Future Commissioning of London HIV Prevention Services
Project Steering Group

Evidence Review Update (2010-2013): HIV Prevention Interventions

This report was commissioned by the Association of Directors of Public Health (London) and written by Matrix

In February 2013 the Leaders' Committee at London Councils recognised the shortcomings of the Pan London HIV Prevention Programme (PLHPP) approach to HIV prevention. In response, the Association of Directors of Public Health (ADPH) London, working with London Councils, designed the Future Commissioning of London HIV Prevention Services (FCLHPS) Project to oversee a London-wide needs assessment over the summer of 2013. The FCLHPS project included six work streams:

- Epidemiological review
- Evidence review update
- A Call for Evidence
- Stakeholder engagement
- Segmented insight research
- Mapping of current HIV prevention.

The overall findings of the needs assessment are published in the report: "HIV Prevention Needs Assessment for London" (November 2013). This report is the output of one of the six underpinning work streams, and focused on the evidence review update. ADPH London and London Councils will develop an options paper for a meeting of the leaders of the 33 councils in London, due to take place in November 2013.

Evidence Review Update (2010-2013): HIV Prevention Interventions

Final Report

Future Commissioning of London HIV Prevention Services (FCLHPS) Steering Group

Version 3

November 2013

Contents

Abbreviations

A&E	Accident and Emergency
ART	Anti-retroviral Therapy
BI	Behavioural Intervention
DSPH	Directors of Public Health
FCLHPS	Future Commissioning of London HIV Prevention Services
HIV	Human Immunodefficiency Sydrome
IDU	Injecting Drug User
MI	Motivational Intervention
MSM	Men Who Have Sex With Men
OECD	Organisation for Economic Collaboration and Development
PHAST	Public Health Action Support Team
PLWHIV	People Living With HIV
PrEP	Pre-exposure Prophylaxis
STI	Sexually Transmitted Infection
SW	Sex Workers
YMSM	Young Men Who Have Sex With Men

Executive Summary

Introduction

This report details the work undertaken by Matrix for the Future Commissioning of London HIV Prevention Services (FCLHPS) project steering group. It represents the evidence review update element of the project, and is undertaken by updating the review of published literature (2001-2011) produced by Inner North West London Primary Care Trusts and Public Health Action Support Team (PHAST) on behalf of the Pan London HIV Commissioning Group in July 2011.

Aim

To support the Pan-London HIV Prevention Programme Needs Assessment by undertaking a high quality pragmatic rapid evidence review of published literature on the effectiveness and cost effectiveness of HIV prevention interventions to update that undertaken in 2011.

Method

Two complimentary methodological approaches were adopted to update the earlier review:

- A review of reviews (2011-2013) repeating the methods of the previous report covering the period 2001-2011.
- A review of primary studies (2010-2013) to supplement the updated review of reviews.

In both, only publications of appropriately high quality study designs undertaken in OECD countries were included (i.e. 2+ Cochrane level of evidence quality or higher – see Appendix 2).

Results

A total of 24,003 titles were found from the combined electronic searches of reviews and primary studies.

Following review of the abstracts of these publications, 23,707 were excluded after screening against the project's inclusion and exclusion criteria; and the full texts of the remaining 296 titles were obtained and further screened for inclusion into the update review of reviews and the review of primary studies.

On completion of the full text screening, 21 reviews and 100 primary studies were included in the reviews of primary studies, and data was extracted from these studies. Only two of the included studies concerned cost effectiveness.

Limitations

The report sets-out the findings of an update to a previous review. Consequently it includes only the most recent evidence published over a relatively limited period of time (2010-2013), and alone it does not represent a comprehensive overview of all relevant evidence.

Also, both elements of the work employ pragmatic rapid review methods. The review of primary studies aims to provide a supplementary overview to the review of reviews stream of work, at a similar level of detail. Full detailed analysis of the included primary studies is not feasible within the time and

resources committed to the project, and would entail additional work at a further level of granularity and quality assessment/critique of included reviews and studies.

As would be expected from the methods employed, the following limitations of the review should be recognised, and appropriate cautions applied in the use of the findings.

- Our consideration of effectiveness is based on the reported conclusions of authors of reviews and investigators of primary studies alone. The quality of individual reviews and studies has not been individually assessed in detail, other than against our adopted general Cochrane inclusion/exclusion criteria. This means that no assessment has been made of statistical methods, sample size, effect size, and measures to control for biases.

- The analysis does not include meta-analysis and so no empirical insight can be provided into the appropriate relative weight to the findings of reviews or studies, or between the reviews and primary studies elements of the review can be given to findings.

- The analytic currency/metric for the overall consideration of effectiveness across included studies adopted in the original PHAST report is unclear. Our report has adopted outcome measure as the currency/metric in all included reviews and studies; however, it is not possible to definitively determine the consistency of this with the analysis in the earlier report.

- Given the nature of review publications, it is likely that the current update review of reviews will overlap with evidence already covered in the previous review; and some of the studies included in our review of primary studies may be incorporated into reviews included within our update review of reviews.

- Whilst many of the included primary studies are based on research in large urban centres of population in OECD countries, none are UK-based. Consequently caution is needed in interpreting their generalisability to the UK and London context. For instance and in particular, the majority of studies examining interventions in black ethnic groups are from the USA, and depending on the study design and intervention in question, their findings may not be valid of black ethnic groups in London.

- The update review excludes evidence generated in research in non-OCED countries, some of which may be considered to have some level of relevance to London.

- Many HIV prevention interventions are multi-faceted and as a result are difficult to classify by type in a single exclusive category, for instance knowledge focussed interventions may also aim to bring about motivational or behaviour change. Furthermore, included reviews may examine, categorise, and group interventions differently to individual studies. As a result there is a limit to the accuracy of classification of interventions against a single taxonomy and limits to the extent to which the review and primary study findings can be easily compared in a piece of work of this granularity.

- Evidence was not found for all potential interventions and some interventions are mentioned in the findings of the review of reviews and not in the review of primary studies, and vice versa. The absence of evidence on an intervention does not imply that it cannot be effective. However, the fact that evidence of effectiveness exists for some but not other interventions may still legitimately influence decision-makers.

Findings: Effectiveness

In light of the caveats set-out above, care needs to be given in the confidence and consequently the weight given to the findings alongside the findings of the other streams of work making-up the wider FCLHPS review.

Bearing this in mind, the following tentative conclusions can be made regarding the effectiveness of interventions in relation to key population groups.

Adult males

No evidence was found regarding general populations of adult males in the review of reviews update.

The review of primary studies found evidence of effectiveness from five studies for educational interventions (particularly information/knowledge interventions).

Adult females

No evidence was found regarding general populations of adult females in the review of reviews update.

The review of primary studies found evidence of effectiveness from fifteen studies for educational, supportive, and media interventions.

MSM

The review of reviews update included two reviews on MSM. These found limited evidence of effectiveness for motivational interventions, and that circumcision was ineffective.

The review of primary studies found fourteen studies, and overall these appeared to find that educational, prevention, supportive, media interventions and PrEP were effective in MSM.

Black ethnic groups

The review of reviews update included three reviews of interventions in black ethnic groups. These found evidence that behavioural interventions were effective, and that the balance of evidence suggested that motivational interventions (e.g. skills building) were ineffective.

The review of primary studies found fourteen studies that considered black populations, and suggested that education, media, and support interventions to be effective.

People with HIV

The review of reviews update included two reviews of interventions in people with HIV. They suggest that motivational interventions were effective in reducing risky sexual behaviour, and that behavioural interventions were ineffective in changing condom use.

The review of primary studies found ten studies that considered people with HIV. Overall they appeared to find that educational, supportive, and media interventions were effective.

IDUs

The review of reviews update included just one review of interventions in IDUs, and this found that opioid substance therapy was effective in reducing HIV incidence.

The review of primary studies found six studies that considered IDUs, which suggested that education and support interventions were effective, and media interventions were ineffective.

Sex workers

The review of reviews update included just one review of interventions in sex workers, and this found that behavioural interventions were ineffective.

The review of primary studies found two studies that considered sex workers, which found that supportive interventions were effective.

Adolescents

The review of reviews update included five reviews of interventions in adolescents. Overall, support-based interventions were the most effective by primary category, while behavioural intervention was found to be ineffective. By secondary category, a sport-based intervention and a new digital media were the most effective. Abstinence and peer education were found to be ineffective.

The review of primary studies found twenty-six studies which considered adolescents, and suggested that education, support, media, and testing/screening to be effective.

Findings: Cost effectiveness

In relation to cost effectiveness, the evidence review found just two studies, both from the US, that were eligible for inclusion. This suggests that little new relevant cost-effectiveness evidence has emerged since the previous review.

One study found that PrEP in high risk MSM could be considered cost effective, and the other that HIV screening in settings such as A&E and STI clinics is more cost effective than in in-patient setting, due to the better outcomes associated with earlier detection of HIV.

1.0 Introduction

1.1 Context

In February 2013 the Leaders Committee at London Councils recognised the shortcomings of the Pan London HIV Prevention Programme (PLHPP) approach to HIV prevention. In response, Association of Directors of Public Health (ADPH) London, working with London Councils, designed the Future Commissioning of London HIV Prevention Services (FCLHPS) Project to oversee a London-wide needs assessment over the summer of 2013.

