

## Intrapartum care for women with existing medical conditions or obstetric complications and their babies

### [Q] Evidence review for large-for-gestational age baby

*NICE guideline NG121*

*Evidence reviews for women at high risk of adverse outcomes for themselves and/or their baby because of obstetric complications or other reasons*

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*Final*

*Developed by the National Guideline Alliance hosted by the Royal College of Obstetricians and Gynaecologists*



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# Intrapartum care for women with a large-for-gestational age baby – mode of birth

## Review question

What is the optimal mode of birth (emergency caesarean section or continuation of labour) for women with a large-for-gestational-age baby?

## Introduction

The aim of this review is to determine the optimal mode of birth (emergency caesarean section or continuation of labour) for women with a large-for-gestational-age baby.

## Summary of the protocol

See Table 1 for a summary of the population, intervention, comparison and outcome (PICO) characteristics of this review.

**Table 1: Summary of the protocol (PICO table)**

<b>Population</b>	Women in labour with a (suspected) large-for-gestational-age baby
<b>Intervention</b>	Emergency (unscheduled or unplanned) caesarean section
<b>Comparison</b>	Continuation of labour following the NICE guideline on <a href="#">intrapartum care for healthy women and babies</a> (CG190)
<b>Outcomes</b>	<p>For the woman:</p> <ul style="list-style-type: none"><li>• major morbidities (major haemorrhage, bladder and bowel injury, sepsis, thromboembolic disease, obstetrical anal sphincter injury (OASI), pelvic girdle pain, pubic symphysis diastasis, or shoulder dystocia)</li><li>• admission to HDU or ITU and duration of hospital stay</li><li>• woman's experience of labour and birth, including experience of the birth companion, separation of the woman and baby and breastfeeding initiation</li></ul> <p>For the baby:</p> <ul style="list-style-type: none"><li>• mortality</li><li>• major morbidities (birth injuries, brachial plexus injuries, intracranial haemorrhage, hypoxic ischaemic encephalopathy (HIE), cerebral palsy, neurodevelopmental disability or developmental delay, or neonatal seizures)</li><li>• admission to NICU and duration of hospital stay</li></ul>

*HDU: high dependency unit; HIE: hypoxic ischaemic encephalopathy; ITU: intensive therapy unit; NICE: National Institute for Health and Care Excellence; NICU: neonatal intensive care unit; OASI: obstetrical anal sphincter injury*

For further details see the full review protocol in Appendix A – Review protocol. The search strategies are presented in Appendix B – Literature search strategies.

## Clinical evidence

### Included studies

Six retrospective cohort studies were included in this review (see 'Summary of clinical studies included in the evidence review'). All the studies (Aberg 2016, Alsunari 2005, Flamm 1989, Lipscomb 1995, Menticoglou 1992, Vercellini 2015) compared emergency caesarean section to vaginal birth. Findings in Flamm 1989 related to women with no previous caesarean section were reported together with findings from other studies; findings in Flamm 1989 related to women with a previous caesarean section were reported separately.

Evidence from the studies included in the review is summarised below (see 'Quality assessment of clinical studies included in the evidence review').

Data was reported on the critical outcomes, haemorrhage, bladder injury, obstetrical anal sphincter injuries, shoulder dystocia, mortality in the baby, birth injuries, brachial plexus injuries, intracranial haemorrhage, hypoxic ischaemic encephalopathy, and seizures in the baby, and the important outcomes, admission to a high dependency unit (HDU) or intensive care unit (ITU) and duration of maternal hospital stay. There was no evidence identified for the following maternal outcomes: sepsis (critical outcome), thromboembolic disease (critical outcome), pelvic girdle pain and pubic symphysis diastasis (critical outcome), or for the following outcomes in the baby: cerebral palsy (critical outcome), neurodevelopmental disability (critical outcome), and developmental delay (critical outcome). In relation to bowel injury to the woman (critical outcome), only evidence on a proxy (indirect) outcome (urinary and anal incontinence) was identified. In relation to woman's experience of labour and birth, including experience of her birth companion(s), separation of the woman and the baby and breastfeeding initiation (important outcome), only evidence on proxy (indirect) outcomes (sexual functioning, satisfaction with mode of birth and childbirth experience) were identified. In relation to birth injury (critical outcome) in the baby, an additional proxy outcome (fracture of the clavicle or humerus) was identified.

See also the study selection flow chart in Appendix C – Clinical evidence study selection.

### Excluded studies

Studies not included in this review with reasons for their exclusion are listed in Appendix D – Excluded studies.

## Summary of clinical studies included in the evidence review

Table 2 provides a brief summary of the included studies.

**Table 2: Summary of included studies**

Study	Population	Intervention/ Comparison	Outcomes	Comments
Aberg 2016 Retrospective cohort Sweden	N=195,330 women who had an unassisted vaginal birth N=19,567 women who had an emergency CS	Emergency CS versus vaginal birth	For the baby: • brachial plexus injury • intracranial haemorrhage • convulsions	Induced labour by birthweight subgroups: 4000-4499 g = 22.4% 4500-4999 g = 6.6%

Study	Population	Intervention/ Comparison	Outcomes	Comments
	<p>Macrosomia defined as birthweight of <math>\geq 4000</math> g</p> <p>Subgroups by birthweight:  <i>4000-4499 g:</i>                      vaginal birth = 159,280                      emergency CS = 13,994  <i>4500-4999 g:</i>                      vaginal birth = 32,022                      emergency CS = 4593  <i><math>\geq 5000</math> g:</i>                      vaginal birth = 4028                      emergency CS = 980</p>			$\geq 5000$ g = 1.2%
<p>Alsunnari 2005</p> <p>Retrospective cohort study</p> <p>Canada</p>	<p>N=49 women who gave birth vaginally (spontaneous or instrumental birth)</p> <p>N=25 women who had an emergency CS</p> <p>Macrosomia defined as birthweight of <math>\geq 5000</math> g</p>	Emergency CS versus continuation of labour	<p>For the woman:</p> <ul style="list-style-type: none"> <li>• haemorrhage</li> <li>• third- or fourth-degree perineal lacerations</li> </ul>	-
<p>Flamm 1989</p> <p>Retrospective cohort study</p> <p>USA</p>	<p>N=301 women undergoing trial of labour <i>with previous</i> CS (resulting in vaginal birth = 165, emergency CS = 136)</p> <p>N=301 women undergoing trial of labour <i>with no previous</i> CS (resulting in vaginal birth = 269, emergency CS = 32)</p> <p>Macrosomia defined as birthweight of <math>\geq 4000</math> g</p>	Emergency CS versus continuation of labour	<p>For the woman:</p> <ul style="list-style-type: none"> <li>• bladder injury</li> <li>• shoulder dystocia</li> </ul> <p>For the baby:</p> <ul style="list-style-type: none"> <li>• mortality (rupture related)</li> </ul>	35% (105 of 301) of those with previous CS had labour induced or augmented with oxytocin; no corresponding data reported for those with no previous CS
<p>Lipscomb 1995</p> <p>Retrospective cohort study</p> <p>USA</p>	<p>N=128 women who gave birth vaginally</p> <p>N=35 women who had an emergency CS</p> <p>Macrosomia defined as birthweight of <math>\geq 4500</math> g</p>	Emergency CS versus continuation of labour	<p>For the woman:</p> <ul style="list-style-type: none"> <li>• third- or fourth-degree perineal lacerations</li> <li>• haemorrhage</li> <li>• duration of hospital stay</li> </ul>	-
<p>Menticoglou 1992</p>	<p>N=589 women who gave birth vaginally (spontaneous or instrumental birth)</p>	Emergency CS versus continuation of labour	<p>For the woman:</p> <ul style="list-style-type: none"> <li>• shoulder dystocia</li> </ul>	-



Study	Population	Intervention/ Comparison	Outcomes	Comments
Retrospective cohort study  Canada	N=132 women who had an emergency CS  Macrosomia defined as birth weight of $\geq 4500$ g		For the baby: <ul style="list-style-type: none"> <li>• fracture clavicle or humerus</li> <li>• brachial palsy</li> <li>• skull fracture or intracranial haemorrhage</li> <li>• NICU admission</li> </ul>	
Vercellini 2015  Retrospective cohort study  Italy	N=460 women undergoing vaginal birth (resulting in vaginal birth = 276, emergency CS = 184)  Macrosomia defined as birthweight of $\geq 4000$ g	Emergency CS versus continuation of labour	For the woman: <ul style="list-style-type: none"> <li>• shoulder dystocia</li> <li>• haemorrhage</li> <li>• urinary incontinence</li> <li>• anal incontinence</li> <li>• sexual functioning</li> <li>• satisfaction with mode of birth</li> <li>• satisfaction with childbirth experience</li> </ul> For the baby: <ul style="list-style-type: none"> <li>• mortality</li> <li>• asphyxia</li> <li>• fracture clavicle</li> <li>• brachial palsy</li> </ul>	-

CS: caesarean section; NICU: neonatal intensive care unit

See also the study evidence tables in Appendix E – Clinical evidence tables. No meta-analysis was undertaken for this review (and so there are no forest plots in Appendix F – Forest plots).

### Quality assessment of clinical studies included in the evidence review

The clinical evidence profiles for this review question are presented in Appendix G – GRADE tables.

### Economic evidence

#### Included studies

No economic evidence was identified for this review.

See the study selection flow chart in Supplement 2 (Health economics).

## Excluded studies

Studies not included in this review with reasons for their exclusion are listed in Supplement 2 (Health economics).

## Summary of studies included in the economic evidence review

No economic evidence was identified for this review (and so there are no economic evidence tables in Supplement 2 (Health economics)).

## Economic model

An original health economic cost utility analysis was developed to evaluate the cost effectiveness of emergency caesarean section compared to continuation of labour in women with a suspected large-for-gestational-age baby. A summary of the model is presented below, with full details provided in Supplement 2 (Health economics).

A total of 7 outcomes were included in the analysis with an NHS setting and a population of women in labour with a suspected large-for-gestational-age baby. The outcomes were:

- brachial plexus injury
- anal incontinence
- urinary incontinence
- third- or fourth-degree perineal lacerations
- haemorrhage
- intracranial haemorrhage
- admission to the neonatal intensive care unit (NICU).

The baseline risks for continuation of labour were estimated from the control arm of the studies included in the clinical evidence review. It was also assumed that a proportion of women who decided to continue with labour would ultimately require an emergency caesarean section. Treatment effectiveness estimates were also derived from the studies included in the clinical evidence review.

The cost analysis was undertaken from a NHS and Personal Social Services (PSS) perspective using a 2016/17 price year. The relevant costs in the analysis were those associated with different modes of birth and 'downstream' costs arising from adverse outcomes. Costs arising from adverse outcomes were sourced from published literature. Where costs applied in the long term, discounting was applied by the study authors but at variable rates and not the 3.5% discount rate recommended in NICE guidelines. This was because the studies were not undertaken in the UK.

Health state utility values were also estimated from published literature with a quality adjusted life year (QALY) decrement calculated by estimating the duration in that state.

The base-case analysis found emergency caesarean section to dominate continuation of labour for women presenting in labour with a suspected large-for-gestational-age baby. Probabilistic sensitivity analysis (PSA) indicated a greater than 99% probability of emergency caesarean section being cost effective across all categories of birthweight considered in the model ( $\geq 4000$  g, representing all babies suspected of being large for gestational age, and also 3 subgroups reflected in the clinical evidence and defined by a birthweight of 4000 g – 4499 g; 4500 g – 4999 g, and  $\geq 5000$ g). Both probabilistic and deterministic analyses suggested that

emergency caesarean section dominated continuation of labour, being less costly and more effective as measured by QALYs. This result was driven particularly by the model's estimate of the reduction in urinary and anal incontinence rates.

A sensitivity analysis was undertaken in which the outcomes were restricted to brachial plexus injury and intracranial haemorrhage, the only outcomes for which the clinical evidence reported baseline and treatment effectiveness data by birthweight category. This analysis suggested that emergency caesarean section was certainly not cost effective for suspected birthweights of up to 5000 g, with emergency caesarean section having an incremental cost effectiveness ratio (ICER) of £330,000 per QALY for a birthweight of 4000 g – 4499 g and an ICER of £92,000 per QALY for a birthweight of 4500 g – 4999 g relative to continuation of labour. This analysis suggested that as birthweight increased, so did the relative cost effectiveness of emergency caesarean section. So, for suspected birthweight  $\geq$  5000 g the ICER was much less at £25,000 per QALY, although the PSA still suggested that there was only a 5.1% probability of emergency caesarean section being cost effective for this subgroup.

When interpreting the results of this analysis, the important limitations of the clinical evidence underpinning it need to be recognised. The included studies in the clinical evidence review had a retrospective study design and were based on actual birthweight rather than suspected birthweight. This aspect will tend to over-estimate any treatment effects as not all women with a suspected large-for-gestational-age baby will actually give birth to a large-for-gestational-age baby. Furthermore, the lack of a randomised study design means that there could be systematic differences in the characteristics of the 'exposed' group and the controls. In particular, at least some women who had an emergency caesarean section were likely to have done so for an indication other than a suspected large-for-gestational-age baby and thus may have worse outcomes that reflect the indication for caesarean section. Model outcomes were limited to the outcomes reported in the evidence reviewed for this guideline for pragmatic reasons, but many other outcomes that might be affected by mode of birth were not included.

The committee had reservations about the outcomes related to urinary and anal incontinence, which were both important in driving the apparent cost effectiveness of emergency caesarean section in the base-case analysis. Furthermore, the model assumed that the incontinence is lifelong while the natural history of these conditions suggests that for at least some women this will not be the case. Also, the QALY losses and costs used for these outcomes seem likely to reflect more severe incontinence, which has a much lower prevalence than infrequent incontinence. In addition the high costs attributed to these outcomes, particularly urinary incontinence, would suggest that the costs reflect treatment which would be expected to ameliorate symptoms and improve health related quality of life, and so high rates for costs and QALYs may overstate the potential cost reduction or improvement in health related quality of life that could result from the decision to perform an emergency caesarean section.

Given these limitations, the model provides sufficient cost effectiveness evidence to support the committee's recommendation to offer a choice of mode of birth to women in labour with a suspected large-for-gestational-age baby.

## **Evidence statements**

### **Emergency caesarean section versus vaginal birth**

#### Outcomes for the woman

### *Haemorrhage*

Very low quality evidence from 3 retrospective cohort studies in women with a large-for-gestational-age baby (N=74, N=163, and N=460) showed no clinically important difference in the incidence of haemorrhage between women who gave birth vaginally and those who had an emergency caesarean section.

### *Bladder injury*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=301) reported no bladder injuries for women who gave birth vaginally or those who had an emergency caesarean section. Due to zero events in both groups no estimate could be calculated.

### *Urinary and anal incontinence*

These outcomes were included as they might relate to bladder and bowel injury. Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=218) showed a clinically important difference in the incidence of urinary and anal incontinence with the incidence being lower in women who had an emergency caesarean section compared to those who gave birth vaginally.

