

The University of Sheffield



**A review of the effectiveness and cost effectiveness of
contraceptive services and interventions to encourage use of
those services for socially disadvantaged young people:
Services and interventions in community settings.**

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EXECUTIVE SUMMARY

Introduction

This review was undertaken to support the development of NICE programme guidance on the NHS provision of contraceptive services for socially disadvantaged young people (SDYP) (up to the age of 25). For the purposes of this guidance, 'NHS provision' has been interpreted as including both direct provision and indirect provision (via funding in whole or in part). It provides a systematic review of the published literature on the effectiveness and cost effectiveness of contraceptive services for socially disadvantaged young people, and interventions to encourage young people, especially socially disadvantaged young people, to use contraceptives and contraceptive services (including access to, and information about, contraceptive services) which are based in the community.

Research questions

The primary research questions are:

- What is the effectiveness and cost effectiveness of interventions to encourage young people, especially socially disadvantaged young people, to use contraceptives and contraceptive services (including access to, and information about, contraceptive services)?
- What is the evidence of the effectiveness and cost effectiveness of contraceptive services for socially disadvantaged young people?

Inclusion and exclusion criteria

This review focuses on interventions which are conducted in the community. Interventions conducted in education and health care premises are excluded from this review and are the subject of separate systematic reviews conducted as part of this programme of work.

Interventions were excluded when they were conducted with people aged 25 and older. Interventions which include both under 25s and over 25s were included, but those which focus solely on over 25s were not. Although a younger age cut off has not been explicitly stated, consideration will also be made to the Fraser guidelines for competence to consent.

Quality assessment criteria for effectiveness studies

The quality of effectiveness studies was assessed taking note of the criteria set out by NICE in the CPHE Methods Manual. Studies were graded in reference to their study design, type of intervention, applicability and effectiveness.

Summary of study identification

All search results were downloaded to Reference Manager. Potentially relevant papers were identified through the initial searching (completed as part of the mapping review) and full papers were obtained. From these initial searches the need for a further iteration of database searching was identified. Citation searching of key papers as well as scrutinising reference lists was also carried out. Occasional papers were also suggested by experts. Seventeen effectiveness papers were identified through the database searches, with no additional papers identified through scrutinising reference lists and liaison with experts. We excluded eighteen papers which were obtained as full papers but subsequently found to be outside of the scope of the review. No relevant papers considering cost effectiveness were identified for the target age group.

Quantity of the evidence available

The searches identified 17 studies which met the inclusion criteria. The papers focused on:

- Media/Arts/entertainment based interventions including community theatre (1), a music event (1), a computer based intervention (1), and social marketing campaigns (2).
- Repeat pregnancy: including home visitors (3), Dollar a day (and other peer support) programmes (3), a generic youth programme (1), and a sibling pregnancy prevention intervention (1).
- Other: including male focused programmes (2), and generic programmes with a contraceptive services element (2).

The evidence comes mostly from the USA with one study conducted in Australia and one from the UK, which may have implications for applicability in

the UK, as is discussed below. In terms of study design, there were eight randomised controlled trials (RCTs), two non-randomised controlled trials, four before and after studies (BA), one retrospective cohort study, one case control study and one interrupted time series study (ITS).

Quality of the evidence available

As would be expected, those studies which employed an RCT design scored best overall on the quality rating scale, with five scoring [++] after making allowances for blinding etc. in some cases. Studies which employed a cohort or case control design and the non-randomised control trials received varied scores, with most ITS, and BA studies scoring [-]. Each type of study design included a variety of types of intervention, and the populations (which were biased towards studies conducted in the USA) varied in terms of their ethnic mix (and therefore deprivation scores). The individual studies are discussed in detail below.

Delivery of the intervention

Most authors did not clearly state who delivered the intervention. However, of those that did, delivery was by community social service agency (de Anda 2008), trained home visitors (Barnet 2007, Black 2006), nurses (Brown 1999), social workers (Mazza 2002), and nurse midwives (Quinlivan 2003).

Intervention impact

The heterogeneity of the interventions aims, designs and outcome measures preclude a meta-analysis of their results. We therefore completed a narrative synthesis of the data, primarily in terms of study impact, design, and type of intervention (see section 4.6).

Economic studies

No health economic evidence was identified by the review assessing the cost effectiveness of interventions to encourage young people to use contraceptive services.

Summary of identified research

Most of the papers included in this review (15 of 17) reported on studies conducted in the USA with only one Australian and one UK study identified.

The USA studies were frequently conducted in populations with a high proportion of ethnicities not well represented in the UK population. We identified no studies assessing the cost effectiveness of interventions to encourage young people to use contraceptive services in community settings. There were substantial limitations throughout the papers in terms of study quality (especially sample size) and poor analysis and/or reporting of results. Despite these limitations several evidence statements are presented here, but should be treated with caution due to the limitations which exist in the majority of this evidence.

Research questions for which no evidence was identified

The main issues regarding addressing the subsidiary research questions were that some papers did not adequately describe the socio-economic status of their population. Therefore it is difficult to comment on the effectiveness of contraceptive services in reaching socially disadvantaged young people. The effectiveness of contraceptive service interventions with differing ethnicity is also difficult to quantify as most papers, although describing the ethnic mix in their population, did not report their results with a breakdown for different ethnic groups.

In terms of questions such as the influence of external factors (e.g. setting of targets, adequacy of guidance and support to service providers) along with the facilitators and barriers to implementing effective contraceptive services and interventions, our review on the views of young people (and others) is better placed to address these questions.

Adverse or unexpected outcomes

Philliber et al. (2002) reported that the Carrera youth project achieved improvements in reducing sexual activity and improving contraceptive use (as well as preventing pregnancy), for females only, with no effect seen for males. The study by Wiggins (2009) reported on the adaption of the Carrera project (from the USA) to a UK setting, resulting in negative outcomes in relation to pregnancy and sexual activity rates. The authors question their study design

suggesting this may be the cause of the negative outcomes seen rather than a lack of intervention transferability.

Applicability in the UK context

Care must be taken when considering the potential applicability of the majority of these studies to the UK context. Most of the studies included in the review were conducted in the USA although some will be more applicable than others depending on the exact population studied. Differences in terms of health care culture, policy and context may be much more varied between countries and therefore caution is required when applying USA evidence to the UK.

Implications of the review findings

The literature in general is not at all well developed, especially in terms of good quality effectiveness and cost effectiveness studies (and we identified only one study of effectiveness and no studies of cost effectiveness conducted in the UK). The literature has a substantial bias towards interventions conducted in the USA and the number of studies conducted in populations with high numbers of African Americans, Latinos and Hispanics will have further implications for applicability in the UK.

EVIDENCE STATEMENTS

Evidence statement 1:

Media based interventions

There is mixed evidence from five studies to suggest that media based interventions may reduce teenage pregnancy, increase contraceptive use and improve the knowledge and attitudes of young people in relation to these outcomes:

1a. Computer based interventions

Moderate evidence from one RCT showed that a computer based intervention could significantly reduce pregnancy, and improve EC use as well as improving knowledge and attitudes based outcomes) (Schwarz et al. 2008 RCT [++]).

1b. Arts based interventions

Moderate evidence from one RCT and one BA studies suggest that arts based interventions (music based and community theatre) may be effective in significantly improving young people's knowledge and attitudes with regards to pregnancy and STIs immediately post intervention (Guzman et al. 2003 nRCT [-]; de Anda 2008 BA [-]). No long term outcomes were measured.

1c. Social marketing campaigns

Weak evidence from two BA studies suggest that social marketing campaigns may have a significant effect on the use of contraception or EHC as well as knowledge and attitude based outcomes. In the first study, compared to the controls, the intervention group were significantly more likely to have heard of EHC, know the mechanism of action of EHC, have discussed EHC with a care provider, received an advanced prescription for EHC, and intend to use EHC in the future if needed (Gee et al. 2007 BA [-]). The second study showed that increased exposure to the social marketing campaign was associated with a significant increased in condom use at last sexual experience (Kennedy et al. 2000 BA [-]).

Evidence statement 2:

Interventions to prevent repeat pregnancy

There is inconsistent evidence from eight studies to suggest that community based interventions may be effective in preventing repeat pregnancy:

2a. Home visitor interventions

Inconsistent evidence from three RCT studies suggests that home visitors may be effective in preventing repeat pregnancy; only two of the three studies measured repeat pregnancy rate as an outcome and only one of these provided evidence of clear benefit. The first RCT showed a significant reduction in repeat birth for the intervention group (Black et al. 2006 RCT [++]). The second RCT showed a significant improvement in parenting scores for the intervention group, but the effect on repeat pregnancy was not significant (Barnet et al. 2007 RCT [+]). The third RCT showed a significant improvement in contraceptive use for the intervention group, but did not measure repeat pregnancy (Quinlivan et al. 2003 RCT [++]).

2b. Peer support programmes

Inconsistent evidence from an RCT, a retrospective cohort and an ITS study suggests that the “Dollar a Day” programme (and other incentive based peer support) may be effective in preventing repeat pregnancy; however, the better quality study did not demonstrate an effect on pregnancy rate. The RCT showed no significant effect on repeat pregnancy (Stevens-Simon 1997 RCT). The retrospective cohort study showed significant reduced sexual initiation in the intervention compared to the control group, but did not measure repeat pregnancy (Coleman Dixon et al. 2000 Retro cohort [+]). The ITS study stated that the repeat pregnancy rate for those enrolled in the intervention was half that of the local area during the intervention, but gave no statistical data (Brown et al. 1999 ITS-).

2c. Sibling intervention

Weak evidence from one before and after study suggests that interventions with siblings may be effective in pregnancy prevention, and delaying sexual (East et al. 2003 BA [+]).

2d. Generic programmes for teenage mothers

Moderate evidence from one RCT suggests that generic programmes for teen mothers (to prevent repeat pregnancy, increase school retention, reduce substance abuse, and improve wellbeing) could be effective in significantly reducing repeat pregnancy, and consequent births (McDonnell et al. 2007 RCT [+]).

Evidence statement 3:

Evidence statement 3: Male focused interventions

Moderate evidence from two studies suggests that male focused interventions may not be effective in improving levels of contraceptive use but may reduce number of sexual partners and have a positive effect on knowledge and attitude related outcomes. One nRCT showed no effect on contraceptive use, but did show a significant decrease in the reported number of sexual, and a significant increase in young people's knowledge and attitudes towards these (Kalmuss et al. 2008 nRCT [++]). One RCT again showed no clear intervention effect on contraceptive use (Mazza 2002 RCT [+]).

Evidence statement 4: Generic interventions

Conflicting evidence from two studies suggests that a generic youth programme (part of the Children's Aid Society Carrera program) run after school could be effective in preventing pregnancy, reducing sexual activity and improving contraceptive use. One RCT showed a reduction in pregnancy, and initiation of sexual activity, and an increase in contraceptive use, and service use (Philliber et al. 2002 RCT [++]). However, one case control study showed that transferring this intervention to the UK context resulted in potentially negative effects (which the authors suggest study design may account for) resulting in increased pregnancy rate, level of sexual activity, and expectation of pregnancy (Wiggins et al. 2009 Case control [+]). This study had notable between group differences at baseline.