The FCLHPS project included six work streams:

- Epidemiological review
- Evidence review update
- A Call for Evidence
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The overall findings of the needs assessment are published in the report, "HIV Prevention Needs Assessment for London" (November 2013). This report is the output of one of the six underpinning work streams, focused on the evidence review update. ADPH London and London Councils will develop an options paper for a meeting of the leaders of the 33 councils in London, due to take place in November 2013.

1.2 Matrix Contribution

Matrix has been commissioned to update the review of published literature (2001-2011) produced by Inner North West London Primary Care Trusts and Public Health Action Support Team (PHAST) on behalf of the Pan London HIV Commissioning Group in July 2011.

1.3 Aim

To support the Pan-London HIV Prevention Programme Needs Assessment by undertaking a high quality pragmatic rapid evidence review of published literature on the effectiveness and cost effectiveness of HIV prevention interventions to update that undertaken in 2011.

1.4 Scope

Consistent with the earlier report, the review will include publications reporting research on the following types of HIV prevention interventions:

- Behavioural (i.e. reducing or modifying risk).
- Structural or population (e.g. social & environmental).

- Biomedical (e.g. antiretroviral therapy) activities which have a role in reducing HIV transmission.
- Primary & secondary prevention.
- Condom distribution schemes.
- Group work (i.e. face-to-face & new media).
- Outreach work.
- Counselling & cognitive behaviour therapy.
- Mentoring.
- Mass media campaigns.
- HIV testing & other early diagnosis strategies.

Like the previous review the scope does not include treatment as prevention interventions.

Unlike the previous review, the scope of this report excludes 'grey' literature, which may have been supplied as part of the FCLHPS 'call for evidence' workstream being delivered separately.

1.5 Methods

Consistent with the project aim stated above, and due to the frequent delay in the inclusion of new primary studies in high quality reviews, two complimentary methodological elements were adopted to update the earlier review:

- A review of reviews (2011-2013) repeating the methods of the previous report, which covered the period 2001-2011.
- A review of primary studies (2010-2013) to supplement the updated review of reviews.

The full methodological details of each element are set out separately in the two following chapters.

2.0 Methods: Review of reviews update.

2.1 Introduction

A pragmatic rapid review methodology was adopted in order to describe the nature of the evidence base, and summarise the effectiveness and cost effectiveness findings as far as feasible within the limits of the method and project time and resources.

While the methods adopted cannot be considered as full systematic review (i.e. applying a longer & more details process) or meta analysis (i.e. seeking & combining original study data where feasible for combined statistical analysis), they apply a documented and systematic approach, and are robust within their stated limitations.

Given the client's wish to update and add to, rather than replace, the earlier review of reviews (Pyper and Brodie 2011), and in light of the project resource and time limits, the project adopted the same methodology. The limitations of this are discussed later in the report.

2.2 Search strategy

The following databases, as per the previous review, were searched using the same search strategies for clinical and cost effectiveness studies on HIV prevention interventions:

- Cochrane Library
- MEDLINE
- PYSCHNFO
- EMBASE
- CINAL
- HMIC
- EPPI-centres

The searches were conducted between 2nd and 7th August 2013, and covered the period 2010-2013.

In addition, a search was also conducted of EconLit from 2001-2013, and the NICE website was searched manually for additional relevant evidence.

2.3 Selection process

All citations retrieved from the searches were exported into a Microsoft Access database, duplicates removed, and their titles and abstracts screened by three reviewers using the inclusion and exclusion criteria shown in Appendix 1.

Full texts of selected papers were obtained and fully reviewed by one reviewer against the same inclusion and exclusion criteria, with the opinion of a second reviewer being sought in borderline cases.

Papers selected through the process of full text review were subject to data extraction.

The inclusion criteria are summarised below.

Study design

Reviews of the clinical or cost effectiveness of HIV prevention interventions containing 2+ Cochrane (see Appendix 2) level of evidence or higher.

Population

This includes all individuals at high or low risk of HIV but with particular reference to the following key target populations:

- Men who have sex with men (MSM)
- Black communities
- People living with HIV (PLWHIV)
- Injection drug users (IDUs)
- Adolescents
- Sex workers (SW)

Intervention

Interventions are categorised as far as possible in the following five primary categories and 38 secondary sub-categories.

Primary	Secondary
Education	Information/knowledge
	Skill building (general)
	Perception/Attitude
	Interpersonal skills training
	condom use skills training
	Self-efficacy
	Role play
	Condom promotion
	Service promotion
	Motivational
Prevention	Needle/syringe sharing
	Condom distribution scheme
	Circumcision
	Contact tracing / partner notification
	Screening/testing
Support	Counselling
	Peer group support

Primary	Secondary
	Social support
	Support network
	Mentoring/coaching
	Behavioural (inc Cognitive/CBT)
	Hotline/helplines
	Case Management
	Community Support Group
	Family/friend
Media	Mass media
	Newspaper/magazines
	Leaflets/posters
	TV
	Website/internet
	Advertising
	Social network website
	Texting
	Multi-media
Biomedical	Drug treatment (ART)
	Opioid substance therapy
	PEP
	PrEP

Outcomes

The following outcome measure categories were adopted.

- Condom contraception use, risky sexual behaviour, incidence STIs, incidence HIV;
- Self-efficacy, sexual frequency, sexual partners, knowledge, risky injection, sexual abstinence;
- Behaviour, injection drug use, HIV testing, behaviour intention attitude, substance abuse;
- Needle syringe sharing, STI testing, attitude prejudice, interpersonal communication skills;
- Condom use skills, condom contraception acquisition, drug testing, needle exchange, heroin dependency.

Country

Research conducted in OECD countries was included, and that from non-OECD countries excluded.

Language of study

English language publications only were included.

Date of publication

Reviews were included if published within 2011 to 2013.

To limit the possibility of overlapping and duplicating reviews between this update and the previous review, the final sets of systematic reviews/meta-analysis selected for inclusion and reporting were checked against the reference list of the previous review and any duplicates found were excluded.

2.4 Quality assessment

Consistent with the time and resource limits of the project and the aim to update a pragmatic review of reviews, a formal quality scoring method was not adopted. However, publications of appropriate quality were selected with reference to the 2+ and above Cochrane evidence level (see Appendix 2).

2.5 Data extraction

A data extraction spreadsheet was designed. In summary the following data was extracted:

- Study characteristics: Author, title of study, study objective, study type, country where study was conducted, type of intervention, including primary and secondary intervention features.
- Population characteristics: Age, gender, ethnicity, and HIV risk group.
- Primary & secondary intervention type.
- Outcomes: Outcomes of similar measures were grouped within the same category.

2.6 Data analysis & presentation

As per the original review, extracted data was collated and analysed to examine effectiveness and cost effectiveness findings in terms of outcome measures, populations studied, and intervention type.

The previous review provided minimal insight into the main currency or metric adopted for analysis. However, this is stated to be ‘interventions’. Given that many of the reviews report a range of outcomes for the same intervention, we considered it more appropriate to adopt outcomes as our main currency/metric for analysis and presentation of findings in the following chapters.

Findings are presented both in terms of the effectiveness of achieving outcomes across all interventions, and by intervention type in target populations. The former is intended to provide insight into which HIV prevention outcomes are amenable to change, and the later to identify intervention types that are most effective in key population groups.

3.0 Methods: Review of primary studies

3.1 Search strategy

As set out in Section 2.2, a single combined search strategy was conducted for the update of reviews of reviews and the reviews of primary studies.

3.2 Study selection process

The inclusion/exclusion criteria and selection process set-out in Section 2.3 were also applied, except where detailed otherwise in comments below.

Study design

Primary studies (i.e. randomised, cohort or case-control) of the clinical or cost effectiveness of HIV prevention interventions containing 2+ Cochrane (see Appendix 2) level of evidence or higher were included.

Date of publication

Primary studies were included if published between 2010 and 2013.

Data synthesis and presentation

Extracted data was collated and analysed to examine effectiveness and cost effectiveness findings in terms of outcome measures, populations studied, and intervention type.

3.3 Quality assessment

Consistent with the time and resource limits of the project and the aim to add a pragmatic review of primary studies, a formal quality scoring method was not adopted. However, publications of appropriate quality were selected with reference to the 2+ and above Cochrane evidence level (see Appendix 2).

3.4 Data extraction

As outlined in Section 2.4 in relation to the review of reviews.

3.5 Data analysis & presentation

Extracted data was collated and analysed to examine effectiveness and cost effectiveness findings in terms of outcome measures, populations studied, and intervention type.

The previous review provided minimal insight into the main currency or metric adopted for analysis. However, this is stated to be ‘interventions’. Given that many of the studies report a range of outcomes for the same intervention, we considered it more appropriate to adopt outcomes as our main currency/metric for analysis and presentation of findings in the following chapters.

Findings are presented both in terms of the effectiveness of achieving outcomes across all interventions, and by intervention type in target populations. The former is intended to provide insight into which HIV prevention outcomes are amenable to change, and the later to identify intervention types that are most effective in key population groups.

4.0 Results

4.1 Introduction

Figure 1 below summarises the results for the process of searching, abstract screening, full text screening and data extraction; and in terms of 'identified', 'eligible', and 'included' studies, for both reviews and primary studies.

