National Institute for Health and Care Excellence

Final

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

[S] Evidence review for previous caesarean section

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

March 2019

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 previous caesarean section – management of the first and second stages of labour

Review question

How should the first and second stages of labour be managed for women with a previous caesarean section?

Introduction

The aim of this review is to determine how the first and second stages of labour should be managed for women with previous caesarean section. The committee was aware of the NICE guideline on caesarean section (CG132), which includes recommendations about planning mode of birth after a previous caesarean section. This review focuses on management of the first and second stages of labour for women with a previous caesarean section who have planned a vaginal birth after caesarean section (VBAC) in preference to a repeat caesarean section.

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)

Population	Women in the first or second stage of labour with 1 or more previous caesarean sections
Intervention	Intervention 1 Routine insertion of IV cannula Intervention 2 Oxytocin in the case of suspected or confirmed delay in labour Intervention 3 Emergency caesarean section Intervention 4 Labour or birth in a birth pool Intervention 5 Neuraxial analgesia Intervention 6 Amniotomy Intervention 7 Fasting

	Intervention 8 Antacid prophylaxis (ranitidine, omeprazole or sodium citrate) Intervention 9 Limited mobility (supine, or restricted to the bed) Intervention 10 Use of scoring systems (for example, VBAC or TOLAC)
Comparison	Comparison 1 No IV cannula Comparison 2 No oxytocin Comparison 3 Continuation of labour Comparison 4 Labour or birth without birth pool Comparison 5 No neuraxial analgesia (including pharmacological analgesia) Comparison 6: No amniotomy Comparison 7 • Not fasting • Clear fluids only Comparison 8 No antacid prophylaxis Comparison 9 Unlimited mobility (upright positions, or mobile) Comparison 10 No use of scoring systems

Outcomes	For the woman:
	• major morbidities:
	  ○ uterine rupture or dehiscence
	  ○ major blood loss (>1000 ml)
	  ○ infectious morbidity
	  ○ placenta praevia and/or accreta in future pregnancies or pelvic adhesions complicating any future abdominopelvic surgery
	  ○ hysterectomy
	• women's experience of labour and birth, including experience of the birth companion, separation of the woman and baby and breastfeeding initiation
	• mortality

	• emergency caesarean section or operative vaginal birth for all comparisons except comparison 3 • admission to HDU or ITU and duration of hospital stay For the baby: • major morbidities (respiratory and HIE) • mortality from any cause

HDU: high dependency unit; HIE: hypoxic ischaemic encephalopathy; ITU: intensive therapy unit; IV: intravenous; VBAC: vaginal birth after previous caesarean section; TOLAC: trial of labour after previous caesarean section

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

Eight prospective and 19 retrospective cohort studies were included in this review (see 'Summary of clinical studies included in the evidence review').

Of these 2 compared oxytocin to no oxytocin for the augmentation of labour (Chelmow 1992, Kwee 2007), 23 compared emergency caesarean section to continuation of labour (Baker 1955, Brock 2016, Dhall 1987, Durnwald 2004, Eglinton 1984, Flamm 1984, Gupta 2014, Hadley 1986, Hehir 2017, Jarrell 1985, Kishor 1986, Kwee 2007, Lai 1993, Meehan 1989, Meier 1982, Miller 1992, Morewood 1973, Paul 1985, Phelan 1987, Raynor 1993, Rietveld 2015, Stovall 1987, Yetman 1989), and 3 compared neuraxial analgesia to no neuraxial analgesia (Carlsson 1980, Grisaru-Granovsky 2017, Sakala 1990). One study (Kwee 2007) reported 2 comparisons, namely oxytocin versus no oxytocin for augmentation of labour, and emergency caesarean section versus continuation of labour.

There was no evidence identified for the following comparisons: routine insertion of an intravenous (IV) cannula versus no IV cannula; labour or birth in a birth pool versus labour or birth without a birth pool; amniotomy versus no amniotomy; fasting versus no fasting or consuming only clear fluids; antacid prophylaxis (ranitidine, omeprazole or sodium citrate) versus no antacid prophylaxis; limited mobility (supine position or restricted to the bed) versus unlimited mobility (upright positions or mobile); and use of scoring systems versus no use of scoring systems.

