

DRAFT

Induced Abortion and Mental Health

**A systematic review of the mental
health impact of induced abortion**

Developed for the Academy of Medical Royal Colleges
by the National Collaborating Centre for Mental Health
2011

This review was commissioned by the Academy of Medical Royal Colleges and funded by the Department of Health. It has been carried out by the National Collaborating Centre for Mental Health at the Royal College of Psychiatrists.

The National Collaborating Centre for Mental Health was established in 2001 at the Royal College of Psychiatrists, in partnership with the British Psychological Society. Its primary role is to develop evidence-based mental health clinical guidelines and related guidance for the National Institute for Health and Clinical Excellence (NICE). However, this review is not linked to, funded by or endorsed by NICE.

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1 INTRODUCTION

1.1 BACKGROUND

The Abortion Act 1967, amended by the Human Fertilisation and Embryology Act 1990, governs abortion service provision in England, Scotland and Wales (Great Britain). Under the Act, women can have access to safe, legal abortions. However, a pregnancy may only be terminated if two medical practitioners are of the opinion, formed in good faith that:

- A. The continuance of the pregnancy would involve risk to the life of the pregnant woman greater than if the pregnancy were terminated (Abortion Act 1967 as amended, Section 1(1)(c))
- B. The termination is necessary to prevent grave permanent injury to the physical or mental health of the pregnant woman (Section 1(1)(b))
- C. The pregnancy has not exceeded its 24th week and the continuance of the pregnancy would involve risk, greater than if the pregnancy were terminated, of injury to the physical or mental health of the pregnant woman (Section 1(1)(a))
- D. The pregnancy has not exceeded its 24th week and the continuance of the pregnancy would involve risk, greater than if the pregnancy were terminated, of injury to the physical or mental health of any existing child(ren) of the family of the pregnant woman (Section 1(1)(a))
- E. There is a substantial risk that if the child were born it would suffer from such physical or mental abnormalities as to be seriously handicapped (Section 1(1) (d)).

An abortion may also be carried out in an emergency, certified by the operating practitioner as immediately necessary:

- F. To save the life of the pregnant women (Section 1(4))
- G. To prevent grave permanent injury to the physical or mental health of the pregnant woman (Section 1(4)).

Since 1992, abortions have risen steadily, with the exception of the last 2 years where there has been a small decrease in the number of abortions. In 2009, the total number of abortions carried out on residents of England and Wales was 189,100. Of these, 94% were funded by the National Health Service (NHS). The remaining 6% were funded privately. In that year, 34% of women undergoing abortions had had one or more previous abortions. In women under the age of 25 years, 25% of abortions were repeat abortions. The majority (97%) of abortions carried out in the UK in 2009 were on the

1 grounds that continuing with the pregnancy would result in increased physical
2 or psychological risk. However, there has been concern raised that abortion,
3 while being undertaken to end a pregnancy deemed likely to increase
4 psychological risk, may also increase the risk of an adverse psychological
5 reaction and mental ill-health. Feelings such as loss, grief and doubt may all
6 be present at the time of the abortion (Broen *et al.*,
7 2006), and this led Rue and Speckhard (1992) to suggest that abortion can
8 lead to a specific mental health problem which they termed 'post-abortion
9 syndrome'.

10
11 On the one hand, abortion can be considered a life event that could potentially
12 trigger an adverse psychological reaction, including mental ill-health in
13 vulnerable individuals, there is a debate within the literature regarding the
14 significance of abortion as a life event, whereas for some, abortion is a life
15 event comparable to a minor life event such as undergoing an operation. In
16 this view, the risk of negative psychological reactions or mental ill-health
17 following abortion may be comparable to, or better than, continuing with an
18 unwanted pregnancy to term (American Psychological Association [APA] Task
19 Force on Mental Health and Abortion, 2008).

20
21 An alternative view is that abortion is a more significant life event, perhaps
22 similar to the loss of a child, and carries a much greater risk to a woman's
23 mental health than continuing with an unwanted pregnancy to term. The
24 Rawlinson Report (1994) held the view that there was no psychiatric
25 justification for abortion and that the procedure puts women at risk of
26 psychiatric illness without alleviating previous suffering.

27
28 Since then, numerous studies have examined the relationship between
29 abortion and mental health. However, these have been characterised by
30 varying degrees of quality and bias. In particular, findings from early studies
31 were limited by quality and/or the appropriateness of the study design.
32 Although both quality and research design have improved in more recent
33 research, controversy persists, with some studies suggesting an association
34 between abortion and adverse mental health outcomes (for example, Cogle
35 *et al.*, 2005), and others suggesting no association (for example, Broen *et al.*,
36 2004). Importantly, guidance provided by the Royal College of Obstetricians
37 and Gynaecologists (RCOG) (2004), based upon a review of the literature,
38 concluded that there were studies suggesting that rates of psychiatric illness
39 or self-harm may be higher among women who have had an abortion, when
40 compared with women who give birth or to non-pregnant women of a similar
41 age. However, the report noted that these findings did not imply a causal
42 association.

43
44 The House of Commons Science and Technology Committee (2007) called
45 on both the Royal College of Psychiatrists (RCPsych) and the (RCOG) to
46 update advice on the mental health consequences of induced abortion. The
47 RCPsych (2008) responded by publishing a position statement, which,
48 recognising the imperfect and conflicting evidence, called for a formal review
49 to provide greater clarity on the nature and extent of the relationship between
50 abortion and mental health.

1
2 This current systematic review was commissioned by the Academy of Royal
3 Medical Colleges and funded by the Department of Health, partly in response
4 to the call for a further review of the best available evidence about the
5 relationship between women who have had an induced abortions and mental
6 health problems.
7
8

9 **1.2 TERMINOLOGY**

10
11 This review examines the mental health impact, upon a woman, of an elected
12 induced abortion of an unwanted pregnancy.

13 **Abortion**

14 The terms abortion, termination, termination of pregnancy and induced
15 abortion are used interchangeably in the literature. This review uses the term
16 *abortion* to refer to legal induced abortion.

17 **Unplanned pregnancy**

18 The terms unintended and unplanned are also used interchangeably in the
19 literature and this review uses the term *unplanned pregnancy* to refer to a
20 pregnancy that was not planned or intended to occur.

21 **Unwanted pregnancy**

22 Some unplanned pregnancies are unwanted The term *unwanted pregnancy* is
23 used in this review to refer to a pregnancy which the woman does not wish
24 to continue with, that is, she does not wish to give birth to the baby,

25 **Medical reasons for abortion**

26 This review does not include for medical reasons, for example, women who
27 elect to have an abortion on the basis of fetal abnormalities. This is because
28 these occur primarily, although not exclusively, in wanted pregnancies
29 (STEINBERG2008).
30
31

32 **1.3 PREVIOUS REVIEWS: THE RELATIONSHIP** 33 **BETWEEN INDUCED ABORTION AND MENTAL** 34 **HEALTH**

35 An initial search identified two recent systematic reviews that have assessed
36 the effects of abortion on women's mental health. The APA Task Force on
37 Mental Health and Abortion (APA, 2008) conducted a review from a US
38 perspective, including a very broad range of studies of differing quality and
39 different periods of post-abortion follow-up. A second review (Charles *et al.*,
40 2008) also investigated abortion from a US perspective, but graded the
41 included studies according to study quality, and looked at longer term mental

1 health problems, that is, those occurring 90 days after the abortion. For ease
2 of reading, in this document we will refer to the review by the APA Task Force
3 (2008) as the 'APA review' and the review by Charles and colleagues (2008)
4 as the 'Charles review'.

5 ***The APA review***

6 The APA review was charged with the task of 'collecting, examining, and
7 summarizing the scientific research addressing the mental health factors
8 associated with abortion, including the psychological responses following
9 abortion, and producing a report based upon a review of the most current
10 research.' The report was based around the following questions:

11

- 12 1. Does abortion cause harm to women's mental health?
- 13 2. How prevalent are mental health problems among women in the US
14 who have had an abortion?
- 15 3. What is the relative risk of mental health problems associated with
16 abortion compared with its alternatives (other courses of action that
17 might be taken by a pregnant woman in similar circumstances)?
- 18 4. What predicts individual variation in women's psychological
19 experiences following abortion?

20

21 The authors reviewed all empirical studies published in the English language
22 after 1989 that compared the mental health of women who had an abortion
23 with women who had not had an abortion in the US context. Studies with no
24 comparison groups were also reviewed, to examine the rates of mental health
25 problems in US samples of women who had had an abortion. The review also
26 evaluated the factors most likely to be associated with poor mental health
27 outcomes following an abortion. Fifty studies comparing mental health
28 outcomes in women who had had an abortion with women with other
29 pregnancy outcomes were included in the review. Furthermore, 23 studies
30 were identified that considered only women who had had an abortion. The
31 APA review has subsequently been updated by Major and colleagues (2009),
32 who identified six additional studies but failed to find any evidence to
33 challenge the conclusions of the first review.

34

35 The APA review concluded that no studies were methodologically rigorous
36 enough to accurately determine prevalence rates of mental health following
37 abortion. A number of methodological problems were identified, including
38 sampling issues and problems with the measurement of mental health
39 outcomes. However, the authors did suggest that prevalence rates of mental
40 health problems following abortion were likely to be consistent with general
41 population prevalence rates of mental health problems. For example,
42 Schmiede and Russo (2005), referred to in the APA review, drew upon the
43 National Longitudinal Survey of Youth (NLSY) (1979) and reported rates of
44 depression of 22% in the general population, as measured by the Centre for
45 Epidemiologic Studies - Depression scale (CES-D), and 23% in women
46 reporting one abortion. These rates are comparable with population rates in
47 the UK: the Adult Psychiatric Morbidity Survey (McManus *et al.*, 2007), for
48 example, reported general population rates for common mental health
49 disorders of 19.7%.

1
2 The APA review also suggested that a number of possible factors might
3 influence the development of mental health problems following abortion.
4 These included the stigma surrounding abortion, perceived need for secrecy,
5 social support and previous mental health problems. The most important
6 factor identified was previous mental health problems, although the authors
7 suggested that all of the above factors could affect a woman's mental health,
8 whatever the abortion decision.

9
10 Comparing mental health rates following abortion with rates following other
11 outcomes such as birth and never having been pregnant, the APA review
12 concluded that the relative risk of developing mental health problems following
13 a single, legal, first-trimester abortion of an unplanned pregnancy for non-
14 therapeutic reasons is no greater than the risk for women who go on to deliver
15 an unplanned pregnancy. Among those studies with the strongest
16 methodology, the review concluded that interpersonal concerns, personal
17 characteristics, feelings towards the abortion decision and previous episodes
18 of mental health problems were key factors associated with the development
19 of mental health problems following an abortion.

20 ***The Charles review***

21 The Charles review was conducted in a similar way to the APA review, but
22 focused on the long-term mental health effects of abortion and studies that
23 included a comparison group of woman who had not had an abortion. The
24 Charles review took a different analytical approach from the APA review,
25 grouping studies according to their methodological quality and only including
26 studies with follow-up times of 90 days or more. From over 700 articles
27 identified in their search, 21 studies with a comparison group were included in
28 the review. The authors identified five study characteristics that underpinned
29 the quality of the evidence and used this to rank studies from excellent
30 through to very poor quality. These were:

- 31
- 32 • appropriateness of comparison groups
 - 33 • controlling for pre-abortion mental health status
 - 34 • the use of validated tools to measure mental health
 - 35 • adequacy of confounder control
 - 36 • appropriate interpretation of results.
- 37

38 Using these quality criteria, studies were placed in one of five possible study
39 quality levels (excellent, very good, fair, poor and very poor), where 'excellent'
40 studies satisfied all five quality criteria, and 'very poor' failed to satisfy at least
41 three criteria and were equivocal on the remaining two. Within the review, four
42 studies were identified as very good quality, eight studies as fair, eight as poor
43 and one as very poor.

44
45 The four very good quality studies all showed that abortion had no effect on a
46 woman's mental health in comparison with a no-abortion control group. Of the
47 eight fair studies, the authors report that three showed neutral findings, that is,
48 similar levels of mental health were found in women who had an abortion and

1 the comparison group. Three showed mixed findings, and two showed
2 negative findings of abortion, that is, increased mental health problems for
3 women who had an abortion than in the comparison group. Of the eight poor
4 quality studies identified, one showed neutral findings, four had mixed
5 findings, and three had negative findings. Finally, the one very poor quality
6 study suggested that abortion had a negative impact on a woman's mental
7 health. Overall, the authors concluded that the higher the quality of the study,
8 the greater the likelihood that the study would find no association between
9 abortion and the risk of mental ill-health. The Charles review did not review
10 prevalence rates or factors associated with a poor response to abortion.
11

12 **1.3.1 Limitations of the APA and Charles reviews**

13 ***Generalisability***

14 Despite including studies from outside the US, both the APA and Charles
15 reviews predominately focused on the US perspective. As a result, the
16 findings may not be applicable to the UK population. For example, the APA
17 review cites exposure to anti-abortion picketing as a prominent risk factor for
18 poor outcomes. In the US, an annual pro-life march is held to protest the
19 legalisation of abortion. No such wide-scale event exists in the UK, reducing
20 the applicability of this risk factor to a UK context.

21 ***Inclusion of low quality studies***

22 Although the APA review made it clear that abortion research should be well
23 controlled, the authors did not attempt to group studies by study quality,
24 making interpretation of the results more difficult. The Charles review graded
25 evidence according to study quality based on the key characteristics
26 described above. Grading studies against the characteristic 'the
27 appropriateness of the comparison group' was particularly informative. The
28 relative risk of mental ill health following abortion depended, in part, on the
29 comparator used. As highlighted in the Charles review, differences in the
30 relative risk that were seen between the abortion group and non-appropriate
31 comparators disappeared when appropriate comparators were used.
32

33 Grading studies for quality using 'thoroughness of confounder control' as a
34 criterion was also important. However, the magnitude of the effects of the
35 different potential confounding variables was hard to quantify without
36 additional study investigating each possible confounder. Furthermore, the
37 exclusion of studies with limited confounder control can restrict a review's
38 ability to investigate the effects of controlling for confounding variables on
39 results.

40 ***Follow-up time***

41 Unlike the Charles review, the APA review did not restrict follow-up time to
42 greater than 90 days. This left open the possibility that temporary and
43 transient psychological changes in the early postnatal period may have been
44 included rather than the more substantial and sustained changes associated
45 with mental ill-health.

1 **Measurement of mental health**

2 In identifying papers that reported prevalence rates and risk factors of mental
3 health problems following an abortion, the APA review did not ensure that the
4 measures used were valid. Furthermore, the authors discuss the results of
5 prevalence studies and studies that identify factors associated with mental
6 health briefly, without distinguishing between different disorders. The Charles
7 review did not discuss prevalence rates or factors associated with mental
8 health.

9 **Comparison groups**

10 Both the APA and Charles reviews looked at studies that used a 'never
11 pregnant' comparison group (Pedersen, 2008; Rees & Sabia, 2007). Although
12 it was useful from a research perspective to compare abortion with outcomes
13 like miscarriage or not being pregnant, these would not be viable options for a
14 woman facing the decision of whether to have an abortion or not. This issue is
15 summarised effectively by Cameron (2010) who claimed that 'once a woman
16 is in the situation of having an unwanted pregnancy, there is no magical state
17 of "un-pregnancy".'
18

19 **1.3.2 Limitations of research identified by the APA and**
20 **Charles reviews**

21 In addition to the limitations of the two reviews overall, the key methodological
22 problems of the available evidence, which were identified and outlined in the
23 APA and Charles reviews, were considered.

24 **Comparators**

25 Comparison groups for mental health and abortion vary depending on the
26 particular question of interest. For a woman with an unwanted pregnancy, the
27 alternatives to abortion are limited to continuing with the unwanted pregnancy
28 to term. A woman faced with this decision and concerned about the mental
29 health outcome of each possible choice will be most clearly helped by studies
30 using a comparator that reflects this choice exactly. Therefore, the ideal
31 comparison would be to compare the relative risk of mental health problems
32 after abortion for an unwanted pregnancy with the risk of mental health
33 problems following birth of an unwanted pregnancy. However, very few
34 studies attempted to make this comparison.
35

36 Other comparators include the general population, women who have
37 miscarried, women who have given birth regardless of whether the pregnancy
38 was wanted or unwanted, and women who have never had an abortion.
39 However, a number of problems exist when using these comparison groups.
40 Women in these latter groups may differ in fundamental ways from women
41 facing an unwanted pregnancy. For example, Russo and colleagues (1992)
42 found that, although the characteristics of women seeking an abortion vary
43 between individuals, after controlling for age, the abortion rate for low family
44 income groups (under \$11,000) was more than three times greater than the
45 rate for women from higher family income groups (over \$25,000). Some

1 studies identified pregnancies that were unplanned; again, there is an
2 important distinction between a pregnancy that is unplanned and one that is
3 unwanted. It is important that studies consider these differences in order to
4 provide clear results surrounding the relative risk of mental health problems
5 following abortion compared with going to term.

6 **Control for co-occurring associated factors and confounding** 7 **variables**

8 A number of factors, such as previous mental health problems, social support
9 and perceived ability to cope appear to be associated with an increased
10 likelihood of developing mental health problems following abortion. These
11 factors may also be associated with poor mental health outcomes in other
12 contexts (Major *et al.* 2009a). In addition, rates of abortion are different
13 amongst different sections of the population. For example, rates of abortion in
14 England and Wales peak between 20 and 24 years of age and decline
15 thereafter (Bankole *et al.*, 1999); this period is when a first episode of
16 depression is most likely amongst the general population (National
17 Collaborating Centre for Mental Health [NCCMH], 2010). The abortion rate is
18 nearly five times higher in unmarried women in England and Wales (Bankole
19 *et al.*, 1999), and Patten (1991) suggested that a risk factor for depression
20 may be the absence of a confiding relationship. However, being unmarried
21 does not necessarily preclude this. To reliably estimate the risks of mental ill-
22 health after abortion, often very complex confounding variables need to be
23 identified and adjusted for or taken into account. Studies frequently do not
24 attempt to take into account confounding variables. For example the APA
25 review pointed out that Gissler and colleagues (1997) controlled only for age
26 when considering the relationship between abortion and pregnancy related
27 death.

28 **Study design and sample**

29 The most appropriate study design to examine the relationship between
30 abortion and mental health would be prospective, longitudinal studies of large
31 groups of women from the general population that follow up the decisions and
32 subsequent outcomes for women undergoing abortions or going to term when
33 a pregnancy is unwanted. Small sample sizes taken from other, less
34 representative populations are likely to be biased. However, many studies
35 take samples from more narrowly defined groups for reasons of expediency
36 and cost, for example women seeking advice from sexual health clinics
37 (Bradshaw & Slade, 2005). In an attempt to use a more representative
38 sample, some studies have used mail-back questionnaires to obtain
39 responses (Reardon & Ney, 2000). However, as the APA and Charles reviews
40 note, this method can lead to response bias, reducing the reliability of results.

41
42 A further way of overcoming problems associated with non-representative,
43 small samples is to use secondary analysis of large data sets. However, this
44 can create problems, for example an over-representation of participant groups
45 selected for a purpose other than for investigating the effects of abortion.
46 Furthermore, there can be a high chance of non-reporting, which again can
47 bias results and limit the reliability of subsequent findings.

1 ***Under-reporting of abortion***

2 When assessing the impact of abortion on mental health, it is important to
3 obtain an accurate account of a woman's abortion history. Many studies that
4 use mail questionnaires to obtain responses rely on self-report data. However,
5 abortion is often associated with problems of guilt and shame, and can lead to
6 a woman feeling stigmatised (Boorer & Murty, 2001); therefore, using self-
7 report methods can leave a study's results open to problems of under-
8 reporting (Major *et al.* 2009a). Under-disclosing is also a risk when
9 interviewing women face to face. In addition, under-reporting can occur not by
10 failure to disclose information on the part of the participant, but by failure to
11 ask relevant questions on the part of the investigator. For example, a question
12 commonly asked, 'Have you had a previous abortion?' could introduce errors
13 regarding multiple prior abortions.

14 ***Attrition***

15 It is a common problem in research that people who remain in a study risk
16 differing systematically from those who drop out. For example, it is possible
17 that those who were most distressed by the experience of abortion pulled out
18 of the study, leaving only those with good responses to be compared against
19 a control group. It is therefore important that researchers take account of
20 differences between completers and non-completers, and control for these
21 differences where possible. For example, (Major *et al.* 2009a) highlighted the
22 fact that few studies tested for biases in attrition, citing Pedersen (2008) as an
23 example.

24 ***Operationalisation of outcome***

25 Outcomes in abortion research varied from general mental health status
26 (Gilchrist *et al.*, 1995) and levels of self-esteem (Russo & Dabul, 1997), to
27 diagnosis of a specific mental illness (Pedersen, 2007). Some studies used
28 well-validated tools to measure the mental health impact following abortion or
29 following a comparator, while others did not. The APA review, for example,
30 pointed out that Miller (1992) used a single question to measure post-abortion
31 regret.

32 ***Timing of outcome measurement***

33 Both the APA and Charles reviews referred to the timing of outcome
34 measurement. In particular, the period immediately after birth can be a time of
35 great stress, frustration and fatigue (Aston, 2002) and, as such,
36 measurements taken immediately after birth may not provide a reliable
37 measure of a woman's mental health once the initial stress has subsided. The
38 Charles review suggests that outcome measurements taken 90 days after
39 birth may provide a more robust indication of mental health, as opposed to
40 within the first 3 months postpartum, because it allows a return to baseline
41 hormonal levels after the pregnancy event (Cheng, Fowles, & Walker, 2006,
42 as cited in the Charles review).

43 ***Clinical significance of outcome***

1 It is important that the outcome under investigation is relevant to the question
2 posed (Major *et al.* 2009a). Therefore, when investigating the effect of
3 abortion on mental health, it is important that outcomes are clinically relevant.
4 For example, some studies (for example, Pedersen, 2007) have investigated
5 the relationship between abortion and nicotine dependence. Although nicotine
6 use may be a useful measure in its own right, it is less likely to be of clinical
7 utility when considering the likelihood of drug use in women who have aborted
8 a pregnancy.

9 ***Statistical and interpretational issues***

10 The APA and Charles reviews made two additional comments that should be
11 considered when investigating the impact of abortion on mental health. First,
12 the authors warned against excessive use of statistical tests, for fear of finding
13 a statistically significant result by chance. Second, they highlighted the
14 problems with assuming that correlation means causation, and the need to
15 always consider the impact of potential confounding variables in any
16 interpretation made.
17

18 **1.3.3 Summary of key findings from the APA and Charles** 19 **reviews**

20 In summary, these two reviews came to the following conclusions:
21

- 22 1. There were quite large numbers of studies that examined the
23 relationship between abortion and mental health, but many were of
24 poor or only fair quality, and most had significant methodological
25 problems.
26
- 27 2. There were no rigorous studies that reliably established the prevalence
28 of mental health problems following abortion, which resulted directly
29 from the effect of the abortion rather than other confounding factors.
30
- 31 3. From studies considered, the approximate rates of mental health
32 problems following abortion did not appear to be greatly different from
33 rates of mental health problems in the general US population, although
34 there was some uncertainty regarding this finding.
35
- 36 4. Some factors appeared to be associated with poorer mental health
37 outcomes following abortion, including the stigma associated with
38 abortion, the need for secrecy regarding the abortion, personal
39 characteristics, interpersonal concerns, level of social support and
40 previous mental health problems. Previous mental health problems
41 were identified as probably the most important factor associated with
42 poorer mental health following abortion.
43
- 44 5. The higher the quality of the study, the less likely they were to find
45 differences in the relative risk for adverse outcomes following abortion
46 when compared with the same outcomes following delivery in

1 unplanned pregnancies. The converse appeared to be the case for
2 lower quality studies.

- 3
4 6. If only higher quality studies were included in the analysis, the relative
5 risk of mental ill-health was no greater following a first trimester, legal
6 abortion than following delivery at full term of unplanned pregnancies.
7
8

9 **1.4 THE CURRENT REVIEW: THE RELATIONSHIP**
10 **BETWEEN INDUCED ABORTION AND MENTAL**
11 **HEALTH**

12
13 The current review aims to identify the prevalence of mental health problems
14 in women who have an abortion, the factors associated with poor mental
15 health following an induced abortion and the risks associated with induced
16 abortion relative to delivery. The focus of the review is to consider the
17 question from a woman's point of view; that is, if a woman considering an
18 abortion were to ask what the risks are to her mental health, what answer
19 would be given? The aim was to build upon the APA and Charles reviews to
20 establish a better understanding of the complex relationship between abortion
21 and mental health.
22

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2 METHODS

3

The methods used to conduct this review included the following basic steps of a systematic review:

4

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6

1. Identify significant previous reviews carried out in this specific field.

7

2. Define the scope and parameters of this review and refine review questions to inform the search strategy.

8

9

3. Develop a validated protocol for carrying out the review and apply this to evidence recovered from the search including:

10

11

- eligibility criteria for inclusion and exclusion of studies

12

- assessment of the overall quality and risk of bias in individual studies.

13

14

4. Synthesise and analyse the data extracted from the studies to produce summaries of the evidence for each review question.

15

16

5. Grade the evidence.

17

6. Develop evidence statements.

18

7. Discuss implications for practice.

19

20

2.1 THE STEERING GROUP

21

The Steering Group consisted of 11 members, including representatives of the RCPsych, the RCOG, the Royal College of General Practitioners, technical staff from the NCCMH, and two members from the Department of Health who observed and monitored progress.

22

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26

The Steering Group met on five occasions to refine and advise on the review questions, search strategy, data extraction, data analysis and evidence summaries presented by the technical team. The group contributed to the development of evidence statements, consideration of limitations and implications of findings, drafting of the final report and responding to comments received during consultation.

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At each meeting, all Steering Group members declared any potential conflicts of interest (see Appendix 1). These included paid employment, financial payments or other benefits from products or services relevant to the review that had been received by members themselves, or their family members or employing organisations. Personal non-pecuniary interests were also requested; for example, clear opinions held and public statements that have been made about abortion, or holding office in an organisation or group with a direct interest in or publicly held view on abortion.

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The Steering Group recognised the important moral and ethical debates surrounding induced abortion, but were clear that the purpose of this review was to ascertain what impact induced abortion may have upon a woman's mental health and not to comment on the ethical issues. It was also considered that the question of mental health impact is important to all

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1 clinicians, whether their personal ethical views are in favour of or against
2 abortion, in some or all circumstances.
3

4 **2.2 REVIEW QUESTIONS**

5
6 Review questions were used to guide the identification and interrogation of
7 the evidence base. The Steering Group identified the following three review
8 questions as important areas for review:
9

- 10 **1. How prevalent are mental health problems in women**
11 **who have an induced abortion?**
- 12 **2. What factors are associated with poor mental health**
13 **outcomes following an induced abortion?**
- 14 **3. Are mental health problems more common in women**
15 **who have an induced abortion, when compared with**
16 **women who deliver an unwanted pregnancy?**

17
18
19 The review protocol is provided in Table 1. Data items differed for each of the
20 review questions; therefore, these are listed separately for each review (see
21 Section 2.7). All other methods described below were the same for each
22 review question.
23

24 **2.3 ELIGIBILITY CRITERIA**

25
26 The review protocol shown in Table 1 details the eligibility criteria for
27 inclusion in the review. Ideal criteria were first identified for the review,
28 however due to the limitations of the evidence base a more pragmatic
29 approach was adopted, and is discussed below.
30

Table 1: Review protocol for the review of induced abortion and mental health

<i>Electronic databases</i>	CINAHL – 1990–2010 (week 19) EMBASE – 1990–2010 (week 20) MEDLINE – 1990 to 2010 (week 21) MEDLINE In-process – 1990 to 2010 (24 May) PsycINFO – 1990–2010 (week 19)
<i>Date searched</i>	1990–2011 (full details of search strategy in Section 2.3)
<i>Population and exposure</i>	Women who have had a legally induced abortion
<i>Outcome</i>	Mental health outcomes were defined as: 1. A mental health disorder as defined by <i>Diagnostic and Statistical Manual of Mental Disorders</i> of the American Psychiatric Association (DSM) or <i>International Classification of Diseases</i> (ICD) diagnostic

	<p>criteria</p> <ol style="list-style-type: none"> 2. Outcomes confirmed by validated rating scales designed to measure mental health outcomes 3. Accessing mental health treatment 4. Suicide. <p>For longitudinal studies, measures of mental health had to be assessed to be present at least 90 days after the abortion. Where exact follow-up times were unclear, for example in cross-sectional studies, studies had to provide assurance that post-abortion mental health was being measured.</p>
Additional limits of review question 3	<p>Studies in English language ≥100 participants, comparator group – women who deliver a baby</p>

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Based on the findings and limitations identified in Section 1.3, the ideal eligibility criteria for the current review would be when:

- Mental health outcomes were measured more than 90 days after the abortion
- There was adequate control for previous mental health outcomes and other confounding factors
- Mental health outcomes were assessed using a well-validated tool
- Only abortions for unwanted pregnancies were included, not those carried out for medical reasons
- Studies conducted in the UK

Additionally, where comparisons between abortion and other groups are applicable (review question 3), the following eligibility criteria would apply:

- The use of an ‘unwanted pregnancy, delivered to term’ group
- To include at least 100 participants
- The use of longitudinal and prospective designs.

However, considering the limitations discussed in Section 1.3, a more pragmatic approach was taken:

1. Studies rarely reported the reasons that the abortion was carried out. It was therefore assumed that all abortions were due to unwanted/unplanned pregnancies unless explicitly stated otherwise, in which case the study was excluded.
2. Only one UK-based study was identified, so the criteria were relaxed to include studies from all countries where abortion was legal.
3. Studies identifying prevalence rates of mental health problems following an abortion were not required to have controlled for previous mental health problems, due to the concern that this would result in a very small dataset. Studies that controlled for previous mental health problems were reviewed separately from those that did not consider previous mental health problems.

- 1
2 4. Studies identifying factors affecting poor mental health following an
3 abortion were not required to control for previous mental health and/or
4 other confounding variables. Comparative studies were not required to
5 control for confounding variables apart from previous mental health,
6 once again due to the concern that this would result in a small dataset.
7 The quality assessment of the individual studies included in each
8 review identified whether studies controlled for potential confounding
9 variable factors, and identified this as a strength or weakness of the
10 study, rather than criteria for inclusion or exclusion.
11
12 5. Longitudinal retrospective and cross-sectional studies were included in
13 the review, due to the lack of well-controlled longitudinal prospective
14 studies identified in earlier reviews.
15
16 6. Comparative studies rarely compare abortion with an ‘unwanted
17 pregnancy delivery’ group. Therefore, studies that compared abortions
18 with any delivery group were included. Studies that compared abortion
19 with ‘unwanted pregnancy delivery’ groups were reviewed separately
20 from those which compared abortion with any delivery group. The
21 quality assessment of individual studies identified the comparison
22 group as a strength or weakness of the study accordingly, rather than
23 criteria for inclusion or exclusion.
24

25 In addition to this, a further significant study (MUNK-OLSEN2011), which was
26 thought to meet the inclusion criteria, was reported by a Steering Group
27 member to be in press, with publication expected in January 2011. This study
28 was therefore included in the review.
29

30 **2.4 INFORMATION SOURCES**

31 The search strategy was developed in MEDLINE and modified for other
32 databases. The search was limited to English language reports of human
33 studies. Terms were in part derived from the APA review searches on mental
34 health and abortion, with additional searching being performed for terms on
35 abortion, substance misuse and mental health conditions. Records retrieved
36 from the APA search were excluded from the final dataset, to avoid
37 duplication of effort at the screening stage. (For full details of the search
38 strategy see Appendix 4).
39

40 Additional papers were found by searching references of retrieved articles,
41 tables of contents of relevant journals, previous systematic reviews of induced
42 abortion and mental health, and by writing directly to researchers (see
43 Appendix 2) and obtaining references for new or potentially overlooked work
44 from the Steering Group.
45

2.5 STUDY SELECTION

Determining eligibility for inclusion in the systematic review was conducted in a two-stage process. First, all references were screened on the basis of the title and abstract, and all clearly non-relevant references were excluded. Full texts for all the remaining potentially relevant references were obtained and eligibility assessment was determined independently by two reviewers with disagreements resolved by discussion, and consultation with the Steering Group if needed.