4.2 Searches

As shown in Figure 1 below, a total of 24,003 citations were retrieved from the electronic searches for both the reviews and primary studies.

No additional sources were found from the NICE website.

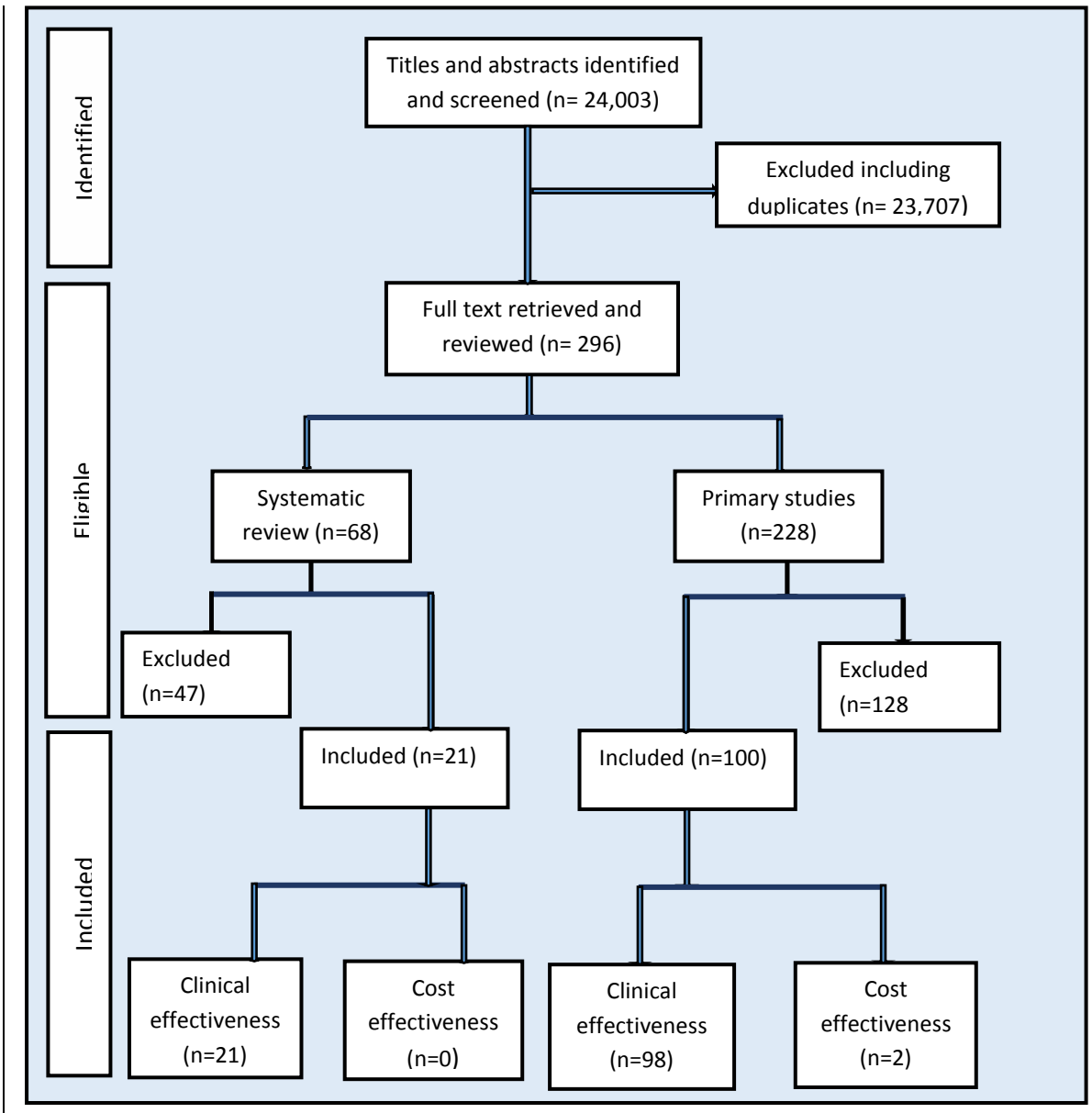
4.3 Abstract screening

Of these, 23,707 were excluded after screening of the titles and abstracts based on the inclusion and exclusion criteria. The full texts of the remaining 296 citations were obtained and further screened for inclusion into the update review of review and the review of primary studies.

4.4 Full text screening & data extraction

On completion of the full text screening, 21 systematic reviews/meta-analyses in 21 publications were included in the final sets of evidence for the update review (see tables in the Report Annex & References in Appendix 3 for full details), and 100 primary studies included in the reviews of primary studies (see References in Appendix 4 for full details), and data was extracted from these studies.

Figure 1: Search & screening results – Reviews & primary Studies



4.5 Findings

Findings in relation to evidence of effectiveness and cost effectiveness are reported in the following chapters as set out below:

- Effectiveness evidence: Review of reviews update (Chapter 5)
- Effectiveness evidence: Review of primary studies (Chapter 6)
- Cost effectiveness: Review of reviews & primary studies (Chapter 7)

5.0 Findings: Review of reviews of effectiveness

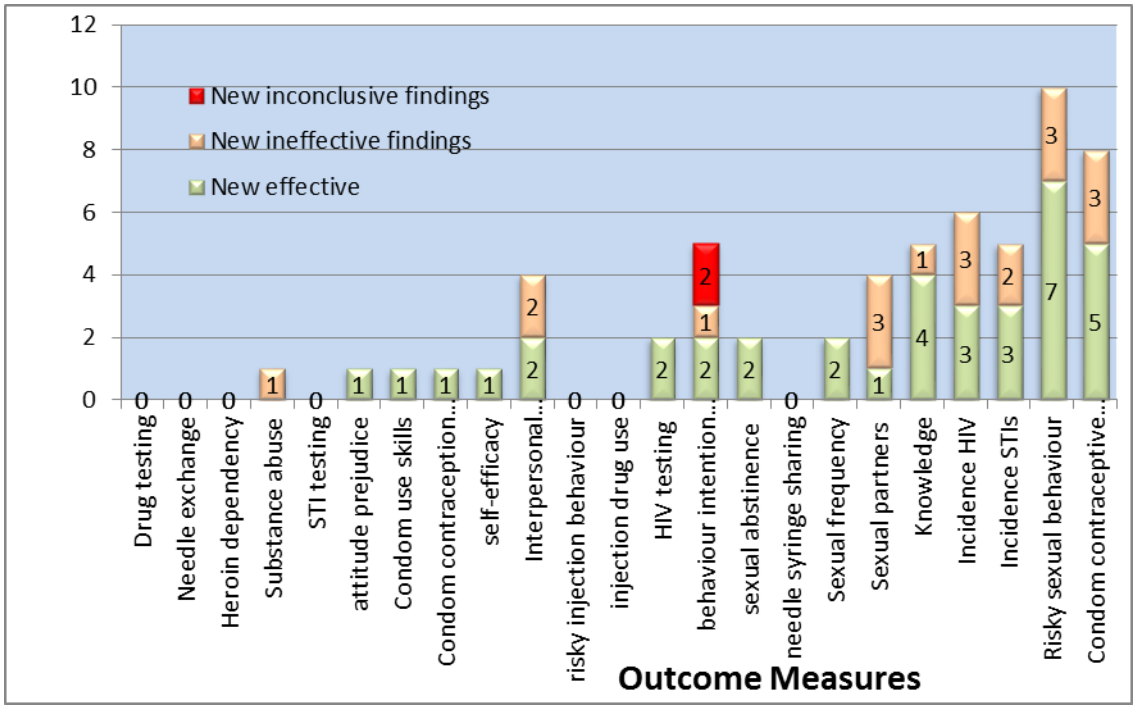
5.1 Introduction

This chapter details the effectiveness findings of the review of reviews for the 21 new reviews, in terms of outcome measure type, populations studied, and intervention type.

5.2 Outcome measures

This section reports the effectiveness findings by outcome measure. As per Figure 2 below, the most frequently reported outcome measures were condom use, risky sexual behaviour, STI incidence, and knowledge.