1. INTRODUCTION

1.1. Aims and objectives

This review was undertaken to support the development of NICE programme guidance on the NHS provision of contraceptive services for socially disadvantaged young people (SDYP) (up to the age of 25). For the purposes of this guidance, 'NHS provision' has been interpreted as including both direct provision and indirect provision (via funding in whole or in part). It provides a systematic review of the published literature on the effectiveness and cost effectiveness of contraceptive services for socially disadvantaged young people, and interventions to encourage young people, especially socially disadvantaged young people, to use contraceptives and contraceptive services (including access to, and information about, contraceptive services) which are based in the community.

This review was preceded by a mapping review to describe the available literature on the full range of contraceptive services for young people, and interventions that aim to encourage young people, especially socially disadvantaged young people, to use contraceptives and contraceptive services. The aim of the mapping review was to identify key areas within the literature on which to focus the subsequent effectiveness and cost effectiveness reviews. The mapping review identified three key groups of studies according to the setting of interventions as follows:

- interventions delivered in educational settings
- interventions delivered in health care settings
- interventions delivered in community settings

The third of these settings is the focus of this review. See section 3.2 for clarification.

1.2 Research questions

The primary research questions for this programme are:

- What is the effectiveness and cost effectiveness of interventions to encourage young people, especially socially disadvantaged young

people, to use contraceptives and contraceptive services (including access to, and information about, contraceptive services)?

- What is the evidence of the effectiveness and cost effectiveness of contraceptive services for socially disadvantaged young people (SDYP)?

Subsidiary research questions for this programme are:

- What is the short term and longer term success of contraceptive services for SDYP?
- What internal factors may have influenced the effectiveness of contraceptive services (e.g. content delivery, setting intensity)?
- What external factors may have influenced the effectiveness of contraceptive services (e.g. setting of targets, adequacy of guidance and support to service providers?)
- How does the effectiveness of contraceptive service interventions vary with factors such as age, teenage parenthood, drug use, school or college attendance etc?
- How does the effectiveness of the contraceptive service interventions vary with factors such as ethnicity?
- How effective have contraceptive services been in reaching socially disadvantaged young people?
- What are the facilitators and what are the barriers to implementing effective contraceptive services and interventions?

2. BACKGROUND

2.1 Definitions and terminology

Fraser guidelines:

It is considered good practice for doctors and other health professionals to follow the criteria outlined by Lord Fraser in 1985, in the House of Lords' ruling in the case of Victoria Gillick v West Norfolk and Wisbech Health Authority and Department of Health and Social Security. These are commonly known as the Fraser Guidelines:

- the young person understands the health professional's advice;
- the health professional cannot persuade the young person to inform his or her parents or allow the doctor to inform the parents that he or she is seeking contraceptive advice;
- the young person is very likely to begin or continue having intercourse with or without contraceptive treatment;
- unless he or she receives contraceptive advice or treatment, the young person's physical or mental health or both are likely to suffer;
- the young person's best interests require the health professional to give contraceptive advice, treatment or both without parental consent.

2.2 The need for guidance

The rate of teenage pregnancy in England and Wales remains the highest in Western Europe (Population Action International 2007) despite the decline in rates of both under 18 and under 16 conceptions over the last 20 years (Office for National Statistics 2007). The current targets to halve the under 18 conception rate by 2010 would require a considerable acceleration in progress in order to be met (Department for Education and Skills 2006).

In addition, there is significant variation in local area performance. In 2006, the under 18 conception rate in England was 40.4 conceptions per 1000 young women (Department for Children, Families and Schools 2008); but almost half of these conceptions (49%) occurred in the most deprived 20% of local authority wards (Department for Children, Families and Schools 2007). Virtually every local authority includes hotspots where annual conception rates are greater than 60 per 1000 women aged 15-17 (Department for Education and Skills 2006) and approximately 20% of births conceived under the age of 18 are to women who are already teenage mothers (Department for Children, Schools and Families 2008).

Teenage pregnancies have a high cost implication for public funding. They place significant pressures on local authority social care, housing and education services. In 2006/7 local authorities spent £23 million on support services for teenage parents (Department for Children Schools and Families

2008). The cost to the NHS of induced abortions for women younger than 25 was £48,680,949 in 2006.

Access to contraceptive services is most problematic for people in disadvantaged communities. There is a six fold difference in teenage conception and birth rates between the poorest areas in England and the most affluent. Under 18 conceptions can lead to socioeconomic deprivation, mental health difficulties and lower levels of education. In addition, resulting children are at greater risk of low educational attainment, emotional and behavioural problems, maltreatment or harm, and illness, accidents and injury (Department for Children, Schools and Families 2008).

3. METHODS

3.1 Search methods

Effectiveness reviews

A full systematic search of key health and social care databases was undertaken for the mapping review of literature which preceded this review. The search strategy was developed by the ScHARR information specialist and was agreed with the NICE information specialist. Full details of the search strategy (search terms and databases used) can be found in Appendix 4.

The search strategy included terms relating to young people, contraceptive services, family planning and pregnancy prevention. The only restrictions that were applied to this search were in terms of date (limited to 1995-2008 to predate the Teenage Pregnancy Strategy) and limiting the search to humans (to avoid animal studies relating to contraception). No restrictions were placed in terms of study type, language or place of publication.

The search results were downloaded into Reference Manager for sifting by the systematic reviewer. Following the sifting of papers for the mapping review, the systematic reviewer identified articles for inclusion in this review on community settings.

Following the mapping review search, the systematic reviewer identified the need for additional targeted database searches on contraception services in community settings. Full details of the search strategy (search terms and databases used) can be found in Appendix 4. The same restrictions were applied to this search as to the Mapping Review searches (limited to 1995-2008 and humans). No restrictions were placed in terms of study type, language or place of publication.

Additional methods to identify evidence were undertaken as follows:

- Searching the reference list of included papers
- Searching the reference list of relevant systematic reviews
- Cited reference searches on all of the included studies in Google Scholar and Web of Science Cited Reference Search. No date, study type or language restrictions were placed on this search.

Cost effectiveness review

A search strategy was developed which sought to identify all of the relevant literature for all three of the effectiveness reviews that this programme covers (education settings, healthcare settings, community settings). The search strategy was as follows:

- Mapping Review search strategy (described above) – systematic reviewer identified all potential relevant articles retrieved through database searches of non-economic databases. These articles were then sifted by the health economist/modeller
- Mapping Review search strategy (described above) – health economist/modeller identified all potential relevant articles retrieved through database searches of economic databases.
- From articles identified as relevant for the cost effectiveness review (from the Mapping Review searches), citation searches were undertaken on these articles

- Community settings search strategy (described above) – systematic reviewer identified all potential relevant articles retrieved through database searches of non-economic databases. These articles were then sifted by the health economist/modeller
- Community settings search strategy (described above) – health economist/modeller identified all potential relevant articles retrieved through database searches of economic databases.
- Targeted searches were undertaken for articles relating to unplanned pregnancy, long term outcomes of teenage pregnancy and the relationship between intention and use of contraception in economic databases

3.2 Inclusion and exclusion criteria

This review focuses on interventions which are conducted in community settings. Interventions conducted solely on education premises or in health care settings are excluded from this review and are the subject of separate systematic reviews conducted as part of this programme of work.

Interventions were excluded when they were conducted with people aged 25 and older. Interventions which include both under 25s and over 25s were included, but those which focus solely on over 25s were not. Although a younger age cut off has not been explicitly stated, consideration will also be given to the Fraser guidelines for competence to consent.

Several activities and interventions will not be covered by this (or any subsequent) review in this programme. These are:

- sexual health services that do not provide contraceptive services
- sterilisation, including vasectomy
- abortion (services which do not also provide contraception)
- use of contraceptive methods for non-contraceptive reasons, for example, for menorrhagia (heavy periods).

3.3 Data extraction strategy

Data relating to study design, outcomes, and quality were extracted by one

reviewer and each extraction was independently checked for accuracy by a second reviewer. Disagreements were resolved by consensus and consulting a third reviewer where necessary. The data extraction tables are presented in Appendix 1.

3.4 Quality assessment criteria for effectiveness studies

The quality of effectiveness studies was assessed taking note of the criteria set out by NICE in the CPHE Methods Manual. Studies were graded in reference to their study design, type of intervention applicability and effectiveness. The CPHE quality criteria for assessing studies include 12 points. These are:

1. The study addresses an appropriate and clearly focused question
2. The assignment of participants to intervention and control groups is reported as randomised (if RCT)
3. An adequate allocation concealment method is used (if appropriate)
4. Investigators are kept blind about intervention allocation
5. The intervention and control groups are similar at the start of the trial
6. The only difference between groups is the intervention under investigation
7. All relevant outcomes are reported using valid or tested scores
8. Percentage of participants or clusters recruited into each arm of the study dropped out before the study was complete- those with dropout rates higher than 30% were downgraded.
9. The use of intention to treat (ITT) analysis - if applicable
10. If the study was carried out at more than one site, are results comparable across sites.
11. Reporting the power of trials to detect a difference
12. Appropriate cluster analysis and subgroups pre-specified.

Owing to the complexity and diversity of study designs encountered in the public health literature, many of these points were not adequate in themselves for grading the type of studies identified. Therefore, an alternative method of scoring the CPHE criteria and therefore grading the studies was used in order to more objectively categorise the studies. Only the CPHE criteria appropriate

to the particular study design in each case were considered. The studies were placed in one of three grades as follows:

Table 1. CPHE and additional criteria used for study grading

Code	CPHE quality criteria	Alternative criteria
++	All or most of the criteria have been fulfilled. Where they have not been fulfilled the conclusions of the study or review are thought very unlikely to alter	At least 7 of the CPHE criteria are well covered- if this is appropriate for the study design Attrition rate less than 30%
+	Some of the criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are thought unlikely to affect conclusions	At least 5 of the CPHE criteria are well covered- if this is appropriate for the study design Attrition rate less than 50%
-	Few or no criteria fulfilled. The conclusions of the study are thought likely or very likely to alter	Less than 5 of the CPHE criteria are well covered Attrition rate more than 50%

3.4.1 Quality assessment criteria for cost effectiveness studies

Studies of cost effectiveness were given a quality rating according to the criteria outlined in Table 2.

Table 2. Criteria used in the quality assessment of cost effectiveness studies

Rating	Criteria
-	An economic evaluation is not carried out, or Modelling approach is insufficient
+	Scope of evaluation is relevant Modelling approach is reasonable Results and conclusions satisfy objective of evaluation
++	Model assumptions are reasonable A sensitivity analysis is conducted Is reasonably generalisable to the UK setting
+++	Modelling approach is robust A full probabilistic sensitivity analysis is carried out which tests key model assumptions Reasonable model validation is carried out

3.5 Classifications of the content of interventions

Effectiveness studies were grouped as to the content of the intervention and the mode of delivery and intended outcome measure. These were grouped as follows:

- Media/Arts/entertainment based (including community theatre, music events, computer based interventions and social marketing campaigns).
- Repeat pregnancy including home visitors, dollar a day (and other peer support) sibling pregnancy prevention and preventing repeat pregnancy as part of a broader intervention.
- Other (including programmes which were male focused and generic youth programmes with a relevant contraceptive services element).

Each primary outcome measure was also defined as follows:

↑: the measure significantly increased

↓: the measure significantly decreased

↔: there was no significant change

This information is presented in the evidence statements.

