G Setswe

INTRODUCTION

Researchers, public health practitioners and patients are loaded with unmanageable amounts of information about the best approaches to change behaviours that put people at risk of getting infected with HIV and AIDS. Over the last 30 years, there has been an exponential rise in the number of published scientific articles across health fields. There have been 131 000 randomised controlled trials (RCTs) completed since 1948, over 2 million articles are published annually in the biomedical literature in over 20 000 journals, and over 3 330 journals are indexed in MEDLINE (Rutherford, Peersman & Sogolow, 2000).

Systematic reviews of behavioural interventions for reducing the risk of HIV have been developed to synthesise the vast number of studies and data sets obtained from these studies. These reviews are useful to social and behavioural health scientists because they link and correlate huge amounts of information in order to identify beneficial or harmful interventions. Policymakers can use systematic reviews to formulate practice guidelines, identify appropriate interventions for funding, and promote health care legislation grounded in sound public health science. Researchers in social and behavioural sciences can use the results of systematic reviews to identify opportunities for further study and to ensure that they are not inadvertently investigating an intervention which has already been proven effective or ineffective (Rutherford et al., 2000).

Several interventions are implemented in the social and behavioural health sciences to reduce HIV risk. These are classified as behavioural and social interventions, and policy studies. Behavioural interventions aim to change risk behaviours or decrease incidence rates of HIV or other sexually transmitted infections (STIs) and tend to emphasise individual and small-group approaches such as counselling, small-group discussion or skills demonstration.

Social interventions aim to change risk behaviours or decrease incidence rates of HIV and also include explicit and direct attempts to change peer or community norms related to HIV risk. These interventions, while they may use individual or small-group approaches, emphasise peer influence and community-level approaches, such as engaging key opinion leaders like educators, and mobilising the community to support HIV risk reduction behaviours. This category also includes any intervention aimed at changing environmental factors or structures related to HIV risk.

Policy studies aim to change risk behaviours or decrease incidence rates of HIV or STIs as a function of administrative or legal decisions – e.g. making condoms available in public settings or supporting HIV education in schools (CDC, 2001).

A systematic review is a method of identifying, appraising, and synthesising research evidence with the aim of evaluating and interpreting all available research that is relevant to a particular review question. A systematic review differs from a traditional literature review in that the latter describes and appraises previous work, but does not specify methods by which the reviewed studies were identified, selected, or evaluated. In a systematic review, the scope (e.g., the review question and any sub-questions and/or sub-group analyses) is defined in advance, and the methods to be used at each step are specified. The steps include:

- a comprehensive search to find all relevant studies
- the use of criteria to include or exclude studies
- the application of established standards to appraise study quality.

**Professor Geoffrey Setswe** is a chief research specialist in the Social and Behavioural Aspects of HIV/AIDS Unit at the Human Sciences Research Council. He was the founding Director of the AIDS Research Institute at the University of the Witwatersrand, where he coordinated HIV/AIDS research. He received the DPH degree and B Cur Honus from MEDUNSA, a Masters of Public Health degree from Temple University in Philadelphia, where he was a Fullbright Scholar, and a BA Cur degree from UNISA. He is deputy Chairman of the Board of the AIDS Consortium, member of the Board of Hope Worldwide and member of the Board of Lilly Foundation.

Professor Setswe is, among others, a member of the International AIDS Society (IAS), a reviewer of public health and HIV/AIDS research for the NRF, AIDS & Behaviour, Health SA. His research interests are in systematic reviews of behavioural interventions for reducing the risk of HIV/AIDS in the workplace, monitoring and evaluation of HIV/AIDS interventions for young people, interventions for reducing HIV/AIDS in the water sector and building capacity for implementing HIV/AIDS interventions.

**Correspondence to:** Geoffreay Setswe, e-mail: gsetswe@hsrc.ac.za
A systematic review also makes explicit the methods of extracting and synthesising study findings (Rychetnik, Hawe, Waters, Barratt & Frommer, 2004).

