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INTERVENTIONS TO IMPROVE THE SEXUAL AND REPRODUCTIVE HEALTH OF YOUNG PEOPLE

A systematic review of reviews

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Interventions to improve the sexual and reproductive health of young people: a systematic review of reviews

Report prepared by Centre for Population Health, Burnet Institute for Family Planning Victoria (FPV).

Report written by:
Anna Bowring, Centre for Population Health, Burnet Institute
Megan Lim, Centre for Population Health, Burnet Institute
Kim Hider, Family Planning Victoria

Search strategy and screening conducted by:
Cassandra Wright, Centre for Population Health, Burnet Institute
Caitlin Douglass, Centre for Population Health, Burnet Institute
Nicole Kopel, Family Planning Victoria
Jenny Jones, Family Planning Victoria

Advisory Group Members
Catherine James, Family Planning Victoria
Mark Camilleri, Family Planning Victoria
Megan Lim, Burnet Institute
Andrea Krelle, Centre for Adolescent Health
Graham Brown, Australian Research Centre in Sex, Health and Society
Helen Keleher, Keleher Consulting
Cath Mayes, Women's Health Barwon South West
Robyn Minty, Women's Health Victoria
Mili Markovic, Department of Health and Human Services
Rebecca Reeves, Centre for Ethnicity and Health

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For more information contact Family Planning Victoria on T: +61 3 9257 0100 or visit www.fpv.org.au

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ABBREVIATIONS

ECP	Emergency contraception pill
ES	Effect size
FPV	Family Planning Victoria
IPV	Intimate partner violence
OR	Odds ratio
SRH	Sexual and reproductive health
STI	Sexually transmissible infections

EXECUTIVE SUMMARY

Background

Young people experience disproportionately high rates of sexual and reproductive health (SRH) problems and are an important population group to target through health promotion initiatives. Interventions may be implemented through diverse means, such as education, communication and marketing, policy change and outreach service delivery models, and in varied settings, such as schools, health services, community settings, and through different communication mediums.

Family Planning Victoria have initiated this systematic review to inform the development of an evidence based sexual and reproductive health resource for health promotion practitioners working in the primary health sector, educators, policy makers and government.

Methods

A systematic review of reviews was conducted in order to assess the evidence of effectiveness of health promotion interventions in reducing the risk of young people engaging in risky sexual behaviour and associated outcomes. Using predefined criteria, we identified and collated published systematic reviews which focused on adolescents or young people aged 10–24 years, and reported on SRH outcomes (pregnancy, sexually transmissible infections [STIs], condoms/contraceptive use, risky sexual behaviour, sexual healthcare access or intimate partner violence [IPV]). We reviewed interventions aimed at improving SRH and included primary studies predominantly conducted in high-income countries.

The strength of evidence was classified based on the consistency of findings and quality of systematic review. These were scored for available outcomes in each review and categorised into colour-coded levels of effectiveness: evidence of effectiveness (green), emerging evidence of effectiveness (yellow), inconsistent evidence (orange) and evidence of ineffectiveness or harmful results (red).

Findings

Sixty-six systematic reviews published between 2005 and 2015 were identified. We considered four domains of impact on SRH: knowledge and skills, attitudes, behaviour and clinical outcomes. No intervention types had evidence for improving all domains, and interventions showing a decrease in sexual risk behaviour were not necessarily matched by a reduction in STIs or unintended pregnancy. In general, interventions for improving knowledge and skills showed a higher level of effectiveness than interventions for behaviour and clinical outcomes. A summary and interpretation of the available evidence in the systematic reviews for interventions to improve the SRH of young people is presented in Table 1.

Table 1: Summary of evidence for interventions to improve the sexual and reproductive health of young people

Intervention	Overview of evidence	Recommendations	Page reference
Education interventions			
Abstinence-only education	Demonstrates ineffective or inconsistent results for nearly all SRH outcomes, including sexual initiation.	Abstinence-only education not recommended.	pg. 13
Abstinence-plus education	Some evidence and emerging evidence of effectiveness for improving knowledge and use of contraception, but results still largely inconsistent.	Abstinence-plus education is not the preferred method of SRH education.	pg. 13
Comprehensive education	Some evidence of effectiveness for behavioural outcomes, particularly among higher quality studies.	Ensure access to comprehensive education on SRH and sexuality at schools. Education delivered through multiple sessions and long-term is more effective.	pg. 13
Education (general, group, curriculum based)	Reviews demonstrating a protective effect of educational interventions included studies based in multiple settings.	SRH education should be implemented through multiple settings, such as schools, community and health clinics.	pg. 13
Peer education	Appears effective for improving knowledge and attitudes, but ineffective at reducing risky behaviour or preventing STIs and pregnancy.	Peer education may play an important role in improving knowledge and is highly acceptable to young people. However, adult-led education is also required.	pg. 13
Family/parent programs	Although largely inconsistent, some reviews including family or parent programs reported favourable SRH outcomes. However, when limiting results to evidence specific to such programs, the effect does not remain.	Involvement of parents in multi-component education interventions is advised.	pg. 13
Educational components			
Motivational interviewing/ components	Evidence of effectiveness for decreasing behavioural risk, but mixed evidence for other domains.	Interventions involving counselling should utilise motivational interviewing.	pg. 14
Skills-building	Evidence of effectiveness for improving knowledge and attitudes and reducing risk behaviour.		pg. 14
Condom demonstration	Strong evidence of effectiveness for improving behavioural and knowledge outcomes, as well as reducing STI prevalence.	SRH education should include practical components for skills-building, including condom demonstration and negotiation skills.	pg. 14
Communication skills	There is evidence of effectiveness for improvements in knowledge, attitudes and behavioural outcomes from reviews reporting on interventions including communication skills, but the evidence is mixed for behavioural and clinical outcomes.		pg. 14
Personal development	Predominantly inconsistent or evidence of ineffectiveness for behavioural outcomes, but two reviews provided evidence of effectiveness for reducing unplanned pregnancy.	Some promising evidence, but further research is required.	pg. 15
Multicomponent	Predominantly mixed evidence for reviews describing *a priori* 'multicomponent'	Interventions are more effective when comprising	pg. 15

	interventions. However, interventions involving multiple components were identified as a key factor increasing effectiveness in multiple reviews.	multiple components and implemented through multiple settings and levels.	
Clinical-type interventions			
School-based health services	With the exception of one review, the evidence for school-based healthcare demonstrates ineffectiveness or equivocal results.	School-based health services may improve access to and utilisation of SRH services and contraception use, but further research is needed.	pg. 15
Community-based testing/Outreach SRH services	Evidence of effectiveness for improving health care access though interventions incorporating outreach or community-based SRH services.	Outreach and community-based SRH services should be implemented to improve access to SRH healthcare, particularly among priority subpopulations of young people with low access to traditional services.	pg. 15
Youth-friendly services	Inconsistent evidence of youth-friendly health services for improving knowledge, healthcare access, and evidence of ineffectiveness for reducing pregnancy. It is possible that our search strategy missed systematic reviews focusing on youth-friendly health services, as this was not identified in the original search terms.	A review specifically focusing on youth-friendly services is needed to more clearly determine strength of evidence.	pg. 15
Communication, promotion and technology			
Digital media	Emerging evidence to support interventions based on digital media platforms for knowledge, attitudes and behavioural domains.	Text messaging interventions are promising, but further research is needed in this area.	pg. 7
Mass media/social marketing	Limited evidence available on mass media interventions, and reviews incorporating mass media demonstrate largely inconsistent results.	May play a role in long-term attitude change, and should be included in multicomponent interventions. Not effective in isolation.	pg. 15
Distribution of condoms/ contraception	Almost consistent evidence of effectiveness across all reviews.	Interventions providing free or low-cost condoms/contraception should be included in multicomponent interventions.	pg. 16
Structural interventions			
Policy change	Evidence of effectiveness from one review only. Individual and group-level interventions are more effective when combined with a structural-level intervention.	Policy change is an important aspect of multicomponent interventions, but further research is required.	pg. 16

Reviews reporting on successful interventions commonly outlined the following features of effective interventions:

- Longer-term and repeated interventions (not single-session);
- Multi-setting (schools, health services, community) and multi-level (e.g. individual, group, structural) interventions;
- Interventions involving parents;
- Culturally, gender and age appropriate/sensitive interventions;
- Interventions incorporating skills building; and
- Multicomponent interventions (e.g. education plus skills building plus condom promotion).

Conclusions

There is a large body of literature reviewing the effectiveness of interventions to improve the SRH of young people. Although there is no consensus on the most effective intervention type, the evidence suggests some components may be more beneficial than others. Multifactorial interventions implemented in more than one setting and involving a variety of approaches are likely to be more effective. Education targeting knowledge alone is ineffective, and SRH education should also teach appropriate skills such as use of condoms and communication about sex and relationships. Application of the findings of this review should be approached with caution due to methodological limitations affecting some of the primary studies, systematic reviews, and our review protocol. Nonetheless, this evidence provides useful guidance for health promotion practitioners and funders when developing and supporting future interventions to improve the SRH of young people in Australia and other high-income countries.

INTRODUCTION

Young people experience high rates of sexual and reproductive health (SRH) problems and are an important population group to target through sexual health promotion. This systematic review of reviews has been conducted to inform the development of an evidence based SRH resource for health promotion practitioners working in the primary health sector. It identifies and collates the available evidence for health promotion interventions that target the SRH of young people in high-income settings. We discuss the strength of available evidence for SRH health promotion initiatives published in the scientific literature in terms of health outcomes, domain (knowledge, attitudes, behaviour, clinical), setting and intervention type. This resource will provide health promotion officers, health promotion planners, and other workers responsible for SRH promotion with collated evidence for planning, designing and implementing SRH health promotion interventions in Australia and other high-income countries.

DEFINITIONS

Young people are those aged between 10–24 years.

Adolescence is defined as 10–19 years of age.

Intimate partner violence (IPV) is defined as violence occurring between people who are, or were formerly, in an intimate relationship. It can occur as economic, psychological or emotional abuse, physical violence and/or sexual violence (Williams et al., 2004).

Reproductive health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes (UNFPA, 1994).

Sexual health is defined by the World Health Organisation as "…a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled." (WHO, 2006)

Unintended pregnancies are pregnancies that are reported to have been either unwanted at the time of conception or mistimed (Santelli et al., 2003). A related concept is **unplanned pregnancies**.

A **systematic review** is a review on the evidence of a clearly defined research question carried out by identifying, collating and summarising all empirical evidence that fits pre-defined eligibility criteria (Higgins et al., 2011).

A **meta-analysis** is the use of statistical methods to summarise the results of independent studies identified through a systematic review.

A **systematic review of reviews** aims to provide a summary of evidence from more than one systematic review at a variety of different levels, including the combination of different interventions, different outcomes, different conditions, problems or populations, or the provision of a summary of evidence on the adverse effects of an intervention (Smith et al., 2011).

BACKGROUND

Young people (10–24 years) experience disproportionate sexual and reproductive health (SRH) problems compared to the adult population. Biological and developmental factors, combined with cultural and social influences, increase the risk of SRH problems in this age group (Brabin et al., 2005, Sawyer et al., 2012). Major SRH problems facing young Australians are a high burden of sexually transmissible infections (STIs), unintended pregnancy, and experience of sexual coercion and violence.

Young people in Australia have a disproportionate burden of STIs such as chlamydia and gonorrhoea (Lewis et al., 2012, The Kirby Institute, 2015). For example, in 2014, 59% of all Victorian notifications of chlamydia were in young people (Department of Health and Ageing, 2015), which is echoed Australia-wide (The Kirby Institute, 2015). Among high risk adolescents (aged 16–19) in the Victorian Primary Care Network for Sentinel Surveillance on Blood Borne Viruses and Sexually Transmitted Infections, 13.7% of males and 9.4% of females tested in 2014 were positive for chlamydia, which was the highest positivity among all age groups (Burnet Institute, 2015). Risky sexual behaviours such as inconsistent condom use, multiple sex partners, and sex under the influence of alcohol or other drugs are common among young people and in combination with low rates of testing for STIs, exacerbate STI risk (Lim et al., 2009, Smith et al., 2009). Globally, unsafe sex is the second leading risk factor for disability-adjusted-life-years lost in adolescents aged 15-19 years (Mokdad et al., 2016).

