HEART
HEALTH & EDUCATION ADVICE & RESOURCE TEAM

Helpdesk Report: Targeted interventions for sex workers to reduce HIV

Date: 14 June 2016

Query: Can targeted interventions on sex workers reduce HIV incidence? Please provide evidence for your answer, specifying the most cost effective targeted interventions.

Content

1. Overview

The term '**sex workers**' constitutes a meaningful single population for epidemiological purposes, but it encompasses female sex workers, male sex workers, and male-to-female transgender sex workers in a wide variety of settings (e.g. brothels, massage parlours, informal settings, and on the street) (Wariki et al., 2012). Sex workers and their clients are at **high risk for HIV exposure**, i.e. they have a high lifetime probability of becoming infected with HIV due to multiple risk factors: large number and high turnover of partners, low levels of condom use, high prevalence of sexually-transmitted infections (STIs), unsafe practices such as douching and use of inappropriate lubricants (UNAIDS, 2002 in Wariki et al., 2012). Evidence also suggests that the size of the female sex worker (FSW) population is correlated with countrywide HIV prevalence (Platt et al., 2013).

HIV prevention strategies with FSWs have traditionally relied on **individual behaviour change**, involving peer educators, condom promotion, and provision of sexual health services (Foss et al., 2007 and Shahmanesh et al., 2008 in Beattie et al., 2014). More recently, approaches to HIV prevention have included a stronger focus on **structural and social factors that shape individual behaviours** and interventions targeted toward contextual factors. This is because in the last decade it has been recognised that HIV epidemics are **'socially and culturally produced'** (Rhodes et al., 2005 in Beattie et al., 2014) and that psychosocial and community-level processes underlie an individual's ability to adopt safer sexual behaviours (Beattie et al., 2014).

Experience with feasible and effective prevention programmes has been accumulating for more than 20 years. In Democratic Republic of Congo (Laga, 1994 in Laga et al., 2016), Côte d'Ivoire (Ghys, 2002 in Laga et al., 2016), and Bolivia (Levine, 1998 in Laga et al., 2016) **HIV and STI rates among sex workers declined** as a result of individual interventions, including condom promotion, STI care and risk-reduction messages. Experience from the Dominican

Republic (Kerrigan, 2006 in Laga et al., 2016) and India (Jana, 1998 and Basu, 2004 in Laga et al., 2016) illustrated the **effectiveness of contextual interventions** to reduce the vulnerability of sex workers and create an enabling environment (Laga et al., 2016).

This review has found a number of peer reviewed studies and grey literature on interventions targeted at sex workers for HIV prevention. Several were systematic reviews (8 reviews, see section 2.), some comprehensive reviews and policy papers (10 papers, see section 3.). A number of individual studies focused on cost effectiveness are presented in section 4.

Two interventions in India are considered particularly effective and scalable interventions. A number of studies on these is presented in section 5. Both of these programmes focus on community mobilisation, and involve FSWs, as well as other key groups.

Key messages:

- The evidence for the cost-effectiveness of FSW interventions is strong, particularly for areas with concentrated HIV epidemics, with an estimated average cost of $102 to $184 per participant (Kerrigan et al., 2012 in Moret, 2014). Cost analyses demonstrate the cost-effectiveness of scaling up HIV prevention and treatment among sex workers, particularly in higher prevalence settings where it becomes cost-saving (Kerrigan et al., 2013).
- Evidence indicates that effective HIV prevention packages for sex workers should include combinations of biomedical, behavioural, and structural interventions tailored to local contexts, and be led and implemented by sex worker communities (Bekker et al., 2015). Additionally, programmes should be holistic and complementary (WHO et al., 2013).
- HIV prevention strategies should target the social determinants of health and inequality (Platt et al., 2013). The literature on HIV interventions targeting FSWs underscores the inextricable connections between gender, political-legal, and economic structures on the vulnerability of FSWs and their susceptibility to HIV (Moret, 2014).
- Community empowerment is an essential approach, as is community participation and leadership (WHO et al., 2013).
- Ultimately, structural and legal changes that align public health and human rights are needed. In the short term, interventions targeted at sex workers could contribute to reducing HIV risk (Chersich et al., 2013).
- Evidence is primarily available for interventions with FSWs.

Interventions:

Structural Interventions

Community mobilisation: Community mobilisation brings together various typologies of sex workers, scattered across rural areas and towns, through mobilisation, participation, and empowerment processes. Community mobilisation provides them with space and opportunity to act together, and to campaign for their rights. It is designed to be an inclusive process, initiated and sustained by the community to bring about the changes they desire through the process of empowerment (Beattie et al., 2014).

Examples of community mobilisation programmes are the Avahan (Laga et al., 2016) and the Sonagachi (Swendeman et al., 2009) programmes in India. Literature exists on the effectiveness of these programmes but there are no randomised controlled trials (RCTs) and few quantitative studies (Beattie, telephone interview, 2016).

Effectiveness: Although studies have reported strong associations between community mobilisation and collective power, uptake of sexually transmitted infection (STI) services, and

consistent condom use with clients, there remains a lack of data examining the impact of community mobilisation on biological (HIV or STI) outcomes (Beattie et al., 2014). A comprehensive review by Kerrigan et al. (2015) found that community empowerment-based approaches to addressing HIV among sex workers were significantly associated with reductions in HIV and other STIs, and with increases in consistent condom use with all clients.

Quality of evidence: One systematic review on community empowerment (including 1 RCT) was conducted in 2013. The reviewers found low to very low quality evidence for all outcomes. The RCT provided only low quality evidence due to very serious limitations in its design (Kerrigan et al., 2013). A more recent comprehensive review also found that community-based empowerment interventions for HIV prevention evaluation designs have been weak and geographically restricted (Kerrigan et al., 2015).

Behavioural Interventions

These include interventions to change behaviour, promote the use of condoms, improve condom availability, introduce voluntary HIV counselling and testing, and educate about sexual health and the effective management of STIs.

Effectiveness: Behavioural interventions were effective in HIV/STI prevention in low- and middle-income countries, including reducing the incidence and prevalence of HIV and STIs (Wariki et al., 2012). There is limited evidence of effectiveness of behavioural interventions in high-income countries (Ota el al., 2011). Evidence in sub-Saharan Africa supports implementation of FSW interventions: peer-mediated condom promotion, risk-reduction counselling and skills-building for safer sex (Chersich et al., 2013). Authors of a China-focused systematic review concluded that condom use and HIV testing uptake were improved by the behavioural interventions, and that comprehensive intervention programmes are more effective in increasing HIV testing uptakes than health education alone as these comprehensive intervention programmes not only promote safe sex information, but also link FSW to HIV testing services.

Distribution of condoms has been shown to reduce rates of HIV and other STIs in sex workers (Ghys et al., 2002, Levine et al., 1998, and Fontan et al., 1998 in UNAIDS, 2015). In India (Smith et al., 2013 and Boily et al., 2013 in UNAIDS, 2015) and Thailand (Rachakulla et al., 2011 in UNAIDS, 2015) increased condom distribution to sex workers and their clients, in combination with other prevention interventions, were associated with reductions of transmission of both HIV and other STIs.

Results from a systematic review (Wariki, 2012) suggest that interventions to increase condom use are more effective when implemented in conjunction with social, network- and/or community-targeted interventions that change the environment in which decisions about safe sex behaviour are taken. A systematic review of 30 studies on peer education interventions between 1990 and 2006 showed that interventions increased knowledge of HIV, decreased equipment sharing for drug users, and increased condom use (Medley et al., 2009 in Moret, 2014). Peer education is a common tactic of community mobilisation programmes.

Quality of evidence: Three systematic reviews focused on behavioural interventions are available, differing in geographical focus: high-income countries (Ota el al., 2011), low-income countries (Wariki et al., 2012), sub-Saharan Africa (2013) and China (Chow et al., 2015).

One of the systematic reviews (low- and middle-income countries, Wariki et al., 2012) included 13 trials (7 RCTs, 2 cluster-RCTs and 4 quasi-RCTs). Methodological quality was rated as ‘high’ for only 4 of the 13 trials. Additionally, there is lack of information about most other outcomes and target populations. Although there is evidence in favour of their

implementation amongst other high-risk populations (such as transgender sex workers) the quality of this evidence is not currently sufficient to conclude that they will be effective amongst these populations.

In high-income countries, there is limited evidence from RCTs (Ota el al., 2011). The systematic review of interventions in China did not include RCTs. A systematic review of systematic reviews includes evidence ratings on individual and group behaviour change interventions for HIV prevention among sex workers. Authors rated the evidence as: A3 (high quality evidence; mixed results) for HIV incidence outcome. C2 (low quality evidence; largely consistent effectiveness) for reported behaviour change outcomes (Mavedzenge et al., 2013). WHO (2014) recommends correct condom use for all key populations based on moderate quality of evidence.

Economic Interventions

Economic strengthening interventions directed toward FSWs can incorporate microfinance and/or vocational training. The goal is to decrease FSWs' vulnerability to HIV by decreasing their financial reliance on sex work (Moret, 2014).

Effectiveness: The evidence on the efficacy of income-generating interventions in preventing HIV is mixed. However, impact studies of economic strengthening interventions with FSWs provide strong evidence in favour of integrated, structural interventions as best practice. The most successful interventions are those that are characterised by a higher degree of involvement by FSWs, rather than being externally led. Two of the projects analysed (Pragati and Sonagachi) demonstrate cost effectiveness (Moret, 2014).

Quality of the evidence: Studies available have limitations (use of cross-sectional data, limited geographically, relying on self-report data) (Moret, 2014).

