommended actions and efficacy**

In a case of condom failure or misuse where one partner is HIV-positive, the recommendation is to visit a health-care professional, who should prescribe a one-month course of post-exposure prophylaxis (PEP) (66). Where the serostatus of one or both sexual partners is unknown, HIV testing is recommended.

### **The relationship between consistent use and efficacy**

Condoms protect against HIV when used, provided that they do not slip off or break. As soon as attempted condom use falls from 100%, then the degree of protection they offer rapidly declines.

In some studies, inconsistent condom use appears to be even less effective against HIV than not using condoms at all (68). Inconsistent users had 44% more gonorrhoea and chlamydia than non-users, and this was statistically significant and broadly in line with other studies (see below) (69).

The apparent ineffectiveness of intermittent condom use may be due to the fact that such use is associated with settings that have a higher risk of HIV infection: longitudinal studies suggest that intermittent users are likely to have behavioural characteristics that put them at higher risk of HIV infection (such as greater numbers of partners). Researchers also hypothesize that men who never use condoms might be more likely to be in monogamous relationships and therefore generally at less risk of HIV (69).

## The effectiveness of condoms in key regions and among key populations

### What does the evidence say about the effectiveness of condoms when they are delivered as part of prevention packages in different settings?

- Condoms are effective alongside other interventions in reducing HIV incidence in different regional and epidemic settings.

### Heterosexuals in sub-Saharan Africa

The earliest population-level decline in HIV prevalence in sub-Saharan Africa, which occurred in Uganda, has been attributed to behavioural and epidemiological changes that occurred alongside increases in condom use (70). Evidence from population-level declines in HIV prevalence is derived from population-based surveys, routine HIV testing data and study cohorts. While these types of data are suitable to document trends, they cannot be linked directly to interventions in the same way as experimental studies. Mathematical models and ecological analyses have therefore been used to assess the contributions that programmes such as condom promotion have made to HIV declines.

In Uganda, the incidence and prevalence of HIV started falling in the late 1980s, well before condoms started to be used widely (70). Similarly, the decline in HIV incidence in Zimbabwe after 1991 has been attributed to a combination of factors, including a decline in multiple or concurrent sexual partnerships, a reduction in men paying for sex and changes in social attitudes towards casual sex. Condom use with nonregular partners, which increased during the 1980s and 1990s, has been cited as another plausible contributing factor to HIV prevalence decline in Zimbabwe (71).

Subsequent increases in condom use may have made more direct contributions to reductions in HIV incidence and prevalence in some countries. For example, South Africa experienced a 35% decline in the rate of new HIV infections between 2002 and 2008, and by comparing data from three consecutive national prevalence surveys, researchers were able to estimate changes in incidence and link the improvements to condom use (among other factors) (56).

### Heterosexuals in Asia: Cambodia, India and Thailand

National promotion of condom use in brothels in Thailand during the 1990s—the 100% Condom Use Programme—was associated with a rapid and substantial reduction in HIV incidence (72). As part of the programme, police informally licensed brothels and ensured that sex workers had regular health checks to pressure owners to ensure that clients demanding unsafe sex would be turned away. Following the launch of the campaign in 1989, condom use in sex establishments increased from less than 20% in 1990 to above 90% in 1994; it was sustained at that level thereafter. HIV prevalence among male military conscripts fell from 4% in 1993 to 1% in 2004. A similar decline in HIV prevalence was observed in Cambodia, which also used the programme (72).

In India, a decline in HIV prevalence among women especially in southern states, among those aged 15 to 24 years, has been attributed to the widespread adoption of condoms by sex workers and their clients, and to a subsequent reduction in transmission of HIV from male clients to other female partners (73). The researchers also credited a 35% decline in HIV

prevalence among young people to an increase in condom use among commercial sex workers and their clients.

### **Latin America**

While the incidence of HIV (0.4%) is much lower in Latin America than in sub-Saharan Africa or parts of Asia, the total number of people infected is nonetheless substantial (74). Incidence rates are high among key populations such as gay men and other men who have sex with men, sex workers (especially male sex workers) and transgender women. Antiretroviral therapy is widely available across the region, but its uptake is far below 100%, varying between 20% in the Plurinational State of Bolivia and 60% in Argentina. As a result, condoms are a critical intervention.

There is a lack of condom effectiveness studies for this region. One reason for this is that certain key populations often falsely identify themselves as heterosexual or hide their HIV status, because gay men and other men who have sex with men and people living with HIV are highly stigmatized in the region (75).

## Key populations

### What does the evidence say about the effectiveness of condoms when they are delivered as part of prevention packages for key populations?

- Condoms used alongside other interventions reduce HIV incidence in all key populations, and they need to be part of all programmes reaching those populations.

### Gay men and other men who have sex with men

The first instance of a substantial increase in condom use in a key population was among gay men and other men who have sex with men early in the epidemic.

Condom use among gay men and other men who have sex with men in San Francisco quadrupled between 1984 and 1987 (76). Because of this increase—and because of reductions in the number of sexual partners—HIV incidence dropped precipitously in 1983–84 after peaking at 7–8% in 1980–82. It has remained at 0.5–3.0% ever since.

An early survey by Sigma Research in the United Kingdom found that about 90% of gay men and other men who have sex with men consistently did not use condoms for anal intercourse before 1980, but that by 1988, the proportion of “rarely or never” users was down to 22% (77).

### Young people

A systematic review of 31 controlled studies conducted in sub-Saharan Africa found that behavioural HIV prevention interventions were associated with an increase in condom use at last sexual episode among males aged 10 to 25 years (78). It also found, however, that intervention and study design were commonly weak. Condom use at last sex was 1.46 times higher among males who received behavioural interventions; any use of condoms also increased in males (RR = 1.32; 95% CI 1.25–1.40). No consistent impact of interventions on condom use was seen in young women, and there was great diversity in the range of behaviour change interventions studied (78).

Integrating condom promotion into programmes focused on sexual behaviour change is advantageous because decisions around condom use are directly affected by issues such as relationship status, gender-based power disparities and denial of HIV risk. Condom programming, like all behaviour change communication, must be locally relevant and culturally specific in order to be effective.

Linkages that facilitate the integration of condom education, promotion and distribution into existing medical, educational and social services programming can serve to expand their uptake by communities at high risk of HIV, particularly in developing countries.

### Sex workers

Interventions to promote condom use among sex workers and their clients are highly effective. A systematic review of interventions to improve condom use in Africa and Asia, for instance, found that of 19 studies that assessed condom use among female sex workers, 15 reported a significant increase in condom use (versus four that did not) (79).



As noted above, Thailand's national 100% Condom Use Programme resulted in a change in reported condom use at sex establishments, with the rate increasing from less than 20% in 1990 to above 90% in 1994, a level that was reportedly sustained thereafter (72).

In India, sex worker outreach projects integrating condom promotion succeeded by using very different techniques (80). In 2004, 70–80% of female sex workers in Karnataka reported using a condom with their last client. This was a sharp increase from prior levels, and it was attributed to the activities of a peer-led female sex worker collective that offered an array of services, including literacy programs, medical care, legal assistance, HIV prevention education and condom promotion. A survey of women and men attending antenatal and STI clinics found a 35% decrease in HIV prevalence (73). The researchers credited these declines to an increase in condom use among commercial sex workers and their clients.

### **People who inject drugs**

Condom promotion can be integrated effectively into harm reduction services for sex workers and people who inject drugs via programmes focused on these key populations. Such integrated programmes are the mainstay of HIV and STI prevention programmes in many countries, and they have been shown to be highly effective in preventing HIV (73).

### **Prisoners**

People in prison settings are another population that is largely deprived of condom access. Most countries still treat condoms as contraband in prisons and jails, despite: (a) clear guidance from the European Court of Human Rights and the UN on the human rights aspect of preventing serious illness; and (b) analysis from WHO, the UN and UNAIDS on the feasibility and benefits of condom provision (84). The political will to reverse these bans is required to create an enabling environment for condom use among people in prison settings.

## The overall impact of condom provision and education on HIV risk

### What does the evidence say about the effectiveness of condom distribution and promotion?

- Condom distribution and promotion schemes are highly efficacious in increasing condom use, and they deliver additional benefits, such as reductions in STI incidence.
- Condom promotion and use do not increase other high-risk sexual behaviours.

A meta-analysis published in 2011 looked at the impact of condom distribution schemes on condom use and risk behaviours, both in the United States and internationally (54). It covered programmes aiming to increase the following:

- Condom availability through the provision of free or subsidized condoms to individuals practising high-risk behaviours and in high-risk venues.
- Condom accessibility, which uses broader general schemes, such as condom provision at music festivals or to students.
- Condom acceptability through media campaigns, safer-sex posters and information, and peer-group interventions.

The analysis showed that condom distribution and promotion schemes are highly efficacious in getting people to carry and use condoms. It also documented a substantial reduction in STI incidence and delayed sexual debut in young people (54).

The overall effect on condom use in 20 studies was an 81% increase in condom use. In a subset of five youth studies, there was a 43% increase in delayed sexual debut or abstinence, which suggests that condom promotion does not lead to risk compensation in the form of earlier sexual debut. In a subset of five studies that measured STI incidence, there was a 31% decrease in STIs (54).

The increasing integration of condom promotion into services focused on women, couples and young people has also shown success. Women accessing HIV-related services in family planning clinics have demonstrably higher rates of condom use than their peers in the general population (81). Emphasis on the contraceptive value of male and female condoms can also counteract potential stigma by drawing attention away from their association with HIV prevention (82, 83).

Another systematic review found variability between populations and partnership types in the effects of promotion on condom use (79). The review identified 62 studies that had evaluated the effects of condom promotion in Asia or sub-Saharan Africa. Positive impacts were reported for sex workers and serodiscordant couples.

A subsequent systematic review and meta-analysis of studies published between 1990 and 2006 on behavioural interventions for people living with HIV in developing countries found those interventions had a very strong effect on condom use in serodiscordant couples (85). The study found that counselling couples together had a significant and substantial effect, whereas individual counselling alone had no impact. This is in keeping with the findings

discussed in the previous section on the effectiveness of HIV testing of couples (see “The effect of voluntary HIV counselling and testing on sexual behaviour”).

A large 2006 meta-analysis of 174 studies published between 1989 and 2003 of any interpersonal (individual or group) sexual risk reduction intervention (not just condoms or condom promotion) found no evidence that, taken as a whole, those interventions increased sexual risk behaviour or the amount of sexual activity (86). These findings contradict assertions that condom promotion encourages risk behaviour, and they support the inclusion of focused condom promotion in all HIV prevention programmes.

### **Operational considerations**

The UNFPA publication *Comprehensive condom programming: a guide for resource mobilization and country programming* has guidance that applies to both male and female condoms (87). It outlines a 10-step strategic approach:

1. Establish a national condom support team.
2. Undertake a situation analysis.
3. Develop a comprehensive and integrated national strategy for male and female condoms.
4. Develop a multi-year operational plan and budget.
5. Link the multi-year operational plan with the national commodity security plan.
6. Mobilize financial resources.
7. Strengthen human resources and institutional capacity.
8. Create and sustain demand for condoms.
9. Strengthen advocacy and engage the media.
10. Monitor the programme routinely, conduct research and evaluate outcomes (87).

### **Acceptability and effectiveness**

While there may be many reasons why people do not use condoms, two main themes stand out when people are asked why they do not use them: intimacy and pleasure. Condoms are sometimes equated with a lack of trust or with relationships that have not yet been firmly established. They can even be taken as proof of unfaithfulness.