Unintended pregnancies can negatively impact the social, economic, psychological and physical health and well-being of both a women and her child, and adverse outcomes may be heightened when unintended pregnancy occurs at a young age (van der Klis et al., 2002, Singh et al., 2010, Ong et al., 2012). One Australian study reports that 13% of sexually active women aged 18–23 years have ever had an unintended pregnancy (Herbert et al., 2013). Unintended pregnancy is often due to inconsistent use of contraceptives rather than non-use, and studies repeatedly show high rates of inconsistent condom use, low rates of long-acting reversible contraceptives (LARCs), and dependence on the oral contraceptive pill, which is highly user dependent and prone to inconsistent use (Ong et al., 2012, Black et al., 2013).

Experience of intimate partner violence (IPV) is prevalent among Australian women, and 14% of young women report ever experiencing physical or sexual violence (Cadilhac et al., 2015). Among young secondary school students, 38% of young women and 19% of young men report unwanted sex, and nearly one-fifth of these report intoxication leading to unwanted sex (Smith et al., 2009). There is a heavy burden of disease related to experience of IPV, including premature death and injury, poor mental health, reproductive health problems, harmful alcohol and other drug use, chronic pain disorders, gastrointestinal disorders and sleep problems (Cadilhac et al., 2015). Furthermore, the burden of disease

contributed by IPV in women aged under 45 years is greater than any other risk factor, including obesity and illicit drug use.

Sub-groups of young people in Australia with increased SRH-related problems and health needs are sexually and gender diverse young people (Bowring et al., 2015), Aboriginal and/or Torres Strait Islander young people (Ward et al., 2014, The Kirby Institute, 2015), young people from culturally and/or linguistically diverse populations, and homeless and incarcerated young people (Kang et al., 2006).

Adolescence is an important time to begin prevention initiatives: the majority of the population become sexually active during adolescence (Rissel et al., 2003); high risk behaviours are more common in this age group; and health and health behaviours developed during adolescence correspond highly with those in adulthood (Sawyer et al., 2012).

Health promotion for SRH can be administered through a variety of means and settings, such as educational and training institutes (schools, universities), health services, community services (including sports and recreational settings) and through media outlets, and may act at an individual, group, community or structural level. Means of implementation include direct service and program delivery, advocacy, policy and legislative reform and communication and social marketing (Women's Health West, 2011b, Sawyer et al., 2012).

OBJECTIVES

The primary objectives of this systematic review of reviews were to:

1. Undertake a systematic review of published systematic reviews on health promotion interventions for improving SRH in young people aged 10-24 years;
2. Assess the available literature on the effectiveness of health promotion interventions in reducing the risk of engaging in risky sexual behaviour and associated outcomes in young people;
3. Identify areas of weakness, inconsistency and gaps in the evidence base for community-based interventions in youth sexual and reproductive health to inform future research; and
4. Develop evidence to inform future SRH promotion initiatives.

METHODS

Overview

A systematic search was conducted of systematic reviews published between 2005 and 2015. Eligible systematic reviews focused on young people or adolescents aged 10–24 years, reported on sexual or reproductive health outcomes (pregnancy, STIs, condoms/contraceptive use, risky sexual behaviour, sexual healthcare access or sexual violence/intimate partner violence), reviewed interventions aimed at improving SRH, and included primary studies predominantly conducted in high-income countries. Both narrative reviews and meta-analyses were included. Further details of the search strategy and selection process are outlined in Appendix 1, pg. 31.

Strength of evidence

The strength of evidence was classified based on the consistency of findings and quality of systematic review. Criteria were adapted from a related review (Mavedzenge et al., 2014).

1) Consistency of findings. Assessment of available evidence in each review to support an intervention's efficacy was based on either the number of studies reporting statistically significant effectiveness or the results of the meta-analysis (pooled odds ratio [OR] or effect size [ES]). These were scored from 1 (consistently effective) to 4 (consistently ineffective). The absolute size of effect was not considered in this judgement, thus a small but statistically significant effect could be coded as one.
2) Quality. Quality of review was categorised as high, medium or low based on AMSTAR score (**s**ee appendix 1).

Consistency of findings and quality of review were combined in a matrix in order to generate a colour-coded score of strength of evidence (green-yellow-orange-red), where A1 (green) provides the strongest level of evidence, yellow indicates emerging evidence and C4 (red) provides the weakest (Table 2).

Table 2: Matrix to assess strength of evidence for intervention(s) in each review

			Quality of review		
			High	Medium	Low
			A	B	C
Consistency of findings	1	Consistently# showed effectiveness*	A1	B1	C1
	2	Largely, but not consistently, showed effectiveness	A2	B2	C2
	3	Mixed beneficial and ineffective or harmful results	A3	B3	C3
	4	Consistent# ineffective or harmful results**	A4	B4	C4

All, or virtually all studies
* Or meta-analysis pooled results statistically significant for beneficial effect.
** Or meta-analysis pooled results statistically insignificant or significantly demonstrate a harmful effect

Synthesis

Results of the systematic review of reviews are described by SRH outcome, domain (knowledge, attitudes, behaviour, clinical), setting and intervention type. Domains of impact are further described in Table 3.

Table 3: Description of outcomes by domain of impact

Knowledge and skills	Accurate knowledge of STIs, HIV, contraception, how to use condoms correctly, safe sex
Attitudes	Attitudes towards safe sex, abstinence, pregnancy, using condoms and sexual violence; self-efficacy to use condoms; intention to use condoms or abstain from sex
Behavioural	Condom use (frequency, consistency, at last sex); contraceptive use; sexual initiation; number of sex partners; risky sexual behaviour; perpetrator or victim of IPV/sexual violence
Clinical	Prevalence or incidence of STIs/HIV (proportion of sample population with self-reported or biologically diagnosed STI/HIV, including new or prevalent infection, as defined by study); unintended pregnancy, teenage pregnancy or repeat pregnancy.

Stratification by setting was based on mutually exclusive categories specifying either the predominant setting included in the review (e.g. majority of interventions based in school settings) or combination of settings included in the review. Reviews providing results stratified by setting are presented in more than one category with setting-specific results.

Stratification by intervention type was based on the most commonly referred to intervention types or components, including comprehensive education, abstinence education, skills-building, and outreach clinical services. Reviews providing results stratified by intervention type are presented in more than one category with intervention-specific results; the intervention description is underlined to indicate that results are specific. Reviews not providing stratified results are still presented in more than one category according to the interventions described, but the findings cannot necessarily be attributed to any one intervention type (**see** Table 6, pg.20).

Considerations for reading this review

Several caveats should be considered when interpreting findings from this review.

Due to the breadth of the review and complexity of compiling reviews with different effect measures and the varied ways of presenting findings, the magnitude of effect is not conveyed in the summary results. We have chosen to report on the consistency of studies reporting a statistically significant effect.

The number of studies reporting on a particular outcome was not always clear and frequently differed from the overall number of included studies in a review. This may have obscured our judgement of strength of evidence, which was based on the proportion of studies reporting an outcome.

Caution must be taken when interpreting the results of multiple reviews, as reviews may not be mutually exclusive. Individual studies may be included in more than one review, and thus may give the false appearance of more evidence than is actually available. For example, of two reviews providing evidence specific to advanced

provision of emergency contraception, the same four primary studies are included in both reviews with only one additional study in the more recent review (Blank et al., 2012, Rodriguez et al., 2013).

Heterogeneity of studies and systematic reviews make it difficult to compile evidence. Systematic reviews often reviewed more than one intervention type and frequently did not provide separate results for each type. We have categorised intervention type by the most common interventions included in a review, but unless stratified results are included (see Synthesis, p.4), results cannot necessarily be attributed to that intervention type. For example, 13 reviews included interventions involving skills-building (see Table 6). Of these, only one provided results specific to skills-building. In all other instances, evidence of effectiveness may relate to skills-building *or* to other intervention types listed (education, family/parent programs, mass media, etc.).

There are a number of limitations relating to the review protocol:

Due to the broad scope and number of systematic reviews identified, only published literature was included in the review, which may have resulted in reporting bias. Furthermore, relying only on systematic reviews means that important primary studies, particularly more recent studies, may not be included in the evidence presented.

There are numerous known limitations of the AMSTAR system of scoring quality of reviews (Burda et al., 2016). There is no guidance on how to interpret or categorise the AMSTAR score; the cut-offs used in this review may differ to other systematic reviews of reviews and do not take into account the relative importance of individual items. However, by design AMSTAR assumes equal weight for all items. Classification of quality of systematic reviews does not fully consider the quality of included studies. Many reviews noted that the evidence was limited in terms of quality, quantity, and consistency of reporting.

Many systematic reviews predominantly included studies from the United States, with less representation from Australia and other high-income countries. Differences in sociocultural setting, education and health systems may influence the generalisability of findings.

This review did not consider the cost-effectiveness of intervention types which may also influence decision-making when designing and implementing health promotion interventions.

RESULTS

Description of included reviews

Overall 66 systematic reviews published since 2005 were identified on health promotion interventions for improving SRH in young people, listed in Appendix 2 (pg. 35). The majority (74%) were systematic reviews, 20% were meta-analyses, and 6% were narrative reviews. The four most recent reviews included through to 2015 in their search.

Nearly one quarter (23%) of reviews targeted sexual and reproductive health in general terms, 20% sexual health specifically, 17% unintended/teenage pregnancy and 17% intimate partner violence/sexual violence. The remaining reviews targeted a combination of related topics, while three targeted general health and wellbeing and included a sub-analysis on SRH.

The majority of reviews specifically targeted adolescents or young people, with the defined age range varying slightly between reviews. Ten reviews targeted the general population or women but young people accounted for the majority of the review sample or results were suitably stratified. Few studies targeted sub-populations of young people, such as homeless youth, disadvantaged youth, Latino youth, African American youth, and young people living with HIV. See Appendix 1 (pg. 31) for full results of search and study selection.

The quality of systematic reviews, assessed by AMSTAR (Shea et al., 2009), ranged from 2–11 out of 11, with an average score of 5.3. The majority of studies were classified as medium (44%) or low (41%) quality.

Evidence of effectiveness by intervention type, domain and outcome is summarised in Table 6, and outlines the strength of the evidence in relation to influencing knowledge and skills, attitudes, behaviours and clinical outcomes. Reviews that illustrated intervention effectiveness are outlined in more detail in the coloured textboxes throughout this report.

Overview by setting

- Most systematic reviews included interventions based in more than one setting but did not stratify results, so it is difficult to ascertain the impact of interventions conducted in different settings.
- Schools were the most commonly reported setting for SRH interventions aimed at young people, but the majority of reviews report mixed or ineffective findings.
- There is emerging evidence to support interventions based on digital media platforms for knowledge, attitudes and behavioural domains (Hieftje et al., 2013, Blackstock et al., 2015). Two reviews provided evidence of effectiveness for improving self-efficacy to use condoms and increasing condom use through mobile phone-based interventions involving text messaging (Jones et al., 2014, Smith et al., 2015). Jones et al. (2014) included data from a single study reporting on STI cases pre- and post-intervention, with favourable results.
- There is good evidence for behavioural change from interventions originating in clinical settings, but these all have varied focus, such as community (or non-GP)-based sexual and reproductive health services, advanced supply of emergency

contraception, comprehensive education and skills building and motivational interviewing. Actual clinical interventions (such as use of long-acting reversible contraceptives) were excluded from this review.

- Two reviews stratified results by setting and suggested differential results between settings:
    - Lazarus et al. (2010) reported similarly mixed results for knowledge and sexual risk behaviour outcomes in both community and school settings, but ineffective results in clinical settings.
    - Ickes et al. (2007) reported higher effectiveness of interventions to improve knowledge in school settings compared to family and community settings.

Overview by domain

Behavioural outcomes were the most commonly reported by systematic reviews (n=58), followed by clinical outcomes (n=35), attitude outcomes (n=25) and knowledge outcomes (n=25).