Studies that used the same data source and examined similar outcomes were included in the narrative reviews for completeness. Where studies used the same data source, this was clearly reported. For any statistical analysis, to avoid double counting of data, where this overlap occurred and both studies met inclusion criteria, judgement for which study to include was based on a number of factors such as which analysis was the least likely to be associated with potential bias and whether outcomes were reported in a manner comparable with other studies.

2.6 RISK OF BIAS IN INDIVIDUAL STUDIES

The assessment of study quality and outcome data extraction was independently conducted by two authors with disagreements resolved by discussion. All studies that met the eligibility criteria above were assessed for methodological quality using National Institute of Health and Clinical Excellence (NICE) checklists for case control or prognostic studies (NICE, 2009). Example checklists are included in Appendix 5.

The cohort-study checklist includes items on selection bias (whether there are systematic differences between groups), attrition bias (systematic differences between comparison groups with respect to loss of participants) and detection bias (bias in how outcomes are ascertained). The prognostic studies checklist includes items on representativeness of sample, validity of outcome measures, accounting for confounding and appropriate statistical analyses.

In addition to the overall assessment of study quality described above, a modified version of the criteria presented in the Charles review, which is specific to abortion research (see Table 2) was used to rate studies included in each review. The definition of 'Control of pre-abortion mental health status' was adapted in the present review. Only studies that adequately controlled for pre-abortion mental health outcomes (through the use of a validated scale, clinical diagnosis or treatment records) were rated as + for this criterion. Studies which used an inappropriate measure of pre-abortion mental health status (for example, non-standardised scale) were rated as + (weak). Studies were also rated as + (weak) if they used an appropriate measure to control for previous mental health outcomes but reported unadjusted results for a particular analysis. For example, the majority of studies included in the prevalence review were designed to investigate factors associated with mental health outcomes following an abortion, and not prevalence rates per se. Consequently, many

1 studies controlled for previous mental health problems within the analyses
 2 conducted for other outcomes, for example risk factors and so on, but
 3 presented raw unadjusted prevalence rates. Adapting the Charles (2008)
 4 criterion in this way ensured that these studies were not all rated as poor or
 5 very poor quality. Second, because studies were not required to compare
 6 women who had an abortion with other populations for inclusion in either the
 7 prevalence or factors associated with mental health reviews, this criterion was
 8 only applicable to studies included in the comparative review.

9
10
11 **Table 2: Quality criteria**

Quality level	Appropriate comparison group	Validated mental health tools	Previous mental health problems	Confounder control	Comprehensive exploration ¹
Excellent	+	+	+	+ (Thorough)	+
Very good	+	+	+	+ (Thorough)	-
Fair	+/-	+	+ (Weak)	+ (Adequate)	-
Poor	-	+	+ (Weak)	+ (Weak)	-
Very poor	-	+/-	-	+/-	-

12
13 **2.7 DATA ITEMS**

14
15 **2.7.1 Prevalence**

16 Proportions or percentages of people with a mental health problem were
 17 extracted from each study. A mental health problem was defined as either a
 18 diagnosis according to DSM or ICD criteria, or a score greater than or equal to
 19 a predefined cut-off on a validated rating scale. Where studies excluded
 20 women with previous mental health problems and subsequently reported
 21 absolute numbers of new cases of mental health problems and/or cumulative
 22 incidence proportions (for example, the proportion of the sample to develop a
 23 new mental health problems over a specified time period), these were used to
 24 estimate period prevalence rates.

25
26 **2.7.2 Factors associated with poor mental health**

27 Odds ratios (ORs), risk ratios (RRs), regression values and mean differences
 28 (with confidence intervals [CIs] or standard errors [SEs]) comparing mental
 29 health outcomes for women who have had an induced abortion and have or
 30 have not been exposed to a particular risk factor were extracted. Raw means
 31 and percentages without statistical interpretations were also included for
 32 completeness (and converted into odds ratios where appropriate), although
 33 the limitations of this approach were highlighted.

34

¹ This indicates that all quality criteria were thoroughly addressed and that exploration of the research question has an explicit theoretical guiding and an appropriate study design.

2.7.3 Mental health outcomes for women following abortion compared with those following a delivery

Odds ratios and/or risk ratios (with confidence intervals or standard errors) comparing rates of mental health outcomes for women who have had an induced abortion with women who delivered a pregnancy were extracted. These odds ratios or risk ratios were required to be adjusted for previous mental health outcomes.

In addition, mean differences (with confidence intervals or standard errors) on continuous outcome measures (for example, rating scales measuring mental health or quality of life) between women who had an induced abortion and women who delivered an unwanted pregnancy were extracted. These were required to be adjusted for previous mental health outcomes.

Ratios were recalculated in studies that contained applicable data on mental health outcomes for induced abortion and delivered pregnancy groups, which were also compared with a third comparator not considered appropriate for the review (for example, women who had never been pregnant) and no data was provided for the required comparison (that is, induced abortion versus delivered pregnancy). This was determined by subtracting the coefficient for delivered pregnancy versus third comparator from the coefficient for induced abortion versus third comparator.

2.8 RESULTS OF LITERATURE SEARCH

The systematic search of the literature across all review questions from 1990 to 2010 identified 5,813 references, excluding the initial search results from the APA review. When combined with the 73 references from the APA review this resulted in a set of 5,886 references. Of these, 103 were seen as potentially relevant. Studies were excluded if they used an inappropriate sample (for example, women who identified themselves as having a negative reaction to abortion), did not use a validated measure of mental health or did not contain any useable data, or where no information was presented on whether the mental health problem was present after the abortion (for example, lifetime history of ever having a disorder). Studies were also excluded if they were not written in English or only abstracts and study proposals were available. Details on the numbers of studies included and excluded are given in the results section for each review question with further information about the reasons for exclusion outlined in Appendix 6.

2.9 DATA EXTRACTION AND SYNTHESIS OF RESULTS

Outcome data extraction was independently conducted by two authors with disagreements resolved by discussion. For all review questions, data were assessed for suitability for meta-analysis. Due to the large amount of

1 heterogeneity, meta-analysis was not conducted for any review questions.
2 Heterogeneity was apparent in terms of study design, outcome measurement
3 method, outcomes reported and study population. Furthermore, heterogeneity
4 was assessed by the I^2 statistic (Higgins & Thompson, 2002) and by visual
5 inspection of forest plots, which confirmed that meta-analysis was not
6 appropriate.

7
8 As meta-analysis was not appropriate narrative synthesis was used to review
9 included studies using an approach adapted from previous guidance on
10 narrative synthesis (Popay *et al.*, 2006). The narrative synthesis approach
11 consisted of a three-stage process:

12
13 **1. Developing a preliminary synthesis of findings of included studies**

14 This consisted of extracting descriptive and outcome data from all
15 included studies according to the inclusion criteria stated above. Each
16 study was narratively summarised and summary data was entered into
17 tables. This data was then presented at a Steering Group meeting to
18 discuss application of inclusion criteria and the preliminary synthesis.

19
20 **2. Exploring relationships in the data**

21 Patterns that emerged from the preliminary synthesis across studies
22 were then examined in more detail. In particular, if substantial
23 heterogeneity was identified between studies in terms of direction and
24 size of effect, potential explanations of these differences were examined.
25 Factors considered included: study design, outcome measures, source of
26 funding and between-study differences in composition of participant
27 populations. This exploration of relationships in the data was initially
28 conducted by one author and then discussed in detail at a Steering
29 Group meeting.

30
31 **3. Assessing the robustness of the synthesis**

32 The robustness of the synthesis was examined in three main ways:

- 33 • first, the draft synthesis was presented to the Steering Group on
34 several occasions for discussion and refining of the review
- 35 • second, when a draft document was agreed by the Steering Group,
36 this was sent out for consultation by national experts in the field of
37 abortion and mental health for further evaluation of the synthesis
- 38 • where appropriate, changes were made to the draft to take into
39 account these comments.

40
41 **2.10 GRADING THE EVIDENCE**

42
43 The quality of the evidence was graded using the Grading of
44 Recommendations Assessment, Development and Evaluation (GRADE)
45 approach (GRADE Working Group, 2004). Under the GRADE approach,
46 evidence from each outcome is initially rated as high if from randomised trials

1 or low if from observational studies. Quality may then be 'down-graded'
2 depending on the following factors:

- 3
- 4 • limitations in study design or execution (risk of bias)
- 5 • inconsistency of results (based on between study heterogeneity)
- 6 • indirectness of evidence (that is, how closely the outcome measures,
7 interventions and participants match those of interest)
- 8 • imprecision (based on the confidence interval around the effect size)
- 9 • publication bias.

10
11 For observational studies without important limitations, quality may be 'up-
12 graded' depending on the following factors:

- 13
- 14 • large magnitude of effect
- 15 • all plausible confounding would reduce the demonstrated effect or
16 increase the effect if no effect was observed
- 17 • dose-response gradient.

18
19 GRADE profiler software was used to grade the evidence and generate
20 evidence profile tables, which include a summary of the findings, number of
21 participants in each group, an estimate of the magnitude of the effect (where
22 possible), and the quality of the evidence for each outcome.

23
24 The overall quality of evidence is a combined grade of the quality of evidence
25 across many outcomes considered critical for a recommendation, defined in
26 the following way:

27
28 **High** = further research is very unlikely to change our confidence in the
29 estimate of the effect

30 **Moderate** = further research is likely to have an important impact in the
31 estimate of the effect and may change the estimate

32 **Low** = further research is very likely to have an important impact on our
33 confidence in the estimate of the effect and is likely to change the
34 estimate

35 **Very low** = any estimate of the effect is very uncertain.

36
37 For further information about the process and rationale of producing an
38 evidence profile table, see the GRADE Working Group website
39 (www.gradeworkinggroup.org).

40
41 Because the GRADE approach is primarily designed for comparative reviews,
42 it was not appropriate to use this approach for either the prevalence review or
43 the review of factors associated with post-abortion mental health outcomes.
44

45 **2.11 CONSULTATION**

46
47 Consultation is being/ carried out over a 3-month period. Comments are being
48 sought from relevant Royal Colleges, statutory organisations, researchers and

1 reviewers who had carried out similar reviews. Views are being sought on the
2 overall cohesiveness of the review, the rigour of the methodology, the
3 accuracy of the evidence statements and the relevance of the final
4 conclusions.

5

6 In addition to this targeted approach, the draft report is being made available
7 on the websites of the RCPsych to enable wider comment from the public and
8 other organisations.

9

10 Following consultation, comments will be responded to, and the report
11 amended where appropriate. Comments and responses will be published
12 separately at [*website address to be inserted after consultation, when known*].

13 All organisations who responded to consultation will be listed in Appendix 3.

14

DRAFT

3 PREVALENCE OF MENTAL HEALTH PROBLEMS IN WOMEN FOLLOWING AN INDUCED ABORTION

3.1 REVIEW QUESTION

How prevalent are mental health problems in women who have an induced abortion?

The aim of this chapter is to identify prevalence rates of mental health problems in women who have had an abortion. As previous mental health problems have been identified as a risk factor for mental health problems following an abortion (APA review), studies that account for previous mental health problems in the analysis of prevalence rates are reviewed separately from studies that failed to do so.

3.2 STUDIES CONSIDERED

Twenty-one² studies examining the prevalence of mental health problems following an abortion met the eligibility criteria for this review. Fourteen studies did not account for previous mental health outcomes, whereas seven studies did apply some control for previous mental health outcomes within the analysis. Five of the studies included in this review used the same data sources and reported prevalence rates for the same or similar outcomes. These studies have been included in the narrative review for completeness because in many cases the results differ due to differences in the inclusion or exclusion criteria. Seventy-nine studies were excluded. The most common reason for excluding studies was that outcomes had been measured within 90 days following an abortion (27 studies). Further details about excluded studies including reasons for exclusion are included in Appendix 6.

² STEINBERG2008 contains two studies utilising different data sources – these are termed STEINBERG2008Study 1 and STEINBERG2008Study 2 throughout this review.

3.3 STUDIES THAT DO NOT ACCOUNT FOR PREVIOUS MENTAL HEALTH

3.3.1 Study characteristics³

A summary of the study characteristics, including quality assessments (described in Section 2.5), of the 14 included studies are shown in Table 3. Nine papers analysed data collected as part of national longitudinal cohort studies from the US and Norway (COLEMAN2009, COUGLE2003, PEDERSEN2007, PEDERSEN2008, REARDON2002B, REES2007, SCHMIEGE2005, STEINBERG2008study1, TAFT2008); four were prospective cohort studies (BROEN2004, BROEN2005, BROEN2006; MAJOR2000) and one was a record linkage study (GISSLER1996). Outcomes measured in the studies varied, as did their method of assessment, with studies utilising clinical diagnosis, treatment claims or standardised measures to calculate the prevalence rates reported. Studies also varied in whether they reported point, period or lifetime prevalence rates, or incidence.

Table 3: Study characteristics of studies not accounting for previous mental health

Study ID and study design	Numbers, participant characteristics and country	Outcome	Measure and mode of administration	Follow-up	Study quality
BROEN2004 BROEN2005 BROEN2006 Prospective cohort	N = 70–80. Women treated in a gynaecology department in a hospital in Drammen, Norway.	Post-traumatic stress disorder (PTSD) Anxiety Depression	Impact of Event Scale (IES) Hospital Anxiety and Depression Scale (HADS) <i>Self-administered</i>	6 months 2 years 5 years	Fair
COLEMAN2009 Cross section	N = 399. Women who completed the US National Co-morbidity Survey. A nationally representative sample.	DSM-III-R psychiatric disorders	University of Michigan-Composite International Diagnostic Interview (UM-CIDI) <i>Clinical interview</i>	Cross section	Fair
GISSLER1996 Record data analysis	N = 93,807. Register linkage study using death certificates and abortion register, Finland	Suicide	Death certificate	1 year	Very poor

³ Here and elsewhere, each study considered for review is referred to by a study ID in capital letters (primary author and date of study publication, except where a study is in press or only submitted for publication, then a date is not used).

Study ID and study design	Numbers, participant characteristics and country	Outcome	Measure and mode of administration	Follow-up	Study quality
MAJOR2000 Prospective	N = 386–442* Women undergoing a first trimester abortion at 3 hospitals, US	Depression PTSD	Adapted Diagnostic Interview Schedule Adapted measure of PTSD <i>Self-report</i>	2 years	Poor
PEDERSEN2008 PEDERSEN2007 Retrospective	N = 76-125*. Women from the Young in Norway Longitudinal Study	Depression Alcohol problems Illicit drug use	Kandals and Davies Depressive Mood Inventory The Alcohol Use Disorders Identification Test (AUDIT) <i>Self-administered</i>	1–5 years 7–11 years 1–11 years Outcome during previous 12 months	Poor Fair
REES2007 Retrospective	n = 99. New mothers who had previously had a live birth recruited into Fragile Families and Child Wellbeing studies.	Major depression	Composite International Diagnostic Interview - Short Form (CIDI-SF) <i>Interview</i>	0–2 years	Fair
STEINBERG2008 study1 Cross section	N = 1236. Women who took part in the National Study of Family Growth, US	Anxiety	Experience of anxiety symptoms (based on DSM-IV criteria for generalised anxiety disorder [GAD])	Cross section	Fair
TAFT2008 Retrospective	N = 1026. Longitudinal cohort study. Random population study, Australia	Depression	CES-D <i>Self-administered</i>	1 year 4 years	Poor
US NLSY					
COUGLE2003 Retrospective	N = 293. Women from the Young in Norway Longitudinal Study	Depression	CES-D <i>Interview</i>	1–12 years (all abortion group)	Poor
REARDON2002 B Retrospective	N = 293. Women who reported an unwanted first pregnancy, US	Depression	CES-D <i>Interview</i>	0-8 years	Very Poor
SCHMIEGE2005	N = 457. Women who reported an unwanted first	Depression	CES-D <i>Interview</i>	1–12 years (post-1979 abortion)	Fair

Study ID and study design	Numbers, participant characteristics and country	Outcome	Measure and mode of administration	Follow-up	Study quality
Retrospective	pregnancy, US			group)	
N = the number of subjects used in the analysis. *Numbers varied across the analysis.					

1

2 3.3.2 Findings

3 Due to the heterogeneity of study design, outcomes and measurement
4 method used in the included studies, meta-analysis of the data was not
5 possible. Therefore, findings from each study have been reviewed narratively,
6 with studies using the same data source reviewed together. Table 4 presents
7 the range of prevalence rates identified. Although a proportion of the studies
8 adjusted for previous mental health problems in some of the analyses, the
9 prevalence rates are all unadjusted (REES2007, STEINBERG2008study1), or
10 an inappropriate method of adjusting for previous mental health problems was
11 used, for example, self-esteem scales (COLEMAN2009, COUGLE2003,
12 REARDON2002B, SCHMIEGE2005). Therefore, the prevalence results
13 presented here potentially include women with a history of mental health
14 problems.

15
16 COLEMAN2009 analysed the National Comorbidity Survey, a US survey of
17 the prevalence of mental disorders within a representative sample of non-
18 institutionalised women aged between 14 and 54 years. The analysis included
19 all women for whom information about pregnancy, mental health diagnosis
20 (based on the Composite International Diagnostic Interview [CIDI]) and
21 potential risk factors were available. This identified 399 women of whom 77%
22 reported one abortion and 23% reported multiple abortions. As shown in
23 Table 4, between 11 and 20% of the sample were diagnosed with some form
24 of anxiety disorder, with the percentage of women varying across the different
25 diagnostic categories, for example panic disorder, agoraphobia, PTSD, and
26 so on. For substance misuse disorders, between 9.52 and 36.84% and 16.97
27 and 23.31% of women were diagnosed with alcohol or drug misuse
28 disorders/dependence respectively. Finally, results for mood disorders
29 indicated that between 2.01% (bipolar disorder) and 40.6% (major
30 depression) of women met diagnostic criteria depending on the diagnosis in
31 question. One of the main limitations (as with all the studies reviewed in this
32 section), is the inadequate control of previous mental health problems.
33 COLEMAN2009 collected some survey data regarding previous conditions,
34 however, they were only able to conclude that 'in most cases, the abortion
35 preceded diagnosis' (page 772), thus raising the possibility that women with
36 pre-existing or previous diagnoses were included in the analysis. The study
37 also failed to control for multiple pregnancy outcomes (that is, two or more
38 different outcomes for a prior pregnancy including birth, abortion or
39 miscarriage) and included women with multiple abortions. Furthermore,
40 women in the study represented only 37.6% of the total survey, due to data
41 constraints relating to the availability of outcomes.

1
2 The NLSY, a US sample of civilians aged between 14 and 21 years in 1979,
3 was used in three of the included studies (COUGLE2003, REARDON2002B,
4 SCHMIEGE2005). Despite using the same survey and measure of depression
5 (CES-D), results varied due to differences in study quality and the variables
6 used. For instance, SCHMIEGE2005 included abortions occurring before
7 1979, whereas the other two studies excluded these cases. Studies also
8 varied regarding whether or not they excluded women with subsequent
9 pregnancy events – SCHMIEGE2005 included multiple events, whereas the
10 other two excluded women on this basis. Results for depression ranged from
11 23.71% as reported in SCHMIEGE2005 to 27.3% as reported in
12 COUGLE2003 and REARDON2002B, who used the same abortion sample,
13 despite differing with regard to their comparison group. In addition to sampling
14 differences, each study was hampered by a lack of adequate confounder
15 control, with studies only controlling for potential confounds in further analyses
16 and not in the prevalence rates reported. Although a measure of locus of
17 control was used in each study, this was not considered an adequate
18 measure of previous mental health problems within the current review.
19 Furthermore, the length of time between abortion and follow-up measurement
20 varied between 1 and 12 years (in the post-1979 abortion group) and 1 and
21 21 years (in the all abortion group), a factor very likely to influence prevalence
22 rates.

23
24 STEINBERG2008study1 conducted a secondary analysis of the National
25 Survey of Family Growth, a national probability sample of civilian women aged
26 between 15 and 44. Two samples were used in the analysis, one of which
27 only included women with unplanned first pregnancies resulting in abortion (n
28 = 1,167) and a second overlapping sample including women whose first
29 pregnancy event ended in abortion regardless of the pregnancy being
30 planned or not (n = 1,236). Although the study did not include a formal
31 diagnostic measure of GAD, the questions used to measure the experience of
32 anxiety reflected DSM criteria. The results indicated that 20.2% (unplanned
33 pregnancies) and 20.0% (all pregnancies) of women experienced anxiety after
34 the abortion. This figure was reduced to 18.8% when considering those who
35 had had one abortion only. It is worth noting the two overlapping samples
36 used in this study suggest that approximately 95% of abortions are for
37 unplanned pregnancies (1167/1236). However, one of the main limitations of
38 the study is the use of retrospective reporting of both whether or not the
39 pregnancy was planned and post-abortion mental health outcomes. In
40 addition to this limitation, the study failed to adequately control for
41 confounding variables in the analysis of prevalence rates.

42
43 Unlike other studies included in this review, REES2007 looked at the mental
44 health impact of subsequent abortions following a delivery. They analysed
45 data from the Fragile Family and Child Wellbeing study, which consisted of a
46 representative sample of US women who had recently given birth. Fifteen
47 mutually exclusive categories based on the different combinations of
48 outcomes were created for the analysis. The abortion group contained 99
49 women who had had an abortion but did not have any other pregnancy events
50 between the two follow-up periods. Depression was measured at both follow-

1 up interviews, but not at baseline, meaning any control for previous
2 depression in the analysis was limited. At both follow-up interviews, major
3 depression was measured through the use of a clinical interview (CIDI-SF). In
4 total, 31.3% met criteria for depression at the second follow-up. Although the
5 study controlled for multiple pregnancy events through the creation of the
6 different categories, the meaning and perception of abortion in this sample
7 may have differed from other studies included in the review, which commonly
8 included only women whose first pregnancy resulted in abortion. This
9 sampling difference, makes it is harder to compare the results of the present
10 study with others included in the review. Furthermore, the study relied on
11 retrospective self-reporting of pregnancy events and failed to control for the
12 effect of confounder variables on depression outcomes.

13
14 TAFT2008 assessed levels of depression in the younger cohort contained in
15 the Australian Longitudinal Study on Women's Health. The women in the
16 study were all aged between 18 and 23 when first surveyed in 1996. Women
17 were also surveyed in 2000 and at both time points information about
18 pregnancy events was recorded. In their analysis of depression rates, as
19 measured by the CES-D, TAFT2008 separated those who reported a first
20 termination in 1996 and those who reported the first termination in 2000. In
21 total 36.9% of women scored above cut-offs for depression; 36% met criteria
22 in the sample of women who had their first abortion in 1996 and 38% met
23 criteria in the sample of women who had their first abortion in 2000. However,
24 it is unclear how many women in these groups had had multiple pregnancy
25 outcomes, although TAFT2008 reported that multiple abortion and pregnancy
26 events were rare, they failed to account for this factor in their analysis.
27 Furthermore, the percentage of women who responded to the survey and
28 could be linked at both time points was low, with only 9,333 of the potential
29 36,000 eligible participants included in the analysis.

30
31 The final studies to conduct a secondary analysis of longitudinal data was
32 PEDERSEN2007 and PEDERSEN2008, who looked at alcohol problems and
33 depression within the Young in Norway Longitudinal Study. The Young in
34 Norway Study surveyed a representative sample of Norwegian school
35 children aged between 12 and 16 years in 1992, with follow-ups occurring
36 two, five and eleven years later. The sample included in the analysis was a
37 subset of the original sample followed up at all time points. Throughout the
38 survey, women were questioned about their pregnancy history with no
39 abortions or births occurring by time point 2 (T2). As shown in Table 4, at up
40 to 11 years following an abortion, 20.8% of women met criteria for depression
41 as measured on the Kandel and Davies' Depression Mood Inventory. Further
42 analysis divided the women into two groups: (1) those who had an abortion 7
43 to 11 years before the final follow-up and (2) those who had an abortion up to
44 6 years before the final follow-up. Results indicated that 11% of women in the
45 former group and 26% of women in the latter met criteria for depression at the
46 time of the final follow-up. Unlike PEDERSEN2008, the women included in the
47 PEDERSEN2007 analysis were restricted to those who at the time of the final
48 follow-up had only reported an abortion and had not given birth. Using the
49 AUDIT, which estimates alcohol problems in the previous 12 months, at final
50 follow-up results indicated that 30.3% of the sample met criteria for alcohol

1 problems, while 31.6% reported cannabis use and 17.1% other illegal drug
2 use. One of the main criticisms of the study is that the time between outcome
3 measurement and abortion varied between 1 and 11 years. The study also
4 relied on self-reporting of pregnancy events, with estimates from officially
5 recorded statistics suggesting the rate in the present sample was lower than
6 expected. A proportion of women in the PEDERSEN2008 sample also
7 experienced multiple pregnancy outcomes, which were not accounted for in
8 the analysis.

9
10 BROEN2004, BROEN2005 and BROEN2006 utilised a prospective design to
11 follow up 80 women who had undergone an abortion in a Norwegian hospital
12 during a 12-month period. PTSD was measured by the IES, with both
13 depression and anxiety determined by the HADS. As seen in Table 4, at 6
14 months, 2 years and 5 years following the abortion the percentage of women
15 meeting criteria for PTSD was 25.7%, 18.1% and 20% respectively. At 6
16 months, 2 and 5 years 47.3%, 31.9% and 34.3% of women were identified as
17 having anxiety, whereas 17.6%, 11.1% and 11.4% met the criteria for
18 depression. Although BROEN2004, BROEN2005 and BROEN2006 were
19 three of only four studies in the present review to adopt a prospective design,
20 the sample size was small (n = 80) and included only 46% of women eligible
21 for the study. Furthermore, the lack of control for previous and subsequent
22 pregnancy events in addition to failing to control for other confounding
23 variables when considering the prevalence rates are further limitations with
24 the results. As with many studies included in the review, the percentage of
25 women with multiple disorders (for example, depression and anxiety) was not
26 reported.

27
28 MAJOR2000 also conducted a prospective study of 442 women who had
29 undergone a first trimester abortion at one of three US hospitals. To be
30 included in the sample, the women had to indicate that the abortion was due
31 to an unplanned pregnancy that was not the result of rape. Women were
32 assessed at three time points namely 1 hour, 1 month and 2 years following
33 the abortion. Although 882 women initially agreed to take part and completed
34 the 1-hour post-abortion measure, approximately 50% were lost to follow-up
35 during the 2-year period. As highlighted in Table 4, 20.21% of women had
36 experienced a period of depression and 1.36% PTSD within the 2-year follow-
37 up period. In addition to the low follow-up rate, the study was also limited by a
38 number of other factors including lack of control for previous mental health
39 problems and other confounding variables.

40
41 GISSLER1996 was the only study to focus on suicide following an abortion.
42 The record linkage study matched information from the Finland Register of
43 Death Certificates on all deaths of women of childbearing age (15 to 49 years)
44 to the abortion register. In total 29 suicides occurred in the sample of 93,807
45 women who had an abortion (0.031%). Using the Charles review quality
46 criteria, GISSLER1996 was rated as very poor, due to multiple limitations.
47 Very little information was provided about the sample, including details about
48 the record linkage process. Furthermore, the study failed to account for any
49 confounding factors including previous mental health problems, how much the
50 pregnancy was wanted, multiple pregnancy events, type of abortion (elective

1 or medical) or any socioeconomic variables, which may be associated with
 2 both abortion and increased suicide risks.

3
 4 As can be seen in Table 4, the prevalence ranges are wide, reflecting the
 5 heterogeneity of the dataset, outcomes and measurement methods used.

6
 7
 8
 9

Table 4: Prevalence rates for studies, which did not control for previous mental health outcomes

Study ID	Follow-up	Prevalence rate (%)	Confidence intervals 95%	Point or period prevalence	Study quality
<i>Depression k = 9 (N = 3214)</i>					
SCHMIEGE2005	1–11 years 12+ years 1–12+ years	23.71 26.22 24.95	18.24–29.18 20.47–31.97 20.98–28.92	Point	Fair
BROEN2006	2 years 5 years	11.1 11.43	3.85–18.37 3.98–18.88	Point	Fair
COLEMAN2009	Cross-sectional study	36.59	31.86–41.32	Point	Fair
	Major depression with hierarchy				
	Major depression without hierarchy	40.6	35.78–45.42		
REES2007	0–2 years	31.3	22.17–40.45	Point	Poor
PEDERSEN2008	1–6 years 7–11 years 1–11 years	26.25 11.11 20.8	16.61–35.89 1.93–20.29 21.6–37.6	Point	Poor
TAFT2008	4+ years Up to 4 years Combined	35.96 37.9 36.89	31.98–39.94 33.5–42.3 33.99–39.89	Point	Poor
COUGLE2003	1–12 years	27.3	22.2–32.4	Point	Poor
MAJOR2000	2 years	20.21	16.2–24.22	Point	Poor
REARDON2002B	1–12 years	27.3	22.2–32.4	Point	Very poor
<i>Anxiety k = 2 (N = 1316)</i>					
BROEN2006	2 years 5 years	31.94 34.29	21.17–42.71 23.17–45.41	Point	Fair
STEINBERG2008study1	Cross-sectional study	20.2	17.92–22.52	Point	Fair
	Unplanned first pregnancy				
STEINBERG2008study1	Cross-sectional study	19.98	17.75–22.21	Point	Fair
	All first pregnancies				
<i>Panic disorder k = 1 (N = 399)</i>					
COLEMAN2009	Cross-sectional study	11.03	7.96–14.1	Point	Fair

Study ID	Follow-up	Prevalence rate (%)	Confidence intervals 95%	Point or period prevalence	Study quality
<i>Panic attacks k = 1 (N = 399)</i>					
COLEMAN2009	Cross-sectional study	18.05	14.28–21.82	Point	Fair
<i>Agoraphobia k = 1 (N = 399)</i>					
COLEMAN2009	Cross-sectional study	18.05	14.28–21.82	Point	Fair
<i>Agoraphobia without panic disorder k = 1 (N = 399)</i>					
COLEMAN2009	Cross-sectional study	14.04	10.63–17.45	Point	Fair
<i>PTSD k = 4 (N = 1001)</i>					
BROEN2004	6 months	25.68	15.73–35.63	Point	Fair
	2 years	18.06	9.17–26.95		
BROEN2005	5 years	20.00	10.63–29.37	Point	Fair
COLEMAN2009	Cross-sectional study	19.8	15.89–23.71	Point	Fair
MAJOR2000	2 years	1.36	0.28–2.44	Point	Poor
<i>Alcohol dependence k = 1 (N = 399)</i>					
COLEMAN2009	Cross-sectional study	23.31	19.16–27.46	Point	Fair
<i>Alcohol misuse/ problems (with/without drug dependence) k = 2 (N = 524)</i>					
COLEMAN2009	Cross-sectional study	14.54	11.08–18	Point	Fair
Alcohol misuse without dependence		36.84	32.11–41.57		
Alcohol misuse					
PEDERSEN2007	Problems within past 12 months at 1–7 years follow-up	30.3	19.93–40.59	Period	Fair
<i>Drug dependence k = 1 (N = 399)</i>					
COLEMAN2009	Cross-sectional study	16.79	13.12–20.46	Point	Fair
<i>Drug misuse (with/without alcohol dependence) k = 2 (N = 524)</i>					
COLEMAN2009	Cross-sectional study	9.52	6.64–12.4	Point	Fair
Drug misuse without dependence		23.56	19.4–27.72		
Drug misuse					
PEDERSEN2007	12 months			Period	Poor

Study ID	Follow-up	Prevalence rate (%)	Confidence intervals 95%	Point or period prevalence	Study quality
Cannabis use		31.6	2.6–8.2		
Other illegal drug use		17.1	3.4–17.7		
<i>Suicide k = 1 (N = 93807)</i>					
GISSLER1996	1 year	0.03	0.02–0.04	Period	Very Poor
<i>Bipolar disorder k = 1 (N = 399)</i>					
COLEMAN2009 Bipolar I disorder	Cross-sectional study	5.51	3.27–7.75	Point	Fair
New mania		2.01	0.63–3.39		

1

2 3.3.3 Limitations

3 As highlighted above, the majority of individual studies included in the review
4 were subject to multiple limitations. In addition to failing to adequately control
5 for previous mental health problems, other limitations common to many of the
6 studies reviewed included the use of retrospective reporting, failing to account
7 for whether or not the pregnancy was planned and whether the pregnancy is
8 wanted (and thus including both elective and therapeutic abortions),
9 inadequate confounder control, including taking no account of multiple
10 pregnancy events, and variable measurement of mental health outcome, often
11 including scale-based measures instead of clinical diagnosis.