3.6 Summary of study identification

All search results were downloaded to Reference Manager. Potentially relevant papers were identified through the initial searching (completed as part of the mapping review) and full papers were obtained. From these initial searches the need for a further iteration of database searching was identified. Citation searching of key papers as well as scrutinising reference lists was also carried out. Occasional papers were also suggested by experts. Seventeen effectiveness papers were identified through the database searches, with no additional papers identified through scrutinising reference lists and liaison with experts (table 3). We excluded eighteen papers which were obtained as full papers but subsequently found to be outside of the scope of the review. A list of these papers and the reasons for their exclusion is given in Appendix 3. No relevant papers considering cost effectiveness were identified for the target age group.

Table 3. Summary of study identification

Source	Number of hits	Papers included
Mapping review searches	5379	13
Community settings searches	1277	4
Economic searches	0	0
Citation searches of included papers and systematic reviews	115	0
Reference list of included papers	5	0
Expert liaison	0	0

4. RESULTS OF THE EFFECTIVENESS REVIEW

4.1. Quantity of the evidence available

The searches identified 17 studies which met the inclusion criteria. The papers focused on:

- Media/Arts/entertainment based interventions including community theatre (1), a music event (1), a computer based intervention (1), and social marketing campaigns (2).
- Repeat pregnancy: including home visitors (3), Dollar a day (and other peer support) programmes (3), a generic youth programme (1), and a sibling pregnancy prevention intervention (1).
- Other: including male focused programmes (2), and generic programmes with a contraceptive services element (2).

The evidence comes mostly from the USA with one study conducted in Australia and one from the UK, which may have implications for applicability in the UK, as is discussed below. In terms of study design, there were eight randomised controlled trials (RCTs), two non-randomised controlled trials, four before and after studies (BA), one retrospective cohort study, one case control study and one interrupted time series study (ITS).

4.2 Populations and settings

This review was restricted to interventions conducted in community settings. The settings of the included studies were mostly described only as community

venues (11), but also included the home (4), entertainment venues (2), and community health centres and pharmacies (1).

Descriptions of study populations were not always comprehensive, and some did not describe socio-economic status (SES). However, six study populations were described as low income (Barnet 2007, Black 2006, Coleman Dixon 2000, Kalmuss 2008, Mazza 2002, McDonell 2007), two as low SES (Brown 1999, Quinlivan 2003), and two as economically disadvantaged (East 2003, Philliber 2002).

4.3 Quality of the evidence available

Details of the study quality assessments are shown in table 4. below. Criteria 3 (an adequate allocation concealment method is used), 4 (investigators are kept blind about the intervention), and 9 (the use of ITT analysis), have been shaded out as they were not addressed in any of the included studies. Blinding is not usually practical for the types of interventions considered here.

Table 4. Quality rating of included papers

Details of the number headings are given in section 3.4.

** Well covered. * Adequately covered. 0 Poorly covered/not addressed/not stated. NA not applicable to study design.

Trial	1	2	3	4	5	6	7	8	9	10	11	12	Quality rating
de Anda	**	NA			NA	NA	*	NA		NA	0	NA	-
Barnet 2007	**	**			0	0	*	**		**	**	**	+
Black 2006	**	**			**	**	*	**		**	0	**	++
Brown 1999	**	NA			NA	NA	*	NA		0	0	NA	-
Coleman Dixon 2000	**	NA			*	*	*	**		NA	0	NA	+
East 2003	**	NA			**	**	*	0		**	0	NA	+
Gee 2007	**	NA			NA	NA	*	NA		*	0	NA	-
Guzman 2003	**	NA			NA	NA	*	NA		**	0	NA	-
Kalmuss 2008	**	*			**	**	*	**		**	0	**	++
Kennedy 2000	**	*			NA	NA	*	NA		NA	0	NA	-
Mazza 2002	**	**			**	**	*	0		NA	0	**	+

McDonell 2007	**	**			**	**	*	0		NA	0	NA	+
Philliber 2002	**	**			**	**	*	**		**	0	**	++
Quinlivan 2003	**	**			**	**	*	**		NA	**	**	++
Schwarz 2008	**	**			**	**	*	**		**	0	**	++
Stevens-Simon 1997	**	**			**	**	*	**		**	**	**	++
Wiggins 2009	**	NA			0	0	*	0		*	*	NA	-

4.3.1 Limitations of study quality

The main limitation of study quality at RCT level was blinding: for studies of health promotion interventions it is usually impossible to blind the participants and there are many practical challenges to blinding the assessors. Only one of these studies discussed blinding in their study design.

Other types of studies are fundamentally limited in their design and several also had issues with small samples, short follow up, high dropout and with poor analysis and/or presentation of data as is discussed in more detail below.

4.4 Outcome measures

Table 5 shows the type of outcome measure used by the included studies. The majority of outcomes related to pregnancy (including repeat pregnancy), contraceptive use (including condoms) and knowledge/attitudes towards pregnancy and sexual health. For the latter two of these groups the majority of data was obtained using self reported measures. Pregnancy rates were generally taken from local data, although some were self reported.

Table 5. Outcome measures of included studies

Outcome type	Papers (1 st Author, date)	No.
Repeat pregnancy	Barnet 2007 Black 2006 Brown 1999 Coleman Dixon 2000 McDonell 2007 Stevens-Simon 1997	6
Pregnancy	East 2003 Philliber 2002	4

	Schwarz 2008 Wiggins 2009	
Contraception use	East 2003 Klamuss 2008 Kennedy 2000 Mazza 2002 Philliber 2002	5
Initiation of sexual intercourse / level of sexual activity	Coleman Dixon 2000 East 2003 Philliber 2002 Wiggins 2009	4
Health care service use	Barnet 2007 Philliber 2002	2
Knowledge and attitudes towards pregnancy / sexual health	de Anda 2008 Guzman 2003 Klamuss 2008 Kennedy 2000 Quinlivan 2003 Wiggins 2009	6
Knowledge of / use emergency contraception	Gee 2007 Klamuss 2008 Schwarz 2008	3
Wellbeing / Depression	Barnet 2007 McDonell 2007	2
School dropout / truancy / attendance	Barnet 2007 East 2003 McDonell 2007 Stevens-Simon 1997	4
Intention to use condoms	Kennedy 2000	1
Programme participation	Stevens-Simon 1997	1

4.5 Interventions

Interventions were coded in terms of their typology, applicability and quality score as discussed in the methods and appendix (table 6).

Table 6. Typology, impact, applicability and quality score of included papers

Study design (n)	Paper (1 st author, date)	Typology	Applicability	Quality
RCT	Barnet 2007	Repeat pregnancy	USA African American	+
	Black 2006	Repeat pregnancy	USA Black	++
	Mazza 2002	Other (males)	USA African American	+
	McDonell 2007	Repeat pregnancy	USA African American	+
	Philliber 2002	Other (generic)	USA Black/Hispanic	++
	Quinlivan 2003	Repeat pregnancy	Aus 30% Indigenous	++
	Schwarz 2008	Media (computer)	USA 44% White	++
	Stevens-Simon 1997	Repeat pregnancy	USA	++
n-RCT	Guzman 2003	Media (arts)	USA 79% Latino	-
	Klamuss 2008	Other (males)	USA Latino/Black	++

Retro Cohort	Coleman 2000 Dixon	Repeat pregnancy	USA	+
Case control	Wiggins 2009	Other (generic)	UK 23% minority ethnic	-
ITS	Brown	Repeat pregnancy	USA African American	-
BA	De Anda 2008	Media (arts)	USA 74% Latino	-
	East 2003	Repeat pregnancy	USA 77% Hispanic	+
	Gee 2007	Media (social marketing)	USA 57% White	-
	Kennedy 2000	Media (social marketing)	USA 47% White	-

As would be expected, those studies which employed an RCT design scored best overall on the quality rating scale, with five scoring [++] after making allowances for blinding etc. in some cases (see above). Studies which employed a cohort or case control design and the non-randomised control trials received varied scores, with most ITS, and BA studies scoring [-]. Each type of study design included a variety of types of intervention, and the populations (which were biased towards studies conducted in the USA) varied in terms of their ethnic mix (and therefore deprivation scores). The individual studies are discussed in detail below.

4.5.1 Delivery of the intervention

Most authors did not clearly state who delivered the intervention. However, of those that did, delivery was by community social service agency (de Anda 2008), trained home visitors (Barnet 2007, Black 2006), nurses (Brown 1999), social workers (Mazza 2002), and nurse midwives (Quinlivan 2003).

4.6 Intervention impact

The heterogeneity of the interventions' aim, design and outcome measures used preclude a meta-analysis of their results. We have therefore completed a narrative synthesis of the data, primarily in terms of study impact, design, type of intervention and outcome.

4.6.1. Media, arts and entertainment based interventions

Arts based

de Anda 2008 (USA) conducted a before and after study [-] with two samples of community members (Sample 1: N1=419. 47.5% male. Age 12-20. 68% high school students, ethnicity not measured), (Sample 2: N2=477. 57% male. Age 12-18. 54% high school students. Latino 74.4%, White 12%, African American 6.9%). The study reports on an intervention to encourage contraception use for youth pregnancy and STI prevention (one component of a two year programme to prevent pregnancy and STIs) delivered by community social service agency. GIG (not an abbreviation, used as a slang term, as in music) is a six hour intervention, held on a Friday or Saturday night, which involves live and recorded music, and local radio celebrities. It presents prevention information in an entertainment venue employing non-conventional and youth culture orientated educational activities. Information regarding pregnancy, contraception and STI risk/prevention, and access to appropriate services is offered in the context of a social event. Knowledge and attitudes towards contraception, pregnancy and STIs were measured before/after the GIG by a brief 15 item questionnaire. Significant improvement was shown in knowledge and attitudes. The intervention was shown to be effective in improving accurate knowledge of, STI and pregnancy risk and prevention (including knowledge about contraception and contraceptive services) as demonstrated by a significant increase in total score from pre to post test (Sample 1, 81% increased their score, $p < 0.001$); (Sample 2, 86.8% increased their score $p < 0.001$). These outcomes were not followed up beyond the intervention date.

Guzman et al. 2003 (USA) conducted an n-RCT [-] controlled before and after study (pre-test data of pupils from one school was compared to post test data from pupils of another school, but all received intervention) of a community theatre intervention to increase knowledge of STIs and the role of condom use (as well as considering abstinence). This study was included as it considers outcomes relating to contraceptive knowledge and use as well as abstinence, not just abstinence alone. The intervention was conducted with the population

of six schools and included 961 teenagers (79% Latino), aged 11-18 (Mean age 13.3 years, SD 0.76), 50.7% female. The intervention - Community Awareness Motivation Partnership (CAMP), was a community teen theatre intervention, and was designed to address the role of contraceptive use in safe sex behaviour through a brief, informative and culturally responsive dramatisation. The intervention consisted of a one hour long theatre performance, delivered by an ethnically diverse cast of 10 adolescents/young actors age 15-25. The performance used urban teen culture in terms of music, mannerisms, clothing and language to promote positive messages about safe sex, sexual practices, negotiation and social skills (including contraception negotiation and service provision) by watching others model appropriate behaviours and receive consequences for inappropriate behaviours. The performance was followed by an open forum with actors directly after performance to discuss the issues highlighted. A questionnaire prior to viewing the theatre presentation (day before) was repeated on the day after the performance. Compared to pre-test, participants were significantly more likely post-test to: intend to postpone sex $p < 0.001$, believe they should use birth control $p < 0.001$, have increased knowledge regarding HIV transmission and prevention $p < 0.001$, accurately define "abstinence" $p < 0.0001$, accurately define "male responsibility" (in contraceptive decisions) $p < 0.001$. This study has no control group and reports on self reported intentions over a very short term.