Surveys such as those based on the Demographic and Health Surveys (DHS) programme almost invariably find that condom use in long-term relationships is much lower than in casual sex. This applies to both heterosexual men and gay men and other men who have sex with men: men in steady relationships, irrespective of the serostatus of their partner, are far less likely to use condoms.

### **Condom breakage and slippage**

What has been called “fit” and “feel” may be crucial when it comes to the decisions that men make about whether or not to continue to use condoms. Failure to supply condoms that fit varying sizes of penis, for instance, may make a difference, as might lubrication and smell. One study, for instance, found that although most men do not have problems with condom fit and feel, men with shorter or larger penile dimensions (length or circumference) were more likely to have negative attitudes and perceptions of condom fit and feel (88).

Unsatisfactory fit and feel also were associated with condom breakage. In one study, condom breakage was twice as likely to be reported by men who felt their condoms did not fit properly (89). Other predictors of condom breakage were, unsurprisingly, letting sharp objects near the condom and previous experiences of condom slippage. STIs were significantly higher with condom breakage, suggesting a similar risk for HIV.

In resource-rich countries, condom manufacturers offer a range of condoms in different sizes and fits. However, the choice of condoms tends to be much more limited when they are supplied free of charge in developing countries. More work is needed to identify what range of condoms must be supplied in different settings in order to increase men’s comfort and satisfaction when using them.

In 2013, the Bill & Melinda Gates Foundation identified the development of new and easier-to-use condoms for resource-poor countries as one of its development priorities (90).

## **The role of lubricants in condom breakage, slippage, reliability and safety**

A woman produces natural lubricating fluids during vaginal sex, but these may not be enough for safer condom use. Women also may need additional lubrication for comfort. A survey of women's lubricating practices in nine countries in Asia, Africa and Latin America found that the use of substances that increased vaginal lubrication was widespread (91). Lubricants also are used by the majority of gay men and other men who have sex with men and by female sex workers (92).

A more recent survey covered lubricant use during anal sex among both men and women (93). In this international survey of 6124 individuals who reported anal sex in the last six months, only 35% used condoms consistently, but 59% always used lubricants. It is recommended that condoms be used with silicone- or water-based lubricant for anal sex. Use of water-based lubricant is associated with a lower male condom failure rate during anal intercourse. In one study, condom breakage was significantly less frequent when used with water-based lubricant compared to no lubricant (3.0% vs 21.4%) (94).

Using oil-based substances, cooking oil and other oily substances as lubricant with latex condoms is not regarded as safe. Oils and greases weaken condoms within minutes: one study found that a condom's resistance to being punctured decreased by 47% and 59%, respectively, after 15 and 30 minutes of exposure to mineral oil (95).

Lubricants are manufactured to a range of specifications according to market requirements. As a result, they differ in their chemical constituents and safety profile. Lubricants may cause harm to the vaginal or anal mucosa, or they may cause damage to male or female condoms (96). In either instance, they would increase the risk of HIV infection.

Lubricants are not subject to uniform regulation; in some cases, they are not regulated. There is an advisory note on lubricants from WHO, UNFPA and FHI 360, but additional evidence on the effects of lubricants is required (97). If no local regulation exists or if regulation is weak, then it is advisable to recommend products that have already been approved in highly regulated markets, such as Europe (products with the "CE" marking) and other developed markets.

Since condom use in many settings is increased by making condoms available for free or at highly subsidized prices, it is advisable to make lubricants available in a similar manner. In these contexts, it should be emphasized that there is no evidence to suggest that lubricants on their own are protective against HIV.

## **Structural-level condom interventions**

Programmes exist that distribute condoms free of charge on a large scale to individuals and communities at high risk of HIV infection. These structural-level condom interventions often are combined with individual or group behaviour change interventions, and they often are supported by community-based social marketing activities. A systematic review and meta-analysis published in 2011 reviewed 21 studies of structural-level interventions in which HIV-related risk behaviours and STIs were measured as relevant outcomes (54). The overall effect of the interventions was an 81% increase in condom use, and in a subset of five youth studies, investigators found a 43% increase in abstinence or delayed sexual debut. In another subset of five studies—this time measuring STI incidence—researchers documented a 31% decrease in STIs (54).

The meta-analysis found that interventions addressing any one of the three parameters—acceptability, accessibility or availability—had a similar magnitude of effect. Interventions to improve availability, such as requiring saunas or sex work premises to make condoms available, had the greatest impact when combined with measures to improve accessibility (such as large-scale condom distribution). Interventions that combined structural-level condom distribution with individual, small group or community interpersonal communication components had significantly greater efficacy than interventions that solely implemented a structural-level component (54).

### **Social marketing**

Condom social marketing (not to be confused with communication that uses social media, such as Facebook) refers to activities that seek to build demand for condoms that are made available at a subsidized price. It was first initiated in the 1980s by international family planning organizations, and it broadened in the 1990s as epidemic rates of HIV highlighted the urgent need to increase condom use.

Social marketing may be combined with free access to condoms through health facilities, family planning clinics or community outreach. It applies the tools and concepts of commercial marketing to noncommercial goals, such as promoting healthy behaviours, and it is generally used to address issues affecting low-income populations that have high morbidity and mortality rates.

In 2012, a systematic review and meta-analysis by Sweat et al. examined six studies of social marketing interventions to increase condom use in developing countries (98). Five of the six studies were conducted in sub-Saharan Africa. The review found that exposure to a social marketing intervention approximately doubled the likelihood that respondents reported condom use at their last sexual encounter. It also confirmed that social marketing only has a moderately positive effect on increasing condom use. Among those exposed to social marketing, overall condom use was slightly more likely among men than women; the effect of social marketing remained significant only for men when the analysis was restricted to casual partners.

Condom social marketers sometimes pave the way for governmental HIV prevention efforts by introducing new condoms and creating public demand for them. That introduction then facilitates the wider distribution of condoms by public health services. In Brazil, for example, DKT (a private-sector social marketer) introduced female condoms in 1997 at a subsidized price. The government subsequently joined the effort by making the condoms available for free for those unable to buy them. By 2004, four million female condoms were being distributed annually through a mix of public and private (social marketing) channels, a figure that the government estimated as one fifth of the actual number needed (100, 101).

### **The total market approach**

The term “total market approach” was first applied to social marketing in 2004 (102). Since then, it has come to be applied to a framework that harmonizes social, private and public market forces to address public health needs. Under such an approach, all sectors (public sector, private sector and social marketing) are integrated within one market that is segmented by willingness to pay (103).

With regard to condoms, the division of labour is generally as follows:

## Male and female condoms

- Commercial businesses sell a range of brands to buyers who can pay retail prices.
- Non-profit, community-based organizations provide branded and unbranded condoms at subsidized prices.
- Public sector workers (e.g., clinics, hospitals and health educators) distribute free condoms.

A 2012 evaluation of work in African countries found that social marketing using a total market approach resulted in significantly increased condom use by women in nonmarital, non-cohabiting relationships in seven countries, and by their male peers in five countries (104).

## Cost-effectiveness

### Are condoms cost-effective?

- Condoms are likely among the most cost-effective HIV prevention interventions available in most settings.

Evidence of the cost-effectiveness of condom distribution and marketing is necessary to sustain political support for its continuation. While it is intuitively apparent that investment in preventing new HIV infections is less expensive than lifelong treatment costs and other expenses associated with HIV acquisition, cost-effectiveness studies have not evaluated male condom promotion as a stand-alone intervention. Instead, it is evaluated as part of an intervention package that also includes HIV education, support and STI prevention. For instance, mathematical modelling to estimate the cost-effectiveness of various HIV prevention interventions in sub-Saharan Africa suggests that male condom provision (with its appropriate ancillary programming) costs only US\$ 181 per HIV infection prevented, making it “the most economically efficient of HIV prevention strategies in sub-Saharan Africa” (105).

A 2014 analysis of the cost-effectiveness of female condoms showed that, despite a higher price, female condoms are nevertheless highly cost-effective compared to other HIV prevention tools when measured by DALY averted (55). As the only dual prevention method (i.e., it blocks STIs and HIV and acts as a contraceptive) that women can initiate when male condom use has been rejected, female condoms are an important complement to the larger HIV prevention intervention package.



## Risk compensation: the potential for a decline in condom use

### What is the role of condoms in the age of antiretroviral therapy?

- When antiretroviral therapy is available, condoms are still needed to prevent rising HIV incidence.
- In the majority of countries, less than half of people living with HIV had a suppressed viral load in 2016. Even if the 90–90–90 targets are achieved, more than a quarter of people living with HIV would not be virally suppressed, and people who are virally suppressed at the time of a viral load test may not be constantly virally suppressed.

It has been questioned whether condom use in resource-rich countries has declined since the advent of antiretroviral therapy in the mid-1990s. The evidence is conflicting, varies between countries and depends on what measures are taken of risk behaviour. Potential different factors include whether condom use and unprotected sex (including unprotected sex between definitely or possibly serodiscordant partners) is counted, and whether the question is asked positively (e.g., “Have you always used a condom during intercourse in the last year?”) or negatively (e.g., “Have you had intercourse without a condom over the last year?”).

Following the advent of antiretroviral therapy in 1996, the proportion of gay men and other men who have sex with men who sometimes did not use condoms started to increase. A survey in San Francisco, for instance, found that the proportion of gay men and other men who have sex with men who reported that they did not always use condoms increased from 31% in 1994 to 47% in 1999 (106).

In the United States, the proportion of gay men and other men who have sex with men who had anal sex without a condom at least once in the previous year increased by nearly 20% between 2005 and 2011 (107). Among men in 2011 who tested HIV-positive but did not know their status, a third had high-risk sex the last time they had sex; this rate had not changed from 2008. This does not imply that not knowing one’s status leads to high-risk sex; rather, it shows that people living HIV who don’t know their status are more likely to have taken sexual risks recently and are more likely to have been recently infected.

Limited data on increasing trends in some STIs may suggest reduced condom use with increased availability of antiretroviral therapy. Despite that, there is not enough evidence to make a definitive statement to that effect.

## **Conclusion: male and female condoms**

Condoms were the first successful mass intervention to prevent the spread of HIV. Their role in containing and reducing HIV incidence alongside other interventions is well-documented, even though the exact level of their effectiveness remains unknown. High effectiveness depends on consistent and correct use, which is not easy to reach, but evidence confirms that increased and sustained condom usage can be achieved following a process such as that outlined in the UNFPA guide, *Comprehensive condom programming* (87).

# Mass media interventions

## Key points

- **Studies have found that mass media interventions are effective in reducing partner numbers, but that their effect on condom use is varied. Mass media interventions have not been linked to decreases in pregnancy or HIV incidence.**
- **Mass media does contribute to increased HIV knowledge, especially with longer campaigns, and it can contribute to short-term reductions in HIV-related stigma.**
- **Mass media and social marketing campaigns can lead to short-term increases in HIV testing.**
- **Internet and digital media communications have been associated with delayed initiation of sex among youth, and with more open discussion of HIV status among gay men and other men who have sex with men.**

Since the 1980s, mass media-based campaigns have been an important part of HIV prevention (108–111). At the beginning of the epidemic, some national campaigns were crucial to raising awareness of the issue and defining a dominant HIV and AIDS narrative. Examples of these include the Zero Grazing campaign in Uganda promoting abstinence and partner reduction and the Grim Reaper campaign in Australia, which used a fear-based approach for health promotion and HIV prevention messaging (112, 113).

Mass media-delivered interventions can be defined as “an intervention message delivered in a natural setting through a mass media channel to which individuals may or may not attend (e.g., radio, television, newspaper, magazine, or mass distribution or mailing of printing materials)” (114). Mass media channels can be used on their own or combined with personal sources of information (such as outreach workers and peer educators).

