Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth (Review)

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Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

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ABSTRACT

Background

When a woman has had a previous caesarean birth, there are two options for her care in a subsequent pregnancy: planned elective repeat caesarean or planned vaginal birth. While there are risks and benefits for both planned elective repeat caesarean birth and planned vaginal birth after caesarean (VBAC), current sources of information are limited to non-randomised cohort studies. Studies designed in this way have significant potential for bias and consequently conclusions based on these results are limited in their reliability and should be interpreted with caution.

Objectives

To assess, using the best available evidence, the benefits and harms of a policy of planned elective repeat caesarean section with a policy of planned VBAC for women with a previous caesarean birth.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group’s Trials Register (30 September 2013) and reference lists of retrieved studies.

Selection criteria

Randomised controlled trials with reported data that compared outcomes in mothers and babies who planned a repeat elective caesarean section with outcomes in women who planned a vaginal birth, where a previous birth had been by caesarean.

Data collection and analysis

Two review authors independently assessed trial quality and extracted data.
Main results

Two randomised trials involving 320 women and their infants were included. However, data for maternal and infant clinical outcomes were available from one trial with very low event rates, involving 22 women only.

For the primary outcomes maternal death or serious morbidity (one study; 22 women; risk ratio (RR) not estimable), and infant death or serious morbidity (one study; 22 women; RR not estimable), there were no statistically significant differences between planned caesarean birth and planned vaginal birth identified.

Authors’ conclusions

Planned elective repeat caesarean section and planned VBAC for women with a prior caesarean birth are both associated with benefits and harms. Evidence for these care practices is largely drawn from non-randomised studies, associated with potential bias. Any results and conclusions must therefore be interpreted with caution. Randomised controlled trials are required to provide the most reliable evidence regarding the benefits and harms of both planned elective repeat caesarean section and planned vaginal birth for women with a previous caesarean birth.

Plain Language Summary

Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

When a woman has had a previous caesarean birth, there are two options for her care in a subsequent pregnancy: planned elective repeat caesarean or planned vaginal birth. Both forms of care have benefits and risks associated with them. There were two small trials available but there are limited data to help women, their partners and their caregivers make this choice.

Background

Description of the condition

The rate of caesarean section in high-income countries is increasing, accounting for 23.7% of all births in the United Kingdom, 26% in Ireland (OECD Health Data 2011), and 32.8% in the United States (Hamilton 2012). Reported rates from South America are higher, reaching over 50% in private hospitals in Chile, Argentina, Brazil and Paraguay (Belizan 1999). Suggested reasons for the high proportion of caesarean births over the last few decades have included medicolegal issues, the increasing use of electronic fetal heart rate monitoring, and reduced training in operative vaginal and vaginal breech births (Mastrobattista 1999). Repeat caesarean section is the most common primary obstetric indication for repeat caesarean in 28% of births in the United Kingdom (RCOG 2001) and 32.8% of births in the United States (CDC 2010).

Concerns about the increasing caesarean section rate resulted in a consensus statement by the American College of Obstetricians and Gynecologists, that “most women with one previous caesarean delivery with a low-transverse incision are candidates for and should be counseled about VBAC” (ACOG 2010). However, there is considerable variation in both the proportion of women attempting labour after caesarean birth (28% to 82%), as well as reported success rates (49% to 87%) (Guise 2010).

Description of the intervention

For a woman with a previous caesarean birth, the decision regarding planned mode of birth in a subsequent pregnancy will be influenced by many factors, including previous experience of a vaginal birth, desire to achieve a vaginal birth, feelings about the previous caesarean birth, and family considerations (including an easier recovery). There are benefits and harms associated with both repeat elective caesarean birth and vaginal birth after caesarean section, which will be discussed subsequently. Repeat elective caesarean birth is associated with an increase in the risk of complications such as bleeding, the need for blood transfusion, infection, damage to the bladder and bowel, and clots in the veins of the legs (called deep venous thrombosis). As the numbers of caesarean births for each individual woman increases, so does the difficulty in performing surgery due to adhesions, and the risk of damage to the bladder or bowel at the time of surgery.
There may also be difficulties in conceiving a further pregnancy or problems where the placenta develops over the scar in the uterus in a subsequent pregnancy (placenta praevia) (Marshall 2011). Occasionally the placenta may continue to develop into the muscle wall of the uterus (placenta accreta/placenta percreta). This may cause difficulties with the placenta being delivered after birth, and sometimes excessive bleeding. Babies born by caesarean may develop some difficulties with breathing (called transient tachypnoea of the newborn), and may need to spend time in a special care nursery. This is usually only for a short duration, and most babies recover fully. Occasionally a baby may develop more serious problems with his or her breathing (called respiratory distress syndrome), and may need extra oxygen, assistance with breathing and a longer stay in the nursery. The risks of developing this relate to the use of general anaesthesia and the age at which the baby is born (Hook 1997; Morrison 1995).

One uncommon, but potentially serious complication associated with a prior uterine surgery (including a previous caesarean section), is that of uterine rupture (where the prior caesarean scar breaks down). This may occur prior to the onset of labour, or during labour while a woman is undergoing a planned vaginal birth after caesarean (VBAC). This complication can be life-threatening for both the woman and her baby. The estimated risk of scar rupture from large prospective studies varies following VBAC from 0.2% (Crowther 2012a), to 0.7% (Landon 2004). Any vaginal birth may be associated with a non-reassuring fetal heart rate tracing (sometimes called fetal distress) or inability of the cervix to dilate (sometimes called failure to progress or lack of progress), both of which may require birth by emergency caesarean section. Emergency caesarean birth in labour has been associated with an increased chance of infection, bleeding (increasing the need for blood transfusion), and clots in the veins of the legs (deep venous thrombosis) when compared with both vaginal birth and elective caesarean birth. Any vaginal birth may be associated with trauma to the woman’s perineum (the area between the vagina and rectum) either from a tear or cut (called an episiotomy) during childbirth. Vaginal birth may also be associated with longer-term problems for the woman, including pelvic floor weakness contributing to symptoms such as prolapse and incontinence. Infants born vaginally may have lower Apgar scores and an increased chance of trauma if the birth has been difficult, than those infants born by elective caesarean section.