Computer based

Schwarz et al. 2008 (USA) conducted an RCT [++] of an intervention to deliver computer assisted provision of emergency hormonal contraception (EHC). A sample of 464 women aged eighteen to 45 year olds (36% 18-24, 44% White,) were recruited from two urgent care clinics and randomly allocated to intervention or control. The control group received information about periconception folate supplement but no info about EHC. The intervention was conducted in urgent care waiting areas where EC had been available without prescription for 3 years, and consisted of a 15 minute computerised educational session and the provision of one pack of EHC. Intention to treat analysis assumed that those lost to follow up had never used

EHC, analysis limited to participants who were followed up was also completed. At follow up 7 months after enrolment, there was a marginally significant trend towards more EHC use in the intervention group than the control (10% vs. 4% of women followed up, $p=0.06$, and 6% vs. 3% of women enrolled $p=0.01$). Fewer women in the intervention were pregnant at follow up (0.8% vs. 6.5% of women followed up, $p=0.01$, and 0.5% vs. 4.0%, $p=0.01$ of women enrolled). The intervention increased knowledge and use of EHC among women able to access EHC without a prescription.

Social marketing

Gee et al. 2007 (USA) conducted a before and after study [-] of a community campaign to increase knowledge and use of EHC. The female survey population consisted of a convenience sample recruited on the street (N=188 pre and 290 post intervention) and were 31% aged 18-24 (21% post test); they were 57% White, 11% Black, 29% Hispanic. The community campaign for EHC included information signs in the community (no details) and distributing pamphlets to local businesses. In addition, the general public, health care providers and pharmacists were targeted for outreach. Educational packs were placed in community health centres and pharmacies. The packs included information on EHC policy, fact sheets, prescribing protocols and information posters. Information sessions were also offered to health centres and pharmacies. After two years of the intervention, women were significantly more likely to have heard of EHC (91% vs. 82%, $p=0.007$), know the mechanism of action of EHC (no details) (49% vs. 39%, $p=0.04$), have discussed EHC with a care provider (38% vs. 24%, $p=0.03$) and have received an advanced prescription for EHC (33% vs. 12%, $p=0.004$), as well as intend to use EHC in the future if needed (79% vs. 63%, $p=0.0002$) compared to before the intervention. The authors note that their convenience sample of street pedestrians is likely to have introduced bias to the study.

Kennedy et al. 2000 (USA) conducted cross sectional [-] (post intervention) telephone interviews to determine the effect of a one year, state wide, social marketing campaign "Teens stopping AIDS" to promote condom use among sexually active adolescents aged 14-18 who used condoms inconsistently.

The convenience sample of a random selection (from a commercially available list of households) of telephone interviewees consisted of 1402 fourteen to eighteen year olds (43.9% male; 47% White, 17% Black, 23% Hispanic, 13% other). The social marketing campaign consisted of a number of “channels” including radio announcements, posters and other promotional material, skills building workshops, peer outreach, and a telephone information line. The number of channels through which an adolescent had been exposed to the campaign was associated with condom use at last sex (OR 1.26 $p < 0.01$) and with psychosocial determinants of behaviour (not defined). The proportion of adolescents who had used a condom at last sex increased 4.3% over the one year intervention period.

Summary

Two arts based interventions (a music event and community theatre presentation) were shown here to be effective in significantly improving young people’s knowledge and attitudes with regards to pregnancy and STIs immediately post intervention. However, both the follow up times were only a couple of days and long term outcomes were not measured, so no long term effects of the interventions can be determined. Both studies scored poorly on the quality grading scale.

A good quality RCT study showed that computer based interventions could be effective in reducing pregnancy and risky sexual activity levels, and improving EC use (where measured) as well as improving knowledge and attitudes based outcomes.

Social marketing campaigns can have a significant effect on the use of contraception or emergency contraception as well as knowledge and attitude based outcomes as demonstrated by the two studies detailed here. However, both were of poor quality.

Evidence statement 1:**Media based interventions**

There is mixed evidence from five studies to suggest that media based interventions may reduce teenage pregnancy, increase contraceptive use and improve the knowledge and attitudes of young people in relation to these outcomes:

1a. Computer based interventions

Moderate evidence from one RCT showed that a computer based intervention could significantly reduce pregnancy, and improve EC use as well as improving knowledge and attitudes based outcomes) (Schwarz et al. 2008 RCT [++]).

1b. Arts based interventions

Moderate evidence from one RCT and one BA studies suggest that arts based interventions (music based and community theatre) may be effective in significantly improving young people's knowledge and attitudes with regards to pregnancy and STIs immediately post intervention (Guzman et al. 2003 nRCT [-]; de Anda 2008 BA [-]). No long term outcomes were measured.

1c. Social marketing campaigns

Weak evidence from two BA studies suggest that social marketing campaigns may have a significant effect on the use of contraception or EHC as well as knowledge and attitude based outcomes. In the first study, compared to the controls, the intervention group were significantly more likely to have heard of EHC, know the mechanism of action of EHC, have discussed EHC with a care provider, received an advanced prescription for EHC, and intend to use EHC in the future if needed (Gee et al. 2007 BA [-]). The second study showed that increased exposure to the social marketing campaign was associated with a significant increased in condom use at last sexual experience (Kennedy et al. 2000 BA [-]).

4.6.2. Interventions to prevent repeat pregnancy

Home visitors

Black et al. 2006 (USA) conducted an RCT of a home based mentoring programme to delay second births among adolescent mothers. Young mothers were recruited from 3 urban hospitals at delivery and 83% of those eligible participated. The sample consisted of 181 first time, Black, adolescent mothers (age 13.5 to 17.9 years), of low income, and living with their mother. They were randomly allocated to intervention or usual care (no details) and stratified by maternal age and gender of child. A total of 149 completed 24 month follow up. The home based mentoring intervention curriculum focused on interpersonal negotiation (including access to contraception), adolescent development and parenting. It was delivered until the infants' first birthday by college educated, Black, single mothers ("big sisters"). Follow up data were collected 6, 12 and 24 months after recruitment. At 2 years, mothers in the control group were about 2.5 times more likely to have given birth to a second child than in the intervention group (24% vs. 11%, OR 2.45, 95% CI 1.003-6.03, $p=0.05$). Having more than two visits increased the odds of not having a second child by more than threefold (OR 3.3, 95% CI 3.0-5.1). Increasing the threshold for adherence from 4 to 6 visits increased the likelihood of not having a second infant (OR 3.6, 95% CI 3.1-7.2, and OR 4.3, 95% CI 3.0-8.3). At 24 months, positive life events (past year) and control group membership were also associated with increased likelihood of a second infant (OR 1.2, 95% CI 1.0-1.5, $P<0.05$ and OR 2.9, 95% CI 1.01-8.3, $p<0.05$). Reported contraceptive use at baseline had no effect on subsequent birth rate. The intervention was effective in preventing rapid repeat births. No repeat births were seen amongst mothers who attended at least 8 sessions (no further statistics). The numbers in this study were small and no power calculation was given.

Barnet et al. 2007 (USA) conducted an RCT of a community based home visiting programme to prevent repeat teenage pregnancy. Pregnant, African American adolescents aged 12-18 (low income) were recruited from 3 urban prenatal care sites and 84 participated out of the 122 eligible. The sample

were randomly allocated to intervention (N=44) or control (N=40), usual care – no further details given). 67% completed follow up assessments at 12 and 24 months. The intervention was delivered by trained African American home visitors (degree, experience in child care or social work) recruited from the local community, who were paired with each adolescent until the child's second birthday. The home visitors visited fortnightly for first year of the child's life and monthly for the second year, and delivered the parenting curriculum, encouraged contraceptive use, connected teens with primary care and promoted school continuation. Over two years, no significant effect on repeat pregnancy, depression, or linkages with primary care was seen. However, parenting scores for home visit teens were 5.5 points higher than control (95% CI 0.5-10.4 p=0.03) and school continuation was 3.5 times greater in home visited than controls (95% CI 1.1-11.8 p<0.05). This study is limited by small sample size and differences in the study groups at baseline. Some outcomes were self reported and the content of primary care received as a result of the intervention was not assessed.

Quinlivan et al. 2003 (Australia) conducted an RCT of post natal home visits to prevent repeat teenage pregnancy and frequency of adverse neonatal outcomes. A study population of 124 was recruited from a teenage pregnancy clinic (aged under 18, mean 16.4 years (S.D. 0.96), 88% low SES, 30% indigenous Australian; no other ethnicities given). The population was randomised to intervention (N=71) or control (N=65, no intervention, no further details given). The intervention consisted of five structured home visits by nurse-midwives and included contraception advice provided at 1 and 4 months. At 6 month follow up contraceptive use was significantly higher in the intervention group (53%) compared to the control (40%) (RR 1.35, 95% CI 1.09-1.68, p=0.007). Postnatal home visits were associated with a reduction in adverse neonatal outcomes (RR 0.24, 95% CI 0.05-1.08) and a significant increase in contraceptive knowledge (mean difference 0.92, 95% CI 0.05-1.08). There was no significant increase in knowledge or practice with respect to breastfeeding or infant vaccination associated with home visits.

Dollar a day (and other peer support)

Brown et al. 1999 (USA) conducted an ITS of a “Dollar a day programme” to prevent repeat teenage pregnancy. The Dollar a day programme is an incentive to prevent repeat pregnancy by promoting consistent use of contraceptive methods and future orientated family and career planning. The sample consisted of 65 girls under 16 years old (aged range 13-16), low SES, 95% African American. The programme was run by nurses from the local health department and consisted of weekly meetings designed as a supporting social event. The meetings included food and an informal programme focused on needs identified by participants, the setting of short term goals and the awarding of \$1 for each day they remained non-pregnant. Over five years, 15% of 65 girls enrolled in the programme experienced repeat pregnancy. This rate was substantially lower than the 30% repeat pregnancy rate for the local area over that time. This study suffers from poor analysis and reporting and no further data is provided.

Stevens-Simon 1997 (USA) conducted an RCT of a “Dollar a day programme” to prevent repeat pregnancy through peer group support. A total of 286 (248 at 24 month follow up) primiparous girls aged less than 18 years (infants younger than 5 months) were recruited from a post partum ward and a teenage parent hospital clinic. Participants were randomised to one of four groups: monetary incentive, peer group support, incentive and support, and no intervention. Participants meet weekly to collect \$7, share snacks and converse informally. There was also more formal discussion plus free contraception and job information. Participants were followed for two years (with data collection at 6, 12, 18 and 24 months). Participation in the intervention was low, but the monetary incentive increased participation from 9% to 58%. However, the peer support incentive failed to prevent repeat pregnancies. The incidence of second pregnancies at 6 months (9%), 12 months (20%), 18 months (29%) and 24 months (39%) did not vary significantly in relation to the control group. Repeat pregnancy was predicted by minority race (OR 1.7, 95% CI 1-2.89, $p < 0.01$), and the presence of more than five of 20 demographic and psychological risk factors (OR 2.4, 95% CI

1.38-4.08, $p < 0.01$). Socio-demographic characteristics significantly affected the timing of subsequent conceptions but the intervention did not.