Meta-analysis is a specific method of statistical synthesis that is used in some systematic reviews, where the results from several studies are quantitatively combined and summarised. The pooled estimate of effect from a meta-analysis is more precise (that is, has narrower confidence intervals) than the findings of each of the individual contributing studies, because of the greater statistical power of the pooled sample.

### SYSTEMATIC REVIEWS OF BEHAVIOURAL INTERVENTIONS FOR REDUCING THE RISK OF HIV INFECTION

Systematic reviews of behavioural interventions for reducing the risk of HIV are used to address a wide range of issues such as the risk of getting infected, strategies to reduce sexual risk behaviour, intervention effectiveness and cost effectiveness, and social and behavioural phenomena that put people at risk. The premise of systematic reviews is that another reviewer using the same methods to address the same review question will identify the same results. Although such repeatability has tended to be more achievable in quantitative reviews and meta-analyses, there are ongoing developments to improve and standardise methods of narrative synthesis.

Systematic reviews on HIV and AIDS are coordinated by the Cochrane Review Group on HIV and AIDS. This is part of the international network of researchers, health care providers and individuals whose mission is to prepare, maintain and disseminate systematic, continuously updated reviews of HIV and AIDS interventions. Systematic reviews conducted by the HIV and AIDS Group methodically assess all available evidence about the effects of specific HIV and AIDS interventions, including behavioural interventions. Reviews are designed to support a fully objective analysis and to minimise bias (Rutherford et al., 2000).

Several studies review behavioural interventions for reducing the risk of HIV infection in various risk groups such as school-children (Kirby, Short, Collins, Rugg, Kolbe, Howard et al., 1994), adolescents (Kim, Stanton, Li, Dickersin & Galbraith, 1997), young people (Oakley, Fullerton, Holland, Arnold, France-Dawson, Kelley et al., 1995), women (Exner, Seal & Ehrhard, 1997; Wingood & DiClemente, 1996), adult heterosexual, youth/adolescent heterosexual and injection drug users (Darbes, Kennedy & Rutherford, 2002), men who have sex with men (MSM) (Johnson, Hedges & Diaz, 2003).

Other systematic reviews have been conducted on behavioural interventions such as the impact of abstinence-only programmes (O'Reilly, Medley, Dennison, Schmid & Sweat, 2003), voluntary HIV counselling and testing (Denison, O'Reilly, Schmid, Strouse & Sweat, 2004) and the efficacy of peer education (Medley, O'Reilly; Schmid & Sweat, 2003) in reducing HIV sexual risk behaviours.

### WHAT EVIDENCE DO WE HAVE ON THE EFFECTIVENESS OF BEHAVIOURAL INTERVENTIONS?

Over the years, reviewers have amassed evidence on effective interventions for reducing the risk of HIV infection in a variety of groups using a variety of approaches. First, this letter to the editor shares outcomes of interventions that provided us with evidence or lack of it, and then discusses areas where reviews are still needed or are in progress.

A review of behavioural interventions for reducing the risk of sexual HIV transmission by injecting drug users (IDUs) found that IDUs changed their sexual risk behaviour to avoid becoming infected with HIV and to avoid transmitting HIV to their sexual partners. Although the risk-reduction effect was moderate, the reviewers suggest that it was important to implement programmes to reduce the sexual risk behaviour of IDUs in all countries (Jarlais & Semaan, 2005).

There is further evidence that HIV risk-reduction interventions can be effective in reducing HIV infection among drug abusers (Needle, Coyle, Normand, Lamb, Cesar et al., 1998; Patten, Vollman & Thurston, 2000; Semaan, Kay, Strourse, Sogalow, Mullin, Neumann et al., 2002; Sterk, Theall & Elison, 2003; Wechsberg, Lam, Zule, Hall, Middlesteadt & Edwards, 2003). However, the reviewers say that intervention programmes must use science-based strategies and must be delivered in culturally sensitive and culturally appropriate ways. A holistic approach is needed with a multilevel effort undertaken by consumers, providers, researchers and policy makers at the individual, community and structural levels.
A meta-analytic review of interventions to modify sexual risk behaviours for preventing HIV infection in MSM conducted by Johnson et al. (2003) included 12 studies (7 trials of small-group interventions, 3 community-level interventions, and 2 individual-level interventions) reported intervention effects on unprotected sex. A summary measure of intervention effects on reducing unprotected sex was favourable, corresponding to a 23% reduction in the proportion of men engaging in unprotected sex. Reviewers concluded that interventions can promote risk reduction among MSM.