How the intervention might work

In an attempt to compare the benefits and harms associated with both a planned repeat elective caesarean birth and a planned VBAC, Guise and colleagues completed a comprehensive systematic review of the literature (Guise 2010), in which the overall rates of maternal complications were low among women undergoing trial of labour and repeat caesarean birth. While the risk of hysterectomy, haemorrhage, and transfusions did not differ significantly between the two methods of birth, maternal death was increased following elective caesarean birth (13.4 per 100,000 repeat caesarean birth versus 3.8 per 100,000 for women undergoing a trial of labour) (Guise 2010). The reported rate of uterine rupture was three per 1000, and significantly higher among women who laboured (4.7/1000 trial of labour versus 0.3/1000 repeat caesarean birth).

In view of the limitations identified in these meta-analyses and the need for more reliable information about the benefits and harms associated with both planned elective repeat caesarean birth and planned vaginal birth after caesarean, Landon (Landon 2004) and Crowther (Crowther 2012a) conducted large prospective cohort studies.

Landon and colleagues within the National Institute of Child Health and Human Development Maternal Fetal Medicine Units Network (Landon 2004) conducted a prospective observational study across 19 centres in the United States. In this study, women with any prior caesarean birth were identified from the delivery suite register, excluding those women who presented in early labour and subsequently underwent a caesarean section. A total of 33,699 women with a prior caesarean birth were involved in the study, of whom 17,898 (53.1%) attempted VBAC, and 15,801 (46.9%) underwent elective repeat caesarean section. The observed rate of symptomatic uterine scar rupture among women undergoing VBAC was 0.7%, and of infant death or hypoxic ischaemic encephalopathy, 0.38%.

Crowther and colleagues (Crowther 2012a) conducted a prospective patient preference study across 14 maternity centres in Australia. In this study, women with a single prior caesarean section presenting in their next ongoing pregnancy, with a live singleton in cephalic presentation, at 37 weeks’ gestation or more, and who were considered eligible to attempt planned VBAC were eligible to participate. Women were asked their preference for either planned VBAC or planned caesarean section, and assigned to their preferred study group. A total of 2323 women participated in the study. A nested randomised trial involving 22 women was conducted in parallel with the patient preference study. Fewer infants in the planned elective repeat caesarean section group suffered death or serious adverse outcome (risk ratio (RR) 0.39; 95% confidence interval (CI) 0.19 to 0.80), when compared with infants born to women in the planned VBAC group. While significantly fewer women in the planned elective repeat caesarean section group suffered major haemorrhage (RR 0.37; 95% CI 0.17 to 0.80), there were no significant differences between the two groups in risk of uterine rupture (RR 0.37; 95% CI 0.04 to 3.57).

While there are risks and benefits for both planned elective repeat caesarean birth and planned vaginal birth after caesarean, current sources of information are limited to non-randomised cohort studies, which are largely retrospective in nature, and hampered by the lack of comparability of the groups assessed. Studies designed in this way have significant potential for bias and consequently conclusions based on these results are limited in their reliability and...
should be interpreted with caution. As outlined by Guise and colleagues, there is little information about the outcomes of intended mode of birth, with the bulk of the available literature reporting outcomes based on actual mode of birth, with “this inception cohort the equivalent of intention to treat for randomized controlled trials” (Guise 2010).

Information from randomised controlled trials would better assess the risks and benefits of vaginal birth after caesarean section with elective repeat caesarean section in women with a previous caesarean birth.

**Why it is important to do this review**

Planned elective repeat caesarean section and planned vaginal birth after caesarean section for women with a prior caesarean birth are both associated with benefits and harms. Evidence for these care practices to allow women and their caregivers to make an informed decision is required.

**OBJECTIVES**

To assess, using the best available evidence, the benefits and harms of a policy of planned elective repeat caesarean section with a policy of planned vaginal birth after caesarean section for women with a previous caesarean birth. The primary outcomes relate to success of trial of labour, need for caesarean section, maternal and neonatal mortality, and maternal and neonatal morbidity.

**METHODS**

**Criteria for considering studies for this review**

**Types of studies**

All published, unpublished, and ongoing randomised controlled trials with reported data, that compared outcomes for mothers and/or babies who were randomised to a planned elective repeat caesarean birth with outcomes for mothers and/or babies who had a planned vaginal birth where a prior birth was by caesarean section.

**Types of participants**

Women with one or more prior caesarean section (regardless of indication for primary caesarean birth, number of caesarean births, type of uterine scar, or method of closure of uterine incision) who were planning a vaginal birth in a subsequent pregnancy.

**Types of interventions**

Planned elective repeat caesarean birth versus planned vaginal birth.

**Types of outcome measures**

**Primary outcomes**

1. Death or serious maternal morbidity (defined by trial authors)
2. Death or serious infant morbidity (defined by trial authors)

**Secondary outcomes**

**Outcome measures for the woman**

1. Vaginal birth
2. Instrumental vaginal birth
3. Caesarean birth
4. Caesarean birth for fetal distress
5. Uterine rupture (defined as clinically significant rupture involving the full thickness of the uterine wall and requiring surgical repair)
6. Uterine scar dehiscence (defined as clinically asymptomatic disruption of the uterus that is discovered incidentally at surgery)
7. Haemorrhage (blood loss greater than 500 mL and/or requiring blood transfusion)
8. Evacuation of the uterus after childbirth for postpartum haemorrhage or retained placental tissue
9. Hysterectomy for any complications resulting from birth
10. Vulval or perineal haematoma requiring evacuation
11. Deep vein thrombosis or thrombophlebitis requiring anticoagulant therapy
12. Pulmonary embolus requiring anticoagulant therapy
13. Pneumonia due to infection, aspiration or other causes
14. Adult respiratory distress syndrome
15. Wound infection (requiring prolongation of hospitalisation or readmission)
16. Wound dehiscence
17. Puerperal infection
18. Damage to the bladder, bowel or ureter requiring surgical repair
19. Cervical laceration extending to the lower uterine segment or abnormal extension of the uterine incision
20. Occurrence of a fistula involving the genital tract and urinary or gastrointestinal tracts
21. Bowel obstruction
22. Paralytic ileus
23. Pulmonary oedema
24. Stroke (acute neurological deficit greater than 24 hours)
25. Cardiac arrest
26. Respiratory arrest
27. Coagulopathy
28. Maternal death
29. Any other serious maternal complication related to birth
30. Level of pain after birth
31. Postnatal depression
32. Breastfeeding