Coleman Dixon et al. 2000 (USA) conducted a retrospective cohort study [+] of “Sisterhood Agenda Inc”, which is a repeat pregnancy prevention intervention. Thirty three past participants of the programme (African American, low income, and aged 14-19, mean age 16, no S.D.) were compared with 32 non participants (no details). The intervention consisted of a thirteen week programme for teenage African American girls. Small groups (max 10) met for four hours once a week. The intervention consisted of four components: ‘reaching for success’ (self understanding), ‘developing inner health for outer beauty’ (nutrition, exercise and peer pressure), ‘fitness dignity and pride’ (public speaking, interviews and communication), and ‘tools for survival’ (self sufficiency, including knowledge and access to birth control). Continued contact with the programme was then provided by a monthly support group. Of 26 participants who had not had sexual intercourse before commencing the programme, 24% of participants compared to 69% of controls initiated sex ($p < 0.001$) by follow up (time to follow up not clear). Pregnancy was more than 3 times more frequent among non participants (23%) than among participants (7%) for the sample overall. Of those who were sexually active, 15% of participants compared to 33% of controls reported at least one pregnancy. Only 7% of participants stated that they first learned about contraception through the intervention, 47% first learned about birth control at school, and 25% through a parent. Again, the small sample limits significance and there are serious concern regarding the accuracy of the data presented.

Sibling pregnancy prevention

East et al. 2003 (USA) conducted a before and after study [+] of a sibling pregnancy prevention programme. There were 1,176 (731 intervention, 445 control) the intervention group were predominantly Hispanic (77%) 11-17 year olds (mean 13.5 years), 59% female, economically disadvantaged, with at least one adolescent sibling who was a parent or had been pregnant. The intervention was delivered at 16 evaluation sites and 33% of those enrolled

participated in the evaluation (due to time constraints only a subset of participants was included in the evaluation). Sites were selected to be representative of the geographic spread, age and race of the Californian population. Specific programmes varied between sites but required at least one face to face contact with every client every month. Programmes included: case management, group activity, formal therapy, and videos to address psychosocial skills (no details), job skills, and sexuality and health issues – including knowledge and use of contraception. On average clients received 18.5 hours of contact (range 45 min to 95 hours) or approx 2 hours per month. Participants were followed up after 9 months. Female programme clients had lower pregnancy rate than comparator females over the evaluation period (4% vs. 7%) as well as lower rate of sexual initiation (7% vs. 16%). The odds of initiating sexual activity over the evaluation period were significantly elevated amongst control relative to intervention females (OR 1.5, 95% CI 1.09-1.94) and the odds of becoming pregnant were significantly higher amongst control than intervention females (OR 1.6 95% CI 1.07-2.52). Consistency of contraception use increased over time among males in the program and decreased among comparison males (no statistics given, no data on females).

Generic programme

McDonnell et al. 2007 (USA) conducted an RCT [+] of the Pathways teen mother support programme to prevent repeat pregnancy by improving contraceptive used, and also to increase school retention, reduce substance abuse, and improve wellbeing. Relevant aspects of the programme included case management as a means of social support and to link teens to community resources (including contraceptive services), and life skills education to help strengthen personal and social competencies including contraception negotiation. A convenience sample of parenting teens (low income, average age 17.5 years, 93% African American; no further details) was recruited through human services, newspaper ads, flyers, posters and community organisations, and was randomly allocated to intervention (N=107) or control (N=90, no details of control condition given). The sample was followed for 24 months with survey data collected at 6 monthly intervals.

Only 42% of the original sample was available at 24 months. Pathways teen mother support programme is an intensive intervention for low income pregnant and parenting teens, which consists of case management, support groups, family group decision making, life skills education and training, leadership development and related services. Teens received \$25 and a small gift for participating. Overall, the intervention group teens had fewer pregnancies ($p < 0.05$) and consequently, fewer births ($p < 0.01$) than the control group, and were less likely to be at risk of contracting a sexually transmitted disease ($p < 0.05$). Older intervention teens were more likely to use contraception ($p < 0.01$) consistently, while the opposite was true of the controls.

Summary

Three RCT studies considered home visitors in preventing repeat pregnancy, although only two of the three studies measured repeat pregnancy rate as an outcome and only one of these provided evidence of clear benefit.

Three studies, two of the “Dollar a Day” programme and one of another peer support programme suggest that this type of intervention may be effective in preventing repeat pregnancy. This should be treated with caution though as although all three studies measured rate of repeat pregnancy, the better quality study did not demonstrate a positive effect on this outcome.

Interventions with siblings of pregnant teenagers may be effective in pregnancy prevention and delaying sexual activity in this group, but only one study was found.

One final study suggests that generic programmes for teen mothers (to prevent repeat pregnancy, increase school retention, reduce substance abuse, and improve wellbeing) could be effective in preventing repeat pregnancy and improving wellbeing.

Evidence statement 2:

Interventions to prevent repeat pregnancy

There is inconsistent evidence from eight studies to suggest that community based interventions may be effective in preventing repeat pregnancy:

2a. Home visitor interventions

Inconsistent evidence from three RCT studies suggests that home visitors may be effective in preventing repeat pregnancy; only two of the three studies measured repeat pregnancy rate as an outcome and only one of these provided evidence of clear benefit. The first RCT showed a significant reduction in repeat birth for the intervention group (Black et al. 2006 RCT [++]). The second RCT showed a significant improvement in parenting scores for the intervention group, but the effect on repeat pregnancy was not significant (Barnet et al. 2007 RCT [+]). The third RCT showed a significant improvement in contraceptive use for the intervention group, but did not measure repeat pregnancy (Quinlivan et al. 2003 RCT [++]).

2b. Peer support programmes

Inconsistent evidence from an RCT, a retrospective cohort and an ITS study suggests that the “Dollar a Day” programme (and other incentive based peer support) may be effective in preventing repeat pregnancy; however, the better quality study did not demonstrate an effect on pregnancy rate. The RCT showed no significant effect on repeat pregnancy (Stevens-Simon 1997 RCT). The retrospective cohort study showed significant reduced sexual initiation in the intervention compared to the control group, but did not measure repeat pregnancy (Coleman Dixon et al. 2000 Retro cohort [+]). The ITS study stated that the repeat pregnancy rate for those enrolled in the intervention was half that of the local area during the intervention, but gave no statistical data (Brown et al. 1999 ITS-).

2c. Sibling intervention

Weak evidence from one before and after study suggests that interventions with siblings may be effective in pregnancy prevention, and delaying sexual (East et al. 2003 BA [+]).

2d. Generic programmes for teenage mothers

Moderate evidence from one RCT suggests that generic programmes for teen mothers (to prevent repeat pregnancy, increase school retention, reduce substance abuse, and improve wellbeing) could be effective in significantly reducing repeat pregnancy, and consequent births (McDonnell et al. 2007 RCT [+]).

4.6.3. Other interventions

Male focused

Kalmuss et al. 2008 (USA) conducted a CBA study [++] (non equivalent control group design with pre and post test assessment) of a sexual health intervention to increase use of sexual and reproductive health care. A sample of 231 men from eight community based organisations was randomised by site (sites switched from intervention to control at each recruitment). The study population were aged 18-30 and were Latino and Black males of low income (no further demographic details) who were participating in an English language education programme. The intervention was developed and implemented by community based organisations providing services to young men, and consisted of three, 50 minute, education sessions informed by preliminary data collected from men in the target population. Sessions were conducted using an interactive group discussion format along with presentations which focused the discussion on key concepts. Demonstration materials and activities were designed to encourage participation. Topics included importance of regular health care examinations, description of services provided, STI transmission, screening and testing, condom use, and emergency contraception. At 3 months post intervention follow up, compared to the control data, the intervention increased sexual and reproductive health knowledge (OR 1.37 95% CI 1.08-1.67, $p=0.017$), attitudes towards using condoms improved (OR 18.2 95% CI 9.07-36.66, $p=0.017$), and reported number of sexual partners was reduced (OR = -0.32, 95% CI -0.56 -to -0.08, $p=0.017$). Compared to the control group, the intervention had no significant impact on frequency of condom use in the last 3 months or whether men always used a condom.

Mazza 2002 (USA) conducted an RCT [+] of a parenting intervention for adolescent, African American, first time fathers. The study considered contraceptive use (along with other non-relevant outcomes). The study population consisted of 30 low income, African American males aged 16-18 who were first time fathers. The similar control group (N=26) received weekly parenting classes focusing on learning to meet infant needs. Participants were recruited through an adolescent mothers programme. The intervention consisted of fortnightly parenting classes plus each member of the experimental group was assigned a social worker with whom he met weekly to assist him with his "life needs" (not described). Participants were followed up after 6 months, and those in the experimental group greatly increased their use of contraceptives (self reported). After the intervention (6 months), 90% of respondents in the experimental group said they always or often use birth control (increased from 10% before the intervention) $p=0.01$. However, after the intervention, 73% of the control group also stated that they always or often used contraceptives, compared with only 7% before, $p=0.01$. It is not clear if there is a significant difference between the intervention and control groups as both had a significant increase in birth control use, and this may suggest inaccurate self reporting resulting in elevated levels of contraceptive use being reported. Improvements in employment, vocational planning, feeling positive about relationships with their children, being able to plan for the future and increasing number of close friends, were also seen but these outcomes are not relevant to service use. Again the study included a very small number of participants.

Generic programmes with sexual health element.

Philliber et al. 2002 (USA) conducted an RCT of a comprehensive after school programme which was part of the Children's Aid Society Carrera program and had elements relating to sexual activity, use of a condom along with a hormonal contraceptive, pregnancy, and access to health care. The study population consisted of 484 disadvantaged 13-15 year olds (268 female), (Black 60%, Hispanic 39%) who were randomly allocated to intervention or control (usual youth programme, no details). The intervention consisted of a

year round after school programme with a comprehensive youth development orientation. Contact was long term and continuous, involved parents, and was delivered in the community, under one roof. It included five activities (job club, academic support, family and sexuality education, arts, individual sports), and two service components (mental health care and medical care). In term time, this was delivered for 3 hours, 5 days per week, and was supported over the summer holidays by occasional maintenance meetings. The project employed a full time co-ordinator plus part time staff. Non attendance of participants was promptly followed up. Seventy nine percent of the initial sample completed a follow up assessment at 3 years. Female participants had significantly lower odds than controls of being sexually active (OR 0.5), and of experiencing pregnancy (OR 0.3). They had significantly elevated odds of having used a condom and hormonal method at last coitus (OR 2.4). There were no significant results for these outcomes in relation to male participants. All participants had elevated odds of receiving good primary care (OR 2.0 for males and OR 2.1 for females). The authors report potential contamination of the control groups due to individuals attending different programmes based at the same sites. No confidence intervals for the odds ratios presented are given.