### *Third- or fourth-degree perineal lacerations*

Very low quality evidence from 2 retrospective cohort studies in women with a large-for-gestational-age baby (N=74 and N=163) showed no clinically important difference in the incidence of third- or fourth-degree perineal lacerations between women who gave birth vaginally and those who had an emergency caesarean section.

### *Shoulder dystocia*

Very low quality evidence from 2 retrospective cohort studies in women with a large-for-gestational-age baby (N=721 and N=460) showed a clinically important difference in the incidence of shoulder dystocia with the incidence being lower in women who had an emergency caesarean section compared to those who gave birth vaginally. However, other very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=301) showed no clinically important difference in the incidence of shoulder dystocia.

### *Hospital stay*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=163) reported the mean hospital stay (days) of 2.3 and 3.5 for women who gave birth vaginally and those who had an emergency caesarean section, respectively. However, the study authors did not report the standard deviation, thus no mean difference could be calculated.

### *Sexual functioning (based on the Female Sexual Function Index questionnaire)*

This outcome was included as it might relate to the woman's experience of labour and birth. Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=218) showed no clinically important improvement in total sexual functioning (measured by the total Female Sexual Function Index (FSFI) score) between women who gave birth vaginally and those who had an emergency caesarean section. Other very low quality evidence from the same study showed no clinically important improvement in the specific domains of sexual functioning (desire, arousal, lubrication, orgasm, satisfaction and pain).

*Satisfaction with mode of birth (based on the question 'Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, if you had the possibility to turn back time, would you repeat the same course regarding the mode of childbirth?')*

This outcome was included as it might relate to the woman's experience of labour and birth. Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=226) showed no clinically important difference in satisfaction with mode of birth between women who gave birth vaginally and those who had an emergency caesarean section.

*Satisfaction with childbirth experience (based on the question 'Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, how would you judge your degree of satisfaction regarding the overall experience associated with childbirth?')*

This outcome was included as it might relate to the woman's experience of labour and birth. Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=226) showed no clinically important difference in satisfaction with childbirth experience between women who gave birth vaginally and those who had an emergency caesarean section.

### Outcomes for the baby

#### *Mortality*

Very low quality evidence from 2 retrospective cohort studies in women with a large-for-gestational-age baby (N=301 and N460) reported no perinatal deaths for women who gave birth vaginally or those who had an emergency caesarean section. Due to zero events in both groups no estimates could be calculated.

#### *Fracture of the clavicle or humerus*

These outcomes were included as they might relate to birth injury in the baby. Very low quality evidence from 2 retrospective cohort studies in women with a large-for-gestational-age baby (N=721 and N460) showed no clinically important difference in the incidence of clavicle or humerus fractures between women who gave birth vaginally and those who had an emergency caesarean section.

#### *Skull fracture or intracranial haemorrhage*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=721) reported no skull fracture or intracranial haemorrhages in the baby for women who gave birth vaginally or those who had an emergency caesarean section. Due to zero events in both groups no estimate could be calculated.

#### *Brachial plexus injury*

Low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=214,897) showed a clinically important difference in the incidence of brachial plexus injury for all birthweight subgroups ( $\geq 4000$  g, 4000-4499 g, 4500-4999 g, and  $\geq 5000$  g) with the incidence being lower in women who had an emergency caesarean section compared to those who gave birth vaginally.

#### *Brachial palsy*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=721) showed no clinically important difference in the incidence of brachial palsy between women who gave birth vaginally and those who had an emergency caesarean section. Other very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=460) reported no incidence of brachial palsy for women who gave birth vaginally or those who had an emergency caesarean section. Due to zero events in both groups no estimate could be calculated.

#### *Intracranial haemorrhage*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=214,897) showed no clinically important difference in the incidence of intracranial haemorrhage for any birthweight subgroup ( $\geq 4000$  g, 4000-4499 g, 4500-4999 g and  $\geq 5000$  g) between women who gave birth vaginally and those who had an emergency caesarean section.

#### *Asphyxia*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=460) showed no clinically important difference in the incidence of asphyxia between women who gave birth vaginally and those who had an emergency caesarean section.

#### *Convulsions*

Low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=214,897) showed a clinically important difference in the incidence of convulsions for 2 birthweight subgroups, that is  $\geq 4000$  g and 4000-4499 g, with the incidence being lower in women who gave birth vaginally compared to those who had an emergency caesarean section. Very low quality evidence from the same study showed no clinically important difference in the incidence of convulsions for 2 other birthweight subgroups, namely 4500-4999 g and  $\geq 5000$  g between women who gave birth vaginally and those who had an emergency caesarean section.

#### *Admission to the neonatal intensive care unit*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=721) showed no clinically important difference in the incidence of admissions to the neonatal intensive care unit (NICU) between women who gave birth vaginally and those who had an emergency caesarean section.

### **Emergency caesarean section versus vaginal birth for women with a previous caesarean section**

#### Outcomes for the woman

##### *Bladder injury*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby with a previous caesarean section (N=301) reported no bladder injuries for women who gave birth vaginally or those who had an emergency caesarean section. Due to zero events in both groups no estimates could be calculated.

##### *Shoulder dystocia*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby (N=301) with a previous caesarean section showed no clinically important difference in the incidence of shoulder dystocia between women who gave birth vaginally and those who had an emergency caesarean section.

### Outcomes for the baby

#### *Mortality*

Very low quality evidence from 1 retrospective cohort study in women with a large-for-gestational-age baby without a previous caesarean section (N=301) reported no perinatal deaths for women who gave birth vaginally or those who had an emergency caesarean section. Due to zero events in both groups no estimate could be calculated.

#### **Economic evidence**

Evidence from the guideline economic analysis including 7 outcomes (brachial plexus injury, anal incontinence, urinary incontinence, perineal lacerations, haemorrhage, intracranial haemorrhage and admission to NICU) suggested that emergency caesarean section was cost effective relative to continuation of labour in women with a suspected large-for-gestational-age baby. The economic analysis is directly applicable to the NICE decision-making context although it is characterised by major limitations.

Evidence from the guideline economic analysis including only 2 of the 7 outcomes listed above (brachial plexus injury and intracranial haemorrhage) suggested that continuation of labour was cost effective relative to emergency caesarean section for women with a suspected large-for-gestational-age baby (for babies with a birthweight of < 5000 g). The economic analysis is directly applicable to the NICE decision-making context although it is characterised by major limitations.

## **The committee's discussion of the evidence**

### **Interpreting the evidence**

#### ***The outcomes that matter most***

The committee prioritised major maternal morbidities such as major haemorrhage, bladder and bowel injury, sepsis, thromboembolic disease, obstetrical anal sphincter injury (OASI), pelvic girdle pain, pubic symphysis diastasis and shoulder dystocia as critical outcomes because these may occur with vaginal birth and caesarean section. The committee rated mortality and major morbidities in the baby such as birth injuries, brachial plexus injuries, intracranial haemorrhage, hypoxic ischaemic encephalopathy (HIE), cerebral palsy, neurodevelopmental disability or developmental delay, and neonatal seizures as critical outcomes because they can be influenced by mode of birth. The committee rated maternal admission to HDU or ITU and duration of hospital stay as important outcomes because they are proxies for maternal morbidity. Likewise, the committee rated admission of the baby to NICU and duration of hospital stay as important outcomes because they are a proxy for morbidity in the baby, and avoiding admission to NICU or a shorter hospital stay can improve outcomes for the baby. Finally, the committee considered the woman's experience of labour and birth, including experience of her birth companion(s), separation of the woman and the baby and breastfeeding initiation as important outcomes because it supports women's informed choice about options available to them in labour. The committee was aware that currently some women feel

pressurised into having a caesarean section, which can impact negatively on breastfeeding and perinatal mental health. The committee noted that some women can feel fearful of having a vaginal birth with a large baby. Some women may not be offered enough information regarding concerns about the size of their baby. Moreover, emergency complications at birth such as shoulder dystocia and emergency caesarean section can lead to physical and psychological birth trauma for the woman.

### ***The quality of the evidence***

No randomised controlled trials were identified. All included studies were retrospective cohort studies. The quality of the evidence from these studies was assessed with GRADE and was rated as very low, mainly due to high risk of comparability bias (studies did not control for any confounding factor) and imprecision.

The committee reviewed the evidence related to management and birth outcomes in pregnancies in which the baby was considered to be large for gestational age and agreed that the evidence was inconclusive to favour one mode of birth, and that all available options should be offered to the woman in these circumstances. The majority of the evidence was derived either from observational studies where birth outcomes were documented following an antenatal suspicion of large for gestational age or retrospectively using actual birthweight. While all of the studies reported increased risks of intrapartum complications (perineal trauma, postpartum haemorrhage, operative birth, shoulder dystocia, and neonatal unit admission) associated with vaginal birth, there was no evidence from randomised controlled trials which might favour a particular mode of birth over another.

The committee wanted to emphasise that there is a lot of uncertainty around the diagnosis of large for gestational age as there is no standardised definition and women should be informed about this. According to the Royal College of Obstetricians and Gynaecologists (RCOG) [shoulder dystocia \(Green-top Guideline No. 42\)](#), third-trimester ultrasound scans have a sensitivity of 60% for macrosomia. However, the committee agreed that when a baby is large for gestational age or suspected to be so then it is very likely that the woman would be offered an elective caesarean section.

The committee discussed that the outcomes from the retrospective studies might be biased as it was not always clear from the evidence why a caesarean section was offered. However, in most studies, women in the emergency caesarean section group had clinical indications for an emergency caesarean section. These indications might, in turn, be associated with adverse outcomes. Therefore, this might introduce bias into the comparison with continuation of labour, especially because studies did not adjust for confounders. The committee also discussed that some of the included studies were relatively old and that current practice is for a woman with a large-for-gestational-age baby to be offered an early birth. However, the committee decided to include these studies in the guideline review because they allowed the committee to emphasise the limitations of the evidence and implications for clinical practice.

The committee recognised that some of the outcomes considered are extremely unlikely to occur with either vaginal birth or caesarean section. For example, perineal lacerations are only relevant to vaginal birth. The committee thought that it was still relevant to report these outcomes as it would allow quantification of the frequency of these complications with particular interventions. In terms of uterine rupture, the committee noted that this outcome should be considered to be the result of labour and not the result of emergency caesarean section (although it is very likely that an



emergency caesarean section would need to be performed in the case of uterine rupture during labour).

The committee noted that the management of shoulder dystocia in a US study included in the evidence review (Menticoglou 1992) was different from that in the UK and they noted the limitations associated with the small sample size.

The committee also noted the limitations associated with the reported urinary and anal incontinence-related outcomes. They questioned whether it could be assumed that these outcomes always related to a bladder or bowel injury. However, they decided to retain the associated studies in the evidence review because they might still be relevant.

The committee discussed that the evidence related to postpartum haemorrhage should be interpreted with caution due to bias in the definition of this outcome; some studies used a higher threshold for blood loss for caesarean section than for vaginal birth (1000 ml and 500 ml, respectively). Also, this outcome is more likely to occur during an emergency caesarean section than, for example, during an elective caesarean section.

The committee highlighted limitations in the woman's satisfaction with mode of birth and childbirth experience outcomes in one of the included studies as a proxy for the woman's experience of labour and birth as being not really valuable in answering this question. They thought that the way the question was phrased in the study was not useful because it included the woman's wellbeing and the baby's wellbeing in the same question. The committee emphasised that responses about satisfaction with birth may have been associated with whether or not the baby was indeed large for gestational age rather than with mode of birth. Moreover, the woman's satisfaction with labour and birth question reported in this study might vary considerably over time, and in this study there was a long interval (at least 6 months) between the birth and the survey being conducted. The committee noted that a better question to ask might have been whether the woman was happy with her involvement in decision-making related to labour and birth. However, the committee decided to keep this outcome in the evidence review because if they excluded it they might be viewed as downplaying the importance of the woman's satisfaction with labour and birth.

### **Benefits and harms**

There is no standardised definition of large for gestational age; it is often considered to mean a baby weighing more than the 90<sup>th</sup> birthweight centile (in some definitions more than the 95<sup>th</sup> centile) or birthweight above 4000 g (in some definitions more than 4500 g). Clinical suspicion of large for gestational age, particularly during labour, is subjective and often inaccurate. Ultrasound estimation of fetal weight is likely to be more accurate but is difficult to perform accurately in labour. The committee agreed, however, that being large for gestational age is associated with an increased risk of adverse outcomes for the woman and the baby. They discussed that there is an association between fetal size and the incidence of shoulder dystocia according to retrospective evidence included in the guideline review and the RCOG [shoulder dystocia \(Green-top Guideline No. 42\)](#). However, fetal size is not a good predictor of shoulder dystocia due to uncertainty in the diagnosis of large for gestational age. Shoulder dystocia does not occur with the vast majority of babies with a birthweight of at 4500 g or more. Moreover, shoulder dystocia can occur with babies who are appropriate for gestational age.

As is the case with small for gestational age, recognition of large for gestational age is challenging and suspicion might prove unfounded. The committee felt it was

important that women are informed of the increased risks associated with large-for-gestational-age babies while acknowledging that there is uncertainty about the accuracy of a diagnosis of a baby being large for gestational age. The committee felt it was important to give the woman balanced information to support shared decision making. The discussion between healthcare professionals and a woman with a baby suspected of being large for gestational age should focus not only on the potential risk of adverse outcomes for the woman and the baby, but also on the uncertainty around the diagnosis of a large-for-gestational-age baby and what it might mean for the woman and her baby if such problems did occur.

In view of the evidence included in the guideline review and their experience, the committee agreed that women with a suspected large-for-gestational-age baby should be offered a choice between continuing labour (including the possibility of augmented labour) and caesarean section. The committee did not find compelling evidence to recommend a particular mode of birth over another, and they agreed that the benefits and risks associated with each mode of birth (particularly an increased risk of maternal morbidity such as infection with caesarean section and increased risks of shoulder dystocia, brachial plexus injury, instrumental birth and perineal trauma with vaginal birth) should be discussed with the woman to support informed decision-making.

### **Cost effectiveness and resource use**

The committee was aware that emergency caesarean section is more expensive than continuing labour, including augmented labour. However, they were also aware of important 'downstream' costs associated with a range of outcomes for the woman and the baby, which can differ by mode of birth, although not always in the same direction for each outcome. Furthermore, the mode of birth and maternal birth trauma can both have implications for subsequent pregnancies.

The committee also noted that while there is an increased risk of shoulder dystocia when it is suspected that the baby is large for gestational age, a significant proportion of shoulder dystocia cases occur in babies weighing less than 4000 g. Large for gestational age is only confirmed at birth and the clinical diagnosis is inaccurate meaning that a directed decision on mode of birth would often subsequently be shown not to be warranted.

The committee considered that the most cost effective mode of birth was not clear, given the limitations in the clinical and cost effectiveness evidence. They therefore thought it reasonable to offer a choice of mode of birth to women with a suspected large-for-gestational-age baby.