12

13 Although it was not possible to produce a GRADE evidence profile due to the
14 primary aim of the review (for example, prevalence rates as opposed to a
15 comparative review), a number of limitations with the evidence as a whole
16 warrant discussion. One of the main limitations of the dataset related to the
17 degree of heterogeneity, which meant that meta-analysis of prevalence rates
18 for the different disorders was not possible. The heterogeneity was most
19 notable in the methods used for outcome measurement. For example,
20 measures of depression varied from scale-based measures such as the HADs
21 to clinical diagnostic interviews. Heterogeneity in sampling and variable
22 selection led to different studies producing a range of prevalence rates, even
23 when using the same data source (COUGLE2003, REARDON2002B,
24 SCHMIEGE2005). SCHMIEGE2005 noted that within the NLSY database
25 used for the secondary analysis, over 3,000 different variables related to
26 pregnancy outcomes; therefore even where the studies were using the same
27 survey, included populations and results could vary based on the variables
28 selected. Another potential reason for the heterogeneity of the prevalence
29 rates reported may result from the follow-up periods used. In many studies,
30 the follow-up time between the abortion and mental health outcome was
31 unclear, with studies including women who had recently had an abortion
32 within the same analysis as those who had had an abortion up to 11 years
33 previously. Furthermore, both point and period prevalence rates were used

1 throughout the dataset, making comparisons between different studies
2 problematic, even if they did report the same outcome.

3
4 Another major limitation with the dataset as a whole is the inadequate control
5 of confounding variables. Many studies failed to control for multiple pregnancy
6 outcomes (that is, a woman having had two or more different outcomes for a
7 prior pregnancy including birth, abortion or miscarriage). While some studies
8 included only women with a first pregnancy event (for example,
9 COUGLE2005, STEINBERG2008study1), others included all abortions during
10 a certain time period (BROEN2004, BROEN2005, BROEN2006,
11 GISSLER1996, MAJOR2000) and REES2007 included women who had
12 delivered a live birth and subsequently went on to have an abortion. It is
13 unclear whether multiple pregnancy events have an impact on the prevalence
14 of mental health problems. This sampling difference further adds to the
15 difficulties in comparing or meta-analysing prevalence rates between the
16 different studies.

17
18 The results of the review are also limited by the study designs, which mainly
19 comprised of secondary data analysis of larger longitudinal cohort studies,
20 many of which were not designed to specifically assess the prevalence of
21 mental health problems following an induced abortion. Only four studies
22 utilised prospective cohort designs (BROEN2004, BROEN2005, BROEN2006
23 and MAJOR2000) although the small sample size, low opt-in rate of only 46%
24 in the BROEN studies and the 50% attrition rate in MAJOR2000 make the
25 findings unclear. Furthermore, none of the studies used a UK sample so any
26 generalisations of the results to the UK population should be made with
27 caution.

28 29 **3.4 STUDIES THAT ACCOUNT FOR PREVIOUS** 30 **MENTAL HEALTH**

31 32 **3.4.1 Study characteristics**

33 The seven studies presented here all control for previous mental health
34 problems in some form within their analyses of prevalence rates. A summary
35 of the study characteristics, including quality assessment, of the included
36 papers are shown in Table 5. Three of the papers included in the review
37 presented analysis of data collected as part of national longitudinal cohort
38 studies (COUGLE2005, MOTA2010, STEINBERG2008study2), three reported
39 outcomes from a record-based study (COLEMAN2002A, REARDON2002A,
40 REARDON2003) and one (MUNK-OLSEN2011) also used registry data to
41 conduct a population-based cohort study. There was significant variability in
42 the methods of outcome measurement with some studies using clinical
43 diagnosis, while others used standardised scaled-based measures and others
44 treatment claims as recorded on regional databases. Studies also varied in
45 whether they reported point or period prevalence rates. Four of the studies
46 included in the review (COLEMAN2002A, MUNK-OLSEN2011,
47 REARDON2002A, REARDON2003) excluded participants with previous

1 mental health problems from their analysis. As all cases of mental health
 2 problems were new, these studies reported incidence rates instead of
 3 prevalence. In this case, where the studies reported absolute numbers or
 4 cumulative incidence rates (for example, the total proportion of the sample to
 5 experience a new mental health problem within a given time period), these
 6 were used to estimate period prevalence rates (for example, the total number
 7 of people to experience a mental health problem within a given time period)
 8 because all cases of the mental health problem could be classed as new
 9 cases.

10
 11 **Table 5: Study characteristics of studies accounting for previous mental**
 12 **health**

Study ID and study design	Numbers, participant characteristics and country	Outcome	Measure and mode of administration	Follow-up	Study quality (Charles rating)
COUGLE2005 Cross section	N = 1033. National Survey of Family Growth, US	Anxiety	Interview based on DSM-IV criteria for GAD	Cross section	Fair
MOTA2010 Cross section	N = 452. Women who completed the National Comorbidity Survey Replication, US	DSM-IV psychiatric disorders	Unmodified CIDI Interview	Cross section	Fair
MUNK-OLSEN2011 Prospective cohort study	N = 84620. Women with a first ever abortion identified from national records, Denmark	First psychiatric contact	Danish records of either inpatient or outpatient contact	9 months pre-abortion 1 year post-abortion	Very good
STEINBERG2008 study2 Cross section	N = 273. Identified from the National Comorbidity Survey, US	DSM-III-R anxiety disorders	Unmodified CIDI Interview	Cross section	Very good
<i>Californian Medical and Deaths Records study</i>					
COLEMAN2002 A Retrospective	N = 14297. Women who claimed from state-funded medical insurance programme, California, US	Outpatient treatment for ICD-9 mental illness	Insurance claims for psychiatric outpatient treatment	1 year 2 years 3 years 4 years	Fair
REARDON2003 Retrospective	N = 15299. Women who claimed from state-funded medical insurance programme, California, US	Psychiatric admission for ICD-9 mental illness	Insurance claims for psychiatric inpatient admission	1 year, 2 years, 3 years, 4 years	Fair

Study ID and study design	Numbers, participant characteristics and country	Outcome	Measure and mode of administration	Follow-up	Study quality (Charles rating)
REARDON2002 A Retrospective	N = 17472. Women who claimed from state funded medical insurance programme, California, US	Suicide	Death certificate	0–8 years	Fair

1 N = the number of subjects used in the analysis.

2

3 3.4.2 Findings

4 Due to differences in outcome measurement, follow-up times and whether
5 point or period prevalence was reported, meta-analysis of prevalence rates for
6 each outcome was not possible. As above, a narrative approach has been
7 adopted for the present review, with prevalence rates for each disorder
8 reported in Table 6.

9

10 Like STEINBERG2008study1 (discussed in Section 3.3.2), COUGLE2005
11 also analysed data from the fifth cycle of the National Survey of Family
12 Growth. In order to determine the effect of abortion on mental health
13 problems, variables relating to pregnancy outcome, whether or not the
14 pregnancy was planned, and anxiety were extracted from the survey. The
15 final sample used in the analysis included women who had reported that their
16 first pregnancy event was unplanned and resulted in abortion. As the outcome
17 of interest was anxiety, women who reported a period of anxiety either before
18 or during their first pregnancy were excluded. This resulted in a total of 1,033
19 included in the analysis. Where women indicated that they had experienced
20 either anxiety or worry on the initial items, follow-up questions which related to
21 the DSM-IV classification of GAD were used. In total, 13.75% of women
22 included in the study met the criteria for anxiety. One of the main limitations of
23 the study was that the time period between the abortion and mental health
24 outcomes was unclear. Furthermore, the reports of anxiety both prior to (used
25 as the basis for exclusion) and following the pregnancy event, are based upon
26 retrospective self-reporting. The study also failed to control for other
27 confounding factors within the analysis of prevalence rates. For example,
28 although an attempt was made to control for previous pregnancies by
29 excluding women who reported that the abortion occurred after a previous
30 pregnancy, there was no control for multiple pregnancies in the follow-up
31 period.

32

33 Unlike COLEMAN2009 (discussed in Section 3.3.2) who also utilised the
34 National Comorbidity Survey, STEINBERG2008study2 only included women
35 whose first pregnancy event ended in abortion, resulting in a sample of 273.
36 STEINBERG2008study2 used data on the first and most recent onset of each
37 disorder (as classified by the CIDI) to determine the percentage of women
38 with post-abortion anxiety. Controlling for previous anxiety disorders in this

1 way reduced the prevalence rates reported in the study. For instance
2 COLEMAN2009 reported that 19.8% of women met criteria for PTSD whereas
3 in STEINBERG2008study2 this figure was 10.26%, with rates for GAD and
4 social anxiety at 6.2% and 12.09% respectively. To control for multiple
5 abortions, STEINBERG2008study2 reported the percentage of women
6 meeting criteria for the different disorders categorised by the number of
7 abortions. For women with only one abortion, the rates for GAD, social anxiety
8 and PTSD were 6.5%, 11.0% and 9.2% respectively, with higher prevalence
9 rates reported for women experiencing two or more abortions. Despite
10 controlling for these factors, one of the main limitations of the study is that the
11 time period between the abortion and subsequent assessment of anxiety
12 varied from a few months to 20 years. The study also relied upon
13 retrospective reporting and failed to distinguish between elective and
14 therapeutic abortions.

15
16 MOTA2010 analysed data from the National Comorbidity Survey Replication
17 study, which surveyed women aged 18 and over between 2001 and 2003.
18 The sample used in the present study included women with a history of
19 abortion (n = 452). Lifetime mental health disorders were diagnosed through
20 the use of a structured clinical interview, the Composite International
21 Diagnostic Interview (CIDI). In order to control for previous mental health
22 problems, the analysis distinguished between women whose age of onset of
23 mental health problems preceded their first abortion and women whose age of
24 onset was after their first abortion. As shown in Table 6, prevalence rates
25 varied from disorder to disorder with 18.14, 9.29 and 2.88% experiencing
26 major depression, GAD and social phobia respectively. Results for drug and
27 alcohol misuse ranged from 4.65 to 10.62% depending on the diagnostic
28 category. Finally 10.62 and 3.54% of women reported suicidal ideation and
29 attempts respectively. The prevalence rates reported are limited by a number
30 of factors including the retrospective reporting of abortion and mental health
31 outcomes. This included retrospective reporting of when the first period of
32 mental health problems was experienced, which was used as the basis for
33 controlling for previous conditions. Crucially, distinctions between pre- and
34 post-abortion disorders were diagnosis specific, therefore, women who
35 reported depression prior to the abortion would still be included in the post-
36 abortion anxiety prevalence rates and vice versa. Furthermore, by using
37 lifetime measures of abortion and mental health history, follow-up times
38 between events are unclear, especially as the study fails to control for
39 confounding variables including multiple pregnancy outcomes.

40
41 COLEMAN2002A, REARDON2002A and REARDON2003 used data from a
42 US state-funded medical insurance programme to identify a sample of women
43 whose first pregnancy ended in abortion during a specific time period. In order
44 to control for previous mental health problems, women who claimed for
45 psychiatric inpatient treatment (COLEMAN2002A) or inpatient and/or
46 outpatient treatment (REARDON2002A, REARDON2003) in the 12 to 18
47 months prior to the abortion were excluded. While COLEMAN2002A and
48 REARDON2003 assessed outpatient and inpatient treatment respectively,
49 REARDON2002A used data from death certificates to assess suicide rates
50 subsequent to the abortion. As shown in Table 6, the overall period

1 prevalence rates of women who had received inpatient treatment was 0.3%,
2 0.56%, 0.84% and 1.18% up to 1, 2, 3 and 4 years respectively. Rates for
3 outpatient treatment on the other hand were 4.7%, 7.85%, 10.98% and
4 14.49% up to each time point, and at up to 8 years following the abortion 11
5 women or 0.063% had died by suicide. As with other studies utilising the
6 same data source, the three studies varied in their inclusion criteria regarding
7 prior mental health outcomes. COLEMAN2002A only excluded women with a
8 history of inpatient admission, whereas the other two studies excluded women
9 with a history of both inpatient and outpatient treatment (REARDON2002A,
10 REARDON2003). One of the main limitations of the study is the use of
11 treatment records to estimate mental health problems because women with
12 mental health problems who did not claim for treatment would not be included
13 in the rates reported. Furthermore, although each study excluded women with
14 a history of pregnancy events prior to abortion, women were not excluded if
15 they experienced subsequent pregnancy events resulting in abortion,
16 miscarriage or birth, which could all impact upon mental health outcomes.

17
18 Unlike the record linkage studies above, MUNK-OLSEN2011 used linkage
19 data to conduct a national prospective cohort study. Using data from the
20 Danish Civil Registration System to establish the potential sample, the
21 authors linked abortion records from the Danish National Register of Patients
22 to the Danish Psychiatric Central Register, which includes records of all
23 inpatient and outpatient psychiatric contact. Women were included in the
24 sample if they had undergone a first abortion between 1995 and 2007, and
25 had no history of mental health problems between birth and 9 months prior to
26 the first abortion. In total 84,620 women were included in the sample and
27 individually followed up to a maximum of 12 months after the abortion or until
28 psychiatric contact, emigration or death occurred. Unlike other studies
29 included in the review, MUNK-OLSEN2011 assessed psychiatric contact in
30 the 9 months leading up to the abortion as well as 1 year following the
31 abortion. As the focus of the study was on incidence of psychiatric treatment,
32 for example, first psychiatric contact, it was not possible to present prevalence
33 rates accurately for the different diagnostic categories. For example, someone
34 with a first contact for depression may have gone on to have contact for
35 psychosis but would not be included in the psychosis analysis. Despite this
36 focus, period prevalence rates for first psychiatric contact (regardless of
37 diagnosis) could be extracted from the data. In total, 1% of the sample had
38 psychiatric contact in the 9 months leading up to the abortion compared with
39 1.5% in the 12 months' follow-up period. Although the study is of higher
40 quality than others included in the review because it did not rely on
41 retrospective reporting, had a low attrition rate and included a large national
42 sample, a number of limitations warrant discussion. In particular, using
43 psychiatric contact as a measure of mental health outcome may
44 underestimate the rates reported as women may have experienced mental
45 health problems without coming into contact with services. Furthermore, the
46 study failed to control for confounding variables and did not distinguish
47 between elective abortions and abortions conducted due to medical reasons,
48 such as fetal abnormality.

49

1 **Table 6: Prevalence rates for each outcome from studies accounting for**
 2 **previous mental health outcomes**

Outcome	Studies	Follow-up	Percentage	CI	Study quality
<i>GAD k = 2 (N = 725)</i>					
GAD	MOTA2010	Cross sectional	9.29	6.61 to 11.97	Fair
GAD	STEINBERG2008s tudy2	n/a	6.23	3.36 to 91	Very good
<i>Social phobia k = 1 (N = 452)</i>					
Social phobia	MOTA2010	Cross sectional	2.88	1.34 to 4.42	Fair
<i>Anxiety k = 2 (N = 15330)</i>					
Anxiety states	COLEMAN2002A	1-4 years	2.48	2.23 to 2.73	Fair
Anxiety	COUGLE2005	n/a	13.75	11.65 to 15.85	Fair
<i>Social anxiety k = 1 (N = 273)</i>					
Social anxiety	STEINBERG2008s tudy2	n/a	12.09	8.22 to 15.96	Very good
<i>Depression-related disorders k = 1 (N = 452)</i>					
Major depression	MOTA2010	Cross sectional	18.14	14.59 to 21.69	Fair
<i>Suicide k = 2 (N = 17924)</i>					
Suicidal ideation	MOTA2010	Cross sectional	10.62	7.78 to 13.46	Fair
Suicide attempt	MOTA2010	Cross sectional	3.54	1.84 to 5.24	Fair
Suicide	REARDON2002A	Up to 8 years	0.06	0.02 to 0.1	Fair
<i>Psychiatric admissions k = 1 (N = 15299)</i>					
Psychiatric admission	REARDON2003	Up 1 year Up to 2 years Up to 3 years Up to 4 years	0.3 0.56 0.84 1.18	0.21 to 0.39 0.44 to 0.68 0.7 to 0.98 1.01 to 1.35	Fair
<i>Alcohol misuse k = 1 (N = 452)</i>					
Alcohol misuse	MOTA2010	Cross sectional	10.62	7.78 to 13.46	Fair
<i>Alcohol dependence k = 1 (N = 452)</i>					
Alcohol dependence	MOTA2010	Cross sectional	4.65	2.71 to 6.59	Fair
Alcohol misuse	MOTA2010	Cross sectional	7.96	5.46 to 10.46	Fair
<i>Drug dependence k = 1 (N = 452)</i>					
Drug	MOTA2010	Cross sectional	4.65	2.71 to 6.9	Fair

dependence					
<i>PTSD k = 1 (N = 273)</i>					
PTSD	STEINBERG2008s tudy2	n/a	10.26	6.66 to 13.86	
<i>Outpatient treatment k = 1 (N = 14297)</i>					
Outpatient psychiatric treatment	COLEMAN2002A	Up 1 year	4.7	4.35 to 5.05	Fair
		Up to 2 years	7.85	7.41 to 8.29	
		Up to 3 years	10.98	10.47 to 11.49	
		Up to 4 years	14.49	13.91 to 15.07	
<i>Psychiatric treatment k = 1 (N = 84620)</i>					
First contact with psychiatric services	MUNK- OLSEN2011	9 months before	1.03	0.96 to 1.1	Very good
		0 to 12 months	1.52	1.44 to 1.6	
		Total time	2.53	2.42 to 2.64	
		period			

1

2 3.4.3 Limitations

3 Although these studies in general were of better quality than the studies that
4 did not control for previous mental health problems, they still have a number
5 of limitations. In particular, the studies included in this review failed to control
6 for other confounding factors, including multiple pregnancy outcomes both
7 before and during the follow-up periods, relied on retrospective reporting of
8 pregnancy and mental health outcomes and failed to distinguish between
9 elective and therapeutic abortions.

10

11 The methods of identifying and controlling for previous mental health
12 problems were both varied and limited. REARDON2003, COLEMAN2002A
13 and REARDON2002A all excluded women who had made a claim for
14 psychiatric treatment within the last 6 to 12 months prior to the survey.
15 However, there is no certainty that all women experiencing mental health
16 problems would have claimed for treatment. Moreover, the exclusion time
17 period of only 1 year prior to the abortion would lead to women with older
18 claims dating back beyond 1 year still being included in the study. On the
19 other hand MOTA2010 excluded women whose age at onset of a mental
20 health problem preceded of the age at which they had the abortion. However,
21 the age of onset of mental health problems was assessed retrospectively and
22 was therefore subject to the possibility of recall bias.

23

24 As with the review in Section 3.3, heterogeneity in the outcomes investigated
25 and in the measurement of disorders meant that meta-analysis was not
26 possible. Very few studies looked at the same outcomes. For example, while
27 REARDON2003 and COLEMAN2002A focused on inpatient and outpatient
28 psychiatric treatment respectively, MUNK-OLSEN2011 did not distinguish
29 between the two, making comparisons across these studies difficult. Even
30 where studies reported prevalence rates for the same diagnostic category, the
31 methods of outcome measurement varied with some studies using
32 standardised measures while others used clinical interviews. Furthermore, the
33 difference in follow-up times, which ranged from 90 days to 20 years, and the

1 use of point and period prevalence rates further complicates any comparisons
2 made and the conclusions drawn.

3
4 These limitations aside, it is also unclear how generalisable the findings would
5 be to a UK population given that three of the six included studies
6 (COLEMAN2002A, REARDON2002A, REARDON2003) all used the same
7 data source, which focused on US women of low income and none were
8 conducted in the UK..
9

10 **3.5 COMPARISON OF STUDIES THAT ACCOUNT FOR** 11 **PREVIOUS MENTAL HEALTH AND STUDIES THAT** 12 **DO NOT ACCOUNT FOR PREVIOUS MENTAL** 13 **HEALTH PROBLEMS**

14
15 It is possible to compare prevalence rates from studies that do not account for
16 previous mental health outcomes with those that do account for previous
17 mental health as described in Sections 3.3 and 3.4, respectively.

18
19 A higher rate of mental health problems was reported in studies that did not
20 control for previous mental health outcomes compared with studies that did
21 account for previous mental health (see Table 7 for a comparison). This was
22 true even where studies used the same data source. For example,
23 COLEMAN2009 and STEINBERG2008study2 both analysed data from the
24 National Comorbidity Survey. However, only STEINBERG2008study2
25 adequately controlled for previous mental health outcomes and reported lower
26 rates of the same disorders when compared with COLEMAN2009. A similar
27 pattern of results was also apparent for COUGLE2005 (controlled for previous
28 anxiety), who reported lower prevalence rates of anxiety, compared with
29 STEINBERG2008study1, which did not control for previous anxiety despite
30 using the same data source. These findings suggest that a history of mental
31 health problems prior to an abortion will have an effect on the rates of mental
32 health problems following an abortion.

33
34 However, it must also be noted that differences in the results may also be
35 attributable to other variations within the studies, including sample and
36 variable selection, heterogeneity in outcomes reported and differences in the
37 measurement methods used. Studies differ greatly from one another, making
38 a direct comparison between studies that do and do not control for previous
39 mental health outcomes problematic. Furthermore, comparisons of rates of
40 mental health problems between studies that do and do not account for
41 previous mental health problems are limited to five outcomes. There is no
42 information on to whether this observed difference in rates applies to other
43 mental health outcomes.

1 **Table 7: Comparison of prevalence rates between studies that account**
 2 **for previous mental health and studies that do not account for previous**
 3 **mental health**

Outcome	Studies that account for previous mental health	Studies that do not account for previous mental health
Depression / related disorder	18.14	11.1 to 40.6
Anxiety / related disorder	2.48 to 13.75	19.98 to 34.29
PTSD	10.26	1.36 to 25.68
Suicide	0.06 to 10.62	0.03
Outpatient treatment	4.7 to 14.49	-
Psychiatric admissions	0.3 to 1.18	-
Alcohol/drug related disorder	4.65 to 10.62	9.52 to 36.84
Psychiatric treatment	1.03 to 2.53	-
Panic disorder/attacks	-	11.03 to 18.05
Agoraphobia with/without panic disorder	-	14.04 to 18.05
Bipolar disorder	-	2.01 to 5.51

4

5 **3.6 EVIDENCE STATEMENTS**

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1. The studies included in the review have a number of significant limitations, such as retrospective study designs and secondary data analysis of population studies, varied measurement of mental health outcomes both prior to and following the abortion, small sample sizes, and lack of adequate control for confounding variables including whether or not the pregnancy was planned and multiple pregnancy events both before and after abortion. The high degree of heterogeneity in prevalence rates reported and the differences in outcome measurement make it difficult to form confident conclusions or generalisations from these results.
2. When prior mental health is not taken into account, rates of mental health problems post-abortion appear to be high.
3. Controlling for previous mental health problems has an impact on the prevalence rates of mental health problems following an abortion. Specifically, studies that controlled for previous mental health problems reported lower rates of mental health problems following an abortion when compared with studies that did not adequately control for previous mental health problems.
4. The samples used in STEINBERG2008study1 suggest that in countries where abortion is legal, the majority of abortions (up to 95% as reported in the study) are for unplanned pregnancies with only a small proportion occurring due to therapeutic reasons such as fetal abnormality or risk to the mother.

4 FACTORS ASSOCIATED WITH MENTAL HEALTH PROBLEMS FOLLOWING INDUCED ABORTION

4.1 REVIEW QUESTION

What factors are associated with poor mental health outcomes following an induced abortion?

This chapter identifies factors that are associated with poor mental health following an induced abortion.

4.2 STUDIES CONSIDERED

Eighteen studies were included in the review of factors associated with mental health outcomes following an induced abortion. Of the 18 included studies, nine were designed with the specific aim of testing for predictors of mental health outcomes (BROEN2006, FERGUSSON2009, MAJOR2000, MUNK-OLSEN2011, PEDERSEN2007, PEDERSEN2008, QUINTON2001, REARDON2002A, RUSSO1997). The remaining nine studies (COLEMAN2002A, COUGLE2005, GILCHRIST1995, REARDON2002B, REARDON2003, REES2007, SCHMIEGE2005, STEINBERG2008study1, STEINBERG2008study2) were primarily concerned with comparing outcomes in abortion and non-abortion groups, rather than directly assessing the factors that can lead to poor outcomes following an abortion. In addition, 81 studies were excluded from the review. The most common reason for exclusion was lack of useable data. Studies that used the same data source within their analysis (MAJOR2000, QUINTON2001, REARDON2002B, RUSSO1997, SCHMIEGE2005) and examined the same factors associated with mental health outcomes were included in the narrative review for completeness, because in many cases results differ due to differences in the inclusion/exclusion criteria and different statistical comparisons conducted. Further details about excluded studies including reasons for exclusion are included in Appendix 6.

4.3 FACTORS ASSOCIATED WITH POOR MENTAL HEALTH FOLLOWING AN ABORTION

4.3.1 Study characteristics

The studies in this section identify factors associated with poor mental health following an abortion. Studies varied as to whether they were specifically designed to determine the effect of factors on subsequent mental health outcomes or if this was a secondary outcome. Details of the included studies can be seen in Table 8.

The 18 studies included in the review analysed data drawn from 11 separate data sources. Five studies, reporting on three data sources (BROEN2006, GILCHRIST1995, MAJOR2000, MUNK-OLSEN2011, QUINTON2001), utilised prospective cohort designs to follow-up women either requesting or obtaining an abortion during a set time period. Ten studies analysed retrospective or cross-sectional data collected as part of national longitudinal cohort studies or surveys. Within these ten studies, six different data sources were used, including the NLSY (REARDON2002B, RUSSO1997, SCHMIEGE2005), the National Survey of Family Growth (COUGLE2005, STEINBERG2008study1), the Fragile Families and Child Wellbeing Study (REES2007), the National Comorbidity Survey (STEINBERG2008study2), the Young in Norway Longitudinal Study (PEDERSEN2007, PEDERSEN 2008) and the Christchurch Health and Developmental Study (FERGUSON2009). The final three studies utilised data obtained from Californian medical and death records linking pregnancy outcomes to subsequent treatment claims and suicides (COLEMAN2002A, REARDON2002A, REARDON2003).

Across the studies a range of post-abortion mental health outcomes were assessed including depression (BROEN2006, MAJOR2000, PEDERSEN2008, QUINTON2001, REARDON2002B, REES2007, SCHMIEGE2005), anxiety (BROEN2006, COUGLE2005, STEINBERG2008study1, STEINBERG2008study2), psychiatric treatment (COLEMAN2002A, REARDON2003), PTSD (MAJOR2000), alcohol and drug misuse (PEDERSEN2007), psychosis (GILCHRIST1995), self-harm (GILCHRIST1995), non-psychotic illness (GILCHRIST1995), suicide (REARDON2002A), any DSM psychiatric disorder (FERGUSON2009, GILCHRIST1995) and self-esteem (RUSSO1997).

In addition to the variation in study design and mental health outcomes reported, studies differed in the factors assessed. The following factors were included in the review: a history of mental illness (BROEN2006, GILCHRIST1995, MAJOR2000); low self-esteem (RUSSO1997); age (COLEMAN2002A, COUGLE2005, MAJOR2000, PEDERSEN2008, QUINTON2001, REARDON2003); ethnicity (COUGLE2005, MAJOR2000, MUNK-OLSEN2011, RUSSO1997, SCHMIEGE2005); education (BROEN2006, RUSSO1997); other pregnancy events including multiple abortions or births (BROEN2006, MAJOR2000, MUNK-OLSEN2011, PEDERSEN2007, REARDON2002A, REES2007, RUSSO1997, STEINBERG2008study1,

1 STEINBERG2008study2); employment (BROEN2006, RUSSO1997); marital
 2 and/or relationship status (BROEN2006, COUGLE2005, MAJOR2000,
 3 REARDON2002B, RUSSO1997, SCHMIEGE2005); religion (MAJOR2000,
 4 RUSSO1997, SCHMIEGE2005); negative reactions to abortion (BROEN2006,
 5 FERGUSSON2009); negative attitudes towards abortion (BROEN2006);
 6 medical complications following the abortion (MAJOR2000) and stressful life
 7 events (BROEN2006).