Mass media is seen as useful because it can access a wide community, repeat messages frequently and use different content formats. Mass media interventions usually address behaviour change communication, which often is theorized to affect psychosocial factors such as knowledge, attitudes, perceptions of social acceptability, and self-efficacy. Changes in these factors are believed to influence specific behaviours or practices, including condom use, delayed sexual debut and overlapping sexual partnerships. Some factors that might influence the effectiveness of mass media campaigns are how many channels or coordinated sets of communication activities or messages are used (115, 116), and the duration and extent of exposure to the campaign (114).

A review by Bekalu et al. of the literature from 2000 to 2010 on the use of mass media campaigns to advance both biomedical and behavioural approaches to HIV prevention in sub-Saharan Africa suggests that mass media is used primarily for behavioural interventions (117). Biomedical or structural interventions rarely featured in the mass media approaches included in the review.

## Mass media interventions

There are numerous methodological challenges to evaluating the effectiveness of behaviour change communication involving mass media (118). Whereas randomized controlled trials are normally conducted with clearly delineated groups of people, mass media campaigns aim to maximize spread and saturation within a population, potentially making it impossible to identify control communities that have not been exposed to a particular campaign. While researchers often rely on comparisons of behavioural surveys before and after implementation of a campaign—or they compare people who remember seeing a campaign with people who do not—these methods are subject to bias.

Despite these evaluation challenges, it is worthwhile to evaluate mass media efforts and their effects on HIV-related behaviour, attitudes and beliefs because of their potential cost-effectiveness, ability to reach vast numbers of people and widespread utility in prevention efforts (119, 120). This section will review the effects of mass media on various HIV prevention-related outcomes, including sexual behaviour, knowledge, stigma and HIV testing. It also will explore the effectiveness of new and digital media.

## The effect of mass media on sexual behaviour

### What does the evidence say about the effect of mass media on sexual behaviour?

- It has varied effects on condom use.
- There has been a reduction in sexual partners in some contexts, but not in others.
- There are no effects on HIV or pregnancy incidence.

### Varied effects on condom use

Three systematic reviews of condom use as an outcome of mass media have been published. The first, by Noar et al. in 2009, was based on evaluations of 34 diverse HIV-related mass communication campaigns in 23 countries between 1998 and 2007 (116). The review then compared these findings to a similar review of campaigns conducted earlier (from 1986 to 1998). Most campaigns included radio and printed material, but approaches varied, with some also using community outreach, peer education and television. Of 10 quasi-experimental evaluations included in the review, eight found that the campaign had a statistically significant impact on self-reported behaviour or behavioural intentions—a lower-level outcome. Five of the 10 studies reported increased condom use (121–125). None of the evaluations assessed biological outcomes.

A second systematic review, by Bertrand et al. in 2006, limited its focus to mass media campaigns in developing country settings (the Caribbean and Latin America, central Africa, South and East Africa, and South-East Asia) between 1990 and 2004 (110). The 24 interventions identified focused on changing HIV-related knowledge, attitudes and behaviours, and they yielded varied results. The authors reported that most of the outcomes examined had no statistically significant impact. Among those studies that did produce statistically significant results, the effect sizes were typically small to moderate. Seventeen of the 24 studies evaluated condom use; three of these (121, 123, 124) are also included in the Noar et al. review (116).

Some campaigns used television, radio and small media (including brochures and leaflets). There were varied outcomes to these approaches. Some studies showed no effect; for example, Schopper et al. reported no significant increase in condom use in Uganda after community education and a pamphlet campaign (126). However, Bertrand et al. also report a Columbia-based study that showed “ever use of condoms” and “use of condoms in the past year” both rose after a radio advertising campaign (from 25% to 34% and from 8% to 12%, respectively) (127). No statistically significant effects on HIV or pregnancy were found.

The third systematic review and meta-analysis, conducted in 2014 by LaCroix et al., investigated the effectiveness of mass media campaigns in preventing HIV (114). It included 54 reports (including unpublished ones) evaluating 72 interventions, mainly on condom use and knowledge of transmission and prevention. Studies were based in many regions: the greatest concentration was in Africa (27 countries), with nine studies in Asia, six studies each in Europe and the United States, five studies in South and central America and one in Australia. The most frequently reported outcome variable was condom use (i.e., frequency and proportion of protected sex). When the results were averaged, the authors concluded that

the increased condom use was greater when: (a) longer campaigns were run; (b) message content reportedly matched the target audience; (c) refusal rates were low; and (d) the nation in which the campaign occurred scored lower on the Human Development Index (114).

Overall, LaCroix et al. found that longer campaigns were associated with statistically significant but small increases in condom use [ $d + 0.25$ ; 95% CI: 0.18–0.21] (114).<sup>4</sup> For example, a study by Vaughan et al.—which was included in all three systematic reviews discussed here (110, 114, 116)—investigated the effects that the long-running entertainment radio soap opera, *Twende na Wakati* (Let's Go with the Times), had on knowledge, attitudes and adoption of HIV prevention practices in the United Republic of Tanzania from mid-1993 through 1997 (123). The programme's characters were intended to provide positive, negative and transitional role models in terms of their HIV prevention behaviours; their conversations about HIV were intended to stimulate interpersonal communication about the topic. The conversations focused on four key HIV prevention themes: medical treatment of STIs, condom use, HIV transmission knowledge and false rumours about HIV and AIDS. Broadcast of the programme was delayed in one region of the country to allow for evaluation by the researchers. Yearly household surveys suggested that condom use increased, but that it remained relatively low at 16% in the treatment area (against 13% in control sites) (123).

Another study included in LaCroix's systematic review was conducted in Sierra Leone by the American Refugee Committee International (127). It investigated knowledge, attitudes and practice related to HIV, AIDS and STIs in Port Loco, Sierra Leone, following a mass media campaign. The study—based on 956 interviews with military, sex workers, youth and ex-combatants—reported that condom use among all groups increased significantly (from 26% to 53%). For military and sex workers, even greater increases were reported (68% use at last sexual intercourse, with 82% reporting having ever used a condom). This study and the Vaughn et al. study of mass media in the United Republic of Tanzania yielded the largest standardized mean differences in condom use of all the studies included in this meta-analysis (123, 128). For all the other studies, however, the standardized mean differences were more modest or negligible. This suggests that a majority of mass media programmes may have a negligible, limited or moderate effect on condom use.

LaCroix et al. identified three major limitations in the mass media studies included in their review (114). First, many of the studies focused on short-term effects of the interventions, so it might be difficult to gauge what the long-term effects would be. Second, many studies used multiple communication channels, making it difficult to determine the effects of individual interventions and assess which channels were more effective. Finally, the most problematic issue was the evaluation of these interventions: 89% of studies (64 out of 72) did not have a comparison group of any kind.

### **Reduction in sexual partners**

In addition to reporting an increase in condom use among the audience of *Twende na Wakati*, Vaughan et al. reported on a household survey that asked about sexual partner numbers. The study reported significant reductions: respondents who had adopted any HIV prevention method reported reducing their number of sexual partners (123). The decline from 1993 to 1995 was greater in the treatment arm (0.7 partners) than in the comparison arm (0.3 partners), which was statistically significant.

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<sup>4</sup> Cohen's  $d$  is a statistical effect size to quantify the magnitude of a phenomenon. Cohen's  $d$  of  $0.20 < d < 0.50$  indicates small effect size.

The multimedia One Love campaign in southern Africa was designed with the aim of reducing multiple and concurrent sexual partnerships. The campaign included a mix of television, radio, print and interpersonal communications in nine southern African countries. An interim evaluation of the campaign suggested that the campaign was associated with increased knowledge of partner reduction among men and women aged 16 to 55 years, decreased likelihood of increased numbers of partners among single women (compared to the preceding year) and reduced reports of transactional sex between men (129). Effects on other multiple partnership behaviours were not consistent, but the campaign was associated with an increase in condom use overall.

These results suggest that mass media programmes about multiple partnerships may have a dual role in HIV prevention in specific contexts, specifically settings with high HIV prevalence, high levels of multiple partnerships and gaps in personalized risk perception. Such programmes can increase risk perception of multiple partnerships, thereby influencing various HIV-related outcomes (such as use of condoms or HTS). In specific contexts, they can also directly change multiple partnership behaviours (130, 131).

### **Young women more likely to say “no” to sex, and sexually active young people more likely to stay with one partner**

Also included in the LaCroix et al. systematic review was a multichannel campaign for young people in Zimbabwe that was based on the Steps to Behaviour Change framework (121). The framework describes five stages through which people pass as they change their behaviour — knowledge, approval, intention, practice and advocacy—and it suggests that communication campaigns should identify the stage that their audience is at and focus activities accordingly.

In the case of young people aged 10 to 24 years in Zimbabwe, this was determined to be knowledge (understanding their own vulnerability to HIV infection and developing sexual negotiation skills) and approval of behaviour change (discussing sexual matters with family and peers). The campaign encouraged abstinence, reductions in partner numbers and condom use. Its slogans were “have self-control,” “value your body” and “respect yourself.” The campaign employed posters, leaflets, peer educators and a telephone hotline, as well as community events, radio programmes and theatre shows that inserted educational content into entertainment media (121).

The campaign’s impact was assessed through behaviours self-reported by young people during household surveys before and after the campaign, both in five communities where the campaign was conducted and two where it was not. There were few changes in knowledge or beliefs about gender roles, but young people in campaign areas were more likely than those living in non-campaign areas to discuss sexual issues with others (OR = 5.6;  $P < 0.001$ ), seek health services (OR = 7.6;  $P < 0.001$ ), say “no” to sex (OR = 2.5;  $P < 0.001$ ) or (among those with sexual experience) report sticking to one sexual partner (OR = 26.1;  $P < 0.001$ ) (121).

## The effect of mass media on knowledge related to HIV transmission and HIV prevention

### What does the evidence say about the effect of mass media on transmission and prevention knowledge?

- It increases in HIV transmission knowledge, especially in countries in Asia and countries that score lower on the Human Development Index.
- Longer campaigns result in larger increases in prevention knowledge.

There is consensus that disseminating knowledge is only one step in increasing uptake of HIV prevention services or adoption of safer sexual behaviours, and that it is insufficient on its own.

### Increase in HIV transmission and prevention knowledge

In the systematic review by LaCroix et al., secondary outcomes were also examined (114). These included accuracy of HIV transmission knowledge (e.g., HIV is not transmitted through a mosquito) and HIV prevention knowledge (e.g., condoms prevent sexual transmission of HIV). Increases in HIV transmission and prevention knowledge were largest in countries in Asia, while a statistically significant but small increase in transmission knowledge ( $d + = 0.30$ ; 95% CI: 0.18–0.41) was larger in settings that score lower on the Human Development Index and among respondents reporting greater exposure to the campaign. Increases in condom use ( $d + = 0.25$ , 95% CI: 0.18–0.21) and prevention knowledge ( $d + = 0.39$ ; 95% CI: 0.25–0.52) were larger for longer campaigns.

For example, Sood et al. conducted a longitudinal study from 2001 to 2003 in three northern Indian states (Delhi, Rajasthan and Uttar Pradesh) (132). The study measured improved knowledge about (and interpersonal communication on) HIV and AIDS, based on exposure to a mass media entertainment–education campaign, including television shows and radio spots.

By the end of the campaign, respondents exposed to the campaign had higher knowledge about STIs, HIV and AIDS than people who had not been exposed to the campaign. For instance, awareness of HIV and AIDS rose from 78% (in November 2001) to 99% in July 2003 ( $P < 0.01$ ). Knowledge about the routes of HIV transmission was significantly higher among individuals exposed to the campaign (96%) than those who were not exposed (approximately 68%), a statistically significant difference ( $P < 0.01$ ). There was limited evidence with regard to the campaign's effect on changes in condom-use behaviours (132).