Practice is thought to be varied and it is difficult to gauge the impact of the recommendations on future NHS costs. Most large-for-gestational-age babies are born to women with diabetes, a condition that is outside the scope of this guideline. The number of suspected large-for-gestational-age babies presenting in labour and, therefore, the number of women affected by this recommendation is thought to be relatively small.

### **Other factors the committee took into account**

The committee discussed that the [2015 Montgomery versus Lanarkshire Health Board Judgment of the UK Supreme Court](#) was particularly relevant in the considerations addressed in this review because it arose in the context of a large-for-gestational-age baby (albeit in a pregnancy complicated by type 1 diabetes, which is

outside the guideline scope). The principle of informed choice is, therefore, central to the recommendations developed by the committee.

## References

### **Aberg 2016**

Åberg K, Norman M, Pettersson K, Ekéus C. Vacuum extraction in fetal macrosomia and risk of neonatal complications: a population-based cohort study. *Acta Obstet Gynecol Scand.* 95(10):1089-96, 2016

### **Alsunnari 2005**

Alsunnari S1, Berger H, Sermer M, Seaward G, Kelly E, Farine D. Obstetric outcome of extreme macrosomia. *J Obstet Gynaecol Can.* 27(4):323-8, 2005

### **Flamm 1989**

Flamm BL, Goings JR. Vaginal birth after cesarean section: is suspected fetal macrosomia a contraindication? *Obstet Gynecol.* 74(5):694-7, 1989

### **Lipscomb 1995**

Lipscomb KR, Gregory K, Shaw K. The outcome of macrosomic infants weighing at least 4500 grams: Los Angeles County + University of Southern California experience. *Obstet Gynecol.* 85(4):558-64, 1995

### **Menticoglou 1992**

Menticoglou SM, Manning FA, Morrison I, Harman CR. Must macrosomic fetuses be delivered by a caesarean section? A review of outcome for 786 babies greater than or equal to 4,500 g. *Aust N Z J Obstet Gynaecol.* 32(2):100-3, 1992

### **Vercellini 2015**

Vercellini P, Fumagalli M, Consonni D, de Braud L, Barbara G, Iurlaro E, Mosca F, Fedele L. Historic cohort study on mode of delivery of a macrosomic baby: the women's point of view. *Acta Obstet Gynecol Scand.* 94(11):1235-44, 2015

# Appendices

## Appendix A – Review protocol

### Intrapartum care for women with a large-for-gestational age baby – mode of birth

Item	Details	Working notes
Area in the scope	Women at high risk of adverse outcomes for themselves and/or their baby because of obstetric complications or other reasons – intrapartum care for women with a large-for-gestational age baby – mode of birth	
Review question in the scope	What is the optimal mode of birth (emergency caesarean section or continuation of labour) for women with a large-for-gestational-age baby?	
Review question for the guideline	What is the optimal mode of birth (emergency caesarean section or continuation of labour) for women with a large-for-gestational-age baby?	
Objective	The aim of this review is to determine the optimal mode of birth (emergency caesarean section or continuation of labour) for women in labour with a large-for-gestational-age baby. This is an important topic because in England and Wales, 11.1% of live births were high birthweight (more than 4 kg) in 2015 (ONS 2016)	
Population and directness	<p>Women in labour with a (suspected) large-for-gestational-age baby.</p> <p>Large-for-gestational age as defined in the studies.</p> <p>Studies involving women with a diagnosis of diabetes during pregnancy will be excluded.</p> <p>Studies in which up to 34% of the women have diabetes will be included. Evidence in which any of the women have diabetes should be downgraded for indirectness.</p> <p>Studies in which any of the women have multiple pregnancy should be excluded.</p>	•
Intervention	Emergency (unscheduled or unplanned) caesarean section	
Comparison	Continuation of labour as per the NICE guideline on intrapartum care for healthy women and babies (CG190)	
Outcomes	<p>Critical outcomes:</p> <ul style="list-style-type: none"> <li>• for the woman: <ul style="list-style-type: none"> <li>○ major morbidities (major haemorrhage, bladder and bowel injury, sepsis, thromboembolic disease, obstetric anal sphincter injury (OASI), pelvic girdle pain, pubic symphysis diastasis, or shoulder dystocia)</li> </ul> </li> <li>• for the baby: <ul style="list-style-type: none"> <li>○ mortality</li> <li>○ major morbidities (birth injuries, brachial plexus injuries, intracranial haemorrhage, hypoxic ischaemic</li> </ul> </li> </ul>	

Item	Details	Working notes
	<p>encephalopathy (HIE), cerebral palsy/ neurodevelopmental disability/developmental delay, or neonatal seizures)</p> <p>Important outcomes:</p> <ul style="list-style-type: none"> <li>• for the woman: <ul style="list-style-type: none"> <li>○ admission to HDU/ITU and duration of hospital stay</li> <li>○ woman's experience of labour and birth, including experience of the birth companion, separation of the woman and baby and breastfeeding initiation</li> </ul> </li> <li>• for the baby: <ul style="list-style-type: none"> <li>○ admission to NICU and duration of hospital stay</li> </ul> </li> </ul>	
Importance of outcomes	<p>Preliminary classification of the outcomes for decision making:</p> <ul style="list-style-type: none"> <li>• critical (up to 3 outcomes)</li> <li>• important but not critical (up to 3 outcomes)</li> <li>• of limited importance (1 outcome)</li> </ul>	
Setting	All birth settings	
Stratified, subgroup and adjusted analyses	<p>Groups that will be reviewed and analysed separately:</p> <ul style="list-style-type: none"> <li>• induction of labour versus spontaneous labour</li> <li>• BMI</li> </ul> <p>In the presence of heterogeneity, the following subgroups will be considered for sensitivity analysis:</p> <ul style="list-style-type: none"> <li>○ weight charts used in the study to define large for gestational age (for example, birth centiles for weight in the UK-WHO growth charts or other)</li> <li>○ gestational age</li> </ul> <p>Potential confounders:</p> <ul style="list-style-type: none"> <li>• size of the baby</li> <li>• diabetes</li> <li>• maternal age</li> <li>• gestational age</li> <li>• fetal sex</li> <li>• ethnicity</li> <li>• BMI</li> <li>• maternal height</li> <li>• parity</li> <li>• previous caesarean section</li> <li>• previous adverse outcomes</li> <li>• birthweight of previous babies</li> </ul>	
Language	English	
Study design	<ul style="list-style-type: none"> <li>• Published full text papers only</li> <li>• Systematic reviews</li> <li>• RCTs</li> <li>• Only if RCTs unavailable or there is limited data to inform decision making:</li> </ul>	

Item	Details	Working notes
	<ul style="list-style-type: none"> <li>○ prospective or retrospective comparative observational studies (including cohort and case-control studies)</li> <li>● Prospective study designs will be prioritised over retrospective study designs</li> <li>● Conference abstracts will not be considered</li> <li>● Qualitative or cross-sectional studies for outcome of woman's experience of labour and birth</li> </ul>	
Search strategy	<p>Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA and Embase.</p> <p>Limits (e.g. date, study design): All study designs. Apply standard animal/non-English language filters. No date limit.</p> <p>Supplementary search techniques: No supplementary search techniques were used.</p> <p>See Appendix B – Literature search strategies for full strategies</p>	
Review strategy	<p>Appraisal of methodological quality:</p> <ul style="list-style-type: none"> <li>● the methodological quality of each study will be assessed using checklists recommended in the NICE guidelines manual 2014 (for example, AMSTAR or ROBIS for systematic reviews, and Cochrane RoB tool for RCTs) and the quality of the evidence for each outcome (that is, across studies) will be assessed using GRADE</li> <li>● if studies report only p-values, this information will be recorded in GRADE tables without an assessment of imprecision</li> </ul> <p>Synthesis of data:</p> <ul style="list-style-type: none"> <li>● meta-analysis will be conducted where appropriate</li> <li>● default MID<sub>s</sub> will be used; 0.8 and 1.25 for dichotomous outcomes; 0.5 times the SD of the measurement in the control arm (or median score across control arms if multiple studies are included) for continuous outcomes</li> <li>● for continuous data, change scores will be used in preference to final scores for data from non-RCT studies; final and change scores will not be pooled; if any study reports both, the method used in the majority of studies will be adopted</li> </ul>	<p>Review questions selected as high priorities for health economic analysis (and those selected as medium priorities and where health economic analysis could influence recommendations) will be subject to dual weeding and study selection; any discrepancies will be resolved through discussion between the first and second reviewers or by reference to a third person. This review question was prioritised for health economic analysis and so formal dual weeding and study selection (inclusion/exclusion) will be undertaken. Additionally, internal (NGA) quality assurance processes will include consideration of the outcomes of weeding, study selection and data extraction and the committee will review the results of study</p>

Item	Details	Working notes
		selection and data extraction
Equalities	<p>Equalities considerations will be considered systematically in relation to the available evidence and draft recommendations.</p> <p>The guideline scope includes women with cognitive or physical disability as populations for whom there may be equalities issues.</p> <p>Women who have received no antenatal care will be considered as a subgroup for all systematic reviews performed within the medical conditions work stream and a specific question has been included in the obstetric complications work stream for this population</p>	
Notes/additional information	<ul style="list-style-type: none"> <li>• Statistical bulletin: Birth characteristics in England and Wales: 2015. Live births by sex, ethnicity and month. Maternities by place of birth and with multiple births. Stillbirths by age of parents and quarter, 2016, Office for National Statistics (<a href="https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2015#birthweight">https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2015#birthweight</a>)</li> <li>• Cole TJ, Williams AF, Wright CM. Revised birth centiles for weight, length and head circumference in the UK-WHO growth charts. <i>Ann Hum Biol</i> 2011; 38:7–11. doi:10.3109/03014460.2011.544139</li> <li>• Boulvain et al. Induction of labour versus expectant management for large-for-date fetuses: a randomised controlled trial. <i>Lancet</i>. 2015, 385(9987):2600-5</li> <li>• Inducing labour. Clinical guideline [CG70], 2008 (<a href="https://www.nice.org.uk/guidance/cg70/chapter/1-guidance">https://www.nice.org.uk/guidance/cg70/chapter/1-guidance</a>)</li> <li>• Diabetes in pregnancy: management from preconception to the postnatal period. NICE guideline [NG3], 2015 (<a href="https://www.nice.org.uk/guidance/ng3/resources/diabetes-in-pregnancy-management-from-preconception-to-the-postnatal-period-pdf-51038446021">https://www.nice.org.uk/guidance/ng3/resources/diabetes-in-pregnancy-management-from-preconception-to-the-postnatal-period-pdf-51038446021</a>)</li> </ul>	
Key papers	None identified by the committee	

AMSTAR: Assessing the Methodological Quality of Systematic Reviews; BMI: body mass index; CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; CS: caesarean section; DARE: Database of Abstracts of Reviews of Effects; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HDU: high dependency unit; HTA: Health Technology Assessment; ITU: intensive therapy unit; LGA: large for gestational age; MID: minimal important difference; NGA: National Guideline Alliance; NICE: National Institute for Health and Care Excellence; NICU: neonatal intensive care unit; RCT: randomised controlled trial; RoB: risk of bias; ROBIS: Risk of Bias in Systematic Reviews; SD: standard deviation; UK: United Kingdom; WHO: World Health Organization



## Appendix B – Literature search strategies

### Intrapartum care for women with a large-for-gestational age baby – mode of birth

Database: Medline; Medline Epub Ahead of Print; and Medline In-Process & Other Non-Indexed Citations

#	Searches
1	FETAL MACROSOMIA/
2	macrosomia?.ti,ab.
3	(large adj3 gestational adj3 age?).ab,ti.
4	(large adj3 date?).ab,ti.
5	or/1-4
6	exp CESAREAN SECTION/
7	(c?esar#an\$ or c section\$ or csection\$ or (deliver\$ adj3 abdom\$)).ti,ab.
8	or/6-7
9	LABOR, OBSTETRIC/
10	((vagina\$ or spontaneous\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
11	((expect\$ or continu\$) adj3 labo?r\$).ti,ab.
12	or/9-11
13	LABOR, INDUCED/
14	(induc\$ adj3 (labo?r\$ or birth\$ or born or deliver\$)).ti,ab.
15	or/13-14
16	exp EXTRACTION, OBSTETRICAL/
17	((extract\$ or vacuum\$) adj3 (birth\$ or born or deliver\$ or obstetric\$)).ti,ab.
18	(vacuum\$ adj3 extract\$).ti,ab.
19	ventouse?.ti,ab.
20	OBSTETRICAL FORCEPS/
21	forcep?.ti,ab.
22	((assist\$ or instrument\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
23	or/16-22
24	"TRIAL OF LABOR"/
25	(trial adj3 labo?r\$).ti,ab.
26	or/24-25
27	*DELIVERY, OBSTETRIC/mt [Methods]
28	(mode? adj3 birth?).ti,ab.
29	((route? or mode?) adj3 deliver\$).ti,ab.
30	or/27-29
31	5 and 8 and 12
32	5 and 8 and 15
33	5 and 8 and 23

#	Searches
34	5 and 26
35	5 and 30
36	or/31-35
37	limit 36 to english language
38	LETTER/
39	EDITORIAL/
40	NEWS/
41	exp HISTORICAL ARTICLE/
42	ANECDOTES AS TOPIC/
43	COMMENT/
44	CASE REPORT/
45	(letter or comment*).ti.
46	or/38-45
47	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
48	46 not 47
49	ANIMALS/ not HUMANS/
50	exp ANIMALS, LABORATORY/
51	exp ANIMAL EXPERIMENTATION/
52	exp MODELS, ANIMAL/
53	exp RODENTIA/
54	(rat or rats or mouse or mice).ti.
55	or/48-54
56	37 not 55

#### Database: Cochrane Central Register of Controlled Trials

#	Searches
1	FETAL MACROSOMIA/
2	macrosomia?.ti,ab,kw.
3	(large adj3 gestational adj3 age?).ab,ti.
4	(large adj3 date?).ab,ti.
5	or/1-4
6	exp CESAREAN SECTION/
7	(c?esar#an\$ or c section\$ or csection\$ or (deliver\$ adj3 abdom\$)).ti,ab.
8	or/6-7
9	LABOR, OBSTETRIC/
10	((vagina\$ or spontaneous\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
11	((expect\$ or continu\$) adj3 labo?r\$).ti,ab.
12	or/9-11
13	LABOR, INDUCED/
14	(induc\$ adj3 (labo?r\$ or birth\$ or born or deliver\$)).ti,ab.