Biomedical Interventions

Treatment for STIs:
Effectiveness: Treatment for STIs was found to be more effective in reducing HIV and STI transmission when combined with the consistent and correct use of condoms (Laga, 1994 and Ghys, 2001 in Wariki et al., 2012), suggesting that behavioural interventions for primary prevention may also serve to enhance the effectiveness of secondary prevention activities. A systematic review by Shahmanesh et al. (2008) also found that combining sexual risk reduction, condom promotion and improved access to STI treatment reduces HIV and STI acquisition in sex workers receiving the intervention. However, none of the RCTs showed an impact on HIV incidence.

Standalone STI screening and management as well as periodic presumptive treatment (PPT) interventions were not found to be effective in reducing HIV based on the WHO systematic reviews conducted (WHO, UNFPA et al., 2012 in Kerrigan, 2013). However, clinical services for sex workers that include regular screening coupled with prevention messages have reported increases in condom use and reductions in STI and HIV prevalence (Steen and Dallabetta, 2003).

There is still uncertainty around the efficacy of STI treatment in HIV prevention for sex workers, what is the best STI treatment strategy, what components of structural interventions work, and what are the potential negative ramifications of targeting sex workers. In addition, there is limited data available on the wider public health benefits of targeting sex workers (Shahmanesh et al., 2013).

Quality of the evidence: A systematic review found 11 RCTs and 17 quasi experimental studies. Authors suggest there were methodological limitations (Shahmanesh et al., 2008). A

systematic review of systematic reviews includes evidence ratings on HIV and STI screening and treatment among sex workers. Authors rate the evidence as C2 (low quality evidence; largely consistent effectiveness) for biological (genital warts) and reported behaviour change outcomes.

Oral pre-exposure prophylaxis (PrEP): where antiretroviral drugs are used by HIV-negative people to reduce their risk of acquiring HIV. According to WHO (2015), PrEP is effective in preventing HIV acquisition, but is not yet widely available and is currently only recommended as an additional tool for people at higher risk, such as people in sero-discordant relationships, men who have sex with men and female sex workers, in particular in circumstances in which consistent condom use is difficult to achieve (WHO, 2015 in UNAIDS, 2015).

STI presumptive treatment: STI presumptive treatment of sex workers, as an effective measure to rapidly reduce STI rates in high transmission areas, can strengthen STI prevention and control. Once prevalence rates are brought down, other longer-term strategies are essential to maintain reduced rates. However, presumptive treatment are not effective against some important STIs, including HIV (Steen and Dallabetta, 2003).

2. Systematic reviews

Behavioural Interventions Improve Condom Use and HIV Testing Uptake Among Female Sex Workers in China: A Systematic Review and Meta-Analysis
Chow E.P.F., Tung K., Tucker J. D., Muessig K. E., Su S., Zhang X., Jing J., and Zhang L. (2015). AIDS Patient Care and STDs 29(8): 454-460.
http://online.liebertpub.com/doi/abs/10.1089/apc.2015.0043

This study systematically reviews the impacts of behavioural interventions on condom use and HIV testing uptake among female sex workers (FSWs) in China. 128 behavioural studies conducted between 2000 and 2013 were included (no RCTs).

Meta-analyses indicated that FSWs in the post-intervention period were 2.3–5.0 times more likely to use condoms with male clients in their last sexual act and 2.3–3.4 times more likely to use condoms consistently in the last month than in the pre-intervention period. In particular, multiple session interventions were more effective in improving condom use among FSWs with male clients (OR=5.6, [4.0–7.8]) than a single session intervention (OR=3.3, [2.8–3.8]). Behavioural interventions also improved past-12-month HIV testing uptake 4.6-fold (95% CI, 2.9–7.4). Comprehensive intervention programmes were more effective (OR=8.1, [4.0–16.7]) in improving HIV testing uptake compared with health education only programmes (OR=2.7, [1.6–4.5]). Longer intervention duration (>12 months) did not increase effectiveness in improving condom use or HIV testing rate among Chinese FSWs. Behavioural interventions are effective in improving condom use and HIV testing uptake among Chinese FSWs.

The authors concluded that **comprehensive intervention programmes are more effective in increasing HIV testing uptakes than health education** alone as comprehensive intervention programmes not only promote safe sex information, but also link FSWs to HIV testing services.

Community empowerment among female sex workers is an effective HIV prevention intervention: a systematic review of the peer-reviewed evidence from low- and middle-income countries
Kerrigan D.L., Fonner V.A., Stromdahl S., Kennedy C.E (2013). AIDS Behav. 17(6):1926-40.
https://www.ncbi.nlm.nih.gov/pubmed/23539185

This is a systematic review of the evidence for **community empowerment interventions** for preventing HIV infection in FSWs in low- and middle-income countries (LMIC). Community empowerment interventions are defined as structural interventions designed to address and improve social, political and material conditions for FSWs. This was a high quality **systematic review**. It addresses nearly all points of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.

Ten studies (including one RCT) were included in the review. Seven studies were from India, two were from Brazil and one was from the Dominican Republic. Three observational studies measured changes in HIV infection; six observational studies measured STI infection; nine studies measured condom use. All studies included explicit community empowerment and social mobilisation activities as well as community-led peer education, condom distribution and the promotion of periodic STI screening.

The reviewers conclude that **community empowerment interventions were associated with significant improvements in many HIV outcomes**. They note that no significant negative associations were documented among any of the outcomes assessed in the review. Rigorous studies of community empowerment interventions for FSWs are needed, particularly in settings with generalised or rapidly growing HIV epidemics

The reviewers used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology to assess evidence quality. **The reviewers found low to very low quality evidence for all outcomes**. The RCT provided only low quality evidence due to very serious limitations in its design.

Effectiveness of HIV Prevention, Treatment and Care Interventions Among Adolescents: A Systematic Review of Systematic Reviews
Mavedzenge S.N., Luecke E., Ross D.A. (2013). UNICEF Technical Brief
http://www.grassrootsoccer.org/wp-content/uploads/SystReview-of-Syst-Review-Napierala-Mavedzenge-et-al-UNICEF-Techn-Brief-Systematic-Review_Effective-HIV-Response-in-Adolescents_2013.pdf

This report presents the results of a systematic review of systematic reviews examining the evidence on effectiveness of HIV prevention, treatment, and care interventions among adolescents. It also looks at evidence available on interventions with sex workers. Relevant reviews and ratings are as follows:

1. *PrEP use among sex workers – strength of evidence rating: not applicable, data unavailable*

One article was reviewed as it provided useful information on PrEP use among sex workers (Okwundu et al., 2012). To date there have been no RCTs of PrEP use specifically targeting sex workers. One RCT conducted in Kenya and Uganda included both men who have sex with men (MSM) and sex workers, however only 5 women were enrolled and therefore conclusions cannot be drawn about the efficacy of PrEP in this population group (Mutua et al., 2012).

2. *HIV and STI screening and treatment among sex workers – strength of evidence rating: C2 (low quality evidence; largely consistent effectiveness) for biological (genital warts) and reported behaviour change outcomes*

One relevant, high quality review article, published in 2012, summarised the available data on HIV and STI screening and treatment among FSWs (Wariki et al., 2012). This review was of interventions among FSWs in low- and middle income countries. The authors also found an additional article which, while it was not a systematic review and therefore did not meet the inclusion criteria, none-the-less provided useful information on STI screening interventions among sex workers (Steen et al. 2003).

3. *Individual and group behaviour change interventions among sex workers – strength of evidence rating: A3 (high quality evidence; mixed results) for HIV incidence*

outcome. Strength of evidence rating: C2 (low quality evidence; largely consistent effectiveness) for reported behaviour change outcomes.

The articles that met criteria only included FSWs. Three relevant, good quality review articles, published between 2011 and 2013, adequately summarised the data on individual and group behaviour change interventions among sex workers (Wariki et al., 2012, Ota el al., 2011 and Chersich et al., 2013).

Factors mediating HIV risk among female sex workers in Europe: a systematic review and ecological analysis

Platt L., Jolley E., Rhodes T., Hope V., Latypov A., Reynolds L., Wilson D. (2013). BMJ Open 3:e002836

http://bmjopen.bmj.com/content/3/7/e002836.full

This is a systematic review of the epidemiology of HIV and selected STIs among FSWs in WHO-defined Europe. There were three objectives: (1) to assess the prevalence of HIV and STIs (chlamydia, syphilis and gonorrhoea); (2) to describe structural and individual-level risk factors associated with prevalence and (3) to examine the relationship between structural-level factors and national estimates of HIV prevalence among FSWs.

Findings show that HIV prevention interventions should be nested inside strategies that address the **social welfare of sex workers**, highlighting the **need to target the social determinants of health and inequality**, including regarding access to services, experience of violence and migration. Future epidemiological and intervention studies of HIV among vulnerable populations need to better systematically delineate how microenvironmental and macroenvironmental factors combine to increase or reduce HIV/STI risk.

Priority interventions to reduce HIV transmission in sex work settings in sub-Saharan Africa and delivery of these services

Chersich M.F., Luchters S., Ntaganira I., Gerbase A., Lo Y.R., Scorgie F., Steen R. (2013) Journal of the International AIDS Society 16:17980.

http://www.jiasociety.org/index.php/jias/article/view/17980

This is a systematic review of studies with quantitative outcomes, reporting interventions for reducing HIV transmission among **FSWs in sub-Saharan Africa** between January 2000 and July 2011. 26 studies were included in the review, including 7 randomised trials.

