

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 health care 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 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 on healthcare premises.

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 on health care premises. Interventions conducted on education premises and in community 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 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. Twenty four effectiveness papers were identified through the database searches, with no additional papers identified through scrutinising reference lists and liaison with experts. We excluded 41 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 24 studies which met the inclusion criteria. The papers focused on: new adolescent services (two papers); outreach to existing services (five papers); advanced provision of emergency contraception (four papers); condom provision and advice (five papers); general contraceptive provision and advice (three papers); repeat pregnancy prevention (four papers), plus one additional paper where there was insufficient data to categorise the intervention.

The evidence comes mostly from the USA (18 of 24 papers), which may have implications for its applicability in the UK, as is discussed below. In terms of study design, there were eleven random controlled trials (RCTs) (two of cluster design), two non-randomised controlled trials, one controlled before and after study (CBA), seven retrospective cohort studies, and three interrupted time series studies (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 eight scoring [++] after making allowances for blinding etc. Studies which employed a CBA designed and the non-randomised control trials also scored well, with the vast majority of ITS, and retrospective design 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). Those of poorer design often scored better for impact overall, it is therefore important to keep in mind the potential of study design to affect the applicability score (that is; lesser quality designs may present less reliable results). 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, outreach for new clinics was delivered by a clinical outreach worker (Baraitser et al. 2002) and a team of specialist health personnel (Wilson et al. 1994), and for clinic expansion and reorganisation by peer providers (Brindis et al. 2005). Other service reorganisation mentioned delivery by African American nursing assistants (Kissinger et al. 1997) and a senior nurse outreach worker (Reed et al. 1999). An intervention to support advanced provision of emergency contraception was delivered by a nurse counsellor (Ullman and Lathrop 1996). Condom and oral contraception provision interventions were delivered by GUM clinic staff (Thompson and Smith 2001), trained facilitators who were community members (Jemott et al. 2005) and a nurse (Hanna 1993). Finally, interventions to prevent repeat pregnancy were delivered by a nurse counsellor (Gilliam et al. 2004) and by a combination of nurses and social workers (Adams et al. 1990).

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 (18 of 24) reported on studies conducted in the USA, frequently in populations with a high proportion of ethnicities not well represented in the UK population. We categorised the papers as those which focused on new adolescent services (two papers), outreach to existing services (five papers), advanced provision of emergency contraception (four papers), condom provision and advice (five papers), general contraceptive provision and advice (three papers), repeat pregnancy prevention (four papers), plus one additional paper where there was insufficient data to categorise the intervention. We identified no studies assessing the cost effectiveness of interventions to encourage young people to use contraceptive services. There were limitations throughout the papers in terms of study quality (especially sample size) and poor reporting of results. Despite these limitations several evidence statements are presented here.

Research questions for which no evidence was identified

The main issues regarding addressing the subsidiary research questions were that many 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. The exception to this is one study (Chewning et al. 1999) who conducted their contraceptive provision intervention in two populations (one

majority White and affluent, one majority Black and deprived) and reported positive results for the White population only.

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

None of the papers included in this review reported adverse outcomes for the intervention groups in their study.

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 well developed, especially in terms of good quality effectiveness and cost effectiveness studies (and the limited number of studies of effectiveness or 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 (and other ethnic groups not frequently represented in the UK) will have further implications for applicability in the UK.

EVIDENCE STATEMENTS

Evidence statement 1: Interventions to provide new adolescent services and to encourage access to existing services.

Evidence statement 1a:

New adolescent clinics

Weak evidence from two studies suggests that new adolescent clinics were not effective in reducing teenage pregnancy rates. In the first study, the local rate of conception rose slightly, compared to the teenage pregnancy rate which rose significantly (Wilson et al. 1994 retrospective cohort [-]). In the second study, no overall improvements were seen in pregnancy rates, knowledge and use of services, or attitudes towards contraception (Hughes et al. 1995 ITS [+]).

Evidence statement 1b.

Outreach to existing mainstream services

Moderate evidence from five studies suggests that outreach programmes to encourage young people to attend mainstream sexual health services may be effective in increasing service use, but the effect on reducing teenage pregnancy rates is unclear. In the nRCT study, compared to control, the outreach group were significantly more likely to report consistent birth control use, and females were also less likely to report pregnancy (Brindis et al. 2005 nRCT [+]). In the first cohort study, condom use increased and pregnancy decreased but the impact of the intervention is unclear due to poor reporting (Greene 2006 retrospective-cohort study [+]). In the second cohort study, during the five years of the intervention, the number of attendees at family planning clinics aged under 20 and under 16 significantly increased. Pregnancy is reported to have “remained low” but no data is given (Reed et al. 1999 retrospective cohort study [-]). In the third cohort study, those who attended an orientation session were significantly more likely to initiate services, and attendance at the three month booster session was associated with significantly higher continued clinic contact at one year (Kissinger et al. 1997 retrospective cohort [-]). In the ITS study, The number of new users of family planning services aged under 26 years increased significantly in the first 18 months of the outreach programme (Baraitser et al. 2002 ITS [-]).

Evidence statement 2:**Advanced supply of emergency hormonal contraception.**

There is strong evidence from four RCT studies to support the advanced provision of emergency hormonal contraception (EHC) to adolescents to increase EHC use. In most cases increased use was not at the expense of other contraceptive use, and did not promote risky sexual behaviour; the exception was one study with adolescent mothers (Belzer et al 2005). In the first study, at six month follow up EHC use was significantly higher in the intervention (advanced provision) group than the control, and the mean time to use EHC was significantly shorter in the intervention compared to the control. There were no differences in hormonal contraception or condom use between the groups (Ekstrand et al. 2008 RCT [++]). In the second study (with random allocation to receive EHC via pharmacy, clinical access or advanced provision) EHC use at six month follow up was significantly greater in the advanced provision than the clinical access group. Pharmacy access did not affect EHC use when compared to clinic access (Harper et al. 2005 RCT [++]). In the third study, the advanced EHC group reported (non-significantly) higher emergency contraception use and significantly sooner use (Gold et al. 2004 RCT [++]). In the fourth study, at 12 month follow up, those in the advanced provision group were significantly more likely than the controls to have used EHC but also more likely to have had unprotected sex in the last 6 months (Belzer et al. 2005 RCT [+]).

Evidence statement 3:**Interventions to promote adolescent condom use**

There is strong evidence from five studies to support interventions which combine discussion and demonstration of condom use to increase adolescent condom use and engagement with clinical services. In the first study, at six month follow up intervention subjects reported significant increased condom use by their sexual partner for protection against STIs (Orr et al. 1996 cluster RCT [++]). In the second study, at one year, clients were twice as likely to report having received condoms from the clinic (Ullman and Lathrop 1996 RCT [++]). In the third study, of two methods of CBT to reduce unprotected sex, those in the skills based CBT group were significantly less likely to have unprotected sex at 12 months than the information based CBT group, or control (Jemott et al. 2005 RCT [++]). In the fourth study, more of the intervention group than the comparators returned for their scheduled clinic revisits (significance not clear) (Smith et al. 1997 CBA [++]). In the fifth study, it is suggested that, compared to the rest of the country, attendance at the GUM clinic by young people is much higher, particularly at sites offering daily access and located geographically close to a school (no statistical data are given to validate this) (Thompson and Smith 2001 retrospective cohort [-]).

Although the studies were mostly well designed, the data were not always well analysed and reported which may have issues for reliability. Applicability in the UK may also be limited as most of the studies were conducted in the USA/Canada (two in populations which were majority Black American (Orr et al. 1996, Smith et al. 1997), and one population who were African American/Latino (Jemott et al. 2005).

Evidence statement 4:**Adolescent contraceptive use**

Strong evidence from two RCT and one nRCT studies suggests that interventions aimed to improve adolescent contraceptive use by additional service provision can be effective, but this depends upon the intervention. In the first study, a nurse led “transactional” intervention improved the intervention group reported significantly greater oral contraception adherence than the controls (Hanna 1993 RCT [++]). In the second study, a computer based contraception decision aid intervention, at one year follow up, the first intervention sample had significantly higher contraception knowledge and (non-significantly) fewer pregnancies. This finding was not replicated in a second study population (Chewning et al. 1999 nRCT [+]). In the third study, of an intervention to administer "quick start" of contraception (immediately administered contraceptive injection), at six month follow up, there were no differences in continuation rates and no difference in pregnancy rate between the groups (Edwards et al. 2008 RCT [++]).

Evidence statement 5:**Multi-component programmes**

Inconsistent evidence from four studies is unclear on the use of comprehensive, multi-component programmes to prevent repeat pregnancy in adolescents. Weak evidence from two studies may support the use of comprehensive, multi-component programmes to prevent repeat pregnancy in adolescents. In the first study, at three year follow up the repeat pregnancy rate for those completing the programme was lower than the state rate (intervention effect not clear). (Omar et al. 2008 (USA) retrospective cohort [-]). In the second study, the strongest predictor of repeat pregnancy in the first two years was failure to use Norplant (LARC) (Stevens-Simon et al. 2001 ITS [-]). These studies suggest that the use of LARC to prevent adolescent repeat pregnancy is most important for this positive outcome, rather than any aspects of the multi-component programme itself. A further two studies did not support the use of comprehensive, multi-component programmes to prevent repeat pregnancy in adolescents. In the first study no decrease in repeat pregnancy was seen at 12 months (Gilliam et al. 2004 RCT [+]). In the second study, no significant association could be found with attendance at the programme and repeat unwanted pregnancy (Adams et al. 1990 retrospective cohort [-]).

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 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 on healthcare premises.

This review was preceded by a mapping review to describe the available literature on the full range of 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 second 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 medical 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 1990-2008 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 health care settings.

Following the mapping review search, the systematic reviewer identified the need for additional targeted database searches on contraception services in healthcare 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 1990-2008 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
- Healthcare 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

- Healthcare 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 in economic databases (see Appendix Four)
- From articles identified as relevant for the cost effectiveness review (from the healthcare settings searches), citation searches were undertaken on these articles

3.2 Inclusion and exclusion criteria

This review focuses on interventions which are conducted on health care premises. This includes interventions which have an outreach element, but where the majority of the service provided is still delivered in the clinic. Interventions conducted solely on education premises or in community 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 drop out 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 through 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:

- New sexual health services for adolescents
- Outreach to existing sexual health services
- Advanced provision of emergency contraception
- Condom provision and advice
- General contraceptive provision and advice
- Repeat pregnancy prevention

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. Twenty four 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 41 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	19
Healthcare settings searches	1219	3
Economic searches	323	0
Citation searches of included papers and systematic reviews	115	2
Reference list of included papers	5	0
Expert liaison	4	0

4. RESULTS OF THE EFFECTIVENESS REVIEW

4.1. Quantity of the evidence available

The searches identified 24 studies which met the inclusion criteria. The papers focused on: new adolescent services (two papers); outreach to existing services (five papers); advanced provision of emergency contraception (four papers); condom provision and advice (five papers); general contraceptive provision and advice (three papers); repeat pregnancy prevention (four papers), plus one additional paper where there was insufficient data to categorise the intervention.