Another study included in the LaCroix et al. review evaluated a web-based intervention for improving HIV- and AIDS-related knowledge in three counties in rural Yunnan, China (Dayao, Mouding and Nanhua) (132). Villages and schools in Nanhua received computers and logistical support, villages and schools in Mouding received intervention messages without the additional support, and Dayao functioned as a control county. The campaign's website included information on STIs and HIV and AIDS and was designed to meet the needs of the rural participants.

The effects of the campaign on knowledge were mixed. Nanhua showed significantly greater knowledge increases for most areas investigated than did Mouding and Dayao ( $P < 0.0001$



## Mass media interventions

and  $P < 0.0008$ , respectively). Correspondingly, at the one-year follow-up, students in Nanhua also showed the most significant mean increase in knowledge measured by a mean score (21.5%,  $P < 0.01$ ) compared to the other two counties (133).

Overall, available data suggest that mass media campaigns have an effect on HIV prevention-related knowledge, and that they remain relevant strategies for rapidly increasing knowledge in settings where large knowledge gaps about HIV prevention continue to exist.

## The effect of mass media on stigma

### What does the evidence say about the effect of mass media on stigma?

- It results in short-term reductions in stigma.

Few articles address the effect of mass media on stigma. Bekalu et al. analysed cross-sectional data pooled from the 2006 to 2011 DHS in 11 sub-Saharan African countries covering a study population of  $n = 204\,343$  to investigate the moderating effects of exposure to mass media on HIV-related stigma (134). Respondents were asked about their media use, and their attitudes towards people living with HIV were assessed through the following questions:

- If they would care for a relative who has AIDS in their own households.
- If they would want to keep a family member's HIV-positive status secret.
- If they would be willing to buy fresh vegetables from a market vendor who is HIV-positive.
- If they thought a female teacher who is HIV-positive but not sick with AIDS should be allowed to keep teaching.

The results suggest that while there is variation within countries, stigma appeared to be stronger in western and central African countries (Benin, Democratic Republic of the Congo, Mali, Niger, Nigeria and Sierra Leone) and less pronounced in eastern and southern African countries (Eswatini, Ethiopia, Lesotho, Uganda and Zambia). HIV-related stigma tends to be higher among people with low educational attainment ( $P < 0.001$ ), rural residents ( $P < 0.001$ ), people who have low levels of HIV knowledge ( $P < 0.001$ ) and people who do not personally know a person living with HIV ( $P < 0.001$ ). Media use was independently associated with reduced stigma. The results are consistent with other studies where HIV-related outcomes (such as HIV knowledge) are positively associated with the socioeconomic status of people in sub-Saharan Africa.

Kerr et al. tried to report the effectiveness of a behavioural HIV risk reduction strategy (the Focus on Youth programme) or a general health curriculum (the Promoting Health among Teens programme) in addressing stigma (135). While the Focus on Youth programme promoted risk reduction through increased HIV prevention, transmission knowledge and skill development in order to reduce risk behaviours, the Promoting Health among Teens programme focused on cardiovascular and cancer risk reduction through dietary adjustments, physical activity and substance use behaviours. In total, 1613 African-American adolescents from four cities participated in a randomized controlled trial, whereby two of the four cities received culturally-tailored TV- and radio-based media interventions. Study participants were either randomized to the Focus on Youth programme or to the Promoting Health among Teens programme, and depending on their location, they either received the media intervention or did not. The measure for stigma was associated with several stigma beliefs (e.g., people who have HIV should be ashamed or people who have HIV are dirty). The scale had six response options, ranging from 1 (strongly disagree) to 6 (strongly agree).

Focus on Youth media participants had lower stigma than Promoting Health among Teens participants after baseline for all follow-up intervals at three, six and 12 months. Focus on

## Mass media interventions

Youth programme participants in media cities had lower stigma scores at three months ( $P < 0.05$ ) and 12 months ( $P < 0.10$ ). The report seems to show that the mass media intervention had a modest benefit in addressing stigma among adolescents in the short term, but that it was no longer statistically significant after a year. The authors point out that stigma scores were statistically similar at baseline, but that participants in non-media cities demonstrated greater stigma at the three-month evaluation, and that the differences diminished at the six-month evaluation. In other words, the study seems to show that media facilitated short-term effects in stigma reduction, but that it did not maintain these effects for longer periods of time (135).

## The effect of mass media on HIV testing

### What does the evidence say about the effect of mass media on HIV testing?

- It has short-term effects that result in increases in HIV testing.

### Moderate increase in HIV testing

One review examining the use of mass media interventions for promoting HIV testing included two randomized controlled trials, three non-randomized controlled trials and nine interrupted time series (136). The study suggested that short-term effects (estimated mean = 5.487; 95% CI: 2.370–8.605) were possible, but that no long-term effects were seen (95% CI: -0.188–9.082).

### Increases in HIV testing among gay men and other men who have sex with men

An exploratory review of HIV prevention mass media campaigns focusing on gay men and other men who have sex with men found 16 reports from 12 studies (137). All studies were from high-income countries, and most examined multimedia interventions.

HIV testing rates or intention to test were reported by six studies (138–143). One study examined Gimme 5 Minutes, a multimedia HIV testing campaign aimed at increasing uptake of HIV testing among specific groups of gay men and other men who have sex with men in London through the use of peer images (141). The study compared control clinics to intervention clinics through a 12-week campaign using full-page advertisements in a free tabloid newspaper widely distributed to gay-friendly venues in London.

Overall, it reported a 4.5-fold overall increase ( $P < 0.003$ ) in gay men and other men who have sex with men who tested at the campaign clinics. Increases were proportionately greater in the specific subpopulations that were the focus of the study: testing increased 14 fold among men of south European origin ( $P < 0.001$ ), 6.5 fold among black men ( $P = 0.003$ ) and 9.5 fold among men under the age of 25 ( $P < 0.001$ ). These findings suggest that gay men and other men who have sex with men respond most strongly to images of people chosen to represent their demographic background.

Including detailed information about means to access HTS may contribute to the success of mass media interventions that focus on HIV testing.

## The effect of social marketing using mass media communications

### What does the evidence say about social marketing?

- It has a short-term effect on increased condom use.
- It leads to a short-term increase in HIV testing among gay men and other men who have sex with men.
- There is no increase in STI testing.

### Short-term effect on increased condom use

Advertising and promotional campaigns are key aspects of the social marketing of male condoms, female condoms, HTS and VMMC. Social marketing applies commercial marketing principles to achieve behavioural goals for a social good. By doing so, it aims to increase demand for a product while simultaneously ensuring that it is more affordable and readily available, with the result that the product is used more frequently and has an impact on HIV infection and other health outcomes. Moreover, communication used to raise awareness of a product as part of social marketing may also raise awareness of its health benefits and promote behaviour change.

There is a lack of reliable evidence on the impact of social marketing on HIV-related behaviour. A meta-analysis of condom social marketing in developing countries could not identify any randomized controlled trials; it only included six studies conducted between 1990 and 2010 (98). The six interventions—one in India and five in sub-Saharan Africa—focused on groups that included sex work clients, urban youth, male miners and the general population. Similar in design, all six interventions were sponsored by Population Services International, a leading condom social marketer, which implies that this evidence primarily reflects research from one implementer.

In these social marketing campaigns, mass media was used extensively, often supplemented with community-based outreach efforts such as peer education and promotional events. A meta-analysis showed that individuals exposed to condom social marketing were approximately twice as likely to use a condom as those who were not exposed. The effect on condom use was moderately greater for sex with casual partners (98). Similarly, a meta-analysis of 47 DHS conducted between 2005 and 2015 found an association between mass media communication and contraceptive use in 31 sub-Saharan African countries. The pooled effect indicated that across countries and surveys, exposure to communication programmes on family planning through mass media was associated with a 93% (OR = 1.93; 95% CI: 1.75–2.14) increase in the odds of contraceptive use compared to non-exposure (99).

### No quality evidence on social marketing of voluntary medical male circumcision

Social marketing also has been used for VMMC, but no data on effective approaches are yet available. Given the different motivators and barriers to the uptake of circumcision in different demographic groups, demand creation messages and approaches to stimulate demand must

be tailored to each setting (144). Interventions need to appeal to young men (aged 15 to 29 years) who are at greatest risk of infection or who will soon age into the years with greatest risk of infection in countries with high HIV prevalence and low rates of male circumcision. In the absence of empirical data, however, some authors suggest that social marketing of VMMC should include messages that go beyond HIV prevention: for instance, they could address the hygiene benefits of VMMC, emphasize its modernity or highlight the preferences of sexual partners for circumcised men (144).

### **Short-term effect on increased HIV testing among gay men and other men who have sex with men**

A review assessing the impact of social marketing interventions on the uptake of HIV and STI testing among gay men and other men who have sex with men and transgender women found three serial, cross-sectional pretest/post-test study designs (145): one with a control group (141) and two without (146, 147). The reviewed interventions used multiple communication channels (e.g., television, radio and print material).

The primary outcome measure was HIV infection; secondary outcome measures were STI infection and quality of life. No studies were from developing countries. All studies employed weak designs, resulting in low quality and high risk of bias. The most rigorous study included a control group and concluded that social marketing had increased the HIV testing uptake among gay men and other men who have sex with men by 4.5 fold ( $P < 0.001$ ) (141). Statistical pooling of the results presented in two studies indicated that multimedia social marketing campaigns had a significant impact on HIV testing uptake when compared to preintervention testing levels (OR = 1.58; 95% CI: 1.40–1.77) (141, 145, 146).

## The effect of Internet-based and digital media interventions

### What does the evidence say about the effect of Internet-based and digital media interventions?

- They result in delayed initiation of sex for youth.
- They lead to more open discussion of HIV status among gay men and other men who have sex with men.

Interest in the opportunities offered by new information technologies grows yearly. Social and behaviour change communication can take advantage of new delivery strategies, and it may be delivered electronically through a number of means:

- Online videos, quizzes, exercises and games.
- Interventions in chat rooms and on social networking websites (including Facebook and Twitter).
- Text messaging systems.

These delivery strategies may be particularly attractive to younger audiences, who often are the groups most in need of information and persuasion for HIV prevention.

While social media and other web-based technologies have transformed the way that people interact with media, the studies currently available do not yet allow for the systematic assessment of innovative uses of new media for HIV prevention. Websites and phone applications that connect people who share interests into social networks may offer great potential, but there is little evidence of their effectiveness. For example, although websites used by gay men and other men who have sex with men to meet sexual partners often are used by outreach workers to make contact and offer one-on-one advice (including in developing countries), there is little evidence of the use of these media to deliver highly focused behaviour change communication.

### Delayed initiation of sex for youth

The increase in adolescents using the Internet, text messaging and social networking sites for communication offers a new way for health education and promotion practitioners to expand their programmes. Guse et al. summarized evidence from 10 articles on the effectiveness of new digital media-based sexual health interventions (e.g., web-based interventions, text messaging and social networking) for adolescents aged 13 to 24 years (148).

One study in the United States showed significant impact on the delayed initiation of sex, with 10 urban Texas high schools randomly assigned to the control or experimental condition (149). The intervention integrated group-based classroom activity with personal journaling and computer- and Internet-based interventions for pregnancy, STIs and HIV prevention. It found that students in the experimental school were less likely to initiate sexual activity between pretest and post-test, and that students in the control school were nearly 1.29 times more likely to initiate sexual activity than were students exposed to the intervention (absolute risk reduction [ARR] = 1.29; 95% CI: 1.02–1.64;  $P < 0.05$ ) (149).