Evidence supports implementation of the following interventions to reduce unprotected sex among FSWs: **peer-mediated condom promotion, risk-reduction counselling and skills-building for safer sex**. One study found that interventions to counter hazardous alcohol-use lowered unprotected sex. Data also show effectiveness of screening for STIs and syndromic STI treatment, but experience with periodic presumptive treatment is limited. HIV testing and counselling is essential for facilitating sex workers' access to care and antiretroviral treatment (ART), but testing models for sex workers and indeed for ART access are little studied, as are structural interventions, which create conditions conducive for risk reduction. With the exception of Senegal, persistent criminalisation of sex work across Africa reduces sex workers' control over working conditions and impedes their access to health services. It also obstructs health-service provision and legal protection.

The authors conclude that **there is sufficient evidence of effectiveness of targeted interventions with female sex workers in Africa to inform delivery of services for this population.**

Ultimately, structural and legal changes that align public health and human rights are needed to ensure that sex workers on the continent are adequately protected from HIV. In the shorter term, interventions with sex workers, based on evidence reviewed, implemented at sufficient

scale and intensity could contribute to markedly reducing the considerable HIV and social risks that sex workers, their clients and the general population face in sub-Saharan Africa.

Behavioural interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries
Wariki W.M.V., Ota E., Mori R., Koyanagi A., Hori N., Shibuya K. (2012). Cochrane Database of Systematic Reviews 2012, Issue 2. Art. No.: CD005272.
http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005272.pub3/full

This systematic review evaluates the **effectiveness of behavioural interventions to reduce the transmission of HIV infection among sex workers and their clients** in LMICs. Behavioural interventions were defined as interventions that aim to change not only individual behaviour to prevent HIV infection but also peer and social norms, including strategies such as community mobilisation and structural and resource support, and through administrative or legal decisions, such as promoting condom availability. Thirteen trials with 8,698 participants were analysed. These included seven RCTs, two cluster-RCTs and four quasi-RCTs.

Several successful behavioural interventions have been reported including interventions to reduce HIV/STI incidence and prevalence, change behaviour, promote condom use, improve condom availability, and increase sexual health knowledge. Results showed **that the interventions were effective in HIV/STI prevention, including reducing the incidence and prevalence of HIV and STIs.**

However, these trials were **small** and generally had few participants. As a result, evidence for the effectiveness of social cognitive theory and promoting condom use in reducing HIV/STI incidence compared to other behavioural interventions was limited, because no RCTs examined the effects of these interventions on HIV prevalence or on sex workers other than FSWs. In future research and program agendas therefore it is important to assess other potentially more potent behavioural change strategies.

The quality of the evidence was assessed using the GRADE process. The highest quality rating was found in six trials. Methodological quality was rated as 'high' for only four of the thirteen trials. The author concludes that these behavioural interventions **should be considered** for implementation in high-risk FSW communities in LMICs. This decision should be supported, however, by the knowledge that **there is lack of information about most other outcomes and target populations,** and although there is evidence in favour of their implementation amongst other high-risk populations (such as transgender sex workers) the quality of this evidence is not currently sufficient to conclude that they will be effective amongst these populations.

Behavioural interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries
Ota E., Wariki W.M.V., Mori R., Hori N., Shibuya K. (2011). Cochrane Database of Systematic Reviews 2011, Issue 12. Art. No.: CD006045.
http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006045.pub3/full

This review identifies and evaluates the effects of the studies performed on behavioural interventions to reduce the transmission of HIV infection among sex workers and their clients in **high-income** countries. Four studies were included, comprising two RCTs and two quasi-experimental pretest-posttest trials with control groups involving 1,795 participants. No trials reported HIV prevalence/incidence as outcomes.

The four studies contributing data to the review focused on different outcomes. One study included clients of FSWs (Lau, 2010), while the participants of the other three studies were FSWs (Archibald, 1994; Surratt, 2010; Wong, 1998). The authors concluded that there is

limited evidence from RCTs for the effectiveness of behavioural interventions to reduce the transmission of HIV infection among sex workers and their clients in high-income countries.

Although there was no significant difference between the behavioural intervention group and the control group for overall condom use, Wong (1998) observed a significant increase in the number of FSWs always refusing sex without a condom in the intervention group at the 5-month follow-up, which may be related to the favourable outcome of the STI incidence above. Interventions that include condom negotiation techniques with role-playing and peer group discussions may be effective strategies for FSWs. Moreover, findings from the two studies (Archibald, 1994; Lau, 2010) demonstrated the effectiveness of interventions that increase knowledge of HIV transmission for sex workers and their clients.

Effectiveness of interventions for the prevention of HIV and other sexually transmitted infections in female sex workers in resource poor setting: a systematic review
Shahmanesh, M., Patel, V., Mabey, D. and Cowan, F. (2008) Tropical Medicine & International Health, 13: 659–679.
http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3156.2008.02040.x/full

The effectiveness of harm reduction or STI treatment as an HIV prevention intervention for sex workers has not been systematically assessed. This paper presents the findings of a systematic review of the evidence for the effectiveness of HIV and STI prevention interventions, in **female sex workers**, in resource-poor settings. The authors identified four broad categories of intervention: behavioural interventions with condom promotion, addition of vaginal microbicide, addition of STI treatment, and structural interventions.

Included were: 28 interventions; 11 studies were RCTs, three of which were cluster-RCTs; 17 were quasi-experimental. 26 (93%) studies assessed changes in incident or prevalent HIV or STIs, of which 12 measured HIV incidence. Despite methodological limitations, the evidence **suggested** that combining sexual risk reduction, condom promotion and improved access to STI treatment **reduces HIV and STI acquisition in sex workers receiving the intervention**. Strong evidence that regular STI screening or periodic treatment of STIs confers additional protection against HIV was lacking. It appears that structural interventions, policy change or empowerment of sex workers, reduce the prevalence of STIs and HIV. None of the RCTs showed an impact on HIV incidence. However, the observational data suggests that there is some evidence for the effectiveness of risk reduction counselling and condom promotion.

Rigorous evaluation of HIV/STI prevention interventions in sex workers is **challenging**. There is some evidence for the efficacy of multi-component interventions, and/or structural interventions. The effect of these interventions on the wider population has rarely been evaluated. There is still uncertainty around the efficacy of STI treatment in HIV prevention for sex workers, what is the best STI treatment strategy, what components of structural interventions work, and what are the potential negative ramifications of targeting sex workers. In addition, there is limited data available on the wider public health benefits of targeting sex workers.

3. Comprehensive reviews, guidelines and policy papers

UNFPA, WHO and UNAIDS: Position statement on condoms and the prevention of HIV, other sexually transmitted infections and unintended pregnancy
http://www.unaids.org/en/resources/presscentre/featurestories/2015/july/20150702_condoms_prevention

Distribution of condoms has been shown to **reduce rates of HIV and other STIs** in sex workers (Ghys et al., 2002; Levine et al., 1998; and Fontan et al., 1998) and men who have sex with men (Smith et al., 2013). In India (Smith et al., 2013; Boily et al., 2013) and Thailand (Rachakulla et al., 2011) increased condom distribution to sex workers and their clients, in combination with other prevention interventions, were associated with reductions of transmission of both HIV and other STIs. Zimbabwe (Halperin et al., 2011) and South Africa are two high-prevalence countries where increased condom use was found to contribute to reductions in HIV incidence (Johnson et al., 2012). Programmes promoting condoms **must address stigma and gender-based and socio-cultural factors** that hinder effective access and use of condoms.

However, few programmes adequately address the barriers that hinder access and use of condoms by young people (International Organisation for Standardisation, 2014), key populations (including sex workers) and men and women in relationships. In some contexts, sex workers are forced to have unprotected sex by their clients (Global Commission on HIV and the Law, 2012; UNAIDS, 2014) and carrying condoms is criminalised and used as evidence by police to harass or to prove involvement in sex work (Open Society Foundations, 2012; Bhattacharjya et al., 2015).

Oral pre-exposure prophylaxis (**PrEP**)—where antiretroviral drugs are used by HIV-negative people to reduce their risk of acquiring HIV—is also effective in preventing HIV acquisition, but is not yet widely available and is currently only recommended as an additional tool for people at higher risk, such as people in sero-discordant relationships, MSM and FSWs, in particular in circumstances in which consistent condom use is difficult to achieve (WHO, 2015).

What Works for Women and Girls: Evidence for HIV/AIDS Interventions
UN Women. Accessed on 14 June 2016
http://www.whatworksforwomen.org/pages/overview

The purpose of this resource is to provide the evidence necessary to inform country-level programming. It includes a chapter on ‘what works’ in prevention for FSWs.

1 Comprehensive prevention programmes that include components such as peer education, medical services, and support groups, can be effective in enabling sex workers to adopt safer sex practices.
2 Clinic-based interventions with outreach workers can be effective in increasing condom use and HIV testing among sex workers.
3 Peer education can increase condom use.
4 Creating a sense of community, empowerment and leadership among sex workers can help support effective HIV prevention.

Promising strategies include:

5 Policies that involve sex workers, brothel owners and clients in development and implementation of condom use can increase reported condom use.
6 Providing routine, high quality, voluntary and confidential STI clinical services that include condom promotion can be successful in reducing HIV risk among sex workers.

7 Interventions targeting male clients can increase condom use and thus reduce HIV risk for sex workers.
8 Decriminalisation of sex work can promote access to health care and support safer working conditions, including safer sex practices, among sex workers.