Outcome measures for the infant
1. Neonatal or perinatal death
2. Meconium-stained liquor
3. Apgar score less than seven at five minutes
4. Birthweight
5. Admission to the neonatal intensive care unit (NICU)
6. Birth trauma (subdural or intracerebral haemorrhage, spinal cord injury, basal skull fracture, other fracture, peripheral nerve injury)
7. Seizures at less than 24 hours of age
8. Laceration to baby at time of birth
9. Neonatal encephalopathy
10. Altered level of consciousness
11. Use of mechanical ventilation
12. Any respiratory disease
13. Severe respiratory distress syndrome requiring oxygen (as defined by trialists)
14. Any oxygen requirement
15. Transient tachypnoea of the newborn
16. Use of tube feeding
17. Necrotising enterocolitis
18. Proven systemic infection treated with antibiotics within 48 hours of life

Maternal emotional well-being
1. Postnatal depression (defined as the number of women screening at risk of postnatal depression, in addition to mean depressive score, using the Edinburgh Postnatal Depression Scale (EPDS))
2. Maternal anxiety (defined as the mean anxiety score as measured using the State Trait Anxiety Index (STAI))
3. Maternal quality of life (as defined by trialists)

Longer-term outcomes for the woman
1. Return to 'normal' activities
2. Health and well-being assessment
3. Sexual health
4. Symptoms related to pelvic floor damage
5. Need for operative pelvic floor repair
6. Relationship with partner and child(ren)
7. Future fertility (both voluntary and involuntary)
8. Development of placenta praevia or placenta accreta/percreta in subsequent pregnancies
9. Mode of birth in subsequent pregnancy

Longer-term outcomes for the child
1. Death after discharge from hospital
2. Disability in infancy
3. Disability in childhood

Measures of satisfaction include
1. Women's satisfaction with care
2. Women's preferences for care

Costs include
1. Costs associated with planned elective repeat caesarean birth versus planned vaginal birth
2. Maternal postnatal length of stay
3. Neonatal length of stay
4. Costs associated with readmission of mother
5. Costs associated with readmission of baby

Outcomes would have been included in the analysis if data were available according to original treatment allocation and reasonable measures were taken to minimise observer bias. Only outcomes with available data would have appeared in the analysis tables. Data that were not prestated would have been extracted and reported. These would have been clearly labelled as such (not prespecified). The possibility has to be borne in mind that such outcomes would only have been reported because the difference between the groups, which is a result of chance, have reached conventional levels of statistical significance. In order to minimise the risk of bias, the conclusions would have been based solely on the prestated outcomes.

Search methods for identification of studies

Electronic searches
We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (30 September 2013). The Cochrane Pregnancy and Childbirth Group's Trials Register is maintained by the Trials Search Co-ordinator and contains trials identified from:
1. Monthly searches of the Cochrane Central Register of Controlled Trials (CENTRAL);
2. Weekly searches of MEDLINE;
3. Weekly searches of Embase;
4. Handsearches of 30 journals and the proceedings of major conferences;
5. weekly current awareness alerts for a further 44 journals plus monthly BioMed Central email alerts.
Details of the search strategies for CENTRAL, MEDLINE and Embase, the list of handsearched journals and conference proceedings, and the list of journals reviewed via the current awareness service can be found in the ‘Specialized Register’ section within the editorial information about the Cochrane Pregnancy and Childbirth Group.
Trials identified through the searching activities described above are each assigned to a review topic (or topics). The Trials Search Co-ordinator searches the register for each review using the topic list rather than keywords.
For details of additional author searching carried out in the initial version of the review, please see Appendix 1.

Searching other resources
We searched the reference lists of retrieved studies.
We did not apply any language restrictions.

Data collection and analysis
For the methods used when assessing the trials identified in the previous version of this review, see Dodd 2004.
For this update we used the following methods when assessing the reports identified by the updated search.

Selection of studies
Two review authors independently assessed for inclusion all the potential studies we identified as a result of the search strategy. We resolved any disagreement through discussion or, if required, we consulted a third person.

Data extraction and management
We designed a form to extract data. For eligible studies, at least two review authors extracted the data using the agreed form. We resolved discrepancies through discussion or, if required, we consulted a third person. We entered data into Review Manager software (RevMan 2012) and checked for accuracy.
When information regarding any of the above was unclear, we planned to contact authors of the original reports to provide further details.
Jodie Dodd and Caroline Crowther are the authors of one of the reports included in this review (Crowther 2012b). This study report was assessed by the other review authors.

Assessment of risk of bias in included studies
Two review authors independently assessed risk of bias for each study using the criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins 2011). We resolved any disagreement by discussion or by involving a third assessor.

(1) Random sequence generation (checking for possible selection bias)
We described for each included study the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.
We assessed the method as:
- low risk of bias (any truly random process, e.g. random number table; computer random number generator);
- high risk of bias (any non-random process, e.g. odd or even date of birth; hospital or clinic record number);
- unclear risk of bias.

(2) Allocation concealment (checking for possible selection bias)
We described for each included study the method used to conceal allocation to interventions prior to assignment and assessed whether intervention allocation could have been foreseen in advance of, or during recruitment, or changed after assignment.
We assessed the methods as:
- low risk of bias (e.g. telephone or central randomisation; consecutively numbered sealed opaque envelopes);
- high risk of bias (open random allocation; unsealed or non-opaque envelopes, alternation; date of birth);
- unclear risk of bias.

(3.1) Blinding of participants and personnel (checking for possible performance bias)
We described for each included study the methods used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. We considered studies to be at low risk of bias if they were blinded, or if we judged that the lack of blinding would be unlikely to affect results. We assessed blinding separately for different outcomes or classes of outcomes.
We assessed the methods as:
- low, high or unclear risk of bias for participants;
- low, high or unclear risk of bias for personnel.

(3.2) Blinding of outcome assessment (checking for possible detection bias)
We described for each included study the methods used, if any, to blind outcome assessors from knowledge of which intervention a participant received. We assessed blinding separately for different outcomes or classes of outcomes.
We assessed methods used to blind outcome assessment as:
- low, high or unclear risk of bias.
(4) Incomplete outcome data (checking for possible attrition bias due to the amount, nature and handling of incomplete outcome data)

We described for each included study, and for each outcome or class of outcomes, the completeness of data including attrition and exclusions from the analysis. We have stated whether attrition and exclusions were reported and the numbers included in the analysis at each stage (compared with the total randomised participants), reasons for attrition or exclusion where reported, and whether missing data were balanced across groups or were related to outcomes. Where sufficient information was reported, or could be supplied by the trial authors, we planned to re-include missing data in the analyses undertaken.