#	Searches
15	or/13-14
16	exp EXTRACTION, OBSTETRICAL/
17	((extract\$ or vacuum\$) adj3 (birth\$ or born or deliver\$ or obstetric\$)).ti,ab.
18	(vacuum\$ adj3 extract\$).ti,ab.
19	ventouse?.ti,ab,kw.
20	OBSTETRICAL FORCEPS/
21	forcep?.ti,ab,kw.
22	((assist\$ or instrument\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
23	or/16-22
24	"TRIAL OF LABOR"/
25	(trial adj3 labo?r\$).ti,ab.
26	or/24-25
27	*DELIVERY, OBSTETRIC/mt [Methods]
28	(mode? adj3 birth?).ti,ab.
29	((route? or mode?) adj3 deliver\$).ti,ab.
30	or/27-29
31	5 and 8 and 12
32	5 and 8 and 15
33	5 and 8 and 23
34	5 and 26
35	5 and 30
36	or/31-35

#### Database: Cochrane Database of Systematic Reviews

#	Searches
1	FETAL MACROSOMIA.kw.
2	macrosomia?.ti,ab.
3	(large adj3 gestational adj3 age?).ab,ti.
4	(large adj3 date?).ab,ti.
5	or/1-4
6	CESAREAN SECTION.kw.
7	(c?esar#an\$ or c section\$ or csection\$ or (deliver\$ adj3 abdom\$)).ti,ab.
8	or/6-7
9	LABOR, OBSTETRIC.kw.
10	((vagina\$ or spontaneous\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
11	((expect\$ or continu\$) adj3 labo?r\$).ti,ab.
12	or/9-11
13	LABOR, INDUCED.kw.
14	(induc\$ adj3 (labo?r\$ or birth\$ or born or deliver\$)).ti,ab.
15	or/13-14

#	Searches
16	EXTRACTION, OBSTETRICAL.kw.
17	((extract\$ or vacuum\$) adj3 (birth\$ or born or deliver\$ or obstetric\$)).ti,ab.
18	(vacuum\$ adj3 extract\$).ti,ab.
19	ventouse?.ti,ab.
20	OBSTETRICAL FORCEPS.kw.
21	forcep?.ti,ab.
22	((assist\$ or instrument\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
23	or/16-22
24	"TRIAL OF LABOR".kw.
25	(trial adj3 labo?r\$).ti,ab.
26	or/24-25
27	(mode? adj3 birth?).ti,ab.
28	((route? or mode?) adj3 deliver\$).ti,ab.
29	or/27-28
30	5 and 8 and 12
31	5 and 8 and 15
32	5 and 8 and 23
33	5 and 26
34	5 and 29
35	or/30-34

#### Database: Database of Abstracts of Reviews of Effects

#	Searches
1	FETAL MACROSOMIA.kw.
2	macrosomia?.tw,tx.
3	(large adj3 gestational adj3 age?).tw,tx.
4	(large adj3 date?).tw,tx.
5	or/1-4
6	CESAREAN SECTION.kw.
7	(c?esar#an\$ or c section\$ or csection\$ or (deliver\$ adj3 abdom\$)).tw,tx.
8	or/6-7
9	LABOR, OBSTETRIC.kw.
10	((vagina\$ or spontaneous\$) adj3 (birth\$ or born or deliver\$)).tw,tx.
11	((expect\$ or continu\$) adj3 labo?r\$).tw,tx.
12	or/9-11
13	LABOR, INDUCED.kw.
14	(induc\$ adj3 (labo?r\$ or birth\$ or born or deliver\$)).tw,tx.
15	or/13-14
16	EXTRACTION, OBSTETRICAL.kw.
17	((extract\$ or vacuum\$) adj3 (birth\$ or born or deliver\$ or obstetric\$)).tw,tx.

#	Searches
18	(vacuum\$ adj3 extract\$).tw,tx.
19	ventouse?.tw,tx.
20	OBSTETRICAL FORCEPS.kw.
21	forcep?.tw,tx.
22	((assist\$ or instrument\$) adj3 (birth\$ or born or deliver\$)).tw,tx.
23	or/16-22
24	"TRIAL OF LABOR".kw.
25	(trial adj3 labo?r\$).tw,tx.
26	or/24-25
27	(mode? adj3 birth?).tw,tx.
28	((route? or mode?) adj3 deliver\$).tw,tx.
29	or/27-28
30	5 and 8 and 12
31	5 and 8 and 15
32	5 and 8 and 23
33	5 and 26
34	5 and 29
35	or/30-34

#### Database: Health Technology Assessment

#	Searches
1	FETAL MACROSOMIA/
2	macrosomia?.tw.
3	(large adj3 gestational adj3 age?).tw.
4	(large adj3 date?).tw.
5	or/1-4
6	exp CESAREAN SECTION/
7	(c?esar#an\$ or c section\$ or csection\$ or (deliver\$ adj3 abdom\$)).tw.
8	or/6-7
9	LABOR, OBSTETRIC/
10	((vagina\$ or spontaneous\$) adj3 (birth\$ or born or deliver\$)).tw.
11	((expect\$ or continu\$) adj3 labo?r\$).tw.
12	or/9-11
13	LABOR, INDUCED/
14	(induc\$ adj3 (labo?r\$ or birth\$ or born or deliver\$)).tw.
15	or/13-14
16	exp EXTRACTION, OBSTETRICAL/
17	((extract\$ or vacuum\$) adj3 (birth\$ or born or deliver\$ or obstetric\$)).tw.
18	(vacuum\$ adj3 extract\$).tw.
19	ventouse?.tw.

#	Searches
20	OBSTETRICAL FORCEPS/
21	forcep?.tw.
22	((assist\$ or instrument\$) adj3 (birth\$ or born or deliver\$)).tw.
23	or/16-22
24	"TRIAL OF LABOR"/
25	(trial adj3 labo?r\$).tw.
26	or/24-25
27	*DELIVERY, OBSTETRIC/mt [Methods]
28	(mode? adj3 birth?).tw.
29	((route? or mode?) adj3 deliver\$).tw.
30	or/27-29
31	5 and 8 and 12
32	5 and 8 and 15
33	5 and 8 and 23
34	5 and 26
35	5 and 30
36	or/31-35

#### Database: Embase

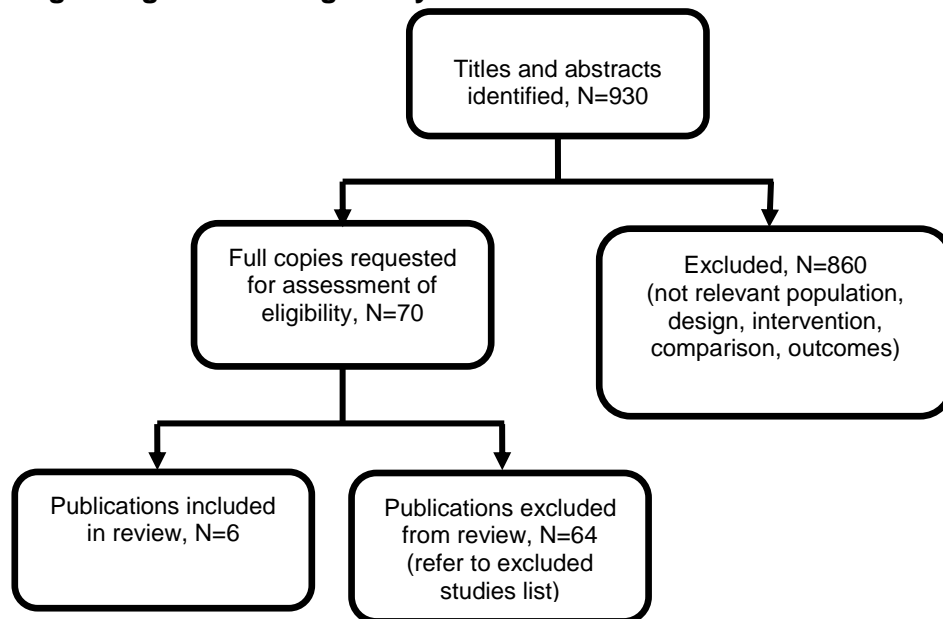
#	Searches
1	*MACROSOMIA/
2	macrosomia?.ti,ab.
3	(large adj3 gestational adj3 age?).ab,ti.
4	(large adj3 date?).ab,ti.
5	or/1-4
6	exp *CESAREAN SECTION/
7	(c?esar#an\$ or c section\$ or csection\$ or (deliver\$ adj3 abdom\$)).ti,ab.
8	or/6-7
9	*LABOR/
10	*VAGINAL DELIVERY/
11	((vagina\$ or spontaneous\$) adj1 (birth\$ or born or deliver\$)).ti,ab.
12	((expect\$ or continu\$) adj3 labo?r\$).ti,ab.
13	or/9-12
14	*LABOR INDUCTION/
15	(induc\$ adj3 (labo?r\$ or birth\$ or born or deliver\$)).ti,ab.
16	or/14-15
17	*VACUUM EXTRACTION/
18	((extract\$ or vacuum\$) adj3 (birth\$ or born or deliver\$ or obstetric\$)).ti,ab.
19	(vacuum\$ adj3 extract\$).ti,ab.
20	ventouse?.ti,ab.

#	Searches
21	*FORCEPS DELIVERY/
22	*OBSTETRICAL FORCEPS/
23	forcep?.ti,ab.
24	((assist\$ or instrument\$) adj3 (birth\$ or born or deliver\$)).ti,ab.
25	or/17-24
26	"TRIAL OF LABOR"/
27	(trial adj3 labo?r\$).ti,ab.
28	or/26-27
29	(mode? adj3 birth?).ti,ab.
30	((route? or mode?) adj3 deliver\$).ti,ab.
31	or/29-30
32	5 and 8 and 13
33	5 and 8 and 16
34	5 and 8 and 25
35	5 and 28
36	5 and 31
37	or/32-36
38	limit 37 to english language
39	letter.pt. or LETTER/
40	note.pt.
41	editorial.pt.
42	CASE REPORT/ or CASE STUDY/
43	(letter or comment*).ti.
44	or/39-43
45	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
46	44 not 45
47	ANIMAL/ not HUMAN/
48	NONHUMAN/
49	exp ANIMAL EXPERIMENT/
50	exp EXPERIMENTAL ANIMAL/
51	ANIMAL MODEL/
52	exp RODENT/
53	(rat or rats or mouse or mice).ti.
54	or/46-53
55	38 not 54

## Appendix C – Clinical evidence study selection

### Intrapartum care for women with a large-for-gestational age baby – mode of birth

Figure 1: Flow diagram of clinical article selection for intrapartum care for women with a large-for-gestational age baby – mode of birth





## Appendix D – Excluded studies

### Intrapartum care for women with a large-for-gestational age baby – mode of birth

#### Clinical studies

Study	Reason for exclusion
Autuori, M. C., Avagliano, L., Bozzetti, P., Morabito, A., Mansour, M., Marconi, A. M., Outcome of induction of labor in relation to clinical indication: Retrospective analysis of 1721 patients, <i>Reproductive Sciences</i> , 19, 126A, 2012	Conference abstract
Aviram, A., Gabbay-Benziv, R., Hirsch, L., Ashwal, E., Hadar, E., Shmueli, A., Wiznitzer, A., Yogev, Y., Similar, yet not the same: Pregnancy outcome of LGA newborns stratified by the presence or absence of GDM, <i>American Journal of Obstetrics and Gynecology</i> , 216, S339-S340, 2017	Poster
Bailey, C., Kalu, E., Fetal macrosomia in non-diabetic mothers: Antenatal diagnosis and delivery outcome, <i>Journal of Obstetrics and Gynaecology</i> , 29, -208, 2009	Not relevant comparison, that is, comparison of the outcomes between women with suspected macrosomia in the antenatal period versus those women who were not diagnosed as having a macrosomic baby
Basit, I., Ciprike, V., Butler, M., Daly, S., Geary, M., The antenatal and peripartum management of pregnancies with macrosomic babies weighing >5000 g at two tertiary hospitals: A dublin experience, <i>Archives of Disease in Childhood: Fetal and Neonatal Edition</i> , 95, 2010	Conference abstract
Berard, J., Dufour, P., Vinatier, D., Subtil, D., Vanderstichele, S., Monnier, J.C., Puech, F., Fetal macrosomia: risk factors and outcome. A study of the outcome concerning 100 cases >4500 g, <i>European Journal of Obstetrics, Gynecology, and Reproductive Biology</i> , 77, 51-59, 1998	No data reported for the relevant subgroup, that is, caesarean section group includes a mixed population - those with an elective caesarean section and those with failed trial of labour. Moreover, fetal macrosomia was suspected in 76% of the population
Berkus, M. D., Conway, D., Langer, O., The large fetus, <i>Clinical Obstetrics &amp; Gynecology</i> , 42, 766-84, 1999	The article describes factors associated with macrosomic births, their management and associated complications
Bjorstad, A.R., Irgens-Hansen, K., Daltveit, A.K., Irgens, L.M., Macrosomia: mode of delivery and pregnancy outcome, <i>Acta Obstetrica et Gynecologica Scandinavica</i> , 89, 664-669, 2010	No data for the emergency caesarean section subgroup
Boulet, S. L., Salihi, H. M., Alexander, G. R., Mode of delivery and birth outcomes of macrosomic infants, <i>Journal of Obstetrics and Gynaecology</i> , 24, 622-629, 2004	Literature review. Relevant studies from this review were assessed separately for inclusion
Boulet, S.L., Salihi, H.M., Alexander, G.R., Mode of delivery and the survival of macrosomic infants in the	Not relevant comparison, that is, comparison of mode of birth between the

Study	Reason for exclusion
United States, 1995-1999, Birth: Issues in Perinatal Care, 33, 278-283, 2006	different weight groups of babies. It is not stated in the article whether caesarean sections performed were elective or emergency. However, it is highly likely that the study authors meant elective caesarean sections as they mentioned "prophylactic cesarean delivery"
Boyd, M. E., Usher, R. H., McLean, F. H., Fetal macrosomia: prediction, risks, proposed management, Obstetrics & Gynecology, 61, 715-22, 1983	Not the question of interest. The article compares the incidence of birth-related outcomes in different weight groups between 2 time periods (1963-1965 and 1978-1980) and factors associated with these outcomes. Also, it is not stated in the article whether caesarean sections performed were elective or emergency
Brown, K., Redfearn, C., MacLeod-Thompson, A., Ross, G., Stone, S., Management of large for gestational age fetuses and accuracy of ultrasound-a comparison of results between two Trusts in the South East of England, BJOG: An International Journal of Obstetrics and Gynaecology, 124, 128, 2017	Conference abstract
Carlsson Fagerberg, M., Influence of the indication for the first cesarean delivery on the second delivery trial of labor failure rate, Journal of Maternal-Fetal and Neonatal Medicine, 25, 100, 2012	Conference abstract
Chauhan, S. P., Grobman, W. A., Gherman, R. A., Chauhan, V. B., Chang, G., Magann, E. F., Hendrix, N. W., Suspicion and treatment of the macrosomic fetus: a review, American Journal of Obstetrics & Gynecology, 193, 332-46, 2005	The article describes the time trends in the prevalence of macrosomia and the detection of macrosomia
Cheung, T. H., Leung, A., Chang, A., Macrosomic babies, Australian & New Zealand Journal of Obstetrics & Gynaecology, 30, 319-22, 1990	The article examines clinical parameters associated with shoulder dystocia and neonatal morbidity in macrosomic babies
Delpapa, E.H., Mueller-Heubach, E., Pregnancy outcome following ultrasound diagnosis of macrosomia, Obstetrics and Gynecology, 78, 340-343, 1991	Not the question of interest. The article assesses the accuracy of birthweight prediction by ultrasound examination; no data for a relevant subgroup
Diani, F., Venanzi, S., Zanconato, G., Murari, S., Moscatelli, C., Turinetto, A., Fetal macrosomia and management of delivery, Clinical and Experimental Obstetrics and Gynecology, 24, 212-214, 1997	A description of neonatal and maternal outcomes in relation to mode of birth in macrosomic pregnancies. No data for the relevant subgroups
Doherty, L. J., Chandranath, D. I., Fetal macrosomia at delivery-outcomes in RJMS, BJOG: An International Journal of Obstetrics and Gynaecology, 120, 157, 2013	Conference abstract
Ekeus, C., Aberg, K., Pettersson, K., Norman, M., Vacuum extraction in fetal macrosomia and risk for neonatal complications: A population-based cohort study, Journal of Perinatal Medicine. Conference: 12th World Congress of Perinatal Medicine, 43, 2015	Conference abstract