### **More open discussion of HIV status among gay men and other men who have sex with men**

A systematic review described 13 interventions using eHealth interventions for HIV prevention in gay men and other men who have sex with men engaging in high-risk behaviours (150). Interventions included web-based education modules, text messaging, short message services (SMS), chat rooms and social networking.

In one study in the United States, 3092 men who had responded to online advertising were randomized to: (a) watch a nine-minute video drama about sexual risks; (b) watch a five-minute factual video; (c) read a web page on prevention topics; or (d) receive no intervention (151). At a two-month follow-up—which was completed by 53% of the participants—men in the video conditions but not in the web page condition were significantly more likely to have fully disclosed their serostatus to their last sexual partner than were men in the control condition (OR = 1.32; 95% CI: 1.01–1.74). HIV-negative men in the video conditions (OR = 0.70; 95% CI: 0.54–0.91) and the web page condition (OR = 0.43; 95% CI: 0.25–0.72) also reported significantly reduced unprotected anal intercourse at two-month follow-up.



## Operational considerations

While the social marketing of condoms and other commodities has sometimes applied audience segmentation, most mass media campaigns conducted in developing countries have focused on members of the general public, or more narrowly on young people, but not on other populations at high risk of HIV infection. Political opposition and cultural sensitivities have frequently hindered the implementation of behaviour change communication that frankly addresses sexuality or is pitched to key populations.

Social and behaviour change communication using mass media can communicate with large audiences at a low cost per person reached. It has proven effective in terms of raising awareness and improving basic knowledge—and, to some degree, in increasing protective behaviours—but it does not seem to achieve more complex outcomes, such as developing interpersonal skills. Most studies represented here yielded mixed results in terms of the effectiveness of mass media campaigns to change HIV-related behaviours. The systematic reviews by Bertrand et al. and Noar et al. reported statistical significance, but effect sizes were small to moderate and study designs were weak (110, 116). However, the review by LaCroix et al., which evaluated 54 reports with 72 evaluations, showed campaigns associated with increases in condom use and knowledge of HIV transmission and prevention (115). These findings suggest that mass media could be more effective with longer campaigns that occur in places that have greater need.

More research—including on evaluation of media and communication campaigns—is needed to detect their full effects on HIV preventive behaviour, especially protective skills. In addition, as the emphasis of HIV efforts shifts to treatment and biomedical prevention, the potential role of mass media may be overlooked. An informed and aware population, however, is essential for the uptake and adherent use of these new approaches. Based on these approaches, mass media may have an important but as yet unappreciated role to play in creating the conditions for successful HIV campaigns.

## **Conclusion: mass media interventions**

Documented effects of mass media interventions to prevent new HIV infections vary. To date, no evidence exists indicating reduced HIV incidence following exposure to mass media interventions. While they play a role in increasing knowledge of HIV prevention, such interventions only have a short-term effect on eliminating HIV-related stigma and increasing HIV testing. The effect on condom use varies, with longer campaigns indicating more promising results. Advertising and promotional campaigns may contribute to increased HIV testing uptake and condom use in the short-term, yet reliable evidence on the impact of social marketing is currently limited. Some reductions in the number of sexual partners are documented, particularly in high-prevalence settings, but it is not clear how long such reductions would be sustained. Use of new media (such as Internet and digital communication channels) suggests a delay of sexual debut among youth and more open discussions of HIV status among gay men and other men who have sex with men. Overall, the effectiveness of mass media interventions on HIV prevention behaviour remains difficult to measure given multiple communication channels used in the interventions, challenges in evaluating their individual effects and other methodological limitations in study designs used to date.

# 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.

## 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

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.

- 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

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

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.

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.

## Individual and group interventions for social and behaviour change

- 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).

## 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.

## Individual and group interventions for social and behaviour change

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.

## 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).

## 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.



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.

## **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.

## **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.

# HIV prevention education and comprehensive sexuality education

## Key points

- **In-school behavioural interventions can improve knowledge, attitudes and skills.**
- **There is very limited evidence of school-based programmes having a positive impact on HIV and STI incidence.**
- **Abstinence-based school programmes have not been found to delay sexual debut in lower-income countries or to reduce HIV incidence in higher-income countries.**
- **There is limited evidence of a positive effect of peer education outside of schools on the use of sterile injecting equipment among people who use drugs, but there is no effect on any outcome when peer education is used in schools.**
- **There is a lack of evidence about the sustained effect of peer education on HIV and STI incidence.**

This section summarizes the effects of HIV prevention education and comprehensive sexuality education. This includes a range of school-based prevention approaches, as well as other peer education programmes that are partially conducted in schools.

School-based health and sexuality education can have a range of outcomes beyond HIV prevention, including sexual and reproductive health knowledge and attitudes. Those outcomes, however, are beyond the scope of this compendium.

For the sake of readability, all peer education approaches are covered in this section, although out-of-school peer education also could have been classified as individual and group communication activities (and thus covered under the section “Individual and group interventions for social and behaviour change”).

## School-based HIV prevention and comprehensive sexuality education

### What does the evidence say about the effect of school-based HIV prevention and comprehensive sexuality education?

- School-based interventions can have an effect on knowledge of (and attitudes towards) sexual and reproductive health and HIV prevention. In some cases, they also can have an effect on self-reported behaviours.
- Positive long-term effects were mostly found for knowledge.
- Few studies measured biological outcomes. Of the ones that did, most did not find significant effects.
- More successful interventions tend to be delivered by trained adult facilitators, have multiple sessions, include skill- and knowledge-building activities, and consider social context.

### Characteristics of successful programmes

There is a relatively large evidence base for HIV prevention in schools. A 2013 review by the United Nations Children's Fund (UNICEF) summarized the findings of 18 previous systematic reviews and meta-analyses (181). It found that while in-school interventions can be effective in terms of knowledge, attitudes and skills, the few trials that have evaluated their impact on biological outcomes have largely found no significant effects. The evidence for reported behaviours was mixed and needs to be interpreted with consideration for the limitations of self-reporting of outcomes and small to moderate effect sizes, but it suggests that key characteristics of the more successful interventions included the following:

- Delivery by trained adult facilitators.
- Multisession programmes.
- Curricula that include skill- and knowledge-building activities.
- Programmes tailored to the social context.

Programmes led by peers (e.g., other young people) were not generally effective in school. This will be discussed in greater depth below (under "Peer-based interventions").

### Abstinence focus or comprehensive sexuality education

Adolescent sexuality is a politically sensitive issue in many settings, and there often is pressure for in-school programmes to emphasize abstinence or delay of sexual debut. However, the 2013 UNICEF review reported that most abstinence-only programmes were found to be ineffective, and that there was no evidence that other programmes hastened sexual debut or increased sexual activity. Moreover, a systematic review of abstinence-only programmes in high-income countries found no evidence that the approach prevented new HIV infections among young people or changed their sexual behaviour (182). Programmes

that offer abstinence as an option for reducing risk—alongside condoms and other strategies—were more effective (183).

### **Long-term effects limited to knowledge**

One rigorously evaluated example of a programme for young people that emphasized delaying sexual debut and reducing partner numbers was MEMA kwa Vijana (good things for young people). Set in rural areas of the United Republic of Tanzania, MEMA kwa Vijana was based on social learning theory and included the following (184):

- Teacher-led, peer-assisted sexual and reproductive health education for school pupils aged 12 to 15 years.
- Efforts to make sexual and reproductive health services more acceptable to young people.
- Condom promotion and distribution by young people.
- Community mobilization activities.

Evaluation showed that implementation and coverage of the programme was good: three years after recruitment, there were improvements in knowledge, sexual attitudes and some reported sexual behaviours, especially among males (184). However, the programme had no impact on HIV incidence or the prevalence of other STIs.

Since it could be hypothesized that programmes for adolescents and efforts to change community norms might only have an impact on such outcomes several years later, further evaluation of the MEMA kwa Vijana programme was conducted nine years after its first implementation. Young people who were of school age when it was provided were interviewed, and it was found that knowledge continued to be higher in intervention communities. Despite this, the observed differences in sexual behaviour were modest and the programme had no impact on rates of HIV or STIs (185).

The results therefore challenge the belief that positive changes in knowledge and reported attitudes and behaviours will eventually lead to a significant reduction in HIV, STIs and unwanted pregnancies. Qualitative research on MEMA kwa Vijana did highlight social norms and structural barriers that the programme did not sufficiently engage and modify: (a) the young people in the programme were not always in a position to use the knowledge and skills they were taught; (b), there was considerable peer pressure to be sexually active; and (c) there was widespread acceptance of relationships between older males and younger females (186).

### **Effects on knowledge and sexual behaviour of young people**

Michielsen et al. systematically assessed the effectiveness of HIV prevention interventions in changing sexual behaviour of young people (aged 10 to 25 years) in sub-Saharan Africa (78). Included in the review were 31 studies reporting on 28 interventions. In meta-analysis, effects on condom use at last sex only increased among males [RR = 1.46; 95% CI: 1.31–1.64], with little heterogeneity in these effect measures.

A school-based campaign for young people (particularly women) that discussed high HIV levels among adult men and the risk of unprotected sex was evaluated in a randomized controlled trial in western Kenya (187). It provided a simple session informing young women

about HIV prevalence among male partners of different ages, the implications for HIV risk for young women and basic HIV prevention methods.

The intervention reduced teenage pregnancy by 28% and teenage pregnancy from an older partner by more than 60%. Reduced teenage pregnancy in this context was used as an objective proxy for a decrease in unprotected sex and HIV-related risk reduction (187). This suggests that the specific risk information component applied in the intervention campaign that had previously not been communicated to young women through the national HIV and AIDS curriculum for schools (e.g., information on HIV prevalence among male partners of different ages, implications for HIV risk for young women and risk reduction strategies) was sufficient to help them choose fewer contacts with older partners. It also enabled them to have more condom-protected sex with same-age partners.

Another systematic review, this time in 2014 by Fonner et al., investigated the efficacy of school-based HIV prevention and sex education interventions for changing HIV-related knowledge and risk behaviours in low- and middle-income countries (188). The review included 64 interventions presented in 63 articles. Nine interventions were either abstinence-only or emphasized abstinence (also known as the “abstinence-plus approach”); the remaining 55 interventions provided comprehensive sex education. Twenty-one studies measured condom use as a primary outcome, but only 13 could be included in a meta-analysis. Four articles with condom use as a primary outcome were included in both this review and the Michielsen et al. review (78). Fonner synthesized condom interventions (condom use at last sex, 100% condom use and consistent condom use) and reported that condom use was significantly higher among intervention participants (OR = 1.34; 95% CI: 1.18–1.52;  $P < 0.001$ ) (187).

## Peer-based interventions

### What does the evidence say about peer-based interventions?

- There is no effect on any outcome when peer education is used in schools.
- There is limited evidence of a positive effect from peer education on the use of non-sterile injecting equipment among people who use drugs.
- There is no evidence of a sustained effect from peer education on HIV and STI incidence.

Peer education—where individuals are trained to deliver HIV prevention interventions to people like them who are in similar situations—is based on the idea that peers are best placed to reach socially marginalized groups who are vulnerable to HIV. This approach builds on the assumption that health professionals may be less able to reach these groups, who may be unwilling to discuss issues of sexuality or drug use with them. Due to their insider status, however, peers are seen as the best communicators of knowledge and skills.