We assessed methods as:
- low risk of bias (e.g. no missing outcome data; missing outcome data balanced across groups);
- high risk of bias (e.g. numbers or reasons for missing data imbalanced across groups; ‘as treated’ analysis done with substantial departure of intervention received from that assigned at randomisation);
- unclear risk of bias.

(5) Selective reporting (checking for reporting bias)

We described for each included study how we investigated the possibility of selective outcome reporting bias and what we found. We assessed the methods as:
- low risk of bias (where it is clear that all of the study’s pre-specified outcomes and all expected outcomes of interest to the review have been reported);
- high risk of bias (where not all the study’s pre-specified outcomes have been reported; one or more reported primary outcomes were not pre-specified; outcomes of interest are reported incompletely and so cannot be used; study fails to include results of a key outcome that would have been expected to have been reported);
- unclear risk of bias.

(6) Other bias (checking for bias due to problems not covered by (1) to (5) above)

We described for each included study any important concerns we had about other possible sources of bias. We assessed whether each study was free of other problems that could put it at risk of bias:
- low risk of other bias;
- high risk of other bias;
- unclear whether there is risk of other bias.

(7) Overall risk of bias

We made explicit judgements about whether studies were at high risk of bias, according to the criteria given in the Cochrane Handbook (Higgins 2011). With reference to (1) to (6) above, we assessed the likely magnitude and direction of the bias and whether we consider it likely to impact on the findings. We planned to explore the impact of the level of bias through undertaking sensitivity analyses - see Sensitivity analysis.

Measures of treatment effect

Dichotomous data

For dichotomous data, we presented results as summary risk ratio with 95% confidence intervals.

Continuous data

For continuous data, we used the mean difference if outcomes were measured in the same way between trials. In future updates, if appropriate, we will use the standardised mean difference to combine trials that measure the same outcome, but use different methods.

Unit of analysis issues

Cluster-randomised trials

No cluster-randomised trials were included in this update. In future updates, if identified, we will include cluster-randomised trials in the analyses along with individually-randomised trials. We will adjust their sample sizes using the methods described in the Cochrane Handbook [Section 16.3.4] using an estimate of the intraclass correlation co-efficient (ICC) derived from the trial (if possible), from a similar trial or from a study of a similar population. If we use ICCs from other sources, we will report this and conduct sensitivity analyses to investigate the effect of variation in the ICC. If we identify both cluster-randomised trials and individually-randomised trials, we plan to synthesise the relevant information. We will consider it reasonable to combine the results from both if there is little heterogeneity between the study designs and the interaction between the effect of intervention and the choice of randomisation unit is considered to be unlikely. We will also acknowledge heterogeneity in the randomisation unit and perform a sensitivity analysis to investigate the effects of the randomisation unit.

Dealing with missing data

For included studies, we noted levels of attrition. In future updates, if more studies are included, we will explore the impact of
including studies with high levels of missing data in the overall assessment of treatment effect by using sensitivity analysis. In future updates of this review, for all outcomes, we will carry out analyses, as far as possible, on an intention-to-treat basis, i.e. we will attempt to include all participants randomised to each group in the analyses, and all participants will be analysed in the group to which they were allocated, regardless of whether or not they received the allocated intervention. The denominator for each outcome in each trial will be the number randomised minus any participants whose outcomes are known to be missing.

Assessment of heterogeneity

In future updates, if more studies are included and data are available for meta-analysis, we will assess statistical heterogeneity in each meta-analysis using the Tau², I² and Chi² statistics. We will regard heterogeneity as substantial if the I² is greater than 30% and either the Tau² is greater than zero, or there is a low P value (less than 0.10) in the Chi² test for heterogeneity.

Assessment of reporting biases

In future updates, if there are 10 or more studies in the meta-analysis, we will investigate reporting biases (such as publication bias) using funnel plots. We will assess funnel plot asymmetry visually. If asymmetry is suggested by a visual assessment, we will perform exploratory analyses to investigate it.

Data synthesis

We carried out statistical analysis using the Review Manager software (RevMan 2012). However, we were unable to combine data as maternal and infant clinical outcomes were available from only one trial (Crowther 2012b). We planned to use fixed-effect meta-analysis for combining data where it was reasonable to assume that studies were estimating the same underlying treatment effect: i.e. where trials were examining the same intervention, and the trials’ populations and methods were judged sufficiently similar. In future updates, if more data become available for meta-analysis and there is clinical heterogeneity sufficient to expect that the underlying treatment effects differ between trials, or if substantial statistical heterogeneity is detected, we will use random-effects meta-analysis to produce an overall summary, if an average treatment effect across trials is considered clinically meaningful. The random-effects summary will be treated as the average range of possible treatment effects and we will discuss the clinical implications of treatment effects differing between trials. If the average treatment effect is not clinically meaningful, we will not combine trials. If we use random-effects analyses, the results will be presented as the average treatment effect with 95% confidence intervals, and the estimates of Tau² and I².

Subgroup analysis and investigation of heterogeneity

It was not possible to perform the proposed subgroup analyses. In future updates, if we identify substantial heterogeneity, we will investigate it using subgroup analyses and sensitivity analyses. We will consider whether an overall summary is meaningful, and if it is, use random-effects analysis to produce it. We plan to carry out the following subgroup analyses.
1. Previous vaginal birth versus no previous vaginal birth.
2. Single prior caesarean birth versus two or more prior caesarean births.

The following outcomes will be used in subgroup analysis.
1. Death or serious maternal morbidity (defined by trial authors).
2. Death or serious infant morbidity (defined by trial authors).

We will assess subgroup differences by interaction tests available within RevMan (RevMan 2012). We will report the results of subgroup analyses quoting the Chi² statistic and P value, and the interaction test P value.

Sensitivity analysis

It was not possible to perform the proposed sensitivity analyses. In future updates, sensitivity analyses will be performed on the basis of trial quality to explore the effects of any heterogeneity identified.

RESULTS

Description of studies

Results of the search

The search strategy identified six reports of two randomised trials in which women with a single previous caesarean birth were randomised to either planned elective caesarean section or to planned vaginal birth in a subsequent pregnancy (Crowther 2012b; Law 2010).