Figure 2: Effectiveness (number of outcomes: n=58) & outcome measure type (studies: n=21)

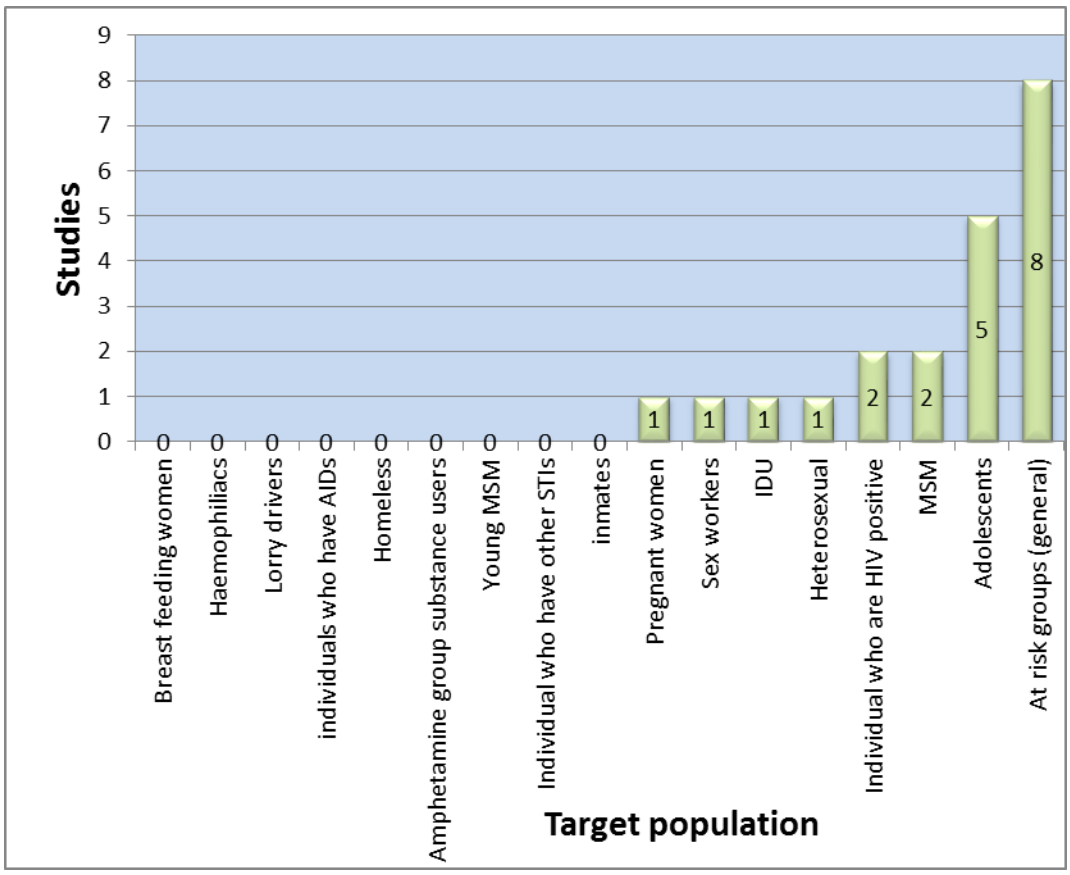


It appears that reviews show more evidence of effectiveness in studies examining condom use, risky sexual behaviour, and knowledge.

5.3 Study populations

Figure 3 reports the target populations studied in the 21 new reviews, and shows that the most common populations to be studied were general populations, adolescents, MSM, people with HIV, and heterosexuals. No or very few studies were reported in some other important target groups.

Figure 3: Target populations included in studies (n=21)



5.4 Effectiveness findings: Target groups

Introduction

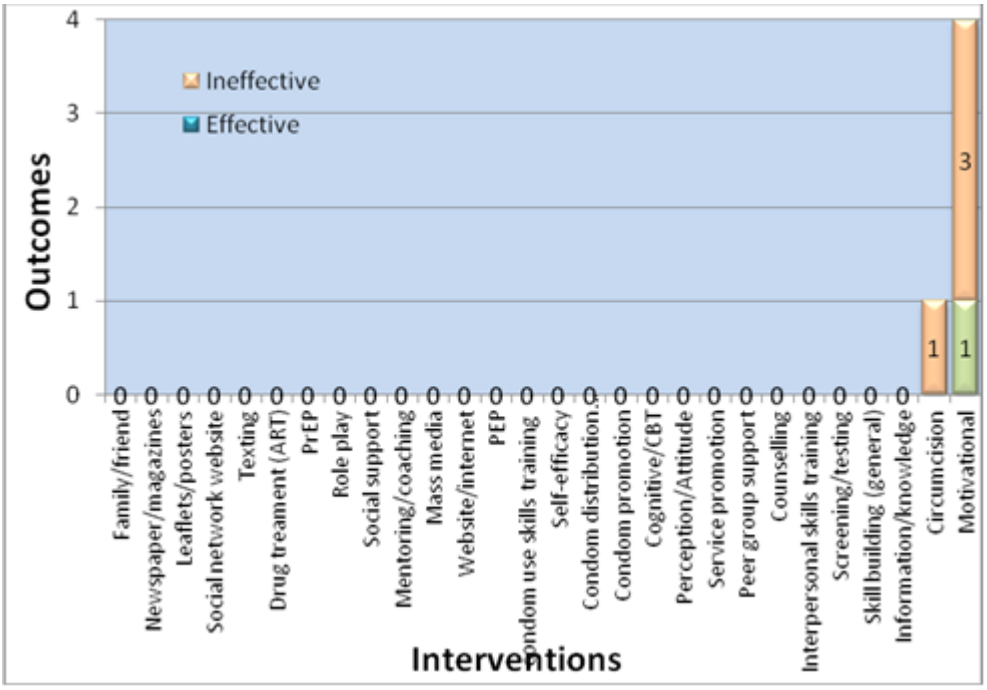
The following sub-sections report the numbers of new reviews and summary effectiveness findings for 'secondary' level intervention categories in the following key target populations:

- MSM
- Black ethnic groups
- People with HIV
- Injecting drug users
- Sex workers
- Adolescents
- General populations

MSM

Two reviews (Berg 2011, Wiysonge 2011) reporting 5 outcomes, specifically focussing on HIV prevention in MSM were identified, examining motivational interventions (MI) and circumcision. Overall, MI was found to be ineffective for all outcome measures except HIV testing. Circumcision was found ineffective in reducing HIV incidence.

Figure 4: Interventions in MSM: Effectiveness (studies: n=2 outcomes: n=5)

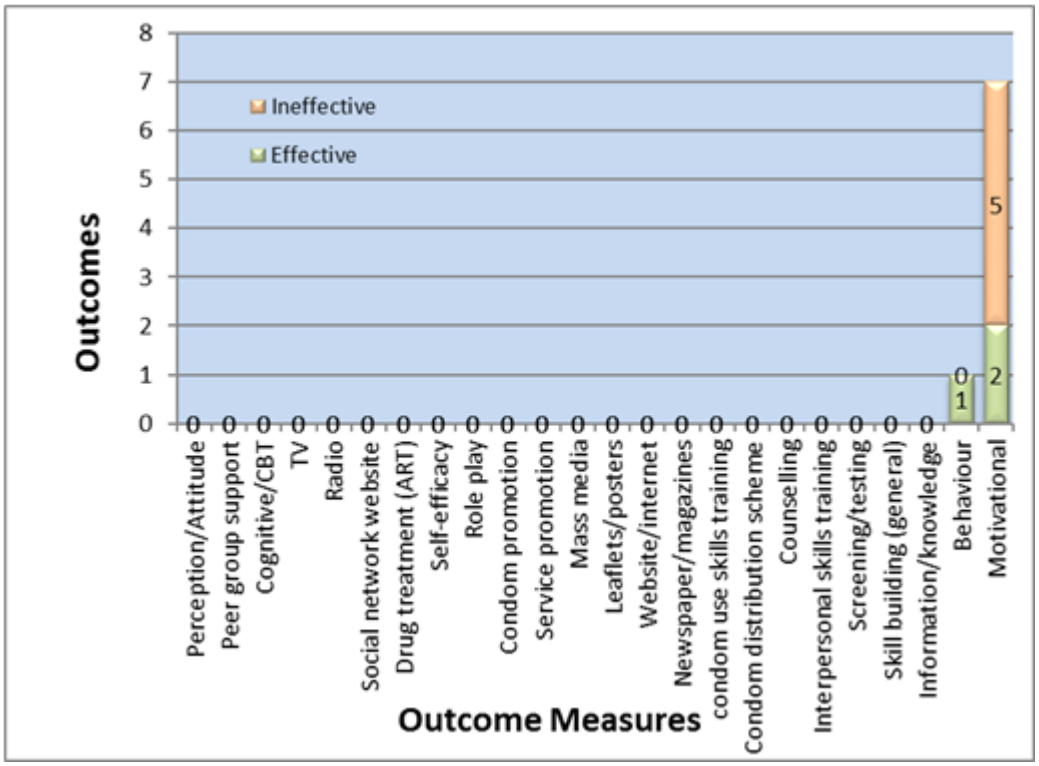


Black ethnic populations

Three of the included reviews, which examined the effectiveness of prevention in MSM, heterosexuals and PLWHIV specifically, focused on individuals from black ethnic background (African Americans in most studies). Two of the review (Berg 2011, Naar-King 2012) examined the effectiveness of MI, while the other (Henny 2012) the effectiveness of behavioural interventions (BI). The specific secondary subcategory for BI was not reported. However the author stated that nearly two-thirds of the interventions evaluated included studies were skills building.

Overall MI was ineffective according to five outcome measures and effective according to two. The BI was effective in one outcome measure.