Study	Reason for exclusion
Ferreira, L., Mourinho, V., Oliveira, C., Cruz, C., Lobo, I., Viseu, O., Macrossomia, a 3 year review, <i>Journal of Maternal-Fetal and Neonatal Medicine</i> , 23, 236, 2010	Poster
Fox, N. S., Matthews, K. C., Williamson, J., Gupta, S., Lam-Rachlin, J., Saltzman, D. H., Rebarber, A., The effect of a sonographic estimated fetal weight on the risk of cesarean delivery in macrosomic and small for gestational age infants, <i>American Journal of Obstetrics and Gynecology</i> , 214, S270, 2016	Poster
Froehlich, R., Simhan, H., Larkin, J., An outcomes-based approach to defining macrosomia, <i>American Journal of Obstetrics and Gynecology</i> , 210, S77, 2014	Poster
Galvin, D. M., Burke, N., Burke, G., Breathnach, F., McAuliffe, F., Morrison, J., Turner, M., Dornan, S., Higgins, J., Cotter, A., Geary, M., Cody, F., Mulcahy, C., Daly, S., Dicker, P., Tully, E., Malone, F., Accuracy of prenatal detection of macrosomia >4,000g and outcomes in the absence of intervention: Results of the prospective multicenter genesis study, <i>American Journal of Obstetrics and Gynecology</i> , 216, S68, 2017	Conference abstract
Ghi, T., Dall'Asta, A., Suprani, A., Aiello, E., Musaro, A., Bosi, C., Pedrazzi, G., Kiener, A., Arduini, D., Frusca, T., Rizzo, G., Correlation between Subpubic Arch Angle and Mode of Delivery in Large-for-Gestational-Age Fetuses, <i>Fetal Diagnosis and Therapy</i> , 2017	No relevant outcomes reported
Gonen, R., Bader, D., Ajami, M., Effects of a policy of elective cesarean delivery in cases of suspected fetal macrosomia on the incidence of brachial plexus injury and the rate of cesarean delivery, <i>American Journal of Obstetrics &amp; Gynecology</i> , 183, 1296-300, 2000	No data for the relevant subgroup
Gregory, K. D., Henry, O. A., Ramicone, E., Chan, L. S., Platt, L. D., Maternal and infant complications in high and normal weight infants by method of delivery, <i>Obstetrics and Gynecology</i> , 92, 507-513, 1998	A cross-sectional study that estimates population risks associated with macrosomia
Haram, K., Pirhonen, J., Bergsjö, P., Suspected big baby: A difficult clinical problem in obstetrics, <i>Acta Obstetrica et Gynecologica Scandinavica</i> , 81, 185-194, 2002	Literature review. Relevant studies from this review were assessed separately for inclusion
Hehir, M. P., McHugh, A. F., Maguire, P. J., Mahony, R., Extreme macrosomia - Obstetric outcomes and complications in birthweights >5000 g, <i>Australian and New Zealand Journal of Obstetrics and Gynaecology</i> , 55, 42-46, 2015	Not relevant comparison, that is, mode of birth between nulliparous and multiparous women
Holzer, I., Lehner, R., Ristl, R., Husslein, P. W., Berger, A., Farr, A., Effect of delivery mode on neonatal outcome among preterm infants: an observational study, <i>Wiener Klinische Wochenschrift</i> , 1-6, 2016	No data for the relevant subgroup reported, that is, caesarean section group includes a mixed population - those with elective and unplanned caesarean sections. Also all the babies were preterm

Study	Reason for exclusion
Janevski, M. R., Popovic, A., Pavlovic, N., Ristic, M., Preterm infant and cesarean section: Effect on neonatal outcome, <i>Journal of Perinatal Medicine</i> , 45, 210, 2017	Conference abstract
Jaschevatzky, O. E., Mor, G., Miller, M., Avinery, R., Grunstein, S., Risk in the vaginal delivery of the large fetus, <i>Australian and New Zealand Journal of Obstetrics and Gynaecology</i> , 24, 178-181, 1984	Not relevant comparison, that is, comparison between macrosomic and normal weight babies regarding obstetric outcomes. Mode of birth is an outcome
Jastrow, N., Roberge, S., Gauthier, R.J., Laroche, L., Duperron, L., Brassard, N., Bujold, E., Effect of birth weight on adverse obstetric outcomes in vaginal birth after cesarean delivery, <i>Obstetrics and Gynecology</i> , 115, 338-343, 2010	Not relevant comparison, that is, comparison of obstetric outcomes between different birthweights of babies
Jeremic, K., The complications of deliveries with fetal macrosomia, <i>International Journal of Gynecology and Obstetrics</i> , 131, E69, 2015	Conference abstract
Kolderup, L. B., Laros, R. K., Jr., Musci, T. J., Incidence of persistent birth injury in macrosomic infants: Association with mode of delivery, <i>American Journal of Obstetrics and Gynecology</i> , 177, 37-41, 1997	Not relevant comparison, that is, birth injuries by mode of birth. Caesarean section is not defined
Lim, J. H., Tan, B. C., Jammal, A. E., Symonds, E. M., Delivery of macrosomic babies: management and outcomes of 330 cases, <i>Journal of Obstetrics &amp; Gynaecology</i> , 22, 370-4, 2002	A mixed study population, that is, it includes women with elective and non-elective caesarean sections. No data reported for the relevant subgroups
Linder, N., Lahat, Y., Kogan, A., Fridman, E., Kouadio, F., Melamed, N., Yogev, Y., Klinger, G., Macrosomic newborns of non-diabetic mothers: anthropometric measurements and neonatal complications, <i>Archives of Disease in Childhood Fetal &amp; Neonatal Edition</i> , 99, F353-8, 2014	Not relevant comparison, that is, macrosomic babies versus normal weight babies; mode of birth is an outcome
Maher, M. H. K., Soltani, R., Zeinalzadeh, A. H., Pourasghar, S., Complications and risk factors of neonatal macrosomia: A case-control study, <i>Iranian Journal of Neonatology</i> , 9, 24-28, 2018	No relevant outcomes reported
Mahony, R., Walsh, C., Foley, M.E., Daly, L., O'Herlihy, C., Outcome of second delivery after prior macrosomic infant in women with normal glucose tolerance, <i>Obstetrics and Gynecology</i> , 107, 857-862, 2006	Not relevant comparison, that is, macrosomic babies versus normal weight babies. Mode of birth is an outcome
McFarland, L. V., Raskin, M., Daling, J. R., Benedetti, T. J., Erb/Duchenne's palsy: A consequence of fetal macrosomia and method of delivery, <i>Obstetrics and Gynecology</i> , 68, 784-788, 1986	Not relevant comparison. Mode of birth is an outcome
Mikulandra, F., Perisa, M., Stojnic, E., When is fetal macrosomia (> or = 4500 g) an indication for caesarean section?, <i>Zentralblatt fur Gynakologie</i> , 118, 441-7, 1996	No data for the relevant subgroup reported, that is, caesarean group includes a mixed population - those with elective and emergency caesarean sections

Study	Reason for exclusion
Mocanu, E. V., Greene, R. A., Byrne, B. M., Turner, M. J., Obstetric and neonatal outcome of babies weighing more than 4.5 kg: an analysis by parity, <i>European Journal of Obstetrics, Gynecology, &amp; Reproductive Biology</i> , 92, 229-33, 2000	Not relevant comparison, that is, mode of birth by parity; no data by the relevant subgroup
Nassar, A. H., Usta, I. M., Khalil, A. M., Melhem, Z. I., Nakad, T. I., Abu Musa, A. A., Fetal macrosomia (> or =4500 g): perinatal outcome of 231 cases according to the mode of delivery, <i>Journal of Perinatology</i> , 23, 136-41, 2003	The caesarean section group includes a mixed population of women, that is, those with emergency and non-emergency caesarean sections
Navti, O. B., Ndumbe, F. M., Konje, J. C., The peripartum management of pregnancies with macrosomic babies weighing > or =4,500 g at a tertiary University Hospital, <i>Journal of Obstetrics &amp; Gynaecology</i> , 27, 267-70, 2007	Not relevant comparison, that is, comparison of obstetric outcomes between different fetal size groups
Onwude, J.L., Rao, S., Selo-Ojeme, D.O., Large babies and unplanned Caesarean delivery, <i>European Journal of Obstetrics, Gynecology, and Reproductive Biology</i> , 118, 36-39, 2005	Not relevant comparison, that is, macrosomic babies versus normal weight babies. Mode of birth is an outcome
Oueslati, D., Chelli, D., Vaginal delivery of a macrosomia: What maternal-fetal risk?, <i>International Journal of Gynecology and Obstetrics</i> , 119, S815, 2012	Poster
Palumbo, M. A., Fauzia, M., Gulino, F. A., Di Grazia, F. M., Giunta, M. R., Giannone, T. T., Grasso, F., Zarbo, G., Macrosomia: Effect, predictive maternal factor, neonatal complications. Our casuistry, <i>Giornale Italiano di Ostetricia e Ginecologia</i> , 35, 453-456, 2013	The article describes the incidence of and predictive factors for fetal macrosomia. Not stated whether caesarean sections were elective or emergency
Peleg, D., Warsof, S., Wolf, M. F., Perlitz, Y., Shachar, I. B., Counseling for fetal macrosomia: an estimated fetal weight of 4,000g is excessively low, <i>American Journal of Perinatology</i> , 32, 71-74, 2015	Not relevant comparison; that is, comparison of birth outcomes between macrosomic and normal weight babies. The caesarean section group includes a mixed population of women, that is, those with emergency and non-emergency caesarean sections
Pettersen-Dahl, A., Murzakanova, G., Sandvik, L., Laine, K., Maternal body mass index as a predictor for delivery method, <i>Acta Obstetrica et Gynecologica Scandinavica</i> , 97, 212-218, 2018	Not relevant population, that is, a non-selected population of women
Raio, L., Ghezzi, F., Di Naro, E., Buttarelli, M., Franchi, M., Durig, P., Bruhwiler, H., Perinatal outcome of fetuses with a birth weight greater than 4500 g: an analysis of 3356 cases, <i>European Journal of Obstetrics, Gynecology, &amp; Reproductive Biology</i> , 109, 160-5, 2003	Not relevant comparison, that is, comparison of obstetric outcomes by intended mode of birth. No data reported for the relevant subgroup
Redfearn, C., Brown, K., Ross, G., O'Donoghue, K., Delivery outcomes of ultrasound scans indicated large for gestational age infants (>4000 g), <i>BJOG: An International Journal of Obstetrics and Gynaecology</i> , 123, 89-90, 2016	Poster

Study	Reason for exclusion
Roopnarinesingh, S., Reid, S., Ramsewak, S., Foetal macrosomia--a continuing perinatal challenge, West Indian Medical Journal, 34, 154-7, 1985	No data reported for the relevant subgroup, that is, emergency caesarean section
Rosen, H., Shmueli, A., Ashwal, E., Hirsch, L., Yogev, Y., Aviram, A., Delivery outcomes of large-for-gestational-age newborns stratified by the presence or absence of gestational diabetes mellitus, International Journal of Gynecology and Obstetrics, 141, 120-125, 2018	Not the comparison of interest, that is, comparison between women with gestational diabetes and a large-for-gestational age or normal weight baby versus those with no diabetes and a large-for-gestational age or normal weight baby. Mode of birth is an outcome
Rossi, A. C., Mullin, P., Prefumo, F., Prevention, management, and outcomes of macrosomia: a systematic review of literature and meta-analysis, Obstetrical & Gynecological Survey, 68, 702-9, 2013	Literature review. Individual relevant studies from this review were assessed separately for inclusion
Ruplinger, J., Marquardt, D. N., Clinical inquiries. Should induction of labor be considered in a woman with a macrosomic baby?, Journal of Family Practice, 50, 745-8, 2001	A narrative article and opinion piece about whether induction of labour should be considered for women with macrosomic babies
Sadeh-Mestechkin, D., Walfisch, A., Shachar, R., Shoham-Vardi, I., Vardi, H., Hallak, M., Suspected macrosomia? Better not tell, Archives of Gynecology and Obstetrics, 278, 225-230, 2008	Not relevant comparison, that is, comparison between macrosomic and normal weight babies
Sandmire, H. F., DeMott, R. K., The Green Bay cesarean section study: IV. The physician factor as a determinant of cesarean birth rates for the large fetus, American Journal of Obstetrics and Gynecology, 174, 1557-1564, 1996	Caesarean section is not defined; not clear whether it is elective or non-elective or a mixture of these
Shmueli, A., Nassie, D. I., Hirsch, L., Ashwal, E., Wiznitzer, A., Yogev, Y., Aviram, A., Prerecognition of large for gestational age (LGA) fetus and its consequences, American Journal of Obstetrics and Gynecology, 216, S150-S151, 2017	Poster
Siggelkow, W., Boehm, D., Skala, C., Grosslercher, M., Schmidt, M., Koelbl, H., The influence of macrosomia on the duration of labor, the mode of delivery and intrapartum complications, Archives of Gynecology and Obstetrics, 278, 547-553, 2008	The article assesses the impact of fetal weight on mode of birth. No data reported for the relevant subgroup
Vathanan, V., Sharma, B., Sandhu, C., Maternal and fetal outcome of macrosomia, Archives of Disease in Childhood: Fetal and Neonatal Edition, 95, 2010	Conference abstract
Vinturache, A. E., Chaput, K. H., Tough, S. C., Pre-pregnancy body mass index (BMI) and macrosomia in a Canadian birth cohort, Journal of Maternal-Fetal and Neonatal Medicine, 30, 109-116, 2017	Not relevant comparison, that is, comparison between macrosomic and normal weight babies
Walsh, C.A., Mahony, R.T., Foley, M.E., Daly, L., O'Herlihy, C., Recurrence of fetal macrosomia in non-diabetic pregnancies, Journal of Obstetrics and Gynaecology, 27, 374-378, 2007	Not relevant comparison, that is, mode of birth by birthweight