The evidence comes mostly from the USA, which may have implications for its applicability in the UK, as is discussed below. In terms of study design, there were eleven random controlled trials (RCTs) (two of cluster design), two non-random controlled trials, one controlled before and after study (CBA), seven retrospective cohort studies, and three interrupted time series studies (ITS).

4.2 Populations and settings

This review was restricted to interventions conducted in health care settings (although not just those conducted in the NHS). Many authors simply described their setting as a “clinic” (or gave no description at all). Where more description was given, interventions were most often located in family planning clinics (four studies), teenage/youth clinics (two studies). In addition we identified one study conducted in each of the following settings; case

management office, community health clinic, hospital based clinic, GUM clinic, university health centre.

Descriptions of study populations were not always comprehensive, and many did not describe socio-economic status (SES). However, Orr et al. (1996) stated that their population were from SES group four (lower socioeconomic status), and Jemott et al. (2005) stated that their population were from low income families. A further two studies stated that the majority of their population were in receipt of “medi-assist” indicating their low SES (Gold et al. 2004, Stevens-Simon et al. 2001). Several studies were conducted within locations where the majority of adolescents were from a particular population subgroup such as African American (Gold et al. 2004, Chewing et al. 1999, Gillam et al. 2003), Black (Smith et al. 1997, Orr et al. 1996), Hispanic (Belzer et al. 2005, Brindis et al. 2005), or a combination of these (Stevens-Simon et al. 2001, Harper et al. 2005, Omar et al. 2008, Edwards et al. 2008, Jemott et al. 2005); also including Latino. Ethnic groupings (such as African American, Latino) are often used as a proxy for socio-economic status in literature from countries such as the USA.

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. N/A not applicable to study design.

Trial	1	2	3	4	5	6	7	8	9	10	11	12	Quality rating
Adams 1990	**	NA			NA	NA	**	NA		NA	NA	*	-
Baraitser 2002	*	NA			NA	NA	**	NA		NA	NA	NA	-
Belzer 2005	**	**			**	**	**	0		NA	0	*	+

Brindis 2005	**	0		**	**	**	0	**	0	*	+
Chewning 1999	**	0		**	**	**	**	0	0	*	+
Edwards 2008	**	**		**	**	**	**	**	NA	NA	++
Ekstrand 2008	**	**		**	**	**	**	NA	**	*	++
Gilliam 2004	**	0		**	**	**	**	0	0	*	+
Gold 2004	**	**		**	**	**	**	NA	0	*	++
Greene 2006	*	NA		NA	NA	**	NA	**	NA	*	+
Hanna 1993	**	**		**	**	**	**	NA	**	*	++
Harper 2005	**	**		**	**	**	**	**	**	*	++
Hughes 1995	**	NA		**	**	**	**	**	NA	*	+
Jemott 2005	**	**		**	**	**	**	NA	**	*	++
Kissinger 1997	**	NA		NA	NA	**	NA	**	NA	*	-
Omar 2008	**	NA		NA	NA	**	NA	NA	NA	*	-
Orr 1996	**	**		**	**	**	**	**	0	*	++
Pedlow 2004* Abstract only*	**	**		**	**	**	NR	NR	0	*	+
Reed 1999	**	NA		NA	NA	**	NA	NA	NA	*	-
Smith 1997	**	NA		**	**	**	**	**	NA	*	++
Stevens-Simon 2001	**	NA		NA	NA	**	NA	NA	NA	*	-
Thompson 2001	**	NA		NA	NA	**	NA	NA	NA	*	-
Ullman 1996	**	**		**	**	**	**	**	0	*	++
Wilson 1994	**	NA		NA	NA	**	NA	NA	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 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 drop out 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 rates, sexual behaviour, or use of contraceptives, or condoms specifically. 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 (1st Author, date)	No.
Sexual behaviour: (Self reported change in sexual behaviour; Reducing risky sexual behaviour; Rates of sexual activity; Developing abstinence/refusal skills)	Belzer 2005 Gold 2004 Smith 1997 Harper 2005 Orr 1996 Ekstrand 2008 Pedlow 2004 Jemott 2005	8
Pregnancy rates: (Rates of conception under 16; Rates of unintended conception 16-25; Rates of conception 12-18; Rates of conception 13-19; Adolescent birth rate; Adolescent pregnancy rate; Repeat pregnancy)	Stevens-Simon 2001 Chewning 1999 Hughes 1995 Harper 2005 Omar 2008 Reed 1999 Greene 2006 Edwards 2008 Gillam 2004 Wilson 1994 Adams 1990	11
Effective contraception/condom use	Belzer 2005 Brindis 2005 Gold 2004 Harper 2005 Orr 1996 Ekstrand 2008 Ullman 1996 Greene 2006 Edwards 2008 Gillam 2004 Hanna 1993	11
Effective emergency contraception use	Belzer 2005 Gold 2004 Ekstrand 2008	3
Knowledge of contraception methods	Chewning 1999 Orr 1996 Omar 2008 Adams 1990 Hanna 1993	5
Intention to use condoms/contraception	Hughes 1995 Jemott 2005	2
Knowledge of STIs/risk	Baraitser 2002	1
Service provision/access/use	Hughes 1995 Kissinger 1997 Thompson 2001 Reed 1999 Baraitser 2002 Wilson 1993	6
Psychosocial outcomes	Chewning 1999 Orr 1996 Adams 1990	3
Knowledge of conception risk	Orr 1996	1
Socio-demographic	All papers	24
Use/effectiveness of intervention	Brindis 2005 Greene 2006 Wilson 1993 Adams 1990	4

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 (11)	Jemott 2005	Condoms	USA AAmer/Latino	++
	Hanna	Contra	USA White	++
	Belzer 2005	EC	USA 82% Hispanic	+
	Gold 2004	EC	USA 57% AAmerican	++
	Harper 2005	EC	USA Mixed	++
	Orr 1996	Condoms	USA 55% Black	++
	Ekstrand 2008	EC	Sweden 92% Nordic	++
	Pedlow 2004	NS	USA	+
	Ullman 1996	Condoms	Canada	++
	Edwards 2008	Contra	USA	++
	Gillam 2003	Repeat	USA AAmerican	+
Non-RCT (2)	Brindis 2005	Outreach	USA 41% Hispanic	+
	Chewning 1999	Contra	USA 96% AAmerican	+
CBA (1)	Smith 1997	Condoms	USA 73% Black	++
ITS (3)	Baraitser 2002	Outreach	UK	-
	Hughes 1995	New	USA mixed	+
	Stevens-Simon 2001	Repeat	USA Mixed	-
Retro-cohort (7)	Kissinger 1997	Outreach	American	-
	Thompson 2001	Condoms	Scotland	-
	Omar 2008	Repeat	USA Mixed	-
	Reed 1999	Outreach	UK	-
	Greene 2006	Outreach	USA	+
	Wilson 1994	New	UK	-
	Adams 1990	Repeat	USA	-

**Typology: EC: advanced provision of emergency contraception, New: new adolescent clinics, Outreach: outreach to generic services, Condoms: condom provision and advice, Contra: general contraceptive provision and advice, Repeat: repeat pregnancy prevention, NS: insufficient data.

As would be expected, those studies which employed an RCT design scored best over all on the quality rating scale, with eight scoring [++] after making allowances for blinding etc. in some cases (see above). Studies which employed a CBA design and the non-randomised control trials also scored well, with the vast majority of ITS, and retrospective design 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). Those of poorer design often scored better for impact overall, it is therefore important to keep in mind the potential of study design to affect the applicability score (that is; lesser quality designs may present less reliable results). 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, outreach for new clinics was delivered by a clinical outreach worker (Baraitser et al. 2002) and a team of specialist health personnel (Wilson et al. 1994), and for clinic expansion and reorganisation by peer providers (Brindis et al. 2005). Peer providers were aged 15 to 19 and received training and Basic Health Worker certification (three months of instruction in clinical operations, reproductive health, counselling skills and clinic procedures). Other service reorganisation mentioned delivery by African American nursing assistants (Kissinger et al. 1997) and a senior nurse outreach worker (Reed et al. 1999). An intervention to support advanced provision of emergency contraception was delivered by a nurse counsellor (Ullman and Lathrop 1996). Condom and oral contraception provision interventions were delivered by GUM clinic staff (Thompson and Smith 2001), trained facilitators who were community members (Jemott et al. 2005) and a nurse (Hanna 1993). Finally, interventions to prevent repeat pregnancy were delivered by a nurse counsellor (Gilliam et al. 2004) and by a combination of nurses and social workers (Adams et al. 1990).

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.

One study (Pedlow et al. 2004) could not be obtained as a full paper and no details are given in the available summary regarding the content of the

intervention, other than to say the intervention aimed to reduce sexual risk behaviours using a motivational skills development programme. Therefore, the study has not been included in this narrative synthesis but remains in the previous data tables for completion.

4.6.1. Interventions to provide new adolescent services and to encourage access to existing services.

We identified seven papers, (three from the UK and four from the USA) which reported on new adolescent services (two papers); or adolescent focused outreach to generic services (five papers);

Interventions to provide new adolescent clinics

Wilson et al. 1994 (UK) conducted a retrospective cohort study of 1402 adolescent females (age 12 to 19) to assess the impact of a new teenage contraceptive clinic (measured by the local teenage pregnancy rate). A contraceptive and counselling service was developed within a new health centre offering easy access to drop in clinics for teenagers. A team of specialist health professionals were recruited and, anecdotally, the success of the clinic is described by increasing numbers of clients and a need to extend opening times and expand staffing levels to meet demand (no data). However, over the first 3 years of the clinic, no reduction in teenage conception rates was seen. The data were presented in comparison to the local rate for 20 to 44 year olds, whose rate of conception rose by 0.7 per 1000 compared to the teenage pregnancy rate which rose by 1.0 per 1000 ($p < 0.005$), therefore actually increasing by more than the trend would suggest. The authors question the validity of using conception rate to measure sexual health care success for teenagers.