Another meta-analytic review of HIV behavioural interventions for reducing sexual risk behaviour of MSM by Herbst et al. (2005) found that interventions that were successful in reducing risky sexual behaviour were based on theoretical models, included interpersonal skills training, incorporated several delivery methods, and were delivered over multiple sessions spanning a minimum of 3 weeks. The reviewers concluded that these behavioural interventions provided an efficacious means of HIV prevention for MSM.

A review conducted by Exner et al. (1997) demonstrated that HIV prevention programmes can be effective in reducing risky sexual behaviour among at-risk women. Programme effectiveness varied by intervention type, session duration, and whether studies included women alone or both men and women. The most efficacious HIV prevention programmes were specifically directed towards women, focused on relationship and negotiation skills, and involved multiple, sustained contacts. Evidence also indicated that community-level interventions hold promise.

A quantitative review of the effectiveness of 40 adolescent AIDS-risk reduction interventions by Kim et al. (1997) concluded that AIDS risk reduction interventions can be effective in improving knowledge, attitudes, and behavioural intentions and in reducing risk practices. A majority of the studies they reviewed had a positive intervention impact (88% of studies assessing changes in knowledge; 58% changes in attitude, 60% changes in intention to use condoms, 73% in condom use, and 64% in decreasing number of sexual partners). Interventions that demonstrated an increase in intention to use a condom were significantly more likely to be theory-based than those that did not show any significant changes in intention (100% v. 0%, p = .048). Interventions that increased condom use and decreased the number of sexual partners were longer in duration than those that did not improve these outcomes.

In a meta-analysis of the impact of adolescent HIV/AIDS prevention programmes on sexual behaviours, Chookaew, Soeken, Harris, Johantgen, DeForge, Dorsey et al. (2004) found that evidence in primary studies suggests that adolescent HIV/AIDS prevention programmes are effective in reducing HIV risk-taking behaviours. However, the overall effect size of the intervention studies included in this meta-analysis was 0.19 (p < .001) indicating a small positive impact of adolescent HIV/AIDS prevention programmes in preventing HIV sexual risk-taking behaviours.

An intervention among black male adolescents on the effects of an AIDS prevention intervention by Jemmott, Jemmott and Fong (1992) found that adolescents who received AIDS intervention had greater AIDS knowledge, less favourable attitudes toward risky sexual behaviour and lower intentions to engage in such behaviour than did those in the control condition. In short, they found that behaviour skills training was effective in lowering black male adolescents’ sexual risk behaviour. However, another study by Schinke, Gordon and Weston (1990) that evaluated a cognitive intervention with minority youths found that although the youths learned problem-solving skills, their cognitive acquisition did not transfer into any measurable behaviour changes lowering their HIV infection risk. These two studies provide conflicting evidence on whether it is cognitive acquisition transfer into behaviour changes that lowers adolescents’ HIV infection risk.

Reviews of effectiveness of school-based programmes to reduce sexual risk behaviours have found that:

- it is possible to modify sexual behaviour through education, provided that attention is paid to programme design and implementation
- the impact of educational strategies is in the direction of postponed initiation of sexual intercourse and/or safer practices (there is little support for the contention that sex education encourages experimentation or increased sexual activity)
- school sex education that includes specific targeted
methods with the direct use of medical staff and peers can produce behavioural changes that lead to health benefits (Kirby et al., 1994; Grunseit, Kippax, Aggleton, Baldo & Slutkin, 1997).