The trial by Crowther and colleagues was conducted as a nested randomised trial within a prospective patient preference study.

Included studies

The two identified randomised trials were included involving a total of 320 women with a single prior caesarean birth in a subsequent pregnancy (Crowther 2012b; Law 2010). Both studies compared a plan for elective repeat caesarean birth with vaginal birth.

The primary outcome for the Crowther trial was a composite of death or serious adverse outcome for the infant, in addition to...
secondary outcomes reflecting death or serious adverse outcomes for the woman (Crowther 2012b).
The primary outcome for the Law trial was an assessment of maternal psychometric measures including depression, general health and well-being, anxiety, and satisfaction, with no reporting of other clinical outcomes either for the woman or her infant (Law 2010).

Excluded studies

There were no excluded studies.

Risk of bias in included studies

The overall methodological quality of both trials was good. Please refer to table Characteristics of included studies for further details and to the summary figures for assessments of risk of bias (Figure 1; Figure 2).

Figure 1. Risk of bias graph: review authors’ judgements about each risk of bias item presented as percentages across all included studies.
Figure 2. Risk of bias summary: review authors’ judgements about each risk of bias item for each included study.

<table>
<thead>
<tr>
<th>Risk of Bias Item</th>
<th>Crowther 2012b</th>
<th>Law 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Other bias</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Blinding of participants and personnel (performance bias)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Blinding of outcome assessment (detection bias)</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**Allocation**

Both trials were stated to be randomised trials, and utilised computer-generated randomisation sequences (Crowther 2012b; Law 2010). Allocation concealment was adequate for both, Crowther and colleagues utilising a telephone randomisation service (Crowther 2012b), and Law and colleagues used sealed opaque sequentially numbered envelopes (Law 2010).

**Blinding**

Blinding of participants, caregivers and outcome assessors was not achieved in either study (Crowther 2012b; Law 2010).

**Incomplete outcome data**

There were no reported losses to follow-up in the Crowther trial (Crowther 2012b). Law and colleagues report outcomes for 291 of 298 women randomised (six women withdrew after randomisation - three in each group - and one woman was excluded as she was ineligible) (Law 2010).
Selective reporting
A range of maternal and infant clinical outcomes were reported by Crowther (Crowther 2012b). Psychometric outcomes for women were reported by Law, with no other clinical outcomes reported for the woman or her infant (Law 2010).

Other potential sources of bias
Both studies were assessed as being at low risk of bias.

Effects of interventions
Two randomised trials involving 320 women and their infants were included. However, data for maternal and infant clinical outcomes were available from one trial with very low event rates, involving 22 women only (Crowther 2012b).

Primary outcomes
For the primary outcomes maternal death or serious morbidity (one study; 22 women; RR not estimable), and infant death or serious morbidity (one study; 22 women; RR not estimable), there were no statistically significant differences between planned caesarean birth and planned vaginal birth identified.

Secondary outcomes
For the secondary maternal and infant outcomes reported, there were no statistically significant differences identified between planned caesarean section and planned vaginal birth for women with a prior caesarean birth, as assessed at six months postpartum using the State Trait Anxiety Inventory (median score 35.5; interquartile range (IQR) 25.8 to 44.0 planned caesarean section versus median 33.0; IQR 24.8 to 45.0 planned vaginal birth); Edinburgh Postnatal Depression Scale (median 0.0; IQR 0.0 to 4.0 planned caesarean section versus median 0.5; IQR 0.0 to 4.0 planned vaginal birth); Beck Depression Inventory (median 1.5; IQR 0.0 to 4.8 planned caesarean section versus median 1.0; IQR 0.0 to 4.3 planned vaginal birth); General Health Questionnaire (median 0.0; IQR 0.0 to 1.0 planned caesarean section versus median 0.0; IQR 0.0 to 2.0 planned vaginal birth); or the Client Satisfaction Questionnaire (median 24.0; IQR22.0 to 25.0 planned caesarean section versus median 23.0; IQR 22.0 to 25.0 planned vaginal birth).

It was not possible to perform the proposed subgroup analyses.

Discussion
There were two randomised controlled trials identified that compared outcomes for women planning a repeat elective caesarean with women planning a vaginal birth where a prior birth was by caesarean section. However, clinical outcomes were reported in only one of the studies involving 22 women (Crowther 2012b). As the event rates were very low, the risk of each outcome is not estimable, significantly limiting our ability to reliably draw conclusions from the randomised data. There do not appear to be differences in maternal emotional well-being associated with either planned repeat caesarean birth or vaginal birth after caesarean section (VBAC).

While there are risks and benefits for both planned elective repeat caesarean birth and planned VBAC, current sources of information are limited to non-randomised cohort studies, that are largely retrospective in nature. Studies designed in this way have potential for bias and consequently any conclusions based on these results are limited in their reliability and should be interpreted with caution.

There is a need for methodologically rigorous studies to provide direct evidence about the relative benefits and harms of elective repeat caesarean birth and vaginal birth after caesarean for both short-term and long-term health outcomes for women and their infants. This information is best obtained from randomised controlled trials, as the methodology limits the potential for bias and provides the most reliable evidence regarding the benefits and harms of both forms of care.

Authors’ Conclusions

Implications for practice
The practice of planned elective repeat caesarean section and planned vaginal birth after caesarean section (VBAC) for women with a prior caesarean birth are both associated with benefits and harms. However, the evidence for the magnitude of these benefits and harms is drawn from non-randomised studies, associated with potential bias. The results and conclusions of these studies must therefore be interpreted with caution.