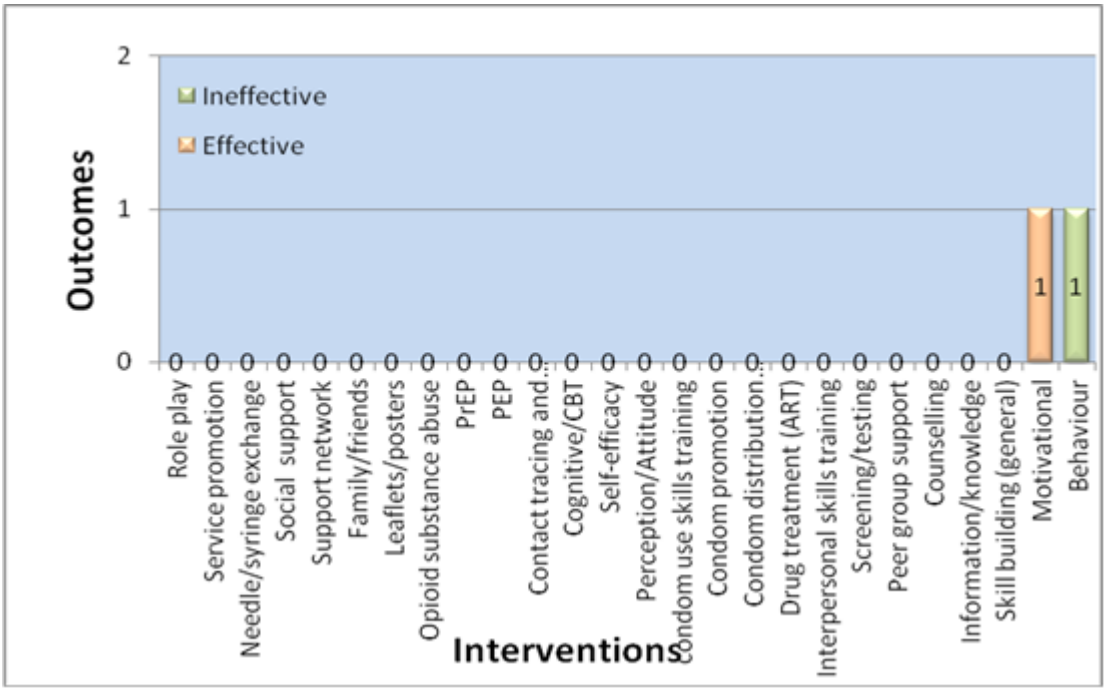
Figure 5: Interventions in black ethnic groups: Effectiveness (studies: n=3 outcomes: n=8)



People with HIV

Two reviews were identified in people living with HIV (PLWHIV). One (Carvalho 2011) examined the effectiveness of BI in condom use, while the other (Naar-King 2012) the effectiveness of MI in relation to sexual risk and substance use. The reviews found BI to be ineffective for promoting condom use, while MI effective for reducing risky sexual behaviour.

Figure 6: Interventions in PLWHIV: Effectiveness (studies: n=2 studies outcomes: n=2)



IDU

One review (MacArthur 2012), which examined the effectiveness of opioid substance therapy in HIV transmission was identified, and found that the intervention was effective in reducing HIV transmission among IDUs.

Sex workers

One review (Ota 2012), which examined the effectiveness of behavioural or social interventions, delivered to sex workers and their clients as either individuals, groups or community level was identified. The review suggests BI to be ineffective in reducing HIV incidence.

Adolescents

As shown in Table 1, five reviews examining interventions for adolescents were identified.

Table 1: Interventions targeted for adolescents

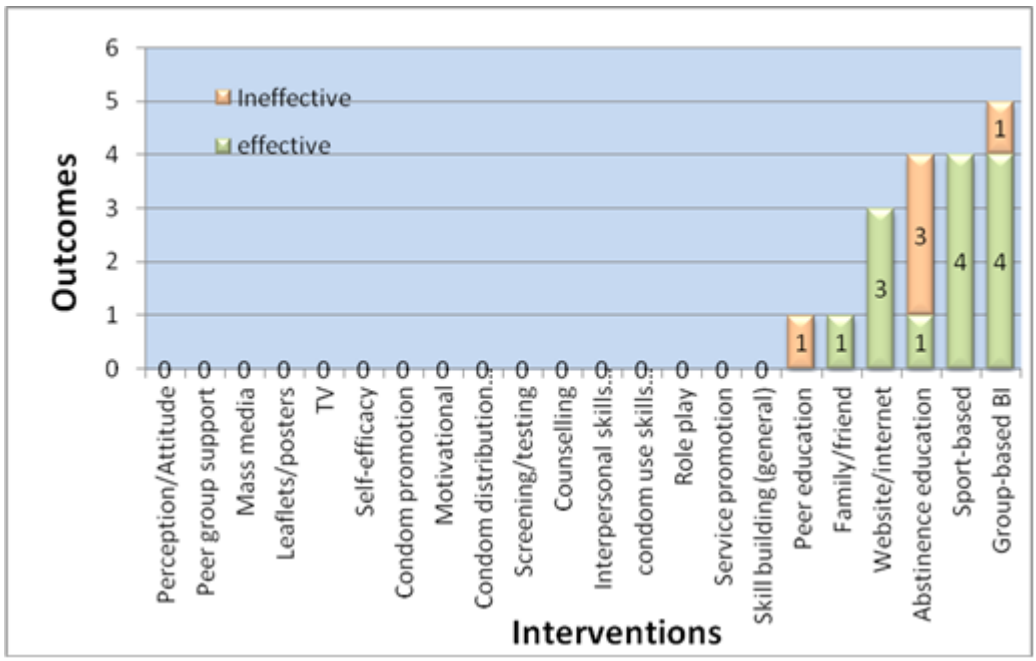
Author	Primary intervention category	Secondary intervention category.
Downing et al. 2011 Kaufman et al. 2013	Support	Parent/family based Sport-based
Guse et al. 2011	Media	New digital media
Tolli et al. 2011	Education	Peer education
Chin et al. 2012	Behavioural	Comprehensive risk reduction group-based BI Abstinence education

A majority of the interventions were offered in group format to both males and females, and included the following: Interpersonal communication skill; condom use skill; sexual abstinence; behaviour

intention attitude; knowledge; sexual partners; sexual frequency; STI incidence; risky sexual behaviours; and condom use.

Overall, the support-based interventions were the most effective by primary category, while behavioural intervention was found to be ineffective. By secondary category, a sport-based intervention and a new digital media (HIV interactive communication delivered via the internet) were the most effective. Abstinence and peer education were found to be ineffective.

Figure 7: Interventions for adolescents: Effectiveness (studies: n=5 outcomes: n=18)



Interventions for general adult populations

No reviews targeting general adult, male or female populations were identified.

5.5 Review of reviews: Findings summary

- 21 reviews of international studies were included, incorporating 58 outcome measures in total.
- The most common target populations to be studied were adolescents, MSM, people with HIV, and heterosexuals. No or very few studies were reported in some other important populations.
- Evidence of effectiveness was more common in studies examining condom use, risky sexual behaviour, and knowledge.
- Whilst the level of insight into the strength of evidence available from this pragmatic review has limitations, based on the balance of the number of effective/ineffective/inconclusive conclusions reported in the included reviews, the following tentative findings can be drawn regarding effectiveness:

- Two reviews studied MSM. Just one of four outcome measures (i.e. reducing HIV incidence) suggested motivational interventions to be effective, and circumcision was found to be ineffective.
- Three reviews studied black ethnic groups and found that motivational interventions (e.g. skills building) were ineffective according to five of seven outcome measures, and that behavioural interventions were effective according to one outcome measure.
- Two reviews studied people with HIV and suggested that behavioural interventions were ineffective in changing condom use and that motivational interventions were effective in reducing risky sexual behaviour.
- One review studied IDUs and found that opioid substance therapy was effective in reducing HIV incidence.
- One review studied sex workers and found that behavioural interventions were ineffective.
- Five reviews studied adolescents. Overall, support-based interventions were the most effective by primary category, while behavioural intervention was found to be ineffective. By secondary category, a sport-based intervention and a new digital media intervention were the most effective. Abstinence and peer education were found to be ineffective.

6.0 Findings: Review of primary studies of effectiveness

6.1 Introduction.

This chapter details the effectiveness findings of the review of the 98 included primary studies in terms of outcome measures, populations studied, and intervention type.

The commentary reports effectiveness of intervention types in key sub populations at the 'primary' category level and 'secondary' category effectiveness findings are shown in tables.

87% of the studies were set in the USA, with the remainder in Australia, Canada, Spain, Netherlands, Mexico, Turkey, Japan, or multiple countries. Most studies were undertaken in large urban population centres.