### Interventions working with peer educators

A review of 30 studies of peer-based prevention interventions in developing countries published before 2006 found that peer-based interventions were significantly associated with increased HIV knowledge (OR = 2.28; 95% CI: 1.88–2.75), reduced use of non-sterile injecting equipment among people who inject drugs (OR = 0.37; 95% CI: 0.20–0.67) and increased condom use (OR = 1.92; 95% CI: 1.59–2.33) (189). However, they had no significant effect on STIs.

Moreover, study designs were generally weak: for example, the review did not identify any randomized studies that assessed a biological outcome (either HIV or STIs). A number of additional studies were identified in a later review, but it also found that positive effects (in the form of self-reported attitudes and behaviour) were more frequently reported than changes in biological outcomes (190).

Similarly, a review of European studies of peer-based HIV prevention interventions for young people found no clear evidence that peer education had an impact on knowledge, behaviour, STIs or unintended pregnancy (191). A large study in the United Kingdom with a total follow-up period of seven years found few differences in outcomes among those receiving school sex education from peers and those receiving it from teachers (192).

### Interventions working with early adopters

Another large, multi-country trial that involved peer education and community mobilization was Project Accept. This study randomized 48 communities in South Africa, Thailand, the United Republic of Tanzania and Zimbabwe to: (a) a wide-ranging package of activities that focused on the whole community; or (b) standard clinic-based services (193). Based on diffusion of innovation theory which suggests that innovations and changes often originate with an influential subset of the population known as “opinion leaders”, the study sought to engage influential early adopters to promote HIV testing and status disclosure through multiple activities, including training sessions, meetings, the distribution of printed materials



and informal discussions with friends and colleagues. In addition, greater access to HTC was offered through mobile units in community settings (e.g., marketplaces and transport venues), as were a package of post-test support services. The latter aimed to improve the quality of life of people tested for HIV, regardless of their HIV status, and it addressed issues such as safer sex, disclosure, stigma, mental health and peer support.

At the end of the three-year intervention period, a post-intervention behavioural survey was conducted with 56 683 people aged 18 to 32 years (the peak age range for HIV infection in these settings). Importantly, participants had not necessarily had any prior contact with the intervention; they simply lived in a community where it had been provided. The evaluation therefore tested whether the innovation had diffused through the communities.

HIV incidence, estimated through anonymous testing during the behavioural survey, was 1.52% per year in intervention communities, compared to 1.81% in the control communities (193). The RR of infection was 14% lower, just missing statistical significance (RR = 0.86; 95% CI: 0.73–1.02). The intervention had the greatest effect on older women within the sample (those aged 25 to 32 years): incidence in this group was 30% lower (RR = 0.70; 95% CI: 0.54–0.90).

Disappointingly, however, HIV infections did not fall among younger women or men aged 18 to 24 years, and there were no differences in terms of condom use (193). Individuals living with HIV in the intervention communities did report fewer sexual partners and were less likely to have multiple partners. These effects were most noticeable among men.

### **Peer education for adolescents in- and out-of-school (combined)**

Another programme in Zimbabwe combined the following:

- Peer education for adolescents, both in- and out-of-school.
- Work to make sexual and reproductive health services more acceptable to young people.
- A programme for parents and community stakeholders that aimed to create a more supportive environment for adolescents and improve communication between parents and children (194).

Qualitative and process evaluation suggested that the intervention was popular; the peer educators (who were a few years older) were described as an inspiration to the young people.

Four years later, the evaluation found modest improvements in knowledge and attitudes among young men and women in intervention communities, but no impact on self-reported sexual behaviour (194). There also was no impact on biological outcomes (the prevalence of HIV, HSV-2 or current pregnancy), but women were less likely to report ever having been pregnant.

### **Peer education for other populations**

Peer-based interventions can also help reach people who inject drugs, a group that otherwise may be hard to reach. In a review of systematic reviews, three core and two supplementary reviews of injecting equipment interventions were found (195). In the 30 peer intervention studies included in these reviews, researchers reported a 63% reduction in the use of non-sterile equipment (OR = 0.37; 95% CI: 0.20–0.67) and an almost doubling of the use of condoms (OR = 1.92; 95% CI: 1.59–2.33).

Despite these effects on reported behaviours, there was no clear evidence of an effect on HIV transmission. The authors concluded that the evidence for the effectiveness of needle and syringe programmes (NSP) in preventing HIV transmission is tentative, and that ecological studies have more consistently suggested a positive impact of NSP on hepatitis C and HIV than individual-level observational studies have done. The authors highlight the limitations of the designs of studies that have been undertaken as a likely cause of the inability to detect the effect of NSP on biological outcomes, especially in the case of HIV (195). Studies have been affected by inadequate measurement of coverage or intensity of the specific interventions (i.e., the amount of injecting equipment provided), and many studies showed a limited number of needles or syringes supplied, which was insufficient to meet client demand. They also may be susceptible to a range of biases, including self-selection and frequently unclear distinctions between exposure and non-exposure (e.g., unexposed groups may access clean needles and syringes outside of the study sites, while exposed groups may maintain high-risk injecting practices). Finally, the authors suggest that studies have not had large enough samples and have not been adequately powered to find true and statistically significant biological effects.

## Operational considerations

### Issues to consider when designing school-based programmes

There are some additional considerations when designing school-based HIV prevention programmes within (or complemented by) comprehensive sexuality education.

- To be effective, comprehensive sexuality education content must respond appropriately to the specific context and needs of young people. This adaptability is central to culturally relevant programming, and it includes understanding the messages (sometimes positive and sometimes negative) that cultures convey about gender, sex and sexuality.
- Curricula-based education was shown to be more effective when it addresses gender norms and power, including how power inequalities in relationships influence the ability of individuals to protect their health (196).
- While programmes using adult-led facilitation have been found to be more successful in some studies, teacher training is required to ensure that comprehensive sexuality education is provided in a safe environment.
- School-based interventions on the risk of age-disparate sex could be more effective for adolescent girls aged 10 to 19 years (among whom HIV prevalence is still low) than among young women aged 20 to 24 years. Model analysis showed that if many young women who are already HIV-positive replaced older partners with young male partners, HIV prevalence would rise among younger men, an outcome that could reduce the population-level benefits of such a campaign (197). It also is important to ensure that interventions are not replicating stereotypes of so-called sugar daddies, as very large age differences (those exceeding 15 years) are rare (198). Evidence shows that sexual risk behaviour is mainly present in partnerships with both age and economic asymmetries. To avoid stereotyping partnerships with large age differences, economic relations in such partnerships should be assessed in detail, as should their frequency and what effect they may have on sexual risk behaviour.

### Increased school attendance and its effect on HIV prevention

Depending on baseline levels of school attendance and other contextual factors, increased school attendance itself could potentially reduce the risk of adolescent girls acquiring HIV in three different ways.

- Being in school can be protective and reduce HIV by reducing early marriage and high-risk sexual partnerships. In Botswana, for instance, each additional year of secondary schooling induced by a secondary school reform led to an absolute reduction of 8.1% in the cumulative risk of HIV infection ( $P = 0.008$ ) relative to a baseline prevalence of 25.6% (199). The authors controlled for a range of factors, including potential confounders, and they suggest that there is a causal relationship. Similarly, a study in South Africa found that the risk of acquiring HIV for women who stayed in school and attended more often was reduced by two thirds (200).
- In contexts with advanced HIV epidemics, higher educational attainment is itself associated with reduced HIV prevalence in life and with safer behaviours (201).

## HIV prevention education and comprehensive sexuality education

- Keeping girls in school implies that adolescent girls can access HIV prevention information in the context of comprehensive sexuality education or school-based campaigns.

Whether programmatic efforts to increase school attendance will have these types of effects on HIV in a specific setting, however, will depend on the specific country and local context. In some countries, momentum for increasing access to in-school education and realizing gender parity in education may have been generated in the education sector itself. In settings with low access to secondary education for adolescent girls, high HIV incidence and limited momentum for keeping girls in school, HIV advocacy needs to support efforts to enhance access to secondary education for adolescent girls. Given the greater vulnerability that orphaned adolescents have to HIV, advocacy also is required to achieve equitable access to schooling for them. These actions will require alliances with partners in the education sector and with parental groups, and for concerted investment cases to be presented to ministries of finance and decentralized local authorities.

## **Conclusion: HIV prevention and comprehensive sexuality education**

The potential of school-based HIV prevention and comprehensive sexuality education lies in the opportunity to achieve high coverage in a short period of time. That reach also reflects rising levels of school attendance in many parts of the world since the 1990s (including sub-Saharan Africa). When they integrate HIV prevention communication into the curriculum and deliver it through existing systems, schools offer a cost-efficient opportunity to further increase HIV knowledge (including disseminating new knowledge) and to build HIV prevention skills across young populations, both in high HIV incidence communities and beyond. Due to mixed results and moderate effect sizes, however, school-based programmes on their own cannot be relied on to reduce HIV incidence among young people at the population level.

# Community-wide interventions for social and behaviour change

## Key points

- In a large HIV prevention programme for sex workers and their clients in India, community mobilization and empowerment approaches were associated with increased condom use by the clients of sex workers, a decline in HIV prevalence among sex workers in some areas and a decline in HIV prevalence among pregnant women in intervention areas.
- Initial studies showed that conditional or unconditional cash transfers reduce HIV and STI prevalence and some HIV risk behaviours, and that such transfers may represent a promising behavioural intervention with growing evidence of effectiveness. However, subsequent trials have not found HIV incidence reductions, and further research is needed.
- Although most cash transfer programmes have been conditional on school attendance or testing negative for some STIs, there is evidence that unconditional cash transfers for girls of school age can also work to reduce HIV prevalence.

Community-wide HIV prevention interventions vary considerably in their rationale and form. Most are informed by an understanding that an individual's health behaviours are subject to the influence of community members and leaders, and to social norms and structural factors. They address people not just as individuals, but also as connected members of groups, networks and communities who interact and have relationships with each other.

## Community empowerment and mobilization approaches that support behaviour change

### What does the evidence say about community mobilization and empowerment approaches?

- Community mobilization and empowerment approaches have been associated with increased condom use by clients of sex workers, a decline in HIV prevalence among sex workers in some areas and a decline in HIV prevalence among pregnant women.

Some (but not all) theories of individual behaviour change—such as social cognitive theory and the theory of planned behaviour—recognize that an individual's perception of the social environment can affect his or her health behaviours. For example, beliefs about what behaviours are typical or whether peers would approve of a specific behaviour influence individual choices. Interventions may therefore seek to bring issues of gender, sexuality and HIV into the public realm where they can be discussed and debated. Highly visible programmes may raise awareness of HIV within a community, build support for altered expectations of behaviour and create demand for HIV prevention services.

Community mobilization approaches seek to create and harness the agency of groups that are highly vulnerable to HIV, enabling them to build a collective response through their full participation in the design, implementation and leadership of health programmes. In addition to making programmes more relevant, acceptable and effective, it is argued that community mobilization approaches help to develop a stronger sense of agency within marginalized groups. Individuals with wider networks and deeper trust relationships may have a stronger sense of self-confidence, self-esteem and hope, and they may be able to exert greater control over decision-making.

Rather than remaining focused on problems, programmes within a community mobilization approach may seek to build upon and strengthen the assets (strengths, skills, resources and relationships) of a particular group. Community mobilization also may involve building supportive relationships and partnerships with powerful groups outside the community in order to address structural barriers (202). Programmes often combine several approaches, and community interventions may focus on a particular geographical area or social institution, such as a district, peri-urban area or workplace. Identification of priority locations for interventions should be based on an analysis of epidemiological and behavioural trends (203).

### Community empowerment and mobilization for disadvantaged groups

Community empowerment and mobilization interventions have often been developed through work with disempowered groups like sex workers. These interventions aim to enable sex workers to have greater control over the environmental factors (such as working conditions) that make them vulnerable to HIV. While these interventions are strongly recommended by WHO and UNAIDS, this was done on the basis of values, an analysis of the balance of potential benefits and harms, and limited observational data (204).