Knowledge and attitude measures

- Reviews reporting on SRH knowledge demonstrated higher levels of effectiveness than reviews reporting on other domains. There was evidence of effectiveness for 32% of reviews reporting on knowledge and skills, compared to lower effectiveness for behavioural outcomes (21%), attitude outcomes (20%) and clinical outcomes (17%).
- Favourable improvements in knowledge were predominantly demonstrated for knowledge of HIV/STIs and knowledge of condoms and other contraceptive methods.
- There is high-level evidence of effectiveness for improving attitudes towards risky sex and emerging evidence of effectiveness for interventions improving attitudes relating to condoms/contraception and IPV.

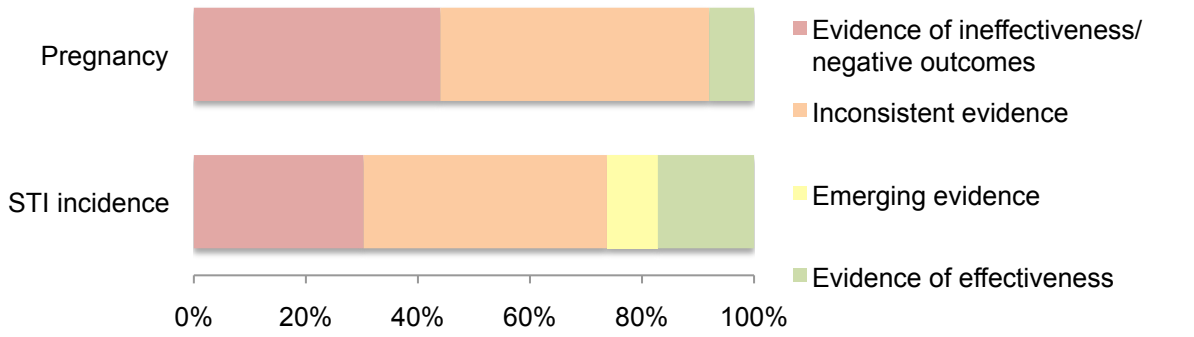
Behavioural measures

- Multiple reviews showed evidence for improvements in behavioural measures for multiple SRH outcomes, such as increased condom use, delayed sexual initiation, reduced number of sexual partners, and improved health service access. No reviews reported evidence of effectiveness for reducing IPV.

Clinical measures

- Clinical measures had the lowest level of effectiveness, and 40% of reviews reporting on clinical measures reported evidence of ineffectiveness or negative outcomes (coded red) for any clinical outcome.
- There is more evidence for interventions being effective at reducing STIs compared to preventing pregnancy (Figure 1).
- Favourable evidence for interventions reducing sexual risk is not necessarily matched by clinical outcomes. For example, reviews finding high level of effectiveness for improving condom use have demonstrated inconsistent results or evidence of ineffectiveness for preventing pregnancy or reducing STIs.

Figure 1: Evidence for interventions on improving SRH clinical outcomes



Overview by outcome

Sexually transmissibleinfections

- High-level evidence of effectiveness was reported in four reviews for reducing STI incidence (Johnson et al., 2011, Chin et al., 2012, Jones et al., 2014, O'Connor et al., 2014).
- There is high-level evidence for interventions improving knowledge of STIs through abstinence-plus education (Underhill et al., 2008) and general education/skills building/communication skills/family parent programs (Sutton et al., 2014).
- There is some evidence that peer education can improve sexual health knowledge and attitudes, but not behavioural and clinical outcomes (Kim et al., 2008, Lazarus et al., 2010).
- There is some emerging evidence for interventions utilising digital media to improve sexual health and STI knowledge (Guse et al., 2012, Blackstock et al., 2015) .
- There was evidence of effectiveness for peer education to improve attitudes related to SRH (Kim et al., 2008, Katz et al., 2013). Another systematic review incorporating a variety of interventions such as family/parent programs, education, skills building and mass media demonstrated evidence of effectiveness for improving attitudes relating to risky sexual behaviour (Wight et al., 2013).
- There is a high level of evidence related to improving condom or condom/contraception use through comprehensive education, general education, motivational techniques, condom demonstrations, communication skills and community-based SRH services (Oringanje et al., 2009, Blank et al., 2010, Shepherd Jonathan et al., 2011, Blank et al., 2012, Chin et al., 2012, Mbuagbaw et al., 2012, Sutton et al., 2014, Smith et al., 2015).

EVIDENCE FOR REDUCING STIS

Johnson (2011) found a significant decrease in STIs (laboratory diagnosed or self-reported) as well as behavioural indicators of sexual risk. The systematic review focused on behavioural interventions, including HIV education, interpersonal skills training, self-management skills training, condom demonstrations and motivational content. The review found that interventions were more likely to succeed if they included motivational content or condom skills training.

Chin (2012) reviewed the effectiveness of abstinence-only and comprehensive education programs in schools. Comprehensive education significantly lowered incidence of STIs (n=6, pooled odds ratio [OR] 0.65, 95% CI 0.47-0.90) while abstinence-only education had a non-significant effect. Neither program had a significant effect on reducing teen pregnancy.

O'Connor (2014) reported a significant reduction in incident STIs among adolescents with high-intensity counselling in clinical settings at 12 month follow-up (OR 0.38, 95% CI 0.24-0.60).

Evidence of effectiveness for reducing STIs by **Jones (2014)** is based on one study only, thus limiting confidence in this result.

Pregnancy

- There is a high level of evidence relating to clinical measures of unintended or teenage pregnancy, and emerging evidence for improving pregnancy-related attitudes.
- High-level evidence of effectiveness was reported in two reviews for preventing pregnancy (Harden et al., 2009, Dean et al., 2014).
- One review reported emerging evidence for improving attitudes towards pregnancy (Meade et al., 2005) through integrated clinical and social care and prevention education; however, the review only included one study reporting on this outcome.
- In addition to interventions with evidence for improving condom use (see Sexually transmissibleinfections), there is a high level of evidence related to improving contraception use through distribution of contraception (Oringanje et al., 2009, Blank et al., 2010, Rodriguez et al., 2013). These predominantly related to advanced provision of emergency contraception to improve use of the emergency contraceptive pill. Two of these reviews also reported on pregnancy as a clinical outcome but found no evidence of effect.

EVIDENCE FOR REDUCING UNINTENDED PREGNANCY

Dean (2014) focused on young women, reviewing preconception care which included a wide range of interventions such as comprehensive education, personal development, and text messaging. The meta-analysis of 33 studies demonstrated a 15% relative reduction in odds of teen pregnancy (OR 0.85, 95% CI 0.74-0.98) and 37% reduction in odds of repeat teen pregnancy (OR 0.63, 95% CI 0.49-0.82). The systematic review attributed the most successful outcomes to comprehensive and multicomponent interventions involving a combination of education, vocational support and personal development, healthcare, and condom distribution. Contrarily, sexual education, and interventions based in school and healthcare were found to be unsuccessful.

Harden (2009) reviewed interventions targeting social disadvantage to prevent teenage pregnancy, thus focusing on the social determinants of SRH through education, employment and social connectedness. These included personal development programs providing vocational training, volunteering opportunities or life skills, and early childhood interventions, which might provide parent training, social skills training, preschool education or support for continuing education. The meta-analysis of six studies found a 39% relative risk reduction of teenage pregnancy rates (relative risk [RR] 0.61, 95% CI 0.48 – 0.77). The review authors recommended that interventions to target social disadvantage should complement rather than replace sexual education.

Intimate partner violence

- Evidence for interventions to prevent IPV or sexual violence demonstrates inconsistency at best and ineffectiveness at worst.
- There is emerging evidence for interventions improving attitudes towards IPV through education-based interventions (Garrity, 2011, Jewkes et al., 2015).

EVIDENCE FOR IMPROVED ATTITUDES TOWARDS IPV

Jewkes et al. (2015) limited analysis to high quality studies only and found that 10/16 studies significantly improved attitudes towards violence, 5/9 studies reported a significant impact on reducing adherence to rape myths and 3/4 studies significantly changed bystander attitudes.

Health service access

- There is high-level evidence for outreach SRH services improving SRH service uptake (Blank et al., 2010, Blank et al., 2012, Denno et al., 2012).

Overview by intervention type

Evidence for numerous types of interventions were found through systematic reviews. These are described in Table 4.

Table 4: Description of intervention types and components.

Interventions	Description	Key review(s)
Education interventions		
Abstinence-only education	Education promoting abstinence from sexual activity (either delayed initiation or abstinence until marriage).	Underhill (2007), Manlove (2015)
Abstinence-plus education	Education promoting sexual abstinence as the best way to prevent STIs and unintended pregnancy, but also promoting condoms and contraception for sexually active participants.	Underhill (2008), Manlove (2015)
Comprehensive education	Education promoting behaviours that prevent or reduce risk of pregnancy, HIV, and other STIs.	Chin (2012), Manlove (2015)
Education (general, group, curriculum based)	General education (content unspecified) including group education, curriculum-based education or a combination of different education formats.	
Peer education	Education delivered to young people by their peers, often in a community setting.	Kim (2008)
Family/parent programs	Sex and relationship education delivered with a parent or family focus, either actively targeting parents or including both parents and child/children in education sessions.	Downing (2011)
Educational components		
Motivational interviewing/components	Refers to a specific style of counselling which is client-centred and attempts to help clients to recognise and react to their problems through collaborative and guided conversation.	Mbuagbaw (2012)
Skills-building	Interventions including the development of sexual behavioural skills, such as how to use a condom and how to negotiate safer sex.	Picot (2012)
Condom demonstration	Interventions including practical demonstrations showing how to use a condom correctly.	Picot (2012), Blank (2012), Johnson (2011)
Communication skills	Interventions promoting communication skills of young people, such as negotiating safer sex, or focusing on parent-child communication skills.	
Personal development	Interventions teaching skills for personal development or employability, such as life skills training or vocational training. Interventions involving community service also promoted personal development.	Harden (2009), Manlove (2015)
Multicomponent	Descriptions of interventions stated *a priori* as 'multicomponent' varied, but included those implemented through multiple means and levels of influence (young people, parents, teachers, community) and those targeting multiple health outcomes.	
Clinical type interventions		
School-based health services	School-based health clinics, centres or healthcare with variation in how clinics are staffed (medical, nursing or other staff; full-time or part-time) and services offered.	Mason-Jones (2012)
Community-based testing/Outreach SRH services	Services providing access to SRH testing, treatment or management services through non-clinical settings such as community venues, sports clubs, entertainment venues and outreach.	Denno (2012)
Youth friendly services	Clinical services targeting young people and designed to promote a respectful, appealing and easily accessible space for young people to access information and health services addressing SRH needs. Common elements of youth-friendly services are confidentiality, free or low cost services, non-judgemental and easy access.	Blank (2012)

Communication, promotion and technology		
Digital media	Digitally delivered interventions to target knowledge, attitudes, risk behaviours and health-seeking behaviours. Such interventions may incorporate education, skills-building, motivation, reminders, and/or counselling and may be static or interactive platforms.	Jones (2014), Guse (2012), McLellan (2013)
Mass media/social marketing	Campaigns promoting knowledge, behaviours or promoting community support for SRH delivered through media which typically reach large audiences, such as television, radio, billboards, posters and print media.	Robinson (2014)
Distribution of condoms/ contraception	Interventions providing free or low-cost condoms and/or hormonal contraception, often through non-traditional outlets such as schools and community services.	Rodriguez (2013), Oringanje (2009)
Structural interventions		
Policy change	Legislation supporting access to SRH services, such as allowing emergency contraception to be dispensed without a prescription or mandating condom use in brothels.	Denno (2012)

Educational interventions

- **Abstinence-only education** demonstrates ineffective or inconsistent results for nearly all SRH outcomes, including sexual initiation, with the exception of one review (Chin et al., 2012).
- Higher effectiveness was noted for **abstinence-plus education** than abstinence-only education, such as in the domains of STI and condom/contraceptive knowledge and use of contraception (Bennett et al., 2005, Underhill et al., 2008), but results were still largely inconsistent.
- Systematic reviews including studies assessing interventions with **comprehensive education** demonstrated some higher-level evidence of effectiveness for behavioural outcomes. While results were largely inconsistent, the three reviews demonstrating a protective effect of comprehensive education tended to be of higher quality (medium versus low quality). Two of these reviews provided evidence of effectiveness specific to comprehensive education.
- Many systematic reviews covered **education** initiatives more broadly (content unspecified). Reviews demonstrating a protective effect of educational interventions included studies based in multiple settings.
- **Peer education** appears effective for improving knowledge and attitudes, but ineffective at reducing risky behaviour or preventing STIs and pregnancy.
- Although largely inconsistent, some reviews including **family or parent programs** reported favourable SRH outcomes. However, when limiting results to evidence specific to such programs (Downing et al., 2011, Kao et al., 2013), the effect does not remain.