Hughes et al. 1995 (USA) conducted an ITS study of the expansion of teenage directed family planning through the development of twelve teenage family planning RESPECT clinics (Responsible Education on Sexuality and Pregnancy for Every Communities Teens). Their sample consisted of young people aged 14-18 of various ethnicities (Black and White included in the analysis). Young people were interviewed prior to initiation of the service and

again two and a half years later (due to time constraints, only 20% of participants were re-interviewed giving a longitudinal sample of 1181). Nine existing clinics either increased services for teenagers or began serving teenagers, in addition three new clinics offering teenage services opened in previously unserved communities. The clinics had two common goals: to increase the number of teenage clients served and to initiate education outreach programmes. The outreach work mostly focused on sponsoring group education sessions at community institutions for teenagers and their parents, and participation in events such as community health fairs. Several clinics included peer education as a component of their outreach activities. However, no overall improvements were seen in pregnancy rates, knowledge and use of services, or attitudes towards contraception. The authors suggest that community family planning (available to all ages) may not be the most useful strategy for engaging young people in services.

Interventions to encourage generic clinic attendance by adolescent outreach.

Baraitser et al. 2002 (UK) conducted an ITS study of a new mainstream contraceptive clinic (open to all ages) with a proactive and targeted outreach programme for young people. The study population consisted of 2978 under 25 year olds (no other demographic data). The clinic consisted of a mainstream service open to clients of all ages with extended opening hours and no appointments. This was supported by an outreach programme targeting the under 25s which included the development of close links between the clinic and local schools, youth services, social services and the voluntary sector. This was achieved by the employment of a clinical outreach worker (family planning nurse) to conduct outreach sessions. Questionnaires were completed by patients who registered six months before, and 18 months after initiation of the new service. The number of new users of family planning services aged under 26 years increased 12 fold in the first 18 months of the outreach programme (from 280 six months before, to 959; no further data). The authors suggest that outreach to encourage mainstream clinic attendance by young people is an effective alternative to dedicated services for young people.

Brindis et al. 2005 (USA) conducted a non-randomised controlled trial of the effectiveness of a peer provider model to support adolescent access to five community reproductive health service clinics. The study population consisted of 1424 female adolescent aged 15-17 of mixed ethnicity (41% Hispanic) and 166 male adolescents aged 15-17 (37% Hispanic). Four groups were retrospectively assigned from case notes as having received clinic services only; clinic plus outreach; clinic plus phone follow up; or full model (outreach, clinic services and phone follow up). The peer provider model therefore consisted of three key components. The peer providers first met clients for an intake session before they received clinical services, discussing reasons for the visit, what to expect and answer any questions. Every session included discussion about the importance of condom use as well as a condom demonstration. Secondly peer providers made follow up telephone calls to each female client shortly after their visit and then on a quarterly basis to reinforce health education messages, provide lab results, answer questions and arrange follow up appointments as necessary. Male clients were only called with abnormal test results or to follow up specific problems due to limited resources and concerns that male clients may be more resistant to being called at home. Thirdly, a two person team of young adult outreach health educators (one male, one female) provided group outreach to adolescents in mainstream and alternative schools (e.g. home schooled, special educational needs, travelling school) and individual outreach to male adolescents in a variety of community settings to provide information about reproductive anatomy, birth control, condom use and services available at peer provider clinics. Peer providers were aged 15 to 19 and received training and Basic Health Worker certification (three months of instruction in clinical operations, reproductive health, counselling skills and clinic procedures). The results were mixed. For females: compared to clinic only clients, telephone clients were more likely to report consistent birth control use (OR 1.7, 95% CI 1.33-2.08), and importantly, also less likely to report pregnancy (OR 0.2, 0.01-0.66). For males: clinic outreach clients were less likely than clinic only clients to report that they always used birth control or condoms (OR 0.8 $p < 0.01$ for both). No other results were significant. Therefore, the telephone intervention

was shown to be effective to some extent for females, but the school/community outreach for males was not. There are questions over the reliability of these results as only 19% of female and 8% of male clinic clients were recruited after the selection criteria were imposed (never had sex, not experienced clinical appointment).

Greene 2006 (USA) conducted a retrospective-cohort study including 202,289 15 to 19 year olds (no other demographic details given) who received contraceptive methods through the Family PACT (Planning, Access, Care and Treatment) programme. The programme included the normal (all ages) family planning clinic services (no further details given) plus outreach and recruitment programmes to improve access to family planning services for hard to reach populations (adolescents, men, residents of underserved counties). Service provision was also expanded under the programme to meet anticipated demand. No further details on the outreach and recruitment programmes are given. After 5 years of the programme, 52% of women were using condoms compared with 31% at the start of the programme. Almost 6.4 million women months of contraception were provided through Family PACT in 2002. As a result the authors estimated that 205,000 pregnancies leading to 79,000 births (21,400 to adolescents) were averted. The impact of the outreach programme on these figures is not explicit.

Kissinger et al. 1997 (USA) conducted a retrospective cohort study of 737 African American adolescent women (mean age 16, no range given) of an intervention to provide additional support to initiate and continue contact with a family planning service (open to all ages). The intervention consisted of a one hour orientation session and a three months booster visit conducted in adult specific clinics. The control group did not receive the orientation session. Teenagers were allowed to walk into the clinic without an appointment for the orientation session and encouraged to make an appointment for a later date. Topics covered during the session include details of how the clinic works, a description of birth control methods available, proper condom usage, counselling on preventing STIs, how to negotiate sex and condom use, what to expect in a gynaecological examination and basic hygiene information.

Sessions were facilitated by African American nursing assistants with special training in counselling adolescents. Attendance at the orientation session (intervention) was associated with initiation of services (29% versus 9% who did not attend). After adjusting for age and school enrolment, those who attended an orientation session were 14.3 times more likely to initiate services (RR 14.3, 95% CI 5.73-35.82, $p < 0.01$). For those who attended the orientation session, attendance at the three month booster session was associated with higher continued clinic contact at one year (RR 2.4, 95% CI 1.03-5.61, $p < 0.05$).

Reed et al. 1999 (UK) conducted a retrospective cohort study of the reconfiguring of a family planning service (open to all ages) to encourage access by people under 20 years of age (no further population demographics are given). The reconfiguration included retraining multidisciplinary staff and developing outreach activities, along with the development of clinical guidelines and proformas, reducing waste and income generation. The outreach element included a senior nurse who was employed as an outreach worker to develop links with schools, youth and other organisations, social services, women's groups and local committees. This included organising road shows and ensuring leaflets were available in libraries and community centres. During the five years of the intervention, the number of attendees at family planning clinics aged under 20 increased by 71% (from 840 to 1433) and for under 16s by 183% (from 66 to 188). In addition the authors state that the teenage pregnancy rates remained relatively low (no data given).

Summary

Interventions where new clinics aimed at young people have been created as have been shown to be successful in increasing young people's engagement and in terms of increasing attendance rates. However, the two studies identified here also looked at teenage pregnancy rate and found that the new clinics had no effect on the rate. Therefore these clinics, although successful in terms of attendance may not be reaching those young people with the most need (i.e. the ones most likely to become pregnant).

The addition of teenage focused outreach programmes to mainstream services to encourage attendance by young people has been shown to be effective in terms of service initiation and continued attendance but also in terms of pregnancy and contraceptive use (where that was measured). These results question whether bespoke services for young people are the best solution in health care settings, as from these results, encouraging young people to attend whole population services may be more successful in terms of pregnancy related outcomes.

Evidence statement 1: Interventions to provide new adolescent services and to encourage access to existing services.

Evidence statement 1a:

New adolescent clinics

Weak evidence from two studies suggests that new adolescent clinics were not effective in reducing teenage pregnancy rates. In the first study, the local rate of conception rose slightly, compared to the teenage pregnancy rate which rose significantly (Wilson et al. 1994 retrospective cohort [-]). In the second study, no overall improvements were seen in pregnancy rates, knowledge and use of services, or attitudes towards contraception (Hughes et al. 1995 ITS [+]).

Evidence statement 1b.

Outreach to existing mainstream services

Moderate evidence from five studies suggests that outreach programmes to encourage young people to attend mainstream sexual health services may be effective in increasing service use, but the effect on reducing teenage pregnancy rates is unclear. In the nRCT study, compared to control, the outreach group were significantly more likely to report consistent birth control use, and females were also less likely to report pregnancy (Brindis et al. 2005 nRCT [+]). In the first cohort study, condom use increased and pregnancy decreased but the impact of the intervention is unclear due to poor reporting (Greene 2006 retrospective-cohort study [+]). In the second cohort study, during the five years of the intervention, the number of attendees at family planning clinics aged under 20 and under 16 significantly increased. Pregnancy is reported to have “remained low” but no data is given (Reed et al. 1999 retrospective cohort study [-]). In the third cohort study, those who attended an orientation session were significantly more likely to initiate services, and attendance at the three month booster session was associated with significantly higher continued clinic contact at one year (Kissinger et al. 1997 retrospective cohort [-]). In the ITS study, The number of new users of family planning services aged under 26 years increased significantly in the first 18 months of the outreach programme (Baraitser et al. 2002 ITS [-]).

4.6.2. Interventions to provide advanced supply of emergency contraception

We identified four RCT studies (three from the USA and one from Sweden) which reported on clinical interventions to provide advanced supply of emergency contraception.

Gold et al. 2004 (USA) recruited 301 ethnic minority (57% African American) low income women aged 15-20 (mean 17.1, S.D. 1.7) from one hospital based clinic, who were randomly assigned to receive advanced provision of emergency contraception, versus advice only (written and verbal communication). It is not stated who provided the advice. At 6 month follow up there were no significant differences in unprotected sex, hormonal contraception use, or condom use overall. However, the advanced emergency contraception group reported (non-significantly) higher emergency contraception use (8% versus 6%, $p=0.54$) and significantly sooner use (11 hours after sexual intercourse versus 22 hours, $p<0.001$). Therefore the advanced provision group used the emergency contraceptives significantly earlier than the control (thus increasing effectiveness) without affecting other contraceptive use or risky behaviour. However, the authors draw caution to the high attrition rates they experienced in the study (63% of the sample available at 6 month follow up) and the reliance on self reported behaviour measures.

In a similar study Belzer et al. 2005 (USA) conducted an RCT study with 160, majority Hispanic (82%) adolescent mothers aged 13-20 (mean age 17.2). The study was conducted at one urban, non-medical case management office and included 82 intervention and 78 control subjects. The control subjects were significantly more likely to be sexually active at baseline ($p=0.05$) and slightly more likely to be using condoms at baseline ($p=0.035$) (no percentages given). The intervention again consisted of the advanced provision of one course of emergency contraception. Both groups received information and handouts regarding contraceptive use, as well as information on how to use and access emergency contraception (again it is not stated

who provided the information, although the researcher is implied). At 12 month follow up, those in the advanced provision group were more likely than the controls to have used emergency contraception (64% versus 17%, $p < 0.01$) but also more likely to have had unprotected sex in the last 6 months (69% versus 45%, $p = 0.02$). So, in this case although emergency contraception use has again increased, this may be at the expense of more risky sexual behaviour. Again concerns over loss to follow up were expressed (43% attrition at 12 months).