Study	Reason for exclusion
Weeks, J. W., Pitman, T., Spinnato, J. A., 2nd, Fetal macrosomia: does antenatal prediction affect delivery route and birth outcome?, American Journal of Obstetrics & Gynecology, 173, 1215-9, 1995	Not relevant comparison, that is, mode of birth by birthweight
Weissmann-Brenner,A., Simchen,M.J., Zilberberg,E., Kalter,A., Weisz,B., Achiron,R., Dulitzky,M., Maternal and neonatal outcomes of macrosomic pregnancies, Medical Science Monitor, 18, H77-H81, 2012	Not relevant comparison, that is, mode of birth by birthweight
Yan,J.S., Chang,Y.K., Yin,C.S., Elective cesarean section for macrosomia?, Chung Hua i Hsueh Tsa Chih - Chinese Medical Journal, 53, 141-145, 1994	Not relevant comparison, that is, macrosomic versus normal weight babies. Mode of birth is an outcome
Zelop,C.M., Shipp,T.D., Repke,J.T., Cohen,A., Lieberman,E., Outcomes of trial of labor following previous cesarean delivery among women with fetuses weighing >4000 g, American Journal of Obstetrics and Gynecology, 185, 903-905, 2001	Not relevant comparison, that is, macrosomic babies versus normal weight babies

### Economic studies

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

## Appendix E – Clinical evidence tables

### Intrapartum care for women with a large-for-gestational age baby – mode of birth

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p><b>Full citation</b> Alsunari,S., Berger,H., Sermer,M., Seaward,G., Kelly,E., Farine,D., Obstetric outcome of extreme macrosomia, Journal of Obstetrics and Gynaecology Canada: JOGC, 27, 323-328, 2005</p> <p><b>Ref Id</b> 65701</p> <p><b>Country/ies where the study was carried out</b> Canada</p> <p><b>Study type</b> Retrospective cohort</p>	<p><b>Sample size</b> N=49 women who gave birth vaginally (includes instrumental births) N=25 women who had a caesarean section (CS) during labour</p> <p><b>Characteristics</b> Macrosomia was defined as birthweight of <math>\geq 5000</math> g Gestational diabetes = 6.3%, mean gestational age (weeks (range)) = 39.7 (35-42), mean birthweight (+-SD (range)) = 5206 (+-295 (5000-6100))</p> <p><b>Inclusion criteria</b> The charts of all women who gave birth to babies weighing <math>\geq 5000</math>g at a hospital in Toronto were reviewed</p>	<p><b>Interventions</b> Non-elective CS</p>	<p><b>Details</b> The study authors reviewed the charts of all women who gave birth to babies weighing <math>&gt;5000</math> g at a hospital in Toronto from 1986 to 2000. Four databases (the obstetrical, newborn, Neonatal Intensive Care Unit and hospital medical record databases) were used to identify suspected cases. Also, the paediatric charts of neonates with either shoulder dystocia or low Apgar scores were reviewed. Postpartum haemorrhage was defined as blood loss of <math>&gt;500</math> ml after a vaginal birth or <math>&gt;1000</math> ml following a caesarean section</p>	<p><b>Results</b> <b>For the woman</b> <u>Haemorrhage*</u>: spontaneous/instrumental vaginal birth (n=49): 7 caesarean section in labour (n=25): 2 *defined as blood loss of <math>&gt;500</math> ml after a vaginal birth or <math>&gt;1000</math> ml following a caesarean section. <u>Third or fourth degree perineal tear</u>: spontaneous/instrumental vaginal birth (n=49): 4 caesarean section in labour (n=25): 0</p>	<p><b>Limitations</b> Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as hospital charts of all women who gave birth to macrosomic babies were reviewed; however, the study authors did not report whether any charts had information missing. The non-exposed group was drawn from the same hospital as the exposed group; there is certainty that the outcomes of interest were not present at the start of the study given that the outcomes</p>



Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p><b>Aim of the study</b> To determine the effect of extreme macrosomia on perinatal outcome</p> <p><b>Study dates</b> 1986-2000</p> <p><b>Source of funding</b> Not reported</p>	<p><b>Exclusion criteria</b> Not reported</p>				<p>could not occur before labour).</p> <p>Comparability: high risk of bias (the study did not control for any factor).</p> <p>Outcome: low risk of bias (outcomes were collected from hospital records; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study).</p> <p><b>Other information</b> The study obtained formal ethics committee approval</p>
<p><b>Full citation</b> Flamm, B. L., Goings, J. R., Vaginal birth after cesarean section: Is suspected fetal macrosomia a contraindication?, <i>Obstetrics and Gynecology</i>, 74, 694-697, 1989</p> <p><b>Ref Id</b> 648949</p>	<p><b>Sample size</b> N=301 women undergoing a trial of labour with a previous caesarean section (resulted in vaginal birth = 165, caesarean birth = 136) N=301 women undergoing a trial of labour with no previous caesarean section (resulted in vaginal birth = 269, caesarean section = 32)</p> <p><b>Characteristics</b></p>	<p><b>Interventions</b> Non-elective caesarean section</p>	<p><b>Details</b> A computerised trial-of-labour data bank at 8 medical centres was used to identify women with at least 1 previous caesarean sections who gave birth to a macrosomic baby. A history of &gt;1 previous caesarean sections was not considered a contraindication to trial of labour; 18 out of 301 women had a history of &gt;1 previous caesarean section. Oxytocin was used for induction or augmentation of</p>	<p><b>Results</b> <b>For the woman</b> <u>Bladder injury:</u> 1) women with previous caesarean section vaginal birth (n=165): 0 caesarean section (n=136): 0 2) women without previous caesarean section vaginal birth (n=269): 0 caesarean section (n=32): 0 <u>Shoulder dystocia*:</u> 1) women with previous caesarean section vaginal birth (n=165): 6 caesarean section (n=136): 0</p>	<p><b>Limitations</b> Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as a computerised trial-of-labour data bank was used to identify women with a history of ≥1 caesarean sections who gave birth to a macrosomic baby;</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p><b>Country/ies where the study was carried out</b> USA</p> <p><b>Study type</b> Retrospective cohort</p> <p><b>Aim of the study</b> To evaluate the validity and implications of estimated-fetal-weight restrictions in use at the time of the study</p> <p><b>Study dates</b> 1984 - 1985</p> <p><b>Source of funding</b> Not reported</p>	<p>Macrosomia was defined as birthweight of <math>\geq 4000</math> g. No baseline characteristics of the study population were reported</p> <p><b>Inclusion criteria</b> Women identified via a computerised trial-of-labour data bank at 8 medical centres with a history of <math>\geq 1</math> caesarean section who gave birth to an baby weighing <math>\geq 4000</math> g during 1984 - 1985</p> <p><b>Exclusion criteria</b> Women with a known classical or low vertical uterine incision, twin pregnancy or breech presentation and those with insulin-dependent diabetes were excluded</p>		<p>labour in 35% of women, that is, 105 of 301 (reported only in those women who had a previous caesarean section). All women were screened routinely for diabetes</p>	<p>2) women without previous caesarean section vaginal birth (n=269): 7 caesarean section (n=32): 0 *5-min Apgar scores <math>\geq 8</math> in all cases</p> <p><b>For the baby</b> <u>Fetal death (rupture related):</u> 1) women with previous caesarean section vaginal birth (n=165): 0 caesarean section (n=136): 0 2) women without previous caesarean section vaginal birth (n=269): 0 caesarean section (n=32): 0</p>	<p>however, the study authors did not report whether they reviewed all records or whether any of the charts had any information missing. The non-exposed group was drawn from the same data bank as the exposed group; data were collected via the trial-of-labour data bank; there is certainty that the outcomes of interest were not present at the start of the study given that the outcomes could not occur before labour). Comparability: high risk of bias (the study did not control for any factor). Outcome: low risk of bias (outcomes were collected via the computerised trial-of-labour data bank; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study).</p> <p><b>Other information</b></p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Whether or not the study obtained formal ethics committee approval was not reported
<p><b>Full citation</b> Lipscomb,K.R., Gregory,K., Shaw,K., The outcome of macrosomic infants weighing at least 4500 grams: Los Angeles County + University of Southern California experience, Obstetrics and Gynecology, 85, 558-564, 1995</p> <p><b>Ref Id</b> 193427</p> <p><b>Country/ies where the study was carried out</b> USA</p> <p><b>Study type</b> Retrospective cohort</p> <p><b>Aim of the study</b> To review maternal and neonatal outcomes in</p>	<p><b>Sample size</b> N=128 vaginal birth N=35 caesarean section with trial of labour</p> <p><b>Characteristics</b> Macrosomia was defined as birthweight of <math>\geq 4500</math> g. Mean maternal age (+-SD) was 27.8 (+-5.4) years, mean gestational age (+-SD) at birth was 40.4 (+- 1.6) weeks, incidence of diabetes was 14.9%</p> <p><b>Inclusion criteria</b> Babies weighing <math>\geq 4500</math> g</p> <p><b>Exclusion criteria</b> Not reported</p>	<p><b>Interventions</b> Non-elective caesarean section</p>	<p><b>Details</b> A retrospective chart review of the birth log at a hospital was performed to identify babies weighting <math>\geq 4500</math> g between January 1991 and December 1991; 227 maternal records were reviewed (a chart retrieval rate of 93.8%). The study authors reviewed available information on missing charts and reported that no women had documentation suggestive of shoulder dystocia on the official birth log, and none were referred for litigation according to information obtained from the medical records department. Fetal weights were estimated by Leopold manoeuvres and ultrasound assessment. Lacerations included midline episiotomy, 3rd degree lacerations, proctoepisiotomy and sulcal or cervical lacerations; 3rd and 4th degree lacerations were evaluated independently.</p>	<p><b>Results For the woman</b> <u>3rd and 4th degree lacerations:</u> vaginal birth (n=128): 19 caesarean section with trial of labour (n=35): 0 <u>Haemorrhage*:</u> vaginal birth (n=128): 4 caesarean section with trial of labour (n=35): 2 *defined as an estimated blood loss <math>&gt;500</math> ml at vaginal birth or <math>&gt;1000</math> ml at caesarean section, or documented management of atony by uterine massage, prostaglandin or methylergonovine use, or uterine or hypogastric artery ligation. <u>Hospital stay (days):</u> vaginal birth (n=128): 2.3 caesarean section with trial of labour (n=35): 3.5</p>	<p><b>Limitations</b> Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as a retrospective chart review of the birth log at a hospital was used to identify babies weighing <math>\geq 4500</math> g; the non-exposed group was drawn from the same data bank as the exposed group; however, not all charts could be included due to missing information (chart retrieval rate was 93.8%). The study authors reviewed available information on missing charts and reported that no women had documentation suggestive of shoulder dystocia on the official birth log, and none were</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>women with macrosomic babies</p> <p><b>Study dates</b> January 1991 - December 1991</p> <p><b>Source of funding</b> Not reported</p>			<p>Postpartum haemorrhage was defined as an estimated blood loss &gt;500 ml at vaginal birth or &gt;1000 ml at caesarean section, or documented management of atony by uterine massage, prostaglandin or methylergonovine use, or uterine or hypogastric artery ligation</p>		<p>referred for litigation according to information obtained from the medical records department. There is certainty that the outcomes of interest were not present at the start of the study given that the outcomes could not occur before labour). Comparability: high risk of bias (the study did not control for any factor). Outcome: low risk of bias (outcomes were collected via a retrospective chart review of the birth log at a hospital; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study)</p> <p><b>Other information</b> Whether or not the study obtained formal ethics committee approval was not reported</p>
<p><b>Full citation</b> Menticoglou, S. M., Manning, F. A.,</p>	<p><b>Sample size</b> N=589 vaginal birth (spontaneous/instrumental)</p>	<p><b>Interventions</b> Non-elective CS</p>	<p><b>Details</b> The chart of each newborn weighing <math>\geq 4500</math> g was reviewed with particular</p>	<p><b>Results For the woman</b> <u>Shoulder dystocia:</u></p>	<p><b>Limitations</b> Limitations assessed with the Newcastle-Ottawa</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>Morrison, I., Harman, C. R., Must                      macrosomic fetuses be delivered by a caesarean section? A review of outcome for 786 babies greater than or equal to 4,500 g, Australian &amp; New Zealand Journal of Obstetrics &amp; Gynaecology, 32, 100-3, 1992</p> <p><b>Ref Id</b> 649067</p> <p><b>Country/ies where the study was carried out</b> Canada</p> <p><b>Study type</b> Retrospective cohort</p> <p><b>Aim of the study</b> To review labour-related mortality and morbidity of babies weighing <math>\geq 4500</math> g</p> <p><b>Study dates</b></p>	<p>N=132 emergency caesarean section (CS)</p> <p><b>Characteristics</b>                      Macrosomia was defined as birthweight of <math>\geq 4500</math> g. No baseline data for the population were reported</p> <p><b>Inclusion criteria</b>                      Newborns weighing <math>\geq 4500</math> g</p> <p><b>Exclusion criteria</b>                      Not reported</p>		<p>attention to Apgar scores, the presence of convulsions or cerebral irritability/depression, traumatic injuries and need for admission to NICU. Cases of shoulder dystocia were identified from maternal birth record sheets</p>	<p>spontaneous/instrumental vaginal birth (n=589): 54                      emergency caesarean section (n=132): 0</p> <p><b>For the baby</b>  <u>Fracture clavicle/humerus:</u>                      spontaneous/instrumental vaginal birth (n=589): 9                      emergency caesarean section (n=132): 0  <u>Branchial palsy:</u>                      spontaneous/instrumental vaginal birth (n=589): 9                      emergency caesarean section (n=132): 0  <u>Skull fracture/intracranial haemorrhage:</u>                      spontaneous/instrumental vaginal birth (n=589): 0                      emergency caesarean section (n=132): 0  <u>NICU admission:</u>                      spontaneous/instrumental vaginal birth (n=589): 8                      emergency caesarean section (n=132): 5</p>	<p>Quality Assessment Scale:                      Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as hospital charts of all newborns weighing <math>\geq 4500</math> g were reviewed; for some outcomes maternal labour record sheets were also reviewed; however, the study authors did not report whether there was information missing in any of the charts. The non-exposed group was drawn from the same hospital as the exposed group; there is certainty that the outcomes of interest were not present at the start of the study given that the outcomes could not occur before labour).                      Comparability: high risk of bias (the study did not control for any factor).                      Outcome: low risk of bias (outcomes were collected from the hospital charts for newborns and from maternal labour record</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>1980 - 1989</p> <p><b>Source of funding</b> Not reported</p>					<p>sheets; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study.)</p> <p><b>Other information</b> Whether or not the study obtained formal ethics committee approval was not reported</p>
<p><b>Full citation</b></p> <p>Vercellini, P., Fumagalli, M., Consonni, D., De Braud, L., Barbara, G., Iurlaro, E., Mosca, F., Fedele, L., Historic cohort study on mode of delivery of a macrosomic baby: The women's point of view, Acta Obstetrica et Gynecologica Scandinavica, 94, 1235-1244, 2015</p> <p><b>Ref Id</b> 649197</p>	<p><b>Sample size</b> N=460 women who attempted a vaginal birth (n=276 gave birth vaginally, n=184 underwent a caesarean section during labour) Long-term outcomes were assessed in 273 women</p> <p><b>Characteristics</b> Macrosomia was defined as birthweight of <math>\geq 4000</math> g. Vaginal birth group: mean age (+-SD) = 31 (+-5.5), diabetes = 14 (5%). Caesarean section in labour group: mean age (+-SD) = 32.1 (+-5), diabetes = 12 (6%).</p>	<p><b>Interventions</b> Non-elective caesarean section</p>	<p><b>Details</b> All women who gave birth to a first live singleton weighing <math>&gt;4000</math> g between 2008-2012 were identified using a computerised perinatal database. Neonates were classified in 3 categories: 4001-4499 g, 4500-4999 g and <math>\geq 5000</math> g. A single abstractor retrieved data from original medical records. At least 6 months after giving birth, women were contacted by telephone and asked to complete several questionnaires either in the outpatient clinic or via email. <u>Urinary incontinence</u> Urinary incontinence was defined as unintentional urine</p>	<p><b>Results</b> <b>For the woman</b> <u>Shoulder dystocia:</u> vaginal birth (n=276): 13 caesarean section in labour (n=184): 0 <u>Haemorrhage with <math>&gt;1000</math> ml blood loss:</u> vaginal birth (n=276): 41 caesarean section in labour (n=184): 19 <u>3rd degree lacerations:</u> vaginal birth (n=276): 9 caesarean section in labour (n=184): 0 <u>4th degree lacerations:</u> vaginal birth (n=276): 1 caesarean section in labour (n=184): 0 <u>Prevalence of urinary incontinence*:</u></p>	<p><b>Limitations</b> Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as data were retrieved from original clinical records of all women who gave birth to a macrosomic baby and data were extracted by the same person; however, the study authors did not report whether any hospital records had missing information. The non-</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p><b>Country/ies where the study was carried out</b> Italy</p> <p><b>Study type</b> Retrospective cohort</p> <p><b>Aim of the study</b> Objectives 1) to determine the degree of women's satisfaction with childbirth after an elective caesarean section, a vaginal birth or a cesarean section during labour; 2) to compare neonatal outcome and maternal urologic, intestinal and sexual conditions between the 3 modes of birth</p> <p><b>Study dates</b> 2008 - 2012</p> <p><b>Source of funding</b> The study authors reported that no funds</p>	<p>Mean birthweight was 4148 g (not reported by mode of birth)</p> <p><b>Inclusion criteria</b> All women who gave birth to a first live singleton weighting &gt;4000 g between 2008-2012 were identified using a computerised perinatal database and were considered eligible for inclusion</p> <p><b>Exclusion criteria</b> Not reported</p>		<p>loss lasting more than 4 months after birth.</p> <p><u>Anal incontinence</u> Anal incontinence was defined as persistent (&gt;4 months) anal incontinence after birth.</p> <p><u>Woman's experiences</u> Sexual functioning The Female Sexual Function Index (FSFI) was used to evaluate sexual functioning. The FSFI questionnaire is a 19-item (on a 5-point Likert scale), validated, multidimensional, self-report instrument. It has acceptable internal consistency and test-retest reliability. Domains include: desire, arousal, lubrication, orgasm, satisfaction and pain. Scores for each question were transformed by multiplying domain scores by a factor of 0.3–0.6 to equally weigh each domain depending on the number of questions per domain. The transformed maximum score for each domain was 6 and the maximum transformed full scale score was 36, with a minimum full-scale score of 2. Women with a FSFI total score below 26.55 were</p>	<p>vaginal birth (n=135): 56 caesarean section in labour (n=83): 12</p> <p>*unintentional urine loss lasting &gt;4 months after birth</p> <p><u>Prevalence of anal incontinence**</u>: vaginal birth (n=135): 25 caesarean section in labour (n=83): 5</p> <p>**persistent (&gt;4 months) anal incontinence after birth</p> <p><u>Woman's experience Sexual functioning (FSFI questionnaire, values are means +-SD)</u>: vaginal birth (n=135): FSFI total score: 26 (+-5.4), desire: 3.8 (+-1), arousal: 4.4 (+-1), lubrication: 4.5 (+-1.2), orgasm: 4.3 (+-1.2), satisfaction: 4.8 (+-1), pain: 4.2 (+-1.2) caesarean section in labour (n=83): FSFI total score: 27.8 (+-4.3), desire: 4 (+-0.9), arousal: 4.7 (+-0.9), lubrication: 4.8 (+-1), orgasm: 4.8 (+-1), satisfaction: 5 (+-1), pain: 4.5 (+-1)</p> <p><u>Women would repeat their mode of birth</u>: vaginal birth (n=141):</p>	<p>exposed group was drawn from the same hospital as the exposed group; there is certainty that the outcomes of interest were not present at the start of the study given that the outcomes could not occur before labour; baseline characteristics of women who participated, those who could not be reached and those who did not return the questionnaires were very similar, with exception of age and ethnicity).</p> <p>Comparability: high risk of bias (the study did not control for any factor). Outcome: moderate risk of bias (outcomes were collected from hospital records; follow-up was long enough for outcomes to occur; however, the response rate was approximately 50% for urinary and anal incontinence, sexual functioning and childbirth satisfaction outcomes)</p>



Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p>were received for the study</p>			<p>classified as experiencing sexual dysfunction, whereas those with scores above the cut-off were classified as functionally normal. Higher scores indicate better functioning.</p> <p><b>Satisfaction with childbirth</b> The degree of satisfaction with childbirth was assessed using a 5-level scale (very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, very dissatisfied) as a reply to the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, how would you judge your degree of satisfaction regarding the overall experience associated with childbirth?".</p> <p>Women were also asked if they would repeat their type of mode of birth (yes, no, don't know) according to the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, if you had the possibility to</p>	<p>yes: 95 (67%), don't know: 23 (16%), no: 23 (16%)</p> <p>caesarean section in labour (n=85): yes: 59 (69%), don't know: 14 (16%), no: 12 (14%)</p> <p><b>Satisfaction with childbirth experience:</b> vaginal birth (n=141): very satisfied: 45 (32%), satisfied: 49 (35%), neither satisfied nor dissatisfied: 26 (18%), dissatisfied: 7 (5%), very dissatisfied: 14 (10%)</p> <p>caesarean section in labour (n=85): very satisfied: 10 (12%), satisfied: 38 (45%), neither satisfied nor dissatisfied: 18 (21%), dissatisfied: 12 (14%), very dissatisfied: 7 (8%)</p> <p><b>For the baby</b> <b>Death:</b> vaginal birth (n=276): 0 caesarean section in labour (n=184): 0</p> <p><b>Asphyxia:</b> vaginal birth (n=276): 1 caesarean section in labour (n=184): 1</p> <p><b>Clavicular fracture:</b> vaginal birth (n=276): 6 caesarean section in labour (n=184): 0</p>	<p><b>Other information</b> The study obtained formal ethics committee approval</p>



Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
			turn back time, would you repeat the same course regarding the mode of childbirth?"	<u>Branchial plexus palsy:</u> vaginal birth (n=276): 0 caesarean section in labour (n=184): 0	
<p><b>Full citation</b></p> <p>Aberg, Katarina, Norman, Mikael, Pettersson, Karin, Ekeus, Cecilia, Vacuum extraction in fetal macrosomia and risk of neonatal complications: a population-based cohort study, Acta Obstetrica et Gynecologica Scandinavica, 95, 1089-96, 2016</p> <p><b>Ref Id</b></p> <p>741678</p> <p><b>Country/ies where the study was carried out</b></p> <p>Sweden</p> <p><b>Study type</b></p> <p>Retrospective cohort</p>	<p><b>Sample size</b></p> <p>N=195,330 women who had an unassisted vaginal birth; N=19,567 women who had an emergency caesarean section (CS)</p> <p>Subgroups by birthweight: 4000-4499 g: vaginal birth = 159,280 emergency CS = 13,994 4500-4999 g: vaginal birth = 32,022 emergency CS = 4593 ≥5000 g: vaginal birth = 4028 emergency CS = 980</p> <p><b>Characteristics</b></p> <p>Maternal age (years) by age and birthweight subgroups: ≤19 years: 4000-4499 g = 2226 (12.9%), 4500-4999 g = 352 (2%), ≥5000 g = 46 (0.3%) 20-24 years: 4000-4499 g = 21164 (15.6%), 4500-4999 g = 3970 (2.9%), ≥5000 g = 503 (0.4%) 25-29 years: 4000-4499 g = 56863 (17.8%), 4500-4999 g</p>	<p><b>Interventions</b></p> <p>Emergency CS</p>	<p><b>Details</b></p> <p>The study was based on data from the Swedish Medical Birth Register (Swedish National Board of Health and Welfare). The register covers ≈99% of all births in Sweden and includes prospectively collected information on maternal characteristics, reproductive history, pregnancy, birth and the neonatal period. Macrosomia defined as birthweight of ≥4000 g</p>	<p><b>Results For the baby</b></p> <p><u>Brachial plexus injury*:</u> Subgroups by birthweight: ≥4000 g: emergency CS = 6, vaginal birth = 1154 4000-4499 g: emergency CS = 4, vaginal birth = 563 4500-4999 g: emergency CS = 2, vaginal birth = 407 ≥5000 g: emergency CS = 0, vaginal birth = 184</p> <p><u>Intracranial haemorrhage*:</u> Subgroups by birthweight: ≥4000 g: emergency CS = 8, vaginal birth = 56 4000-4499 g: emergency CS = 6, vaginal birth = 41 4500-4999 g: emergency CS = 2, vaginal birth = 12 ≥5000 g: emergency CS = 0, vaginal birth = 3</p> <p><u>Convulsions*:</u> Subgroups by birthweight: ≥4000 g: emergency CS = 46, vaginal birth = 204 4000-4499 g: emergency CS = 36, vaginal birth = 144 4500-4999 g: emergency CS = 5, vaginal birth = 47</p>	<p><b>Limitations</b></p> <p>Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as data were retrieved from a national medical birth register covering 99% of all births in the study country. The non-exposed group was drawn from the same birth register as the exposed group; there is certainty that the outcomes of interest were not present at the start of the study given that the outcomes could not occur before labour). Comparability: low risk of bias (the study reported adjusted odds ratios). Outcome: low risk of bias (outcomes were collected from the birth register;</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
<p><b>Aim of the study</b> To investigate the association between birthweight, mode of birth and neonatal outcomes among babies born at term with a birthweight of <math>\geq 3000</math> g</p> <p><b>Study dates</b> Between 1999 and 2012</p> <p><b>Source of funding</b> The study was funded by grants from the Swedish Research Council</p>	<p>= 11472 (3.6%), <math>\geq 5000</math> g = 1536 (0.5%) 30-34 years: 4000-4499 g = 70236 (19.5%), 4500-4999 g = 15128 (4.2%), <math>\geq 5000</math> g = 2035 (0.6%) 35-39 years: 4000-4499 g = 34270 (20.6%), 4500-4999 g = 7790 (4.7%), <math>\geq 5000</math> g = 1118 (0.7%) <math>\geq 40</math> years: 4000-4499 g = 6127 (20%), 4500-4999 g = 1458 (4.8%), <math>\geq 5000</math> g = 204 (0.7%) Induced labour by birthweight subgroups: 4000-4499 g = 27295 (22.4%) 4500-4999 g = 8058 (6.6%) <math>\geq 5000</math> g = 1411 (1.2%)</p> <p><b>Inclusion criteria</b> Babies born at term (<math>&gt;36</math> completed weeks of gestational) with a birthweight of <math>\geq 3000</math> g</p> <p><b>Exclusion criteria</b> Babies born via elective CS, by forceps, stillbirths, multiple births, births with</p>			<p><math>\geq 5000</math> g: emergency CS = 5, vaginal birth = 13 Odds ratios (ORs) adjusted for maternal age, height, BMI, parity, diabetes, induction of labour, epidural anaesthesia, fetal presentation, gestational age, indications for operative birth, reference group = birthweight 3000-3999 g:</p> <p><u>Brachial plexus injury:</u> <u>Subgroups by birthweight:</u> 4000-4499 g emergency CS: OR = 0.33 (95% CI 0.12 - 0.89) vaginal birth: OR = 7.33 (95% CI 6.42 - 8.37) <math>\geq 4500</math> g emergency CS: OR = 0.46 (95% CI 0.11 - 1.84) vaginal birth: OR = 36.64 (95% CI 31.97 - 41.99)</p> <p><u>Intracranial haemorrhage:</u> <u>Subgroups by birthweight:</u> 4000-4499 g emergency CS: OR = 0.91 (95% CI 0.39 - 2.21) vaginal birth: OR = 1.68 (95% CI 1.17 - 2.41) <math>\geq 4500</math> g emergency CS: OR = 0.83 (95% CI 0.20 - 3.46) vaginal birth: OR = 2.82 (95% CI 1.63 - 4.89)</p>	<p>follow-up was long enough for outcomes to occur)</p> <p><b>Other information</b> The study obtained formal ethics committee approval</p>

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	non-cephalic or undocumented presentation and term infants with birth weight <3000 g			<p>Neonatal convulsions:</p> <p><u>Subgroups by birthweight:</u></p> <p>4000-4499 g                      emergency CS: OR = 1.64 (95% CI 1.13 - 2.37)                      vaginal birth: OR = 1.53 (95% CI 1.26 - 1.85)</p> <p>&gt;=4500 g                      emergency CS: OR = 1.24 (95% CI 0.65 - 2.37)                      vaginal birth: OR = 2.85 (95% CI 2.16 - 3.76)</p>	

## **Appendix F – Forest plots**

### **Intrapartum care for women with a large-for-gestational age baby – mode of birth**

No meta-analysis was undertaken for this review and so there are no forest plots.