Wiggins et al. 2009 (UK) reported on a case control study of the Young People's Development Programme, which consisted of the Carrera project delivered in a UK context by 54 youth services in England. The study population consisted of 2724 young people (23% Black/Minority Ethnic) aged 13-15 (mean age 14.6 years) who were deemed by professionals to be at risk of teenage pregnancy, substance abuse or school exclusion, or to be vulnerable. The intervention was an adaptation of the Carrera project described above and compared this intensive, multi-component youth development programme including sex, drugs education, with standard youth provision (not described) The intervention included advice on accessing services such as family planning. At 18 months follow up, compared to the control group, young women in the intervention group more commonly reported pregnancy (16% vs. 6%, OR 3.55, 95% CI 1.32-9.50), there was an increase in early heterosexual experience (58% vs. 33%, OR 2.53, 95% CI

1.09-5.92), and expectation of teenage parenthood (34% vs. 24%, OR 1.61, 95% CI 1.07-2.43). The authors suggest that methodological limitations may at least partly account for the adverse effects seen here. There were also some notable differences between the groups at baseline (in the intervention group, the rate of contraceptive use at baseline was lower for males and females ($p < 0.05$) compared to the controls, they were also defined as more “vulnerable” in terms of alcohol consumption and sexual experience). In addition, there are known concerns that the intervention was not faithful to the original Carrera project (but this is not mentioned by the authors) .

Summary

Two studies of male focused interventions suggest that targeting this group may not be effective in improving levels of contraceptive use but may reduce number of sexual partners and have a positive effect on knowledge and attitude related outcomes.

A study of a generic youth programme (part of the Children’s Aid Society Carrera program) suggests that a broadly targeted intervention could be effective in preventing pregnancy, reducing sexual activity and improving contraceptive use for female participants only in the USA. However transferral of the programme to the UK context questions these results as negative effects on pregnancy, sexual experience and expectation were seen (but this study scored poorly for quality).

Evidence statement 3:**Evidence statement 3: Male focused interventions**

Moderate evidence from two studies suggests that male focused interventions may not be effective in improving levels of contraceptive use but may reduce number of sexual partners and have a positive effect on knowledge and attitude related outcomes. One nRCT showed no effect on contraceptive use, but did show a significant decrease in the reported number of sexual, and a significant increase in young people's knowledge and attitudes towards these (Kalmuss et al. 2008 nRCT [++]). One RCT again showed no clear intervention effect on contraceptive use (Mazza 2002 RCT [+]).

Evidence statement 4: Generic interventions

Conflicting evidence from two studies suggests that a generic youth programme (part of the Children's Aid Society Carrera program) run after school could be effective in preventing pregnancy, reducing sexual activity and improving contraceptive use. One RCT showed a reduction in pregnancy, and initiation of sexual activity, and an increase in contraceptive use, and service use (Philliber et al. 2002 RCT [++]). However, one case control study showed that transferring this intervention to the UK context resulted in potentially negative effects (which the authors suggest study design may account for) resulting in increased pregnancy rate, level of sexual activity, and expectation of pregnancy (Wiggins et al. 2009 Case control [+]). This study had notable between group differences at baseline.

5. RESULTS OF THE COST EFFECTIVENESS REVIEW

No health economic evidence was identified by the review assessing the cost effectiveness of interventions to encourage young people to use contraceptive services.

6. DISCUSSION

6.1. Summary of identified research

Most of the papers included in this review (15 of 17) reported on studies conducted in the USA with only one Australian and one UK study identified. The USA studies were frequently conducted in populations with a high proportion of ethnicities not well represented in the UK population. We identified no studies assessing the cost effectiveness of interventions to encourage young people to use contraceptive services in community settings. There were substantial limitations throughout the papers in terms of study quality (especially sample size) and poor analysis and/or reporting of results. Despite these limitations several evidence statements are presented here, but should be treated with caution due to the limitations which exist in the majority of this evidence.

6.2 Research questions for which no evidence was identified

The main issues regarding addressing the subsidiary research questions were that some papers did not adequately describe the socio-economic status of their population. Therefore it is difficult to comment on the effectiveness of contraceptive services in reaching socially disadvantaged young people. The effectiveness of contraceptive service interventions with differing ethnicity is also difficult to quantify as most papers, although describing the ethnic mix in their population, did not report their results with a breakdown for different ethnic groups.

In terms of questions such as the influence of external factors (e.g. setting of targets, adequacy of guidance and support to service providers) along with the facilitators and barriers to implementing effective contraceptive services and interventions, our review on the views of young people (and others) is better placed to address these questions.

6.3 Evaluating the impact of different approaches

Finding an effective methodology for the evaluation of these interventions, particularly in terms of outcomes relating to sexual behaviour, can be challenging and will have led to some of the problematic features of the

papers and limitations of the literature. Many of the interventions used self reported measures which have significant issues with regard to their validity, especially in relation to young people who may be more likely to report what they anticipate the researcher would like to hear. However, self reported measures are often the best available measure due to the lack of other appropriate, validated measures. A lack of process evaluations or measurement of "intervention fidelity" (did they actual deliver what they were supposed to?) along with limited follow up in many cases makes it difficult to recommend specific intervention types or components.

6.4 Adverse or unexpected outcomes

Philliber et al. (2002) reported that the Carrera youth project achieved improvements in reducing sexual activity and improving contraceptive use (as well as preventing pregnancy), for females only, with no effect seen for males. The study by Wiggins (2009) reported on the adaption of the Carrera project (from the USA) to a UK setting, resulting in negative outcomes in relation to pregnancy and sexual activity rates. The authors question their study design suggesting this may be the cause of the negative outcomes seen rather than a lack of intervention transferability.

6.5 Applicability in the UK context

Care must be taken when considering the potential applicability of the majority of these studies to the UK context. Most of the studies included in the review were conducted in the USA although some will be more applicable than others depending on the exact population studied. Differences in terms of health care culture, policy and context may be much more varied between countries and therefore caution is required when applying USA evidence to the UK.

6.6 Implications of the review findings

The literature in general is not at all well developed, especially in terms of good quality effectiveness and cost effectiveness studies (and we identified only one study of effectiveness and no studies of cost effectiveness conducted in the UK). The literature has a substantial bias towards interventions conducted in the USA and the number of studies conducted in

populations with high numbers of African Americans, Latinos and Hispanics will have further implications for applicability in the UK.

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8. APPENDICES

8.1 Appendix 1: Evidence table for included effectiveness studies

Author, year,	Study design	Lo cat ion	Population (sex, age, ethnicity, SES)	Comp arator	Sample size	Type of intervent ion	Objectives / Outcome measures	Intervention details	Duration and length of FU	Methods and analysis	Main findings	Recommen dations/ Limitation s	Grade
de Anda	BA 1. Community members 2. No response rate given 3. No control 4. No effect size.	US A	Sample 1 47.5% male Age 12-20 68% high school students Ethnicity not measured. Sample 2 57% male Age 12-18 54% high school students Latino 74.4% White 12% African American 6.9%	Data from participants only (pre-post test)	Two academic years: N1=419 N2=477	Educational intervention for youth pregnancy and STI prevention	Knowledge and attitudes towards pregnancy and STIs.	One component of a programme to prevent pregnancy and STIs. Delivered by community social service agency. GIG (not an abbreviation, used as a slang term as in music!?) is a six hour intervention, held on a Fri or Sat night, involves live and recorded music, and local radio celebrities, which presents information in an entertainment venue employing non conventional and youth culture orientated educational activities.	Two year programme. 6 hour intervention	Measured by brief 15 item questionnaire. ANCOVA	Significant improvement in knowledge and attitudes with regards to pregnancy and STIs. The intervention was shown to be effective in improving accurate knowledge of STI and pregnancy risk and prevention demonstrated by a significant increase in total score from pre to post test Sample 1 t= -10.52, p<0.001 Sample 2 t= -25.15, p<0.001.		-
Barnet 2007	RCT 1. Recruited from 3 urban prenatal care sites. 2. 84 of 122 eligible participated 3. Random	US A	Pregnant adolescents aged 12-18. Low income African American	Usual care. No details.	N=44 Intervention N=40 control. 67% completed both FU assessments.	Community based home visiting programme	Repeat pregnancy Depression School drop out Primary care use	Randomly assigned to home visiting or usual care. Trained African American home visitors (degree, experience in child care or social work) recruited from the local community paired with each adolescent until child's second birthday. Visited	Baseline with FU at 1 and 2 years.	Programme impact over time measured with ITT analysis using generalised estimating equations.	No effect on repeat pregnancy, depression or linkages with primary care. Parenting scores for home visit teens were 5.5 points higher than control (95% CI 0.5-10.4 p=0.03). School continuation was 3.5X greater in home visited than controls (95% CI 1.1-11.8 p<0.05)	Small sample size. Study groups not balance at baseline. Some outcomes self reported. Content of	+

	allocation 4. Sample size of 40 = power of 0.80 to test for effect size of 0.4.						biweekly for first year of child's life and monthly for second year. Delivered parenting curriculum, encouraged contraceptive use, connected teen with primary care and promoted school continuation.					primary care received was not assessed.	
Black 2006	RCT 1. Recruited from 3 urban hospitals at delivery 2. 83% participated 3. Random allocation stratified by maternal age and gender of child. 4. No power calc	USA	181 first time, Black adolescent mothers (, age 13.5 to 17.9), Low income, living with mother.	Usual care, no details.	N=181 149 completed 24 month FU	Home based mentoring	Second birth within 2 years	Home based intervention curriculum focusing on interpersonal negotiation, adolescent development and parenting. Delivered until infants 1 st birthday by college educated, Black, single mothers ("big sisters")	FU 6, 12 and 24 months after recruitment.	ITT analysis	At 2 years, mothers in the control group were 2.5 times more likely to have given birth to a second child than the intervention group (24% vs. 11%, OR 2.45, 95% CI 1.003-6.03, p=0.05). Having more than two visits increased the likelihood of not having a second child by more than threefold (OR 3.3, 95% CI 3.0-5.1). Increasing the threshold for adherence from 4 to 6 visits increased the likelihood of not having a second infant (Or 3.6, 95% CI 3.1-7.2, and OR 4.3, 95% CI 3.0-8.3). At 24 months, positive life events (past year) and control group membership were also associated with increased likelihood of a second infant (OR 1.2, 95% CI 1.0-1.5, P<0.05 and OR 2.9, 95% CI 1.01-8.3, p<0.05). Reported contraceptive use at baseline had no effect on subsequent birth rate.	Intervention was effective in preventing rapid repeat births. No repeat births amongst mothers who attended at least 8 sessions. But numbers were small.	++

Brown 1999	ITS	US A	Girls under 16 (aged range 13-16) Low SES 95% African American.	None	N=65	Repeat pregnanc y	Repeat pregnancy	Dollar a day programme. Run by nurses from the local health department. Weekly meetings designed as supporting social event: including food and an informal programme focused on needs identified by participants, setting of short term goals and the awarding of \$1 for each day they remained non- pregnant.	Five years	?	15% of 65 girls enrolled in the programme experienced repeat pregnancy. This was substantially lower than the 30% repeat pregnancy rate for the local area.	Poor detail in analysis.	-
Coleman Dixon 2000	Retrospecti ve cohort	US A	33 past participants. Aged 14-18 (mean age 16). Low income neighbourhoods	32 non particip ants.	N=33	Preventin g repeat pregnanc y.	Initiation of sexual intercourse. Conception use. Teenage pregnancy.	Sisterhood Agenda Inc. Thirteen week programme for teenage African American girls. Small groups (max 10) meet for four hours once a week. Four components: reaching for success (self understanding), developing inner health for outer beauty (nutrition, exercise and peer pressure), fitness dignity and pride (public speaking, interviews and communication), tools for survival (self sufficiency).	13 week program me. FU after program me.	No details.	Of 26 who had not had sexual intercourse before commencing the programme, 24% participants compared to 69% of controls initiated sex ($X^2 = 11.24, p < 0.001$). Pregnancy was more than 3 times more frequent among non participants (23%) than among participants (7%) for the sample over all. Of those who were sexually active 15% of participants compared to 33% of controls reported at least one pregnancy.	Small sample limits significance Not random sample.	+
East 2003	BA	US A	N=1,176 Hispanic (77%) 11-17 year olds with at least one adolescent sibling who was a parent or had been pregnant. 59% female Mean age 13.5. Economically	N=445 Receiv ed no system atic service s.	N=731	Sibling pregnanc y preventio n program me.	Pregnancy rate Sexual initiation School truancy Contraceptive use	Specific programmes varied between sites but required at least one face to face contact with every client every month. Programmes included: case management, group activity, formal therapy, videos)	FU nine months	Logistic regression	Female programme clients had significantly lower pregnancy rate than comparator females over the evaluation period (4% vs. 7%) as well as lower rate of sexual initiation (7% vs. 16%). The odds of initiating sexual activity over the	Due to time constraints only a subset (33%) of 3,300 participants were included in the evaluation.	+