8
 9 **Table 8: Study characteristics: risk and predictive factors associated**
 10 **with mental health problems following an abortion**

11

Study ID and study design	Participant characteristics and country	Outcome, measure and mode of administration	Factors and measures	Follow-up period	Study quality
BROEN2006 Prospective	N = 70–80. Women treated in a Norwegian gynaecology department	Anxiety and depression (HADS) <i>Self-administered</i>	Negative attitudes to abortions Doubt (negative reaction) Previous mental health Life events Education Multiple pregnancy events Marital status Employment	6 months to 5 years	Fair
FERGUSSON 2009 Retrospective (with some prospective data)	N = 104. New Zealand women followed from birth to 30 years old reporting an abortion	DSM-IV diagnosis (questionnaire based on the CIDI) <i>Self-administered</i>	Negative reaction to abortion	Follow-ups occurred at age 15–18, 18–21, 21–25 and 25–30 years	Fair
GILCHRIST1995 Prospective	N = 6410. Women requesting an abortion were recruited from UK GP (general practitioner) surgeries	Any psychiatric illness Psychotic illness Non-psychotic illness Deliberate self-harm (All GP rated)	Psychiatric history	Every 6 months from 1976–1987	Fair
MUNK-OLSEN2011 Prospective	N = 84620. Women with no history of a mental disorder (prior inpatient psychiatric contact) prior to first childbirth or abortion in the first trimester	Psychiatric inpatient and outpatient contact (Danish Psychiatric Central Register)	Age Prior child birth	Up to 12 years	Poor

Study ID and study design	Participant characteristics and country	Outcome, measure and mode of administration	Factors and measures	Follow-up period	Study quality
PEDERSEN2008	N = 76-125 Women from the Young in Norway Longitudinal Study	Alcohol use (intoxication episodes; Rutgers Alcohol Problem Index, AUDIT) Cannabis use or substance use (self-report) <i>Self-administered</i>	Age at time of pregnancy Current relationship status Other pregnancy events	11 years	Poor
PEDERSEN2007					Fair
Retrospective					
REES2007	N = 99. New mothers who had previously had a live birth recruited into the Fragile Families and Child Wellbeing Study	Major Depression (CIDI-SF) <i>Interview</i>	Multiple pregnancy events	0 to 2 years	Fair
STEINBERG 2008study 2	N = 273. Identified from the Nation Comorbidity Survey. All first pregnancies ending in an abortion.	DSM-III-R anxiety disorders (CIDI) <i>Interview</i>	Multiple pregnancy events	Cross section	Very good
<i>Californian medical records – linkage study</i>					
COLEMAN 2002A	N = 14297. Californian women who claimed from state-funded medical insurance program	Claims for psychiatric outpatient treatment	Age at time of pregnancy	90 days to 4 years	Fair
REARDON 2002A	N = 17472. Californian women who claimed for an abortion	Suicide (record data)	Multiple pregnancy events	0 to 8 years	Fair
REARDON 2003	N = 15299. Californian Women who claimed from state-funded medical insurance program	Claims for psychiatric admission for ICD- 9 disorder	Age at time of pregnancy	90 days to 4 years	Fair
<i>National Study of Family Growth</i>					

Study ID and study design	Participant characteristics and country	Outcome, measure and mode of administration	Factors and measures	Follow-up period	Study quality
COUGLE2005 Cross sectional	N = 1033. US women whose first pregnancy was unplanned and ended in abortion, and who did not report a period of pre-pregnancy anxiety	Experience of anxiety (interview based on DSM-IV GAD criteria) <i>Interview</i>	Marital status Ethnicity Age	Cross section study	Poor
STEINBERG 2008study1 Cross sectional	N = 1167. US women who took part in National Study of Family Growth	Experience of anxiety (based on DSM-IV GAD criteria) <i>Interview</i>	Muliple pregnancy events	Cross section study	Very good
<i>Buffalo prospective study</i>					
MAJOR2000 Prospective	N = 386. Women obtaining an abortion from one of three clinics in Buffalo, NY, for an unplanned pregnancy, not as a result of rape	Depression (Brief Symptom Inventory and a questionnaire version of the Diagnostic Interview Schedule) <i>Self-administered</i>	Previous mental health probelms Age Ethnicity Multiple pregnancy events Medical complications	2 years	Fair
QUINTON2001 Prospective	N = 436. Minors and adults from one of three abortion clinics in Buffalo, NY	Depression (depression subscale of the Brief Symptom Inventory) <i>Self-administered</i>	Age	2 years	Fair
<i>National Longitudinal Survey of Youth</i>					
REARDON 2002B Retrospective	N = 293. Non-institutionalised US women with a history of at least one abortion	Depression based on the CES-D <i>Self-administered</i>	Marital status	Up to 12 years	Very Poor
RUSSO1997 Retrospective	N = 721. Non-institutionalised US women with a history of at least one abortion	Well-being (10 item Rosenberg Self-Esteem Scale) <i>Self-administered</i>	Ethnicity Religion Previous self-esteem Education Marital status Multiple pregnancy outcomes	8 years	Fair

Study ID and study design	Participant characteristics and country	Outcome, measure and mode of administration	Factors and measures	Follow-up period	Study quality
SCHMIEGE2005 Retrospective	N = 479. Non-institutionalised US women with a history of at least one abortion	Depression based on the CES-D <i>Self-administered</i>	Marital status Ethnicity Religion	Up to 22 years	Fair
N = the number of subjects used in the analysis.					

1

2 4.3.2 Findings

3 Due to the heterogeneity of study design, outcome and measurement
4 methods used in the included studies, meta-analysis of the data was not
5 possible. Meta-analysis of similar outcomes where they did exist was also not
6 possible due to the selective reporting of data, with the majority of studies only
7 reporting a particular factor when a significant result was obtained and many
8 studies only reporting approximate p-values. Therefore, findings for each risk
9 factor have been reviewed narratively, with studies using the same data
10 source reviewed together to highlight any differences in findings. Summary
11 findings for each of the factors are shown in Table 9.

12

13 4.3.2.1 History of mental illness

14 Three prospective studies assessed the impact of previous mental health
15 problems on post-abortion mental health outcomes (BROEN2006,
16 GILCHRIST1995, MAJOR2000). Two of the studies directly aimed to
17 determine the effects of previous mental health problems (BROEN2006,
18 MAJOR2000). GILCHRIST1995, on the other hand, indirectly evaluated the
19 impact of previous mental health problems, comparing the mental health
20 outcomes for women who either had or had not requested a termination for an
21 unplanned pregnancy.

22

23 BROEN2006 set out to determine the effect of previous mental illness on
24 measures of depression and anxiety following a pregnancy termination (either
25 miscarriage or abortion). The authors conducted multivariate analyses to
26 identify risk factors for mental health problems (using logistic regression for
27 categorical variables and linear regression for continuous variables) following
28 a pregnancy termination, with separate results reported for the miscarriage
29 and abortion groups. The results of the analyses indicated that a history of
30 poor psychiatric health prior to the abortion was associated with higher
31 depression scores ($p < 0.001$) at 6 months, and higher depression and anxiety
32 scores ($p < 0.001$ and $p < 0.05$, respectively), as measured by the HADS, at 5
33 years. However, no indication was given of the precision or magnitude of
34 these differences.

35

36 MAJOR2000 conducted a longitudinal study to investigate the effect of
37 induced abortion on levels of depression, self-esteem and abortion-specific
38 PTSD in women attending three abortion clinics in the US. Using multiple

1 regression, their model included (and controlled for) a number of potential
 2 factors including age, history of depression, prior births, ethnicity, religious
 3 affiliation, marital status, number of prior abortions and physical complications
 4 post-abortion. In agreement with BROEN2006, the results of the multiple
 5 regression analyses indicated that a history of depression was associated
 6 with poorer post-abortion outcomes for all measures of depression and PTSD.
 7 Specifically, a history of depression was the only significant predictor included
 8 in the model for both post-abortion depression as measured by the diagnostic
 9 interview schedule and PTSD ($\beta = 0.87$, $SE = 0.30$, $p < 0.01$ and $\beta = 2.26$, SE
 10 $= 0.75$, $p < 0.05$, respectively). Furthermore, a history of depression was also
 11 significantly associated with a continuous measure of depression: the Brief
 12 Symptom Inventory Depression Interview score ($\beta = 0.49$, $SE = 0.11$, $p <$
 13 0.001) and with post-abortion negative emotions ($\beta = 0.54$, $SE = 0.13$, $p <$
 14 0.001).

15
 16 GILCHRIST1995 investigated mental health outcomes in a UK prospective
 17 cohort study of women with an unplanned pregnancy over a period of up to 11
 18 years. Groups were stratified according to their psychiatric histories, namely
 19 previous psychosis, previous non-psychotic illness, previous deliberate self-
 20 harm without another psychiatric illness or no previous psychiatric illness.
 21 Incidence rates of first psychiatric illnesses were reported for all women
 22 included in the study and stratified by psychiatric history. For all pregnancy
 23 outcomes, a history of psychotic illness was associated with an increased risk
 24 of post-pregnancy psychiatric illnesses. Specifically, for women who had an
 25 abortion, incidence rates (per 1000 woman-years) for all psychiatric illnesses
 26 for each group are shown in Table 9 (GILCHRIST1995).

27
 28
 29 **Table 9: Incidence rates for all psychiatric illnesses in women who have**
 30 **had an abortion**

Psychiatric illness	Incidence rates (per 1000 woman-years)
Previous psychosis	116.0
Previous non-psychotic illness	108.8
Previous deliberate self-harm	66.5
No psychiatric history	63.5

31
 32 The authors further report incidence rates (per 1000 woman-years) for
 33 psychotic episodes, non-psychotic episodes and deliberate self-harm across
 34 the four groups for previous psychosis, previous non-psychotic illness,
 35 previous deliberate self-harm and no psychiatric history (Table 10).

36
 37

1 **Table 10: Incidence rates for episodes of psychiatric illnesses in women**
 2 **who have had an abortion**

Groups	Incidence rates (per 1000 woman-years)		
	Psychotic episodes	Non-psychotic episodes	Deliberate self-harm episodes
Previous psychosis	28.2	115.9	18.2
Previous non-psychotic illness	4.9	107.0	7.1
Previous deliberate self-harm	0	63.3	8.4
No psychiatric history	1.1	61.8	3.0

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Despite the consistency of findings, one of the main limitations of the study is the lack of analysis conducted to ascertain whether the differences in incidence rates between women with differing psychiatric histories was statistically significant.

10 **4.3.2.2 History of low self-esteem**

11 Rather than looking at mental illness as a risk factor, RUSSO1997 assessed
 12 the impact of prior self-esteem on measures of post-abortion self-esteem in
 13 women included in the National Longitudinal Youth Survey. When focusing on
 14 women who reported an abortion, results of multiple regression analyses
 15 revealed that only previous levels of self-esteem were significant predictors of
 16 post-abortion self-esteem. Despite reporting the significance of the findings,
 17 exact results of the regression in terms of the resulting β coefficients were not
 18 reported.

19

20 **4.3.2.3 Demographic factors**

21 The association between a number of demographic factors and post-abortion
 22 mental health has been investigated within various studies utilising a range of
 23 designs. In particular, studies have assessed the impact of age, ethnicity,
 24 religion, marital/relationship status, education, income and employment.

25 **Age**

26 Seven studies (COLEMAN2002A, COUGLE2005, MAJOR2000, MUNK-
 27 OLSEN2011, PEDERSEN2008, QUINTON2001, REARDON2003) assessed
 28 the impact of age at the time of the abortion on different measures of post-
 29 abortion mental health. Of these seven studies, only MAJOR2000 and
 30 QUINTON2001 (who used the same sample of women recruited from three
 31 abortion clinics in the US) specifically aimed to assess the impact of age.
 32 Within their analyses, the findings for the impact of age at the time of abortion
 33 were mixed. MAJOR2000 found that at 2-year follow-up, age was a significant
 34 predictor of negative emotions post-abortion ($\beta = -0.05$, $SE = 0.01$, $p < 0.001$),
 35 with younger women reporting more negative attitudes. However,
 36 MAJOR2000 failed to find any impact of age on either scale-based or
 37 interview measures of depression ($\beta = -0.02$, $SE = 0.01$, $p > 0.05$ and $\beta = -$
 38 0.01 , $SE = 0.03$, $p > 0.05$, respectively), or on PTSD ($\beta = -0.05$, $SE = 0.11$, $p >$

1 0.05). Unlike MAJOR2000, who grouped their participants according to five
2 age categories when comparing minors (17 years old and younger) with
3 adults (over 17 years old), QUINTON2001 found no effect of age on negative
4 emotions at 2-year follow-up ($F = 0.00$; 95% CI, 1.0 – 5.0, $p > 0.05$).
5 Furthermore, by grouping the women in this way QUINTON2001 also failed to
6 show any effect of age on measures of post-abortion depression at 2-year
7 follow-up ($F = 0.23$; 95% CI, 0.0 – 4.0, $p > 0.05$).

8
9 Findings from studies that were not specifically designed to assess the impact
10 of age, and hence did not provide any statistical comparisons between age
11 groups, also produced mixed findings. In their cross-sectional analysis of
12 survey data, COUGLE2005 reported that women who had an abortion under
13 the age of 20 years had slightly higher rates of anxiety symptoms (14.1%)
14 than women over the age of 20 (12.8%). Converting this raw data into odds
15 ratios indicated that there was no significant difference between age groups
16 ($OR = 1.15$; 95% CI, 0.79 – 1.65, $p > 0.05$). However, caution must be noted
17 with this result because raw unadjusted data has been used to produce these
18 estimates. In contrast, when analysing retrospective data, PEDERSEN2008
19 reported that 21% of women aged 21 to 26 years experienced depression up
20 to 11 years post-abortion, compared with only 5% of women aged 15 to 20
21 years. Odds ratios for the data indicated that this difference between the two
22 age groups was significant ($OR = 0.35$; 95% CI, 0.12 – 1.01, $p = 0.05$).

23
24 Analysis of medical records data also produced unclear findings.
25 REARDON2003 reported that up to 4 years after pregnancy, the rate of first
26 time psychiatric admissions per 10,000 increased as age at the time of the
27 abortion increased. Rates of inpatient admissions ranged from 915.4 in every
28 10,000 at age 13 to 19 years, to 1,065.2 in every 10,000 at age 25 to 29 years
29 and to 1,117.1 in every 10,000 at age 35 to 49 years. Similarly, using the
30 same data set, COLEMAN2002A found that incidence rates of psychiatric
31 outpatient treatment per 10,000 were greatest for women aged between 35
32 and 49 years at the time of the abortion (2,237.6) and lowest for women aged
33 between 13 and 19 years (1,044.7). MUNK-OLSEN2011 reported, as an
34 additional analysis, that age did not significantly affect the effect of time
35 relative to abortion on the risk of psychiatric contact. However, it was not
36 possible to ascertain whether the differences between age groups were
37 significant because no statistical comparisons were conducted. Moreover, the
38 precise significance of depression or other mental health problems, several
39 years post-abortion, is unclear.

40 ***Ethnicity***

41 In total, four studies assessed the impact of ethnicity on post-abortion mental
42 health outcomes. Of these four studies, two (MAJOR2000, RUSSO1997)
43 were designed to assess ethnicity, whereas the others (COUGLE2005,
44 SCHMIEGE2005) provide raw percentages of women with post-abortion
45 mental health outcomes grouped by ethnicity. In general, the findings for
46 ethnicity were mixed, with studies varying as to whether ethnicity was a
47 significant factor or not. Even within studies, ethnicity was associated with
48 some outcomes but not others.

49

1 One prospective study found a mixed association between ethnicity and post-
2 abortion well-being. MAJOR2000 indicated that ethnicity had an impact on
3 post-abortion self-esteem at 2 years, with African–American women reporting
4 higher self-esteem than other ethnic groups ($\beta = 0.25$, $SE = 0.13$, $p < 0.05$).
5 Furthermore, ethnicity was linked to depression (as measured on the Brief
6 Symptom Inventory Depression Interview), with Hispanic women scoring
7 significantly higher at 2-year follow-up ($\beta = 0.95$, $SE = 0.32$, $p < 0.01$). In
8 contrast, however, results for depression (as measured on the Diagnostic
9 Interview Schedule) and PTSD indicated that ethnicity did not have an effect
10 on outcomes as reported at 2-year follow-up.

11
12 Using data from the National Longitudinal Youth Survey, both RUSSO1997
13 and SCHMIEGE2005 assessed the effect of ethnicity on post-abortion well-
14 being. RUSSO1997 reported that when controlling for education, net family
15 income and total number of children there was no evidence that ethnicity (in
16 this case black versus white) had an impact on post-abortion self-esteem.
17 Specifically, in their analysis, black women showed no evidence of better
18 wellbeing following an abortion compared with white women ($F[2; 4,861]$
19 0.27 , $p > 0.05$). Likewise, using the same dataset, SCHMIEGE2005 reported
20 that 19.9% of white women compared with 32.5% of black women reported
21 post-abortion depression. When converting these raw percentages into odds
22 ratios, as with RUSSO1997, these results were not significant ($OR = 1.54$;
23 $95\% CI, 0.86 - 2.65$, $p > 0.05$). In both cases, there was no control for
24 previous mental health.

25
26 Although not providing any statistical comparison of different ethnic groups,
27 COUGLE2005, in part, substantiates the findings of MAJOR2000 by indicating
28 that ethnicity is associated with differing risks of post-abortion anxiety.
29 COUGLE2005 reported that fewer black women developed post-pregnancy
30 anxiety (6.0%) compared with white women (16.3%), Hispanic women
31 (14.9%) and women of other ethnic backgrounds (24.2%). When converting
32 the raw percentages into odds ratios, black women had significantly lower
33 rates of anxiety when compared with white women ($OR = 0.33$; $95\% CI, 0.19$
34 $- 0.57$, $p < 0.001$) and all other ethnic groups ($OR = 0.31$; $95\% CI, 0.16 - 0.61$,
35 $p < 0.001$). However it must be noted that all studies assessing the impact of
36 ethnicity have been conducted in the US the results may not be generalisable
37 to the UK context.

38 **Education**

39 Two studies assessed the impact of education on an abortion-only group.
40 Within their multiple regression analysis, BROEN2006 found that level of
41 education was inversely related to mean depression score at 5-years post-
42 abortion ($p < 0.05$). That is, a lower level of education was significantly
43 associated with higher depression scores. However, education was not
44 associated with either anxiety or depression at 2-years or anxiety at 5-years
45 post-abortion. In contrast, a multiple regression conducted by RUSSO1997
46 found that education did not have an impact on levels of post-abortion self-
47 esteem when focusing purely on women who reported an abortion. However,
48 no further details about the results were reported.

1 **Marital /relationship status**

2 A number of studies assessed the impact of marital or relationship status on
3 post-abortion mental health. BROEN2006, MAJOR2000 and RUSSO1997 all
4 included marital status in their regression analyses of factors predicting post-
5 abortion mental health. In all studies, marital status was not a significant
6 predictor of any post-abortion outcomes. Specifically, both MAJOR2000 and
7 RUSSO1997 failed to find an effect of marital status on self-esteem, with
8 MAJOR2000 and BROEN2006 also indicated that marital status was not
9 associated with any measure of depression (BROEN2006, MAJOR2000),
10 anxiety (BROEN2006) or PTSD (MAJOR2000).

11
12 Despite both using the National Longitudinal Survey of Youth,
13 SCHMIEGE2005 and COUGLE2005 produced contrasting results when
14 assessing the impact of marital status. SCHMIEGE2005 indicated that more
15 unmarried white women exceeded the cut-off score for depression on the
16 CES-D than married white women (30 and 16%, respectively). The same was
17 true for black women (38 and 24% of unmarried and married women,
18 respectively). However, only the difference between white women was
19 statistically significant (OR = 0.46; 95% CI, 0.25 to 0.86, $p < 0.05$; OR = 0.52,
20 95% CI, 0.19 – 1.39, $p > 0.05$, respectively). When considering all women
21 included in their sample (regardless of ethnicity), REARDON2002B also failed
22 to find a significant association between marital status and post-abortion
23 depression, with 26.2% of married women and 28.7% of unmarried women
24 meeting CES-D criteria (OR = 0.88; 95% CI, 0.53 – 1.48, $p > 0.05$). Although
25 using the same data source, it must be noted that SCHMIEGE2005
26 additionally included women who had an abortion pre-1979 in their analysis,
27 whereas REARDON2002B restricted their sample to women with post-1979
28 abortions. Finally COUGLE2005, when analysing data from the national
29 comorbidity survey, failed to find any association between marital status at
30 time of first pregnancy and post-abortion anxiety, with 17.2% of married
31 women and 13.5% of unmarried women meeting criteria (OR = 1.33, 95% CI,
32 0.66 – 2.69, $p > 0.05$). In all three studies, only raw percentages were
33 provided. These were converted into odds ratios for the purpose of the
34 present review.

35 **Religion**

36 Three studies (MAJOR2000, RUSSO1997, SCHMIEGE2005), two of which
37 used data from the same data source (RUSSO1997, SCHMIEGE2005),
38 investigated the effect of religion on different measures of post-abortion well-
39 being and failed to find a significant association. When directly assessing the
40 impact of having a religious affiliation for all women included in the analysis
41 (for example, those with and without a history of abortion), RUSSO1997 found
42 no relationship between religion and self-esteem ($F [5; 4,150] = 0.59$, $p >$
43 0.05). Furthermore, when assessing this relationship specifically in women
44 with a history of abortion, having a religious affiliation was not predictive of
45 post-abortion self-esteem. Using the same data source, SCHMIEGE2005
46 focussed on Catholics. As with RUSSO1997, there was no association
47 between having a Catholic religious affiliation and measures of post-abortion
48 depression with 21% of Catholic women compared with 27% of non-Catholic

1 women meeting criteria (OR = 1.01; 95% CI; 0.64 – 1.59, $p > 0.05$). In
2 agreement with this finding, MAJOR2000 entered religious affiliation into a
3 regression model and found no relationship with any measure of post-abortion
4 depression, self-esteem or PTSD.

5 **Income**

6 Only RUSSO1997 investigated the effects of income on measures of self-
7 esteem within an abortion specific group. After controlling for other contextual
8 variables, income was not significantly associated with outcome. However, it
9 is unclear from this retrospective study whether income was measured at the
10 time of the abortion, or at the time of follow-up.

11 **Employment**

12 The final demographic factor to be investigated in a number of studies was
13 employment status. Both RUSSO1997 and BROEN2006 failed to find any
14 significant effect of employment on either post-abortion self-esteem or
15 depression and anxiety. As with income, it is unclear whether this relates to
16 employment at the time of abortion or at the time of follow-up.

17 **4.3.2.4 Negative reactions to abortion**

18 One prospective study (BROEN2006) and a study utilising both prospective
19 and retrospective reporting (FERGUSON2009) investigated the effects of
20 negative attitudes towards abortion in general (risk factor) and the effects of
21 negative emotional reactions to the abortion (predictive factor) on post-
22 abortion mental health. The studies considered feelings such as relief,
23 emptiness, grief, anger, guilt, loss and doubt that were experienced by women
24 when asked about their abortion.

25
26 BROEN2006 found that women reporting negative attitudes towards abortion
27 at the time of the procedure had significantly more anxiety at 6 months' ($p <$
28 0.01), 2 years' ($p < 0.05$) and 5 years' ($p < 0.05$) follow-up (based on the
29 HADS) compared with those with no negative attitudes towards the abortion.
30 However, negative attitudes were not significantly related to depression at any
31 time point. In contrast, doubt at the time of the abortion was associated with
32 increased depression at 2 years' ($p < 0.05$), but not at 5 years' follow-up. At
33 both time points, doubt was not a significant predictor of anxiety. In all cases,
34 no indication was given about the precision of these results.

35
36 Similarly, FERGUSON2009 examined the association between emotional
37 reactions to abortion and post-abortion mental health outcomes in a
38 longitudinal cohort study, utilising both prospective and retrospective
39 reporting. Retrospective reporting of reactions to abortion were used as
40 predictors of subsequent mental health problems across a range of diagnostic
41 categories. In general, the study demonstrated a linear relationship between
42 increased measures of negative emotions following an abortion and higher
43 incidence rates of post-abortion mental health problems. Specifically, when
44 compared with women who did not report any negative reactions to their
45 abortion, the incidence rate ratios (IRR) indicate a 23 and 51% increase in the
46 rate of developing a mental health problem for women reporting one to three
47 and four to six negative emotions, respectively (IRR = 1.23; 95% CI, 1.00 –

1 1.51 and IRR = 1.51; 95% CI, 1.01 – 2.27). Although not providing any
2 statistical comparisons, this increase in rates was more pronounced for
3 depression, anxiety and suicidal ideation in comparison with drug and alcohol
4 dependence. In contrast, there was no relationship between positive emotions
5 and post-abortion mental health problems.
6

7 **4.3.2.5 Life events**

8 The impact of life events (such as experiencing serious illness, an accident, a
9 break-up with a partner or a death of immediate family or friends) following an
10 abortion were investigated prospectively by BROEN2006. Their results
11 indicated that if women experienced an increased number of life events during
12 the year of follow-up (1 to 2 years after the abortion), this was associated with
13 increased HADS anxiety scores ($p < 0.001$) as measured at 2 years' follow-up.
14 Furthermore, if women experienced at least three life events in the year of the
15 assessment (4 to 5 years after the abortion) this was also associated with
16 higher level of anxiety as measured at 5 years' follow-up. However, life events
17 were not significantly associated with depression at either time point.
18

19 **4.3.2.6 Other pregnancy-related factors**

20 A number of studies either directly or indirectly tested the effect of other
21 pregnancy factors on post-abortion mental health outcomes. Studies included
22 in this section assessed history of multiple abortions, abortion and subsequent
23 pregnancy, previous abortion and/or births, or abortion and delivery
24 regardless of timing of each pregnancy event.
25

26 In both study 1 and study 2, STEINBERG2008 assessed the impact of
27 multiple abortions on measures of post-abortion anxiety. Two overlapping
28 samples of women were used in STEINBERG2008study1, one that included
29 all women with a first pregnancy regardless of whether or not the pregnancy
30 was planned and a second sample that only included women with an
31 unplanned first pregnancy. In both cases, women who reported one abortion
32 were compared with those reporting two or more abortions. Despite the
33 difference in anxiety rates not being significant when assessing the impact of
34 multiple abortions alone without controlling for any confounding factors
35 (unplanned pregnancy OR = 1.22; 95% CI, 0.92 – 1.62, $p = 0.16$ and all
36 pregnancy OR = 1.24; 95% CI, 0.96 – 1.59, $p = 0.10$), when covariates were
37 controlled for including pre-pregnancy anxiety, sociodemographics and the
38 experience of rape there was a positive association between the number of
39 abortions and post-abortion anxiety (unplanned pregnancy OR = 1.40; 95%
40 CI, 1.00 – 1.95, $p = 0.05$ and all pregnancies OR = 1.34; 95% CI, 1.00 – 1.80,
41 $p = 0.05$). Mixed findings were also reported in STEINBERG2008study2,
42 which assessed a range of anxiety disorders in a sample of women who had
43 not previously experienced anxiety. Results indicated that multiple abortions
44 were associated with increased social anxiety (OR = 2.20; 95% CI, 1.24 –
45 3.88, $p < 0.01$) but not PTSD (OR = 2.84; 95% CI, 0.93 – 11.90, $p = 0.07$) or
46 GAD (exact OR not reported). However, within this analysis, there was no
47 control for covariates including demographics, experience of rape or number
48 of births, and the confidence intervals were wide. When controlling for these

1 covariates, the positive association between social anxiety and multiple
2 abortions was no longer significant (OR = 1.96; 95% CI, 0.83 – 4.62, p =
3 0.12).

4
5 In their prospective cohort study, BROEN2006 included the number of
6 previous abortions, number of children and whether the women was pregnant
7 between 'time 2' (6 months) and 'time 4' (5 years) in their regression analysis.
8 For both anxiety and depression none of the variables were found to be
9 significant predictors at any time point. Similarly, MAJOR2000 collected
10 information on both prior births and abortions within their prospective cohort
11 study. Although prior births were associated with a decreased rating of post-
12 abortion relief, decision satisfaction and benefit appraisal, neither prior births
13 nor prior abortions were significantly associated with increased levels of
14 depression or PTSD at 2 years' follow-up.

15
16 Although the adjusted odds ratios reported in the study do not directly
17 compare women who had an abortion with women who had a history of
18 delivery and abortion, PEDERSEN2007 reports the percentages of women
19 with self-reported alcohol problems or illegal substance misuse in each group.
20 These data were used to calculate the odds ratios within this review. The
21 findings indicated that women who reported both a delivery and an abortion
22 had significantly lower rates of alcohol problems, illegal substance misuse and
23 use of cannabis compared with women who only reported a history of abortion
24 (OR = 0.38; 95% CI, 0.15 – 0.98; OR = 0.21; 95% CI, 0.04 – 0.96 and OR =
25 0.19; 95% CI, 0.06 – 0.60, respectively). One of the main limitations of these
26 findings is that it is not possible to distinguish the relative timings of events, for
27 example whether the abortion preceded the delivery or vice versa.
28 Furthermore, because raw percentages have been used to estimate the odds
29 ratios, the findings do not control for any confounding variables, including
30 previous substance misuse problems and multiple abortions, which may have
31 an impact on results.

32
33 MUNK-OLSEN2011 reported that parity status (prior history of childbirth) was
34 not significantly associated with the effect of abortion on the risk of a
35 psychiatric contact. The only data provided was a p-value (p = 0.09).

36
37 READON2002a assessed the suicide rates associated with a number of
38 multiple pregnancy outcomes. Using medical records, women were
39 categorised into the following groups: abortion only, abortion followed by
40 delivery or delivery followed by abortion. Suicide rates ranged from 16.3 to
41 62.8 per 100,000 across the three groups; however, none of the pair-wise
42 comparisons indicated a significant difference in rates between groups.