Ekstrand et al. 2008 (Sweden) also looked at advanced provision of emergency contraception. Their population consisted of 420 Nordic (92%) girls aged 15 to 19 years old, who requested emergency contraception at a youth clinic. Both the intervention and control groups received emergency contraception on request. The intervention group also received one extra dose of emergency contraception, condoms, and information leaflets regarding condoms and emergency contraception use. At six month follow up emergency contraception use was higher in the intervention group (31%) than the control (19%) $p = 0.01$, and the mean time to use emergency contraception was shorter in the intervention (15.6 hours) compared to the control (26.4 hours) $p = 0.006$. There were no differences in hormonal contraception or condom use between the groups.

Harper et al. 2005 (USA) looked at advanced provision of emergency contraception, but using different study groups. Their study population, recruited from four clinics, totalled 2117 and included 964 adolescents (90 of which were under 16 year old) who were analysed separately. The under 16 population consisted of 35.6% African Americans and 26.7% Latinos (the over all sample was similar). They were randomly assigned to receive emergency contraception via one of three methods. The pharmacy group received information of how to obtain emergency contraception from a pharmacy without prescription (including directions to local pharmacies). The clinical access group received a card telling them to return to the clinic if they needed emergency contraception. The advanced provision group were provided with three courses of emergency contraception at the clinic. The analysis showed

that the adolescent and under sixteen groups behaved no differently from the general population. In all groups, emergency contraception use at six month follow up was greater in the advanced provision (44%) than the clinical access (29%) group, $p < 0.001$. Pharmacy access did not affect emergency contraception use when compared to clinic access (30% versus 29%) $p = 0.83$. Other behaviours were unchanged by study arm including unprotected sex, condom use and pregnancy. Therefore advanced provision of emergency contraception increased its use, but did not affect routine contraception or increase risky sexual behaviour.

Summary

Advanced provision of emergency contraception to adolescents has been shown to be effective in promoting its use, and speed of use in several adolescent populations (when compared to advice only, or alternative methods of provision). In most cases increased use has not been at the expense of other contraceptive use, nor has it promoted risky sexual behaviour. The exception to this was a study of adolescent mothers, so particular consideration is required with this group. Interestingly the only study to compare pregnancy rates (which looked at advanced provision and other methods of emergency contraception access) did not show a difference in pregnancy rates.

Evidence statement 2:**Advanced supply of emergency hormonal contraception.**

There is strong evidence from four RCT studies to support the advanced provision of emergency hormonal contraception (EHC) to adolescents to increase EHC use. In most cases increased use was not at the expense of other contraceptive use, and did not promote risky sexual behaviour; the exception was one study with adolescent mothers (Belzer et al 2005). In the first study, at six month follow up EHC use was significantly higher in the intervention (advanced provision) group than the control, and the mean time to use EHC was significantly shorter in the intervention compared to the control. There were no differences in hormonal contraception or condom use between the groups (Ekstrand et al. 2008 RCT [++]). In the second study (with random allocation to receive EHC via pharmacy, clinical access or advanced provision) EHC use at six month follow up was significantly greater in the advanced provision than the clinical access group. Pharmacy access did not affect EHC use when compared to clinic access (Harper et al. 2005 RCT [++]). In the third study, the advanced EHC group reported (non-significantly) higher emergency contraception use and significantly sooner use (Gold et al. 2004 RCT [++]). In the fourth study, at 12 month follow up, those in the advanced provision group were significantly more likely than the controls to have used EHC but also more likely to have had unprotected sex in the last 6 months (Belzer et al. 2005 RCT [+]).

4.6.3. Interventions to promote condom provision and advice

We identified five studies (one from the UK and four from the USA/Canada) which aimed to improve adolescent condom use. Studies were included even where the interventions were designed specifically to address STI rates, because of the contraceptive effect of condom use.

Orr et al. 1996 (USA) conducted a cluster RCT of an intervention to increase condom use among “high risk” female adolescents (those deemed likely to engage in risky sexual behaviour). The sample consisted of 295 females age 15 to 19 (mean 17.9, SD 1.7) of various ethnicities (55% Black). The intervention was conducted at one family planning clinic with a second clinic acting as control. At the control clinic patients underwent the usual individual

discussion with the school nurse about STIs and their prevention. The intervention in addition consisted of the research assistant briefly discussing STIs with the young women and demonstrating how to use a condom correctly. This was followed by a brief structured rehearsal scenario which involved a young woman trying to get her partner to use a condom. At six month follow up intervention subjects reported increased condom use by their sexual partner for protection against STIs (OR 2.4, $p=0.02$). Controlling for condom use at enrolment demonstrated that involvement in the intervention (OR 2.8, $p=0.03$), and higher cognitive complexity (a measure of intellect) (OR 4.6, $p=0.02$), independently contributed to increased condom usage at 6 months.

Smith et al. 1997 (USA) conducted a CBA study of an intervention to motivate condom use which was conducted at two sites of a hospital teenage health clinic. The intervention group contained 205 female adolescents aged 13 to 20 (mean 17.3, SD 1.55) of varying ethnicity (73% Black, 9.7% White, 17.6% Hispanic) with a current STI diagnosis. The control group consisted of 119 female adolescents with comparable age and ethnicity, also with a current STI diagnosis. Both groups received STI treatment; in addition the intervention consisted of a condom motivation class given by a clinic STI educator in small groups of four or more adolescents. The 45 minute class consisted of a video tape (15 minutes) which addressed aspects of STI prevention and condom use. A condom demonstration followed the video and the session was completed with a set of question and answer games to reinforce STI knowledge. There were no significant differences in return rates, new and re-infection STI rates. However, 73% of the intervention group compared to 67% of comparators returned for their scheduled clinic revisits (no further statistics given). In this way the intervention was successful in slightly improving young people's continued engagement with the service. It is important to note that members of this population were diagnosed with an STI at the onset of the study, therefore their motivation to engage with services (and therefore to keep their scheduled clinic visits) may be expected to be greater when compared to the general population.

Ullman and Lathrop 1996 (Canada) conducted an RCT looking at the promotion of dual methods of contraception to young people. They included 100 repeat clients of a family planning clinic as their participants, along with an age matched comparator sample (85% under 24 years old) but gave no further demographic details. The intervention consisted of the usual advice and teaching, and in addition nurse counsellors were asked to offer all clients at their first visit a pack containing information about dual contraception methods. Each client also received additional condoms at each subsequent birth control visit. At one year, clients were twice as likely to report having received condoms from the clinic (89% versus 45% of the control), and at last intercourse 39% of intervention clients (compared to 29% of control clients) had used dual contraception. This study has a major confounder as nearly half the controls had received free condoms from the clinic. However, the promotion of dual method contraception does not appear to deter young people from repeat clinic use, and the authors claim that larger and more rigorously controlled free condom distribution programmes for adolescents are warranted. The data analysis in this paper is poor with only percentage values being given.

Thompson and Smith 2001 (UK) conducted a retrospective cohort study (from clinical case notes) of 286 male and 327 female clients (mostly aged 16 or under (no further demographic details given)) at a “condom club” situated in a Scottish GUM clinic. Over the intervention period, each person attending for condoms was seen individually by a trained member of staff who discussed issues related to sexual activity (STIs/HIV, access for emergency contraception, underage sex). The correct use of condoms was also demonstrated and condoms provided to the client. Data in this paper are poorly presented, but it is suggested that, compared to the rest of the country, attendance at the GUM clinic by young people is much higher, particularly at sites offering daily access and located geographically close to a school (no specific data are given to validate this).

Jemott et al. 2005 (USA) conducted an RCT of cognitive behavioural therapy (CBT) to promote condom use. A total of 682 adolescent, low income girls

aged 12 to 19 (mean 15.3) including 463 African Americans and 210 Latinos attending an adolescent medicine clinic (situated in a children's hospital) were randomly assigned to receive one of two CBT course (skills or information based) or the clinic's normal health promotion (control). The CBT interventions consisted of one 250 minute session of group discussion, videotapes, games and exercises in groups of two to ten participants. The groups were facilitated by 14 African American women (mean age 38) who undertook 8 hours of CBT training. The information based CBT HIV/STI risk reduction intervention addressed the elevated risk among inner city African American and Latino young women, diverse messages about sex, responsibility for sexual risk reduction, the importance of using condoms and the belief that condoms interfere with sexual enjoyment. Videotapes demonstrated correct condom use and depicted effective negotiation strategies. Participants were not given the opportunity to practice skills relating to negotiating condom use or using condoms correctly. The skills based CBT HIV/STI risk reduction intervention differed from the information intervention in that participants practiced the skills needed to use condoms. Participants handled condoms, practiced correct use with anatomical models, and engaged in role play to increase skill in negotiating condom use.

There were no differences in outcomes between the information based CBT and the normal health promotion control. However, those in the skills based CBT group were less likely to have unprotected sex at 12 months than the information based CBT group ($p=0.03$) or control ($p=0.002$) (percentages not given).

Summary

All these five studies with primary aims of increasing condom use delivered interventions which combined discussion and demonstration of condom use; three studies also provided clients with free condoms. Their outcome measures demonstrated increased condom usage but also high levels of continued engagement with the clinics. However, the data were not always well analysed and reported which may have issues for result reliability.

Evidence statement 3:**Interventions to promote adolescent condom use**

There is strong evidence from five studies to support interventions which combine discussion and demonstration of condom use to increase adolescent condom use and engagement with clinical services. In the first study, at six month follow up intervention subjects reported significant increased condom use by their sexual partner for protection against STIs (Orr et al. 1996 cluster RCT [++]). In the second study, at one year, clients were twice as likely to report having received condoms from the clinic (Ullman and Lathrop 1996 RCT [++]). In the third study, of two methods of CBT to reduce unprotected sex, those in the skills based CBT group were significantly less likely to have unprotected sex at 12 months than the information based CBT group, or control (Jemott et al. 2005 RCT [++]). In the fourth study, more of the intervention group than the comparators returned for their scheduled clinic revisits (significance not clear) (Smith et al. 1997 CBA [++]). In the fifth study, it is suggested that, compared to the rest of the country, attendance at the GUM clinic by young people is much higher, particularly at sites offering daily access and located geographically close to a school (no statistical data are given to validate this) (Thompson and Smith 2001 retrospective cohort [-]).

Although the studies were mostly well designed, the data were not always well analysed and reported which may have issues for reliability. Applicability in the UK may also be limited as most of the studies were conducted in the USA/Canada (two in populations which were majority Black American (Orr et al. 1996, Smith et al. 1997), and one population who were African American/Latino (Jemott et al. 2005).