EVIDENCE FOR EDUCATION INTERVENTIONS

A large high-quality review of 39 program evaluations found that compared to control programs, abstinence-plus programs significantly improved both short and long-term HIV knowledge. When considering individual behavioural outcomes such as condom use or sexual initiation, results were inconsistent, but 23/39 evaluations demonstrated significant protective effect on at least one behavioural outcome (Underhill et al., 2008).

A meta-analysis of comprehensive risk reduction programs found a statistically significant impact on behavioural and clinical outcomes, including increased use of condoms and/or other contraception (n=38; OR 1.39, 95% CI 1.19-1.62) and lowered incidence of STIs (Chin et al., 2012).

EVIDENCE FOR EDUCATION COMPONENTS

Motivational interviewing
Based on moderate quality evidence from two US trials, among young people living with HIV, motivational interviewing is more effective than standard of care at reducing frequency of unprotected sex (Mbuagbaw et al., 2012).

In a meta-analysis of behavioural interventions targeting adolescents, Johnson et al. (2011) conducted additional analyses to understand what components of interventions explain variation in sexual risk outcomes. Motivational training was significantly associated with effectiveness of interventions for increasing condom use. However, this was only true for studies conducted before 1995, and the impact of motivational training was markedly increased for higher quality studies.

Skills building
Picot et al. (2012) specifically focused on schools-based skills building behavioural interventions for the prevention of STIs. Four out of five studies reported significant improvements in knowledge of HIV/STIs, 3/7 reported significant improvement in self-efficacy to use condoms, and 1/1 study reported a significant improvement in attitude towards sexual risk.

Blank et al. (2012) reported evidence from five studies to support combining discussion and demonstration of condoms to increase condom use and SRH service engagement.

Education components

- Systematic reviews including studies assessing **motivational interviewing** had largely positive results for decreasing behavioural risk and improving knowledge (Trivedi et al., 2009, Blank et al., 2010, Johnson et al., 2011, Mbuagbaw et al., 2012).
- Five systematic reviews including interventions with a **skills-building** component demonstrated effectiveness for improving knowledge and attitudes and reducing risk behaviour.
- Reviews including interventions with **condom demonstrations** reported almost consistently effective results for improving behavioural and knowledge outcomes, as well as reducing STI prevalence.
- There is evidence of effectiveness for improvements in knowledge, attitudes and behavioural outcomes from reviews reporting on interventions including **communication skills**, but the evidence is mixed for behavioural and clinical outcomes. Some studies focused on the communication skills of young people,

whereas others focused on parent-child communication skills (e.g. Sutton et al., 2014).

- Six systematic reviews included interventions with **personal development** components, such as vocational training, life skills or community service. Although four provided mixed or ineffective results for behavioural outcomes, two provided evidence of effectiveness for reducing unplanned pregnancy.
- There is mixed evidence for **multicomponent** interventions, which may be due to the differences in defining multicomponent (see Table 4, p.12). One review found evidence of effectiveness for behaviour change for multicomponent interventions incorporating education of young people, parent training, community linkages and staff development and targeting both sexual health and pregnancy (Blank et al., 2010). Another review found evidence of effectiveness for reducing teen pregnancy through multicomponent interventions, such as those targeting sexual health plus relationships (Oringanje et al., 2009). However, there is evidence of ineffectiveness for behavioural outcomes and prevention of STIs.

Clinical-type interventions

- One review found evidence of effectiveness for school-based health care, with improved effectiveness when combined with contraception provision within school (Blank et al., 2010). Elsewhere, the evidence for **school-based healthcare** demonstrates ineffectiveness or equivocal results.
- There is inconsistent evidence of **youth-friendly health services** for improving knowledge, healthcare access, and evidence of ineffectiveness for reducing pregnancy. However, it is likely that our search strategy missed systematic reviews focusing on youth-friendly health services. Blank et al. (2012) noted that these services may not be reaching sub-populations of young people most at need.
- There is evidence of effectiveness for improving health care access though interventions incorporating **outreach** or **community-based SRH services**. For example, Blank et al. (2012) reported moderate evidence from five studies, and Denno et al. (2012) reported that outreach services were effective for increasing chlamydia screening.

Communication and promotion

- Despite the popularity of health media campaigns (Wakefield et al., 2010), relatively few systematic reviews included interventions involving **mass media** campaigns, and only one provided specific data. Reviews incorporating mass media demonstrate largely inconsistent results. Jewkes et al. (2015) noted that communication campaigns are useful for promoting conversation and awareness and may contribute to long-term change, but generally do not have immediate behaviour benefits.

EVIDENCE FOR DISTRIBUTION OF CONTRACEPTION AND MASS MEDIA

Two reviews reporting on largely the same studies provided strong evidence of effectiveness specific to the advanced supply of the emergency contraceptive pill, demonstrating increased use of emergency contraception after unprotected sex. Importantly, supply of emergency contraception did not reduce condom use. However, advanced provision of emergency contraception did not reduce risk of unintended pregnancy (Blank et al., 2012, Rodriguez et al., 2013).

Oringanje et al. (2009) found that contraceptive promotion (with or without contraceptive distribution) is only effective when combined with education components.

Robinson et al. (2014) analysed four studies assessing mass media campaigns and found a non-significant increase in condom use. The effect was greater for mass media campaigns combined with condom distribution, but remained non-significant (median 4% change in condom use, inter-quartile range -4.0 to 10.8).

Structural interventions

- **Distribution of contraception** (which in one case may have included condoms, but in other cases specified hormonal or emergency contraception), appears effective.
- There is less evidence for condom distribution interventions. One review found that structural interventions limited to young people in the United States had a non-significant effect on condom use behaviours. However, overall interventions targeting availability only (low-cost condoms, condom vending machines, condom bowls as well as policy change improving availability) were effective in U.S.-based studies. Targeted condom distribution through key venues frequented by young people, in combination with education and prevention messages, may be more effective than mass distribution of free condoms (Charania et al., 2011).
- Only two reviews looked at **policy change** interventions, involving change in policy to allow the dispensing of emergency contraception without a prescription (Denno et al., 2012) or mandating condom use in brothels (Charania et al., 2011). Denno (2012) found that policy change significantly increased use of contraception in the majority of studies reviewed. Although Charania (2011) did not find a significant effect of reviewed interventions on condom use in young people, in general they reported that individual and group-level interventions were more effective when combined with a structural-level intervention, such as policy change. Further evidence on policy change interventions is needed to advocate for supportive SRH policy.

Features of successful interventions

Numerous systematic reviews have highlighted features of successful interventions or characteristics associated with more effective outcomes. These are described in Table 5**Error! Reference source not found.**. Recurring features of successful interventions reported were:

- Longer-term and repeated interventions (not single-session)
- Multi-setting and multi-level (e.g. individual, family, community) interventions
- Interventions involving parents
- Culturally, gender and age appropriate/sensitive interventions

- Interventions incorporating skills building
- Multicomponent interventions (e.g. education, skills building, condom promotion).

Some reviews provided conflicting advice on whether it is preferable to focus on more than one outcome (e.g. pregnancy and safer sex; broader health focus)(Blank et al., 2010, Owen et al., 2010) or have clear and narrowly defined health goals (Kirby et al., 2007).

Table 5: Characteristics of successful interventions as reported in systematic reviews

Allen-Meares (2013)	Trained professionals delivering treatment; Multiple sessions of intervention.
Blank (2010)	Contraception provision provided on site (schools); multicomponent (pregnancy + safer sex).
Charania (2011)	Structural interventions combined with individual and group level interventions.
De Koker (2014)	Based in multiple settings (school + community); focus on key people (teachers, parents, community members).
Dean (2014)	Comprehensive community programs (educational + vocational) to prevent teenage pregnancy.
Denno (2012)	Mail-based STI screening, condom distribution via street outreach, policy allowing emergency contraception without prescription.
Gavin (2010)	Skill-building, enhanced bonding, strengthen family context, engage youth in real roles, strengthen school context, communicate expectations for behaviour, and be stable and longer-lasting.
Haberland (2015)	Addressing gender or power improves effectiveness of HIV education programs.
Harden (2009)	Youth development programs. Programs of social support, educational support and skills training have more immediate impact.
Ickes (2007)	Elements of successful programs included integrating theory, cultural sensitivity, gender sensitivity, and longer duration of interventions and those that involved skill training.
Jackson (2012)	The most promising interventions addressed multiple domains (individual and peer, family, school and community) of risk and protective factors for risk behaviour.
Johnson (2011)	Successful program factors relating to sex frequency outcomes: being implemented with institutionalised adolescents; had no focus on abstinence; greater number of intervention sessions. Program factors for reducing condom use are: greater amount of condom training; motivational training.
Kao (2013)	Incorporating parents strengthened intervention effect. Providing resources and support for parents essential.
Kirby (2007)	Clear health goals; narrow focus on specific behaviours leading to health goals; addressed psychosocial risk/protective factors affecting sexual behaviour; created safe social environment; used institutionally sound teaching methods (actively involved participants, health participants personalise info); employed culturally/age/experience appropriate activities, instructional methods & behavioural messages; involved multi-sectoral people in development; activities consistent with community values; if necessary, implemented activities to recruit & retain youth (e.g. offered food).
Lazarus (2010)	Peer-led more acceptable to young people, but improvements in knowledge only.
Leen (2013)	Programs focused on behaviour change may elicit more positive effects more readily than those focusing on knowledge and attitude change.
Lomotey (2013)	Theoretical basis, targeted to specific population, interactive group-based education & behavioural skills training, well-trained facilitators.
Lundgren (2015)	Better results for interventions with longer-term investment and repeated exposure. School-based interventions targeting dating violence stronger evidence than those targeting gender-equitable norms. Gender-segregated community based interventions to target forming gender-equitable attitudes.
Manlove (2015)	Parent–youth relationship programs and clinic-based approaches were particularly effective.

O'Connor (2014)	Intervention intensity was the only characteristic that significantly influenced SRH outcomes.
Oringanje (2009)	Concurrent use of interventions such as education, skill-building and contraception promotion.
Owen (2010)	Broad-based, holistic service models, not restricted to sexual health, offer the strongest basis for protecting young people's privacy and confidentiality, countering perceived stigmatisation, offering the most comprehensive range of products and services, and maximising service uptake.
Petrova (2015)	Comprehensive STI education in the form of prevention-related skills.
Robinson (2014)	Mass media more effective when combined with product (condom) distribution.
Shepherd (2011)	Socially and culturally relevant, provide information about transmission and prevention of STIs, facilitate sexual communication and negotiation skills.
Sutton (2014)	Joint parent and child session attendance, promotion of parent/family involvement, sexuality education for parents, developmental and/or cultural tailoring, and opportunities for parents to practice new communication skills with their youth.
Trivedi (2009)	Messages about male responsibility, delivery in the participants' own community settings, group participation, promotion of a sense of worth, appreciation of relationships and the encouragement of the sharing of knowledge and information with peers and parents. Strengthen links to clinical services.
Wight (2013)	Community-based programs seem the most promising, whereas home-based media programs seem the least promising. Programs encouraging parental regulation (with more intense involvement of parents) have greatest evidence of effectiveness.

Gaps in evidence

A number of gaps in the evidence for SRH interventions were identified. There is a lack of available evidence identified through this review on youth-friendly health services and school-based health services. Further research is needed on personal development interventions, digital media delivered interventions, and the effectiveness of policy change interventions on attitude and clinical outcomes. In addition, further research is needed to identify successful interventions to prevent IPV among young people. Systematic reviews do not provide adequate evidence to support interventions targeting particular subgroups of young people who report higher SRH risk or poorer outcomes, such as sexually and gender diverse young people, and further means of analysing the available evidence is needed. The majority of research on SRH interventions for young people in high-income countries originates from the U.S., and Australia-specific evidence is currently limited.