A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up
Kerrigan D. Kennedy C.E., Morgan-Thomas R., Reza-Paul S., Mwangi P., Win K.T., McFall A., Fonner V.A., Butler J. (2015). The Lancet Volume 385, Issue 9963 Pages 172–185.
http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)60973-9/abstract

This is a comprehensive review of community empowerment approaches for addressing HIV in sex workers. Within this effort, authors did a systematic review and meta-analysis of the **effectiveness of community empowerment in sex workers in low-income and middle-income countries**. We found that **community empowerment-based approaches to addressing HIV among sex workers were significantly associated with reductions in HIV and other sexually transmitted infections, and with increases in consistent condom use with all clients.** Despite the promise of a community-empowerment approach, authors identified **formidable structural barriers** to implementation and scale-up at various levels. These barriers include regressive international discourses and funding constraints; national laws criminalising sex work; and intersecting social stigmas, discrimination and violence. The evidence base for community empowerment in sex workers needs to be strengthened and diversified, including its role in aiding access to, and uptake of, combination interventions for HIV prevention. Furthermore, social and political change are needed regarding the recognition of sex work as work, both globally and locally, to encourage increased support for community empowerment responses to HIV.

A community empowerment-based HIV response is a process by which sex workers take collective ownership of programmes and services to achieve the most effective HIV responses and address social and structural barriers to their health and human rights. These prevention interventions in sex workers are associated with significant reductions in HIV and STI outcomes and increases in consistent condom use with clients. However, **evaluation designs have been weak and geographically restricted**. Community empowerment approaches to combination HIV prevention in sex workers are rare and should be expanded and assessed.

Combination HIV prevention for female sex workers: what is the evidence?
Bekker L.G., Johnson L., Cowan F., Overs C., Besada D., Hillier S., Cates W.Jr (2015). The Lancet 85: 72–87.
http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(14)60974-0.pdf

This literature review focused on HIV prevention programmes and interventions, and in particular those that focused on the FSW population. This review included observational studies, RCTs and consensus papers or programme reports from organisations, when they were peer reviewed. Data from systematic reviews of HIV prevention interventions both in the female population and general population were included as often data and programmes specifically addressing FSWs were scarce. 69 were included that gave a broad range of interventions that have an effect on HIV prevention, either in the FSW population or general population.

Existing prevention strategies include behavioural and structural approaches, and sexual and reproductive health services, including condoms, counselling, testing, and supportive linkage to care for newly diagnosed FSWs. **The most effective strategies have been within community-based programmes, which have intervened on the drivers of HIV transmission in FSWs including condomless sex, STIs, gender-based violence, unsafe**

working environments, and poor service usage due to stigma and discrimination (Shannon et al., 2014).

The design of an FSW-tailored HIV prevention package **needs an approach that recognises all levels of risk, and consists of biomedical, behavioural, and structural interventions.** The epidemic context (risk level 5) in which the sex work occurs is an important determinant of HIV risk, and the importance of sex worker-focused interventions depends on this context (Jones et al., 2014).

Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations.
World Health Organisation. 2014 reprinted in 2016 with changes.
http://apps.who.int/iris/bitstream/10665/128048/1/9789241507431_eng.pdf?ua=1&ua=1

In this new updated and consolidated guidelines document on HIV prevention, diagnosis, treatment and care for key populations, WHO brings together all existing guidance and recommendations relevant to five key populations – men who have sex with men, people who inject drugs, people in prisons and other closed settings, **sex workers** and transgender people.

Key recommendations and guidelines:
Health sector interventions – prevention:

1. **Comprehensive condom and lubricant programming**.
   a. The correct and consistent use of condoms with condom-compatible lubricants is recommended for all key populations to prevent sexual transmission of HIV and STIs (strong recommendation, moderate quality of evidence) (WHO, 2011; WHO, UNODC, UNAID, 2010; WHO, 2007; WHO, 2012).
   b. Correct and consistent use of condoms and condom-compatible lubricants is recommended for sex workers and their clients (WHO, 2012).
   c. Sex workers, female or male, often face power imbalances that limit their ability to use condoms with clients. FSWs who inject drugs may be particularly vulnerable to these power imbalances. The female condom has the advantages over the male condom that the woman can initiate its use and it can be inserted up to several hours before intercourse (WHO, 2002). Peer-led and outreach approaches may help to increase knowledge, develop skills and empower sex workers to use condoms and lubricants consistently.
2. **Behavioural Interventions**.
   a. Condom promotion programmes, including community-led programmes, can increase condom use by sex workers and their clients. Through peer- and community-led interventions, these programmes can provide information and skills building for condom use and information and create demand for HIV testing, STI screening, and HIV treatment and care (WHO, 2013).

The report highlights **Critical Enablers**:

1. Programmes should be put in place to sensitise and educate health-care providers on non-discrimination and sex workers' right to high-quality and non-coercive care, confidentiality and informed consent (WHO, 2012).
2. Programmes should implement a package of interventions to enhance community empowerment among sex workers (strong recommendation, very low quality of evidence) (WHO, 2012).
3. Community empowerment is a necessary component of sex worker interventions and should be led by sex workers.

Case study: **Integrated services for sex workers in Zimbabwe.** Centre for Sexual Health and HIV AIDS Research (CeSHHAR) runs the Sisters with a Voice programme, which provides integrated services for sex workers in multiple sites across Zimbabwe on behalf of

the National AIDS Council. Since 2009, the programme has expanded from 5 sites to a comprehensive network of 36 sites nationally. By 2013, the 6 fixed facilities and 30 outreach sites together served more than 14,000 women. Moreover, at a site where two population-based surveys were conducted, the proportion of HIV-negative women that reported having a recent HIV test increased from 35% in 2011 to more than 70% in 2013. Over the same period the proportion of women living with HIV who were obtaining ART increased from 28% to 45%.

Economic Strengthening for Female Sex Workers: A Review of the Literature
Moret, W. (2014). ASPIRES, FHI 360
http://www.fhi360.org/sites/default/files/media/documents/Economic_Strengthening_for_Female_Sex_Workers.pdf

Despite evidence supporting the efficacy of structural interventions and the key role that economic vulnerability plays in contributing to structural vulnerability, **there is relatively little research focused on the financial lives and needs of FSWs.** Furthermore, though control over resources has been identified as a central component of economic vulnerability, there is limited research on this topic as pertains to FSWs. This report reviews the literature on **economic strengthening interventions for risk reduction and HIV prevention** among FSWs to identify best practices as well as opportunities for further research. It begins with an overview of intervention approaches, including evidence supporting structural interventions. It then discusses existing research on the needs and financial practices of sex workers, followed by an overview and analysis of interventions designed to meet these needs. The report concludes with recommendations for future research to lay the groundwork for a future economic strengthening pilot with FSWs.

Ten studies were included in this review. Studies on the lives of FSWs suffer similar **limitations**. Nearly all use cross-sectional data and are therefore limited in their account for change over time. Since most studies are limited to a specific geographical location, they are of limited generalisability. Finally, nearly all of the studies rely on self-report data for behavioural practices, such as condom use, and face potential social desirability bias.

Throughout the literature, **economic need and coercion** are mentioned as the primary motivating factors for entering sex work (Odek et al., 2009; Pillai et al., 2012).
Economic strengthening interventions directed toward FSWs typically incorporate **microfinance and/or vocational training**, with the goal of decreasing FSWs' vulnerability to HIV by decreasing their financial reliance on sex work. Economic strengthening interventions seek to diversify FSWs; income sources or to enable them to leave sex work altogether for alternative forms of employment. They can also serve as platforms for HIV education and conduits for social capital development (Kennedy et al., 2013). Overall, however, the **evidence remains mixed on the efficacy of income-generating interventions in preventing HIV.** Nevertheless, impact studies of economic strengthening interventions with FSWs provide strong evidence in favour of integrated, structural interventions as best practice. The interventions that yielded less successful impact results were externally determined, rather than internally directed by FSWs.

The most celebrated and successful of the interventions discussed in this review is the Sonagachi Project. Pragati also illustrates a comprehensive, combination approach to HIV prevention. Both demonstrate **cost effectiveness**. While interventions with unsustainable microfinance strategies, such a K-VOWRC, or social business strategies, such as Pi, have not demonstrated cost effectiveness.

The evidence is clear that t**argeting HIV prevention interventions to sex workers is a cost effective, high-impact approach to combatting the global HIV epidemic.** However, many opportunities for further research and innovation remain, particularly with regard to economic strengthening. This review confirms previous analysis suggesting that there is more evidence

in support of interventions featuring microfinance services combined with health services than for vocational training (Kennedy et al., 2013).

Implementing comprehensive HIV/STI programmes with sex workers: practical approaches from collaborative interventions
World Health Organization, United Nations Population Fund, Joint United Nations Programme on HIV/AIDS, Global Network of Sex Work Projects, The World Bank. Geneva, World Health Organization (2013).
http://apps.who.int/iris/bitstream/10665/90000/1/9789241506182_eng.pdf?ua=1

This publication follows the 2012 WHO recommendations by offering practical advice on implementing HIV and STI programmes for sex workers. It contains examples of good practice from around the world that may support efforts in planning programmes and services, and describes issues that should be considered and how to overcome challenges.

Case examples from programmes around the world are presented. These highlight specific aspects related to sex worker programming that have worked well in their contexts. The purpose of the case examples is to illustrate how an issue or challenge has been addressed, and to inspire ideas about approaches that could work in the reader's own context. Several principles underline the 2012 recommendations and the operational guidelines given in this publication:

- **Community Empowerment** is an essential approach;
- **Community participation and leadership** are essential;
- Programmes should **address structural barriers**;
- Programmes must **operate at multiple levels**;
- Programmes should be **holistic** and **complementary**.