4.6.4. Interventions to promote hormonal contraceptive service use and advice

We identified three studies (all conducted in the USA) which aimed to improve adolescent hormonal contraceptive use.

Chewning et al. 1999 (USA) conducted a non-randomised controlled trial with two ethnically separate samples aged 20 years or less (no further details). The first sample, based in Chicago was 96% African American and the second sample, from Madison was 94% white, representing the differing ethnic composition of the local populations. In total 493 control and 456 experimental patients were recruited from family planning clinics and underwent either the standard patient education package (control) or the computer based contraception decision aid (CDA) intervention. As a method of pseudo randomisation alternate patients were assigned to intervention and control. The CDA which aimed to reduce pregnancies and improve short term knowledge of oral contraception, included demonstrations of how contraceptives are used, graphs of their effectiveness, a discussion of personal suitability, costs and benefits, feedback and advice. A print out of this information was provided to the patient. At one year follow up, the intervention grouping the Madison sample had higher contraception knowledge $p=0.03$ (no percentages given) and (non-significantly) fewer pregnancies (8.6% control versus 3.6% intervention) $p=0.07$. The differences were not repeated in the Chicago sample only. Therefore although the intervention had some success in the Madison (White) sample this was not replicated in the Chicago population (Black).

Hanna 1993 (USA) conducted an RCT study with 51 adolescent females (50 Caucasian, one Black) aged 16 to 18 (mean 17) years old attending one clinic. Patients were randomly assigned to receive either the clinic's normal contraceptive teaching (control) which included written information and a video provided at the initial clinic visit, or normal teaching plus a "transactional intervention". The intervention consisted of a nurse led session (one to one) to facilitate the adolescents' consideration of perceived oral contraception benefits and barriers and means for reducing the barriers, confirming the goal

of avoiding pregnancy, and developing an adherence regimen to manage perceived oral contraception barriers. At three months the effect of the intervention was measured using a contraceptive health belief scale (Eisen et al. 1985). The intervention group reported greater oral contraception adherence than the controls ($F=4.15$, $p<0.05$) suggesting the intervention is effective in increasing continuation of use. However, the authors also draw attention to doubts over the reliability of the contraceptive health belief subscales which questions the reliability of the result.

Edwards et al. 2008 (USA) conducted a study of adolescents presenting to two urban clinics requesting oral contraception. The study included 539 predominantly African American (58%) and Latino (34%) adolescent women aged 12 to 19 (mean age 17, SD 1.0) who were randomly assigned to conventional initiation of the oral contraceptive pill (conventional start) versus immediate, directly observed contraceptive injection in the clinic (quick start). At both three and six month follow up, there were no differences in continuation rates (OR 1.0, 95% CI 0.7-1.1 at three months, and OR 1.1, 95% CI 0.7-1.8 at six months). Only 26% of adolescents overall continued contraception at 6 months. During follow up there were 17 pregnancies in the quick start group and 28 in the conventional start group (6.5% versus 10.5%, $p=0.08$). Overall, continuation rates and pregnancy rates were unaffected by the quick start initiative. The lack of continuation in either group is highlighted by the authors as demonstrating the need to seek further novel ways to engage adolescents more successfully with services in order to improve continuation rates.

Summary

These three studies employed very different interventions to attempt to improve adolescent use of hormonal contraception. It is possible that a computer based contraception decision aid or a nurse led “transactional” intervention can have positive effects on engaging young people in services and improving contraceptive adherence in specific populations.

Evidence statement 4:

Adolescent contraceptive use

Strong evidence from two RCT and one nRCT studies suggests that interventions aimed to improve adolescent contraceptive use by additional service provision can be effective, but this depends upon the intervention. In the first study, a nurse led “transactional” intervention improved the intervention group reported significantly greater oral contraception adherence than the controls (Hanna 1993 RCT [++]). In the second study, a computer based contraception decision aid intervention, at one year follow up, the first intervention sample had significantly higher contraception knowledge and (non-significantly) fewer pregnancies. This finding was not replicated in a second study population (Chewning et al. 1999 nRCT [+]). In the third study, of an intervention to administer “quick start” of contraception (immediately administered contraceptive injection), at six month follow up, there were no differences in continuation rates and no difference in pregnancy rate between the groups (Edwards et al. 2008 RCT [++]).

4.6.5. Interventions to prevent repeat adolescent pregnancy

This section deals intentionally with a specific population subgroup, rather than a method or change in service provision.

We identified four studies (from the USA) which looked at interventions to prevent repeat adolescent pregnancy by increasing service access/provision. A fifth study looking at advanced provision of emergency contraception (discussed in section 4.6.2) was also conducted in a population of young mothers.

Gilliam et al. 2004 (USA) conducted a RCT of a postpartum education intervention aimed at increasing compliance with oral contraception and decreasing repeat pregnancy in African American adolescent women (n=43, aged 15 to 25, mean age 19). The multi component intervention consisted of one to one nurse counselling (focusing on self efficacy), videotape (of on camera interviews with African American women describing their experiences with oral contraceptive use), and written material (six information sheets on: how to take oral contraceptives, what to do if a pill is missed, how

contraceptives work, risks, benefits, and myths. All participants (intervention and control) received the clinic's normal resident physician counselling, as well as three packets of oral contraceptive pills with pill taking instructions taped to the side. No decrease in repeat pregnancy was seen at 12 months (intervention versus control) although increased knowledge of oral contraceptives was demonstrated in the intervention group (the data are presented in a separate paper on contraceptive knowledge and beliefs).

Stevens-Simon et al. 2001 (USA) conducted an ITS study of a comprehensive, multidisciplinary adolescent orientated maternity programme at one clinic (in a large, urban teaching hospital) with 373 young women (93% low income; eligible for medic-aid) age 13 to 19 (mean 17.4, SD 1.4) of mixed ethnicities (41% White, 33% Black, 24% Hispanic, 2% other). The intervention aimed to promote pregnancy prevention by simplifying access to contraception, discouraging school drop out, and promoting career development. Professional services were integrated together and a positive emphasis was placed on healthy habits, school, and future orientated career planning. Three weekly clinic visits were conducted in pregnancy, with a further nine visits in the first year after birth and four visits in the second year. The strongest predictor of repeat pregnancy in the first two years was failure to use Norplant (LARC) (RR 8.89, 95% CI 2.8-28.5). Exhibiting nine or more risk characteristics (such as: poverty, social deviant behaviour, large family, no future plans, new boyfriend, non teen boyfriend) (RR 2.37, 95% CI 1.38-4.06), and not using Depo-Provera (RR 2.30, 95% CI 1.60-3.29) were also associated with repeat pregnancy. The number of visits to the clinic (that is, compliance with the intervention) was not associated with pregnancy prevention (nor was total contact with health care providers or return to school). These results therefore suggest that use of LARC, particularly in those demonstrating a large number of risk behaviours may be an effective way to prevent repeat adolescent pregnancy.

Omar et al. 2008 (USA) conducted a retrospective cohort study of a repeat pregnancy prevention programme at a University Health Centre young parent programme. The study population (which was compared with local state data) consisted of 1386 teen mothers aged 11 to 19, (the stated ethnic mix is 50.4%

Black, 48.9% White, 6% Hispanic, which must contain inaccuracies). The programme provided comprehensive, pre and post natal care for mother and baby. This included preventative care, reproductive services, mental health services, and acute care. Family counselling was also provided to the teen mothers' siblings. At three year follow up the repeat pregnancy rate for those completing the programme was 11.9, compared to a state rate of 18.7 per thousand. The pregnancy rate was also related to contraceptive choice, with seven pregnancies occurring in programme participants who used condoms, and two who used contraceptive pills. There were no repeat pregnancies in those using LARC. The authors conclude that a comprehensive programme for teen mothers can be very successful in preventing repeat pregnancy. However, as in the previous paper, the choice of LARC may be as important as the programme itself.

Adams et al. 1990 (USA) also conducted a retrospective cohort study of adolescent mothers. Forty three adolescent mothers attending the "Rochester adolescent maternity project" (aged 12 to 19, no other demographic details given) undertook a specialised programme of prenatal care including attendance at prenatal groups and nurse/social worker appointments. The support of nurse midwives and obstetrician-gynaecologists was also provided. The focus was on preparing for labour, delivery and parenthood as well as enhancing communication skills and problem solving. Nearly half (47%) did not repeat unwanted pregnancy within two years of completing the programme, but no significant association could be found with attendance at the programme and repeat unwanted pregnancy.

Summary

We identified four studies with the primary aim of preventing (unwanted) repeat adolescent pregnancy. All four were comprehensive, multi-component programmes but most struggled to have any effect on repeat pregnancy rates. Data from two studies suggests that choosing LARC after adolescent pregnancy may be more effective than any of the programmes in preventing repeat pregnancy.

Evidence statement 5:**Multi-component programmes**

Inconsistent evidence from four studies is unclear on the use of comprehensive, multi-component programmes to prevent repeat pregnancy in adolescents. Weak evidence from two studies may support the use of comprehensive, multi-component programmes to prevent repeat pregnancy in adolescents. In the first study, at three year follow up the repeat pregnancy rate for those completing the programme was lower than the state rate (intervention effect not clear). (Omar et al. 2008 (USA) retrospective cohort [-]). In the second study, the strongest predictor of repeat pregnancy in the first two years was failure to use Norplant (LARC) (Stevens-Simon et al. 2001 ITS [-]). These studies suggest that the use of LARC to prevent adolescent repeat pregnancy is most important for this positive outcome, rather than any aspects of the multi-component programme itself. A further two studies did not support the use of comprehensive, multi-component programmes to prevent repeat pregnancy in adolescents. In the first study no decrease in repeat pregnancy was seen at 12 months (Gilliam et al. 2004 RCT [+]). In the second study, no significant association could be found with attendance at the programme and repeat unwanted pregnancy (Adams et al. 1990 retrospective cohort [-]).

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 (18 of 24) reported on studies conducted in the USA, frequently in populations with a high proportion of ethnicities not well represented in the UK population. Only four UK studies were identified. We categorised the papers as those which focused on new adolescent services (two papers), outreach to existing services (five papers), advanced provision of emergency contraception (four papers), condom provision and advice (five papers), general contraceptive provision and advice

(three papers), repeat pregnancy prevention (four papers), plus one additional paper where there was insufficient data to categorise the intervention. We identified no studies assessing the cost effectiveness of interventions to encourage young people to use contraceptive services. There were limitations throughout the papers in terms of study quality (especially sample size) and poor reporting of results. Despite these limitations several evidence statements are presented here.

6.2 Research questions for which no evidence was identified

The main issues regarding addressing the subsidiary research questions were that many 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. The exception to this is one study (Chewning et al. 1999) who conducted their contraceptive provision intervention in two populations (one majority White and affluent, one majority Black and deprived) and reported positive results for the White population only.