6.2 Outcome measures

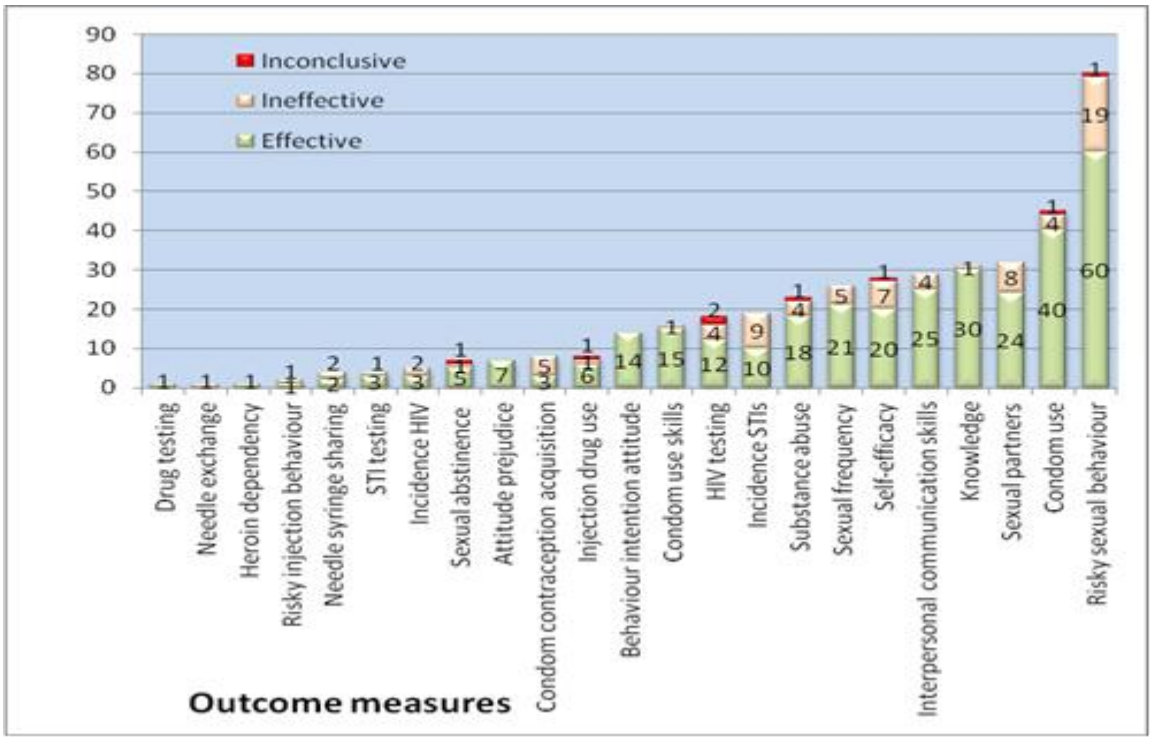
A wide variety of outcome measure types were used in the primary studies. Of these, risky sexual behaviour, condom use, number of sexual partners, and increase in the knowledge of HIV transmission were the most frequently reported; whilst the least reported are drug testing, needle exchange, heroin dependency and risky injection behaviour.

The figure below reports effective findings of the included studies according to outcomes. The most frequently reported outcomes were risky sexual behaviour and condom use.

In total 410 study outcomes were reported.

The balance of effective and ineffective/inconclusive findings suggest that interventions are more effective in addressing the following outcomes: Risky sexual behaviour, condom use, sexual partners, knowledge, inter-personal skills, self efficacy, sexual frequency, substance abuse, HIV testing, condom skill, and behaviour intension attitude.

Figure 8: Effectiveness (number of outcomes) & outcome measure type (studies: n=98)

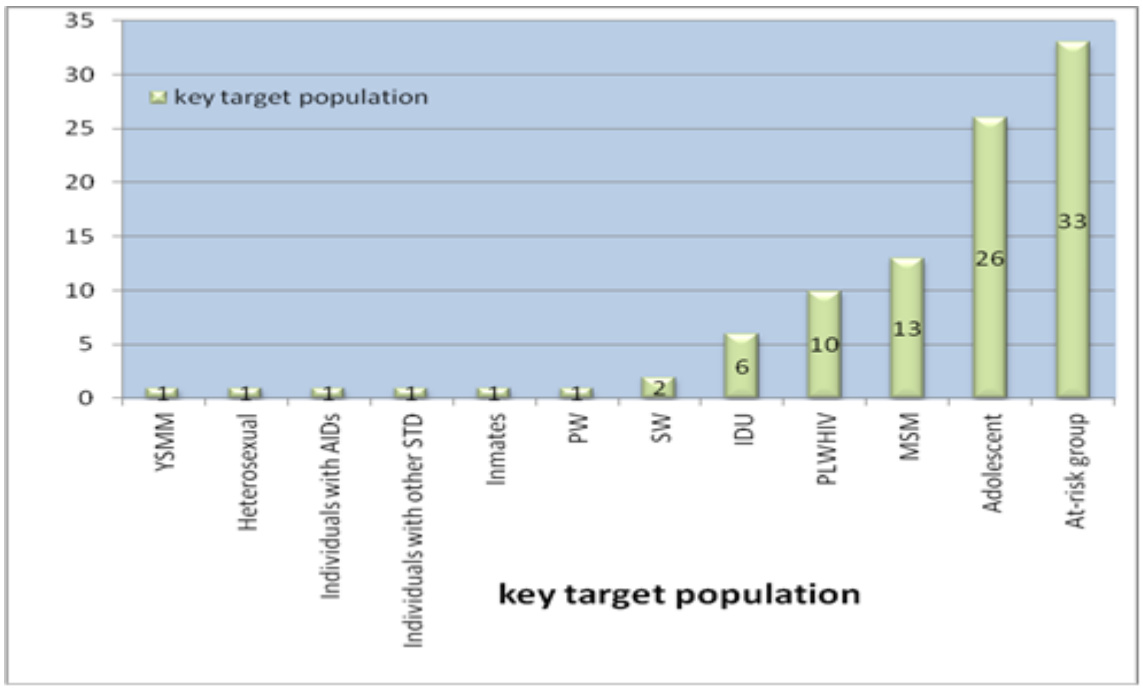


6.3 Study populations

The key populations examined by the studies are presented as summary in the chart below. This shows that the most studied were: general at-risk groups (n=33), followed by adolescents (n=26), MSM (n=14), and people with HIV (n=11).

The least studied populations were: young men who have sex with men (YMSM), heterosexuals, homeless people, and individual with AIDS, individuals with other STIs, inmates, pregnant women, and sex workers.

Figure 9: Number of studies in key target population



6.4 Effectiveness findings: Target populations

Matrix Introduction

The following sub-sections report the numbers of new reviews and summary effectiveness findings in the following key target populations:

- Adult males
- Adult females
- MSM
- Black ethnic groups
- People with HIV
- Injecting drug users
- Sex workers
- Adolescents

Adult males

In total, 5 RCTs (Caslyn 2010, Caslyn 2011, Rhodes 2011, Menza 2010, and Kennedy 2012) from the USA reported on interventions in males in general populations. The interventions studied were mostly educational (informational/knowledge, motivational, skills building and condom promotion). The next most featured was support based contingency management.

As shown below, overall the educational interventions appear to be effective, and within this category, information/knowledge interventions have the largest number of supportive study outcome findings.

Table 1: Interventions for adult males: Effectiveness (studies: n=5; outcomes: n=10)

Primary intervention features	Effective	Ineffective	Secondary intervention features	Effective	Ineffective
Education	8	0	Information/knowledge	4	0
			Skills building	2	0
			Condom promotion	1	0
			Motivational	1	0
Support	1	1	Contingency management	1	1

Adult females

Fifteen studies of adult female populations were included, again most from the USA.

As shown below, despite some exceptions, the majority of study outcomes investigating educational, supportive, and media interventions suggested these to be effective.

Table 2: Interventions for adult females: Effectiveness (studies: n=14; outcomes: n=51)

Primary intervention features	Effective	Ineffective	Secondary intervention features	Effective	Ineffective
Education	29	4	Information/knowledge	11	0
			Skills building	8	2
			Condom promotion	6	0
			Interpersonal skills	2	2
			Motivational	2	0
Support	9	1	Cognitive/CBT	6	1
			Mentoring/coaching	3	0
Media	8	0	Website/internet	2	0
			Multi-media	6	0

Source: Dilorio 2011, Wingood 2011, Hull 2012, Langhorst 2012, Mallory 2013, Reynald 2011, Card 2011, Peragallo 2012, Collins 2011, Davey-Rothwell 2011, Holstad 2011, Hien 2010, Gollub 2010, Diallo 2010

MSM

13 randomised and 1 observational study studied interventions in MSM. All were set in the USA except one from Australia.

Outcomes of all studies (n=17) examining educational interventions and prevention (n=3) found these were effective, all but one study outcomes (n=17) examining supportive interventions reported these to be effective, and the majority of study outcomes on media interventions (n=18) also found these effective, though five reported them to be ineffective. PrEP was examined in one study and was found to be effective in terms of HIV incidence.

Table 3: Interventions for MSM: Effectiveness (studies: n=14; outcomes: n=62)

Primary intervention features	effective	ineffective	Secondary intervention features	effective	ineffective
Education	17	0	Skills building	14	0
			Information/knowledge	3	0
Media	18	5	Multi-media	12	1
			Website/internet	6	4
Preventive service	3	0	Screening/testing	3	0
Support	17	1	Peer group support	6	0
			Mentoring/coaching	4	0
			Counselling	7	1
Bio-medical	1	0	PrEP	1	0

Source: Mckirnan 2010, Safren 2013, Schwarcz 2013, Koblin 2012, Hirshfield 2012, Tobin 2013, Snow 2013, Sikkema 2011, Eaton 2011, Mansergh 2010, Rosser 2010, Carpenter 2010, Rosser 2010b, Grant 2010

Black ethnic groups

14 randomised controlled studies in black ethnic groups were included. Again all were from the USA.

A large number (n=34) of the study outcomes were from education intervention studies, and the majority of these (n=28) reported the interventions to be effective. All the reported study outcomes in the media (n=6) and support (n=12) interventions found these to be effective.