CONCLUSIONS

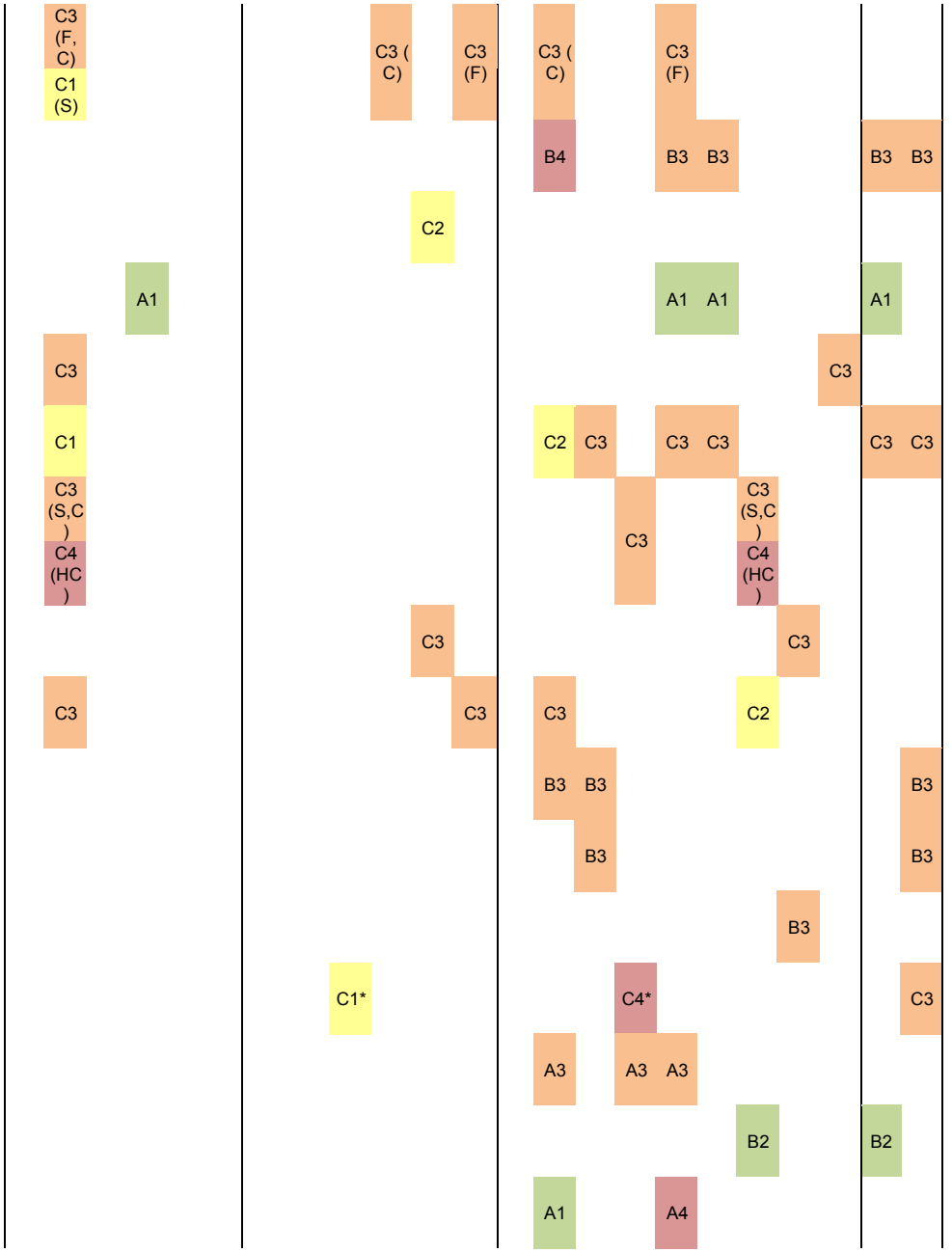
There is a large body of evidence relating to interventions to improve the SRH of young people, and a systematic review of reviews provides a means to comprehensively identify and collate available research. Results indicate that there is no single effective approach to improving SRH among young people, and interventions implemented through multiple settings and levels of influence (individual, community, family, etc.) appear to have the most favourable results. These findings should be considered by health promotion practitioners and funders when planning and supporting future health promotion interventions to improve the SRH of young people.

Table 6: Strength of evidence for common intervention types

Study	Settings	Intervention summary	Knowledge and skills						Attitudes						Behavioural									Clinical	
			Any	HIV/ STIs	Pregnancy	Condoms/contraception	IPV	Risky behaviour	Any	HIV/ STIs	Pregnancy	Condoms/contraception	IPV	Risky behaviour	Any	Condom	Contraception	Condoms/contraception use	Sexual initiation/ activity	Number of sex partners	Gen risky behaviour	IPV	Health service access	HIV/ STIs	Pregnancy
EDUCATION TYPE																									
Abstinence-only education																									
Bennett (2005)	S	Abstinence-only education;																	C3	C4					C4
Blank (2010)	S +, U, C	Abstinence-only education; Comprehensive education; Infant stimulator program; Multicomponent; Motivational interviewing; Outreach; Condom distribution; School-based healthcare service																							B3
Cardoza (2012)	S+, C, H	Abstinence-only education; Comprehensive education	C3						C3										C3	C3					
Chin (2012)	S, C	Abstinence-only education;														B4	B4		B1	B4				B4	B4
Manlove (2015)	S, C, HC, H, JD	Abstinence-only education; Abstinence-plus education; Comprehensive education; Personal development; Family/parent programs														C3			C3	C3				C3	C3
Petrova (2015)	S, HC	Abstinence-only education; Comprehensive educatiom																						B4	
Underhill (2007)	S/U+, C, H	Abstinence-only education																	A4	A4	A4			A4	A4
Abstinence-plus education																									
Bennett (2005)	S	Abstinence-plus education				C1										C3	C2		C3	C4					C4
Manlove (2015)	S, C, HC, H, JD	Abstinence-only education; Abstinence-plus education; Comprehensive education; Personal development; Family/parent programs														C3			C3	C3				C3	C3
Underhill (2008)	S, C, H	Abstinence-plus education		A2											A2	A3			A3	A3				A4	A3

Comprehensive education			
Blank (2010)	S+, U, C	Abstinence-only education; Comprehensive education; Infant simulator program; Multicomponent; Motivational interviewing; Outreach; Condom distribution; School-based healthcare service	B3 B3
Cardoza (2012)	S+, C, H	Abstinence-only education; Comprehensive education	C3 C3 C3 C3
Chin (2012)	S, C	Comprehensive education	B1 B1 B1 B1 B1 B4
Corcoran (2007)	C, HC+	Supply of contraception; Education only; Comprehensive education, case-management and counselling	B3
De Koker (2014)	S+, C	Comprehensive education; Gender power; Family/parent programs; Community component; Communication skills	C3
Dean (2014)	S, C, HC	Comprehensive education; Community service; Vocational training; Conditional cash transfers; Digital media (education/reminders); Peer counselling; Supply of contraception	B1
Manlove (2015)	S, C, HC, H, JD	Abstinence-only education; Abstinence-plus education; Comprehensive education; Personal development; Family/parent programs	C3 C3 C3 C3 C3
Petrova (2015)	S, HC	Abstinence-only education; Comprehensive education	B1
Education (general, group, curriculum based)			
Blackstock (2015)	M/T	Counselling; education; skills training (technology/media delivered)	C1 C1 C1 C2 C1 C3
Coren (2013)	C	Education; Vocational training; Harm reduction; Family/parent programs	A3 A4 A4
Eaton (2012)	HC	Education; Motivational interviewing; Skills-building; Role play	A4
Fellmeth (2015)	S, U+, C, HC	Education; Self-defence	B4 B4 B4
Garrity (2011)	U	Group education; Peer education	C3 C2
Gavin (2010)	S, C	Education; Skills-building; Family/parent programs; Community service	C3 C3 C3 C3 C3
Haberland (2015)	S+, C, HC	Education; Gender power component	C3 C3

Ickes (2007)	S, C+, F	Education, skills-building, culturally/gender specific and sensitive materials, family programs	C3 (F, C) C1 (S)
Jackson (2012)	S+, C, W	Curriculum-based education (sexual risk + alcohol)	
Jewkes (2015)	S+, W, DM	Education; Media campaigns	
Johnson (2011)	S, C	Education; Condom demonstrations; Motivational interviewing; Skills-building	A1
Kang (2010)	C, HC, C, DM, S	Community-based testing, youth friendly services ; Digital media/promotion; Education	C3
Kirby (2007)	S, C, HC	Group education	C1
Lazarus (2010)	S+, C, HC	Education; peer education	C3 (S,C) C4 (HC)
Leen (2013)	S+, C	Education; skills-building	
Lomotey (2013)	S, C, HC	Group education; skills-building	C3
Lopez (2013)	S, C, HC+	Theory-based intervention	
Lopez (2015)	HC, H	Special education versus routine/delayed education	
Lundgren (2015)	S+, C, H	Family/parent programs; Group education; Peer education; Skills-building; Economic empowerment interventions; Marketing; Media campaigns	
Meade (2005)	S, HC+	Integrated clinical and social care; Prevention education	
Naranbhai (2011)	C	Education; Skills-building; Family/parent programs; Condom distribution	
O'Connor (2014)	HC	Education; Condom demonstrations; Skills-building; Communication skills	
Oringanje (2009)	S+, C, HC	Education; Contraception promotion; Supply of contraception; Multicomponent	