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. 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

None of the papers included in this review reported adverse outcomes for the intervention groups in their study.

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 well developed, especially in terms of good quality effectiveness and cost effectiveness studies (and the limited number of studies of effectiveness or 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 (and other ethnic groups not frequently represented in the UK) 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	Location (country)	Population (sex, age, ethnicity, SES)	Comparator	Sample size	Type of intervention	Objectives / Outcome measures	Intervention details	Duration and length of FU	Methods and analysis	Main findings	Recommendations/ Limitations	Grade
Adams 1990	Retrospective cohort	USA	43 adolescent mothers Age 12-19	None	Rochester Adolescent Maternity project	Repeat teenage pregnancy	Repeat pregnancy Programme adherence Knowledge of contraception Locus of control	Specialised programme of prenatal care, including attendance at prenatal groups and nurse / social worker visits.	2 years	Questionnaires	20 (47%) were none repeaters, including 16 with no subsequent pregnancy, 3 with planned pregnancy and 1 IUD device failure which resulted in pregnancy. No relationship found between locus of control score and unplanned repeat pregnancy. No relationship found between attendance at the RAMP programme and repeat unplanned pregnancy.	Programme attendance did not improve repeat unplanned pregnancy rates	-
Baraitser 2002	ITS	UK	Under 25s. N=2978	None	One clinic	Outreach programme	Number of new users Number of young people citing clinic as their source of information.	Mainstream service (open to clients of all ages) with extended hours and no appointments. Plus outreach programme for under 25s. Includes development of close links between clinic and local schools, youth services, social services and voluntary sector.	6 months before and 18 months after new service.	Questionnaire	The number of new users aged under 16 years increased by 12 fold in the first 18 months (from 280 six months before, to 959 eighteen months after implementation). The number of young people citing a school sex education class as their source of information about the clinic increased more than five fold.	An effective alternative to dedicated services for young people.	-
Belzer 2005	RCT	USA	160 adolescent mothers, age 13-20 (mean 17.2)	N=78 control Controls more	One case management office	Advanced supply of EC (AEC)	EC use Sexual activity Unprotected intercourse Contraception	Emergency contraception (one course) provided to intervention group. Information and	Baseline plus 6 and 12 months follow up	Baseline interview and telephone follow up	At 12 month follow up: AEC group more likely than controls to: have unprotected sex in last 6 months (p=0.02)	AEC increases use, may lead to more unprotected sex.	+

			82% Hispanic N=82 intervention (AEC)	sexually active at baseline (p=0.05), more likely to use condoms (p=0.035)			use	handouts on contraception provided to all, as well as info on how to use and access EC.	N=77 at 12 months		use EC (p<0.01) No differences in sexual activity levels, type of contraceptive used, pregnancy rate	Latino - generalisable? Loss to FU 43% at 12 months	
Brindis 2005	Non-random CT	USA	Adolescents 1424 F 41% Hispanic 53% age 15-17 45% age 18-20 166 M 37% Hispanic 50% age 15-17 47% age 18-20	One group, clinic services only	5 community health clinics	Peer providers (supporting clinic services)	Effectiveness of peer provider model Frequency of condom use, use at last intercourse	4 groups, retrospectively assigned from case notes: 1. Clinic services only 2. Clinic plus outreach 3. Clinic plus phone FU 4. Clinic plus outreach and phone FU (full model) 3. and 4. female only	3 years (quarterly follow ups)	Multivariate analysis	Females Clients exposed to multiple components were no more likely than clinic only clients to always use birth control, have used an effective method at last intercourse, always use condoms, or have tested positive for an STI. But compared to clinic only, clinic-telephone clients were more likely to report consistent birth control (OR 1.7 (95% CI 1.33-2.08) and less likely to report pregnancy (0.2, 0.01-0.66) Males Clinic-outreach less likely than clinic only to report that they always used birth control or condoms (OR 0.8 p<0.01 for both)	Promising addition to services. Adolescent recall Sample size only 19%F and 8%M client population.	+
Chewning 1999	Non-random CT	USA	N=949 Chicago sample 96% A American Madison sample 94% white	N= 493 controls (456 experimental) Control = standard patient education package	Family planning clinics in Chicago and Madison USA	Computer based contraception decision aid (ADC)	Reduced pregnancies Improved short term knowledge of oral contraceptive and confidence.	Demonstrations of how contraceptives used, graphs of effectiveness, personal suitability discussed, benefits and costs discussed, feedback and advice given, print out generated	1 year		After 1 year Intervention group had higher OC knowledge and trend for fewer pregnancies (8.6% vs. 3.6% p<0.074) in the Madison sample only	Useful addition to services. Less effective for different ethnicity sample	+

Edwards 2008	RCT	USA	539 adolescents age 12 to 17 (15.9 +1) A American 58%, Latina 34% Other 8%	Normal provision	Urban clinics	Early start of HC	Continuation rates Pregnancies	Randomised to conventional initiation of the OC pill (conventional start CS) verse immediate, directly observed OC injection in the clinic (quick start, QS).	3 and 6 months Interviews (telephone) 86% and 77% at 2 follow ups.		No difference in OC continuation rates at 3 or 6 months (OR 1.0 95% CI 0.7-1.1 and 1.1 95% CI 0.7-1.8). Only 26% of adolescents continued OC at 6 months 45 pregnancies occurred during FU (8.3%), all among subjects who discontinued OC for at least 7 days. 17 pregnancies were in the QS group and 28 in the CS group (6.5% vs. 10.5% p=0.08).	Overall continuation rates unaffected	++
Ekstrand 2008	RCT	Sweden	N=420 girls age 15-19 Mean age 17 (1..3) 92% Nordic Intervention n=214	N=206	Requesting EC at a youth clinic.	Randomly assigned to intervention/control	EC use, time span between unprotected sex and EC, EC intake, contraceptive use, sexual risk taking	Both groups received EC on request, intervention group received one extra dose of EC, condoms and an info leaflet regarding EC and condom use.	Baseline questionnaire. FU 3-6 months (telephone)	Questionnaire. T test, Chi squared.	At 6 months ECP use higher intervention (31%) than control (19%) p=0.01 Mean time to use EG, 15.59 intervention vs. 26.38 control p=0.006 No differences in use of contraception or condoms.	Shortened time to EC use without affecting contraceptive use.	++
Gilliam 2004	RCT	USA	43 young pregnant African American Women. Aged 15-25 (mean 19)	Resident physician counselling (normal) plus three pill packs.	Hospital clinic	Repeat pregnancy	Repeat pregnancy Knowledge of OC	Antipartum, multicomponent intervention consisting of counselling, videotape, about OC, written material.	6 weeks, 6 and 12 months (n=25 intervention at 12 months). Only 6 control and 8 intervention with data at all time points.	2 tail t-test	No decrease in repeat pregnancies (intervention vs. control) at 12 months. Increased knowledge in OCs throughout the study period. Poor data.	Problems with FU	+
Gold 2004	RCT	USA	301 minority, low income women	Advice only	1 hospital based clinic	Advanced provision of EC - 1	Self reported Unprotected sex Use of EC, HC, condoms	AEC provided vs. advice only (written and verbal communication)	6 months post enrolment	10 min telephone interviews	At 6 months AEC group reported: More condom use (72 vs. 62% p=0.02) but not signif at last	Began EC sooner, more effective	++

			Age 15-20 (mean 17.1 +1.7) 57% African American, 305 Caucasian, 13% other 46% Medi-assist			course (versus instruction and advice on how to get it)	Time of EC after unprotected sex	Stratified as early (15-16), mid (17-18) and late (19-20) age groups	63% at 6 month FU	Multiple logistic regression	intercourse (83 vs. 78% p=0.19) More EC use n/s (8 vs. 6% p=0.54) but also used sooner (11 vs. 22 hours p=0.0005) No effect on unprotected sex, hormonal contraception use or condom use over all.	Self reported Quite high attrition rate.	
Greene 2006	Retrospective	USA	N=202,289	Before outreach	Clinics throughout California	Outreach programme	Claims data on contraceptives dispensed were used to estimate the number of pregnancies experienced by women in the programme in 2002, thus the number of pregnancies averted through family PACT.	Normal service plus outreach and recruitment programmes to improve access to family planning services for hard to reach populations (e.g. adolescents, men and residents of underserved counties).	About 5 years - unclear.	Medical records data.	52% of women entering the programme were using condoms in 2000 compared with 31% at the earlier evaluation. Almost 6.4 million woman months of contraception were provided through family PACT in 2002, as a result an estimated 205,000 pregnancies, leading to 79,000 abortions, and 94,000 births (including 21,400 births to adolescents) were averted.	Family PACT's impact is primarily in preventing pregnancy in women who would otherwise not use contraception.	+
Hanna 1993	RCT	USA	51 adolescent females Age 16-18 (mean 17) 50 Caucasian 1 Black Control = 25 Intervention = 26	Clinic's contraceptive teaching	Clinic	Oral contraception adherence	Oral contraceptive adherence (self reported). Contraceptive perceptions	Transactional intervention: facilitate the adolescents consideration of perceived oral contraceptive benefits and barriers and means for reducing barriers. Confirming goal of avoiding pregnancy and developing an adherence regimen to manage perceived oral contraception barriers.	3 months	Contraceptive health belief scale Sample size calc given.	Those who experienced the transactional intervention had greater levels of oral contraceptive adherence than those who had not F=4.15, p<0.05	Low reliability of the contraceptive health belief subscales.	++