Implications for research
The available non-randomised studies of planned elective repeat caesarean section and planned VBAC for women with a previous caesarean birth provide limited insight into the potential benefits and harms associated with both forms of care. Randomised controlled trials are required to provide the most reliable evidence regarding the benefits and harms of both planned elective repeat caesarean section and planned vaginal birth for women with a previous caesarean birth (NICE 2004).
ACKNOWLEDGEMENTS

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REFERENCES

References to studies included in this review

Crowther 2012b {published data only}


Law 2010 {published data only}


Additional references

ACOG 2010

Belizan 1999

CDC 2010

Crowther 2012a

Guise 2010

Hamilton 2012

Higgins 2011

Hook 1997

Landon 2004

Marshall 2011
Mastrobattista 1999

Morrison 1995

NICE 2004

OECD Health Data 2011

RCOG 2001

RevMan 2012

References to other published versions of this review

Dodd 2004

* Indicates the major publication for the study
### Characteristics of included studies [ordered by study ID]

#### Crowther 2012b

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methods</strong></td>
<td>Randomised trial conducted in 14 maternity units in Australia between November 2002 and May 2007</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>Women were eligible with a single prior caesarean section, live singleton fetus at 37 weeks’ gestational age, and who were considered eligible to attempt VBAC by caregiver. Women with any of the following were excluded: more than 1 prior caesarean; vertical/inverted T/unknown uterine incision; prior uterine rupture; prior uterine surgery involving entry of uterine cavity; prior uterine perforation; multiple pregnancy; any contraindication to vaginal birth (placenta praevia; transverse lie; active genital herpes); cephalopelvic disproportion; lethal congenital anomaly; fetal anomaly associated with mechanical difficulties at birth</td>
</tr>
<tr>
<td><strong>Interventions</strong></td>
<td>22 eligible women were randomised to either planned vaginal birth or to planned caesarean section. Where women planned vaginal birth, the spontaneous onset of labour was awaited. Where women planned an elective caesarean section, this was scheduled between 38 and 40 weeks’ gestation</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>The primary outcome was a composite of death or serious adverse outcome for infant. A range of secondary clinical outcomes reflecting serious adverse outcomes for the woman and infant were reported</td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td>This study was conducted as a randomised trial nested within a larger prospective patient preference study. The inclusion and exclusion criteria and reported outcomes were the same for both the randomised and patient preference components of the study</td>
</tr>
</tbody>
</table>

### Risk of bias

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Computer-generated random number sequence.</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Low risk</td>
<td>Telephone randomisation service.</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias) All outcomes</td>
<td>Low risk</td>
<td>No losses to follow-up reported.</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>Outcomes identified in the published protocol have been reported</td>
</tr>
<tr>
<td>Other bias</td>
<td>Low risk</td>
<td>No other bias identified.</td>
</tr>
</tbody>
</table>
Blinding of participants and personnel (performance bias)

All outcomes | Low risk | No blinding of participants, caregivers or outcome assessors but not considered likely to bias outcomes

Blinding of outcome assessment (detection bias)

All outcomes | Low risk | No blinding of participants, caregivers or outcome assessors but not considered likely to bias outcomes

**Law 2010**

**Methods**
Randomised trial conducted in a single maternity unit affiliated with University of Hong Kong, Hong Kong.

**Participants**
Women were eligible with a single prior caesarean section, who were considered eligible to attempt vaginal birth by their caregiver. Women with a prior vaginal birth or any contraindication to attempting vaginal birth were excluded.

**Interventions**
298 eligible women were randomised to either planned vaginal birth or to planned caesarean section prior to 28 weeks’ gestation. Where women planned vaginal birth, the spontaneous onset of labour was awaited. Where women planned an elective caesarean section, this was scheduled at 38 weeks’ gestation.

**Outcomes**
The primary outcomes were maternal psychometric assessments (EPDS, Beck Depression Inventory; State-Trait Anxiety Inventory; General Health Questionnaire (GHQ-12); Client Satisfaction Questionnaire) measured at 6 months postpartum.

**Notes**
There are no maternal or infant clinical outcomes reported.

**Risk of bias**

<table>
<thead>
<tr>
<th>Bias</th>
<th>Authors’ judgement</th>
<th>Support for judgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random sequence generation (selection bias)</td>
<td>Low risk</td>
<td>Computer-generated random number sequence.</td>
</tr>
<tr>
<td>Allocation concealment (selection bias)</td>
<td>Low risk</td>
<td>Sealed, opaque, sequentially numbered envelopes.</td>
</tr>
<tr>
<td>Incomplete outcome data (attrition bias)</td>
<td>Low risk</td>
<td>6 women refused to participate after randomisation; 1 woman was excluded after randomisation due to ineligibility</td>
</tr>
<tr>
<td>Selective reporting (reporting bias)</td>
<td>Low risk</td>
<td>Specified primary outcomes are reported; there are no clinical maternal or infant outcomes reported</td>
</tr>
</tbody>
</table>
Other bias | Low risk | No other bias identified.
---|---|---
Blinding of participants and personnel (performance bias) | Low risk | No blinding of participants, caregivers or outcome assessors but not considered likely to bias outcomes
Blinding of outcome assessment (detection bias) | Low risk | No blinding of participants, caregivers or outcome assessors but not considered likely to bias outcomes

EPDS: Edinburgh Postnatal Depression Scale
VBAC: vaginal birth after caesarean
**DATA AND ANALYSES**

Comparison 1. Primary outcome

<table>
<thead>
<tr>
<th>Outcome or subgroup title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Death or serious maternal morbidity</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>2 Death or serious infant morbidity</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
</tbody>
</table>

Comparison 2. Secondary maternal outcomes

<table>
<thead>
<tr>
<th>Outcome or subgroup title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Vaginal birth</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.34 [0.09, 1.29]</td>
</tr>
<tr>
<td>2 Caesarean section</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>1.92 [0.92, 4.01]</td>
</tr>
<tr>
<td>3 Uterine rupture</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>4 Haemorrhage or need for blood transfusion</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>1.2 [0.20, 7.05]</td>
</tr>
<tr>
<td>5 Hysterectomy</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>6 Vulval or perineal haematoma</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>7 Deep vein thrombosis</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>8 Pulmonary embolus</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>9 Pneumonia</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>10 Adult respiratory distress syndrome</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>11 Wound Infection</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>12 Wound dehiscence</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>13 Organ damage</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>14 Development of fistula</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>15 Bowel obstruction</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>16 Pulmonary oedema</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>17 Stroke</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>18 Cardiac arrest</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>19 Respiratory arrest</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>20 Maternal death</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
</tbody>
</table>
### Comparison 3. Secondary infant outcomes

<table>
<thead>
<tr>
<th>Outcome or subgroup title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Perinatal death</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>2 Apgar score less than 7 at 5 minutes</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>3 Birthweight</td>
<td>1</td>
<td>22</td>
<td>Mean Difference (IV, Fixed, 95% CI)</td>
<td>-133.0 [-513.12, 247.12]</td>
</tr>
<tr>
<td>4 Intensive care unit admission</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>5 Birth trauma</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>6 Seizures</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>7 Neonatal encephalopathy</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>8 Severe respiratory distress syndrome</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>9 Necrotising enterocolitis</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
<tr>
<td>10 Systemic infection</td>
<td>1</td>
<td>22</td>
<td>Risk Ratio (M-H, Fixed, 95% CI)</td>
<td>0.0 [0.0, 0.0]</td>
</tr>
</tbody>
</table>