43
44 Lastly, REES2007 analysed data from the Fragile Families and Child
45 Wellbeing study to assess the impact of multiple pregnancy outcomes on
46 depression. All of the women included in the study had previously given birth.
47 REES2007 further distinguished between women who went on to have
48 subsequent pregnancy outcomes, including abortion, birth or miscarriage:
49 31.6% of women who reported having an abortion compared with 37.8%
50 women who reporting having an abortion followed by a delivery met criteria for

1 depression, a difference that was not significant (OR = 0.75; 95% CI, 0.36 –
 2 1.57, p > 0.05). Information was also available for women who had an abortion
 3 and miscarriage or a miscarriage and birth; however, the numbers included in
 4 each group were too low to allow for any further analysis (n < 5). Given that all
 5 women included in the study had previously given birth, it is also unclear how
 6 generalisable these findings are to the other studies included in the review.
 7 One more retrospective study assessed the impact of the number of children
 8 and abortions at any time point. RUSSO1997 reported that neither the
 9 number of children nor the number of abortions was associated with changes
 10 in or lower post-abortion self-esteem.
 11

12 4.3.2.7 Medical complications following abortion

13 Only one study (MAJOR2000) assessed the impact of medical complications
 14 on post-abortion mental health. Findings suggested that for all measures of
 15 post-abortion well-being (self-esteem, depression and PTSD), medical
 16 complications following the abortion were not associated with differences in
 17 outcome.
 18

19 A summary all factors considered, is shown in Table 11.
 20
 21

22 **Table 11: Summary of factors associated with post-abortion mental**
 23 **health outcome**

Factor	Mental health outcome	Positive	Negative	Neutral	No statistical comparison
<i>Previous mental health problems</i>	Depression	3	-	-	-
	Anxiety	1	-	1	-
	PTSD	1	-	-	-
	<i>Total</i>	<i>5*</i>	<i>0</i>	<i>1</i>	<i>0</i>
<i>Previous self-esteem</i>	Self-esteem	-	1	-	-
	<i>Total</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>
<i>Age</i>	Depression*	1	-	2	-
	PTSD	-	-	1	-
	Anxiety	-	-	1	-
	Psychiatric treatment	-	-	-	-
	<i>Total</i>	<i>1</i>	<i>0</i>	<i>4</i>	<i>0</i>
<i>Ethnicity</i>	Self-esteem	-	-	1	1 ^a
	Depression*	-	-	2	1 ^b
	PTSD	-	-	1	-
	Anxiety	-	-	-	1 ^c
	<i>Total</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>3</i>
<i>Education</i>	Depression*	-	1	1	-
	Anxiety	-	-	1	-
	Self-esteem	-	-	1	-
	<i>Total*</i>	<i>0</i>	<i>1</i>	<i>3</i>	<i>0</i>
<i>Marital/relationship status</i>	Depression	-	-	2	1 ^d
	Anxiety	-	-	1	-

	<i>Total*</i>	0	0	3	1
<i>Religion</i>	Self-esteem	-	-	2	-
	Depression	-	-	2	-
	PTSD	-	-	1	-
	<i>Total*</i>	0	0	5	0
<i>Income</i>	Self-esteem	-	-	1	-
	<i>Total</i>	0	0	1	0
<i>Employment</i>	Self-esteem	-	-	2	-
	Depression	-	-	1	-
	PTSD	-	-	1	-
	<i>Total*</i>	0	0	4	0
<i>Negative attitudes to abortion</i>	Depression	-	-	1	-
	Anxiety	1	-	-	-
	<i>Total</i>	1	0	1	0
<i>Life events</i>	Anxiety	1	-	-	-
	Depression	-	-	1	-
	<i>Total*</i>	1	0	1	0
<i>Other pregnancy outcomes</i>					
<i>Multiple abortions</i>	Anxiety	1	-	1	-
	PTSD	-	-	1	-
	GAD	-	-	1	-
	Social anxiety	-	-	1	-
	Depression	-	-	1	-
	PTSD	-	-	1	-
	<i>Total*</i>	1	0	6	0
<i>Number of children</i>	Depression	-	-	3	-
	Anxiety	-	-	1	-
	PTSD	-	-	1	-
	Alcohol use	-	-	-	1 ^e
	Cannabis use	-	-	-	1 ^e
	Illicit drug use	-	-	-	1 ^e
	Psychiatric contact	-	-	1	-
	<i>Total*</i>	0	0	6	3
<i>Medical complications</i>	Depression	-	-	1	-
	PTSD	-	-	1	-
	Self-esteem	-	-	1	-
	<i>Total*</i>	0	0	3	0

Key: positive relationship indicates that increasing the factor increases the risk of mental health problems; negative relationship indicates that reducing the factor increases the risk of mental health problems; neutral indicates that the factor has no statistically significant effect on mental health; other association relates to non-linear associations such as ethnicity; no statistical comparison indicates a statistical comparison was not possible with the data reported.

* Includes studies/ findings using the same data source/study.

^a African–American women had significantly higher self-esteem than women of other ethnicities.

^b Hispanic women had significantly higher depression scores than women of other ethnicities.

^c Black women had significantly lower levels of anxiety than women of other ethnicities.

^d Unmarried white women had higher rates of depression compared with married white women.

^e Women who had an abortion and delivery reported lower rates than women who reported only an abortion.

4.4 LIMITATIONS

A number of limitations that restrict the generalisability of these findings warrant discussion. Many of the studies included in the review were not specifically designed to assess factors predictive of post-abortion mental health. Instead, studies compared women with a history of abortion to women with a history of either a delivery or no abortion. In these cases, only limited information regarding the relationship between a particular factor and mental health outcomes for women who had had an abortion was available. Additionally, a number of studies (COLEMAN2002A, COUGLE2005, GILCHRIST1995, PEDERSON2007, PEDERSON2008, REARDON2002B, REARDON2003, REES2007, SCHMIEGE2005) only reported raw data (for example, percentages) when assessing the impact of a factor, without reporting any useable statistical analysis (for example, odds ratios or regression co-efficients). Throughout the review, where possible, raw percentages have been used to calculate odds ratios. However, these odds ratios are reported without controlling for confounding variables. Therefore results from these studies need to be treated with caution.

One of the most common limitations across the individual studies was a lack of adequate control for potential confounding variables, with a proportion of the included studies only assessing the impact of one or two factors. Although a number of studies employed logistic regression models to control for potential confounders, in total, only six studies adequately controlled for other factors in addition to previous mental health (BROEN2006, FERGUSSON2009, GILCHRIST1995, MAJOR2000, PEDERSEN2007, RUSSO1997). Furthermore, control for previous and subsequent pregnancy events was very limited and differed greatly across studies. The lack of confounder control was particularly pronounced for studies that did not statistically assess the relationship between a specified factor and post-abortion mental health. Where studies have not controlled for potential confounding variables, the impact of any one factor is impossible to determine with confidence.

Only four of the studies included in the review adopted a prospective design (BROEN2006, GILCHRIST1995, MAJOR2000, QUINTON2001). Instead, many studies used retrospective and self-report measures to assess reactions to, and mental health outcomes following, an abortion. Not only is self-report data open to social desirability bias, the accuracy of recalled data is also limited. Where studies did utilise a prospective design, attrition data was limited, with only MAJOR2000 and QUINTON2001 providing statistical analysis comparing women who did not remain in the study with those who were followed up at all time points.

In addition to the limitations of the individual studies discussed above, there are also a number of limitations of the dataset as a whole. One of the main limitations relates to the high degree of heterogeneity, which meant that meta-analysis was not possible. Heterogeneity in sampling and variable selection led to different studies producing mixed findings for the same factor, even

1 when using the same data source. For instance, MAJOR2000 and
2 QUINTON2001 both utilised the same prospective data source yet produced
3 contrasting results on the impact of age on post-abortion mental health. In this
4 case, MAJOR2000 divided the sample into five age groups, whereas
5 QUINTON2001 only divided women into majors and minors. Heterogeneity
6 was also apparent in the methods used to measure pre- and post-abortion
7 mental health. For example, FERGUSON2009 and MAJOR2000 relied on
8 modifications of validated scales, but with no standardised algorithm for
9 determining clinical diagnosis, whereas, other studies (COLEMAN2002A,
10 REARDON2002A, REARDON2003) used medical claim databases or clinical
11 diagnosis (GILCHRIST1995) to assess mental health.

12
13 Another source of heterogeneity is the variation in follow-up times, with the
14 time between abortion and mental health outcome often unclear, particularly
15 in studies utilising a cross-sectional design. Within these studies, women who
16 had recently experienced an abortion were included in the analysis alongside
17 women who had experienced an abortion up to 20 years previously. In many
18 of the studies it is also hard to ascertain the exact timing of the factor in
19 relation to the abortion, particularly where mental health outcomes, abortion
20 status and factors such as demographics or pregnancy history are all
21 measured retrospectively or cross-sectionally.

22
23 In addition to the heterogeneity inherent in the data, selective reporting of data
24 meant that meta-analysis was not appropriate. For example, where studies
25 included the same factors and assessed the same outcomes, meta-analysis
26 was not possible because studies frequently reported data for only the
27 significant findings. Factors that were not significant were only reported in the
28 text, without the appropriate data required for meta-analysis.

29
30 Culture, social and clinical practices vary both geographically and historically.
31 Therefore, although in other respects GILCHRIST1995 is methodologically
32 rigorous, this study was conducted in one country (UK) and reported 15 years
33 ago, raising questions about generalisability.

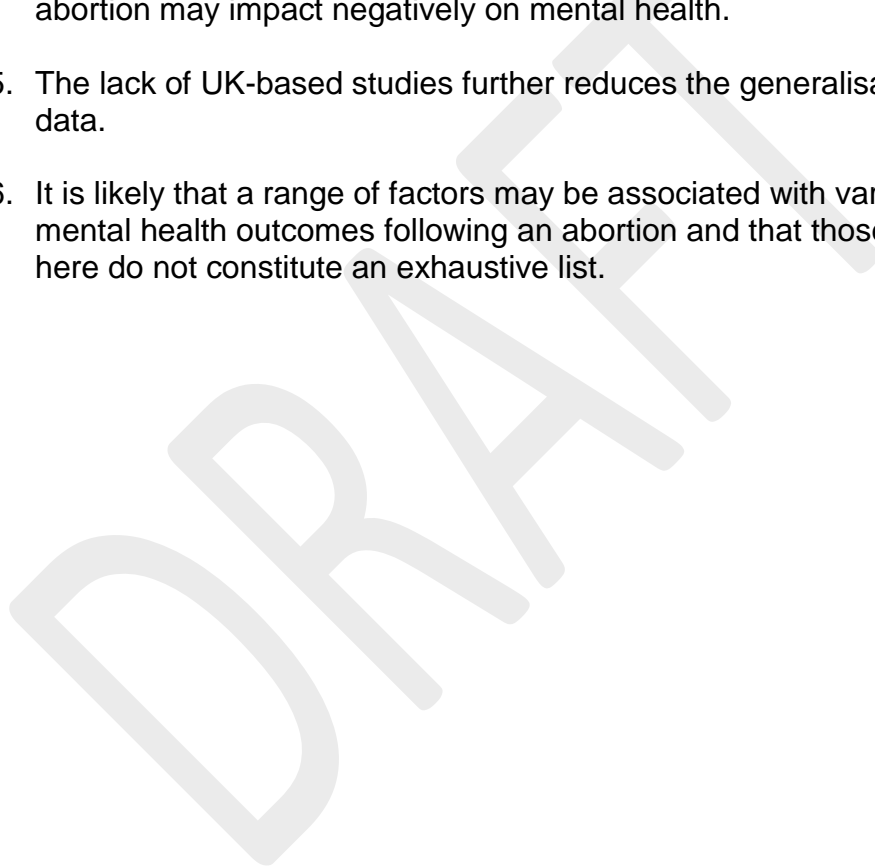
34
35 Finally, it is important to note that the list of potential risk factors reviewed
36 here is not exhaustive. A number of other factors such as exposure to
37 violence (TAFT2008), reasons for the abortion (BROEN 2005) and coping
38 mechanisms (QUINTON2001) may be associated with variations in post-
39 abortion mental health. Furthermore, factors associated with a particular
40 mental health outcome, for example depression, may not necessarily be
41 associated with an alternative outcome such as psychosis.

43 **4.5 EVIDENCE STATEMENTS**

- 44
45 1. The evidence base reviewed above is restricted by a number of
46 limitations including heterogeneity in the factors assessed and the
47 outcomes reported, inconsistent reporting of non-significant factors and
48 variations in follow-up times.

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2. When considering prospective studies, the only consistent factor to be associated with poor post-abortion mental health is pre-abortion mental health problems.
3. The most reliable predictor of post-abortion mental health problems was having a history of mental health problems prior to the abortion. A history of mental health problems was associated with a range of post-abortion mental health conditions, regardless of outcome measure or method of reporting used.
4. A range of other factors have more mixed results, although there is some suggestion that life events and negative attitudes towards abortions in general, and towards a woman's personal experience of abortion may impact negatively on mental health.
5. The lack of UK-based studies further reduces the generalisability of the data.
6. It is likely that a range of factors may be associated with variations in mental health outcomes following an abortion and that those reviewed here do not constitute an exhaustive list.



5 MENTAL HEALTH OUTCOMES FOR WOMEN FOLLOWING ABORTION COMPARED WITH FOLLOWING A DELIVERY

5.1 REVIEW QUESTION

Are mental health problems more common in women who have an induced abortion, when compared with women who delivered a live birth?

This chapter identifies the mental health outcomes of women who have had an abortion compared with women who delivered a live birth. Women who delivered an unwanted or unplanned pregnancy were considered the most appropriate comparison group for this review. Therefore, studies accounting for this factor were reviewed separately from those which did not account for whether the pregnancy was planned or wanted.

5.2 STUDIES CONSIDERED

Thirteen⁴ studies that compared mental health outcomes for women who have an abortion with those who deliver a live birth met the eligibility criteria for the review. Of the 13 included studies, nine compared women who had an abortion with those who delivered, without accounting for whether the pregnancy was wanted or planned; three considered unplanned pregnancies; and one considered unwanted pregnancies. Two studies that used the same data source within their analysis (COUGLE2005, STEINBERG2008study1B) and examined the same mental health outcomes were included in the narrative review for completeness. In addition, 88 studies were excluded from the review. The most common reason for exclusion was outcomes measured less than 90 days after an abortion (29 studies). Further details about excluded studies including reasons for exclusion are included in Appendix 6.

⁴ Includes one paper which presents three studies; these have been labelled as STEINBERG2008study1a, STEINBERG2008study1b and STEINBERG2008study2.

5.3 ABORTION VERSUS DELIVERY – NO ACCOUNT OF WHETHER PREGNANCY WAS WANTED

5.3.1 Study characteristics

The studies in this section compare mental health outcomes for women who had an abortion with those who had a delivery, without accounting for whether the pregnancy was wanted/ planned. Details of the included studies can be seen in Table 12. The nine studies included in the review analysed data drawn from six separate data sources. One study (MUNK-OLSEN2011) utilised a prospective cohort design to follow-up women who either had a first abortion or gave birth to a first pregnancy during a set time period. Four studies analysed retrospective or cross-sectional data collected as part of three national longitudinal cohort surveys: the National Survey of Family Growth (STEINBERG2008study1A); the National Comorbidity Survey (STEINBERG2008study2); and the Young in Norway Longitudinal Study (PEDERSEN2007, PEDERSEN2008). One study, which analysed data obtained from the Christchurch Health and Developmental Study (FERGUSON2006), utilised both prospective and retrospective reporting within their analysis. The final three studies included in the review utilised data obtained from Californian medical and death records, linking pregnancy outcomes to subsequent treatment claims and suicides (COLEMAN2002A, REARDON2002A, REARDON2003).

Across the studies a range of post-abortion mental health outcomes were assessed including depression (PEDERSEN2008), anxiety (STEINBERG2008study1A, STEINBERG2008study2), psychiatric treatment (COLEMAN2002A, MUNK-OLSEN2001, REARDON2003), PTSD (STEINBERG2008study2), GAD (STEINBERG2008study2), alcohol and drug misuse (PEDERSEN2007), suicide (REARDON2002A) and any DSM psychiatric disorder (FERGUSON2006). The measurement methods used to assess mental health outcomes also differed across studies, with methods varying from clinical diagnosis to medical treatment records.

In addition to the variation in outcomes measures, studies also differed in the ways in which they controlled for previous mental health problems. Three studies (COLEMAN2002A, MUNK-OLSEN2011, REARDON2003) excluded those with a history of mental health problems from the analysis. In contrast, six studies (FERGUSON2006, PEDERSEN2007, PEDERSEN2008, REARDON2002A, STEINBERG2008study1A, STEINBERG2008study2) presented both unadjusted and adjusted odds ratios that controlled for previous mental health outcomes in addition to other confounding factors such as demographic information, number of pregnancies and a history of rape.

1 **Table 12: Summary characteristics of studies that did not control for**
 2 **whether the pregnancy was wanted or planned**

Study ID and study design	Participant numbers, characteristics and country	Comparison group	Outcome	Measure and mode of administration	Study quality
FERGUSON2006 ⁵	N = 51–74. Women from the Christchurch Health and Development Study. Longitudinal cohort study of New Zealand children	Abortion versus delivery	Any mental health problems	Questionnaire based on CIDI and Assessment of Dominance, Influence, Steadiness, Conscientiousness (DISC) <i>Interview</i>	Fair
MUNK-OLSEN2011	N = 83752–84620. Women with a first abortion identified from Danish national records	First abortion versus first delivery	Psychiatric treatment	Medical records	Fair
PEDERSEN2008 PEDERSEN2007	N = 76–125. Women from the Young in Norway Longitudinal Study. Longitudinal cohort study recruited as adolescence from schools and followed for 13 years	Abortion versus delivery	Depression	Kandals and Davies Depressive Mood Inventory <i>Self report</i>	Poor Poor
STEINBERG2008 study1A	N = 1236 Women who took part in the National Study of Family Growth. A US national probability sample	Unplanned pregnancies: abortion versus delivery	Experience of anxiety symptoms	A measure of experience of anxiety symptoms which is reflective of DSM IV criteria for GAD <i>Interview</i>	Very good
STEINBERG2008 study2	N = 273 Women who completed US National Comorbidity Survey. A nationally representative sample	All first pregnancies: abortion versus birth	GAD, social phobia, anxiety	Modified CIDI <i>Interview</i>	Very good
Californian medical and death records – linkage study					

⁵ Includes data obtained from personal correspondence with the authors.

Study ID and study design	Participant numbers, characteristics and country	Comparison group	Outcome	Measure and mode of administration	Study quality
COLEMAN2002A	N = 14297. California, US. Women who claimed from state funded medical insurance program	Abortion versus delivery	Outpatient treatment for ICD-9 mental illness	Insurance claims for psychiatric outpatient treatment	Fair
REARDON2003	N = 5299 California, US. Women who claimed from state funded medical insurance program.	First pregnancy: abortion versus delivery	Psychiatric Admission	Insurance claims for psychiatric admission	Fair
REARDON2002A	N = 17472 California, US. Women who claimed from state funded medical insurance program.	First pregnancy: abortion versus delivery	Suicide	Death certificate	Fair

N = the number of subjects used in the analysis.

1

2 5.3.2 Findings

3 Due to the heterogeneity of study design, outcome and measurement
4 methods used in the included studies, meta-analysis of the data was not
5 possible. Therefore, the findings have been grouped by outcome and
6 reviewed narratively with studies using the same data source reviewed
7 together. Results from all studies are detailed in Table 13 with a GRADE
8 evidence profile shown in Table 14.

9

10 5.3.2.1 Psychiatric treatment

11 Three studies (COLEMAN2002A, MUNK-OLSEN2011, REARDON2003)
12 assessed psychiatric treatment following a pregnancy event. Two of the
13 studies (COLEMAN2002A, REARDON2003) used the same data source,
14 namely a retrospective analysis of Californian medical and death records,
15 whereas MUNK-OLSEN2011 conducted a prospective population-based
16 cohort study of Danish women. Studies in this section assessed outpatient
17 treatment (COLEMAN2002A), inpatient treatment (REARDON2003) or any
18 psychiatric treatment (MUNK-OLSEN2011).

19

20 COLEMAN2002A reported that in general women who had an abortion were
21 significantly more likely to receive outpatient psychiatric treatment up to 4
22 years following the pregnancy event (OR 1.17; 95% CI, 1.10 – 1.25, p<
23 0.0001). When analysing the data by individual years, the results indicated

1 that women who had an abortion were more likely to claim for outpatient
2 psychiatric treatment up to 90 days, 180 days and 1 year following the
3 pregnancy event (OR 1.63; 95% CI, 1.40 – 1.91, $p < 0.0001$; OR 1.42; 95% CI,
4 1.25 – 1.60, $p < 0.0001$ and OR 1.30; 95% CI, 1.18 – 1.44, $p < 0.0001$). When
5 assessing the claims made in the 2nd, 3rd and 4th years following the
6 pregnancy event, women who had an abortion were significantly more likely to
7 receive outpatient treatment in the 2nd year (OR 1.16; 95% CI, 1.03 – 1.30, p
8 = 0.018) with no significant increase in the 3rd or 4th years (OR 1.10; 95% CI,
9 0.97 – 1.23, $p > 0.05$ and OR 1.05; 95% CI, 0.93 – 1.18, $p > 0.05$, respectively).
10 Despite the consistency of these findings, the odds ratios are consistent with
11 a small effect size. Furthermore, rates of contact overall were low.

12
13 REARDON2003 indicated that women who had an abortion were significantly
14 more likely to claim for inpatient psychiatric treatment compared with women
15 who delivered at up to 90 days, 180 days and 1 year following the pregnancy
16 event (OR 2.6; 95% CI, 1.6 – 5.3, $p < 0.01$; OR 2.2; 95% CI, 1.3 – 3.7, $p < 0.01$
17 and OR 1.9; 95% CI, 1.3 – 2.8, $p < 0.01$ respectively). Similarly, women in the
18 abortion group were more likely to receive inpatient psychiatric treatments
19 during the 2nd year (OR 2.1; 95% CI, 1.3 – 3.2, $p < 0.01$), 3rd year (OR 1.6;
20 95% CI, 1.1 – 2.3, $p < 0.05$) and the 4th year (OR 1.5; 95% CI, 1.1–2.1, $p <$
21 0.05) following the pregnancy event.

22
23 In their prospective study, MUNK-OLSEN2011 assessed the rates of any
24 psychiatric treatment in a population-based cohort of Danish women with no
25 previous history of mental health problems. First psychiatric incidence rates
26 were calculated for the 9-month period prior to the pregnancy event (either
27 birth or abortion) and in the year following pregnancy. When using the raw
28 data reported in the paper to calculate odds ratios for the purpose of this
29 review, the results indicated that women in the abortion group were
30 significantly more likely to seek psychiatric treatment during the 12-month
31 follow-up period when compared with those who delivered a pregnancy (OR
32 2.25; 95% CI, 2.09 – 2.41, $p < 0.001$). However, there was also an increase in
33 psychiatric contact for women in the abortion group, in the 9 months period
34 prior to the pregnancy event (OR 3.68; 95% CI, 3.34 – 4.05, $p < 0.001$).
35 Furthermore rates of psychiatric contact in the abortion group did not increase
36 following the abortion relative to the rate of psychiatric contact prior to the
37 abortion. In contrast the rate of psychiatric contact within the delivery group
38 significantly increased following birth compared with the 9 months prior to the
39 birth. The authors suggested that the difference in psychiatric incidence rates
40 indicates that women who have an abortion may constitute a population with
41 higher psychiatric morbidity and that this propensity predates the actual
42 abortion. Furthermore, the authors noted that having an unwanted pregnancy
43 may be the cause of distress itself, whatever the outcome.

44 45 **5.3.2.2 Any mental health diagnosis**

46 Using prospective data collected as part of a longitudinal survey,
47 FERGUSSON2006 assessed whether women who had an abortion were
48 more likely to report a higher number of mental health problems compared
49 with women who gave birth. Findings indicated that women in the abortion

1 group did not experience a significantly greater number of mental health
2 problems, compared with those who did not have an abortion (OR 0.55; 95%
3 CI, 0.23 – 1.36, $p > 0.05$).

5.3.2.3 Depression

7 Although PEDERSEN2008 did not provide any statistical comparison between
8 the abortion and delivery group, both groups were compared with a third
9 comparator (for example, never pregnant) within the analysis. Odds ratios
10 were recalculated in the present review (see Section 2.7.3 for details of the
11 method) to compare women who had an abortion to those who gave birth. For
12 those aged 15 to 20 at the time of the pregnancy event, there was no
13 evidence to suggest that women who had an abortion were more or less likely
14 to have depression than those who gave birth (OR 0.53; 95% CI, 0.14 – 1.95,
15 $p > 0.05$). However, women who had an abortion between 21 and 26 years old
16 were more likely to suffer from depression at follow-up compared with women
17 giving birth between these ages (OR 2.90; 95% CI, 1.31 - 6.40, $p < 0.01$).

5.3.2.4 Anxiety disorders

20 After controlling for a number of covariates including previous mental health
21 problems, experience of rape and age at first pregnancy,
22 STEINBERG2008study1A indicated that women who had an abortion were no
23 more likely to experience anxiety compared with those who gave birth (OR
24 1.23; 95% CI, 0.96 – 1.56, $p = 0.1$). However, further analysis assessed the
25 impact of multiple abortions on mental health outcomes (for example, 1
26 versus 0, 2 versus 0). When compared with women who had given birth to
27 their first pregnancy, those who reported two or more abortions were
28 significantly more likely to experience anxiety (OR 1.68; 95% CI, 1.22 – 2.31,
29 $p = 0.002$). Similarly, those women who had one abortion were also more
30 likely to experience anxiety at the time of the survey (OR 1.25; 95% CI, 1.00 –
31 1.56, $p = 0.05$). In all cases, the odds ratios reported were consistent with only
32 a small effect

34 STEINBERG2008study2 (also cross sectional) compared the rates of social
35 anxiety and GAD in women who had an abortion or gave birth to their first
36 pregnancy. The analysis indicated that having an abortion was not associated
37 with increased odds of either diagnosis (social anxiety: OR 0.87; 95% CI, 0.52
38 – 1.47, $p = 0.60$; GAD: OR 0.84; 95% CI, 0.45 – 1.88, $p = 0.58$). However,
39 despite controlling for previous mental health problems, this analysis did not
40 control for any additional covariates. Further analysis of the social anxiety
41 data by number of abortions (for example, 2 versus 0 and 1 versus 0) which
42 controlled for a number of covariates including experience of violence and age
43 at first pregnancy indicated that abortion was not associated with an
44 increased rate of social anxiety (2 versus 0 abortions: OR 1.65; 95% CI, 0.76–
45 3.57, $p = 0.20$; 1 versus 0 abortions: OR 0.84; 95% CI, 0.44 – 1.63, $p = 0.60$).

1 **5.3.2.5 PTSD**

2 As with the findings for social anxiety and GAD reported above,
 3 STEINBERG2008study2 indicated that the odds of PTSD were no greater in
 4 women who aborted their first pregnancy compared with those who gave birth
 5 (OR 1.33; 95% CI, 0.67 – 2.73, p = 0.43). When controlling for additional
 6 covariates women who had either one or multiple abortions were no more
 7 likely to experience PTSD at the time of follow-up than those women who
 8 delivered their first pregnancy (1 versus 0 abortions: OR 0.98; 95% CI, 0.54 –
 9 1.78, p = 0.94. 2 versus 0 abortions: OR 1.29; 95% CI, 0.43 – 3.84. p = 0.64)

11 **5.3.2.6 Suicide**

12 REARDON2002A used medical records and death certificates to compare the
 13 rates of suicide between women with only one known pregnancy who either
 14 delivered or aborted the pregnancy. After adjusting for age and previous
 15 psychiatric history, the results indicated that women who had an abortion
 16 were at a significantly increased risk of suicide compared with those who had
 17 delivered a pregnancy (RR = 3.12; 95% CI, 1.25 – 7.78, p< 0.001). In this
 18 case however, the control for previous psychiatric history was limited, with
 19 only those who had made a treatment claim in the year prior to the pregnancy
 20 event excluded from the analysis. Therefore, women who did not claim for
 21 psychiatric treatment, or who claimed before that 1-year period, would still be
 22 included in the study.

24 **5.3.2.7 Substance misuse disorders**

25 As with PEDERSEN2008, PEDERSEN2007 did not provide any statistical
 26 comparison between the abortion and delivery group but instead compared
 27 both groups to a third ‘never pregnant’ group. Odds ratios calculated for this
 28 review indicated that alcohol problems, cannabis use and illegal drug misuse,
 29 were significant more likely in the abortion group compared with women who
 30 gave birth (OR 20.00; 95% CI, 7.89 – 50.68, p< 0.001; OR 11.33; 95% CI,
 31 3.55 – 36.20, p< 0.001 and OR 7.83; 95% CI, 1.68 – 36.61 p< 0.001
 32 respectively). In all cases, the odds ratios were consistent with very large
 33 effects.

35 **Table 13: Summary of findings by outcome**

Mental health outcome	Study ID	Follow-up/age at time of abortion	Results OR/RR (CI 95%), p-value
Psychiatric inpatient claims	REARDON2003	Up to 90 days	OR 2.6 (1.3 to 5.3) p< 0.01
		Up to 180 days	OR 2.2 (1.3 to 3.7) p< 0.01
		Up to 1 year	OR 1.9 (1.3 to 2.8) p< 0.01
		2nd year	OR 2.1 (1.3 to 3.2) p< 0.01
		3rd year	OR 1.6 (1.1 to 2.3) p< 0.05
		4th year	OR 1.5 (1.1 to 2.1) p< 0.05
Psychiatric outpatient claims	COLEMAN2002A	Up to 90 days	OR 1.63 (1.40 to 1.91) p< 0.0001
		Up to 180 days	OR 1.42 (1.25 to 1.60) p< 0.0001
		Up to 1 year	OR 1.30 (1.18 to 1.44) p< 0.0001
		Up to 4 years	OR 1.17 (1.10 to 1.25) p< 0.0001
		2nd year	OR 1.16 (1.03 to 1.30) p = 0.018

Mental health outcome	Study ID	Follow-up/age at time of abortion	Results OR/RR (CI 95%), p-value
		3rd year 4th year	OR 1.10 (0.97 to 1.23) p> 0.05 OR 1.05 (0.93 to 1.18) p> 0.05
Any psychiatric treatment	MUNK-OLSEN2011	9 months prior to pregnancy event 12-month follow-up	OR 3.68 (3.34 to 4.05) p< 0.001 OR 2.25 (2.09 to 2.41) p< 0.001
Any mental health problem	FERGUSON2006	5-year lagged model	OR 0.55 (0.23 to 1.36) p> 0.05*
Depression	PEDERSEN2008	15 to 20 years 21 to 26 years	OR 0.52 (0.14 to 1.91) p> 0.05 OR 2.90 (1.31 to 6.40) p< 0.01
Experience of anxiety symptoms	STEINBERG2008 study1A 2 versus 0 abortion 1 versus 0 abortion	Cross-sectional study	OR 1.23 (0.96 to 1.56) p> 0.05 OR 1.68 (1.22 to 2.31) p = 0.002 OR 1.29 (1.00 to 1.56) p = 0.05
GAD	STEINBERG2008 study2	Cross-sectional study	OR 0.84 (0.45 to 1.88) p = 0.58
PTSD	STEINBERG2008 study2 2 versus 0 abortion 1 versus 0 abortion	Cross-sectional study	OR 1.33 (0.67 to 2.73) p = 0.43 OR 1.29 (0.43 to 3.84) p = 0.64 OR 0.98 (0.54 to 1.78) p = 0.94
Social anxiety	STEINBERG2008 study2 2 versus 0 abortion 1 versus 0 abortion	Cross-sectional study	OR 0.87 (0.52 to 1.47) p = 0.60 OR 1.65 (0.76 to 3.57) p = 0.20 OR 0.84 (0.44 to 1.63) p = 0.60
Suicide	REARDON2002A	Up to 8 years	RR 3.12 (1.25 to 7.78) p< 0.001).
Alcohol problems	PEDERSEN2007	Up to 11 years	OR 20.00 (7.89 to 50.68) p< 0.001
Cannabis use	PEDERSEN2007	Up to 11 years	OR 11.33 (3.55 to 36.20) p< 0.001
Illicit drug use	PEDERSEN2007	Up to 11 years	OR 7.83 (1.68 to 36.61) p< 0.001
*OR <1 indicates an increased risk of the mental health problem in the abortion group within FERGUSON2006.			