Harper 2005	RCT	USA	N=2117 (964 adolescents , 90 under 16s), African American 35.6%, Latina 26.7% of under 16, other groups similar).	3 groups - differing access.	4 clinics	Randomly assigned to receive non prescription pharmacy access, advanced provision of 3 packs or clinic access (controlled) to EC	Contraceptive and sexual risk behaviours Pregnancy and STI rates	Pharmacy group - given details of how to obtain EC from pharmacy with prescription (including pharmacy addresses) Advanced provision group - 3 course of EC Clinic access group _ card telling them to return to the clinic if they needed EC	Baseline and 6 months visits.	Logistic regression Young (<16) middle (16-17) and older (18-19) adolescents and adults (20-24)	Adolescents under 16 behaved no differently. In all groups EC use was greater in advanced provision than in clinic access (44% vs. 29% p<0.001) and other behaviours were unchanged by study arm. Additionally, improved access to EC did not become vulnerable to unwanted sexual activity.	Improved access resulted in more EC use but did not compromise use of routine contraception or sexual risk behaviour.	++
Hughes 1995	ITS	USA	N=1961 in analysis (2 waves) Black/White only in analysis Age 14-18	Rest of city	12 REPSECT clinics	Responsible Education on Sexuality and Pregnancy for Every Community's Teens	Pregnancy Knowledge and use of services Attitudes towards contraception	Increased family planning budget compared to areas without RESPECT clinics . (9 clinics increased or began services for teenagers, 3 new clinics in communities with no previous service)s.	30 months	Interviews (Wave 1 baseline, Wave 2 @ 30 months)	No improvements	Community family planning may not be most useful strategy for YP 20% at Wave 1 re-interviewed at Wave 2 FU	+
Jemott 2005	RCT	USA	682 adolescent girls 463 African American 210 Latino Age 12-19 (mean 15.3) Low income	Normal health promotion	Adolescent medicine clinic (children's hospital)	Oral contraception provision / use	Frequency of unplanned sex in last 3 months. Sexual intercourse while intoxicated, number of sexual partners, STDs, theoretical mediators including intention to use	CBT Skills based Information based 250 minutes group discussion, videotapes, games and exercises. 1 session with 2 to 10 participants. Health promotion control	12 months (3, 6 and 12 months)	Questionnaires Poisson regression Facilitators = 14 African American women, mean 38.2 years old. 8 hour training.	No difference between information based CBT and health promotion control. Skills based CBT, less likely to have unprotected sex at 12 months than information based CBT mean (SE) 4.04 (0.8) p=0.03 or control 5.05 (0.8) p=0.002	Skills based CBT reduced unprotected sex at 12 months.	++

							condoms and condom use knowledge.						
Kissinger 1997	Retrospective cohort	USA	American adolescent women N=737 Mean age 16 23% attended orientation session	Did not attend orientation session.	Two initiatives	Additional support to initiate/continue contact with family planning service	Initiation of family planning services Continuation of service (attendance at annual visit)	Two initiatives: 1 hour orientation session and 3 month booster visits conducted in adult specific clinics for improving initiation and continuation of family planning services	1 year	Multiple logistic regression	Attendance at the orientation session (intervention) was associated with initiation of services (29% vs. 9% noninitiated), after adjusting (age, school enrolment) those attending the orientation session were 14.3 times more likely to initiate services (RR 14.3, 5.73-35.82) Attendance at 3 month booster visit and choosing a contraceptive require medical follow up were associated with attendance at annual visit (3.4 [2.1-5.52 p<0.01] and 4.3 [2.22-8.18 p<0.01] times as likely as those who did not to attend annual FU). For those who attended orientation, attendance at booster session was associated with return for 1 yr FU RR 2.4 (95% CI 1.03-5.61 p<0.05).	Simple techniques such as orientation and follow up visits can improve initiation of and compliance with family planning.	-
Omar 2008	Retrospective cohort	USA	1386 teen mothers age 11-19 50.4% black, 48.9% white, 6% Hispanic	None – state data used as comparator	University health centre Young parent programme	Preventing repeat TP	Repeat teenage pregnancy Contraceptive choice	Comprehensive care for mother and baby pre/post natal. Preventative care, reproductive services, mental health, acute care. Family counselling also provided to siblings	3 years	Descriptive statistics	11.87% repeat pregnancy compared to state rate of 18.7% Pregnancy rate related to contraceptive choice. Pregnancies occurred with condoms (7) HC (2) no contraception (2) but not with DMPA.	Comprehensive intervention for teen mothers can be very successful in preventing repeat pregnancy.	-
Orr 1996	RCT (cluster)	USA	295 female adolescents age 15-19 (17.9 SD 1.7) (112 at FU)	One clinic served as the control site	Two family planning clinics	Randomly assigned to intervention and	Sexual behaviour, condom practices, attitudes and beliefs,	Control consisted of individual discussion with the clinic nurse about STDs.	6 months (5-7 months)	Multi instrument questionnaire Examination.	Intervention subjects reported increased use of condoms by their sexual partners for protection against STDs (OR 2.4 p=0.02) and for vaginal intercourse (OR 3.1 p=0.005) at	Condom use increased but remained inconsistent.	++

			55% Black Median SES group 4 (lower class)			control (standard education)	cognitive complexity and motivation. C. trachiomatis infection Aimed to increase adolescent perception of vulnerability to and seriousness of STDs and to decrease barriers to condom use.	Intervention: Research assistant briefly discussed C trachiomatis infection with young woman, then shown how to use condom correctly. Finally participated in brief, structured rehearsal scenario (young woman trying to get her partner to use a condom).			6 month FU. Controlling for condom use at enrolment demonstrated that the experimental intervention (OR 2.8, p=0.03) and higher cognitive complexity (OR 4.6 p=0.02) independently contributed to increased condom use at FU		
Pedlow 2004 * Abstract only*	RCT	USA	Age 18-24, college students, at risk from HIV/STIs	Information only	Motivational skills development	Randomly assigned	Sexual risk behaviour including biological outcomes (STD diagnosis)	No details.	2 months	No data	Women who received the intervention had improved HIV/STI knowledge and greater self efficacy for safer sex at follow ups. No difference in condom attitudes, decisional balance, behavioural intentions.	Promising intervention	+
Reed 1999	Retrospective cohort	UK	Young people under the age of 20	Rest of area	Family planning clinic	Preventing TP	Use of family planning services Teenage pregnancy rates	Reconfiguration of services, retraining multidisciplinary staff, development of clinic guidelines and proformas, outreach activities, reducing wastage, income generation	5 years	Routine data	Number of attendees at family planning clinics (young people under 20) increased by 71% (from 840 to 1433), those under 16 increased by 183% (from 66 to 188). Teenage pregnancy rates continued to be low.	Effective increase in service access.	-
Smith 1997	CBA	USA	205 female adolescents age 13-20	N=119 Comparable age	Two sites of a	Effectiveness of small	New and reinfection rates of STDs	Condom motivation class given by a clinic STD educator	6 months	Specimen analysis, clinic attendance	No significant differences on return rates, new and reinfection rates or any	Adolescent clinics which combine family	++

			(mean 17.3 +1.55) with a current STD. 72.7% Black, 9.7% white, 17.6% Hispanic (86 intervention group)	and ethnicity, received STD treatment but not motivation classes	teenage health clinic	group condom motivation education		in small groups of four or more adolescents.			sociodemographic variables But 70% overall (73% of study group and 67% of comparators returned for their scheduled clinic re-visit	planning and STD treatment maintain high client enrolment.	
Stevens-Simon 2001	ITS	USA	N=373 41% white, 33% black, 24% Hispanic, 2% other 93% medic-aid Age 13-19 (17.4+1.4)	None	Maternity programme - 1 clinic Recruited at delivery	Comprehensive, multidisciplinary, adolescent orientated maternity programme	Repeat adolescent pregnancy	Pregnancy prevention by simplifying access to contraception, discouraging school drop out, encouraging career dev. Professional services integrated together, emphasis on healthy habits, school, future oriented career planning. 3 weekly visits in pregnancy, 9 visits in 1 st year after, 4 visits in 2 nd year.	2 years	Questionnaires Logistic regression	Strongest predictor of repeat pregnancy during first two years was failure to use Norplant (RR 8.89 95% CI 2.8-28.5) Also, exhibiting more than 9 pregnancy related factors (2.37 1.38-4.06) and not using Depo-Provera post pregnancy (2.3 1.6-3.3) Not significant: frequency of clinic visits, contact with health care, return to school.	Norplant for preventing repeat pregnancy.	-
Thompson 2001	Retrospective cohort	Scotland	286 males, 327 females	Normal GUM clinic services	1 Nurse lead condom club at GUM clinic	Nurse lead condom club Retrospective	Number of visits Services accessed Age	Each person attending for condoms is seen individually by a trained member of staff who discusses issues related to sexual activity (STI/HIV access for EC, under age sex). Condom	N/a	N/s	Proportion of new patients attending GUM clinic much higher than in the rest of the country. Mostly at site offering daily access and geographically close to school ~(poor data)	Young teenagers will access a nurse lead service.	-

								demonstration. Condoms given out.					
Ullman 1996	Cluster RCT	Canada	N=100 85% age 24 or under.	Age matched contracep tive pill using sample from 2 nd clinic	Family planning clinics	Usual of dual protectio n	Use of dual methods of contraception	In addition to usual advice/teaching, nurse counsellors were asked to offer all clients at their first visit, a pack containing six condoms and an info card about dual contraception methods. Each client received additional condoms at each birth control supply visit.	1 yr	Brief anonymous self administered questionnaire	Intervention clients were twice as likely to report having received condoms from the clinic (89 vs. 45%) and a high percentage ~72% had used them or given them to some one else. At last intercourse 39% of intervention clients used dual protection compared to 29% of control clients 15% believed the programme helped them to initiate condom use, 51% believed they were helped to continue use. But differences in condom use not significant (data not presented).	Confounder: 41% of controls had received free condoms or purchased condoms in the past year.	++
Wilson 1994	Retrospective Cohort	UK	1402 females aged 12-19		New teenage contraception clinic	Teenage pregnancy	Conception rates Reasons for attending clinic Clinical care provided Number and timing of repeat visits	Evaluation of a new teenage clinic	3 years	Clinical records	No reduction in teenage conception rates. The 20 to 44 year old conception rate rose by 0.7 per 1000 with a significant trend (p=0.001) and the teenage conception rate by 1.9 per 1000 (p<0.005). So teenage conceptions increased more than would have been expected from the overall trend.	Questions value of conception rates to measure sexual health care for teenagers	-

8.2 Appendix 2: Included studies

Adams et al. (1990). Successful contraceptive behavior among adolescent mothers: Are there predictors? *Journal of Adolescent Health Care* 11 (4) 319-325.

Baraitser et al. (2002). Quality, mainstream services with proactive and targeted outreach: a model of contraceptive service provision for young people. *Journal of Family Planning & Reproductive Health Care* 28(2) 90-94.

Belzer et al. (2005). Advance supply of emergency contraception: a randomized trial in adolescent mothers. *Journal of Pediatric & Adolescent Gynecology* 18: 347-354.

Brindis et al. (2005). Evaluation of a peer provider reproductive health service model for adolescents. *Perspectives on Sexual & Reproductive Health*. 37(2): 85-91.

Chewning et al. (1999). Evaluation of a computerized contraceptive decision aid for adolescent patients. *Patient Education & Counseling* 38(3): 227-239.

Edwards et al. (2008). Initiation of Oral Contraceptives-Start Now! *Journal of Adolescent Health* 42: 3432-436.

Ekstrand et al. (2008). Advance provision of emergency contraceptive pills reduces treatment delay: a randomised controlled trial among Swedish teenage girls. *Acta Obstetrica et Gynecologica Scandinavica* 87(3): 354-359.

Gillam et al. (2003). Success with oral contraceptives: a pilot study. *Contraception* 69: 413-418.