O’Reilly et al. (2004) conducted a systematic review on the impact of abstinence-only programmes and found little evidence of the effectiveness of abstinence-only programmes in developing countries, either because of weak study designs or the difficulty in measuring outcomes of interest. Most evidence of effectiveness related to changes in normative beliefs. However, changes in normative beliefs may be encouraging but cannot be assumed to result in safer sexual behaviour.

Denison et al. (2004) conducted a systematic review of the impact of voluntary HIV counselling and testing (VCT) on risk behaviour in developing countries. Of the nine articles identified, one study found significant reduction in HIV incidence among women who attended antenatal clinics and whose partners also underwent VCT. One study found no intervention effect on HIV incidence among male factory workers. The reviewers concluded that evidence exists for VCT as an effective behaviour change strategy in developing countries, but weak study designs and limited replication mitigate the strength of evidence. VCT was shown to promote the most behaviour change between couples tested together, and among HIV-infected individuals, especially with their non-primary partners.

Medley et al. (2004) conducted a systematic review of the efficacy of peer education in reducing HIV sexual risk behaviours and concluded that evidence exists for peer education as an effective behaviour change strategy in developing countries. Peer education had the strongest impact on changing HIV knowledge and attitudes. Eleven studies showed peer education (PE) increased HIV knowledge/attitudes, 8 studies showed increased condom use, 2 showed increased risk perception for HIV, and 3 showed decreased barriers to condom use. In addition, 1 study showed PE was effective in reducing the incidence of gonorrhoea.

Kim, Griffin, Marrero-Gonzalez, Rama & Crepaz (2004) conducted a meta-analysis of the effects of behavioural interventions in United States STI clinics on the reduction of unsafe sexual behaviours and STI re-infection. They found that overall, behavioural interventions had a significant impact on the reduction of sexual risk behaviour. They found that interventions that provided skills training on condom use and negotiating safer sex with partners were effective in reducing sexual risk behaviours. The reviewers concluded that behavioural interventions successfully modified high-risk behaviours of STI clinic patients, primarily African-Americans and Hispanics – two populations which are greatly affected by HIV/STI epidemics.

The CDC (2001), through its HIV/AIDS Prevention Research Synthesis Project, compiled a compendium of HIV prevention interventions in the USA with evidence of effectiveness. Interventions with evidence of effectiveness that were identified were 5 for drug users, 10 for heterosexual adults, 5 for men who have sex with men and 8 for youth.

Certain components were shared by the majority of interventions that achieved positive behavioural changes, including skills training; cultural sensitivity; gender sensitivity; interventions longer in time, number of sessions, or both; and interventions which use science or theory-based strategies or specific targeted methods.

We have as yet no evidence of the effectiveness of behavioural interventions for workers in occupational settings (Setswe, Herman, Mokwena & Ram, 2005), street children and youth in developing countries (Kondagunta, 2003b), abstinence-promotion (Underhill, 2003), use of the female condom, modifying drug-taking risk behaviours, commercial sex workers (Kondagunta, 2003a), and ethnic minorities in the USA (Darbes, 2003). The Cochrane Review Group on HIV infection and AIDS indicate that these reviews are currently registered as either topics or protocols. Some of the reviews may have been completed recently but have not been published in peer-reviewed journals.

CONCLUSION
Systematic reviews have provided the research world with the evidence that behavioural interventions do reduce the risk of HIV infection in IDUs, MSM, women, adolescents and youth. Systematic reviews have also provided us with evidence that behavioural interventions are effective in reducing the risk of HIV
infection in school-based programmes, through VCT and peer education programmes, and for other unsafe sexual behaviours.

There is conflicting evidence on whether it is cognitive acquisition transfer into behaviour change that lowers adolescents’ HIV-infection risk. Two reviews had totally different findings on this matter. Again, there is little evidence of the effectiveness of abstinence-only programmes in developing countries. The reviewers attributed this to weak study designs or the difficulty they had in measuring outcomes of interest.

At this point in time we do not have evidence of effectiveness or otherwise of behavioural interventions for workers in occupational settings, street children, commercial sex workers, and use of the female condom. These interventions are currently under review at the Cochrane Review Group on HIV and AIDS.