1

1 **Table 14: GRADE summary of evidence profile for the mental health**
 2 **outcomes of abortion compared with delivery of pregnancies**
 3 **(regardless of whether or not the pregnancy was planned).**

Outcomes	Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)
Any psychiatric treatment Follow-up: mean 1 year	OR 2.25 (2.09 to 2.41)	363892 (1 study)	⊕⊕⊕⊕ low ^{1,2}
Psychiatric outpatient Treatment Follow-up: mean 4 years	OR 1.17 (1.1 to 1.25)	54419 (1 study)	⊕⊕⊕⊕ very low ^{1,3}
Inpatient psychiatric treatment Follow-up: mean 4 years	OR ranged from 1.5 to 2.6 (range is due to various follow-ups)	56741 (1 study)	⊕⊕⊕⊕ very low ^{1,3,4}
Any mental health diagnosis Follow-up: mean 5 years	OR 0.55 ⁵ (0.23 to 1.36)	205 (1 study)	⊕⊕⊕⊕ very low ⁵
Depression Follow-up: mean 11 years	OR ranged from 0.53 to 2.9	357 (1 study)	⊕⊕⊕⊕ very low ^{1,6,7}
Anxiety Clinical interview	OR ranged from 0.84 to 1.23	8516 (2 studies)	⊕⊕⊕⊕ very low ^{6,8}
PTSD Clinical diagnosis	OR 1.33 (0.67 to 2.73)	1822 (1 study)	⊕⊕⊕⊕ very low ^{1,6,8}
Suicide Follow-up: mean 8 years	RR 3.12 (1.25 to 78)	59428 (1 study)	⊕⊕⊕⊕ low ^{1,2}
Alcohol problems Follow-up: mean 11 years	OR 20.00 (7.89 to 50.68)	259 (1 study)	⊕⊕⊕⊕ low ^{1,7,9}
Cannabis use Follow-up: mean 11 years	OR 11.33 (3.55 to 36.20)	259 (1 study)	⊕⊕⊕⊕ low ^{1,7,9}
Illicit drug misuse Follow-up: mean 11 years	OR 7.83 (1.68 to 36.61)	259 (1 study)	⊕⊕⊕⊕ low ^{1,7,9}
CI: confidence interval; RR: risk ratio; OR: odds ratio. ¹ Sparse data. ² Large effect. ³ Findings varied across the follow-up periods. ⁴ Adjusted odds ratios not presented for the total 4-year follow-up period (data reported form first year only). ⁵ Odds ratios less than 1 indicate greater risk of mental health problems in the abortion group. ⁶ Compatible with increased and decreased risk of mental health problems. ⁷ Retrospective reporting. ⁸ Cross-sectional design using retrospective reporting. ⁹ Very large effect.			

4

5 **5.3.3 Limitations**

6 In addition to the main limitation of these studies (that is, that they did not
 7 control for whether the pregnancy was wanted or planned) the studies were
 8 also limited by a number of other factors. As shown in Table 14, a GRADE
 9 evidence summary was produced for the findings. In general, the evidence
 10 available from this section of the review ranged from low to very low, with
 11 problems in areas such as imprecision and study design. In particular, many
 12 of the studies produced imprecise effect estimates, with confidence intervals
 13 compatible with increased and decreased rates of mental health problems.
 14

1 Studies varied in the outcomes they assessed with very few studies assessing
2 the same diagnosis. Studies also varied in the methods of outcome
3 measurement which ranged from treatment records to clinical diagnosis,
4 through to scales based measures. Due to this clinical heterogeneity, meta-
5 analysis of the data was not possible. Three of the included studies
6 (COLEMAN2002A, MUNK-OLSEN2011, REARDON2003) used psychiatric
7 treatment records as their measure of mental health outcome. One of the
8 main limitations of this method of outcome evaluation is that women who
9 experienced mental health problems may not have sought psychiatric
10 treatment. Furthermore, as incidence rates were provided, for example first
11 psychiatric contact, it is not possible to truly ascertain the difference in risk for
12 different diagnoses as women who experienced depression may also go on to
13 experience, for example, anxiety.

14
15 Another major limitation of the dataset as a whole is the inadequate control of
16 confounding variables. In particular, many of the studies included in the
17 review failed to control for multiple pregnancy outcomes, with only
18 REARDON2002A limiting analysis to women with one known pregnancy.
19 Other studies included in the review only partly controlled for multiple
20 pregnancy events with COLEMAN2002A, MUNK-OLSEN2011 and
21 REARDON2003 limiting their sample to women who had delivered their first
22 pregnancy and had no subsequent abortions but with no such criteria applied
23 to the abortion group. Similarly STEINBERG2008study1A and
24 STEINBERG2008study2 included women with a first pregnancy event during
25 a set time period. However, women could go on to have multiple pregnancy
26 outcomes, with only multiple abortions assessed in the analysis. Control for
27 other potential confounding factors such as experience of violence, age of
28 pregnancy, socioeconomic status varied across studies, with few studies
29 apart from STEINBERG2008study1 and STEINBERG2008study2 controlling
30 for a large number of confounding variables.

31
32 Studies were also limited in the methods used for controlling for previous
33 mental health with COLEMAN2002A, REARDON2003, REARDON2002A and
34 MUNK-OLSEN2011 all relying on medical treatment records, whereas other
35 studies (FERGUSON2006, PEDERSEN2007, PEDERSEN2008,
36 STEINBERG2008study1, STEINBERG2008study2) relied on retrospective
37 and/or self-reported measures of previous mental health problems.

38
39 Studies also have specific limitations associated with their design. Only one
40 study included in the review adopted a prospective design (MUNK-
41 OLSEN2011), with FERGUSON2006 relying on both retrospective and
42 prospective data. Instead, many studies used retrospective and self-report
43 measures of mental health outcomes following an abortion. Follow-up periods
44 included in the studies also varied, particularly in cross-sectional studies
45 (STEINBERG2008study1A, STEINBERG2008study2), where the time
46 between abortion and follow-up could range from 6 months to 20 years.

5.4 ABORTION VERSUS DELIVERY OF AN UNWANTED OR UNPLANNED PREGNANCY

5.4.1 Study characteristics

The four studies presented in this section compare mental health outcomes for women who had an abortion with those who delivered an unwanted (FERGUSON2008) or unplanned pregnancy (COUGLE2005, GILCHRIST1995, STEINBERG2008study1B). Details of the included studies, including quality assessment scores, are shown in Table 15. The four studies included in the review analysed data drawn from three separate data sources. One study (GILCHRIST1995) utilised a prospective cohort design to follow-up women either requesting or not requesting an abortion for an unplanned pregnancy. Two studies analysed cross-sectional data collected as part of the National Survey of Family Growth (COUGLE2005, STEINBERG2008study1B). The final study (FERGUSON2008), which analysed data obtained from the Christchurch Health and Developmental Study, utilised both prospective and retrospective reporting within their analysis.

Across the studies a range of post-abortion mental health outcomes were assessed, including depression (FERGUSON2008), anxiety, (COUGLE2005, FERGUSON2008, STEINBERG2008study1B), psychiatric treatment (GILCHRIST1995), psychosis (GILCHRIST1995), non-psychotic illness (GILCHRIST1995), self-harm (GILCHRIST1995), alcohol and drug misuse (FERGUSON2008), suicidal ideation (FERGUSON2008), or any DSM psychiatric disorder (FERGUSON2008). Methods used to measure mental health outcomes in the studies included the use of medical treatment records (GILCHRIST1995) and diagnostic interviews (COUGLE2005, FERGUSON2008, STEINBERG2008study1B).

In addition to the variation in outcomes, studies also differed in their control of previous mental health problems. Two studies (COUGLE2005, GILCHRIST1995) excluded those with a history of mental health problems, whereas STEINBERG2008study1B and FERGUSON2008 adjusted for previous mental health outcomes within their analyses.

Table 15: Study characteristics: studies considering unwanted/unplanned pregnancies

Study ID and study design	Participant characteristics and country	Comparison group	Outcome	Measure and mode of administration	Study quality
FERGUSON 2008 ⁶	N = 507–542. Longitudinal birth cohort.	Pregnant abortion versus Birth of	Major depression Anxiety	Questionnaire based on CIDI and DISC	Fair

⁶ Includes data obtained via personal correspondence with the authors.

	Christchurch New Zealand	'unwanted' pregnancy.*	disorder Suicidal ideation Alcohol dependence Illicit drug dependence Number of mental health problems	<i>Interview</i>	
GILCHRIST 1995	N = 6410 Women with an unplanned pregnancy recruited from UK GP surgeries	Unplanned pregnancy: Obtained abortion versus did not request an abortion	Psychotic Illness Non-psychotic illness Deliberate self harm	Coded by GP using ICD-8	Fair
National Study of Family Growth					
STEINBERG 2008study1B	N = 1236 (unplanned pregnancies) A US national probability sample	Unplanned pregnancies: Abortion versus Delivery	Experience of Anxiety Symptoms	A measure of Experience of anxiety symptoms which is reflective of DSM IV criteria for GAD <i>Interview</i>	Very good
COUGLE2005	N =1033	Unplanned pregnancies: Abortion versus Delivery	Experience of Anxiety Symptoms	A measure of Experience of anxiety symptoms which is reflective of DSM IV criteria for GAD <i>Interview</i>	Poor
N = the number of subjects used in the analysis. *Data was provided by the authors which informed this comparison.					

1

2 5.4.2 Findings

3 Due to the heterogeneity of study design, outcome and measurement
4 methods used, meta-analysis of the data was not possible. Therefore, the
5 findings have been grouped by outcome and reviewed narratively with studies
6 using the same data source reviewed together. Results from all studies are
7 detailed in Table 16 with a GRADE evidence profile shown in Table 17.

8

9 5.4.2.1 Anxiety disorders

10 Three studies (using two data sources) assessed anxiety following either an
11 abortion or delivery. COUGLE2005 and STEINBERG2008study1B used the
12 same data source to assess the impact of abortion or delivery on a cross-

1 sectional measure of anxiety, which were reflective of DSM-IV criteria for
2 GAD. FERGUSON2008 used the Diagnostic Interview Schedule for Children
3 to assess DSM-IV anxiety disorders within their study.

4
5 COUGLE2005 indicated that women who had an abortion were significantly
6 more likely to experience anxiety at the time of follow-up compared with those
7 who delivered a pregnancy (OR 1.34; 95% CI, 1.05 – 1.70, $p < 0.018$). Despite
8 the significance of the finding, the odds ratio is consistent with only a small
9 effect. Furthermore, although removing individuals who reported a period of
10 anxiety prior to the date of their pregnancy from the analysis, COUGLE2005
11 only controlled for age at interview and race within their analysis.

12
13 Unlike COUGLE2005, who excluded women with previous experience of
14 anxiety, STEINBERG2008study1B adjusted for previous mental health
15 problems in addition to other confounding variables within their analysis. The
16 adjusted results indicated that women who underwent an abortion were no
17 more likely to experience anxiety compared with those who delivered the
18 pregnancy (OR 1.24; 95% CI, 0.92 – 1.68, $p = 0.15$). Further analysis
19 indicated that only women who reported two or more abortions had a higher
20 rate of anxiety at follow-up (OR 1.69; 95% CI, 1.16 – 2.47, $p = 0.007$)
21 compared with women who delivered the pregnancy. There was no significant
22 difference in anxiety outcomes for women reporting only one abortion (OR
23 1.21; 95% CI, 0.91 – 1.61, $p = 0.19$). In all cases, STEINBERG2008study1B
24 the range of factors controlled for in the analysis included experience of rape,
25 subsequent births and education level. One possibility for the difference
26 between STEINBERG2008study1B and COUGLE2005 may be due to these
27 differences in confounder control and sample selection.

28
29 FERGUSON2008 assessed the differences in rates of anxiety between the
30 abortion and delivery groups using data from a lagged model, in which
31 pregnancy history was measured in the 5 years prior to the assessment of
32 mental health outcomes. In their analysis, a relative odds ratio of less than 1
33 indicated an increased risk of anxiety in the abortion group. Findings indicated
34 that women who had an abortion were no more likely to experience anxiety
35 disorders than those who delivered a pregnancy (OR 0.55; 95% CI, 0.20 –
36 1.48, $p > 0.05$).

37 38 **5.4.2.2 Major depression**

39 Using the same lagged model as described in Section 5.4.2.1,
40 FERGUSON2008 indicated that women who had an abortion were no more
41 likely to experience depression than those who delivered an unwanted
42 pregnancy (OR 1.27; 95% CI, 0.51 – 3.16, $p > 0.05$).

43 44 **5.4.2.3 Suicidal ideation**

45 Only FERGUSON2008 assessed suicidal ideation, with results suggesting
46 that women who undergo an abortion were no more likely to experience
47 suicidal ideation in comparison with those who delivered the pregnancy (OR
48 0.63; 95% CI, 0.17 – 2.32, $p > 0.05$).

1 **5.4.2.4 Alcohol and drug misuse**

2 Using their 5-year lagged model, FERGUSON2008 also assessed both
3 alcohol and illicit drug dependence. In both cases, findings suggested that
4 having an abortion was not significantly associated with an increased risk
5 when compared with delivering an unwanted pregnancy (OR 0.14; 95% CI,
6 0.01 – 1.98, $p > 0.05$ and OR 0.08; 95% CI, 0.005 – 1.22, $p > 0.05$,
7 respectively).
8

9 **5.4.2.5 Psychiatric illness**

10 Two studies assessed any psychiatric illness following a pregnancy event. In
11 their prospective study, GILCHRIST95 assessed incidence rates for any
12 psychiatric illness, whilst retrospective and prospective reporting was used by
13 FERGUSON2008 to assess the number of mental health problems.
14

15 Using data from women with no history of mental health problems prior to the
16 pregnancy, GILCHRIST1995 suggested that there was no difference in
17 psychiatric illness in women who had an abortion compared with those who
18 did not request an abortion for an unplanned pregnancy (RR 1.0; CI 1.0 – 1.1,
19 $p > 0.05$).
20

21 Similarly, FERGUSON2008 indicated that women who had an abortion were
22 not at an increased risk of a higher number of mental health problems
23 compared with those who deliver an unwanted pregnancy (IRR 0.79; 95% CI,
24 0.51 – 1.23, $p > 0.05$)⁷. Note that this comparison was not made by
25 FERGUSON2008, however, figures were provided by the authors which
26 informed this analysis.
27

28 **5.4.2.6 Psychotic illness**

29 With regard to psychotic illnesses, GILCHRIST1995 indicated that women in
30 the abortion group were 70% less likely to experience a psychotic illness than
31 those in the delivery group (RR 0.3; 95% CI, 0.2 – 0.4, $p < 0.05$). Further
32 analysis was focused on cases of psychosis that led to hospital admission
33 and excluded those with puerperal psychosis (described by the GPs as mild).
34 Results for this analysis indicated similar rates of psychotic illness following
35 an abortion (rate 0.93 per 1000 terminations) or delivery (rate 1.02 per 1000
36 deliveries) although no statistical comparison was provided. Furthermore,
37 these rates included women with a history of previous psychosis and other
38 mental health problems.
39

40 **5.4.2.7 Non-psychotic illness**

41 GILCHRIST1995 found no difference in the risk of non-psychotic illnesses for
42 women who had an abortion compared with those who delivered the
43 pregnancy (RR 1.0; 95% CI, 1.0 – 1.1, $p > 0.05$).
44

⁷ As with the odds ratios, an incidence risk ratio less than 1 suggests a greater risk of mental health problems in the abortion group compared with those who deliver the pregnancy.

5.4.2.8 Self-harm

The final category assessed by GILCHRIST1995 in their prospective study was self-harm. There was a significant increase in the risk of self-harm for individuals in the abortion group compared with the delivery group (RR 1.7; 95% CI, 1.1 – 2.6, $p < 0.05$). However the confidence intervals of the effect are wide, making it hard to determine the true magnitude of the effect.

Table 16: Studies considering unwanted or unplanned pregnancies

Mental health outcome	Study ID	Follow-up	Results OR/RR (CI 95%)
Experience of anxiety symptoms	COUGLE2005	Cross-sectional study	OR 1.34 (1.05 – 1.70) $p < 0.018$
	STEINBERG2008 study1B 2 versus 0 abortions 1 versus 0 abortions	Cross-sectional study	OR 1.24 (0.92 – 1.68) $p = 0.15$ OR 1.69 (1.16 – 2.47) $p = 0.007$ OR 1.21 (0.91 – 1.61) $p = 0.19$
Anxiety	FERGUSON2008	5-year lagged model	OR 0.55 (0.20 – 1.48) $p > 0.05^*$
Major depression	FERGUSON2008	5-year lagged model	OR 1.27 (0.51 – 3.16) $p > 0.05^*$
Suicidal ideation	FERGUSON2008	5-year lagged model	OR 0.63 (0.17 – 2.32) $p > 0.05^*$
Alcohol dependence	FERGUSON2008	5-year lagged model	OR 0.14 (0.01 – 1.98) $p > 0.05^*$
Number of mental health problems	FERGUSON2008	5-year lagged model	RR 0.79 (0.51 – 1.23) $p > 0.05^*$
Any psychiatric illness	GILCHRIST1995	Variable	IRR 1.0 (1.0 – 1.1) $p > 0.05$
Psychotic illness	GILCHRIST1995	Variable	RR 0.3 (0.2 – 0.4) $p < 0.05$
Non-psychotic illness	GILCHRIST1995	Variable	RR 1.0 (1.0 – 1.1) $p > 0.05$
Self-harm	GILCHRIST1995	Variable	RR 1.7 (1.1 – 2.6) $p < 0.05$
*OR and RR less than 1 indicate a higher risk of mental health problems in the abortion group within FERGUSON2008.			

10

1 **Table 17: GRADE evidence summary for profile mental health outcomes**
 2 **for the mental health outcomes of abortion compared with delivery of**
 3 **unwanted/ unplanned pregnancies**

Outcomes	Relative effect (95% CI)	Number of participants	Quality of the evidence (GRADE)
Anxiety disorder Cross sectional	OR ranged from 1.24 to 1.34	6557 (3 studies ¹)	⊕⊕⊕⊕ very low ^{2,3}
Depression Follow-up: mean 5 years	OR 1.27 (0.51 – 3.16) ⁴	169 (1 study)	⊕⊕⊕⊕ very low ^{3,5}
Suicidal ideation Follow-up: mean 5 years	OR 0.63 (0.17 – 2.32) ⁴	169 (1 study)	⊕⊕⊕⊕ very low ^{3,5}
Alcohol dependence Follow-up: mean 5 years	OR 0.14 (0.01 – 1.98) ⁴	169 (1 study)	⊕⊕⊕⊕ very low ^{3,5}
Illicit drug dependence Follow-up: mean 5 years	OR 0.08 (0.005 – 1.22)	169 (1 study)	⊕⊕⊕⊕ very low ^{3,5}
Psychiatric illness Follow-up: 1-5 years	RR ranged from 1 to 0.815	Non-estimable (2 studies)	⊕⊕⊕⊕ very low ³
Psychotic illness Follow-up: mean 1 year	RR 0.3 (0.2 – 0.4)	Non-estimable (1 study)	⊕⊕⊕⊕ very low ⁵
Non-psychotic illness Follow-up: mean 1 year	RR 1.0 (1.0 – 1.1)	Non-estimable (1 study)	⊕⊕⊕⊕ very low ^{3,5}
Self-harm Follow-up: mean 1 year	RR 1.7 (1.1 – 2.6)	Non-estimable (1 study)	⊕⊕⊕⊕ very low ⁵

4 ¹ Studies used same data source.
 5 ² Cross-sectional study using retrospective reporting.
 6 ³ Compatible with increased and decreased risk.
 7 ⁴ Odds ratios less than 1 indicate increased risk in the abortion group.
 8 ⁵ Sparse data.

10 **5.4.3 Limitations**

11 As shown in Table 17, a GRADE evidence summary was produced for the
 12 findings of the review. In general, the evidence available was very low, due to
 13 downgrading based on imprecision of the findings. In this case, data for each
 14 outcome was sparse with confidence intervals for the majority of results
 15 consistent with an increased or decreased risk of the mental health outcome
 16 assessed. Furthermore, the clinical heterogeneity in the results and the use of
 17 overlapping samples meant that outcomes could not be combined with a
 18 meta-analysis.

19
 20 In general, the studies reviewed in this section controlled for a number of
 21 confounding factors, although the level of confounder control varied between
 22 the studies. In particular, control over subsequently pregnancy events
 23 including multiple abortions, births and miscarriages differed with
 24 GILCHRIST1995 keeping individuals who went on to have miscarriages in the
 25 analysis, whilst FERGUSSON2008 did not account for any multiple pregnancy
 26 outcomes. The importance of adequate confounder control was highlighted by
 27 the results of COUGLE2005 and STEINBERG2008study1B, who, despite
 28 using the same dataset, produced contrasting results. COUGLE2005 only
 29 controlled for race and age of pregnancy in their analysis, and found a
 30 significant effect of abortion on rates of anxiety. In contrast,
 31 STEINBERG2008study1B who controlled for a range of potential confounding

1 variables including age, race, marital status, rape history, income and
2 pregnancy outcomes, failed to find a significant effect.

3
4 Studies included in this section of the review all considered women with either
5 an unplanned or unwanted pregnancy. Despite being viewed as a more
6 appropriate comparison group (APA review), a number of limitations warrant
7 discussion. COUGLE2005, GILCHRIST1995 and STEINBERG2008study1B
8 all identified unplanned pregnancies. In all these cases, an unplanned
9 pregnancy is not the same as an unwanted pregnancy. The one study that did
10 consider unwanted pregnancy (FERGUSON2008) based this classification
11 on whether the women reported having an adverse reaction, felt distressed
12 about the pregnancy or reported that it was unwanted. Whilst giving an
13 indication as to whether the pregnancy was unwanted, using initial distress as
14 a proxy for an unwanted pregnancy may be limited.

15
16 Only one study included in the review adopted a wholly prospective design
17 (GILCHRIST1995), with FERGUSON2008 relying on both retrospective and
18 prospective data. Both COUGLE2005 and STEINBERG2008study1B used
19 retrospective and self-report measures of mental health outcomes following
20 an abortion. The follow-up periods included in the studies also varied,
21 particularly in the two cross-sectional studies (COUGLE2005,
22 STEINBERG2008study1B), where the time between abortion and follow-up
23 could range from 6 months to 20 years. Furthermore, the use of retrospective
24 data to control for previous mental health problems
25 (STEINBERG2008study1B) may lead to recall bias. Finally, only one of the
26 studies used a UK sample (GILCHRIST1995), which may limit the
27 generalisability of results.

29 **5.5 EVIDENCE STATEMENTS**

30
31 Studies that do not control for whether or not the pregnancy was planned or
32 wanted suggest that there are increased risks of psychiatric treatment, suicide
33 and substance misuse for women who undergo abortions compared with
34 those who deliver a live birth. Findings for depression, anxiety disorders and
35 PTSD did not indicate an increased risk.

- 36
37 1. Where studies control for whether or not the pregnancy was planned or
38 wanted, there is no evidence of elevated risk of mental health problems
39 and some evidence of lower rates of psychotic illness for women who
40 have an abortion compared with those who deliver the pregnancy.
- 41
42 2. Data for all outcomes is still limited by a number of factors including a
43 lack of comparable data across a range of diagnostic categories.
44 Adequate control of confounding factors was shown to impact results.
- 45
46 3. Rates of psychiatric contact did not increase following an abortion,
47 whereas there was a significant increase in psychiatric treatment

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following a pregnancy (without controlling for whether or not the pregnancy was planned).

4. Rates of psychiatric contact were found to be significantly higher in the abortion group 9 months prior to the abortion (MUNK-OLSEN2011). This suggests that women who have an abortion may differ from those who deliver a live birth and that any propensity towards mental health problems may be present before the abortion.

DRAFT

6 DISCUSSION AND CONCLUSION

6.1 OVERVIEW

The question

When a woman is carrying an unwanted pregnancy in most Western societies, she will have the option to continue with the pregnancy to a full-term birth or to elect to terminate the pregnancy, subject to the relevant legal framework (for example, rules on timing and the presence of risk to either the mother or child). It is important, in this context, for a woman to understand the possible physical and mental health risks associated with each course of action. It is also important that healthcare professionals can identify factors that may be associated with a poor outcome following abortion or birth following of an unwanted pregnancy.

It is reasonably well accepted that there are a broad range of physical and mental health risks known to be associated with birth. However, it is less certain whether the mental health risks associated with birth are altered if the pregnancy is unwanted. Similarly, for abortion, it is well accepted that there are some physical risks directly related to the timing and techniques used to undertake an abortion. We are less certain about the mental health impact of abortion for an unwanted pregnancy.

The relationships between unwanted pregnancy, abortion and mental health have been the subject of much debate and research. In an explicit effort to clarify this area, the APA and Charles reviews have drawn together research addressing these relationships. These reviews concluded that abortion of an unwanted pregnancy was no more likely to lead to mental health problems than if the pregnancy went to full term. However, each review can be criticised on the grounds of either quality of included studies or breadth of the field of inquiry.

The APA review examined the relationships between unwanted pregnancy, birth and mental health very broadly, looking at prevalence, factors associated with poor outcomes, comparing mental health following both birth and abortion, and controlling for confounders. This review included a very broad range of studies, a number of which were of low quality.

The Charles review used quality criteria to exclude lower quality studies and to identify studies of higher quality that were more able to compare the mental health impact of abortion with that for birth in an unwanted pregnancy. It did not undertake a broader examination of studies to examine the prevalence of, or to identify factors associated with, mental health problems following

1 abortion for unwanted pregnancy. This review has attempted to address the
2 broader issues and to combine these two approaches, taking the best from
3 each.

4
5 Therefore, like the APA review, but unlike the Charles review, the current
6 review covered three questions, addressed separately in section 6.2 below.
7

- 8 1. *How prevalent are mental health problems in women who*
9 *have an induced abortion?*
- 10 2. *What factors are associated with poor mental health*
11 *outcomes following an induced abortion?*
- 12 3. *Are mental health problems more common in women who*
13 *have an induced abortion when compared with women who*
14 *deliver an unwanted pregnancy?*

15
16 Unlike the APA review, studies were excluded in this review if they had not
17 used a validated measure of mental health and/or if follow-up was less than
18 90 days. In addition, to improve confidence in the evidence, the current review
19 applied NICE (2009) quality checklists for case control or prognostic studies to
20 all potentially eligible studies. An adapted version of the abortion specific
21 quality criteria applied in the Charles review was also used to assess quality
22 of studies. Finally, the current review utilised the GRADE (2004) process to
23 evaluate the quality of outcomes across the different studies.
24

25 **6.2 FINDINGS**

27 **6.2.1 How prevalent are mental health problems in women who** 28 **have an induced abortion?**

29 **What does the evidence say?**

30
31
32 The evidence statements from this review are shown in full in section 3.6.
33 The key points are as follows:

- 34
35 1. When prior mental health is not taken into account, rates of mental
36 health problems post-abortion appear to be high.
- 37
38 2. If women with previous mental health problems are excluded, the rate
39 of mental health problems after abortion, are lower.
- 40
41 3. The studies included in the review are limited in a number of ways,
42 making it difficult to form confident conclusions from the results.
43

1 There was a broad range of findings across the different mental health
2 diagnostic categories regarding prevalence rates following an abortion.
3 Overall the quality of the studies was poor to fair, with large variation in the
4 study design (including retrospective study designs and secondary data
5 analysis of population studies), variable and sometimes small sample sizes,
6 considerable variation in the measurement methods and the outcomes
7 reported, and lack of adequate control for confounding variables including
8 whether or not the pregnancy was planned and multiple pregnancy events
9 both before and after abortion. In this context, the high degree of
10 heterogeneity in prevalence rates reported may well result from these
11 variations, making it difficult to form reliable conclusions or to make
12 generalisations from these results.

13
14 Nevertheless, when prior mental health is not taken into account, rates of
15 mental health problems post-abortion appear to be high. Conversely, by
16 controlling for previous mental health problems, studies report greatly reduced
17 prevalence rates for mental health problems post-abortion. Although these
18 findings confirm the APA review findings, the included studies for this review
19 do not show that the rates for post-abortion mental health problems amongst
20 women with no history of mental health problems occurs at the same level as
21 that of women in the general population.

22
23 One important, tangential finding from this part of the review is taken from the
24 samples analysed by STEINBERG2008study1, which suggests that in
25 countries where abortion is legal, the majority of abortions (up to 95% in this
26 study) are for unwanted pregnancies with only a small proportion occurring
27 due to other therapeutic reasons such as fetal abnormality or risk to the
28 mother. We can therefore assume that in such countries, the abortion rate
29 approximates the abortion rate for women with an unwanted pregnancy.

32 **6.2.2 What factors are associated with poor mental health** 33 **outcomes following an induced abortion?**

34 **What does the evidence say?**

35
36
37 The evidence statements from this review are shown in full in section 4.5.
38 In summary, they are as follows:

- 39
40 1. The evidence base reviewed is restricted by a number of limitations
41 and the lack of UK-based studies reduces the generalisability of the
42 data.
- 43
44 2. The most reliable predictor of post-abortion mental health problems is
45 having a history of mental health problems prior to the abortion.
- 46
47 3. A range of other factors produced more mixed results; although there is
48 some suggestion that life events and negative attitudes towards

1 abortions in general, and towards a woman's personal experience of
2 abortion, may impact negatively on mental health.

3
4 This section of the review aimed to assess factors associated with mental
5 health problems following an abortion. Identifying these factors would enable
6 healthcare professionals to monitor and provide greater support for women
7 identified as potentially 'at risk'.

8
9 All studies were of variable quality and even where studies used the same
10 data source, differential control of confounding factors and variation in the way
11 each factor was classified meant that studies came to different conclusions.
12 Furthermore, a proportion of studies included in the review were not
13 specifically designed to assess the different factors associated with mental
14 health problems following an abortion. Other limitations included
15 heterogeneity within the factors assessed and the outcomes reported,
16 inconsistent reporting of non-significant factors and variations in follow-up
17 times. In addition, it should be noted that this review excluded a number of
18 poorer quality studies, which had been included in the APA review, did not
19 satisfy our eligibility criteria. Also, the associated factors examined were not
20 an exhaustive list. Very few of the studies were UK-based studies. Overall,
21 the quality of studies was variable, including one very good quality study.

22
23 The most reliable predictor of post-abortion mental health problems was
24 having a history of mental health problems prior to the abortion, a finding that
25 emerged regardless of the specific outcome measure or method of reporting
26 used. This confirms the findings of the APA review. This finding gains
27 additional confirmation from this review as we considered prospective studies
28 only: the single consistent factor to be associated with poorer mental health
29 outcomes post-abortion was pre-abortion mental health problems. It also
30 appears that *any* mental health problem prior to pregnancy will increase the
31 risk of post-abortion mental health problems.

32
33 A range of other potentially associated factors had more mixed results,
34 although there is some suggestion that life events and negative attitudes
35 towards abortions in general, and towards a woman's personal experience of
36 abortion, may impact negatively on mental health. Stigma, the perceived need
37 for secrecy and lack of social support were also reported to be important
38 factors associated with poorer post-abortion outcomes. Moreover, women
39 who show a negative emotional reaction immediately following the abortion
40 are likely to have a poorer outcome – a useful means of identifying those at
41 risk.