Gold et al. (2004). The effects of advance provision of emergency contraception on adolescent women's sexual and contraceptive behaviours. *Journal of Pediatric & Adolescent Gynecology* 17: 87-96.

Greene (2006). Estimates of pregnancies averted through California's Family Planning Waiver Program in 2002. *Perspectives on Sexual and Reproductive Health* 38(3): 126-131.

Hanna 1993. Effect of a nurse client transaction on female adolescents' oral contraceptive adherence. *Image - the Journal of Nursing Scholarship* 25(4): 285-290.

Harper et al. (2005). The effect on increased access to emergency contraception among young adolescents. *Obstetrics and Gynecology* 106(3): 483-491.

Hughes et al. (1995). The impact of an increase in family planning services on the teenage population of Philadelphia. *Family Planning Perspectives* 27: 60-65.

Jemott et al. (2005). HIV/STD risk reduction interventions for African American and Latino adolescent girls at an adolescent medicine clinic - A randomized controlled trial. *Archives of Pediatrics & Adolescent Medicine* 159(5): 440-449.

Kissinger et al. (1997). An evaluation of initiatives to improve family planning use by African-American adolescents. *Journal of the National Medical Association* 89(2): 110-114.

Orr et al (1996). Behavioral intervention to increase condom use among high-risk female adolescents. *Journal of Pediatrics* 128: 288-295.

Pedlow et al. (2004). Randomized controlled trial of a brief information, motivation, and behavioral skills intervention to reduce HIV/STD risk in young women. *Dissertation Abstracts International: Section B: The Sciences and Engineering* 65(6): pp3176.

Reed et al. (1999). Access to family planning clinics--a local experience. *European Journal of Contraception & Reproductive Health Care* 4(1): 49-53.

Omar et al. (2008). Significant Reduction of Repeat Teen Pregnancy in a Comprehensive Young Parent Program. *Journal of Pediatric and Adolescent Gynecology* 21: 283-287.

Smith et al. (1997). The role of condom motivation education in the reduction of new and reinfection rates of sexually transmitted diseases among inner-city female adolescents. *Patient Education & Counseling* 31(1): 77-81.

Stevens-Simon et al (2001). A village would be nice but...it takes a long-acting contraceptive to prevent repeat adolescent pregnancies. *American Journal of Preventive Medicine* 21(1): 60-65.

Thompson and Smith (2001). 'Condom club': an interface between teenage sex and genitourinary medicine. *International Journal of STD & AIDS* 12(7): 475-478.

Ullman and Lanthrop 1996. Impact of free condom distribution on the use of dual protection against pregnancy and sexually transmitted disease. *Canadian Journal of Human Sexuality* 5(1): 25-29.

Wison et al. (1994). An evaluation of a new teenage clinic and its impact on teenage conceptions in Nottingham from 1986 to 1992. *Contraception* 50(1): 77-86.

8.3 Appendix 3: Excluded studies

<p>Knowledge/views on an intervention (not effectiveness)</p>	<p>De Anda Replication of an Intensive Educational Intervention for Youth Pregnancy and STI prevention: The GIG. <i>Child Adol Soc Work</i> (2008) 25: 55-69</p> <p>Ingram J, Salmon D. (2007). Young People's experiences of nurse led drop in sexual health services in South West England. <i>J Research in Nursing</i> 12(4) 305-316</p> <p>Jones KE et al. (2006) Success of a nurse led community based genitourinary medicine clinic for young people in Liverpool: review of the first year. <i>Sex Transm Infect</i> 82 318-320.</p> <p>Sangalang BB et al. (2006) First birth outcomes and timing of second births. A statewide case management program for adolescent mothers. <i>Health and Social work</i> 31(1) 54-63</p> <p>Garwick A et al. (2004) Risk and protective factors for sexual risk taking among adolescents involved in Prime Time. <i>J Paedi Nursing</i> 19(5) 340-350</p> <p>McAllister KF et al. (2002) Evaluation of a young person's health service in a commercial setting. <i>J Fam Plan and Repro Health Care</i> 28(4) 203-206</p> <p>Sykes S, O'Sullivan K (2006) A mystery shopper project to evaluate sexual health and contraceptive services for young people in Croydon. <i>J Fam Plann Reprod Heath Care</i> 32(1) 25-26</p> <p>Lloyd K, Gale E. (2005) Provision of emergency hormonal contraception through community pharmacies in a rural area. <i>J Fam Plann Reprod Heath Care</i> 31(4) 297-300</p> <p>Baraitser P et al (2005) Involving service users in sexual health service development. <i>J Fam Plann Reprod Heath Care</i> 31(4) 281-284</p> <p>Schwarz EB et al. (2008) Computer assisted provision of emergency contraception a randomised controlled trial. <i>J Gen Intern Med</i> 23(6) 794-799</p> <p>Green E et al. (2005) Implementing a teenage health service in primary care. <i>Nursing Times</i> 101(38) 36-39</p>
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Community intervention	Philliber S et al. (2002) Preventing pregnancy and improving health care access among teenagers: an evaluation of the children's aid society CARRERA program. <i>Persp on Sexual and Repro Heath</i> 34(5) 244-251
Methodology assessment	<p>Martyn KK et al. (2006) Improving adolescent sexual risk assessment with event history calendars: a feasibility study. <i>J Pediatric Health Care</i> 20(1)19-26</p> <p>Brindis CD et al. (2005) Service integration and teen friendliness in practice: a program assessment of sexual and reproductive health services for adolescents. <i>J Adol Health</i> 37 155-162</p> <p>Allaby (1993). Reviewing family planning services: a method for population based outcome-related needs assessment. <i>British Journal of Family Planning</i>. 18 102-105.</p>
Observational behavioural study	<p>Kershaw TS et al. (2003) Short and long term impact of adolescent pregnancy on post partum contraception use: implications for prevention of repeat pregnancy. <i>J Adol Health</i> 33 359-368</p> <p>Stewart HE et al. (2003) The impact of using emergency contraception on reproductive health outcomes: a retrospective review in an urban adolescent clinic. <i>J Pediatr Adolesc Gynecol</i> 16 313-318</p> <p>Rousseau-Pierre T et al. (2006) Hormonal contraception use among adolescent emergency contraception users: a two year follow up study. <i>Abstracts</i> 28 137-163</p> <p>Burstein GR et al. (2003) Missed opportunities for sexually transmitted diseases, HIV and pregnancy prevention services during adolescent health supervision visits. <i>Pediatrics</i> 111(5) 996-1001</p> <p>Churchill D et al (2002) Teenagers at risk of unintended pregnancy: identification of practical risk markers for use in general practice from a retrospective analysis of case records in the UK. <i>Int J Adolesc Med Health</i> 14(2) 153-160</p> <p>Lewington et al. (2006). Access to emergency hormonal contraception from community pharmacies and family planning clinics. <i>British Journal of Clinical Pharmacology</i>. 61 (5) 605-608.</p>
Age range	Petersen et al. (2007) Acceptance and use of emergency contraception with standardized counselling intervention: a result of a randomised controlled trial. <i>Contraception</i> 75 119-125
Narrative/Discussion	<p>Watkins J et al. Experiences of a youth advisory clinic Bournemouth.</p> <p>Storey K (2007) New College Swindon: Development of the Confide Clinic. <i>Education and Health</i> 25(4) 77-80</p> <p>Edgecombe J et al. (2002) Mobile outreach services for young people. <i>Int J Adolesc Med Health</i> 14(2) 111-115</p> <p>Jackson P et al. (1996) Youngsters get an introduction to sexual health clinics. <i>Nursing Times</i> 92(21) 34-36</p>

	<p>Jones M (1996) Clients express preference for one stop sexual health shop. <i>Nursing Times</i> 92(21) 32-33</p> <p>Levine D et al. (2008) SEXINFO: A sexual health text messaging service for San Francisco youth. <i>Am J PH</i> 98(3) 393-394</p> <p>Thomson R. (1996) Nurses who dispense post-coital contraception. <i>Nurse prescriber/Community Nurse</i> 1(12) 27-28</p> <p>Nelson MD (2006) Time 4U youth clinic. <i>Health visitor</i> 70(4) 159-160</p> <p>Macereth C et al. (1998) Sexual health messages: working with young people. <i>Community practitioner</i> 71(12) 412-414</p> <p>Smart S (1997) A clinic in the countryside. <i>Community Nurse</i> 3(4) p18</p> <p>Morrison A et al. (1997) The Sexual Health Help Centre: a service for young people. <i>J Public Health Medicine</i> 19(4) 457-463</p> <p>Bloxham S et al. (1999) Combining GUM and contraceptive services for young people: profile of an innovative clinic. <i>The British J of Family Planning</i> 25 18-21</p> <p>Laughlin S et al. (2001) The Sandyford Initiative: creating added value to health and health care. <i>Health Bulletin</i> 59(4) 238-243</p> <p>Smith K (1997) Immaculate conception. <i>Nursing Times</i> 93(34) 2-4</p>
Curriculum/education intervention	<p>Coyle KK et al. (2006) All4You! A randomised trial of a HIV, other STDs and pregnancy prevention intervention for alternative schools students. <i>AIDS Education and Prevention</i> 18(3) 187-203.</p> <p>Chuang CH and Freud KM (2005) Emergency contraception: an intervention on primary care providers. <i>Contraception</i> 72 182-186</p> <p>Boothroyd RI (2003) Analysing the contribution of environmental change to prevent adolescent pregnancy. <i>Dissertation abstracts international</i> 65(4) 2123</p>
Clinical comparison	<p>Stevens-Simon C et al. (1999) Preventing repeat adolescent pregnancies with early adoption of the contraceptive implant. <i>Fam Plann Persp</i> 31(2) 88-93</p> <p>Omar H et al. (2002) Improved continuation rate of DMPA in adolescent mothers. <i>Int J Adolesc Med Health</i> 14(2) 149-152</p>

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 unintent* 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 Healthcare Settings 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 *Community Pharmacy Services/
 23 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22
 24 (EHC or EC or EAC or (emergency adj2 contraception) or (plan adj2 B) or
 post coital contraception).ti,ab. or *Contraception, Postcoital/
 25 12 and 24
 26 (genitourinary or GU or GUM).ti,ab.
 27 12 and 26
 28 nurs*.ti,ab. or *nurses/
 29 12 and 23 and 28
 30 ((primary adj2 care) or general practi* or GP or (health adj (centre or center))
 or CASH).ti,ab. or *Primary Health Care/
 31 12 and 23 and 30
 32 ((young people* or youth) adj service*).ti,ab.
 33 23 and 32
 34 (LARC or long acting reversible contracept*).ti,ab.
 35 12 and 34
 36 25 or 27 or 29 or 31 or 33 or 35