Behavioural interventions to reduce risk for HIV infection are effective and should not only be disseminated widely, but should also be used extensively to translate increased awareness and knowledge levels of HIV and AIDS into workable behaviour change patterns that will help reduce the risk of HIV infection, particularly in groups at high risk.

References
Brennan, R. C., Garmey, J. G., & Land, G. H. (1999). Evidence-based decision making in public health. Journal of Public Health Management Practice, 5, 96 – 97.
Centers for Disease Control and Prevention (2003). Compendium of HIV prevention interventions with evidence of effectiveness. HIV/AIDS Prevention Research Synthesis Project, August 31, 2003. Compendium available online at: http://www.cdc.gov/HIV/pubs/HIVcompendium/ HIVcompendium.htm
Choueke, N., Ssekan, K., Harri, R., Johanson, M., DuPonte, B., Donovan, S., & Fritz, C. (2014). The impact of adolescent HIV/AIDS prevention programmes on sexual behaviour: a meta-analysis. The XV International AIDS Conference, 13 July (1), ThEe Poster 7653. Bangkok, Thailand.
Dobbs, L. (2015). Behavioral interventions to decrease HIV infection among ethnic minorities in the developed world. (Protocol). The Cochrane Database of Systematic Reviews, 1.
Dobbs, L., Kennedy, G. E., Peersman, G., & Sogolow, E. (2002). Systematic review of HIV behavioural prevention research in African-American. March 2012. Online available at http://wwwiro.ucsf.edu/Evidence/04-07/05Pub/04-07/05Pub-04-07-09
Denison, J. A., O'Reilly, K., Schmid, G., & Sweat, M. D. (2003). Systematic review of the impact of voluntary HIV counseling and testing (VCT) on risk behaviour in developing countries. The XV International AIDS Conference, 11 July (11), ThEe Poster 4923. Bangkok, Thailand.
Enem, T., Md, D. W., & Heffela, A. A. (1997). A review of HIV interventions for at-risk women. AIDS and Behavior, 1(2), 93 – 124.
Grimes, A., Kiprotich, S., Aggleton, P., Balak, M., & Shinko, G. (1997). Sensitivity education and young people’s sexual behaviour: a review of studies. Journal of Adolescent Research, 12(4), 421–453.
Herbst, J. H., Sheth, R. T., Crepaz, N. & HIV/AIDS Prevention Research Synthesis Team (2005). A meta-analytic review of HIV behavioral interventions for reducing sexual risk behavior of men who have sex with men. Journal of AIDS and Human Immunodeficiency Syndrome, 9(2), 288 – 294.
Jellicoe, D. C. D., & Soosam, S. (2003). Interventions to reduce the sexual risk behaviour of injecting drug users. International Journal of Drug Policy, 14 (Supplement 1), 58 – 66.
Jemmott, J. B., Jemmott, L. S., & Pong, G. T. (1992). Reductions in HIV-risk associated sexual behaviours among Black male adolescents: Effects of an AIDS prevention intervention. American Journal of Public Health, 82(5), 772 – 777.
Johnson, W. S., Hodges, L. V., & Duan, R. M. (2003). Interventions to modify sexual risk behaviours for preventing HIV infection in men who have sex with men. The Cochrane Database of Systematic Reviews, 1.
Kim, N., Stanton, B., Xi, X., Dickerman, K., & Gilbar, J. (1997). Effectiveness of the 40 adolescent AIDS-risk reduction interventions. A quantitative review. Journal of Adolescent Health, 20, 204 – 215.
Kim, A. S., Grillia, T., Murianto-Gonsalvez, P.C., Ramu, S. M., & Crepaz, N. (2014). Effects of behavioural interventions conducted in US STD clinics on the reduction of unsafe sexual behaviours and VCT to infection: Meta-analysis. Society for Medical Decision-making. Poster Session – Public Health; Methodological Advances. http://smartxinn.com/conf/ex/2014js/toeprogram/ P1415HTM