42
43 When considering the risk of post-abortion mental health problems, it is also
44 instructive to consider factors associated with poorer mental health outcomes
45 following a live birth. In 2007, NICE published a clinical guideline on antenatal
46 and postnatal mental health (NCCMH, 2007). The guideline conducted a
47 systematic review of the best available evidence (large-scale prospective
48 studies and existing systematic reviews) which assessed the mental health
49 outcomes for women following a birth. Similar to the findings from the present
50 review, the most important risk factor for poor mental health following a live

1 birth was a history of mental health problems both before and during the
2 pregnancy. Other important risk factors included low social support, exposure
3 to recent life events, low self-esteem, childcare difficulties, relationship status,
4 'neuroticism', birth complications, marital discord, obstetric factors, socio-
5 economic status, age at time of pregnancy and a family history of depression.
6 These risk factors can increase a new mother's chances of developing a
7 range of mental health problems, including depression, puerperal psychosis,
8 anxiety disorders and eating disorders. Clearly, there is some overlap in the
9 risk factors for a poor mental health outcome post-abortion and postpartum,
10 although large scale comparative data is lacking. The overlap in risk factors
11 suggests, nevertheless, that for women with a history of mental health
12 problems, monitoring and support may be required regardless of the
13 pregnancy resolution. In addition, particular attention should be paid to those
14 who have a negative emotional reaction after an abortion.
15
16

17 **6.2.3 Are mental health problems more common in women who**
18 **have an induced abortion, when compared with women who**
19 **deliver an unwanted pregnancy?**

20
21 **What does the evidence say?**
22

23 The evidence statements from this review are shown in full in section 5.5.
24 In summary, they are as follows:
25

- 26 1. Studies that do not control for whether or not the pregnancy was
27 planned or wanted suggest that there are increased risks of psychiatric
28 treatment, suicide and substance misuse for women who undergo
29 abortions compared with those who deliver a live birth.
30
- 31 2. Where studies control for whether or not the woman planned to get
32 pregnant or whether the pregnancy was unwanted, there is no
33 evidence of elevated risk of mental health problems and some
34 evidence of lower rates of psychotic illness for women who have an
35 abortion compared with those who deliver the pregnancy.
36
- 37 3. Rates of psychiatric contact did not increase following an abortion,
38 compared to birth, whereas there was a significant increase in the
39 likelihood of receiving psychiatric treatment following a pregnancy
40 (without controlling for the pregnancy being planned).
41
- 42 4. Rates of psychiatric contact are significantly higher in women who have
43 an abortion during the nine months prior to the abortion. This may be a
44 reaction to an unwanted pregnancy or that women with mental health
45 problems are at greater risk of having an unplanned (and unwanted)
46 pregnancy. In any event, there appears to be a propensity towards
47 mental health problems present before the abortion.
48

1 5. The studies included in the review are limited in a number of ways,
2 making it difficult to form confident conclusions from the results.
3
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5

6 The aim of this review was to compare the mental health outcomes of women
7 who had an abortion with those who delivered a live birth at full term. As noted
8 in the Charles and APA reviews, women who delivered an unplanned or
9 unwanted pregnancy are considered the most appropriate comparison for the
10 review. As many of the studies did not account for whether or not the
11 pregnancy was planned or wanted, studies that did account for these factors
12 were reviewed separately with the following comparisons considered:
13

- 14 • Any live birth versus abortion
- 15 • Live birth of an unplanned pregnancy versus abortion of an unplanned
16 pregnancy
- 17 • Live birth of an unwanted pregnancy versus abortion of an unwanted
18 pregnancy
19

20 Data for all outcomes is limited by a number of factors including a lack of
21 comparable data across a range of diagnostic categories. Adequate control of
22 confounding factors was also shown to impact on the results. A number of
23 limitations shown in studies included in the prevalence and associated factors
24 sections also apply here.
25

26 Studies that do not control for whether or not the pregnancy was planned or
27 wanted, suggest that there are increased risks of receiving psychiatric
28 treatment, suicide and substance misuse for women who undergo abortions
29 compared with those who deliver a live birth. Findings for depression, anxiety
30 disorders and PTSD did not indicate an increased risk. Where studies control
31 for whether or not the pregnancy was planned or wanted, there is no evidence
32 of elevated risk of mental health problems except for a small increase in
33 possible self harm in those having an abortion compared with the delivery
34 group, and some evidence of lower rates of psychotic illness for women who
35 have an abortion compared with those who deliver the pregnancy at full term.
36 Rates of psychiatric contact did not increase following an abortion, compared
37 with birth, whereas there was a significant increase in psychiatric treatment
38 following a pregnancy (without controlling for whether or not the pregnancy
39 was planned or wanted). However, where studies controlled for multiple
40 confounding factors, the risk of mental health problems following an abortion,
41 was comparable with the risk of mental health problems following a delivery.
42

43 Findings from both the APA and Charles reviews indicated that where studies
44 were of better quality, controlling for previous mental health problems and
45 accounting for other confounding factors, the risk of mental health problems
46 was no greater following an abortion compared with a delivery.
47

48 Since the APA and Charles reviews, the MUNK-OLSEN2011 study, which
49 excluded all women with a prior mental health problem, found that the rates of
50 psychiatric contact were significantly higher in the abortion group in the 9

1 months *prior* to the abortion. This suggests that women who have an abortion
2 develop mental health problems before the abortion and that this may be a
3 reaction to the unwanted pregnancy. However, it is also possible that people
4 with mental health problems are more likely to have an unplanned or
5 unwanted pregnancy. Both these explanations fit with the data in this review,
6 pervious reviews and the MUNK-OLSEN2001 study.
7
8

9 **6.3 CONCLUSION**

10
11 In summary, the following key points were identified by this review:

- 12
13 • although there are significant limitations with the dataset included in
14 this review, this review is perhaps a little more robust, combining the
15 approaches of both main previous reviews, and confirms many of the
16 findings in previous reviews.
17
- 18 • mental health outcomes are likely to be the same, whether women with
19 unwanted pregnancies opt for an abortion or birth
20
- 21 • women with mental health problems prior to abortion or birth, are
22 associated with increased mental health problems after the abortion or
23 birth
24
- 25 • for all women who have an unwanted pregnancy, support and
26 monitoring should be offered as the risk of later mental health problems
27 are greater whatever the pregnancy outcome. The offer of support
28 should depend upon the emergence of mental health problems,
29 whether during pregnancy, post-abortion or after birth, and should be
30 underpinned by NICE guidance for the treatment of the mental health
31 problems identified
32
- 33 • if women who have an abortion show a negative emotional reaction to
34 the abortion, or are experiencing stressful life events, support and
35 monitoring should be offered as they are more likely than others to
36 develop a mental health problem.
37
38
39
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7 APPENDICES

APPENDIX 1: DECLARATIONS OF INTERESTS BY STEERING GROUP MEMBERS

Steering Group members were appointed because of their knowledge of induced abortion, experience of scientific issues, health research, the delivery and receipt of healthcare, mental health issues and the role of professional organisations and organisations for people undergoing induced abortion.

To minimise and manage any potential conflicts of interest, and to avoid any public concern that commercial or other financial interests have affected the work of the Steering Group and influenced the findings of the review, members of the Steering Group were required to declare as a matter of public record any interests held by themselves or their families which fall under specified categories (see below). This process followed that set out by NICE (2009) for Guidelines Development Groups. These categories included any relationships they had with the healthcare industries, professional organisations, organisations that had a declared position for or against abortion, organisations providing induced abortions as well as organisations providing support for people considering induced abortion and their families and carers.

To allow the management of any potential conflicts of interest that might arise during the development of the guideline, Steering Group members were asked to declare their interests at the outset and at each Steering Group meeting throughout the review process. The interests of all the members of the Steering Group are listed below.

Categories of interest

- **Paid employment**
- **Personal pecuniary interest:** financial payments or other benefits from either the manufacturer or the owner of a product or service under consideration, or the industry or sector from which the product or service comes. This includes holding a directorship, or other paid position; carrying out consultancy or fee paid work; having shareholdings or other beneficial interests; receiving expenses and hospitality over and above what would be reasonably expected to attend meetings and conferences.
- **Personal family interest:** financial payments or other benefits from the healthcare industry that were received by a member of your family.
- **Non-personal pecuniary interest:** financial payments or other benefits received by the Steering Group member's organisation or department, but where the member has not personally received payment, including fellowships and other support provided by the healthcare industry. This includes a grant or other payment to sponsor

- 1 a post, or contribute to the running costs of the department;
 2 commissioning of research or other work; contracts with, or grants from
 3 organisations such as NICE.
- 4 • **Personal non-pecuniary interest: these include, but are not limited**
 5 **to**, clear opinions or public statements you have made about induced
 6 abortion, holding office in a professional organisation or advocacy
 7 group with a direct interest in abortion or other reputational risks
 8 relevant to this review.

9

Declarations of interest - Steering Group	
Dr Roch Cantwell	
Employment	Consultant Perinatal Psychiatrist
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	Employer's grants?
Personal non-pecuniary interest	Member of RCPsych
Actions taken	None required
Dr Ian Jones	
Employment	Reader in Perinatal Psychiatry and Honorary Consultant Perinatal Psychiatrist, Cardiff University.
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	Employer's grants?
Personal non-pecuniary interest	Member of Executive of the Perinatal Psychiatric Section of the RCPsych.
Actions taken	None required
Professor Tim Kendall	
Employment	Joint Director, NCCMH, RCPsych Consultant Psychiatrist and Medical Director, Sheffield Health and Social Care NHS Foundation Trust
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	NCCMH's receives grant of approximately £1.2m per year from NICE for the development of a programme of mental health clinical guidelines and related evidence based guidance.
Personal non-pecuniary interest	None
Actions taken	None required
Tahir Mahmood	
Employment	RCOG
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	Fellow of RCOG
Actions taken	None
Claudette Thompson	
Employment	Department of Health, funders of this project
Personal pecuniary interest	None

Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	None
Actions taken	Role in Steering Group was as observer
Lisa Westall	
Employment	Department of Health, funders of this project
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	None
Actions taken	Role in Steering Group was as observer
Judy Shakespeare	
Employment	General Practitioner
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	Fellow of Royal College of General Practitioners
Actions taken	None required
Ms Victoria Bird	
Employment	Consultant Systematic Reviewer to NCCMH
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	Employer's grants?
Personal non-pecuniary interest	None
Actions taken	None
Mr Timothy Kember	
Employment	Research Assistant, NCCMH, RCPsych
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	None
Actions taken	None required
Dr Nick Meader	
Employment	Systematic Reviewer, NCCMH, RCPsych
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	None
Actions taken	None required
Ms Caroline Salter	
Employment	Research Assistant, NCCMH, RCPsych
Personal pecuniary interest	None
Personal family interest	None
Non-personal pecuniary interest	None
Personal non-pecuniary interest	None
Actions taken	None required

1

1 **APPENDIX 2: RESEARCHERS CONTACTED FOR**
2 **INFORMATION ON EXISTING, UNPUBLISHED OR SOON-TO-**
3 **BE PUBLISHED RESEARCH.**

4
5 Professor Phillip C Hannaford
6 Centre of Academic Primary Care
7 University of Aberdeen
8 Scotland

9
10 Professor John Horwood
11 Department of Psychological Medicine
12 University of Otago
13 New Zealand

14
15 Professor David M Fergusson
16 Department of Psychological Medicine
17 Christchurch School of Medicine and Health Sciences
18 New Zealand

19
20 Dr Vignetta Charles
21 National Aids Fund
22 Washington DC
23 USA

24
25 Esther Isabelle Wilder
26 Lehman College Department of Sociology
27 The City University of New York
28 USA

29
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1 **APPENDIX 3: ORGANISATIONS AND INVITED EXPERTS WHO**
2 **SUBMITTED COMMENTS IN RESPONSE TO THE**
3 **CONSULTATION DRAFT OF THE REVIEW**

4 *[List of organisations and experts to be inserted after consultation]*

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1 **APPENDIX 4: SEARCH STRATEGIES FOR THE**
 2 **IDENTIFICATION OF CLINICAL STUDIES**

3 ***Search strategies***

4 The search strategies should be referred to in conjunction with information set
 5 out in Sections 3, 4, and 5. A summary of search strategies is shown in Table
 6 18. Each search was constructed using groups of terms as set out in below
 7 and the full set of search terms constructed for use in MEDLINE follow.
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 9

10 **Table 18: Summary of systematic search strategies**

Review areas	Search construction	Study designs	Databases and years searched	Hit rate
All	[(Abortion terms) AND (Mental health terms OR somatoform terms OR substance abuse terms OR domestic violence terms OR emotion terms OR employment terms OR life satisfaction terms OR self-esteem terms OR stigma terms OR post-abortion adjustment/syndrome terms)]	All	MEDLINE, 1990 to (week 21) 2010; MEDLINE In-Process and Other Non-Indexed Citations through 24 May 2010; EMBASE, 1990 to week 20 of 2010; CINAHL, 1990 to (week 19) of 2010; PsycINFO, 1990 to (week 19) of 2010	5813 [excludes APA2008 search results]

11

12 **MEDLINE**

13 The following search strategy was used to identify papers in MEDLINE
 14 (see Table 19). A similar strategy was used to identify references in other
 15 databases. The resulting evidence was evaluated with respect to its ability to
 16 address all the review areas.
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19 **Table 19: Search strategy used IN MEDLINE**

Abortion	
1	(abortion applicants or abortion, criminal or abortion, eugenic or abortion, habitual or abortion, incomplete or abortion, induced or abortion, legal or abortion, therapeutic or abortion, threatened).sh.
2	(abort\$ or postabort\$ or preabort\$).ti,ab.
3	or/1-2
Mental health terms	

General mental health terms	
4	(mental disorders or mental health).sh.
5	((mental\$ or psychological\$) adj2 (condition\$ or disease\$ or disorder\$ or distress or health or ill\$ or problem\$)).ti,ab.
6	or/4-5
Schizophrenia and psychosis	
7	exp psychotic disorders/ or exp schizophrenia/ or (affective disorders, psychotic or delusions or hallucinations or paranoid disorders).sh.
8	(delusion\$ or hallucin\$ or paranoi\$ or psychiatric\$ or psychosis or psychoses or psychotic\$ or schizo\$).hw,ti,ab.
9	or/7-8
Depression and bipolar disorder	
10	(adjustment disorders or affective symptoms or mood disorders).sh.
11	((adjustment or affective or mood) adj disorder\$) or affective symptom\$).ti,ab.
12	or/10-11
13	exp bipolar disorder/
14	(bipolar disorder\$ or mania\$ or manic\$ or rapid cycl\$).ti,ab.
15	or/13-14
16	(depression or depressive disorder or depressive disorder, major or dysthymic disorder).sh.
17	(depres\$ or dysphori\$ or dysthymi\$).ti,ab.
18	or/16-17
Self-harm	
19	(overdose or self injurious behavior or self mutilation or suicide or suicide, assisted or suicide, attempted).sh.
20	(selfharm\$ or self harm\$ or selfinjur\$ or self injur\$ or selfmutilat\$ or self mutilat\$ or suicid\$ or selfdestruct\$ or self destruct\$ or selfpoison\$ or self poison\$ or (self adj2 cut\$) or cutt\$ or overdose\$ or selfimmolat\$ or self immolat\$ or selfinflict\$ or self inflict\$ or automutilat\$ or auto mutilat\$).ti,ab.
21	or/19-20
Anxiety disorders	
22	exp anxiety disorders/
23	(anxiet\$ or anxious\$ or ((chronic\$ or excessiv\$ or intens\$ or (long\$ adj2 last\$) or neuros\$ or neurotic\$ or ongoing or persist\$ or serious\$ or sever\$ or uncontrol\$ or un control\$ or unrelent\$ or un relent\$) adj2 worr\$)).ti,ab.
24	(obsessive\$ or clean response\$ or compulsi\$ or obsession\$ or ocd or recur\$ thought\$).ti,ab.
25	panic\$.ti,ab.

26	(phobi\$ or agoraphobi\$ or claustrophobi\$).ti,ab.
27	(posttraumatic\$ or post traumatic\$ or stress disorder\$ or acute stress or desnos or ptsd or (extreme stress or flashback\$ or flash back\$ or hypervigilan\$ or hypervigilen\$ or psych\$ stress or psych\$ trauma\$ or psychotrauma\$) or (railway spine or (rape adj2 trauma\$) or reexperienc\$ or re experienc\$ or traumatic neuros\$ or traumatic stress) or (trauma\$ and (avoidance or emotion\$ or grief or horror or nightmare\$ or night mare\$))).ti,ab.
28	or/22-27
Eating disorders	
29	exp eating disorders/ or exp hyperphagia/
30	(anorexi\$ or ((appetite or eating) adj disorder\$) or binge\$ or bulimia or bulimic\$ or (compulsive\$ and (eat\$ or vomit\$)) or (food\$ and bing\$) or hyperphagi\$ or (self induc\$ and vomit\$)).ti,ab.
31	or/29-30
Somatoform disorders	
32	exp somatoform disorders/ or (malingering or munchausen syndrome or psychosomatic medicine).sh.
33	(somato\$ or psychosomat\$).ti,ab.
34	or/32-33
Substance misuse	
35	"codependency (psychology)"/ or exp substance related disorders/ or (alcohol dehydrogenase or alcohol drinking or alcohol withdrawal\$ or behavior, addictive or needle sharing or needle-exchange programs or neonatal abstinence syndrome or overdose or solvents).sh.
36	((alcohol\$ or drug\$1 or nicotine or polydrug\$ or substance\$ or tobacco) adj3 (abstain\$ or abstinen\$ or abus\$ or addict\$ or criminal or dependen\$ or excessive use\$ or illegal\$ or illicit\$ or intoxicat\$ or misus\$ or over dos\$ or overdos\$ or recreation\$ or unlawful\$)) or ((alcohol\$ or drug\$1 or nicotine or polydrug\$ or substance\$ or tobacco) adj use\$1) or ((drug\$1 or polydrug\$ or recreational or substance\$) adj rehab\$) or abusable product\$ or (crave\$ adj2 inject\$) or hard drugs or needle fixation or soft drugs or vsa\$1 or ((amphetamin\$ or cannabis\$ or cocaine or dexamfetamin\$ or dextroamphetamin\$ or dexedrine or heroin or marijuana or marihuana or methamphetamin\$ or psychostimulant\$ or stimulant\$1) adj (abus\$ or addict\$ or misus\$ or depend\$ or use\$1))).ti,ab.
37	or/35-36
Domestic violence	
38	(battered women or child abuse or child abuse, sexual or domestic violence or family conflict or incest or mandatory reporting or pedophilia or rape or sex offenses or spouse abuse or violence).sh.

39	(abuse\$ or abusing or assault\$ or batter\$ or violen\$ or conflict or incest\$ or p?edophil\$ or rape or rapist\$ or (sex\$ adj2 offenc\$)).ti,ab.
40	or/38-39
Emotions	
41	exp emotions/ or (anxiety, separation or emotional intelligence).sh.
42	(emotion\$ or grief or griev\$ or regret\$ or relief or shame\$).ti,ab.
43	or/41-42
Employment	
44	(career choice or career mobility or employment or employment, supported or job application or occupational exposure or occupational health or occupations or personnel downsizing or rehabilitation, vocational or unemployment or vocational education or women, working or workplace).sh.
45	(career\$ or employ\$ or job\$1 or occupation\$ or psychosocial\$ or psycho social\$ or unemploy\$).ti,ab. or psychosocial\$.hw.
46	or/44-45
Life satisfaction	
47	"quality of life"/ or (job satisfaction or life style or personal satisfaction).sh.
48	((life\$ or personal) adj5 satisf\$) or (life\$ adj2 (change\$ or qualit\$ or modif\$)) or wellbeing or well being).ti,ab.
49	or/47-48
Self-esteem	
50	"self assessment (psychology)"/ or "unconscious (psychology)"/ or (self concept or self disclosure).sh.
51	((self adj (concept or esteem or confiden\$ or critici\$ or evaluat\$ or express\$ or perception)) or selfconcept or selfesteem or selfconfiden\$ or selfcritici\$ or selfevaluat\$ or selfexpress\$ or selfperception).ti,ab.
52	or/50-51
Stigma	
53	exp social behaviour/ or (attitude or social perception).sh.
54	(prejudice\$ or discrimin\$ or stereotyp\$ or stigma\$).ti,ab.
55	or/53-54
Post-abortion adjustment/syndrome	
56	((postabort\$ or post abort\$ or ((after or follow\$) adj8 abort\$)) adj8 (adjust\$ or counsel\$ or interven\$ or problem\$ or program\$ or therap\$ or treat\$)).ti,ab.
57	((postabort\$ or abort\$) adj2 syndrom\$).ti,ab.

58 or/56-57

Abortion AND [Mental health or Somatoform or Substance abuse or Domestic violence or Emotions or Employment or Life satisfaction or Self-esteem or Stigma or Post-abortion adjustment/syndrome]

59 3 and (or/4-58)

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2 **APPENDIX 5: METHODOLOGY CHECKLISTS FOR CLINICAL**

3 **STUDIES AND REVIEWS**

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5 The methodological quality of each study was evaluated using NICE

6 checklists (NICE, 2009). The checklists reproduced below are for case-control

7 studies (Table 20) and for prognostic studies (Table 21).

8

9 For other checklists and further information about how to complete each

10 checklist, see *The Guidelines Manual* (NICE, 2009).

11

12

13 **Table 20: Methodology checklist: case-control studies**

Study identification			
<i>Include author, title, reference, year of publication</i>			
Guideline topic:		Review question no:	
Checklist completed by:			
Section 1: Internal validity			
		Circle one option for each question	
1.1	The study addresses an appropriate and clearly focused question.	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
Selection of participants			
1.2	The cases and controls are taken from comparable populations	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
1.3	The same exclusion criteria are used for both cases and controls	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
1.4	What was the participation rate for each group (cases and controls)?	Cases: Controls:	
1.5	Participants and non-participants are compared to establish their similarities or differences	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
1.6	Cases are clearly defined and differentiated from controls	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
1.7	It is clearly established that controls are not cases	Well covered Adequately addressed	Not addressed Not reported Not applicable

		Poorly addressed	
Assessment			
1.8	Measures were taken to prevent knowledge of primary exposure influencing case ascertainment	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
1.9	Exposure status is measured in a standard, valid and reliable way	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
Confounding factors			
1.10	The main potential confounders are identified and taken into account in the design and analysis	Well covered Adequately addressed Poorly addressed	Not addressed Not reported Not applicable
Statistical analysis			
1.11	Have confidence intervals been provided?		
Section 2: Description of the study (This information is required for evidence tables to facilitate cross-study comparisons. Please complete all sections for which information is available). <i>Please print clearly</i>			
2.1	How many people participated in the study? <i>List the numbers of cases and controls separately.</i>		
2.2	What are the main characteristics of the study population? <i>Include all characteristics used to identify both cases and controls – for example, age, sex, social class, disease status.</i>		
2.3	What environmental or prognostic factor is being investigated?		
2.4	What comparisons are made? <i>Normally only one factor will be compared, but in some cases the extent of exposure may be stratified – for example, non-smokers vs light, moderate or heavy smokers. Note all comparisons here.</i>		
2.5	For how long are participants followed up? <i>This is the length of time over which participant histories are tracked in the study.</i>		
2.6	What outcome measure(s) is/are used? <i>List all outcomes that are used to assess the impact of the chosen environmental or</i>		

	<i>prognostic factor.</i>	
2.7	What size of effect is identified? <i>Effect size should be expressed as an odds ratio. If any other measures are included, note them as well. Include p-values and any confidence intervals that are provided.</i>	
2.8	How was the study funded? <i>List all sources of funding quoted in the article, whether government, voluntary sector or industry.</i>	
2.9	Does this study help to answer your guideline review question? <i>Summarise the main conclusions of the study and indicate how it relates to the review question.</i>	

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Table 21: Methodology checklist: prognostic studies

The criteria used in this checklist are adapted from: Hayden JA, Cote P, Bombardier C (2006) Evaluation of the quality of prognosis studies in systematic reviews. *Annals of Internal Medicine* 144: 427–37.

Study identification <i>Include author, title, reference, year of publication</i>				
Guideline topic:			Review question no:	
Checklist completed by:				
Circle one option for each question				
1.1	The study sample represents the population of interest with regard to key characteristics, sufficient to limit potential bias to the results	Yes	No	Unclear
1.2	Loss to follow-up is unrelated to key characteristics (that is, the study data adequately represent the sample), sufficient to limit potential bias	Yes	No	Unclear
1.3	The prognostic factor of interest is adequately measured in study participants, sufficient to limit potential bias	Yes	No	Unclear
1.4	The outcome of interest is adequately measured in study participants, sufficient to limit bias	Yes	No	Unclear
1.5	Important potential confounders are appropriately accounted for, limiting potential bias with respect to the prognostic factor of interest	Yes	No	Unclear
1.6	The statistical analysis is appropriate for the design of the study, limiting potential for the presentation of invalid results	Yes	No	Unclear

APPENDIX 6: EXCLUDED STUDIES

All excluded studies with reasons for exclusion

Study ID	Full reference	Reason for exclusion		
		Prevalence	Risk factors	Comparators
ASHAN1993	Ahsan, S. K. & Soreng, J. (1993) Death anxiety before and after abortions among unmarried women. <i>Journal of Personality and Clinical Studies</i> , 9 (1-2)	No useable data	No useable data	No useable data
BAILEY2001	Bailey, P. E., Bruno, Z. V., Bezerra, M. F., et al. (2001) Adolescent pregnancy 1 year later: the effects of abortion versus motherhood in northeast Brazil. <i>Journal of Adolescent Health</i> , 29, 223–232	Inappropriate sample-illegal abortions	Inappropriate sample - illegal abortions	Inappropriate sample - illegal abortions
BARNET1986	Barnett, W., Freudenberg, N. & Wille, R. (1986) A regional prospective study of psychological sequelae of legal abortion. <i>Fortschritte der Neurologie, Psychiatrie</i> , 54, 106–118	Not in English	Not in English	Not in English
BARNETT1992	Barnett, W., Freudenberg, N. & Wille, R. (1992). Partnership after induced abortion: a prospective controlled study. <i>Archives of Sexual Behavior</i> , 21, 443–455	No useable data	No useable data	No useable data
BARNOW2001	Barnow, S., Ball, J., Doring, K., et al. (2001) The influence of psychosocial factors on mental well-being and physical complaints before and after undergoing an in-patient abortion. <i>Psychotherapie Psychosomatik Medizinische Psychologie</i> , 51(9-10), 356–364	<90 days follow-up	<90 days follow-up	<90 days follow-up
BESSE2002	Besse, D., Wirthner, D. & De Grandi, P. (2002) The psychological experience of patients who have undergone an early medical abortion. <i>Medecine et Hygiene</i> , 60, 1535–1538.	Not in English	Not in English	Not in English
BRADSHAW2005	Bradshaw, Z. & Slade, P. (2005) The relationships between induced abortion, attitudes towards sexuality and sexual problems. <i>Sexual and Relationship Therapy</i> , 20, 391–406	<90 days follow-up	<90 days follow-up	<90 days follow-up
BROEN2004	Broen, A. N., Moum, T., Bodtker, A. S. et al. (2004) Psychological impact on women of miscarriage versus induced abortion: a 2-year follow-up study. <i>Psychosomatic Medicine</i> , 66, 265–271	Included	Inappropriate comparison group	Inappropriate comparison group
BROEN2005	Broen, A. N., Moum, T., Bodtker, A. S. et al. (2005) The course of	Included	Inappropriate	Inappropriate

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	mental health after miscarriage and induced abortion: a longitudinal, five-year follow-up study. <i>BMC Medicine</i> , 3, 18		comparison group	comparison group
BROEN2006	Broen, A. N., Moum, T., Bodtker, A. S., <i>et al.</i> (2006) Predictors of anxiety and depression following pregnancy termination: a longitudinal five year follow-up study. <i>Acta Obstetrica et Gynecologica Scandinavica</i> , 85, 317–323	Included	Included	Inappropriate comparison group
BURNELL1987	Burnell, G. & Norfleet, M. (1987) Women's self-reported responses to abortion. <i>Journal of Psychology: Interdisciplinary and Applied</i> , 121, 71–76	Inappropriate mental health measure, No useable data - OR & CI	Inappropriate mental health measure, No useable data - OR & CI	Inappropriate mental health measure, No useable data - OR & CI
COHAN1993	Cohan, C., Dunkel-Schetter, C. & Lydon, J. (1993) Pregnancy decision making: predictors of early stress and adjustment. <i>Psychology of Women Quarterly</i> , 17, 223–239	<100 participants, <90 days follow-up	<100 participants, <90 days follow-up	<100 participants, <90 days follow-up
COLEMAN1998	Coleman, P. K., Nelson, E.S. (1998) The quality of abortion decisions and college students' reports of post-abortion emotional sequelae and abortion attitudes. <i>Journal of Social and Clinical Psychology</i> , 17, 425-442.	<100 participants	<100 participants	<100 participants
COLEMAN2002B	Coleman, P. K., Reardon, D. C., Rue, V. M., <i>et al.</i> (2002b) A history of induced abortion in relation to substance use during subsequent pregnancies carried to term. <i>American Journal of Obstetrics and Gynecology</i> , 187, 1673–1678	No useable data - OR & CI	No useable data	No useable data
COLEMAN2005	Coleman, P. K., Reardon, D. C. & Cogle, J. R. (2005) Substance use among pregnant women in the context of previous reproductive loss and desire for current pregnancy. <i>British Journal of Health Psychology</i> , 10, 255–268	No useable data - OR & CI	No useable data - OR & CI	Inappropriate comparison group
COLEMAN2006	Coleman, P.K. (2006) Resolution of unwanted pregnancy during adolescence through abortion versus childbirth: individual and family predictors and psychological consequences. <i>Journal of Youth and Adolescence</i> , 35, 903–911	Inappropriate mental health measure, No useable data - OR & CI	Inappropriate mental health measure	Inappropriate mental health measure
COLEMAN2009	Coleman, P. K., Coyle, C. T., Shuping, M., <i>et al.</i> (2009) Induced abortion an anxiety, mood, and substance disorders: isolating the effects of abortion in the national co morbidity survey. <i>Journal of</i>	Included	No useable data	Inappropriate comparison group

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	<i>Psychiatric Research. 43, 770–776</i>			
CONGLETON1993	Congleton, G. K., & Calhoun, L. G. (1993) Postabortion perceptions: A comparison of self-identified distressed and non-distressed populations. <i>International Journal of Social Psychiatry, 39, 255–265</i>	Inappropriate sample, <100 participants	Inappropriate sample, <100 participants	Inappropriate sample, <100 participants
CONKLIN1995	Conklin, M. P., & O'Connor, B. P. (1995). Beliefs about the fetus as a moderator of post-abortion psychological well-being. <i>Journal of Social and Clinical Psychology, 14, 76–95</i>	No useable data	No useable data	Inappropriate control of previous mental health
COUGLE2003	Cogle, J. R., Reardon, D. C., & Coleman, P. K. (2003) Depression associated with abortion and childbirth: A long-term analysis of the NLSY cohort. <i>Medical Science Monitor, 9, CR105-112</i>	Included	Inappropriate control of previous mental health	Inappropriate control of previous mental health
COZZARELLI1993	Cozzarelli, C. (1993) Personality and self-efficacy as predictors of coping with abortion. <i>Journal of Personality and Social Psychology, 65, 1224–1236</i>	< 90 days follow up	< 90 days follow up	< 90 days follow up
COZZARELLI1998	Cozzarelli, C., Sumer, N. & Major, B. (1998) Mental models of attachment and coping with abortion. <i>Journal of Personality and Social Psychology, 74, 453–467</i>	< 90 days follow up	< 90 days follow up	< 90 days follow up
DINGLE2008	Dingle, K., Alati, R., Clavarino, A., <i>et al.</i> (2008) Pregnancy loss and psychiatric disorders in young women: an Australian birth cohort study. <i>British Journal of Psychiatry, 193, 455–460</i>	Lifetime disorder	Lifetime disorder	Inappropriate comparison group
DUTTA2007	Dutta, P. (2007) Mental health status (MHS) of the MTP clients in Kolkata: A facility based study. <i>Psychological Studies, 52, 62–69</i>	< 90 days follow up	< 90 days follow up	< 90 days follow up
ELUL1999	Elul, B., Ellertson, C., Winikoff, B., <i>et al.</i> (1999) Side effects of mifepristone-misoprostol abortion versus surgical abortion: Data from a trial in China, Cuba, and India. <i>Contraception, 59, 107-114</i>	<90 day follow up	<90 day follow up	<90 day follow up
FAURE2003	Faure, S. & Loxton, H. (2003) Anxiety, depression and self-efficacy levels of women undergoing first trimester abortion. <i>South African Journal of Psychology, 33, 28–38</i>	<90 days follow-up,	< 90 days follow up	< 90 days follow up
FELTON1998	Felton, G. M., Parsons, M. A., & Hassell, J. S. (1998) Health behavior and related factors in adolescents with a history of abortion and never-pregnant adolescents. <i>Health Care for Women International, 19, 37-47</i>	<100 participants	<100 participants	<100 participants
FERGUSON2006	Fergusson, D. M., Horwood, L. J., & Ridder, E. M. (2006) Abortion	No useable	No useable	Included