The Global HIV Epidemics among Sex Workers
Kerrigan D., Wirtz A., Baral S., Decker M., Murray L., Poteat T., Pretorius C., Sherman S., Sweat M., Semini I., N'Jie N., Stanciole A., Butler J., Osornprasop S., Oelrichs R., Beyrer C. (2013) International Bank for Reconstruction and Development/The World Bank
https://www.unfpa.org/sites/default/files/resource-pdf/GlobalHIVEpidemicsAmongSexWorkers.pdf

The publication addresses several questions inform an equitable, effective, and sustainable response to HIV, focusing largely on **female sex workers** from LMICs. A strategic combination of epidemiologic, social science, mathematical **modelling** and **cost-effectiveness research methods** were used and findings from these respective analyses were integrated to inform future policy and program recommendations. **The evidence generated builds a case for increased resource allocations for HIV prevention and care among sex workers.** Given the limited epidemiologic and evaluation data available among male and transgender sex workers, mathematical modelling and cost-effective analyses focused on FSW.

This review found **positive trends** regarding the impact of community empowerment interventions among FSW on **HIV-related outcomes**, including HIV infection, STI infection, and condom use**. HIV incidence can be significantly reduced among sex workers and the general population across settings by scaling up community empowerment based, comprehensive HIV prevention services and earlier initiation of ART.** The authors' analysis suggests that expanding the empowerment HIV prevention intervention among sex workers has demonstrable impact on the HIV epidemics among female sex workers, cumulatively averting between 220 and 10,800 infections among sex workers across epidemic scenarios. Similarly, the expansion of this community empowerment-based, comprehensive HIV prevention demonstrates additional impact on the adult population, cumulatively 700 to 20,700 infections among adults within five years. Impacts are greatest in countries where the prevalence of HIV is high among adults as well as female sex workers.

Where sex worker rights organisations have partnered effectively with government the response to HIV among sex workers has been particularly effective and sustainable. This has meant prevention services **which involve significant sex worker leadership** in their design and implementation and which attend to structural barriers to safe sex.

Cost analyses demonstrate the **cost-effectiveness of scaling up HIV prevention and treatment among sex workers, particularly in higher prevalence settings where it becomes cost-saving.** The cost per disability-adjusted life year (DALY) saved by the empowerment intervention is high compared to many other HIV prevention interventions, but below others that have been deemed important to support. When the community empowerment-based comprehensive HIV prevention intervention is conducted in the context of earlier initiation of ART provision the cost-effectiveness is reduced modestly. This effect is explained by reductions in population-level HIV incidence driven by the ART programme; cost per infection increases when there are fewer infections to avert.

The models also illustrate that **reducing violence against sex workers** can impart significant reductions in HIV incidence and prevalence among sex workers, as well as among the adult population, even in the context of expanded ART coverage.

Achieving the millennium development goals for health. Cost effectiveness analysis of strategies to combat HIV/AIDS in developing countries
Hogan D.R., Baltussen R., Hayashi C., Lauer J.A., Salomon J.A. (2005). BMJ. doi:10.1136/bmj.38643.368692.68
http://www.bmj.com/content/bmj/331/7530/1431.full.pdf

This is an assessment of the **costs and health effects** of a range of interventions for preventing the spread of HIV and for treating people with HIV/AIDS in the context of the millennium development goal for combating HIV/AIDS. It is a **cost-effectiveness analysis** based on an epidemiological model, undertaken in two regions classified using the WHO epidemiological grouping—Afr-E, countries in sub-Saharan Africa with very high adult and high child mortality, and Sear-D, countries in South East Asia with high adult and high child mortality. **The authors conclude that reducing HIV transmission could be done most efficiently through mass media campaigns, interventions for sex workers and treatment of STIs where resources are most scarce**. However, prevention of mother to child transmission, voluntary counselling and testing, and school based education would yield further health gains at higher budget levels and would be regarded as cost effective or highly cost effective based on standard international benchmarks. Antiretroviral therapy is at least as cost effective in improving population health as some of these interventions.

Sexually Transmitted Infection Control with Sex Workers: Regular Screening and Presumptive Treatment Augment Efforts to Reduce Risk and Vulnerability
Steen R., Dallabetta G. (2003). Reproductive Health Matters Volume 11, Issue 22
http://www.sciencedirect.com/science/article/pii/S096880800302295X

This paper reviews several **public health strategies** that have been employed for reducing STI transmission in **commercial sex networks**, with emphasis on STI treatment strategies that have proven effective for FSWs. Direct STI control interventions should always be complemented by efforts to improve the conditions that increase vulnerability and the limited access to services in communities where sex work takes place.

A review of STI control strategies involving sex workers reveals several categories of potential interventions with different strengths and weaknesses. All include a strong emphasis on consistent condom use as essential primary prevention. Specific STI treatment strategies include:

- Diagnosis and treatment of **symptomatic** sex workers.

- Regular **screening** of sex workers regardless of symptoms. Regular screening and treatment with high quality diagnostics, where available, can be highly cost-effective, given sex workers' high rates of curable STI. Clinical services for sex workers that include regular screening coupled with prevention messages have reported increases in condom use and reductions in STI and HIV prevalence in Senegal (where sex work is legal) (Meda et al., 1999) Kinshasa (Laga et al., 1994), La Paz (Ghys et al., 2002), Abidjan (Levine et al., 1998), Cotonou (Alary et al., 2002) and Nairobi (Moses, 2002).
- **Presumptive** treatment of sex workers regardless of symptoms. Presumptive treatment of sex workers, as an effective measure to rapidly reduce STI rates in high transmission areas, can strengthen STI prevention and control. Once prevalence rates are brought down, however, other longer-term strategies are essential to maintain reduced rates.

Replicating sex worker interventions such as those cited above requires adaptation based on an **understanding of STI transmission dynamics in local commercial sex settings**. Defining the operational details of interventions should thus be based **on local data** collected with the active **participation of sex workers** and others involved in commercial sex networks. Assuring participation of sex workers in data collection and intervention planning is a critical step.

For such services to have maximum impact, they must:

- Include strong **peer education and empowerment components** that support women to work collectively to address barriers to safer sex.
- Emphasise consistent **condom use** as the only effective way to prevent HIV infection and other incurable viral STIs in sex work.
- Provide effective **treatment** for both symptomatic and asymptomatic STIs.
- Begin to address the **larger social, legal, economic and human rights issues** that increase vulnerability and risk.

There are limitations as well as benefits to STI control interventions. No one intervention is 100% effective at interrupting transmission. **Synergistic** combinations of interventions need to act at several levels to have maximum impact.
It is important to recognise that curative modalities such as presumptive treatment are **not effective** against some important STIs, particularly viral infections such as herpes simplex virus (HSV-2), human papilloma virus (HPV) and **HIV**. Clinical staff and outreach workers should be aware that, without strong prevention efforts, sex workers may be drawn into a false sense of security that erodes rather than reinforces condom use. The **limitations** of presumptive treatment should always be explained to sex workers and the importance of maintaining consistent condom use emphasised by peer educators and clinic staff at every contact. Further research to improve STI control and HIV prevention efforts in commercial sex networks should focus largely on operational issues to better define the **optimal combination of preventive and curative services**.

4. Individual studies – cost effectiveness

A prospective study assessing the effects of introducing the female condom in a sex worker population in Mombasa, Kenya.
Thomsen S.C., Ombidi W., Toroitich-Ruto C., Wong E.L., Tucker H.O., Homan R., Kingola N., Luchters S. (2006). Sex Transm Infect. 82(5):397-402.
https://www.ncbi.nlm.nih.gov/pubmed/16854997

This study was designed to assess the impact and costs of adding **female condoms** to a male condom promotion and distribution peer education programme for sex workers in

Mombasa, Kenya. It was a 12 month, prospective study of 210 FSWs. The introduction of the female condom in an HIV/AIDS prevention project targeting sex workers led to small, but significant, increases in consistent condom use with all sexual partners. However, there was a high degree of substitution of the female condom for male condoms. The cost per additional consistent condom user at a programme level is estimated to be $2,160. The authors conclude that the female condom has some **potential** for reducing unprotected sex among sex workers. However, given its **high cost**, and the marginal improvements seen here, governments should limit promotion of the female condom in populations that are already successfully using the male condom. More research is needed to identify effective methods of encouraging FSWs to practise safer sex with their boyfriends.

Are Targeted HIV Prevention Activities Cost-Effective in High Prevalence Settings? Results From a Sexually Transmitted Infection Treatment Project for Sex Workers in Johannesburg, South Africa
Vickerman P. Terris-Prestholt F. Delany S. Kumaranayake L., Rees H., Watts C. (2006). Sexually Transmitted Diseases- Volume 33 - Issue 10 - pp S122-S132
http://journals.lww.com/stdjournal/Abstract/2006/10001/Are_Targeted_HIV_Prevention_Activities.8.aspx

The objective of this study was to estimate the cost-effectiveness of syndromic management, with and without periodic presumptive treatment (PPT), in averting STIs and HIV in FSWs participating in a hotel-based intervention in Johannesburg. A **mathematical** model was used. The results highlight targeted interventions **can be cost-effective at** all stages of HIV epidemics and suggests PPT could improve the cost-effectiveness of targeted STI interventions.

Cost-Effectiveness of Environmental–Structural Communication Interventions for HIV Prevention in the Female Sex Industry in the Dominican Republic
Sweat M., Kerrigan D., Moreno L., Rosario S., Gomez B., Jerez H., Weiss E., Barrington C. (2006). Journal of Health Communication: International Perspectives. Volume 11, Supplement 2.
http://www.tandfonline.com/doi/abs/10.1080/10810730600974829

A growing body of evidence suggests that structural interventions to change the policy environment and environmental interventions designed to modify the physical and social environment further bolster impact. Little is known about the cost-effectiveness of such comprehensive interventions. This study standard cost analysis methods to examine the incremental cost-effectiveness of two such interventions conducted in Dominican sex establishments. Both models resulted in **cost-effective** outcomes; however, the intervention that included policy regulation resulted in a substantially **more cost-effective** outcome.