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, uterine rupture or dehiscence, placenta praevia in future pregnancies, hysterectomy, hypoxic ischaemic encephalopathy (HIE), and the important outcomes, maternal and neonatal mortality, emergency caesarean section, operative vaginal birth, and the outcome of limited importance, admission to HDU or ITU and duration of hospital stay. There was no evidence identified for the following maternal outcomes: pelvic adhesions complicating any future abdominopelvic surgery (critical outcome) and woman's experience of labour and birth, including experience of her birth companion (s), separation of the woman and baby and breastfeeding initiation (critical outcome), and the following neonatal outcome: major respiratory morbidity. In relation to major blood loss, only evidence on proxy (indirect) outcomes (postpartum haemorrhage and blood transfusion) was identified. In relation to maternal infectious morbidity (critical outcome), evidence on

the following outcomes was identified: febrile morbidity, febrile morbidity requiring antibiotics, endometritis, chorioamnionitis, postpartum fever, urinary tract infection, and wound infection). In relation to HIE (critical outcome), evidence on an additional proxy outcome (birth asphyxia) was identified. In relation to admission to HDU or ITU and duration of hospital stay (outcome of limited importance), evidence on an additional proxy outcome (duration of intrapartum and postpartum stay) 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
Oxytocin in the case of delay or suspected delay in labour versus no oxytocin				
Chelmow 1992 Retrospective cohort study USA	N=504 women with previous CS who attempted TOLAC; n=62 labours augmented with oxytocin, n=442 not augmented with oxytocin	Oxytocin versus no oxytocin for augmentation of labour	For the woman: • uterine rupture • hysterectomy • mortality • emergency CS • operative vaginal birth • febrile morbidity • duration of intrapartum and postpartum stay	In the oxytocin group, n=31/46 (67%) of women who gave birth vaginally had a spontaneous VB and n=15/46 (33%) had an assisted VB; In the no oxytocin group, n=194/245 (79%) of women who gave birth vaginally had a spontaneous VB and n=51/245 (21%) had an assisted VB
Kwee 2007 Prospective cohort The Netherlands	N=2592 women with previous CS who attempted TOLAC; n=536 labours augmented with oxytocin, n=2056 not augmented with oxytocin	Oxytocin versus no oxytocin for augmentation of labour	For the woman: • uterine rupture	Labour induction with oxytocin, prostaglandins, combination of the two, sulproston, misoprostol, or other means in n=682/3274 (20.8%) of women undergoing TOLAC. Labour augmentation

Study	Population	Intervention/ Comparison	Outcomes	Comments
				with oxytocin in n=536/3274 (16.4%) of women undergoing TOLAC. Of those attempting TOLAC 92% had 1 previous CS followed by 1 previous VB, and 73% had 1 previous VB followed by 1 previous CS
Emergency caesarean section versus continuation of labour				
Baker 1955 Retrospective cohort UK	N=83 women with previous CS who attempted TOLAC; n=74 achieved VB, n=9 had emergency CS	Emergency CS versus continuation of labour	For the woman: • placenta praevia as an indication for primary CS • mortality	Of those who achieved VB n=47/74 (64%) had a spontaneous VB and n=27/74 (36%) had an assisted VB
Brock 2016 Prospective cohort USA	N=5727 women with previous CS who attempted TOLAC; n=5640 achieved VB, n=87 had emergency CS	Emergency CS versus continuation of labour	For the woman: • uterine rupture or dehiscence • endometritis • hysterectomy For the baby: • perinatal mortality • hypoxic ischaemic encephalopathy	All women had spontaneous labour. Previous VB: n=3413 (61%) in VB group, n=17 (19.5%) in emergency CS group
Dhall 1987 Retrospective cohort India	N=590 women with previous CS who attempted TOLAC; n=452 achieved VB, n=138 had emergency CS	Emergency CS versus continuation of labour	For the baby: • perinatal mortality	Labour induction with pitocin in n=59/132 (44.7%) in VB group; n=248/590 (42%) had a previous VB and n=342/590 (58%) did not have a previous VB
Durnwald 2004 Retrospective cohort	N=522 women with previous CS who attempted TOLAC; n=344 achieved VB,	Emergency CS versus continuation of labour	For the woman: • postpartum haemorrhage • endometritis • chorioamnionitis • postpartum fewer	Oxytocin use: n=171/344 (49.7%) in VB group, n= 126/178 (70.8%) in emergency CS group

Study	Population	Intervention/ Comparison	Outcomes	Comments
USA	n=178 had emergency CS		• mortality For the baby: • mortality • birth asphyxia	Spontaneous labour: n=293/344 (85%) in VB group, n=136/178 (76%) in emergency CS group
Eglinton 1984 Retrospective cohort USA	N=308 women with previous CS who attempted TOLAC; n=240 achieved VB, n=68 had emergency CS	Emergency CS versus continuation of labour	For the woman: • dehiscence • febrile morbidity • hysterectomy • hospital stay For the baby: • perinatal mortality	Indications for use of oxytocin were the same as for women with an unscarred uterus (no further details reported)
Flamm 1984 Retrospective cohort USA	N=230 women with previous CS who attempted TOLAC; n=181 achieved VB, n=49 had emergency CS	Emergency CS versus continuation of labour	For the woman: • uterine rupture • febrile morbidity • blood transfusion • mortality • hospital stay	Labour induction or augmentation with pitocin in n=94/230 (41%)
Gupta 2014 Prospective cohort India	N=128 women with previous CS who attempted TOLAC; n=76 achieved VB, n=52 had emergency CS	Emergency CS versus continuation of labour	For the baby: • perinatal mortality • birth asphyxia	Oxytocin was used to accelerate labour in a few women (no further details reported). Of those who achieved VB n=40/76 (53%) gave birth without augmentation of labour
Hadley 1986 Retrospective cohort USA	N=40 women with previous CS who attempted TOLAC; n=32 achieved VB, n=8 had emergency CS	Emergency CS versus continuation of labour	For the woman: • uterine rupture • fever during labour • endometritis • urinary tract infection • wound infection • hysterectomy • mortality • hospital stay	Oxytocin use: n=4/32 (12.5%) in VB group, n=4/8 (50%) in emergency CS group. Of those who achieved VB n=23/32 (72%) had spontaneous labour, n=9/32 (28%) had an assisted VB