A systematic review identified 10 studies that included community empowerment and mobilization interventions for sex workers; of those, only one was a randomized controlled

trial (204). The data suggest that interventions reduce the prevalence of HIV and other STIs, and that they increase the use of condoms among sex workers and their clients. Another systematic review did not identify any randomized studies reporting positive effects on consistent condom use or HIV knowledge among sex workers, nor did it find any studies that assessed HIV incidence (179).

### **Working with popular opinion leaders**

A group randomized trial in five countries that featured follow-up over two years assessed the impact of training and engaging the popular opinion leaders of key populations at high risk to personally endorse HIV prevention (205). The programme, based on an intervention first delivered to gay men and other men who have sex with men in the United States (206), was grounded in the theory of the diffusion of innovation (207). The trial was delivered in five countries with diverse epidemiological situations (China, India, Peru, the Russian Federation and Zimbabwe) and different populations that are vulnerable to infection. For example, the intervention was delivered to groups of market workers in China and to alcohol drinkers in India. Popular opinion leaders from each group receiving the intervention were trained to: (a) provide knowledge about HIV, AIDS and STIs and risk reduction steps; (b) suggest strategies that peers could use to reduce risk; (c) instil confidence about using condoms; and (d) personally endorse behaviour change (205).

In each country, ethnographic assessments helped identify appropriate settings, populations, and social and cultural factors that the programme needed to address. The specific characteristics of popular opinion leaders (such as age, gender or life experience) also were identified (208). While the programme was developed by foreign experts, it was delivered by locals, and the main activities of popular opinion leaders were standardized.

The trial's results were disappointing in terms of intervention effects: the community-wide intervention did not result in greater declines in unprotected sex with casual partners among intervention groups, and there were no differences in the incidence of HIV and other STIs between the intervention and control groups (205). At the same time, significant declines in unprotected sex with casual partners were observed in both intervention and control groups. It is worth considering whether a more flexible and open-ended project would have led to different social processes and effects (although it would have made the outcomes more difficult to evaluate) (209).

Another explanation for the lack of difference between the two arms in the trial is that control groups received more extensive prevention interventions than were normally available in the trial settings. Comparing the community-wide intervention with the basic prevention services available to control groups in communities might have resulted in more significant differences between the two arms. The assessment procedures of the trial (detailed self-review of risk behaviour and HIV risk reduction counselling prior to HIV and STI testing) could have had an impact on behaviour. This is a common problem in HIV prevention trials (including trials of biomedical interventions), but in this trial, the reduction in self-reported risk behaviour over time in both trial arms was particularly noticeable (210).



## Economic incentives supporting behaviour change

### What does the evidence say about the effects of economic incentives on behaviour and HIV incidence?

- Some studies showed that conditional or unconditional cash transfers were effective in reducing HIV and STI prevalence and some HIV risk behaviours.
- Subsequent larger, well-controlled trials have not replicated the earlier promising results mentioned above, suggesting that the effect of economic incentives on HIV prevention-related outcomes is specific to a context.
- Further research is needed to establish the effect of economic incentives on sexual behaviour and HIV incidence.

In many settings where HIV is transmitted heterosexually, vulnerability to HIV is associated with gender inequality, economic insecurity and a lack of social capital. The combination of these factors makes women more dependent on men, more likely to have sexual relationships that are partly motivated by economic gain (either transactional sex or sex work), and more likely to have older partners (who, in turn, are more likely to be HIV-positive). Sexual relationships may help an individual broaden her social network and allow access to new social and economic opportunities, while power imbalances can make it challenging for women to insist on monogamy, discuss condom use, refuse sex or leave a high-risk relationship.

Structural interventions—such as changes to inheritance and land rights, marriage and divorce laws, and economic policy—can attempt to modify these factors (211, 212). There is a wealth of literature on the effect of economic incentives on various health and social outcomes. Cash and other social transfers have already been widely used in Latin America and sub-Saharan Africa to alleviate poverty, promote participation in education and encourage healthy behaviours (213).

In relation to HIV prevention, economic incentives aim to affect the sexual or HIV service-related behaviour of specific individuals and clearly defined groups. Cash payments provided without having to undergo certain activities may reduce financial barriers to school attendance, which is significant, because education, particularly for girls, is instrumental in achieving multiple development objectives, including a reduction in the risk of acquiring HIV. Such cash payments are known as “unconditional cash transfers.”

Alternatively, cash payments may only be provided once participants have undertaken a particular activity (such as girls attending school). These payments are known as “conditional cash transfers,” and they may be adapted to be conditional on individuals taking specific actions related to health. For example, payments might be made when an individual completes a course of immunization, takes an HIV test or abstains from drug use (assessed by urine testing).

The wider effects of structural interventions (including economic empowerment) will be discussed in a separate compendium. The focus of this section is on the effects of economic incentives on sexual behaviour.

## Evidence of effectiveness of economic incentives

A 2012 systematic review of conditional cash transfer programmes in low- and middle-income countries concluded that they may be an effective way to increase the uptake of prevention services and improve some health outcomes (214). This review identified 16 relevant studies of interventions using cash payments (including six that were still underway) that had the aim of preventing the sexual transmission of HIV. Almost all were randomized controlled trials conducted with adolescents in developing countries.

Of 10 studies that reported on HIV behaviours, nine found a positive impact. However, most were small studies, and only one large randomized controlled trial with results on HIV outcomes had been published in a peer-reviewed journal in 2012. This was a cluster randomized trial in the Zomba district of Malawi, an area where both HIV prevalence and school dropout rates were high among adolescent girls (215). In the intervention arms of the trial, financial incentives were offered to households with a total of 1289 unmarried school girls aged 13 to 22 years. Some of the payments were conditional on regular school attendance, while others were unconditional and provided regardless of school attendance. Some payments were made to the parents and some were made directly to the girls. There was no intervention in the control arm.

Eighteen months after the programme began, HIV prevalence was 1.2% among those receiving payments compared to 3.0% in the control group, a reduction of 64% (adjusted OR = 0.36; 95% CI: 0.14–0.91). Similarly, the prevalence of HSV-2 was 76% lower (215).

Importantly, no significant differences in health outcomes were detected between those offered conditional or unconditional payments. This raises the question of whether the programme worked not because it incentivized particular behaviours, but because it reduced poverty. Girls receiving the payments reported fewer sexual acts and were less likely to have older partners, and it was hypothesized that the additional income may have made them less dependent on sex as a way of obtaining essential resources (215).

Cash transfer programmes may not necessarily need to have HIV prevention objectives in mind to be beneficial. For example, cash transfers for the caregivers of orphans and vulnerable children in Kenya helped keep young people in school. Four years after the Kenyan programme, a comparison of households (both those randomized to receive the cash transfer and those randomized to a control group) showed that the cash transfers were associated with reduced odds of sexual debut (adjusted OR = 0.69; 95% CI: 0.53–0.89) (216).

In South Africa, a national longitudinal study of an existing publicly funded cash grant programme showed similar results. Adolescent girls in the more than 3000 families receiving regular “child support grants” or “foster child grants” showed a 53% reduction in incidence of transactional sex and a 71% reduction in age-disparate sex (217). However, cash transfers did not reduce multiple partners, unprotected sex or sex while drunk or using drugs.

Despite these results, providing cash for school attendance in order to prevent HIV infection will only be relevant in settings where there are financial barriers to schooling and where schooling can be shown to be protective against HIV. For example, two large-scale, carefully conducted randomized controlled trials in South Africa attempted to keep young people in school through the payment of conditional cash transfers. In the first study, no effect of the cash transfers was detected, as nearly identical proportions of students remained in school in the intervention and control communities (218). The second study (which has not yet been

published in a peer-reviewed journal) used conditional cash transfers tied to HIV testing, participation in life skills training and academic attainment. While the intervention was effective in decreasing HSV-2 incidence in the intervention group, no difference in HIV incidence was found (219). One additional large trial of conditional cash transfers, the Iringa Combination HIV Prevention Trial, has yet to report results.

These large, well-designed randomized studies have not confirmed findings related to the HIV prevalence reduction of the Malawi randomized controlled trial (215); instead, they illustrate that the effect of economic incentives is likely contextual. Effects are likely smaller in contexts where other social transfers already exist (like in South Africa), and cash transfers are therefore less likely to affect school attendance.

Some trials have directly incentivized safer sexual behaviour by making payments conditional on testing negative for curable STIs. In the United Republic of Tanzania, the randomized RESPECT study offered financial incentives to individuals who remained free of curable STIs: US\$ 10 every four months they remained STI-free (221). Those who were offered payments had the same infection rates as the control group, whereas those offered US\$ 20 for remaining STI-free for four months had 27% fewer infections (RR = 0.73; 95% CI: 0.47–0.99) at the end of the one-year programme. A participant in the second group could earn US\$ 60 in a year, approximately a quarter of the average annual income in the area. Larger effects were seen among poorer households and in rural areas.

One year after the programme of cash payments and regular STI testing ended, researchers returned to the intervention communities to see if the benefit had been sustained. Infection rates remained lower among men, but not women (222). Qualitative research showed that the cash rewards and knowledge derived from regular STI testing worked synergistically, opening opportunities for individuals to discuss and negotiate risk reduction strategies with partners (223). However, the study did not include HIV biomarkers to detect differences in HIV incidence.

Since providing cash incentives to a large number of people is very expensive, an alternative approach was explored in which all participants have a chance to receive the incentive for safe behaviour, but only some participants receive it. In Lesotho, a trial used a lottery to decide who would receive the incentive. The results, which indicate a 25% reduction in new HIV infections, are not yet published in a journal (220). One concern with this type of intervention is that lotteries are a form of gambling, which may in itself be seen as problematic: using lotteries for HIV prevention might undermine messages intended to prevent gambling addiction and messages on financial literacy, which are about planning rather than relying on chance.

## Operational considerations

### Community mobilization: operational considerations

In 2007, UNAIDS recommended that exceptional efforts and resources were needed in generalized and hyperendemic settings to mobilize entire communities to change social norms and sexual behaviours: “Prevention programmes should include public information and social mobilization campaigns that instigate social debate and change around gender norms that condone or encourage multiple sexual partner relations or sexual violence” (224).

Community norms around health-seeking behaviour and concepts of masculinity require a similar approach, particularly in relation to new HIV prevention technologies—including antiretroviral therapy-based strategies—and their limited uptake or inconsistent use, particularly among men. Nonetheless, the evidence reviewed does not provide a clear blueprint for how to mobilize communities, in part because the durations of research studies are not commensurate with the time needed for such profound social change to occur. In other words, there is a difference between community mobilization projects, which can be evaluated in trial settings, and community mobilization as a whole: the latter is a complex process that must progress from policy change and leadership engagement through to community participation and normative change.

Interventions addressing community norms need to be carefully presented to groups and settings where HIV transmission is occurring. This is especially important in relation to key populations, either in generalized or concentrated epidemics. For example, there may be particular settings where risk behaviours are frequent or promoted, such as roadside truck stops associated with sex work or saunas where casual sex occurs between men. Such settings provide natural locations for outreach and community-based work.

As with the more intensive individual and group interventions, programmes should not be based on the assumption that all individuals have the autonomy to make decisions about healthy choices. A recent systematic review of interventions for women and girls in low- and middle-income countries—most of which had a community element—was unable to identify interventions that had a substantial impact on behavioural or biological outcomes (225). The review’s authors noted that a woman’s behaviour may not be high-risk, but that her susceptibility may be entirely driven by her husband’s behaviour, over which she has no control. Finding an effective way to reduce the prevalence of concurrent sexual relationships among partners or to address fundamental gender inequities may be more important than addressing the behaviour of women themselves.