	3. Sites selected to be representative of geographic, age and race of Californian population. 4. No power calc.		disadvantaged					On average clients received 18.5 hours of contact (range 45 min to 95 hours) or approx 2 hours per month. Examples of two specific programmes are given.			evaluation period were significantly elevated amongst comparison relative to intervention females (OR 1.5, 95% CI 1.09-1.94) and the odds of becoming pregnant were significantly higher amongst comparison than program females (OR 1.6 95% CI 1.07-2.52). Consistency of contraception use increased over time among males in the program and decreased among comparison males (no stats).		
Gee 2007	BA 1. Convenience sampling 2. N.A. 3. Community locations. 4.	USA	31% aged 18-24 (21% post test). 57% White, 11% Black, 29% Hispanic	No control group	N=188 pre and 290 post intervention	Community education campaign	Knowledge of EC	Community education campaign for EC included educational signs in the community and distributing pamphlets to local businesses. In addition, the general public, health care providers and pharmacists were targeted for outreach. Educational packs were placed in community health centres and pharmacies. The packs included information on EC policy, fact sheets, prescribing protocols and information posters. Educational sessions were also offered to health centres and pharmacies.	Survey before/after intervention. 2 years.	Logistic regression	Following the intervention, women were significantly more likely to have heard of EC (91% vs. 82%, p=0.007), know the mechanism of action of EC (49% vs. 39%, p=0.04), have discussed EC with a care provider (38% vs. 24%, p=0.03) and have received an advanced prescription for EC (33% vs. 12%, p=0.004), as well as use EC in the future if needed (79% vs. 63%, p=0.0002).	Convenience sample (street pedestrians = bias.	-
Guzman 2003	n-RCT (pre-test data of one	USA	N=961 79% Latino Aged 11-18	Before and after;	N=961	Community theatre	Increase knowledge of STIs and the	Community Awareness Motivation Partnership (CAMP) community	Questionnaire prior to	t-tests	Participants were significantly more likely to:	No control group, very short term –	-

	<p>school compared to post test data of comparison school but all received intervention).</p> <p>1. Six schools 2. 961 of 1613 3. See above. 4. No power calc.</p>		(Mean 13.31, SD 0.76). 50.7% female	no control group			<p>role of abstinence and condom use. Promote abstinences to prevent early pregnancy. Encourage adolescents to postpone sexual activity.</p>	<p>teen theatre intervention. One hour long theatre performance. Performed by ethnically diverse cast of 10 adolescents/young actors age 15-25. Using urban teen culture in terms of music, mannerisms, clothing and language.</p> <p>To learn about safe sex, sexual practices, negotiation and social skills from watching others model appropriate behaviours and receive consequences for inappropriate behaviours.</p> <p>Open forum with actors directly after performance to discuss</p>	<p>viewing theatre presentation. Repeated on 3rd day.</p>		<p>intend to postpone sex at post test p<0.001. believe they should use birth control at post test p<0.001. have increased knowledge regarding HIV transmission and prevention p<0.001 accurately define abstinence p<0.0001 accurately define male responsibility p<0.001.</p>	<p>three day FU. Self reported intentions.</p>	
Kalmuss 2008	<p>n-RCT (non equivalent control group design with pre and post test assessment)</p> <p>1. Eight Community based organisations 2. 231 of 272 3. Randomised by site</p>	USA	<p>N= 231 men aged 18-30. Latino/ Black Low income</p> <p>Participating in English language education programme</p>	N=118	N=113	Sexual health intervention.	<p>Attitudes towards health care utilization. Increase use of sexual and reproductive health care. Knowledge of STIs and EC. Safer sex behaviours</p>	<p>SRH intervention developed and implemented by community based organisations providing services to young men. Consisted of three, 50 minute, education sessions informed by preliminary data collected from men in the target population.</p> <p>Used an interactive group discussion format. Presentations focused the discussion on key concepts. Demonstration materials and activities were designed to</p>	<p>FU 3 months post intervention</p> <p>85% complete FU</p>	<p>Questionnaire and interview.</p> <p>Logistic regression.</p>	<p>The intervention increased SRH knowledge (OR 1.37 95% CI 1.08-1.67, P=0.017), attitudes towards using condoms improved (OR 18.2 95% CI 9.07-36.66, p=0.017), and reported number of sexual partners was reduced in the three months of FU (OR =0.32, 95% CI -0.56-0.08, p=0.017).</p> <p>Compared to the control group, the intervention had no significant impact on frequency of condom use in the last 3 months or whether men always used a condom,</p>	<p>Randomisation was not by individual.</p>	++

	(sites switched from intervention to control at each recruitment). 4.No calc							encourage participation. Topics included importance of regular health care examinations, description of services provided, STI transmission, screening and testing, condom use, and EC.					
Kennedy 2000	Cross sectional (post intervention) 1. Convenience sample. 2.? 3. Random selection of telephone interviewees 4. No calc.	US A	Sexually active adolescents aged 14-18 who used condoms inconsistently. 43.9% male. 47% White, 17% Black, 23% Hispanic, 13% other.	N=140 2	None	Social marketing campaign for condom use.	Consistent and correct use of condoms. Condom carrying. Intention to use. Attitudes towards condoms.	Teens stopping AIDs Social marketing campaign included radio announcements, posters and other promotional material, skills building workshops, peer outreach, and a telephone information line.	Telephone survey	Logistic regression.	The number of channels through which an adolescent had been exposed to was associated with condom use at last sex (OR 1.26 p<0.01) and with psychosocial determinants of behaviour. The proportion of adolescents who had used a condom at last sex increased 4.3% over the one year intervention period.	No control.	-
Mazza 2002	RCT 1. Recruited through adolescent mothers programme . 2. 56 of 60 3. Random 4. No calc	US A	Adolescent African American first time fathers. N=60 Low income. Age 16-18.	N=26 The control group received weekly parenting classes focusing on learning to meet infant	N=30	Parenting programme	Contraceptive use (and other, non-relevant outcomes).	Biweekly parenting classes plus each member of the experimental group was assigned a social worker with whom he met weekly to assist him with his life needs.	Six months.	Chi-squared analysis.	Those in the experimental group greatly increased their use of contraceptives (self reported). At time 2 (6 months), 90% of respondents in the experimental group said they always or often use birth control (increased from 80% at time 1) p=0.01 . However at time 2, 73% of the control group stated that they always or often used contraceptives, compared with only 7% at time 1, p=0.01.	Not clear if there is a significant difference between the intervention and control groups as both had a large increase in birth control use. Study numbers small.	+

				needs.							Improvements in employment, vocational planning, feeling positive about relationships with their children, being able to plan for the future and increasing number of close friends, were also seen but these outcomes are not relevant to service use.		
McDone II 2007	RCT 1. Convenience sample: human services, newspaper ads, flyers, posters and community organisations. 2.42% at 24 months 3. Random allocation 4. No power calc.	USA	N=107 intervention N=90 control. Parenting teens aged 18 and below, low income. Average age 17.5, 93% African American (no further details).	N=107	N=90	Preventing repeat pregnancy.	Reduce repeat pregnancy. Also: increase school retention, reduce substance abuse, improve wellbeing.	Pathways teen mother support programme. Intensive intervention for low income pregnant and parenting teens. Consisted of case management, support groups, family group decision making, life skills education and training, leadership development and related services over 24 months. Teens received \$25 and a small gift.	24 months. Survey data collected at 6 monthly intervals.	ANOVA	Overall, intervention group teens had fewer pregnancies (F=6.5 (1, 675) p<0.05) and consequently, fewer births (F=8.2 (1, 597) p<0.01) than the control group, and were less likely to be at risk of contracting a sexually transmitted disease (F=5 (1, 693) P<0.05).. Older treatment teens were more likely to use contraception (F=6.0 (2, 671) p<0.01) consistently, while the opposite was true of the controls.	42% at 24 months.	+
Philliber 2002	RCT 1. Six "agencies" 2. 484 of 600 3. Random allocation 4. No power calc.	USA	N=484 Disadvantaged 13-15 year olds. Black 60% Hispanic 39%	N=242 Usual youth programme	N=242	After school programme	Current sexual activity, Use of a condom along with a hormonal contraceptive, pregnancy, access to health care.	Children's Aid Society Carrera program. Year round after school programme with a comprehensive youth development orientation. Contact is long term and continuous, involves parents and is delivered in the community under one roof. Includes five activity and two service components: job club, academic support, family	3 years FU 79% completed.	Multivariate regression analysis.	Female participants had significantly lower odds than controls of being sexually active (OR 0.5), and of experiencing pregnancy (OR 0.3). They had significantly elevated odds of having used a condom and hormonal method at last coitus (OR 2.4). There were no significant outcomes in relation to	Potential contamination of the control groups due to individuals attending different programmes based at the same sites.	++

								and sexuality education, arts, individual sports, mental health care and medical care. In term time 3 hours, 5 days per week. Over summer maintenance meetings. Full time co-ordinator plus part time staff. Non attendance of participants promptly followed up.			male participants. All participants had elevated odds or receiving good primary care (OR 2-0.2-1).	No CI for odds ratios	
Quinlivan 2003	RCT 1. Recruited from teenage pregnancy clinic 2. 124 of 139 at 6 months. 3. Random 4. Power calc, target popn 134.	Australia	Aged under 18. Mean 16.4 (0.96) 88% low SESE 30% indigenous Australian (no other ethnicities given).	N=65 no intervention	N=71	Postnatal home visiting for teenage mothers.	Frequency of adverse neonatal outcomes Knowledge of contraception, breastfeeding and infant vaccination.	5 structured home visits by nurse-midwives.	6 months.	Multi-variate analysis.	At 6 months, contraceptive use was significantly higher in the intervention group (53) compared to the control (40) (RR 1.35, 95% CI 1.09-1.68, p=0.007). Postnatal home visits were associated with a reduction in adverse neonatal outcomes (RR 0.24, 95% CI 0.05-0.08) and a significant increase in contraceptive knowledge (mean difference 0.92, 95% CI 0.05-1.08). There was no significant increase in knowledge or practice with respect to breastfeeding or infant vaccination associated with home visits.		++
Schwarz 2008	RCT 1. Recruited from two urgent care clinics. 2. 446 of 583 women	USA	N=464. Aged 18 to 45 (36% 18-24). 44% White.	Control group received information about periconception	N=464	Computer assisted provision of EC	Increased knowledge and use of EC among women able to access EC without a prescription: EC knowledge,	Conducted in urgent care waiting areas where EC had been available without prescription for 3 years. 15 minute computerised educational session and one pack of EC	FU 7 months after enrolment	Multivariate logistic regression.	There was a trend towards more EC use in the intervention group than the control (10% vs. 4% of women followed, p=0.06, and 6% vs. 3% of women enrolled p=0.01). Fewer women in the intervention were pregnant		++