Table 4: Interventions for black ethnic groups: Effectiveness (studies: n=14 outcomes: n=52)

Primary intervention features	Effective	Ineffective	Secondary intervention features	Effective	Ineffective
Education	28	6	Information/knowledge	13	1
			Interpersonal skills training	7	3
			Skills building	5	2
			Motivational	2	0
			Condom promotion	1	0
Media	6	0	Multi-media	6	0
Support	12	0	Mentoring/coaching	7	0
			Peer group support	5	0

Source: Dilorio 2011, Williams 2012, Wingood 2011, Kobin 2012, Card 2011, Kogan 2012, Tobin 2013, Yancey 2012, Davey-Rothwell 2011, Outlaw 2010, Diclemente 2010, Dolcini 2010, Diallo 2010, Kennedy 2012

People with HIV

Of ten RCTs in populations of people with HIV most examined educational and support interventions. A high proportion of study outcomes in both of these intervention types suggested they were effective. Information/knowledge was the most examined interventions and was also the most effective.

Table 5: Interventions for people living with HIV: Effectiveness (studies: n=10; outcomes: n=31)

Primary intervention feature	effective	ineffective	Secondary intervention features	effective	ineffective
Education	17	4	Information/knowledge	8	1
			Skills building	4	0
			Motivation	3	1
			Interpersonal skills training	2	2
Preventive service	1	1	Circumcision	1	1
Support	7	1	Counselling	5	0
			Social support	2	1

Source: Sanchez 201, Williams 2012, Hasin 2013, Golin 2012, Murphy 2012, Kalichman 2011, Rose 2010, Illa 2010, Myers 2010, El-Bassel 2010

IDUs

Five RCTs and one observational study were included, all from USA and Canada. The majority examined education and support interventions, and all but one outcome found them to be effective. Two studies found media interventions to be ineffective.

Table 6: Interventions for IDUs: Effectiveness (studies: n=6 outcomes: n=17)

Primary intervention features	effective	Ineffective	Secondary intervention features	effective	ineffective
Education	8	0	Skills building	6	0
			Information/knowledge	2	0
Media	0	2	Website/internet	0	2
Support	6	1	Case management	3	1
			Counselling	3	0

Source: El-Bassel 2011, Kelly 2012, Booth 2011, Tobin 2011, Bowser 2010, Gagnon 2010

Sex workers

Just two studies (Ulibarri 2012, Surratt 2010) in sex workers were included, one from the USA and one Mexico. Both studies examined support-based interventions and all but one outcomes reported the intervention to be effective.

Table 7: Interventions for sex workers: Effectiveness (studies: n=2 outcomes: n=12)

Primary intervention category	Effective	Ineffective	Secondary Intervention category	Effective	Ineffective
Support	11	1	Cognitive/CBT	1	1
			Counselling	10	0

Source: Ulibarri 2012, Surratt 2010

Adolescents

A large number of studies (n=26) examined interventions in adolescents. Most considered education, support, and media interventions, and a substantial proportion of outcomes report them to be effective. Only one study one prevention study (i.e. screening/testing) was included, and this also was found to be effective.

Table 8: Interventions for adolescents: Effectiveness (studies: n=26; outcomes: n=121)

Primary intervention category	Effective	ineffective	Secondary intervention category	Effective	ineffective
Preventive services	1	0	Screening/testing	1	0
Media	13	4	Mass media	5	1
			Leaflets/posters	3	0
			Website/internet	5	3
Support	14	3	Family/friend	7	0
			Cognitive/CBT	5	0
			Community support group	2	3
Education	68	18	Interpersonal skills training	6	6
			Motivational	7	1
			Skill building	24	4
			Information/knowledge	31	7

Source: Morrison-Beedy 2013, Norton 2012, O' Donnell 2010, Bull 2011, Coyle 2013, Ferrer 2011, Kaufman 2012, Markham 2011, Nagamats 2011, Kogan 2012, Prado 2012, Klein 2011, Sznitman 2011, Tolou-Shams 2011, Calderon 2011, Marsh 2011, Jemmott 2010, Sales 2010, Tortolero 2010, Diclemente 2010, Dolcini 2010, Freudenbe 2010, Espada 2013, Hops 2011, Wolfers 2011, Robertson 2011

6.5 Review of primary studies: Findings summary

- 98 primary studies considering effectiveness were included, and reported a total of 410 study outcome measures.
- 87% of the studies were set in the USA and most in large urban population centres.
- The most studied were: general at-risk groups (n=33), followed by adolescents (n=26), MSM (n=14), and people with HIV (n=11); and the least studied populations were: young men who have sex with men (YMSM), heterosexuals, homeless people, and individual with AIDS, individuals with other STIs, inmates, pregnant women, and sex workers.
- Whilst the level of insight into the strength of evidence available from this pragmatic review has limitations, based on the balance of the number of effective/ineffective/inconclusive conclusions reported in the included studies, the following tentative findings can be drawn regarding effectiveness:
    - The balance of effective and ineffective/inconclusive findings suggest that interventions are more effective in addressing the following outcomes: Risky sexual behaviour, condom use, sexual partners, knowledge, inter-personal skills, self efficacy, sexual frequency, substance abuse, HIV testing, condom skill, and behaviour intension attitude.
    - Five studies examined interventions in general adult male populations, and found that educational interventions, particularly information/knowledge interventions to have the largest number of study outcome findings reporting them to be effective.

- Fifteen studies in general adult female populations were included. Many of these considered educational, supportive, and media interventions and suggest these to be effective.
- Fourteen studies considered MSM populations, and overall appeared to find that educational, prevention, supportive, media interventions and PrEP were effective.
- Ten studies considered people with HIV, and overall appeared to find that educational, supportive, and media interventions were effective.
- Fourteen studies considered black populations, and suggested that education, media and support interventions to be effective.
- Six studies considered IDU populations, and suggested that education and support interventions were effective, and media interventions were ineffective.
- Two studies considered sex workers and found that supportive interventions were effective.
- Twenty-six studies which considered adolescents, and suggested that education, support, media, and testing/screening to be effective.

7.0 Findings: Review of cost effectiveness evidence

7.1 Introduction

This chapter details the findings of the review of reviews and primary studies in relation to cost effectiveness.

Just two primary cost effectiveness studies met the inclusion criteria. Their findings and conclusions are summarised below.

7.2 Juusola et al. 2012

This US modelling study examined the cost effectiveness of PrEP for HIV prevention in general and high risk MSM populations, assuming that on the basis of clinical trials infection risk was reduced by 44%.

The analysis found that PrEP was substantially more cost effective in high risk MSM populations. In MSM with an average of five partners a year, the cost per QALY was $50,000.

The authors concluded that while providing PrEP to the general MSM population could save a substantial number of lives, it was expensive; but the use of PrEP in high risk MSM populations compared favourably with other interventions considered cost effective. The cost of providing PrEP to all high risk MSM in the US could total up to $4 billion.

7.3 Prabhu et al. 2011

This US study examined the cost effectiveness of HIV screening, diagnosis, and HAART initiation in three alternative clinical settings: STD clinics, inpatients, and Emergency departments. It considered costs and benefits for the patient population and further transmission of HIV, and consequently is relevant to this review as a prevention intervention.

The findings showed that HIV screening is more cost effective in clinical settings where patients present with less-advanced stages of HIV infection allowing initiating treatment with HAART earlier in the course of infection (i.e. emergency departments & STD clinics).

8.0 Discussion

8.1 Methods & limitations

This rapid pragmatic evidence review has sought to bring decision-makers up to date by providing an update overview of high quality evidence on the effectiveness and cost effectiveness of HIV prevention interventions.

The review has done this by replicating the methods and reporting of the earlier review of reviews, in order to allow the new incremental evidence found to be directly comparable to that in the earlier report; and by supplementing this with a similarly pragmatic and rapid review of recent primary studies, again reported consistently with the earlier report.

Our review of primary studies aims to provide a supplementary overview to the review of reviews stream of work, at a similar level of detail. Full detailed analysis of the included primary studies is not feasible within the time and resources committed to the project, and would entail additional work at a further level of granularity and quality assessment/critique of included reviews and studies.

In light of these considerations the findings of the review must be interpreted in cautiously full recognition of the limitations of the approach inherited from the earlier work, and the time and resource constraints of the current work. Consequently, the key methodological limitations of the review are summarised below.

- Our consideration of effectiveness is based on the reported conclusions of authors of reviews and investigators of primary studies alone. The quality of individual reviews and studies has not been individually assessed in detail, other than against our adopted benchmark Cochrane inclusion/exclusion criteria. This means that no assessment of statistical analysis, sample size, effect size, and measures to control for biases are incorporated.

- The analysis does not include meta-analysis and so no empirical insight can be provided into the appropriate relative weight to the findings of reviews or studies, or between the reviews and primary studies elements of the review can be given to findings.

- The analytic currency/metric for the overall consideration of effectiveness across included studies adopted in the original PHAST report is unclear. Our report has adopted outcome measure as the currency/metric in all included reviews and studies; however, it is not possible to definitively determine the consistency of this with the analysis in the earlier report.

- Given the nature of review publications, it is likely that the current update review of reviews will overlap with evidence already covered in the previous review; and some of the studies included in our review of primary studies may be incorporated into reviews included within our update review of reviews.