### Analysis 1.1. Comparison 1 Primary outcome, Outcome 1 Death or serious maternal morbidity.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 1 Primary outcome

**Outcome:** 1 Death or serious maternal morbidity

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned Caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [0.0, 0.0]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned Caesarean section), 0 (Planned vaginal birth)
Heterogeneity: not applicable
Test for overall effect: Z = 0.0 (P < 0.00001)
Test for subgroup differences: Not applicable
### Analysis 1.2. Comparison 1 Primary outcome, Outcome 2 Death or serious infant morbidity.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 1 Primary outcome

**Outcome:** 2 Death or serious infant morbidity

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned Caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td></td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned Caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

---

### Analysis 2.1. Comparison 2 Secondary maternal outcomes, Outcome 1 Vaginal birth.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 2 Secondary maternal outcomes

**Outcome:** 1 Vaginal birth

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Weight</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>1000 %</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>2/10</td>
<td>7/12</td>
<td></td>
<td>0.34 [ 0.09, 1.29 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td></td>
<td><strong>100.0 %</strong></td>
<td><strong>0.34 [ 0.09, 1.29 ]</strong></td>
</tr>
</tbody>
</table>

Total events: 2 (Planned caesarean section), 7 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 1.58 (P = 0.11)

Test for subgroup differences: Not applicable
**Analysis 2.2. Comparison 2 Secondary maternal outcomes, Outcome 2 Caesarean section.**

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 2 Caesarean section

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Weight</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
<td></td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>8/10</td>
<td>5/12</td>
<td>1.92 [ 0.92, 4.01 ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>10</td>
<td>12</td>
<td>100.0 %</td>
<td>1.92 [ 0.92, 4.01 ]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 8 (Planned caesarean section), 5 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 1.73 (P = 0.083)

Test for subgroup differences: Not applicable

---

**Analysis 2.3. Comparison 2 Secondary maternal outcomes, Outcome 3 Uterine rupture.**

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 3 Uterine rupture

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>10</td>
<td>12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 1.73 (P = 0.083)

Test for subgroup differences: Not applicable
### Analysis 2.4. Comparison 2 Secondary maternal outcomes, Outcome 4 Haemorrhage or need for blood transfusion.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 4 Haemorrhage or need for blood transfusion

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>2/10</td>
<td>2/12</td>
<td>1.20 [ 0.20, 7.05 ]</td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI) 10 12 100.0 % 1.20 [ 0.20, 7.05 ]

Total events: 2 (Planned caesarean section), 2 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.20 (P = 0.84)

Test for subgroup differences: Not applicable

---

### Analysis 2.5. Comparison 2 Secondary maternal outcomes, Outcome 5 Hysterectomy.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 5 Hysterectomy

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI) 10 12 0.0 [ 0.0, 0.0 ]

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable
### Analysis 2.6. Comparison 2 Secondary maternal outcomes, Outcome 6 Vulval or perineal haematoma.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 2 Secondary maternal outcomes

**Outcome:** 6 Vulval or perineal haematoma

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
</tbody>
</table>

**Total (95% CI):** 10 12

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

---

### Analysis 2.7. Comparison 2 Secondary maternal outcomes, Outcome 7 Deep vein thrombosis.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 2 Secondary maternal outcomes

**Outcome:** 7 Deep vein thrombosis

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
</tbody>
</table>

**Total (95% CI):** 10 12

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

---

---

Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth (Review)

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### Analysis 2.8. Comparison 2 Secondary maternal outcomes, Outcome 8 Pulmonary embolus.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 2 Secondary maternal outcomes

**Outcome:** 8 Pulmonary embolus

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

### Analysis 2.9. Comparison 2 Secondary maternal outcomes, Outcome 9 Pneumonia.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 2 Secondary maternal outcomes

**Outcome:** 9 Pneumonia

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable
## Analysis 2.10. Comparison 2 Secondary maternal outcomes, Outcome 10 Adult respiratory distress syndrome.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 10 Adult respiratory distress syndrome

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
Heterogeneity: not applicable
Test for overall effect: Z = 0.0 (P < 0.00001)
Test for subgroup differences: Not applicable

## Analysis 2.11. Comparison 2 Secondary maternal outcomes, Outcome 11 Wound Infection.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 11 Wound Infection

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td>0.0 [ 0.0, 0.0 ]</td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
Heterogeneity: not applicable
Test for overall effect: Z = 0.0 (P < 0.00001)
Test for subgroup differences: Not applicable
### Analysis 2.12. Comparison 2 Secondary maternal outcomes, Outcome 12 Wound dehiscence.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 12 Wound dehiscence

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

---

### Analysis 2.13. Comparison 2 Secondary maternal outcomes, Outcome 13 Organ damage.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 13 Organ damage

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 14 Development of fistula

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 (0.0, 0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 (0.0, 0.0)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
Heterogeneity: not applicable
Test for overall effect: Z = 0.0 (P < 0.00001)
Test for subgroup differences: Not applicable

Analysis 2.15. Comparison 2 Secondary maternal outcomes, Outcome 15 Bowel obstruction.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 15 Bowel obstruction

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 (0.0, 0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 (0.0, 0.0)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
Heterogeneity: not applicable
Test for overall effect: Z = 0.0 (P < 0.00001)
Test for subgroup differences: Not applicable
### Analysis 2.16. Comparison 2 Secondary maternal outcomes, Outcome 16 Pulmonary oedema.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth  

**Comparison:** 2 Secondary maternal outcomes  

**Outcome:** 16 Pulmonary oedema

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)  
Heterogeneity: not applicable  
Test for overall effect: Z = 0.0 (P < 0.00001)  
Test for subgroup differences: Not applicable

---

### Analysis 2.17. Comparison 2 Secondary maternal outcomes, Outcome 17 Stroke.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth  

**Comparison:** 2 Secondary maternal outcomes  

**Outcome:** 17 Stroke

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)  
Heterogeneity: not applicable  
Test for overall effect: Z = 0.0 (P < 0.00001)  
Test for subgroup differences: Not applicable
### Analysis 2.18. Comparison 2 Secondary maternal outcomes, Outcome 18 Cardiac arrest.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 18 Cardiac arrest