Modelling the cost effectiveness of rapid point of care diagnostic tests for the control of HIV and other sexually transmitted infections among female sex workers
Vickerman P., Watts C., Peeling R.W., Mabey D., Alary M. (2006). Sex Transm Infect; 82:403-412
http://sti.bmj.com/content/82/5/403.short

This study uses mathematical modelling to estimate the incremental cost-effectiveness of using POC tests to diagnose Ng/Ct instead of the current syndromic approach used by the SIDA2 HIV/STI prevention project for female sex workers in Cotonou, Benin. The model estimated the STI treatment aspect of the intervention averted 18,553 Ng/Ct and 359 HIV infections over 4 years when the syndromic approach was used. The authors conclude that POC tests **can be a cost-effective strategy** for substantially increasing the impact on HIV transmission, and decreasing the degree of inappropriate treatment of STI treatment interventions that use syndromic management to diagnose Ng/Ct.

HIV prevention programmes for female sex workers in Andhra Pradesh, India: outputs, cost and efficiency
Dandona L., Sisodia P., Kumar S.G.P., Ramesh Y.K., Kumar A.A., Rao M.C., Marseille E., Someshwar M., Marshall N., Kahn J.G. (2005). BMC Public Health 5:98
http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-5-98

Detailed output and cost data for the 2002–2003 fiscal year were obtained using standardised methods at 15 HIV prevention programmes for female sex worker in the state of Andhra Pradesh in southern India. The services provided and their relation to the total and unit economic costs were analysed using regression techniques. Authors conclude that the HIV prevention efforts in this Indian state would benefit from standardisation of the highly variable services provided by peer educators, who form an important part of the sex worker programmes. The **cost per sex worker served decreases with increasing number of sex workers served annually**, but this has to be weighed against an associated modest trend of decrease in time spent with each sex worker in some programmes.

Cost-effectiveness of the female condom in preventing HIV and STDs in commercial sex workers in rural South Africa
Marseille E., Kahn J.G., Billinghurst K., Saba J. (2001). Social Science & Medicine. Volume 52, Issue 1, January 2001, Pages 135–148
http://www.sciencedirect.com/science/article/pii/S0277953600002823

This is an assessment of **the cost-effectiveness of the female condom** in preventing HIV infection and other STDs among commercial sex workers and their clients in the Mpumulanga Province of South Africa. A simulation model calculated health and public sector cost outcomes. **The programme generates net savings** of $5,421 if HIV prevalence in commercial sex workers is 25% rather than 50.3% and savings of $3,591 if each commercial sex workers has an average of 10 clients per year rather than 25. A programme focusing on non-commercial sex workers with only one casual partner would save $199. The authors **conclude that a well-designed female condom programme oriented to commercial sex workers and other women with casual partners is likely to be highly cost-effective and can save public sector health funds in rural South Africa.**

Controlling HIV in Africa: effectiveness and cost of an intervention in a high-frequency STD transmitter core group
Moses S., Plummer F.A., Ngugi E.N., Nagelkerke N.J.D., Anzala A. O., Ndinya-Achola J.O. (1991). AIDS, 5:407-411
https://www.ncbi.nlm.nih.gov/pubmed/1905555

The authors calculated the effectiveness and cost of an STD/HIV control programme. The authors estimate that the programme is responsible for preventing between 6,000 and 10,000 new cases and the cost of the programme is approximately between US$8 and US$12 for each case of HIV infection prevented. They conclude that programmes to reduce the transmission of HIV and other STIs which are targeted at high-frequency STD transmitters, such as sex workers, can be **effective** and relatively **inexpensive** to undertake.

5. Case study 1: India

1. Avahan

The Importance of sex worker interventions: The case of Avahan in India
Laga M., Galavotti C., Sundaramon S., Moodie R. (2016). Sex Transm Infect 2010; 86:i6-i7
http://sti.bmj.com/content/86/Suppl_1/i6.extract

The Government of India has supported sex-worker interventions in many high-prevalence districts since the mid-1990s, adopting mainly individual risk-reduction strategies such as condom distribution and outreach. In **2005, the Bill and Melinda Gates Foundation's Avahan India AIDS Initiative was launched to increase the coverage of interventions for most at-risk populations**, adopting a more holistic approach to prevention for sex workers. Within 2 years of operation, Avahan had scaled up across six states, achieving coverage of over 80% of the target population. In coordination with the Government of India and 134 grass-roots Indian non-governmental organisations (NGOs), the programme reaches over 200,000 sex workers, 60,000 men who have sex with men, 20,000 injecting-drug users and over 5 million high-risk men (Chandrasekeran, 2009).

Careful programme monitoring at all levels has allowed Avahan to document programme coverage and quality, and an ambitious plan to evaluate the prevention impact of Avahan is now under way. **Initial results are promising, with notable decreases in STI and HIV among both the target populations and general population** (Reza-Paul, 2008; Moses, 2008). Three key principles have defined Avahan's work: data, community and scale.

- **Data**: Patterns of the epidemic were mapped, identifying those areas with the majority of HIV cases and with low coverage of HIV prevention services. Data guided every following decision. Based on the data collected, the Avahan team abandoned activities and redirected resources to activities that were more likely to have an **impact at scale**;
- **Community**: Avahan strove to put the community of sex workers at the centre of the response. Sex workers were viewed not only as the key customers but also as the natural owners of the programme. The inspiration for this came from the Sonagachi Project. The Sonagachi Project is led by sex workers in a model that has come to be known as community-led structural intervention.

Community participation **facilitated access** to key social networks and helped the project track the intensity and quality of programme exposure. As their involvement grew, sex workers began to increasingly come together to work on issues affecting the community as a whole.

Changes in HIV and syphilis prevalence among female sex workers from three serial cross-sectional surveys in Karnataka state, South India.
Isac S., Ramesh B.M., Rajaram S., Washington R., Bradley J.E., Reza-Paul S., Beattie T.S., Alary M., Blanchard J.F., Moses S. (2015). BMJ Open. 27;5(3):e007106.
https://www.ncbi.nlm.nih.gov/pubmed/25818275

This paper examined trends over time in condom use, and the prevalences of HIV and syphilis, among FSWs in South India. Data from three rounds of cross-sectional surveys were analysed, with HIV and high-titre syphilis prevalence as outcome variables. Multivariable analysis was applied to examine changes in prevalence over time. The **prevalences** of HIV infection and high-titre syphilis among FSWs have steadily **declined** with increased condom use. Further reductions in prevalence will require intensification of prevention efforts for new FSWs and those soliciting clients using mobile phones or from home, as well as increasing condom use in the context of regular partnerships.

Community Mobilization and Empowerment of Female Sex Workers in Karnataka State, South India: Associations With HIV and Sexually Transmitted Infection Risk
Beattie T.S.H., Mohan H.L., Bhattacharjee P.,Chandrashekar S., Isac S., Wheeler T., Prakash R., Ramesh B.M., Blanchard J.F., Heise L., Vickerman P., Moses S., Watts C. (2014). Am J Public Health; 104(8): 1516–1525.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4103234/

The authors of this study examined the impact of community mobilisation on the empowerment, risk behaviours, and prevalence of HIV and STIs in FSWs in Karnataka, India. Pathway analyses suggested community mobilisation acted above and beyond peer

education; reduction in gonorrhea or chlamydia was attributable to community mobilisation. The authors concluded that community mobilisation is a **central part of HIV prevention programming** among FSWs, empowering them to better negotiate condom use and access services, as well as address other concerns in their lives.

Optimal Allocation of Resources in Female Sex Worker Targeted HIV Prevention Interventions: Model Insights from Avahan in South India
Panovska-Griffiths J., Vassall A., Prudden H.J., Lépine A., Boily M.C., Chandrashekar S., Mitchell K.M., Beattie T.S., Alary M., Martin N.K., Vickerman P. (2014). PLoS ONE 9(10): e107066. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0107066

Evidence suggests Avahan averted 202,000 HIV infections over 4 years. For replicating this intervention elsewhere, it is essential to understand how the intervention's impact could have been optimised for different budget levels. As budget levels increase, the optimal intervention strategy is to first increase intervention intensity which achieves little impact, then scale-up coverage to high levels for large increases in impact, and lastly increase intensity further for small additional gains. The **cost-effectiveness** of these optimal strategies generally improves with increasing resources, while straying from these strategies can triple costs for the same impact. Projections suggest Avahan was close to being optimal, and moderate budget reductions (≥20%) would have reduced impact considerably (>40%).

Assessment of the population-level effectiveness of the Avahan HIV-prevention programme in South India: a preplanned, causal-pathway-based modelling analysis
Pickles M., Boily M.C., Vickerman P., Lowndes C.M., Moses S., Blanchard J.F., Deering K.N., Bradley J., Ramesh B.M., Washington R., Adhikary R., Mainkar M., Paranjape R.S., Alary M. (2013). Lancet Glob Health; 1(5):e289-99.
https://www.ncbi.nlm.nih.gov/pubmed/25104493

The aim of this study was to assess Avahan's overall effectiveness by estimating the number and proportion of HIV infections averted across Avahan districts, following the causal pathway of the intervention, using a mathematical model of HIV transmission. In 13 of 24 IBBA districts, modelling suggested medium to strong evidence for the large self-reported increase in consistent condom use since Avahan implementation. In the remaining 11 IBBA districts, the evidence was weaker, with consistent condom use generally already high before Avahan began. This is the first assessment of Avahan to account for the causal pathway of the intervention, that of changing risk behaviours in female sex workers and high-risk men who have sex with men to avert HIV infections in these groups and the general population. The findings suggest that **substantial preventive effects can be achieved** by targeted behavioural HIV prevention initiatives.