A recent review suggested that many programmes described as a type of community mobilization are conceived by external experts and imposed on communities in top-down ways (209). Such interventions may be more likely to focus narrowly on health-related behaviours than projects that allow community members to set the agendas. The review also found that what is called “community mobilization” was often limited and tokenistic: for example, the entire mobilization might be limited to using community members to gain access to their social networks or involving them in the delivery of a pre-planned intervention.

A more authentic form of community mobilization would be an open-ended and complex process that fosters supportive relationships within the community, is open to a wide range of activities and engages with the broader social and political context. This was done in the Sonagachi Project in Kolkata, India, a programme that was the basis for many subsequent community mobilization interventions. The Sonagachi Project included sex worker groups

conducting advocacy with the police, local government and brothel owners, and it included child health and welfare efforts, literacy classes for sex workers and a cooperative savings and credit scheme (226, 227). The review's authors argued that the community mobilization interventions included in their evaluation might not be a good test of the effectiveness of community mobilization as a whole because they had not always encouraged the sort of socially transformative processes that community mobilization ideally seeks (209).

Community engagement and other community-based programmes can be challenging to deliver effectively in the absence of community cohesion. An evaluation of an intensive HIV prevention programme in a mining community in South Africa found that groups such as sex workers—assumed to be communities of individuals with common interests—were in fact highly diverse, with different and sometimes conflicting interests. Powerful groups who were unwilling to compromise their own interests often dominated stakeholder meetings (228).

Community mobilization and community-based prevention programmes working with volunteers are forms of task shifting in which community members take on activities that might otherwise be the work of health-care professionals. Attention needs to be given to the training, support, adequate funding and organizational stability that such personnel and programmes require to be sustainable. Furthermore, few published studies discuss issues that are likely to affect successful implementation, such as methods of recruiting volunteers (e.g., self-selected, nominated by community structures or nominated by programme staff), details of training and supervision, and whether financial compensation is offered (189).

### **Cash transfers: operational considerations**

Cash transfers to economically disadvantaged households may have an effect on education, health, child marriage, teenage pregnancy and other outcomes. Rather than developing single sector projects, there is a potential for HIV programmes to partner with agencies that are working towards other developmental objectives. Co-financing across sectors would be more sustainable, and HIV prevention and other health components could be integrated into existing cash transfer schemes and government programmes. In countries where social welfare systems are in the process of being developed, a golden opportunity exists to create systems that address HIV concerns (229).

So far, most successful cash transfer programmes with demonstrable health outcomes have been implemented in middle-income countries with relatively well-functioning health systems. This has primarily been in Latin America and the Caribbean, but it has increasingly also happened in the Asia–Pacific region and sub-Saharan Africa. Even in low-income settings, cash transfers are being designed and implemented, showing that it is possible for such programmes to be delivered successfully in resource-limited settings (230).

Conditional cash transfer programmes are more complex to administer, but in some settings, programmes without conditions could equally be effective for certain outcomes (215). It also is important to select the right value for cash payments: if the reward is too small, it may not provide enough motivation, while larger payments may prevent resource-limited countries from making cash transfers available to a sufficiently large number of recipients (214). The right amount is specific to the setting and those receiving the intervention, but it is generally felt that to attain human development outcomes, transfers should meet at least 20% of the total consumption of a focus population.

For some behavioural incentives, initial findings suggest that smaller payments that are made more frequently soon after the desired behaviour are more effective than the promise of

larger payments in the future (214). At present, it is unclear whether effective behaviour change to reduce the risk of HIV infection—if it can be replicated in subsequent studies—will persist after payments are stopped, or if it is dependent on continued financial support. The answer to this will have significant implications for the long-term sustainability of cash transfer programmes.

Cash transfers also may have potential in contexts other than those described above. For instance, they are frequently used when working with people who use drugs (231). Financial incentives for taking an HIV test, or for receiving its results, also have proven effective in developed settings (232), suggesting that they might have a role to play in encouraging adherence to antiretroviral therapy or PrEP, or at least in encouraging the initial HIV testing and engagement with care that are the necessary first steps for those interventions.

## Population considerations

### Community mobilization and empowerment among sex workers

A cluster randomized trial in Zimbabwe examined the impact of a programme of peer education for female commercial sex workers and their male clients who were reached through beer halls and other venues frequented by men. More than 63 000 meetings took place in communities with a population greater than 18 000, and seven million condoms were distributed over three years. This was implemented in combination with an improvement in local STI clinic services (233).

Among women in the intervention communities, knowledge of HIV and AIDS did not improve, levels of unprotected sex actually worsened and HIV incidence did not change. Knowledge of HIV and AIDS improved among men, but neither behaviour nor HIV incidence changed at the community level, although changes had been recorded among men who reported attending programme meetings (233). The authors suggested a number of issues that may have impacted the intervention effects:

- Other HIV prevention interventions being simultaneously implemented at some sites, including control sites.
- Some peer educators reportedly engaging in unprotected commercial sex and therefore damaging the reputation of the programme.
- Long-term changes occurring in the Zimbabwean epidemic at the time, including risk reduction across intervention and control sites.

A wide-ranging programme of community mobilization and educational activities in the Thai army was shown in a randomized trial to lead to an 85% reduction in STI incidence and a 50% reduction in HIV incidence over two years (234).

Implemented in six Indian states with high HIV burden, Avahan was one of the largest HIV prevention programmes ever implemented. It intended to slow the transmission of HIV in the general population by raising the coverage of prevention interventions in certain key populations: female sex workers and their clients, gay men and other men who have sex with men, people who inject drugs and truck drivers (235).

Avahan combined numerous approaches:

- Behavioural interventions (peer-led outreach and behaviour change communication).
- Commodity distribution (condom distribution and needle–syringe exchange).
- Clinical interventions (high-quality STI services for key populations).
- Structural interventions (community participation and mobilization, including to address structural issues through legal empowerment training).

In all activities, there was a strong emphasis on efficient delivery and scale-up of a defined package of interventions in order to achieve saturation coverage (235).

Because of the challenge of demonstrating the efficacy of prevention programmes through experimental designs—and the priority given to rapid scale-up of initiatives in real-world

conditions—Avahan was implemented without control communities (234). As a result, definitive statements about its impact cannot be made. However, analysis of repeated cross-sectional surveys, combined with modelling, do suggest an impact of the programme over time. Female sex workers with greater exposure to interventions were more likely to use condoms consistently with their clients (236). HIV prevalence declined in female sex workers in some areas, with modelling suggesting that the change was associated with their changes in condom use (237). Rates of syphilis fell among the male clients of female sex workers (238). The programme also appeared to have an impact in the general population: districts where more programme activities took place experienced greater reductions in HIV prevalence among pregnant women than other districts (239).

### **Other communities**

Behavioural surveys with transgender people and gay men and other men who have sex with men also found that individuals with greater exposure to interventions reported more condom use. No effect was detected in the proportion of people testing positive for HIV antibodies, but decreases in STIs were noted among both high-risk transgender people and gay men and other men who have sex with men who engaged in high-risk behaviour (240, 241). In addition, a wide range of monitoring and evaluation activities have demonstrated very high levels of programme coverage, well-delivered interventions and tailoring of services.

However, a review of the impact of community mobilization as part of HIV prevention in low- and middle-income countries reported mixed results (209). Among sex workers and gay men and other men who have sex with men, programmes that included community mobilization generally had a positive impact, mostly in terms of risk behaviour and social outcomes (e.g., social support, cohesion or participation), with less evidence for biological outcomes. In programmes for young people or the general community, it is less clear that interventions are effective.

The authors suggest that the approach is most likely to be successful with groups who have a meaningful collective identity, sometimes enhanced through a common experience of discrimination. Engagement with a process of collective action may be fuelled by a need to improve living conditions and challenge social attitudes towards the group, rather than being purely motivated by HIV-related goals. Similarly, while “young people” across the population may be an epidemiologically relevant category, they may not form a group that is sufficiently cohesive for mobilization. The authors of the review also found that community mobilization programmes tended to be more effective when they were accompanied by efforts to achieve change at the structural level, such as sex worker programmes that work towards legal change or a safer working environment (209).



## **Conclusion: community-wide interventions**

As with the other types of interventions included in this compendium, community-wide interventions by themselves may be inadequate to achieve the types of social and behavioural changes widely accepted as being necessary for ending the HIV epidemic. They are effective in some settings and applications, however, and can be an important element in the combination approach that is needed for achieving local, national and global targets.

# Conclusion

It was the aim of this compendium to review the evidence on the effectiveness of behavioural components of combination prevention in relation to HTS, condoms, mass media programmes, individual and group interventions, HIV prevention education and comprehensive sexuality education, and community-wide interventions on HIV incidence and HIV preventive behaviour. Even though biological outcomes (such as changes in HIV incidence) are considered the ultimate goal of prevention interventions, this review mainly presented evidence on outcomes linked to key preventive behaviours and prevention knowledge. This was attributed to the limited evidence on biological outcomes, which require large sample sizes and extensive resources.

- Review findings revealed that **HTS** is an indispensable element of a combination HIV prevention approach. While HTS can contribute to behaviour change—particularly among people who test positive for HIV—it is not sufficient on its own.
- The role of **condoms** in containing and reducing HIV incidence alongside other interventions is well-documented, even though the exact level of their population-level effect remains difficult to estimate. High effectiveness depends on consistent and correct use, which is not easy to reach, but evidence confirms that increased and sustained condom usage can be achieved.
- The evidence on the effectiveness of **mass media interventions** varies. Its role in improving HIV prevention knowledge, increasing HIV testing and reducing HIV-related stigma (particularly in high-prevalence settings) has been documented.
- **Individual and group interventions** have long been used in HIV prevention. Their scope and customizable approach to meet the needs of individuals contributes to the high costs of these interventions, making their use more practical for those at elevated risk of HIV. Evidence suggests that these interventions can be effective in bringing about behaviour change in some people, but that changes may not persist over time.
- The potential of **school-based HIV prevention and comprehensive sexuality education** lies in the opportunity to achieve high coverage rapidly. Integrating HIV prevention communication into school curricula offers a cost-efficient way to increase HIV knowledge and prevention skills. Mixed results and moderate effect sizes indicate that such programmes on their own are not reliable for reducing HIV incidence at the population level.
- Similarly, **community-wide interventions** by themselves may be inadequate to achieve the types of social and behavioural change widely seen as necessary for ending the HIV epidemic, although they are effective in some settings with high HIV prevalence.

More research is needed to gather evidence on the effectiveness of different behavioural components on biological outcomes. Yet, since data on sexual behaviour or the use of HIV prevention tools are an essential condition for reducing HIV incidence, those also merit a

## Conclusion

stronger research focus. Research gaps were identified regarding HCT and its effect on sexual behaviour change and uptake of HIV services, particularly among key populations. The individual effects of multiple communication channels and evaluation designs to detect the potential of mass media interventions on preventive behaviour need to be further explored. This also accounts for research on the effect of community-based interventions, such as economic incentives on sexual behaviour.

Furthermore, it should be taken into account that behavioural interventions play an increasing role in relation to demand and adherence to specific biomedical interventions such as HIV treatment and PrEP, as well as demand for VMMC. There is also a broad spectrum of new media interventions involving behavioural interventions for which evidence is only emerging.

All interventions included in this compendium represent important elements of a combination prevention approach. Integrating them with other behavioural, biomedical and structural elements of HIV prevention may enhance and extend their effect over time.



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