Study	Population	Intervention/ Comparison	Outcomes	Comments
Hehir 2017 Retrospective cohort Ireland	N=2222 women with previous CS who attempted TOLAC; n=1611 achieved VB, n=611 had emergency CS	Emergency CS versus continuation of labour	For the woman: • postpartum haemorrhage • hysterectomy • mortality	All women had spontaneous labour and 1 previous CS
Jarrell 1985 Retrospective cohort USA	N=216 women with previous CS who attempted TOLAC; n=142 achieved VB, n=74 had emergency CS	Emergency CS versus continuation of labour	For the woman: • febrile morbidity requiring antibiotics • wound infection • urinary tract infection • hospital stay	No oxytocin was given to those attempting TOLAC. Previous VB: n=33/142 (23%) in VB group, n=10/74 (14%) in emergency CS group
Kishor 1986 Retrospective cohort India	N=685 women with previous CS who attempted TOLAC; n=473 achieved VB, n=212 had emergency CS	Emergency CS versus continuation of labour	For the baby: • stillbirth	Labour induction or augmentation with pitocinon in n=144/685 (21%). Spontaneous labour: n=395/473 (84%) in VB group, n=31/212 (15%) in emergency CS group. One previous CS and >=1 previous VB: n=120/473 (25%) in VB group, n=42/212 (20%) in emergency CS group
Kwee 2007 Prospective cohort The Netherlands	N=3274 women with previous CS who attempted TOLAC; n=2487 achieved VB, n=787 had emergency CS	Emergency CS versus continuation of labour	For the woman: • uterine rupture • dehiscence	Labour induction with oxytocin, prostaglandins, combination of the two, sulproston, misoprostol, or other means in n=682/3274 (20.8%) of women undergoing TOLAC.

Study	Population	Intervention/ Comparison	Outcomes	Comments
				Labour augmentation with oxytocin in n=536/3274 (16.4%) of women undergoing TOLAC. Of those attempting TOLAC 92% had 1 previous CS followed by 1 previous VB, and 73% had 1 previous VB followed by 1 previous CS
Lai 1993 Retrospective cohort Singapore	N=99 women with previous CS who attempted TOLAC; n=64 achieved VB, n=35 had emergency CS	Emergency CS versus continuation of labour	For the woman: • dehiscence • blood transfusion • febrile morbidity • endometritis • urinary tract infection • mortality • hospital stay	Previous VB: n=33/64 (52%) in VB group, n=7/35 (20%) in emergency CS group. Spontaneous and not augmented labour: n=38/64 (59%) in VB group, n=28/35 (80%) in emergency CS group. Spontaneous and augmented labour: n=17/64 (27%) in VB group, n=5/35 (9%) in emergency CS group
Meehan 1989 Retrospective cohort Ireland	N=844 women with previous CS who attempted TOLAC; n=702 achieved VB, n=142 had emergency CS	Emergency CS versus continuation of labour	For the baby: • perinatal mortality	n=285/844 (34%) women attempting TOLAC had labour induced and the other 559/844 (66%) experienced spontaneous onset of labour
Meier 1982	N=207 women with previous CS who	Emergency CS versus continuation of labour	For the woman: • dehiscence • endometritis	Pitocin induction or augmentation was given to 34/175 (19%)