- Whilst many of the included primary studies are based on research in large urban centres of population in OECD countries, none are UK-based. Consequently caution is needed in interpreting their generalisability to the UK and London context. For instance and in particular, the majority of studies examining interventions in black ethnic groups are from the USA, and

depending on the study design and intervention in question, their findings may not be valid of black ethnic groups in London.

- The update review excludes evidence generated in research in non-OCED countries, some of which may be considered to have some level of relevance to London.
- Many HIV prevention interventions are multi-faceted and as a result are difficult to classify by type in a single exclusive category, for instance knowledge focussed interventions may also aim to bring about motivational or behaviour change. Furthermore, included reviews may examine, categorise, and group interventions differently to individual studies. As a result there is a limit to the accuracy of classification of interventions against a single taxonomy and limits to the extent to which the review and primary study findings can be easily compared in a piece of work of this granularity.
- Evidence was not found for all potential interventions and some interventions are mentioned in the findings of the review of reviews and not in the review of primary studies, and visa versa. The absence of evidence on an intervention does not imply that it cannot be effective. However, the fact that evidence of effectiveness exists for some but not other interventions may still legitimately influence decision-makers.

8.2 Findings: Effectiveness

In light of the caveats set-out above, care needs to be given in the confidence and consequently the weight given to the findings alongside the findings of the other streams of work making-up the review.

Bearing this in mind, the following tentative conclusions can be made regarding the effectiveness of interventions in relation to key population groups.

Adult males

No evidence was found regarding general populations of adult males in the review of reviews update.

The review of primary studies found evidence of effectiveness from five studies for educational interventions (particularly information/knowledge interventions).

Adult females

No evidence was found regarding general populations of adult females in the review of reviews update.

The review of primary studies found evidence of effectiveness from fifteen studies for educational, supportive, and media interventions.

MSM

The review of reviews update included two reviews on MSM. These found limited evidence of effectiveness for motivational interventions, and that circumcision was ineffective.

The review of primary studies found fourteen studies, and overall these appeared to find that educational, prevention, supportive, media interventions and PrEP were effective in MSM.

Black ethnic groups

The review of reviews update included three reviews of interventions in black ethnic groups. These found evidence that behavioural interventions were effective, and that the balance of evidence suggested that motivational interventions (e.g. skills building) were ineffective.

The review of primary studies found fourteen studies which considered black populations, and suggested that education, media, and support interventions to be effective.

People with HIV

The review of reviews update included two reviews of interventions in people with HIV. They suggest that motivational interventions were effective in reducing risky sexual behaviour, and that behavioural interventions were ineffective in changing condom use.

The review of primary studies found ten studies which considered people with HIV. Overall they appeared to find that educational, supportive, and media interventions were effective

IDUs

The review of reviews update included just one review of interventions in IDUs, and this found that opioid substance therapy was effective in reducing HIV incidence.

The review of primary studies found six studies which considered IDUs, which suggested that education and support interventions were effective, and media interventions were ineffective.

Sex workers

The review of reviews update included just one review of interventions in sex workers, and this found that behavioural interventions were ineffective.

The review of primary studies found two studies which considered sex workers, which found that supportive interventions were effective.

Adolescents

The review of reviews update included five reviews of interventions in adolescents. Overall, support-based interventions were the most effective by primary category, while behavioural intervention was found to be ineffective. By secondary category, a sport-based intervention and a new digital media intervention were the most effective. Abstinence and peer education were found to be ineffective.

The review of primary studies found twenty-six studies which considered adolescents, and suggested that education, support, media, and testing/screening to be effective.

8.3 Findings: Cost effectiveness

In relation to cost effectiveness, the evidence review found just two studies, both from the US, that were eligible for inclusion. This suggests that little new relevant cost-effectiveness evidence has emerged since the previous review.

One study found that PrEP in high risk MSM could be considered cost effective, and the other that HIV screening in settings such as A&E and STI clinics is more cost effective than in in-patient setting, due to the better outcomes associated with earlier detection of HIV.

9.0 Appendices

9.1 Appendix 1: Inclusion/Exclusion Criteria

	Criteria	Inclusion	Exclusion	Notes
C1	**Date** Studies published in 2007 (2001 for cost effectiveness studies)	If YES or UNCLEAR, move to next criterion.	If not **1_EX.DATE**	Exclude studies published before 2007 (2001 for cost effectiveness studies).
C2	**Country** OECD countries	If YES or UNCLEAR, move to next criterion.	If not **2_EX.COUNTRY**	Exclude if setting is not an OECD country. Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Israel, Italy, Japan, South Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, UK, USA.
C3	**Language** Only papers published in English	If YES or UNCLEAR, move to next criterion.	If not, **3_EX.LANG**	Exclude all; non English papers
C4	**HIV** Papers about HIV	If YES or UNCLEAR, move to next criterion	If not, **4_EX.HIV**	Exclude papers on treatment of HIV/AIDS
C5	**Interventions** Papers about interventions targeted at HIV	If YES or UNCLEAR, move to next criterion	If not, **5_EX.INT**	Exclude policy papers and thought pieces. Also epidemiological studies.
C6	**Prevention** Interventions should be targeted at prevention of HIV transmission. Can be individual, group or community level interventions.	If YES or UNCLEAR, move to next criterion	If not, **6_EX.PREV**	These can be behavioural interventions to reduce or modify risk; structural/population interventions (e.g. social and environmental interventions); and biomedical interventions (such as antiretroviral therapy) which play a role in reducing HIV transmission. It includes but is not limited to education (e.g. knowledge and skills training), preventative services (e.g. testing and condom distribution), support (e.g. counselling), media (e.g. mass media, internet) and bio-medical (e.g. ART, OST) interventions.
C7	**Outcomes** Exclude papers that do not report relevant outcomes	If YES or UNCLEAR, move to next	If not **7_EX.OUTCOME**	Relevant outcomes include but are not limited to increased testing, reduction in risk behaviour, reduction

		criterion		of incidence of HIV, increase in use of condoms, change in attitudes or behaviour, increased knowledge, increased use of needle exchanges etc.
C8	**Quality** Papers should have at least 2+ quality, using Cochrane level of Evidence.	If YES or UNCLEAR, move to next criterion	If not, **8_EX.QUALITY**	Exclude papers studies at Cochrane quality level 2- or below.
C9	**Outcomes** • Effectiveness • Economic studies	**9_IN.EFFECT** **10_IN.ECON**		
C11	**Query**	**Q_QUERY**		If unsure of category, Query in order for the report to be discussed.

9.2 Appendix 2: Cochrane levels of evidence classification

Level of evidence	Type of evidence
1^{++}	High-quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1^{+}	Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1^{-}	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias*
2^{++}	High-quality systematic reviews of case–control or cohort studies High-quality case–control or cohort studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal
2^{+}	Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal
2^{-}	Case–control or cohort studies with a high risk of confounding bias, or chance and a significant risk that the relationship is not causal*
3	Non-analytic studies (for example, case reports, case series)
4	Expert opinion, formal consensus
*Studies with a level of evidence '–' should not be used as a basis for making a recommendation (see section 7.4)	

9.3 Appendix 3: References – Included reviews

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Charania MR, Crepaz N, Guenther-Gray C, Henny K, Liau A, Willis LA, Lyles CM. Efficacy of Structural-Level Condom Distribution Interventions: A Meta-Analysis of U.S. and International Studies, 1998–2007. AIDS Behav 2011; 15: 1283–1297

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Kaufman ZA, Spencer TS and Ross DA. Effectiveness of Sport-Based HIV Prevention Interventions: A Systematic Review of the Evidence. AIDS Behav 2013; 17: 987–1001

Lindegren ML, Kennedy CE, Bain-Brickley D, Azman H, Creanga AA, Butler LM, Spaulding AB, Horvath T, Kennedy GE. Integration of HIV/AIDS services with maternal, neonatal and child health, nutrition, and family planning services. Cochrane Database of Systematic Reviews 2012, Issue 9

MacArthur GJ, Minozzi S, Martin N, Vickerman P, Deren S, Bruneau J, Degenhardt, L, and Hickman M. Opiate substitution treatment and HIV transmission in people who inject drugs: systematic review and meta-analysis. BMJ 2012; 345: e5945

Meader N, Semaan S, Halton M, Bhatti H, Chan M, Llewellyn A, Don C, and Jarlais D. An International Systematic Review and Meta-analysis of Multisession Psychosocial Interventions Compared with Educational or Minimal Interventions on the HIV Sex Risk Behaviours of People Who Use Drugs. AIDS Behav 2013; 17: 1963–1978

Naar-King S, Parsons JT and Johnson AM. Motivational Interviewing Targeting Risk Reduction for People with HIV: A Systematic Review. Curr HIV/AIDS Rep 2012; 9: 335–343

Obiero J, Mwethera PG, Wiysonge CS. Topical Microbicides for Prevention of Sexually Transmitted Infections. Cochrane Database of Systematic Reviews 2012, Issue 6.

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9.4 Appendix 4: References – Included primary studies

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London | Brussels | Washington DC
1st Floor | Kemp House | 152-160 City Road | London | EC1V 2NP
t: +44 (0) 20 7553 4800
w: www.matrixknowledge.com