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

- Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
- Heterogeneity: not applicable
- Test for overall effect: Z = 0.0 (P < 0.00001)
- Test for subgroup differences: Not applicable

#### Analysis 2.19. Comparison 2 Secondary maternal outcomes, Outcome 19 Respiratory arrest.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 2 Secondary maternal outcomes

Outcome: 19 Respiratory arrest

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>M-H,Fixed,95% CI</td>
<td>M-H,Fixed,95% CI</td>
</tr>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

- Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
- Heterogeneity: not applicable
- Test for overall effect: Z = 0.0 (P < 0.00001)
- Test for subgroup differences: Not applicable
### Analysis 2.20. Comparison 2 Secondary maternal outcomes, Outcome 20 Maternal death.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 2 Secondary maternal outcomes

**Outcome:** 20 Maternal death

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

---

### Analysis 3.1. Comparison 3 Secondary infant outcomes, Outcome 1 Perinatal death.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 3 Secondary infant outcomes

**Outcome:** 1 Perinatal death

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable
Analysis 3.2. Comparison 3 Secondary infant outcomes, Outcome 2 Apgar score less than 7 at 5 minutes.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 3 Secondary infant outcomes

Outcome: 2 Apgar score less than 7 at 5 minutes

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>10</td>
<td>12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)
Heterogeneity: not applicable
Test for overall effect: Z = 0.0 (P < 0.00001)
Test for subgroup differences: Not applicable

Analysis 3.3. Comparison 3 Secondary infant outcomes, Outcome 3 Birthweight.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 3 Secondary infant outcomes

Outcome: 3 Birthweight

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section</th>
<th>Planned vaginal birth</th>
<th>Mean Difference Mean(SD)</th>
<th>Weight</th>
<th>Mean Difference Mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>10 3401 (475)</td>
<td>12 3534 (425)</td>
<td>100.0 % -133.00 [-513.12, 247.12 ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>10</td>
<td>12</td>
<td>100.0 % -133.00 [-513.12, 247.12 ]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: not applicable
Test for overall effect: Z = 0.69 (P = 0.49)
Test for subgroup differences: Not applicable
### Analysis 3.4. Comparison 3 Secondary infant outcomes, Outcome 4 Intensive care unit admission.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 3 Secondary infant outcomes

**Outcome:** 4 Intensive care unit admission

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

### Analysis 3.5. Comparison 3 Secondary infant outcomes, Outcome 5 Birth trauma.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 3 Secondary infant outcomes

**Outcome:** 5 Birth trauma

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable
### Analysis 3.6. Comparison 3 Secondary infant outcomes, Outcome 6 Seizures.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 3 Secondary infant outcomes

**Outcome:** 6 Seizures

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 (0.0, 0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 (0.0, 0.0)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

### Analysis 3.7. Comparison 3 Secondary infant outcomes, Outcome 7 Neonatal encephalopathy.

**Review:** Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

**Comparison:** 3 Secondary infant outcomes

**Outcome:** 7 Neonatal encephalopathy

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 (0.0, 0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 (0.0, 0.0)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable
**Analysis 3.8. Comparison 3 Secondary infant outcomes, Outcome 8 Severe respiratory distress syndrome.**

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 3 Secondary infant outcomes

Outcome: 8 Severe respiratory distress syndrome

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

---

**Analysis 3.9. Comparison 3 Secondary infant outcomes, Outcome 9 Necrotising enterocolitis.**

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 3 Secondary infant outcomes

Outcome: 9 Necrotising enterocolitis

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
<th>Risk Ratio M-H,Fixed,95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable
Analysis 3.10. Comparison 3 Secondary infant outcomes, Outcome 10 Systemic infection.

Review: Planned elective repeat caesarean section versus planned vaginal birth for women with a previous caesarean birth

Comparison: 3 Secondary infant outcomes

Outcome: 10 Systemic infection

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Planned caesarean section n/N</th>
<th>Planned vaginal birth n/N</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
<th>Risk Ratio M-H,Fixed 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowther 2012b</td>
<td>0/10</td>
<td>0/12</td>
<td>0.0 [ 0.0, 0.0 ]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>10</strong></td>
<td><strong>12</strong></td>
<td><strong>0.0 [ 0.0, 0.0 ]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: 0 (Planned caesarean section), 0 (Planned vaginal birth)

Heterogeneity: not applicable

Test for overall effect: Z = 0.0 (P < 0.00001)

Test for subgroup differences: Not applicable

APPENDICES

Appendix 1. Additional searching in initial version of the review

Authors searched the Cochrane Central Register of Controlled Trials (The Cochrane Library 2004, Issue 1) and PubMed (1966 to 24 June 2004) using the following search terms: vaginal birth after caesarean; vaginal birth after cesarean; trial of labour; trial of labor; elective caesarean; elective cesarean; cesarean section, repeat.

WHAT’S NEW

Last assessed as up-to-date: 30 September 2013.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 October 2013</td>
<td>New citation required but conclusions have not changed</td>
<td>Two trials now included.</td>
</tr>
<tr>
<td>30 September 2013</td>
<td>New search has been performed</td>
<td>Search updated, one further report of Crowther 2012b identified.</td>
</tr>
</tbody>
</table>
HISTORY

Review first published: Issue 4, 2004

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 June 2012</td>
<td>Amended</td>
<td>Search updated. Five reports added to Studies awaiting classification</td>
</tr>
<tr>
<td>20 September 2008</td>
<td>Amended</td>
<td>Converted to new review format.</td>
</tr>
</tbody>
</table>

CONTRIBUTIONS OF AUTHORS

Jodie Dodd and Caroline Crowther were involved in the drafting of the review, assessment of trials and data extraction. All authors contributed equally to the subsequent revisions of the review.

DECLARATIONS OF INTEREST

Jodie Dodd and Caroline Crowther are the authors of one of the reports included in this review. This study report was assessed by the other authors.

SOURCES OF SUPPORT

Internal sources
- The University of Adelaide, Department of Obstetrics and Gynaecology, Australia.

External sources
- No sources of support supplied

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

INDEX TERMS

Medical Subject Headings (MeSH)
*Cesarean Section, Repeat; *Surgical Procedures, Elective; *Vaginal Birth after Cesarean; Meta-Analysis as Topic

MeSH check words
Female; Humans; Pregnancy