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	in young women and subsequent mental health. <i>Journal of Child Psychology and Psychiatry</i> , 47, 16–24.	data	data	
FERGUSON2008	Fergusson, D. M., Horwood, J. & Boden, J. M. (2008) Abortion and mental health disorder: evidence from a 30-year longitudinal study. <i>The British Journal of Psychiatry</i> , 193, 444–451	No useable data - OR & CI	No useable data - OR & CI	Included
FERGUSON2009	Fergusson, D. M., Horwood, J. & Boden, J. M. (2009) Reactions to abortion and subsequent mental health. <i>The British Journal of Psychiatry</i> , 195, 420–426	Sample	Included	No useable data
FOK2006	Freudenberg, N. & Barnett, W. (1988) Relationship with a partner following legal abortion – a longitudinal comparative study. <i>Fortschritte der Neurologie Psychiatrie</i> , 56, 300–318	Inappropriate mental health measure	Inappropriate mental health measure	Inappropriate mental health measure
FRANCO1998	Franco, K. N., Tamburrino, M. B., Campbell, N. B., <i>et al.</i> (1989) Psychological profile of dysphoric women postabortion. <i>Journal of the American Medical Women Association</i> , 44, 113–115	<100 participants	<100 participants	<100 participants
FRANZ1992	Franz, W. & Reardon, D. (1992) Differential impact of abortion on adolescents and adults. <i>Adolescence</i> , 27, 161–172	Inappropriate sample	Inappropriate sample	Inappropriate sample
FREUDENBERG1988	Freudenberg, N. & Barnett, W. (1988) Relationship with a partner following legal abortion – a longitudinal comparative study. <i>Fortschritte der Neurologie Psychiatrie</i> , 56, 300–318	Not in English	Not in English	Not in English
GILCHRIST1995	Gilchrist, A. C., Hannaford, P. C., Frank, P., <i>et al.</i> (1995) Termination of pregnancy and psychiatric morbidity. <i>British Journal of Psychiatry</i> , 167, 243–248	No data	Included	Included
GISSLER1996	Gissler, M., Hemminki, E., & Lonnqvist, J. (1996) Suicides after pregnancy in Finland, 1987–94: register linkage study. <i>British Medical Journal</i> , 313, 1431–1434	Included	No useable data	Inappropriate control for previous mental health
GISSLER1997	Gissler, M., Kauppila, R., Merilainen, J., <i>et al.</i> (1997) Pregnancy-associated deaths in Finland 1987–1994 – definition problems and benefits of record linkage. <i>Acta Obstetrica et Gynecologica Scandinavica</i> , 76, 651–657	No useable data	No useable data	Inappropriate control for previous mental health
GISSLER1999	Gissler, M. & Hemminki, E. (1999) Pregnancy-related violent deaths. <i>Scandinavian Journal of Public Health</i> , 1, 54–55	Sample- same as GISSLER1996	No useable data	Inappropriate control for previous mental health

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GISSLER2004a	Gissler, M., Berg, C., Bouvier-Colle, M. H., <i>et al.</i> (2004a) Methods for identifying pregnancy-associated deaths: Population-based data from Finland 1987–2000. <i>Paediatric and Perinatal Epidemiology</i> , 18, 448–455	No relevant or useable data	No relevant or useable data	No relevant or useable data
GISSLER2004b	Gissler, M., Berg, C., Bouvier-Colle, M. H., <i>et al.</i> (2004b) Pregnancy-associated mortality after birth, spontaneous abortion, or induced abortion in Finland, 1980–2000. <i>American Journal of Obstetrics and Gynecology</i> , 190, 422–427	No useable data	No useable data	No useable data
GISSLER2005	Gissler, M., Berg, C., Bouvier-Colle, M. H., <i>et al.</i> (2005) Injury deaths, suicides and homicides associated with pregnancy, Finland 1987–2000. <i>European Journal of Public Health</i> , 15, 458–463	No useable data	No useable data	Inappropriate control for previous mental health
HARLOW2004	Harlow, B. L., Cohen, L. S., Otto, M. W., <i>et al.</i> (2004) Early life menstrual characteristics and pregnancy experiences among women with and without major depression: the Harvard Study of Moods and Cycles. <i>Journal of Affective Disorders</i> , 79, 167–176	Lifetime outcome	Lifetime outcome	Lifetime outcome
HARWOOD2008	Harwood, B., Nansel, T. & National, I. (2008) Quality of life and acceptability of medical versus surgical management of early pregnancy failure. <i>BJOG: An International Journal of Obstetrics & Gynaecology</i> , 115, 501–508	<90 days follow-up	<90 days follow-up	<90 days follow-up
HELLBERG1998	Hellberg, D., Mogilevkina, I. & Mardh, P. A. (1998) Reproductive and contraceptive history, smoking and drug use, and demographic characteristics in women with a history of induced abortions. <i>Italian Journal of Gynaecology and Obstetrics</i> , 10, 136–139	Lifetime outcome	Lifetime outcome	Inappropriate comparison group
HENSHAW1994	Henshaw, R., Naji, S., Russell, I., & Templeton, A. (1994) Psychological responses following medical abortion (using mifepristone and gemeprost and surgical vacuum aspiration: A patient-centered, partially randomised prospective study. <i>Acta Obstetrica et Gynecologica Scandinavica</i> , 73, 812–818	<90 days follow up	< 90 days follow up	< 90 days follow up
HITTNER1987	Hittner, A. (1987) Feelings of well-being before and after an abortion. <i>American Mental Health Counselors Association Journal</i> , 9, 98–104	Inappropriate mental health measure - cross section	Inappropriate mental health measure	Inappropriate mental health measure
HOPE2003	Hope, T. L., Wilder, E. I., & Terling Watt, T. (2003) The	Inappropriate	Inappropriate	Inappropriate

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	relationships among adolescent pregnancy, pregnancy resolution, and juvenile delinquency. <i>Sociological Quarterly</i> , 44, 555–576	mental health measure	mental health measure	mental health measure
HOUSTON1996	Houston, H. & Jacobson, L. (1996). Overdose and termination of pregnancy: an important association? <i>British Journal of General Practice</i> , 46, 737–738	Lifetime outcome	Lifetime outcome	Inappropriate comparison group
HOWIE1997	Howie, F. L., Henshaw, R. C., Naji, S. A., <i>et al.</i> (1997) Medical abortion or vacuum aspiration? Two year follow up of patient preference trial. <i>British Journal of Obstetrics and Gynaecology</i> 104, 829–833	Inappropriate mental health measure	Inappropriate mental health measure	Inappropriate comparison group
LAUZON2000	Lauzon, P., Roger-Achim, D., Achim, A., <i>et al.</i> (2000) Emotional distress among couples involved in first-trimester induced abortions. <i>Canadian Family Physician</i> , 46, 2033–2040	<90 days follow up	< 90 days follow up	< 90 days follow up
LAYER2004	Layer, S. D., Roberts, C., Wild, K., <i>et al.</i> (2004) Postabortion grief: evaluating the possible efficacy of a spiritual group intervention. <i>Research on Social Work Practice</i> , 14, 344–350	<100 participants, <90 days follow-up	< 90 day follow up	< 90 day follow up
LAZARUS1985	Lazarus, A. (1985) Psychiatric sequelae of legalized elective first trimester abortion. <i>Journal of Psychosomatic Obstetrics & Gynecology</i> , 4, 141–150	< 90 days follow-up	< 90 days follow up	< 90 days follow up
LEMKAU1991	Lemkau, J. P. (1991) Post-abortion adjustment of health care professionals in training. <i>American Journal of Orthopsychiatry</i> , 61, 92–102	<90 days follow-up	< 90 day follow up	< 90 day follow up
LOWENSTEIN2006	Lowenstein, L., Deutchsh, M., Gruberg, R., <i>et al.</i> (2006) Psychological distress symptoms in women undergoing medical vs. surgical termination of pregnancy. <i>General Hospital Psychiatry</i> , 28, 43–47	<90 days follow up	<90 days follow up	<90 days follow up
LYDON1996	Lydon, J., Dunkel-Schetter, C., Cohan, C. L., <i>et al.</i> (1996) Pregnancy decision-making as a significant life event: a commitment approach. <i>Journal of Personality and Social Psychology</i> , 71, 141–151	<100 participants, <90 days follow-up	< 90 day follow up	< 90 day follow up
MAJOR1990	Major, B., Cozzarelli, C., Sciacchitano, A., <i>et al.</i> (1990) Perceived social support, self-efficacy, and adjustment to abortion. <i>Journal of Personality and Social Psychology</i> , 59, 452–463	< 90 days follow-up	< 90 day follow up	< 90 day follow up
MAJOR1992	Major, B., Cozzarelli, C., Testa, M., <i>et al.</i> (1992) Male partners' appraisals of undesired pregnancy and abortion: Implications for	< 90 days follow up	< 90 days follow up	< 90 days follow up

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	women's adjustment to abortion. <i>Journal of Applied Social Psychology</i> , 22, 599–614			
MAJOR1997	Major, B., Zubek, J., Cooper, M. L., et al. (1997) Mixed messages: Implications of social conflict and social support within close relationships for adjustment to a stressful life event. <i>Journal of Personality and Social Psychology</i> , 72, 1349–1363	< 90 days follow-up	< 90 days follow up	< 90 days follow up
MAJOR1998	Major, B., Richards, C., Cooper, M. et al. (1998) Personal resilience, cognitive appraisals, and coping: An integrative model of adjustment to abortion. <i>Journal of Personality and Social Psychology</i> , 74, 735–752	< 90 days follow-up	< 90 days follow up	< 90 days follow up
MAJOR1999	Major, B. & Gramzow, R. (1999) Abortion as stigma: Cognitive and emotional implications of concealment. <i>Journal of Personality and Social Psychology</i> , 77(4), 735–745	Inappropriate mental health measure	Inappropriate mental health measure	Inappropriate mental health measure
MAJOR2000	Major, B., Cozzarelli, C., Cooper, M. L. et al. (2000) Psychological responses of women after first-trimester abortion. <i>Archives of General Psychiatry</i> , 57, 777–784	Included	Included	Inappropriate comparison group
MAUELSHAGEN2009	Mauelshagen, A., Sadler, L. C., Roberts, H., et al. (2009) Audit of short term outcomes of surgical and medical second trimester termination of pregnancy. <i>Reproductive Health</i> , 6(16), 1742-4755. Available from: http://www.reproductive-health-journal.com/content/6/1/16 (accessed 1 October 2010)	No useable data	No usable data	No usable data
MEDORA1993	Medora, N. P., Goldstein, A., & von der Hellen, C. (1993) Variables related to romanticism and self-esteem in pregnant teenagers. <i>Adolescence</i> , 28, 159–170	No useable data	No useable data	No comparison group
MEDORA1997	Medora, N. P. & Hellen, C. D. (1997) Romanticism and self-esteem among teen mothers. <i>Adolescence</i> , 32, 811-824	No relevant outcomes	No useable data	Inappropriate comparison group
MILLER1992	Miller, W. B. (1992) An empirical study of the psychological antecedents and consequences of induced abortion. <i>Journal of Social Issues</i> , 48, 67–93	Inappropriate mental health measure	Inappropriate mental health measure	No comparison group
MOTA2010	Mota, N.P., Burnett, M., & Sareen, J. (2010) Associations between abortion, mental disorders, and suicidal behavior in a nationally representative sample. <i>The Canadian Journal of Psychiatry</i> , 55, 239–247	Included	No useable data	Inappropriate comparison group
NEY1994	Ney, P. G., Fung, T., Wickett, A. R., et al. (1994) The effects of	Inappropriate	Inappropriate	Inappropriate

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	pregnancy loss on women's health. <i>Social Science and Medicine</i> , 38, 1193–1200	mental health measure - Health questionnaire	mental health measure	mental health measure
NIINIMAKI2009a	Niinimaki, M., Pouta, A., Bloigu, A., <i>et al.</i> (2009) Frequency and risk factors for repeat abortions after surgical compared with medical termination of pregnancy. <i>Obstetrics & Gynecology</i> , 113, 845–852	No usable data	No usable data	No usable data
NIINIMAKI2009b	Niinimaki, M., Pouta, A., Bloigu, A., <i>et al.</i> (2009) Immediate complications after medical compared with surgical termination of pregnancy. <i>Obstetrics and Gynecology</i> , 114, 795–804.	<90 days follow up	<90 days follow up	<90 days follow up
PHELPS2001	Phelps, R. H., Schaff, E. A. & Fielding, S. L. (2001) Mifepristone abortion in minors. <i>Contraception</i> , 64, 339–343	<100 participants, < 90 days follow-up	< 90 day follow up	< 90 day follow up
POPE2001	Pope, L. M., Adler, N. E. & Tschann, J. M. (2001) Postabortion psychological adjustment: are minors at increased risk? <i>Journal of Adolescent Health</i> , 29, 2–11	<100 participants, < 90 days follow-up	< 90 day follow up	< 90 day follow up
QUINTON2001	Quinton, W. J., Major, B., & Richards, C. (2001) Adolescents and adjustment to abortion: are minors at greater risk? <i>Psychology, Public Policy, and Law</i> , 7, 491–514.	No data means and sds	Included	No comparison group
REARDON2000	Reardon, D. & Ney, P. (2000) Abortion and subsequent substance abuse. <i>The American Journal of Drug and Alcohol Abuse</i> , 26, 61–75	Measure- 1 item question, life time outcomes	Inappropriate mental health measure	Inappropriate mental health measure
REARDON2002B	Reardon, D.C. & Cogle, J.R. (2002b) Depression and unintended pregnancy in the National Longitudinal Survey of Youth: a cohort study. <i>British Medical Journal</i> , 324, 151–152	Included	Included	
REARDON2004	Reardon, D. C., Coleman, P. K. & Cogle, J. R. (2004) Substance use associated with unintended pregnancy outcomes in the National Longitudinal Survey of Youth. <i>The American Journal of Drug and Alcohol Addiction</i> , 30, 369–383	Inappropriate mental health measure	Inappropriate mental health measure	Inappropriate mental health measure
REES2007	Rees, D. I. & Sabia, J. J. (2007) The relationship between abortion and depression: new evidence from the Fragile Families	Included	Included	Inappropriate comparison

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	and Child Wellbeing Study. <i>Medical Science Monitor</i> , 13, 430–436.			group
ROBSON2009	Robson, S. C., Kelly, T., Howel, D., <i>et al.</i> (2009) Randomised preference trial of medical versus surgical termination of pregnancy less than 14 weeks' gestation (TOPS). <i>Health Technology Assessment (Winchester, England)</i> , 13, 1–124	Inappropriate sample	Inappropriate sample	Inappropriate sample
RUE2004	Rue, V. M., Coleman, P. K., Rue, J. J., <i>et al.</i> (2004). Induced abortion and traumatic stress: preliminary comparison of American and Russian women. <i>Medical Science Monitor</i> , 10, SR5–16	No useable data	No useable data	No useable data
RUSSO1992	Russo, N. & Zierk, K. (1992) Abortion, childbearing, and women's well-being. <i>Professional Psychology: Research and Practice</i> , 23, 269–280	No useable data	No useable data	Inappropriate comparison group
RUSSO1997	Russo, N. F. & Dabul, A. J. (1997) The relationship of abortion to well-being: do race and religion make a difference. <i>Professional Psychology: Research and Practice</i> , 28, 23–31	No data	Included	Inappropriate comparison group
RUSSO2001	Russo, N. F., & Denious, J. E. (2001) Violence in the lives of women having abortions: implications for practice and public policy. <i>Professional Psychology: Research and Practice</i> , 32, 142–150	No data	No useable data	Inappropriate comparison group
SCHMIEGE2005	Schmiege, S. & Russo, N.F. (2005) Depression and unwanted first pregnancy: longitudinal cohort study. <i>British Medical Journal</i> . Available from: http://www.bmj.com/content/331/7528/1303.full (accessed 1 October 2010)	Included	Included	Inappropriate control for mental health
SIT2007	Sit, D., Rothschild, A. J., Creinin, M. D., <i>et al.</i> (2007) Psychiatric outcomes following medical and surgical abortion. <i>Human Reproduction</i> , 22, 878–884	<100 participants, < 90 days follow-up	< 90 day follow up	< 90 day follow up
SPECKHARD2003	Speckhard, A. & Mufel, N. (2003) Universal responses to abortion? Attachment, trauma, and grief responses in women following abortion. <i>Journal of Prenatal & Perinatal Psychology & Health</i> , 18, 3–38	<100 participants, No dichotomous data	No useable data	No useable data
STRASSBERG1985	Strassberg, D. & Moore, M. (1985) Effects of a film model on the	< 90 days	< 90 days	< 90 days

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	psychological and physical stress of abortion. <i>Journal of Sex Education & Therapy</i> , 11(2), 46-50	follow-up	follow up	follow up
TAFT2008	Taft, A. J. & Watson, L. F. (2008) Depression and termination of pregnancy (induced abortion) in a national cohort of Australian women: the confounding effect of women's experience of violence. <i>BMC Public Health</i> , 8(75)	Included	No useable data	Not mutually exclusive groups
TEICHMAN1993	Teichman, Y., Shenhar, S., & Segal, S. (1993). Emotional distress in Israeli women before and after abortion. <i>American Journal of Orthopsychiatry</i> , 63, 277–288	<100 participants, Israeli population, only 17 in abortion	Inappropriate sample	Inappropriate sample
THATTE1989	Thatte, S. & Pundlik, J. (1989) Psychological sequelae of MTP: a study of anxiety and hostility in married and unmarried abortees. <i>Indian Journal of Clinical Psychology</i> , 16, 29–33	<90 days follow-up	< 90 days follow up	< 90 days follow up
URQUHART1991	Urquhart, D. R. & Templeton, A. A. (1991) Psychiatric morbidity and acceptability following medical and surgical methods of abortion. <i>British Journal of Obstetrics and Psychiatry</i> , 98, 369–399	<100 participants, < 90 days follow-up	< 90 day follow up	< 90 day follow up
WILLIAMS2001	Williams, G. B. (2001). Short-term grief after an elective abortion. <i>Journal of Obstetric, Gynecologic, and Neonatal Nursing</i> , 30, 174–183	<100 participants, No usable data, means and SDs	No useable data	Inappropriate comparison group
ZABIN1989	Zabin, L. S., Hirsch, M. B. & Emerson, M. R. (1989) When urban adolescents choose abortion: effects on education, psychological status and subsequent pregnancy. <i>Family Planning Perspectives</i> , 21, 248–255	<90 days follow-up	< 90 days follow up	< 90 days follow up
ZEENAH1993	Zeanah, C. H., Dailey, J. V., Rosenblatt, M. J., <i>et al.</i> (1993) Do women grieve after terminating pregnancies because of fetal anomalies? A controlled investigation. <i>Obstetrics and Gynecology</i> , 82, 270–275	<100 participants, fetal abnormality	Inappropriate sample	Inappropriate sample

8 REFERENCES

Adler, N.E., David, H.P., Major, B.N. *et al.* (1990) Psychological responses after abortion. *Science*, 248, 41–44.

APA (1994) *Diagnostic and Statistical Manual of Mental Disorders* (4th edn, revised) (DSM–IV). Washington, DC: APA.

APA Task Force on Mental Health and Abortion (2008) *Report on the Task Force on Mental Health and Abortion*. Washington, DC: American Psychological Association.

Aston, M. L. (2002) Learning to be a normal mother: empowerment and pedagogy in postnatal classes. *Public Health Nursing*, 19, 284–293.

Bankole, A., Singh, S. & Haas, T. (1999) Characteristics of women who obtained induced abortion: a worldwide review. *International Family Planning Perspectives*, 25, 68–77.

Boorer C. & Murty, J. (2001) Experiences of termination of pregnancy in a stand-alone clinic situation. *Journal of Family Planning and Reproductive Health Care*, 27, 97–98.

Bradshaw, Z. & Slade, P. (2005) The relationships between induced abortion, attitudes towards sexuality and sexual problems. *Sexual and Relationship Therapy*, 20, 391–406.

Broen, A. N., Moum, T., Bødtker, A. S. *et al.* (2004) Psychological impact on women of miscarriage versus induced abortion: a 2-year follow-up study. *Psychosomatic Medicine*, 66, 265–271.

Broen, A. N., Moum, T., Bødtker, A. S. *et al.* (2005) The course of mental health after miscarriage and induced abortion: a longitudinal, five-year follow-up study. *BMC Medicine*, 3, 18.

Broen, A. N., Moum, T., Bødtker, A. S., *et al.* (2006) Predictors of anxiety and depression following pregnancy termination: a longitudinal five-year follow-up study. *Acta Obstetrica et Gynecologica Scandinavica*, 85, 317–323.

Cameron, S. (2010) Induced abortion and psychological sequelae. *Clinical Obstetrics & Gynaecology*, 24, 657–665.

Charles, V. E., Polis, C. B., Sridhara, S. K. *et al.* (2008) Abortion and long-term mental health outcomes: a systematic review of the evidence. *Contraception*, 78, 436–450.

Cheng, C., Fowles, E., & Walker, L. O. (2006). Postpartum maternal health care in the United States: A critical review. *Journal of Perinatal Education*, 15, 34–42.

Coleman, P. K., Reardon, D. C., Rue, V. M. *et al.* (2002a) State-funded abortions versus deliveries: a comparison of outpatient mental health claims over 4 years. *American Journal of Orthopsychiatry*, 72, 141–152.

Coleman, P. K., Coyle, C. T., Shuping, M. *et al.* (2009) Induced abortion and anxiety, mood, and substance disorders: isolating the effects of abortion in the National Comorbidity Survey. *Journal of Psychiatric Research*, 43, 770–776.

Cogle, J. R., Reardon, D. C., & Coleman, P. K. (2003) Depression associated with abortion and childbirth: A long-term analysis of the NLSY cohort. *Medical Science Monitor*, 9, CR105–CR112

Cogle, J. R., Reardon, D. C., & Coleman, P. K. (2005) Generalized anxiety following unintended pregnancies resolved through childbirth and abortion: a cohort study of the 1995 National Survey of Family Growth. *Journal of Anxiety Disorders*, 19, 137–142.

Fergusson, D. M., Horwood, L. J., & Ridder, E. M. (2006) Abortion in young women and subsequent mental health. *Journal of Child Psychology and Psychiatry*, 47, 16–24.

Fergusson, D. M., Horwood, L. J., & Boden, J. M. (2008). Abortion and mental health disorders: evidence from a 30-year longitudinal study. *British Journal of Psychiatry*, 193, 444–451.

Fergusson, D. M., Horwood, L. J., & Boden, J. M. (2009) Reactions to abortion and subsequent mental health. *British Journal of Psychiatry*, 195, 420–426.

Gilchrist, A. C., Hannaford, P. C., Frank, P., *et al.* (1995) Termination of pregnancy and psychiatric morbidity. *British Journal of Psychiatry*, 167, 243–248.

Gissler, M., Hemminki, E., & Lonnqvist, J. (1996) Suicides after pregnancy in Finland, 1987–94: Register linkage study. *British Medical Journal*, 313, 1431–1434.

Gissler, M., Kauppila, R., Merilainen, J., *et al.* (1997) Pregnancy-associated deaths in Finland 1987–1994 – definition problems and benefits of record linkage. *Acta Obstetrica et Gynecologica Scandinavica*, 76, 651–657

GRADE Working Group (2004) Grading quality of evidence and strength of recommendations. *British Medical Journal*, 328, 1490–1494.

Higgins, J. P. & Thompson, S. G. (2002) Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine*, 21, 1539–1558.

House of Commons Science and Technology Committee (2007) *Scientific Developments Relating to the Abortion Act 1967*. London: The Stationary Office.

Major, B., Appelbaum, M., Beckman, L. *et al.* (2009a) Abortion and mental health: evaluating the evidence. *American Psychologist*, 64(9), 863–890.

Major, B., Cozzarelli, C., Cooper, M. L., *et al.* (2000). Psychological responses of women after first-trimester abortion. *Archives of General Psychiatry*, 57, 777–784.

McManus, S., Meltzer, H., Brugha, T., *et al.* (2007) *Adult Psychiatric Morbidity in England, 2007: Results of a household survey*. Leicester: NHS Information Centre for Health and Social Care.

Munk-Olsen, T., Laursen, T. M., Pedersen, C. B., *et al.* (2011) Induced first-trimester abortion and risk of mental disorder. *The New England Journal of Medicine*, 364, 332–339.

Mota, N.P., Burnett, M., & Sareen, J. (2010) Associations between abortion, mental disorders, and suicidal behavior in a nationally representative sample. *The Canadian Journal of Psychiatry*, 55, 239–247.

National Collaborating Centre for Mental Health (2007) *Antenatal and Postnatal Mental Health: Clinical Management and Service Guidance*. London: British Psychological Society and Royal College of Psychiatrists.

NCCMH (2010) *Depression: The Treatment and Management of Depression in Adults*. London: British Psychological Society and Royal College of Psychiatrists.

NICE (2009) *The Guidelines Manual*. London: National Institute for Health and Clinical Excellence.

Patten, S. B. (1991) Are the Brown and Harris “vulnerability factors” risk factors for depression? *Journal of Psychiatry & Neuroscience*, 16, 267–271.

Pedersen, W. (2007) Childbirth, abortion and subsequent substance use in young women: a population-based longitudinal study. *Addiction*, 102, 1971–1978.

Pedersen, W. (2008) Abortion and depression: a population-based longitudinal study of young women. *Scandinavian Journal of Public Health*, 36, 424–428.

Popay, J., Roberts, H., Sowden, A., *et al.* (2006) Guidance on the conduct of narrative synthesis in systematic reviews. Available from: http://www.lancs.ac.uk/shm/research/nssr/research/dissemination/publications/NS_Synthesis_Guidance_v1.pdf (accessed 1 October 2010).

Quinton, W.J., Major, B. & Richards, C. (2001) Adolescents and adjustment to abortion: are minors at greater risk? *Psychology, Public Policy, and Law*, 7, 491–514.

The Rawlinson Report: The Physical and Psycho-Social effects of Abortion in Women (1994) *A Report by the Commission of Inquiry into the Operation and Consequences of The Abortion Act*. London: Her Majesty's Stationary Office.

Reardon, D. C., Ney, P. G., Scheuren, F. *et al.* (2002a) Deaths associated with pregnancy outcome: a record linkage study of low income women. *Southern Medical Journal*, 95, 834–841.

Reardon, D. C. & Cogle, J. R. (2002b) Depression and unintended pregnancy in the National Longitudinal Survey of Youth: a cohort study. *British Medical Journal*, 324, 151–152.

Reardon, D. C., Cogle, J. R., Rue, V. M., Shuping, M. W. *et al.* (2003) Psychiatric admissions of low-income women following abortion and childbirth. *Canadian Medical Association Journal*, 168, 1253–1256.

Reardon, D.C. & Ney, P.G. (2000) Abortion and subsequent substance abuse. *American Journal of Drug and Alcohol Abuse*, 26, 61–75.

Rees, D. I. & Sabia, J. J. (2007) The relationship between abortion and depression: new evidence from the fragile families and child wellbeing study. *Medical Science Monitor*, 13, 430–436.

Royal College of Obstetricians and Gynaecologists. *The Care of Women Requesting Induced Abortion*. Evidence-based Clinical Guideline Number 7. London: RCOG Press, 2004.

Royal College of Psychiatrists (1994) *Response to the Rawlinson Report on 'The Physical and Psychosocial Effects of Abortion': Psychiatric Indications for Abortion*. Available from: <http://extras.timesonline.co.uk/rowlinsonreport.pdf> (accessed 25 October 2010).

Royal College of Psychiatrists (2008) *Position Statement on Women's Mental Health in Relation to Induced Abortion*. Available from: www.rcpsych.ac.uk/rollofhonour/currentissues/mentalhealthandabortion.aspx (accessed 26 March 2010).

Rue, V. & Speckhard, A. (1992) Post Abortion Trauma: Incidence and Diagnostic Considerations, *Medicine & Mind*, 6 (1-2), 57-73

Russo, N. P. & Dabul, A. J. (1997). The relationship of abortion to well-being: does race and religion make a difference? *Professional Psychology Research and Practice*, 28, 23–31.

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Russo, N. F., Horn, J. D. & Schwartz, R. (1992) US abortion in context: selected characteristics and motivations of women seeking abortions, *Journal of Social Issues*, 48, 183–202.

Schmiege, S. & Russo, N. F. (2005) Depression and unwanted first pregnancy: longitudinal cohort study. *British Medical Journal*, 331, 1303–1306.

Steinberg, J. & Russo, N. (2008) Abortion and anxiety: what's the relationship? *Social Science and Medicine*, 6, 238–252.

Taft, A. J & Watson, L. F. (2008) Depression and termination of pregnancy (induced abortion) in a national cohort of Australian women: the confounding effect of women's experience of violence. *BMC Public Health*, 8, 75.

WHO (1992) *The International Classification of Diseases: Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines* (tenth edition). Geneva: WHO.

9 ABBREVIATIONS

APA	American Psychological Association
AUDIT	The Alcohol Use Disorders Identification Test
CES-D	Centre for Epidemiologic Studies – Depression scale
CI	confidence interval
CIDI (-SF)	Composite International Diagnostic Interview (– Short Form)
CINAHL	Cumulative Index to Nursing and Allied Health Literature
DISC	Assessment of Dominance, Influence, Steadiness, Conscientiousness
DSM (-III, -R, -IV)	Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association (-3rd edition, -revised, -4th edition)
EMBASE	Excerpta Medica Database
GAD	generalised anxiety disorder
GP	general practitioner
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HADS	Hospital Anxiety and Depression Scale
ICD (-8, -9)	International Classification of Diseases (-8th revision, -9th revision)
IES	Impact of Event Scale
IRR	incidence rate ratios
MEDLINE	Medical Literature Analysis and Retrieval System Online
N/n	Number of participants
NCCMH	National Collaborating Centre for Mental Health
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
NLSY	National Longitudinal Survey of Youth
OR	odds ratio
p	probability
PsycINFO	Psychological Information Database
PTSD	post-traumatic stress disorder
RCPsych	Royal College of Psychiatrists
RCOG	Royal College of Obstetricians and Gynaecologists
RR	relative risk, risk ratio
SE	standard error
UM-CIDI	University of Michigan - Composite International Diagnostic Interview