An integrated structural intervention to reduce vulnerability to HIV and sexually transmitted infections among female sex workers in Karnataka state, south India
Gurnani V., Beattie T.S., Bhattacharjee P., Mohan H.L., Maddur S., Washington R., Isac S., Ramesh B.M., Moses S., Blanchard J.F. (2011). BMC Public Health; 11: 755.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3205062/

The authors of this paper developed structural interventions involving policymakers, secondary stakeholders (police, government officials, lawyers, media) and primary stakeholders (FSWs themselves). Standardised, routine programme monitoring indicators on service provision, service uptake, and community activities were collected monthly from 18 districts in Karnataka between 2007 and 2009. Daily tracking of news articles concerning HIV/AIDS and FSWs was undertaken manually in selected districts between 2005 and 2008. Stigma, discrimination, violence, harassment and social equity issues are critical concerns of FSWs. This report demonstrates that it is possible to address these broader structural factors as part of large-scale HIV prevention programming.

Cost effectiveness of targeted HIV prevention interventions for female sex workers in India
Prinja S., Bahuguna P., Rudra S., Gupta I., Kaur M., Mehendale S.M., Chatterjee S., Panda S., Kumar R. (2011). Sex Transm Infect 87:354-361
http://sti.bmj.com/content/87/4/354.short

A compartmental mathematical Markov state model was used over a 20-year time horizon (1995–2015) to estimate the cost-effectiveness of FSW targeted interventions, with a health system perspective. These resulted in a reduction of 47% (1.6 million) prevalent and 36% (2.7 million) cumulative HIV cases. The authors concluded that at the current gross domestic product in India, targeted intervention is a **cost-effective strategy** for HIV prevention.

The costs of HIV prevention for different target populations in Mumbai, Thane and Bangalore
Chandrashekar S., Vassall A., Reddy B., Shetty G., Vickerman P., Alary M. (2011). MC Public Health 11(Suppl 6):S7.
http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-11-S6-S7

Although the broad costs of such HIV interventions are known, to-date there has been little data available on the comparative costs of reaching different target groups. Costs were found to vary substantially by target group.

Changes in risk behaviours and prevalence of sexually transmitted infections following HIV preventive interventions among female sex workers in five districts in Karnataka state, south India
Ramesh B.M., Beattie T.S.H., Shajy I., Washington R., Jagannathan L., Reza-Paul S., Blanchard J.F., Moses S. (2010). Sex Transm Infect; 86 Suppl 1:i17-24.
https://www.ncbi.nlm.nih.gov/pubmed/20167725

This study examines the impact of Avahan on the prevalence of HIV/STI, condom use and programme coverage. Baseline and follow-up integrated biological and behavioural surveys were conducted on random samples of FSW. This large-scale HIV prevention programme for FSW achieved **reductions** in HIV and STI prevalence, high rates of condom use with clients and high rates of programme coverage.

Interim modelling analysis to validate reported increases in condom use and assess HIV infections averted among female sex workers and clients in southern India following a targeted HIV prevention programme
Pickles M., Foss A.M., Vickerman P., Deering K., Verma S., Demers E., Washington R., Ramesh B.M., Moses S., Blanchard J., Lowndes C.M., Alary M., Reza-Paul S., Boily M.C. (2010). Sex Transm Infect; 86 Suppl 1:i33-43.
http://sti.bmj.com/content/86/Suppl_1/i33.abstract

This study assesses whether the observed declines in HIV prevalence since the beginning of the Avahan initiative are consistent with self-reported increases in condom use by FSWs in two districts of southern India, and provides estimates of the fraction of new infections averted among FSWs and clients due to increases in condom use in commercial sex after 2004. A deterministic compartmental model of HIV/STI transmission incorporating heterogeneous sexual behaviour was developed, parameterised and fitted using data from two districts in Karnataka. The HIV epidemics in Belgaum and Mysore are both declining. Increased condom use following the Avahan intervention **is likely to have played a role** in curbing the HIV epidemic in Mysore. In Belgaum, given the limitations in available data, this method cannot be used alone to decide if there has been an increase in condom use.

The effects of scale on the costs of targeted HIV prevention interventions among female and male sex workers, men who have sex with men and transgenders in India

Chandrashekar S., Guinness L., Kumaranayake L. Reddy B., Govindraj Y., Vickerman P., Alary M. (2010). Sex Transm Infect; 86:i89-i94
http://sti.bmj.com/content/86/Suppl_1/i89.full

This study examines the cost variation of 107 NGOs implementing targeted interventions (Avahan), over the start-up and first 2 years of intervention. The total number of registered people was 134, 391 at the end of 2 years, and 124 ,669 had used STI services during that period. The median average cost of Avahan programme for this period was $76 per person registered with the project. A **significant reduction in average costs was observed.** As full scale-up had not yet been achieved, the average cost at scale is yet to be realised and the extent of the impact of scale on costs yet to be captured.

Declines in risk behaviour and sexually transmitted infection prevalence following a community-led HIV preventive intervention among female sex workers in Mysore, India
Reza-Paul S., Beattie T., Syed, H.U.R., Venukumar, K.T., Venugopal, M.S., Fathima, M.P., Raghavendra H.R.; Akram P., Manjula R., Lakshmi M. Isac S., Ramesh B., Washington R., Mahagaonkar S.B., Glynn J.R., Blanchard J.F., Moses S. (2008) AIDS- Volume 22 - Issue - p S91–S100
http://journals.lww.com/aidsonline/Abstract/2008/12005/Declines_in_risk_behaviour_and_sexually.8.aspx

This case study describes how Ashodaya Samithi in Mysore, funded by Avahan, approached community-led structural interventions by allowing communities to lead the efforts. It investigates the impact on sexual behaviour and STI of the comprehensive programme in Mysore. It documented substantial increases in self-reported condom use, and significant reductions in the prevalence of four curable STIs among FSWs. The study reported no increase in HIV prevalence, and a decline in HIV prevalence among those women without a regular partner.

Impact of an intensive HIV prevention programme for female sex workers on HIV prevalence among antenatal clinic attenders in Karnataka state, south India: an ecological analysis
Moses S., Ramesh B.M.; Nagelkerke N.J.D. Khera, A., Isac, S., Bhattacharjee P, Gurnani V., Washington R., Prakash K. H., Pradeep B.S., Blanchard J.F. (2008). AIDS Volume 22 Suppl 5, p S101–S108.
http://journals.lww.com/aidsonline/Abstract/2008/12005/Impact_of_an_intensive_HIV_prevention_programme.9.aspx

This paper examines the impact of the Avahan programme on community HIV transmission, as represented by HIV prevalence among young antenatal clinic (ANC) attenders in Karnataka state, south India. Although this analysis is limited by lack of precise comparative data on intervention coverage and intensity, it supports the notion that scaled-up, intensive, targeted HIV preventive interventions among high-risk groups can have a measurable and relatively rapid impact on HIV transmission in the general population, particularly young sexually active populations as represented by ANC attenders.

Modelling the impact and cost-effectiveness of the HIV intervention programme amongst commercial sex workers in Ahmedabad, Gujarat, India
Fung I.C.H., Guinness L., Vickerman P., Watts P., Vannela G., Vadhvana J., Foss A.M., Malodia L., Gandhi M., Jani G. (2007). BMC Public Health 7:195
http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-7-195

This study estimates the cost-effectiveness of the Jyoti Sangh HIV prevention programme (outreach, peer education, condom distribution, and free STD clinics), part of the National AIDS Control Programme. A dynamic mathematical model was used with survey and intervention-specific data. Over 51 months**, projections suggest that the intervention**

averted 624 (54%) and 5,131 (51%) HIV cases among commercial sex workers and their clients, respectively. **Cost per HIV infection averted**, excluding and including peer educator economic costs, was $59 and $98 respectively. This study demonstrated that targeted CSW interventions in India **can be cost-effective**, and highlights the importance of replicating this effort in other similar settings.

The role of collectives in STI and HIV/AIDS prevention among female sex workers in Karnataka, India
Halli S.S., Ramesh B.M., O'Neil J., Moses S., Blanchard J.F. (2006). AIDS Care: Psychological and Socio-medical Aspects of AIDS/HIV. Volume 18, Issue 7.
http://www.tandfonline.com/doi/abs/10.1080/09540120500466937

This paper evaluates the role of FSW collectives in the state of Karnataka, regarding their facilitating effect in increasing knowledge and promoting change towards safer sexual behaviour. Collectivisation seems to have a positive impact in increasing knowledge and in empowering FSWs to adopt safer sex practices, particularly with commercial clients.

2. ***The SONAGACHI Project***

Empowering sex workers in India to reduce vulnerability to HIV and sexually transmitted diseases
Swendeman D., Basu I., Das S., Jana S., Rotheram Borusa M.J. (2009). Soc Sci Med; 69(8): 1157–1166.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2824563/pdf/nihms176945.pdf

The Sonagachi Project was initiated in Kolkata, India in 1992 as a STD/HIV intervention for sex workers. The project evolved to adopt strategies common to women's empowerment programmes globally (i.e. community mobilisation, rights-based framing, advocacy, micro-finance) to address common factors that support effective, evidence-based HIV/STD prevention.