	screened. 3. Random allocation 4. No power calc			foliate supplement but no info about EC			EC use, self reported pregnancy.				at FU (0.8% vs. 6.5% of women followed., p=0.01, and 0.5% vs. 4.0%, p=0.01 of women enrolled.		
Stevens-Simon 1997	RCT 1. Recruited from post partum ward and teenage parent hospital clinic. 2. 286 of 364 eligible. 3. Random allocation 4. Power calc: require 300 participants (75 per group) to detect a difference.	USA	N=286 primiparous girls aged less than 18 years, infants younger than 5 months. N=248 at 24 month FU.	Control group received no intervention. N=44.	Group and incentive N= 97. Group only N=23 Incentive only N=84.	Preventing repeat pregnancy through peer group support.	Repeat pregnancy Consistency of participation. Demographic variables and psychological factors including school dropout, behind in school, older boyfriend.	Randomised to 4 interventions: Monetary incentive, peer group support, incentive and support, and no intervention. Dollar a day programme: incentive to prevent repeat pregnancy by promoting consistent use of contraceptive methods and future orientated family and career planning. Meet weekly to collect \$7, share snacks and converse informally. Also more formal discussion plus free contraception and job information.	2 years 6,12,18 and 24 months).	Stepwise logistic regression analysis.	Participation in the intervention was low. Monetary incentive increased participation from 9% to 58%. The peer support incentive failed to prevent repeat pregnancies. The incidence of second pregnancies at 6 months (9%), 12 months (20%), 18 months (29%) and 24 months (39%) did not vary significantly in relation to the intervention group. Repeat pregnancy was predicted by minority race (OR 1.7, 95% CI 1-2.89, p=0.01), and the presence of more than five of 20 demographic and psychological risk factors (OR 2.4, 95% CI 1.38-4.08, p=0.01).	Sociodemographic characteristics significantly affected the timing of subsequent conceptions but the intervention did not.	++
Wiggins 2009	Case control. 1. 54 youth services in England 2. / 3. non random. 4. no calc	UK	N= 2724 young people aged 13-15 (mean age 14.56 years) Intervention at second FU = 566 (30%).	Control group = 1087, 338 at 2 nd FU (31%)		Carrera project: Generic youth programme.	Pregnancy Drug use Alcohol use. Sexual experience Expectations.	Young People's Development Programme, which consisted of the Carrera project delivered in a UK. The intervention was an adaptation of the Carrera project described above and compared this intensive, multi-	18 months follow up	Logistic regression.	young women in the intervention group more commonly reported pregnancy (16% vs. 6%, OR 3.55, 95% CI 1.32-9.50), early heterosexual experience (58% vs. 33%, OR 2.53, 95% CI 1.09-5.92), and expectation of teenage parenthood (34% vs. 24%, OR 1.61, 95% CI 1.07-2.43).	The authors suggest that methodological limitations may at least partly account for the adverse effects seen here.	-

								component youth development programme including sex, drugs education, with standard youth provision (not described).				Quite large loss to FU. Some differences at baseline.	
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Study design:

1. Recruitment sites
2. Response rate
3. Random allocation?
4. Effect size.

8.2 Appendix 2: Included studies

de Anda 2008. Replication of an intensive educational intervention for youth pregnancy and STI prevention: the GIG. *Child and Adolescent Social Work* 25: 55-69.

Barnet et al. 2007. Home visiting for adolescent mothers: effects on parenting, maternal lifecourse and primary care linkage. *Ann Fam Med*. 5: 224-232.

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Wiggins et al. 2009. Health outcomes of youth development programme in England: prospective matched comparison study.

8.3 Appendix 3: Excluded studies

Age	<p>Little et al. 1998. Effect of educational leaflets and questions on knowledge of contraception in women taking the combined contraception pill. <i>BMJ</i> 316: 1948-1952.</p> <p>Saeed et al. 2008. Change in trend of contraceptive uptake – effect of educational leaflets and counselling. <i>Contraception</i> 77: 377-381.</p> <p>Smith and Whitfield. Women’s knowledge of taking oral contraception.: effect of providing information leaflets in general practice. <i>BJGP</i> 45: 409-414.</p> <p>Cohen et al. 1999. Implementation of condom social marketing in Louisiana. 1993-1996. <i>American Journal of Public Health</i> 89(2): 204-208.</p>
Discussion paper	<p>Delisle et al 1999. Accelerated campaign to enhance STD services for youth: successes, challenges and lessons learned. <i>Sexually transmitted diseases</i> 26(4) ps28-s41.</p> <p>Gerressu et al. 2005. Using the internet to promote sexual health awareness among young people. <i>J Fam Plann Reprod Health</i> 31(4): 267-270.</p> <p>Koo et al. 1994. Reducing adolescent pregnancy through a school and community based intervention: Denmark, South Carolina, revisited. <i>Family Planning Perspectives</i> 26: 206-211.</p> <p>Paperny et al 2007. Computerised health assessment and education for adolescent HIV and STD prevention in health care settings and schools. <i>Health Education and Behaviour</i> 24(1) 54-70.</p>

	Tucker et al. 2006. Health demonstration projects: evaluating a community based health intervention programme to improve young people's sexual health. <i>Critical Public Health</i> 16(3) 175-189.
Condoms efficacy	Alstead et al. 1999. Developing, implementing and evaluating a condom promotion program targeting sexually active adolescents. <i>AIDS Education and Prevention</i> 11(6): 497-512. Collins et al. 2009. Entertainment television as a healthy sex educator: the impact of condom-efficacy information in an episode of Friends. <i>Paediatrics</i> 112(5): 1115-1121 Krahe et al. 2005. Can safer sex promotion leaflets change cognitive antecedents of condom use? An experimental evaluation. <i>British Journal of Psychology</i> 10: 203-220.
Inappropriate outcomes	Garwick et al. Risk and protective factors for sexual risk taking among adolescents involved in prime time. <i>Journal of Pediatric Nursing</i> 19(5): 340-349. Kaskowitz et al. 2007. Online availability of hormonal contraceptives without a health care examination: effect of knowledge and health care screening. <i>Contraception</i> 76: 273-277. Trussell et al. 2001. Evaluation of a media campaign to increase knowledge about emergency contraception. <i>Contraception</i> 63: 81-87. Roberto et al. 2007. A computer based approach to preventing pregnancy, STD and HIV in rural adolescents. <i>Journal of Health Communication</i> 12: 53-76.
Abstract only	Johnson et al. 2005. Student perceptions of an abstinence based teenage pregnancy prevention programme implement in rural West Alabama middle schools. <i>Research Quarterly for Exercise and Sport</i> 76(1): A40. Lang et al. 2009. Media campaigns for sexual health: an exploration of their potential impact on young people's attitudes to sexual health and sexual health seeking behaviour. <i>BASHH Abstracts</i> . p.A27.

8.4 Appendix 4: Search strategies

Search Strategy for Mapping Review

List of databases searched

Medline via OVID SP
 Embase via OVID SP
 Cinahl via OVID SP
 British Nursing Index via OVID SP
 PsycINFO via OVID SP
 ASSIA via CSA
 Cochrane – CDSR via Wiley
 Cochrane –DARE via Wiley
 Cochrane –Central via Wiley
 Cochrane –HTA via Wiley

Social Care Online
Science and Social Science Citation Indices via Web of Knowledge
EconLit via OVID SP
Cochrane – NHS EED via Wiley

Sample search strategy from MEDLINE

- 1 *adolescent/
- 2 teen*.ti,ab.
- 3 adolescen*.ti,ab.
- 4 underage.ti,ab.
- 5 youth*.ti,ab.
- 6 (Young adj2 (person or people or adult*)).ti,ab.
- 7 (School adj2 (child* or student* or age)).ti,ab.
- 8 minor*.ti,ab.
- 9 student*.ti,ab.
- 10 (under adj2 (eighteen or "18")).ti,ab.
- 11 (under adj2 (twenty five or "25")).ti,ab.
- 12 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11
- 13 *contraception/
- 14 *family planning services/
- 15 *birth control/
- 16 *contraceptive behavior/
- 17 (family adj2 planning).ti,ab.
- 18 (birth adj2 control).ti,ab.
- 19 sexual health service*.ti,ab.
- 20 sexual health clinic*.ti,ab.
- 21 (Contracepti* and (pharmacy or pharmacist* or community or service* or access* or provision or support* or clinic* or availab* or emergency or delivery or outreach or advice or information or intention*)).ti,ab.
- 22 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21
- 23 exp Pregnancy, Unwanted/
- 24 exp Pregnancy, Unplanned/
- 25 (Pregnan* adj2 (unwanted or unplanned or unintention* or accident*)).ti,ab.
- 26 conception*.ti,ab.
- 27 (Prevent* adj2 pregnancy).ti,ab.
- 28 23 or 24 or 25 or 26 or 27
- 29 22 or 28
- 30 12 and 29
- 31 limit 30 to (humans and yr="1995-2008")

Search Strategy for Community Settings Review

List of databases searched

Medline via OVID SP
PsycINFO via OVID SP
Maternity and Infant Care via OVID SP
Embase via OVID SP

Cinahl via EBSCO
 Social Science Citation Index via Web of Knowledge
 EconLit via OVID SP
 Cochrane – NHS EED via Wiley

Sample search strategy from MEDLINE

1	*adolescent/
2	teen*.ti,ab.
3	adolescen*.ti,ab.
4	underage.ti,ab.
5	youth*.ti,ab.
6	(Young adj2 (person or people or adult*)).ti,ab.
7	(School adj2 (child* or student* or age)).ti,ab.
8	minor*.ti,ab.
9	student*.ti,ab.
10	(under adj2 (eighteen or "18")).ti,ab.
11	(under adj2 (twenty five or "25")).ti,ab.
12	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11
13	(Counsel* adj3 (contracept* or condom* or pregnan* or STI or STD or (family adj planning) or (birth adj control) or (sexual adj (health or transmitted))))).ti,ab.
14	12 and 13
15	((subsequent* or repeat* or second or sibling or teen*) adj3 (pregnan* or conception*)) AND (prevent* or program* or strategy)).ti.
16	14 or 15
17	Computer communication networks/ or cellular phone/ or mass media/ or pamphlets/ or publications/ or internet/
18	(phone* or mobile* or media or radio or television or leaflet* or poster* or pamphlet* or broadcast* or film* or campaign* or newspaper* or magazine* or computer* or PC or internet or website* or (social adj marketing)).ti.
19	17 or 18
20	*Contraception/ or *Family Planning Services/
21	(contracept* or condom* or pregnan* or STI or STD or family planning or birth control or (sexual adj (health or transmitted))))).ti.
22	20 or 21
23	19 and 22
24	16 or 23
25	limit 24 to (humans and yr="1995-current")