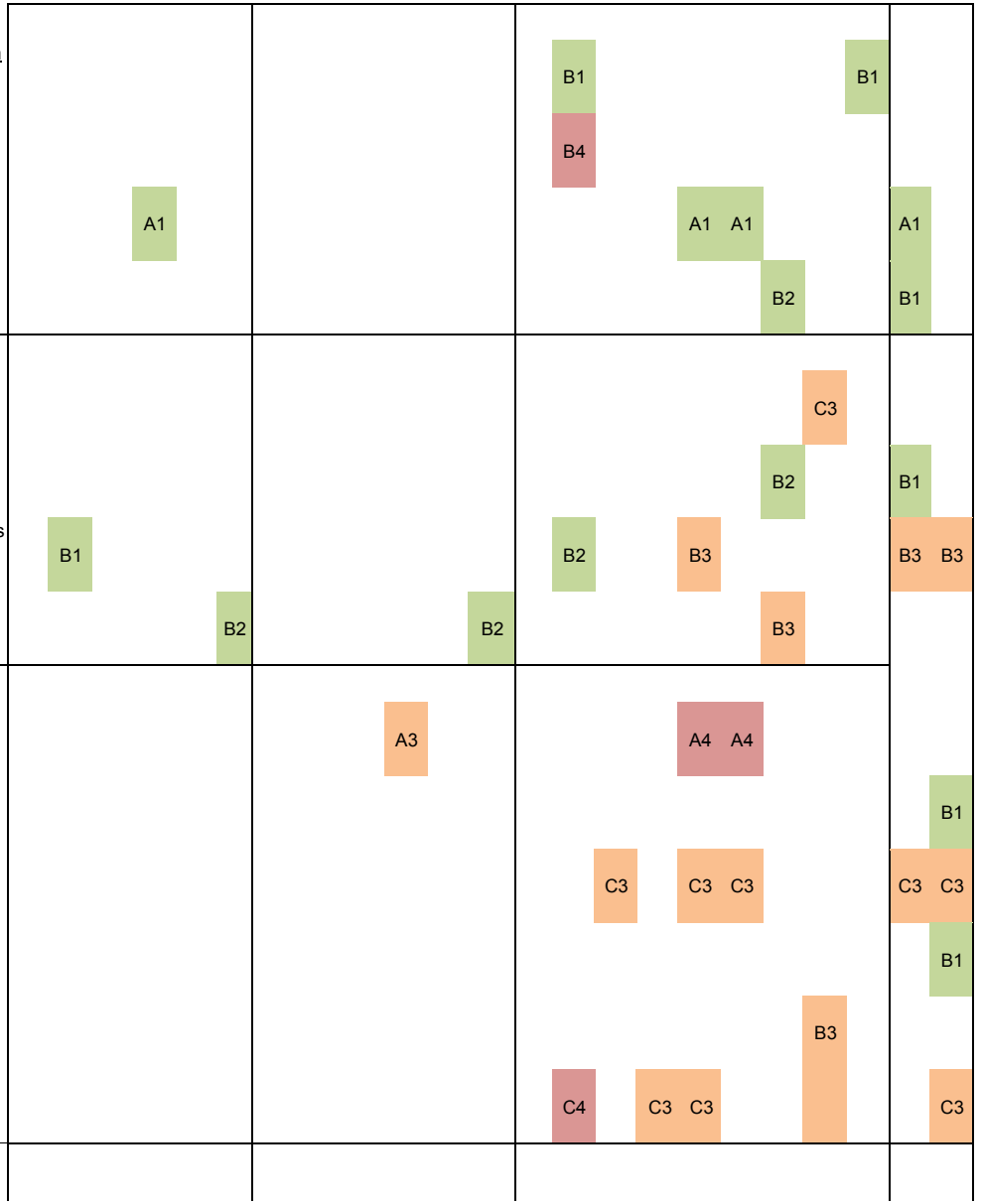


Petering (2014)	S	Education					B3						B3									B3			
Robinson (2014)	S, C, HC	Group education; skills-building; Peer outreach; Mass media; Small media														B3									
Shepherd (2011)	U, S, C, HC+	Education; Community-based SRH services														B2		B4	B3					B3	
Sutton (2014)	S, C, HC	Family/parent programs; Education; Skills-building; Communication skills		B1												B2			B3					B3	B3
Trivedi (2009)	S, C, HC	Education; Skills building; Motivation			C3	B3						C3				C2			C2						
Whitaker (2006)	S+, C	Curriculum-based education (gender norms, power, IPV)											B3									B3			
Whitaker (2013)	S+, U, C	Curriculum-based education; Group education																				C3			
Wight (2013)	S, U, C, H	Family/parent programs; Education; Skills-building; Communication skills; Mass media						B2						B2							B3				
Peer education																									
Dean (2014)	S, C, HC	Comprehensive education; Community service; Vocational training; Conditional cash transfers; Digital media (education/reminders); Peer counselling; Supply of contraception;																							B1
Garrity (2011)	U	Group education; Peer education					C3						C2												
Katz (2013)	U	Peer education											B1									B4			
Kim (2008)	S+, C	Peer education	B1						B1									B4		B4				B3	B4
Lazarus (2010)	S+, C, HC	Education; peer education	C2						C2																
Lundgren (2015)	S+, C, H	Family/parent programs; Group education; Peer education; Skills-building; Economic empowerment interventions; Marketing; Media campaigns																				B3			
Robinson (2014)	S, C, HC	Group education; Skills-building; Peer outreach; Mass media; Small media														B3									
Tolli (2012)	S	Peer education		C3								C4*					C4		C1*	C4*				C4*	C4*

Family/parent programs			
Coren (2013)	C	Education; Vocational training; Harm reduction; Family/parent programs	A3; A4 A4
De Koker (2014)	S+, C	Comprehensive education; Gender power; Family/parent programs; Community component; Communication skills	C3
Downing (2011)	S, C, H	Family (F) / parent (P) programs	B3 (P); B4 (F)
Gavin (2010)	S, C	Education; Skills-building; Family/parent programs; Community service	C3; C3 C3; C3 C3
Ickes (2007)	S, C+, F	Education, skills-building, culturally/gender specific and sensitive materials, family programs	C3; C3; C3
Kao (2013)	S, C+, H	Family/parent programs	C1*; C3; C3; C1*
Lundgren (2015)	S+, C, H	Family/parent programs; Group education; Peer education; Skills-building; Economic empowerment interventions; Marketing; Media campaigns	B3; B3; B3
Manlove (2015)	S, C, HC, H, JD	Abstinence-only education; Abstinence-plus education; Comprehensive education; Personal development; Family/parent programs	C3; C3 C3; C3 C3
Naranbhai (2011)	C	Education; Skills-building; Family/parent programs; Condom distribution	A3; A3 A3
Sutton (2014)	S, C, HC	Family/parent programs; Education; Skills-building; Communication skills	B1; B2; B3; B3 B3
Wight (2013)	S, U, C, H	Family/parent programs; Education; Skills-building; Communication skills; Mass media	B2; B2; B3
EDUCATION COMPONENTS			
Motivational interviewing/components			
Blank (2010)	S+, U, C	Abstinence-only education; Comprehensive education; Infant simulator program; Multicomponent; Motivational interviewing; Outreach; Condom distribution; School-based healthcare service	B1 *
Eaton (2012)	HC	Education; Motivational interviewing; Skills-building; Role play	A4
Johnson (2011)	S, C	Education; Condom demonstrations; Motivational interviewing; Skills-building	A1; A1 A1; A1

Mbuagbaw (2012)	HC	Motivational interviewing													A1								
Trivedi (2009)	S, C, HC	Education; Skills building; Motivation			C3	C3						C3			C2			C2					
Skills-building																							
Blackstock (2015)	DM	Counselling; Education; Skills training (technology/media delivered)		C1		C1						C1			C2					C1		C3	
Eaton (2012)	HC	Education; Motivational interviewing; Skills-building; Role play																				A4	
Gavin (2010)	S, C	Education; Skills-building; Family/parent programs; Community service														C3		C3	C3			C3	C3
Ickes (2007)	S, C+, F	Education; Skills-building; Culturally/gender specific and sensitive materials, family programs		C3								C3		C3	C3			C3					
Johnson (2011)	S, C	Education; Condom demonstrations; Motivational interviewing; Skills-building				A1												A1	A1			A1	
Leen (2013)	S+, C	Education; Skills-building											C3								C3		
Lomotey (2013)	S, C, HC	Group education; Skills-building		C3										C3	C3					C2			
Lundgren (2015)	S+, C, H	Family/parent programs; Group education; Peer education; Skills-building; Economic empowerment interventions; Marketing; Media campaigns																			B3		
Naranbhai (2011)	C	Education; Skills-building; Family/parent programs; Condom distribution													A3		A3	A3					
O'Connor (2014)	HC	Education; Condom demonstrations; Skills-building; Communication skills																		B2		B1	
Picot (2012)	S/U	Skills-building	A1								A4	A3		A1*			A4	A4	A4				
Sutton (2014)	S, C, HC	Family/parent programs; Education; Skills-building; Communication skills		B1											B2			B3				B3	B3
Trivedi (2009)	S, C, HC	Education; Skills building; Motivation			C3	C3						C3			C2			C2					
Wight (2013)	S, U, C, H	Family/parent programs; Education; Skills-building; Communication skills; Mass media						B2						B2						B3			

Condom demonstration			
Blank (2012)	HC	Condom distribution; Youth friendly services ; Multicomponent ; Condom demonstration; Advanced provision of ECP; Outreach	
Charania (2011)	S, C	Condom distribution; Condom demonstration; Social marketing;Mass media	
Johnson (2011)	S, C	Education; Condom demonstrations; Motivational interviewing; Skills-building	
O'Connor (2014)	HC	Education; Condom demonstrations; Skills-building; Communication skills	
Communication skills			
De Koker (2014)	S+, C	Comprehensive education; Gender power; Family/parent programs; Community component; Communication skills	
O'Connor (2014)	HC	Education; Condom demonstrations; Skills-building; Communication skills	
Sutton (2014)	S, C, HC	Family/parent programs; Education; Skills-building; Communication skills	
Wight (2013)	S, U, C, H	Family/parent programs; Education; Skills-building; Communication skills; Mass media	
Personal development (incl vocational training, community service)			
Coren (2013)	C	Education; Vocational training; Harm reduction; Family/parent programs	
Dean (2014)	S, C, HC	Comprehensive education; Community service; Vocational training; Conditional cash transfers; Digital media (education/reminders); Peer counselling; Supply of contraception	
Gavin (2010)	S, C	Education; Skills-building; Family/parent programs; Community service	
Harden (2009)	S+, C, H	Personal development; Early childhood interventions	
Lundgren (2015)	S+, C, H	Family/parent programs; Group education; Peer education; Skills-building; Economic empowerment interventions; Marketing; Media campaigns	
Manlove (2015)	S, C, HC, H, JD	Abstinence-only education; Abstinence-plus education; Comprehensive education; Personal development; Family/parent programs	
Multicomponent			



Blank (2010)	S+, U, C	Abstinence-only education; Comprehensive education; Infant simulator program; Multicomponent; Motivational interviewing; Outreach; Condom distribution; School-based healthcare service	B3			B1						
Corcoran (2007)	C, HC+	Supply of contraception; Education only; Comprehensive education; Case-management and counselling										B3
Meade (2005)	S, HC+	Integrated clinical and social care; Prevention education			C1*			C4*				C3
Oringanje (2009)	S+, C, HC	Education; Contraception promotion; Supply of contraception; Multicomponent				A4	A4		A4		A4	A1
CLINICAL TYPE												
School-based health services												
Blank (2010)	S+, U, C	Abstinence-only education; Comprehensive education; Infant simulator program; Multicomponent; Motivational interviewing; Outreach; Condom distribution; School-based health service				B3	B1			B1	B3	B3
Mason-Jones (2012)	S	School-based health services			C4	C3				C3		
Owen (2010)	S	School-based health services; Condom distribution				B3			B3		B3	B4
Community-based testing/Outreach SRH services												
Blank (2012)	HC	Condom distribution; Youth friendly services ; Multicomponent ; Condom demonstration; Advanced provision of ECP; Outreach								B2		B3
Denno (2012)	S, C, HC	Policy change; Outreach SRH service provision								B2		
Guy (2012)	C	Community-based screening									C2	
Kang (2010)	C, HC, DM, D	Community-based testing, youth friendly services ; Digital media/promotion; Education		C3								
Shepherd (2011)	U, S, C, HC+	Education; Community-based SRH services				B2		B4	B3		B3	
Youth friendly services												
Blank (2012)	HC	Condom distribution; Youth friendly services ; Multicomponent ; Condom demonstration; Advanced provision of ECP; Outreach										B4
Kang (2010)	C, HC, DM, S	Community-based testing, youth friendly services ; Digital media/promotion; Education		C3								

COMMUNICATION, PROMOTION and TECHNOLOGY																			
Digital media																			
Blackstock (2015)	DM	Counselling; education; skills training (technology/media delivered)		C1	C1			C1			C2				C1			C3	
Dean (2014)	S, C, HC	Comprehensive education; Community service; Vocational training; Conditional cash transfers; Digital media (education/reminders); Peer counselling; Supply of contraception;																	B1
Guse (2012)	S, HC, DM	Digital media (education, skills-building, motivation, interactive, reminders)	C1					C3					C3						
Hieftje (2013)	DM	Digital media (interactive education)											C1						
Hightow-Weidman (2015)	DM	Digital media (education, skills-building, motivational interviewing, interactive, reminders)		C3										C4			C3		
Jones (2014)	DM	Digital media (education, reminders)						B2			B3			B3			B3	B1*	
Kang (2010)	C, HC, DM, S	Community-based testing, youth friendly services ; Digital media/promotion; Education		C3	C3												C3		
McLellan (2013)	S/U	Digital media (education, skills-building, interactive, games)	C3				C3						C3						
Smith (2015)	DM	Digital media (education, reminders); Education									A2	A3							
Tait (2015)	U+, HC	Digital media (education); Harm reduction; Motivational interviewing														B4			
Mass media/social marketing																			
Charania (2011)	S, C	Group education; Condom demonstration; Social marketing; Condom distribution									B4								
Jewkes (2015)	S+, W, DM	Education; Media campaigns							C2										
Lundgren (2015)	S+, C, H	Family/parent programs; Group education; Peer education; Skills-building; Economic empowerment interventions; Marketing; Media campaigns														B3			
Robinson (2014)	S, C, HC	Mass media; Distribution of condoms									B3								
Wight (2013)	S, U, C, H	Family/parent programs; Education; Skills-building; Communication skills; Mass media				B2				B2					B3				