Kiley, D.; Short, L.; Collin, J.; Raggi, D.; Kolbs, L.; Howard, M.; Miller, B.; Soosam, S.; & Zelnik, L. S. (1994). School-based programs to reduce sexual risk behaviors: A review of effectiveness. Public Health Reports, 109(3), 359 – 360.
Kondagunta, N. (2013a). Interventions for preventing HIV infection in commercial sex workers and their clients in developing countries. Protocol. The Cochrane Database of Systematic Reviews, 1.
Kondagunta, N. (2013b). Interventions to modify sexual risk behavior for prevention of HIV infection in men and youth in developed countries. The Cochrane Database of Systematic Reviews, 1.
Medley, A., O'Reilly, K., Schmid, G., & Sweat, M. D. (2010). Systematic review of the efficacy of peer education in reducing HIV sexual risk behaviour in developing countries. The Cochrane Database of Systematic Reviews, 1.
Neville, B. H., Cyrul, S. L., Norum, J., Lammert, E., & Cara, T. (Eds.). (1998). HIV prevention with drug-users poputations – current status and future prospects. Introduction and overview Public Health Reports, 113, Suppl. 1.
Ockley, A., Pullerton, D., Holland, J., Arnold, S., Franco-Davon, M., Riley, P., & McGrail, S. (1995). Sexual health education interventions for young people: A methodological review. British Medical Journal, 315, 158 – 162.
O'Reilly, K. R., Medley, A., Demoulin, J., Schmid, G. P., & Sweat, M. D. (2013). Systematic review of the impact of abstinence-only programmes on risk behaviour in developing countries. The Cochrane Database of Systematic Reviews, 1.
Patton, S., Vollman, A., & Thurston, W. (2000). The utility of the transtheoretical model of behavioural change for HIV risk reduction in injection drug users. Journal of the Association of Nurses in AIDS Care, 11(2), 57 – 66.
Rychen, L., Hawe, P., Witter, E., Barran, A., & Perrone, M. (2014). A glossary for evidence-based public health. Journal of Epidemiology & Community Health, 58, S36 – S45.
Rothfield, G. W., Periman, G., & Sugioke, E. (2010). Systematic review (Cochrane) Confirming systematic reviews on HIV infections and AIDS. UCSF AIDS Research Institute, Centre for AIDS Prevention Studies. Available at: www.caps.ucsf.edu/Upil2/publications/Cochrane
Rutherford, G. W., Peersman, G., & Sogolow, E. (2000). Systematic review (Cochrane) Confirming systematic reviews on HIV infections and AIDS. UCSF AIDS Research Institute, Centre for AIDS Prevention Studies. Available at: www.caps.ucsf.edu/Upil2/publications/Cochrane
Semaan, S., Kay, L., Strouse, D., Sogolow, E., Mullen, P. D., Neumann, M. S., et al. (2002). A profile of US-based trials of behavioral and social interventions for HIV risk reduction. Journal of Acquired Immune Deficiency Syndromes 30, 500 – 500.
Semen, G., Herman, A., Molokwu, K., & Ram, P. S. (2015). Behavioral interventions for reducing HIV infection in populations in occupational settings. (Protocol). The Cochrane Database of Systematic Reviews, 1.
Steck, C. E., Thadil, K. P., & Elkon, R. W. (2013). Effectiveness of a risk reduction intervention among African American women who use crack cocaine. AIDS Education and Prevention, 15(3), 15 – 52.
Underhill, K. (2010). Abstinence-promotion interventions for HIV prevention in developed countries. The Cochrane Database of Systematic Reviews, 1.
Wechsberg, W. M., Lam, W. K., Zito, W., Hall, M., Mudd, J. R., & Edwards, J. (2010). Violence, homelessness, and HIV risk among crack-African American women. Substance Use and Misuse, 45(6-1), 672 – 69.
Wang, G. M., & DeClemente, R. J. (1996). HIV sexual risk reduction interventions for women. A review. American Journal of Preventive Medicine, 12, 209 – 217.