This article examines the intervention's impacts on 21 measured variables reflecting five common factors of effective HIV/STD prevention programmes to estimate the impact of empowerment strategies on HIV/STD prevention program goals. The intervention which was conducted in 2000–2001 significantly**:**

1) **improved** knowledge of STDs and condom protection from STD and HIV, and maintained STD/HIV risk perceptions despite treatment;
2) provided a frame to **motivate change** based on reframing sex work as valid work, increasing disclosure of profession, and instilling a hopeful future orientation reflected in desire for more education or training;
3) improved skills in sexual and workplace **negotiations** reflected in increased refusal, condom decision-making, and ability to change work contract, but not ability to take leave;
4) built **social support** by increasing social interactions outside work, social function participation, and helping other sex workers;
5) addressed **environmental barriers** of economic vulnerabilities by increasing savings and alternative income, but not working in other locations, nor reduced loan taking, and did not increase voting to build social capital.

This study's results demonstrate that, **compared to narrowcast clinical and prevention services alone, empowerment strategies can significantly impact a broader range of factors to reduce vulnerability to HIV/STDs.**

HIV Prevention Among Sex Workers in India
Basu I., Jana S., Rotheram-Borus M.J., Swendeman D., Lee S.J., Newman P., Weiss P. (2010) J Acquir Immune Defic Syndr
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2826108/

To test the efficacy of a sustainable community-level HIV intervention among sex workers, the Sonagachi Project was replicated, including community organising and advocacy, peer education, condom social marketing, and establishment of a health clinic. Sex workers were randomly selected in 2 small urban communities in northeastern India (n=100 each) and assessed every 5–6 months over 15 months (85% retention). Overall condom use increased significantly in the intervention community (39%) compared with the control community (11%), and the proportion of consistent condom users increased 25% in the intervention community compared with a 16%f decrease in the control community. This study **supports the efficacy** of the Sonagachi model intervention in increasing condom use and maintaining low HIV prevalence among sex workers.

The necessary contradictions of 'community-led' health promotion: A case study of HIV prevention in an Indian red light district
Cornish F., Ghosh R. (2007). Social Science & Medicine. Volume 64, Issue 2, p 496–507.
http://www.sciencedirect.com/science/article/pii/S0277953606004771

This **ethnographic** study is based on observation of the Sonagachi Project's participatory activities and 39 interviews with a range of its stakeholders (including sex worker employees of the project, non-sex-worker development professionals, brothel managers, sex workers' clients). The analysis shows that the project is deeply shaped by its relationships with non-sex-worker interest groups. Thus, the 'community' that leads this project is much wider than a local grouping of marginalised sex workers. The authors argue that, given existing power relations, the **engagement with other interest groups was necessary** to the project's success. Moreover, as the project has developed, sex workers' interests and leadership have gained increasing prominence. It is suggested that existing optimistic expectations of participation inhibit acknowledgement of the troubling work of balancing power relations. Rather than denying such power relations, projects should be expected to plan for them.

6. Case study 2: Zimbabwe

"You are wasting our drugs": health service barriers to HIV treatment for sex workers in Zimbabwe
Mtetwa, S., Busza J., Chidiya S., Mungofa S., Cowan, F. (2013). BMC Public Health 13:698.
http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-13-698

In Zimbabwe, despite the existence of well-attended services targeted to FSWs, fewer than half of women diagnosed with HIV took up referrals for assessment and ART initiation; just 14% attended more than one appointment. The authors conducted a qualitative study (3 focus group discussions) to explore the reasons for non-attendance and the high rate of attrition. Sex workers emphasised **supply**-side barriers, such as being **demeaned and humiliated by health workers**, reflecting broader **social stigma** surrounding their work. Sex workers were particularly sensitive to being identified and belittled within the health care environment. **Demand**-side barriers also featured, including competing time commitments and costs of transport and some treatment, reflecting sex workers' marginalised socio-economic position. The authors conclude that programmes working to reduce sex workers' attrition from HIV care need to proactively address the quality and environment of public services. Sensitising health workers through specialised training, refining referral systems from sex-worker friendly clinics into the national system, and providing opportunities for sex workers to collectively organise for improved treatment and rights might help alleviate the barriers to treatment initiation and attention.

Impact and Process Evaluation of Integrated Community and Clinic-Based HIV-1 Control: A Cluster-Randomised Trial in Eastern Zimbabwe.

Gregson S., Adamson S., Papaya S., Mundondo J., Nyamukapa C.A., Mason P.R., et al. (2007). PLoS Med 4(3): e102. doi:10.1371/journal.pmed.0040102
http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0040102

This research looks at programmes that deliver information and education through health clinics and directly in the community. Such programmes are termed 'integrated community and clinic-based HIV prevention'. The researchers wanted to find out whether providing these strategies for HIV prevention in Eastern Zimbabwe could reduce the proportion of people within the community infected with HIV.

This was a cluster randomised trial. Six pairs of communities were compared, each of which had its own health centre. Control communities received the standard government services for preventing HIV. The other communities received a package of various additional strategies. These **included education and condom distribution amongst sex workers and their clients;** better services at STI clinics (STIs can increase the risk of HIV infection); and educational HIV/AIDS open days at health centres. They found that there was **no statistical difference** in the number of people in the intervention arm who became infected with HIV over the course of the trial, as compared to people in the control arm. Men in the intervention communities were more likely to have effective treatment for STIs, but women were more likely to show risky behaviours, such as having sex at a younger age, and having unprotected sex. However, men in the intervention communities were more knowledgeable about HIV/AIDS than men in the control communities. One strategy in the intervention arm (delivery of education and condom distribution among sex workers and their clients) may have been less successful because of the economic situation at the time, which meant that the income-generating projects that were supposed to support this initiative were impossible. **Overall, the intervention did not have an impact on the HIV infection rate in the community. Some other trials have also shown similar results. These results mean that other strategies need to be developed, and tested**, which will encourage people to change their behaviour patterns and reduce the risk of getting HIV.

A pilot study for an HIV prevention programme among commercial sex workers in Bulawayo, Zimbabwe
Wilson D., Sibanda B., Mboyi L., Msimanga S., Dube G. (1990). Social Science & Medicine. Volume 31, Issue 5, Pages 609-618.
http://www.sciencedirect.com/science/article/pii/027795369090097C

In a health education pilot study for a programme to reduce HIV transmission among commercial sex workers, 113 were interviewed and observed in Bulawayo, Zimbabwe during 1989. Ethnographic approaches demonstrated a lack of cohesion among these commercial sex workers and a consequent need to foster organised, motivated groups for health education, the importance of incorporating clients in health education and the feasibility of using bar security and sales personnel as health educators. It is concluded that health education is urgently needed among this group, but that it is equally important to direct health interventions at clients, many of whom are resistant to condom use.

The Zimbabwe HIV prevention program for truck drivers and commercial sex workers: a behaviour change intervention
Mupemba, K. (1999). Resistances to Behavioural Change to Reduce HIV/AIDS Infection, 133-137
http://htc.anu.edu.au/pdfs/resistances_ch12.pdf

The Zimbabwe National Employment Council for the Transport Operating Industry (NECTOI) began an AIDS education programme in 1992 targeting transport workers though their companies. An outreach programme was designed for long-distance truck drivers and their assistants through their contacts with sex workers, to stabilise or reduce incidence of STDs including HIV among truckers and their sexual partners along three major highways in

Zimbabwe: to encourage condom use, especially in commercial sex, and to emphasise the dangers of unprotected sex and large numbers of sexual partners. **AIDS awareness and condom use rose** dramatically from 1992 to 1995. Most measures of risk behaviour showed smaller changes between 1995 and 1997. In this period the project worked intensively with sex workers patronised by truck drivers many of whom were still insisting upon unprotected sex. There were baseline (Maradzika et al., 1995) and follow-up (Sibanda et al., 1997) surveys.

7. Further resources

A Systematic Review of HIV and STI Behaviour Change Interventions for Female Sex Workers in the United States.
Abad N., Baack B.N., O'Leary A., Mizuno Y., Herbst J.H., Lyles C.M. (2015). AIDS Behav; 19(9):1701-19.
https://www.ncbi.nlm.nih.gov/pubmed/25711295

HIV risk and preventive interventions in transgender women sex workers
Poteat T., Wirtz A.L., Radix A., Borquez A., Silva-Santisteban A., Deutsch M.B., Khan S.I., Winter S., Operario D. (2015). The Lancet, Volume 385, Issue 9962
http://www.sciencedirect.com/science/article/pii/S0140673614608333

HIV Infection Among Female Sex Workers in Concentrated and High Prevalence Epidemics: Why a Structural Determinants Framework is Needed
Shannon K., Goldenberg S.M., Deering K.N., Strathdeec S.A. (2014). Curr Opin HIV AIDS; 9(2): 174–182.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4286412/

Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis
Baral S., Beyrer C., Muessig K., Poteat T., Wirtz A.L., Decker M.L., Sherman S.G, Kerrigan D. (2012). The Lancet Volume 12, Issue 7.
http://www.sciencedirect.com/science/article/pii/S147330991270066X

Effectiveness of Peer Education Interventions for HIV Prevention in Developing Countries: A Systematic Review and Meta-Analysis
Medley A., Kennedy C., O'Reilly K., Sweat M. (2009). AIDS Educ Prev; 21(3): 181–206.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3927325/

Cost and cost-effectiveness of HIV/AIDS prevention strategies in developing countries: is there an evidence base?
Walker D. (2003). Health Policy Plan. 18 (1): 4-17.
http://heapol.oxfordjournals.org/content/18/1/4.short

8. Additional information

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