STRUCTURAL INTERVENTIONS						
Distribution of condoms/contraception						
Blank (2010)	S+, U, C	Abstinence-only education; Comprehensive education; Infant simulator program; Multicomponent; Motivational interviewing; Outreach; Provision of condoms/contraceptives; School-based healthcare service			B1	
Blank (2012)	HC	Condom distribution; Youth friendly services ; Multicomponent ; Condom demonstration; Advanced provision of ECP; Outreach			B1	
Charania (2011)	S, C	Condom distribution (e.g. condom vending machines); Condom demonstration; Social marketing; Mass media			B4	
Corcoran (2007)	C, HC+	Supply of contraception; Education only; Comprehensive education, case-management and counselling				B3
Dean (2014)	S, C, HC	Comprehensive education; Community service; Vocational training; Conditional cash transfers; Digital media (education/reminders); Peer counselling; Supply of contraception;				B1
Naranbhai (2011)	C	Education; Skills-building; Family/parent programs; Condom distribution			A3 A3 A3	
Oringanje (2009)	S+, C, HC	Education; Contraception promotion; Supply of contraception; Multicomponent			A4 A1 A4	A4 A4
Owen (2010)	S	School-based healthcare services; Condom distribution			B3 B3	B3 B4
Robinson (2014)	S, C, HC	Mass media; Distribution of condoms			B3	
Rodriguez (2013)	HC	Advanced provision of ECP			B3 B1	B4
Policy change		-				
Charania (2011)	S, C	Condom distribution; Condom demonstration; Social marketing; Mass media; Policy change			B4	
Denno (2012)	S, C, HC	Policy change			B2	

Settings: S, school; U, university/college; C, community; HC, healthcare clinical setting; JD, juvenile detention; H, home-based; W, workplace; DM, digital media; F, family-based.
Strength of evidence ranked from green (best evidence of effectiveness), yellow (emerging evidence of effectiveness), orange (inconsistent evidence of effectiveness), red (evidence of ineffectiveness or harm), based on consistency of positive findings (1 to 4) and quality of review (A, high; B, medium; C, low).
+ Indicates majority of studies set in given setting; * based on one study only; Where underlined, results specific to intervention type. Elsewhere results may not be attributed to that intervention because results are aggregated.
Abbreviations: ECP, emergency contraception pill; IPV, intimate partner violence (or sexual violence); SRH, sexual and reproductive health; STI, sexually transmissible infection

APPENDIX 1: METHODOLOGY

Systematic search and selection

A scoping of literature was undertaken in 2015 by Family Planning Victoria. Relevant terms for the interventions were derived from the initial scoping of literature. The search strategy was developed in consultation with subject librarians from both Family Planning Victoria and the Ian Potter Library at Alfred Health.

The following electronic databases were searched: Cochrane library (CDSR, DARE, HTA, CENTRAL); Ovid MEDLINE (Medical Literature Analysis and Retrieval System Online; indexed and non-indexed); Embase; CINAHL; PsycINFO (Database of Psychological Literature); and Scopus.

A dual strategy employing a combination of Medical Subject Headings (MeSH) and 'free-text' terms in conjunction with Boolean and proximity operators were used where possible to ensure maximum coverage. The search syntax specified terms for intervention, age and outcome, for which examples are provided below:

1. Youth terms (e.g. "young people," or teen* or adolescent*); and
2. Outcome terms (e.g. "Reproductive health" or "sexual risk" or "unintended pregnan*" or "sexual violence" or "sexually transmitted infection"); and
3. Intervention terms (e.g. "health promotion" or "social marketing" or "community health service" or "health education" or "sex education").

Only reviews published in English between 2005 and 2015 were considered for inclusion.

Screening

After removing duplicate records, studies were selected according to eligibility criteria established a priori using a two-step screening process. Firstly, a reviewer screened each study title and abstract to assess whether the full paper should be retrieved. To maintain quality control and consistency, a second reviewer independently checked a random sample of 20% of the citations. Any disagreements were discussed verbally. A paper was excluded at this stage if from the title and/or abstract the study was clearly not a systematic review or meta-analysis, if it did not primarily address interventions or the specific youth SRH outcomes previously identified, or if it was conducted in a developing country. All papers considered for inclusion were retained for retrieval of the full-text article, and independently reviewed by two reviewers using the structured inclusion/exclusion criteria outlined below. A Google Form was developed to allow simultaneous data extraction by multiple reviewers.

Inclusion criteria

Reviews targeting young people aged 10-24 years of age, or where the majority (>50%) of included studies classified this criteria or data specific to young people could be extracted. Study populations could include, but were not limited to, specific population target groups as per the sexual and reproductive health promotion framework (Women's Health West, 2011a): same-sex attracted, sex or gender diverse young people, Aboriginal and/or Torres Strait Islander young people, culturally and linguistically diverse young people, young people with a physical or mental disability, young people being released from prison/juvenile justice, young sex workers and young people who inject drugs.

Intervention

Any intervention corresponding to the following health promotion actions described in the Sexual and Reproductive Health Promotion Framework (Women's Health West, 2011a): advocacy, policy and legislative reform; community education and capacity building; and communication and social marketing.

Other health promotion action areas described in the framework - service and program delivery, coordination and sector and workforce development, and research – were not included within the scope of this review as per initial discussions with the project advisory group.

Comparator

No specific comparisons were made, but all comparators selected for inclusion within the systematic reviews are relevant, including interventions targeting a wider population group (i.e. not just young people), control intervention group (i.e. no current intervention/treatment) or alternative interventions.

Outcomes

The review must report on the effectiveness of sexual and reproductive health promotion interventions based on one or more of the following outcomes:

- Use, uptake, knowledge or attitudes of condoms and/or other contraceptives in the community setting;
- Incidence, knowledge or attitudes of unintended or teenage pregnancies;
- Incidence, knowledge or attitudes of STI transmission;
- Engagement, knowledge or attitudes of other indicators of risky sexual behaviour (e.g. number of sex partners, frequency of sex, sexual initiation);
- Incidence (perpetration or victimisation), knowledge or attitudes of sexual or intimate partner violence (IPV) in young people; and
- Access to sexual and reproductive health services.

Study type

Systematic reviews which reflect the definition of a systematic review as per Moher et al. (2009) were included. The criteria for inclusion as a systematic review were as follows:

- A statement of review;
- A documented search strategy of at least one database with search terms stated (however minimal); and
- Stated inclusion/exclusion criteria (however minimal).

Exclusion criteria

The full-text articles will be excluded if:

- They have a broader approach than the current systematic review but do not provide a systematic sub-analysis relevant to the current systematic review (e.g. if the systematic review includes primary research that explores STI incidence in young people, but does not undertake an aggregated sub-analysis within the systematic review);

- Where a relevant systematic review is ongoing at the time searches are undertaken and/or published after the searches, it was noted in the final manuscript but not included in the analyses;
- Primary focus is on efficacy of biomedical and clinical interventions including screening, vaccination and contraceptive interventions not undertaken in the community setting (e.g. increased use of LARC in the clinic setting). Interventions aiming to improve uptake of clinical interventions were included;
- Systematic reviews of reviews/meta-review;
- Interventions conducted exclusively in closed settings (e.g. juvenile justice).

Data extraction

The following data was extracted from all included reviews:

- Review author and year of publication
- Inclusion of high/low-income countries, as classified by *The World Bank*
- Review type (systematic review, meta-analysis)
- Years searched in systematic review (or years covered, if search limits not specified)
- Number of studies included (total, and number relevant, if applicable)
- Overall number of subjects included in review and/or range in number of study participants
- Included study types (e.g. randomised control trials, pre-post test interventions, controlled before and after studies, quasi-experimental) as defined by review authors
- Target population of review
- Main aim of review
- Settings covered in review (education, community, clinical, media/arts/digital technology, workplace, home, other)
- Targeted health thematic area (HIV, pregnancy, sexual health, sexual and reproductive health (SRH), intimate partner violence/sexual violence, general health)
- Categories of interventions covered in review (education/capacity building, communication/social marketing, advocacy, policy, other) and brief description
- Summary of results for key outcomes (HIV/STIs, condoms, pregnancy, risky sexual behaviour, intimate partner violence) in domains of knowledge/skills, attitudes/intentions/self-efficacy, behaviours, clinical outcomes.
- Features of successful programs and interventions, as reported by review authors

Where possible, summary of results included the number of studies reporting on a particular outcome, number of studies reporting a significant or insignificant positive/negative/null finding, and pooled odds ratio (OR) and effect sizes (ES). Where information on outcomes specific to different types of interventions or settings within the one review was readily available, this was also extracted.

Outcomes relating to risky sexual behaviour included either unspecified risk, sexual initiation and/or sexual activity, and number of sexual partners.

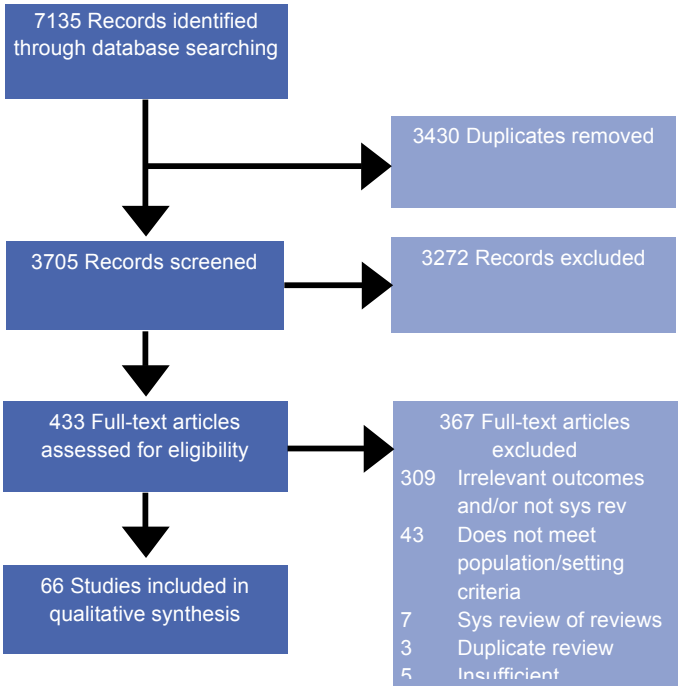
Quality assessment

Quality was assessed using A Measurement Tool to Assess Systematic Reviews (AMSTAR), an 11-item scale which scores reviews according to design, search strategy, selection criteria, completeness of reporting, scientific quality of studies assessed, publication bias, and methods used to combine studies (Shea et al., 2009). For ease of interpretation, we developed a categorical grade of review quality based on total AMSTAR score: high (9-11), medium (5-8), low (0-4).

Search results

Overall 7135 records were identified through database searching. After removing duplicates, 3705 records were screened based on abstract, from which 3272 were excluded. Full-text articles were assessed for 433 records. Of these, 367 were excluded, predominantly because of irrelevant outcomes or not meeting the criteria for a systematic review. In total 66 systematic reviews were deemed eligible and included in the review (Figure 1).