## Appendix G – GRADE tables

### Intrapartum care for women with a large-for-gestational age baby – mode of birth

**Table 3: Clinical evidence profile for emergency caesarean section versus vaginal birth for women with a large-for-gestational-age baby, outcomes for the woman**

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
<b>Haemorrhage</b>												
1 <sup>a</sup> (Alsunna ri 2004)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	2/25 (8%)	7/49 (14.3%)	RR 0.56 (0.08 to 4)	63 fewer per 1000 (from 131 fewer to 429 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 <sup>b</sup> (Lipsco mb 1995)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	2/35 (5.7%)	4/128 (3.1%)	RR 1.83 (0.21 to 16.11)	26 more per 1000 (from 25 fewer to 472 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 <sup>c</sup> (Vercelli ni 2015)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	19/184 (10.3%)	41/276 (14.9%)	RR 0.70 (0.36 to 1.36)	45 fewer per	⊕⊕⊕ ⊖	CRITICAL

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
										1000 (from 95 fewer to 53 more)	VERY LOW	
<b>Bladder injury</b>												
1 (Flamm 1989)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/32 (0%)	0/269 (0%)	-	-	⊕⊖⊖ ⊖ VERY LOW	CRITICAL
<b>Urinary incontinence<sup>d</sup></b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	No serious imprecision	None	12/83 (14.5%)	56/135 (41.5%)	RR 0.35 (0.2 to 0.61)	270 fewer per 1000 (from 162 fewer to 332 fewer)	⊕⊖⊖ ⊖ VERY LOW	CRITICAL
<b>Anal incontinence<sup>e</sup></b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	5/83 (6%)	25/135 (18.5%)	RR 0.33 (0.13 to 0.82)	124 fewer per 1000 (from 33 fewer to	⊕⊖⊖ ⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
										161 fewer)		
<b>Third- or fourth-degree perineal lacerations</b>												
1 (Alsunna ri 2004)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/25 (0%)	4/49 (8.2%)	RR 0.21 (0.01 to 3.82)	64 fewer per 1000 (from 81 fewer to 230 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 (Lipscomb 1995)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/35 (0%)	19/128 (14.8%)	RR 0.09 (0.01 to 1.49)	135 fewer per 1000 (from 147 fewer to 73 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Shoulder dystocia</b>												
1 (Flamm 1989)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/32 (0%)	7/269 (2.6%)	RR 0.55 (0.03 to 9.33)	12 fewer per 1000 (from 25 fewer to 217 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
1 (Menticonoglou 1992)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	No serious imprecision	None	0/132 (0%)	54/589 (9.2%)	RR 0.04 (0 to 0.65)	88 fewer per 1000 (from 32 fewer to 92 fewer)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 (Vercellini 2015)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	0/184 (0%)	13/276 (4.7%)	RR 0.06 (0 to 0.93)	44 fewer per 1000 (from 3 fewer to 47 fewer)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Hospital stay (days)</b>												
1 (Lipscomb 1995)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable <sup>f</sup>	None	35	128	-	MD 0 higher (0 to 0 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Sexual functioning – FSFI questionnaire total score (better indicated by higher values)</b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	83	135	-	MD 1.8 higher (0.5 to 3.1 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Sexual functioning – desire (better indicated by higher values)</b>												



Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	83	135	-	MD 0.2 higher (0.06 lower to 0.46 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Sexual functioning – arousal (better indicated by higher values)</b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	83	135	-	MD 0.3 higher (0.04 to 0.56 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Sexual functioning – lubrication (better indicated by higher values)</b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	No serious imprecision	None	83	135	-	MD 0.3 higher (0 to 0.6 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Sexual functioning – orgasm (better indicated by higher values)</b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	83	135	-	MD 0.5 higher (0.2 to 0.8 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Sexual functioning – satisfaction (better indicated by higher values)</b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	83	135	-	MD 0.2 higher (0.07 lower to 0.46 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
										0.47 higher)		
<b>Sexual functioning – pain (better indicated by higher values)</b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	No serious imprecision	None	83	135	-	MD 0.3 higher (0 to 0.6 higher)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Satisfaction with mode of birth (based on the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, if you had the possibility to turn back time, would you repeat the same course regarding the mode of childbirth?") – yes<sup>9</sup></b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	No serious imprecision	None	59/85 (69.4%)	95/141 (67.4%)	RR 1.03 (0.86 to 1.24)	20 more per 1000 (from 94 fewer to 162 more)	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT
<b>Satisfaction with mode of birth (based on the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, if you had the possibility to turn back time, would you repeat the same course regarding the mode of childbirth?") – don't know<sup>9</sup></b>												
1 (Vercellini 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	14/85 (16.5%)	23/141 (16.3%)	RR 1.01 (0.55 to 1.85)	2 more per 1000 (from 73 fewer to	⊕⊕⊕ ⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
										139 more)		
<b>Satisfaction with mode of birth (based on the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, if you had the possibility to turn back time, would you repeat the same course regarding the mode of childbirth?") – no<sup>g</sup></b>												
1 (Vercelli ni 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	12/85 (14.1%)	23/141 (16.3%)	RR 0.87 (0.45 to 1.65)	21 fewer per 1000 (from 90 fewer to 106 more)	⊕⊖⊖ ⊖ VERY LOW	IMPORTANT
<b>Satisfaction with childbirth experience (based on the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, how would you judge your degree of satisfaction regarding the overall experience associated with childbirth?") – very satisfied/satisfied<sup>h</sup></b>												
1 (Vercelli ni 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Serious <sup>4</sup>	None	48/85 (56.5%)	94/141 (66.7%)	RR 0.85 (0.63 to 1.13)	100 fewer per 1000 (from 247 fewer to 87 more)	⊕⊖⊖ ⊖ VERY LOW	IMPORTANT
<b>Satisfaction with childbirth experience (based on the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, how would you judge your degree of satisfaction regarding the overall experience associated with childbirth?") – neither satisfied nor dissatisfied<sup>h</sup></b>												

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
1 (Vercelli ni 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	18/85 (21.2%)	26/141 (18.4%)	RR 1.15 (0.57 to 2.33)	28 more per 1000 (from 79 fewer to 245 more)	⊕⊖⊖ ⊖ VERY LOW	IMPORTANT
<b>Satisfaction with childbirth experience (based on the question "Taking into account every aspect of your delivery, including your baby's well-being, and possible short- and long-term personal problems, how would you judge your degree of satisfaction regarding the overall experience associated with childbirth?") – dissatisfied/very dissatisfied<sup>h</sup></b>												
1 (Vercelli ni 2015)	Observational studies	Very serious <sup>3</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	19/85 (22.4%)	21/141 (14.9%)	RR 1.5 (0.72 to 3.13)	74 more per 1000 (from 42 fewer to 317 more)	⊕⊖⊖ ⊖ VERY LOW	IMPORTANT

CI: confidence interval; CS: caesarean section; FSFI: Female Sexual Function Index; MD: mean difference; MID: minimally important difference; RR: risk ratio; SD: standard deviation

1 The quality of the evidence was downgraded by 1 level due to high risk of comparability bias

2 The quality of the evidence was downgraded by 2 levels because the 95% CI crosses 2 default MID thresholds

3 The quality of the evidence was downgraded by 2 levels due to high risk of comparability bias and because the response rate was approximately 50%

4 The quality of the evidence was downgraded by 1 level because the 95% CI crosses 1 MID threshold which was calculated as 0.5xSD of the control group

a Defined as an estimated blood loss >500 ml at vaginal birth or >1000 ml at caesarean section

b Defined as >1000 ml blood loss at vaginal birth and caesarean section or documented management of atony by uterine massage, prostaglandin or methylergonovine use, or uterine or hypogastric artery ligation

c Defined as >1000 ml blood loss

d Defined as unintentional urine loss lasting >4 months after birth

e Defined as persistent anal incontinence lasting >4 months after birth

f The effect was not estimable because no standard deviation was reported

g Response based on a 3-item scale (yes, don't know, no)

h Response based on a 5-item scale (very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, very dissatisfied)

**Table 4: Clinical evidence profile for emergency caesarean section versus vaginal birth for women with a large-for-gestational-age baby, outcomes for the baby**

Quality assessment							Number of babies		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
<b>Mortality</b>												
1 (Flamm 1989)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/32 (0%)	0/269 (0%)	-	-	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 (Vercelli ni 2015)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/184 (0%)	0/276 (0%)	-	-	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Clavicle/humerus fractures</b>												
1 (Mentico glou 1992)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/132 (0%)	9/589 (1.5%)	RR 0.23 (0.01 to 3.99)	12 fewer per 1000 (from 15 fewer to 46 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 (Vercelli ni 2015)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/184 (0%)	6/276 (2.2%)	RR 0.12 (0.01 to 2.03)	19 fewer per 1000 (from 22 fewer to 22 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Skull fracture or intracranial haemorrhage</b>												

Quality assessment							Number of babies		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
1 (Mentoglou 1992)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/132 (0%)	0/589 (0%)	-	-	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Brachial plexus injury in babies weighing ≥4000 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	None	6/19567 (0.03%)	1154/195330 (0.59%)	RR 0.05 (0.02 to 0.12)	6 fewer per 1000 (from 5 fewer to 6 fewer)	⊕⊕⊕ ⊖ LOW	CRITICAL
<b>Brachial plexus injury in babies weighing 4000-4499 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	None	4/13994 (0.03%)	563/159280 (0.35%)	RR 0.08 (0.03 to 0.22)	3 fewer per 1000 (from 3 fewer to 3 fewer)	⊕⊕⊕ ⊖ LOW	CRITICAL
<b>Brachial plexus injury in babies weighing 4500-4999 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	None	2/4593 (0.04%)	407/32022 (1.3%)	RR 0.03 (0.01 to 0.14)	12 fewer per 1000 (from 11 fewer to 13 fewer)	⊕⊕⊕ ⊖ LOW	CRITICAL
<b>Brachial plexus injury in babies weighing ≥5000 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	None	0/980 (0%)	184/4028 (4.6%)	RR 0.01 (0.0 to 0.18)	45 fewer per 1000 (from 37 fewer to	⊕⊕⊕ ⊖ LOW	CRITICAL

Quality assessment							Number of babies		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
										46 fewer)		
<b>Brachial palsy</b>												
1 (Mentoglou 1992)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/132 (0%)	9/589 (1.5%)	RR 0.23 (0.01 to 3.99)	12 fewer per 1000 (from 15 fewer to 46 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
1 (Vercellini 2015)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/184 (0%)	0/276 (0%)	-	-	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Intracranial haemorrhage in babies weighing ≥4000 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	8/19567 (0.04%)	56/195330 (0.03%)	RR 1.43 (0.68 to 2.99)	12 more per 100,000 (from 9 fewer to 57 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Intracranial haemorrhage in babies weighing 4000-4499 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	6/13994 (0.04%)	41/159280 (0.03%)	RR 1.67 (0.71 to 3.92)	17 more per 100,000 (from 8 fewer to 75 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Intracranial haemorrhage in babies weighing 4500-4999 g</b>												

Quality assessment							Number of babies		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	2/4593 (0.04%)	12/32022 (0.04%)	RR 1.16 (0.26 to 5.19)	6 more per 100,000 (from 28 fewer to 157 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Intracranial haemorrhage in babies weighing ≥5000 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/980 (0%)	3/4028 (0.07%)	RR 0.59 (0.03 to 11.35)	0 fewer per 1000 (from 1 fewer to 8 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Asphyxia</b>												
1 (Vercellini 2015)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	1/184 (0.54%)	1/276 (0.36%)	RR 1.5 (0.09 to 23.83)	2 more per 1000 (from 3 fewer to 83 more)	⊕⊕⊕ ⊖ VERY LOW	CRITICAL
<b>Convulsions in babies weighing ≥4000 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	None	46/19567 (0.24%)	204/195330 (0.1%)	RR 2.25 (1.64 to 3.10)	130 more per 100,000 (from 67 more to 219more)	⊕⊕⊕ ⊖ LOW	CRITICAL
<b>Convulsions in babies weighing 4000-4499 g</b>												



Quality assessment							Number of babies		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	No serious imprecision	None	36/13994 (0.26%)	144/159280 (0.09%)	RR 2.85 (1.98 to 4.10)	2 more per 1000 (from 1 more to 3 more)	⊕⊕⊖ LOW	CRITICAL
<b>Convulsions in babies weighing 4500-4999 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	5/4593 (0.11%)	47/32022 (0.15%)	RR 0.74 (0.3 to 1.86)	0 fewer per 1000 (from 1 fewer to 1 more)	⊕⊖⊖ VERY LOW	CRITICAL
<b>Convulsions in babies weighing ≥5000 g</b>												
1 (Aberg 2016)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	5/980 (0.51%)	13/4028 (0.32%)	RR 1.58 (0.56 to 4.42)	2 more per 1000 (from 1 fewer to 11 more)	⊕⊖⊖ VERY LOW	CRITICAL
<b>NICU admission</b>												
1 (Mentecoglou 1992)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Serious <sup>3</sup>	None	5/132 (3.8%)	8/589 (1.4%)	RR 2.79 (0.93 to 8.39)	24 more per 1000 (from 1 fewer to 100 more)	⊕⊖⊖ VERY LOW	IMPORTANT

CI: confidence interval; CS: caesarean section; MID: minimally important difference; NICU: neonatal intensive care unit; RR: risk ratio

1 The quality of the evidence was downgraded by 1 level due to high risk of comparability bias

2 The quality of the evidence was downgraded by 2 levels because the 95% CI crosses 2 default MID thresholds

3 The quality of the evidence was downgraded by 1 level because the 95% CI crosses 1 default MID threshold

**Table 5: Clinical evidence profile for emergency caesarean section versus vaginal birth for women with a large-for-gestational-age baby and a previous caesarean section, outcomes for the woman**

Quality assessment							Number of women		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
<b>Bladder injury</b>												
1 (Flamm 1989)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/136 (0%)	0/165 (0%)	-	-	⊕⊖⊖⊖ VERY LOW	CRITICAL
<b>Shoulder dystocia</b>												
1 (Flamm 1989)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Very serious <sup>2</sup>	None	0/136 (0%)	6/165 (3.6%)	RR 0.09 (0.01 to 1.64)	33 fewer per 1000 (from 36 fewer to 23 more)	⊕⊖⊖⊖ VERY LOW	CRITICAL

CI: confidence interval; CS: caesarean section; MID: minimally important difference; RR: risk ratio

1 The quality of the evidence was downgraded by 1 level due to high risk of comparability bias

2 The quality of the evidence was downgraded by 2 levels because the 95% CI crosses 2 default MID thresholds

**Table 6: Clinical evidence profile for emergency caesarean section versus vaginal birth for women with a large-for-gestational-age baby and a previous caesarean section, outcomes for the baby**

Quality assessment							Number of babies		Effect		Quality	Importance
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute		
<b>Mortality</b>												
1 (Flamm 1989)	Observational studies	Serious <sup>1</sup>	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/136 (0%)	0/165 (0%)	-	-	⊕⊖⊖⊖ VERY LOW	CRITICAL

CI: confidence interval; CS: caesarean section

<sup>1</sup> The quality of the evidence was downgraded by 1 level due to high risk of comparability bias

## **Appendix H – Economic evidence study selection**

### **Intrapartum care for women with a large-for-gestational age baby – mode of birth**

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

## **Appendix I – Economic evidence tables**

### **Intrapartum care for women with a large-for-gestational age baby – mode of birth**

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

## **Appendix J – Health economic evidence profiles**

### **Intrapartum care for women with a large-for-gestational age baby – mode of birth**

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

## **Appendix K – Health economic analysis**

### **Intrapartum care for women with a large-for-gestational age baby – mode of birth**

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

## **Appendix L – Research recommendations**

### **Intrapartum care for women with a large-for-gestational age baby – mode of birth**

No research recommendations were made for this review.