Figure 1: Results of search and study selection



APPENDIX 2: DESCRIPTION OF INCLUDED SYSTEMATIC REVIEWS

Table 7: Description of 66 systematic reviews included in review

Study	No. studies included (No. Relevant)	Review type	Years searched	Total n (range)	Target population	Health area	Setting	Country classification	Study types	AMSTAR score
Allen-Meares et al. (2013)	4	SR	<2012	6797 (range 21-4489)	School-based youth	GEN	School	High	pre-post, QE, RCT	2
Bennett et al. (2005)	16	SR	1980-2002	51276 (range 36-10600)	Secondary school-based youth	SRH	School	High	RCTs	2
Blackstock et al. (2015)	11	SR	2011-2015	2099 (range 25-701)	Adolescent and adult women (predominantly African American)	HIV	Technology	High	RCT, pre-post	2
Blank et al. (2010)	29	SR	1995-2008	NR (range 14-4166)	Young people aged <20 years	UP	Schools *, Colleges/University, Community	High	RCT, CBA, ITS	5
Blank et al. (2012)	23	SR	1995-2008	NR (range 43-202,289)	Young people aged <25 years	UP	Hospital/clinic	High	RCTs, NRCT, CBA, CH, ITS	6
Bungay et al. (2013)	20 (5)	SS/NR	2004-2011	1890 (range 24-1114)	Young people aged 11-18 years	GEN	Community	Both	RCT, pre-post, non-experimental	5
Cardoza et al. (2012)	15	SR	1993-2011	(range 26-1594)	CALD (Latino adolescents)	SRH	Schools *, Community, Homes	High	RCT, QE CT, pre-post	2
Charania et al. (2011)	21 (4)	MA	1988-2007	(range 71-4254)	General population (results restricted to young people)	SH	School, Community	Both (results restricted to high)	RCTs, NRCTs	7
Chin et al. (2012)	89	MA	1988-2007	NR	Adolescents	SRH	Schools, Community	High	RCTs, NRCTs	6
Corcoran et al. (2007)	16	MA	1970-2004	NR	Adolescent females (11-20 years) who are pregnant or parenting	UP	Community-based organisation, Hospital/clinic *	High	RCTs, NRCTs	6
Coren et al. (2013)	11 (4)	MA	<2012	(range 32-805)	Street connected children and young people (e.g. homeless youth)	GEN	Homeless shelters, drop-in centres & hostels	High	RCTs, CBA, quasi-RCT	10
De Koker et al. (2014)	6	SR	<2013	(range 191-2858)	Adolescents aged 10-19 years	IPV	School *, Community	Both	RCTs	4
Dean et al. (2014)	168 (33)	MA	<2011	NR	Adolescents and reproductive aged women (results reported limited to adolescent women)	UP	School, Community, Hospital/clinic	Unspecified	CT, OB	6
Denno et al. (2012)	20	SR	<2010	(range 218-30,439)	Adolescents and young adults (10-24 years)	SRH	Schools, Community, Hospital/clinic	Both	QE, TS, CBA, UBA, CS	5
Downing et al. (2011)	17	SR	1990-2009	(range 58-1115)	Parents and families with children aged 5-19 years	SH	Schools, Community, Home(Family)	High	RCT, NRCT, CBA	6
Eaton et al. (2012)	20 (6)	MA	<2011	1405 (range 90-682)	General population (young people stratified)	SH	Hospital/clinic	Both	RCT, CBA, controlled CH	9

Study	No. studies included (No. Relevant)	Review type	Years searched	Total n (range)	Target population	Health area	Setting	Country classification	Study types	AMSTAR score
Fellmeth et al. (2015)	38	MA	<2012	NR	Young people aged 12–25 years	IPV	High schools, University *, Community, Hospital/clinic	High	iRCT, cRCT, quasi-RCT	6
Garrity (2011)	7	SR	2000-2007	931 (range 19-261)	Male college students	IPV	Colleges	High	pre-post, exploratory	2
Gavin et al. (2010)	30	SR	1985-2007	(range 111-15,386)	Adolescents <20 years	SRH	Schools, Community organisations	High	iRCT, cRCT, QE	4
Guse et al. (2012)	10	SR	2000-2011	(range 8-1892)	Adolescents aged 13–24 years	SH	Schools, Clinics, Digital Media	Both	RCTs, QE, pilot studies	3
Guy et al. (2012)	4	SR	<2011	NR	ATSI aged 15–40 years	SH	Community	High	Repeated CS	4
Haberland (2015)	22	SR	1990-2012	148->9000	Adolescents <19 years	HIV	Schools *, Community, Hospital/clinic	Both	RCTs, controlled CH	3
Harden et al. (2009)	15	SR	1994-2004	(range 104-1163)	Socially disadvantaged young people <20 years	UP	School *, Community, Homes	High	RCT, NRCT	7
Hieftje et al. (2013)	19 (2)	SR	1950-2010	1007 (range 300-907)	Adolescents <18 years	SH	Digital media	NR	RCT	4
Hightow-Weidman et al. (2015)	66 (24)	SR	2014-2015	(range 10-2477)	Young people aged 13-29 years	HIV	Digital media	Both	RCTs, NRCTs	3
Ickes et al. (2007)	14	SS/NR	1992-2006	NR	African American adolescents	HIV	Schools, Community *, Family	High	NR	2
Jackson et al. (2012)	18	SR	<2010	(range 316-5954)	Young people	SRH	Schools *, Community, Workplaces	Both	RCT, NRCT	5
Jewkes et al. (2015)	65	SS/NR	<2014	NR	Adolescent boys aged 12-19 years	IPV	School *, Workplaces, Media/technology	Both	NR	3
Johnson et al. (2011)	67	MA	1985-2008	51,240	Adolescents	HIV	School, Community	NR	RCTs, QE	9
Jones et al. (2014)	11	SR	n.s.	(range 32-7606)	Young adults 15-24 years	SH	Digital media	High	iRCT, cRCT, pre-post, QE, feasibility	5
Kang et al. (2010)	19	SR	2000-2009	(range 22-2085)	Young people 12-25 years	SH	Community, Hospital/clinic, Digital media	High	pre-post, uncontrolled intervention, RCT, descriptive, repeated CS, matched control study	3
Kao et al. (2013)	20 (6)	SR	1998-2011	(range 154-1115)	Adolescents	SH	Public schools, Community *, Homes	High	RCT, other (NR)	3
Katz et al. (2013)	12	MA	1997-2011	2926 (rage 56-716)	College students	IPV	Colleges	High	Not clear but all had comparison groups	5

Study	No. studies included (No. Relevant)	Review type	Years searched	Total n (range)	Target population	Health area	Setting	Country classification	Study types	AMSTAR score
Kim et al. (2008)	13	SR	1998-2005	(range 150-12,000)	Adolescents aged 10–19	SRH	Schools *, Community	Both	RCT, QE	5
Kirby et al. (2007)	83	SR	1990-2007	NR	Young people 9-24 years	SRH	School, Community, Hospital/clinic	Both	iRCT, cRCT, matched CH, unmatched repeated CS	2
Lazarus et al. (2010)	19	SR	1995-2005	(range 72-8430)	Young people aged 10-24 years	SH	School *, Community, Hospital/clinic	High	RCTs, pre-post, QE, pilot study evaluation, comparative study	2
Leen et al. (2013)	9	SS/NR	2000-2011	(range 26-1722)	Young people aged 12-19 years	IPV	Schools *, Community	High	Pre-post	2
Lomotey et al. (2013)	8	SR	1991-2011	(range 157-10,954)	Young men aged 10–18	SH	Schools, Community, Hospital/clinic	High	RCTs	3
Lopez Laureen et al. (2013)	17	SR	<2013	(range 36-9645)	Women (11/17 targeted adolescents)	UP	School, Community, Hospital/clinic *	High	iRCTs, cRCTs	7
Lopez Laureen et al. (2015)	12 (6)	SR	<2015	4145	Postpartum women (results stratified for adolescent women)	UP	Hospital/clinic, Home	Both (results restricted to high)	iRCTs, cRCTs	8
Lundgren et al. (2015)	61	SR	1990-2012?	NR	Targeted adolescents aged 10-19 years but included those aged 10-26 years	IPV	School-based *, Community, Home (family)	Both	QE, RCT, other (non-controlled)	6
Manlove et al. (2015)	103	SR	1990-2014	NR	Adolescents <19 years	SRH	Schools , Community-based organisations, Clinic, Home, Juvenile detention	High	Random-assignment evaluations	3
Mason-Jones et al. (2012)	27	SR	1990-2012	NR	Adolescents	SRH, MH	Schools	High	Evaluations, only one experimental	4
Mbuagbaw et al. (2012)	2	SR	1980-2012	(range 51-186)	People living with HIV aged 10-24 years	SH, SU	Hospital/clinic	High	RCTs	11
McLellan et al. (2013)	30 (10)	SR	<2011	NR	Young people aged 12-25 years	SRH, SU	School/university	High	RCTs, CH, studies reporting baseline at follow-up	2
Meade et al. (2005)	9	SR	1981–2003	(range 58-14,718)	Pregnant teens or teen-moms aged <20 years	SRH	School-based, Hospital/clinics *	High	Not clear but all had comparison groups	2
Naranbhai et al. (2011)	3	SR	1981-2010	615	Homeless youth aged 12-24 years	HIV	Homeless shelters	High	RCTs	9
O'Connor et al. (2014)	31 (8)	MA	2007-2013	3407	General population (results limited to adolescents)	SH	Hospital/clinic	High	RCTs	8
Oringanje et al. (2009)	41	MA	<2008	95,662	Adolescents aged 10-19 years	UP	Schools *, Community, Hospital/clinic	Both	iRCTs, cRCTs	11

Study	No. studies included (No. Relevant)	Review type	Years searched	Total n (range)	Target population	Health area	Setting	Country classification	Study types	AMSTAR score
Owen et al. (2010)	30	SR	1985-2010	NR	Young people aged 11-18 years	SRH	Schools	NR	CBA ,case studies, repeated CS, CH, QE, UBA	7
Petering et al. (2014)	13	SR	2002-2012	(range 28-2,654)	Young people aged 12-26 years	IPV	Schools	High	QE, random assignment to intervention(s)/control	5
Petrova et al. (2015)	18	MA	1989-2012	15,579	US young people	SRH	Schools, Clinics	High	78% RCT	7
Picot et al. (2012)	15	MA	1985-2008	(range 157-8766)	Young people aged 13-19 years	SRH	School or college	Both	RCTs	9
Robinson et al. (2014)	22 (6)	SR	1980-2009	NR	General population (4/6 targeted young people)	SH	School, Community, Clinic	High	CS, comparison group, NRCT,	6
Rodriguez et al. (2013)	14 (5)	SR	1980-2012	NR	Women of reproductive age (results for adolescent females <20years stratified) ,	UP	Clinics	Both	RCTs	6
Shepherd Jonathan et al. (2011)	23	SR	2007-2010	NR	Young women <26years	SH	University/college, School, Community, Clinics *	High	RCTs	8
Smith et al. (2015)	5	SR	1993-2004	1382	Women	UP	Digital media	Both	RCTs	11
Sutton et al. (2014)	15	SR	1988-2012	NR	Disadvantaged youth, Black/African American and Latino youth	SRH	Schools, Churches, Community organisations, Clinics	High	RCT or QE with a comparison arm	8
Tait et al. (2015)	5	SR	2003-2015	17594	General population (included studies all targeted adolescents and young people)	IPV	University/college *, Hospital	High	Not clear but all had comparison groups	6
Tolli (2012)	5	SR	1999-2010	(range 702- >9000)	Young people	SRH	Schools	High	RCT, NRCT	4
Trivedi et al. (2009)	20 (3)	SR	1996-2008	NR	Young men/fathers	UP	Schools, Community (includes juvenile justice, street outreach, social services, recreational centres), Clinics	High	UBA, CC	3
Underhill et al. (2008)	39	SR	1980-2007	37724	Young people	HIV	Schools, Community facilities, Home	High	RCT and NRCTs	10
Underhill et al. (2007)	13	SR	1980-2007	15940 (range 248-5244)	Young people	HIV	School/university *, Community centres, Homes	High	RCT and NRCTs	9
Whitaker et al. (2006)	11	SR	1990-2003	NR	General population (included studies all targeted young people)	IPV	Schools *, Community	NR	QE, experimental, pre-post	5

Study	No. studies included (No. Relevant)	Review type	Years searched	Total n (range)	Target population	Health area	Setting	Country classification	Study types	AMSTAR score
Whitaker et al. (2013)	19	SR	NR	NR	General population (included studies all targeted young people)	IPV	Schools *, University, Community	Both	RCT, QE, CT	4
Wight et al. (2013)	44	SR	1990-2009	(range 18-3058)	Young people, parents of young people	SH	Secondary school, College, Community, Other	Both	RCTs, NRCT, before-after studies	5

Review type: Systematic Review (SR), Meta-analysis (MA), Systematic Search (SS), Narrative Review (NR)
Targeted area: sexual health (SH), sexual and reproductive health (SRH), HIV, Unintended/Teenage Pregnancy (UP), Intimate partner violence or sexual violence (IPV), general health (GEN), mental health (MH), substance use (SU)
Setting: Asterisk indicates majority setting of included studies.
Study types: Randomised controlled trial (RCT), individualised RCT (iRCT), cluster RCT (cRCT), controlled before and after study (CBA), uncontrolled before and after study (UBA), non-randomised controlled trials (NRCT), controlled trial (CT), cross-sectional (CS), observational (OB), pre- and post-test intervention study (pre-post test), quasi-experimental (QE), cohort (CH), case-control (CC), interrupted time series (ITS), not reported (NR)
AMSTAR: A Measurement Tool to Assess Systematic Reviews. Scored from 0–11 based on quality of systematic review.

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