Study	Population	Intervention/ Comparison	Outcomes	Comments
Retrospective cohort USA	attempted TOLAC; n=175 achieved VB, n=32 had emergency CS		For the baby: • stillbirth	women in the VB group
Miller 1992 Prospective cohort Australia	N=125 women with previous CS who attempted TOLAC; n=80 achieved VB, n=45 had emergency CS	Emergency CS versus continuation of labour	For the woman: • hospital stay For the baby: • mortality • stillbirth	n=88/125 (64%) women attempting TOLAC received oxytocin in labour
Morewood 1973 Retrospective cohort Jamaica	N=243 women with previous CS who attempted TOLAC; n=171 achieved VB, n=72 had emergency CS	Emergency CS versus continuation of labour	For the woman: • uterine rupture • placenta praevia as an indication for primary CS • mortality For the baby: • perinatal mortality	In women not in established labour 6 to 12 hours after operative amniotomy, carefully titrated intravenous oxytocin was administered (no further details reported)
Paul 1985 Prospective cohort USA	N=751 women with previous CS who attempted TOLAC; n=614 achieved VB, n=137 had emergency CS	Emergency CS versus continuation of labour	For the woman: • dehiscence • febrile morbidity • hysterectomy • hospital stay	Oxytocin was administered to n=289 (38%) of those attempting TOLAC (of those n=32 underwent indicated induction of labour and n=257 received oxytocin augmentation to achieve adequate uterine activity)
Phelan 1987 Prospective cohort USA	N=1796 women with previous CS who attempted TOLAC; n=1465 achieved VB, n=331 had emergency CS	Emergency CS versus continuation of labour	For the woman: • dehiscence • febrile morbidity • hospital stay	Oxytocin use: induction n=59/1796 (3%) and augmentation n=734/1796 (41%) of t hose attempting TOLAC
Raynor 1993 Retrospective cohort	N=51 women with previous CS who	Emergency CS versus continuation of labour	For the woman: • postpartum haemorrhage	49% of women received oxytocin (no details given).

Study	Population	Intervention/ Comparison	Outcomes	Comments
USA	attempted TOLAC; n=31 achieved VB, n=20 had emergency CS			n=3 had a previous VB after CS (no further details reported)
Rietveld 2015 Prospective The Netherlands	N=5246 women with previous CS who attempted operative TOLAC; n=5027 achieved operative VB, n=219 had emergency CS	Emergency CS versus (operative) continuation of labour	For the woman: • uterine rupture • postpartum haemorrhage	All women had 1 previous CS only. Induction of labour in women with attempted operative VB was 48.2%
Stovall 1987 Prospective cohort USA	N=272 women with previous CS who attempted TOLAC; n=216 achieved VB, n=56 had emergency CS	Emergency CS versus continuation of labour	For the woman: • uterine rupture • mortality For the baby: • mortality	Oxytocin use: n=98/216 (45%) in VB group, n=35/56 (62%) in CS group
Yetman 1989 Retrospective cohort USA	N=224 women with previous CS who attempted TOLAC; n=137 achieved VB, n=87 had emergency CS	Emergency CS versus continuation of labour	For the woman: • haemorrhage	-
Neuraxial analgesia versus no neuraxial analgesia				
Carlsson 1980 Retrospective cohort study Sweden	N=119 women with previous CS who attempted TOLAC; n=77 extradural analgesia, n=42 no extradural analgesia	Extradural block versus no extradural block	For the woman: • dehiscence • emergency CS • operative vaginal birth	Oxytocin use: extradural analgesia group n=59 (77%); of these, labour was induced in n=25 and in n=34 spontaneous labour was accelerated; no extradural analgesia group n=17 (40%), of these, labour was induced in n=4 and in n=13

Study	Population	Intervention/ Comparison	Outcomes	Comments
				spontaneous labour was accelerated. No previous VB: n=66/77 (86%) in extradural analgesia group, n=32/42 (76%) in no extradural group
Grisaru-Granovsky 2017 Retrospective cohort study Israel	N=7149 women with previous CS who attempted TOLAC; n=4081 epidural, n=3068 no epidural	Neuraxial analgesia versus no neuraxial analgesia	For the woman: • uterine rupture • dehiscence • emergency CS • operative vaginal birth • postpartum haemorrhage • durations of hospital stay (>3 days for VB, >4 days for CS)	Labour induction: epidural group = 272 (6%), no epidural group = 99 (3.2%) Oxytocin use: epidural group = 1018 (24.9%), no epidural group = 268 (8.7%) Previous VB: epidural group = 2652/4081 (65%), no epidural group = 2542/3068 (83%). Spontaneous VB: n=3246/4081 (80%) in epidural group, n=2622/3068 (86%) in no epidural group
Sakala 1990 Retrospective cohort study USA	N=237 women with previous CS who attempted TOLAC; n=87 epidural, n=150 no epidural	Neuraxial analgesia versus no neuraxial analgesia	For the woman: • uterine rupture • blood transfusion • dehiscence • emergency CS • operative vaginal birth • endometritis	n=46 out of n=150 epidural group received no labour analgesia and n=104 received narcotic-sedative combinations (no further details reported). Of those who received epidural analgesia and oxytocin n=18/40 (45%) had a spontaneous VB and with no

Study	Population	Intervention/ Comparison	Outcomes	Comments
				oxytocin n=30/46 (65%) had a spontaneous VB. Of those who did not receive epidural analgesia but received oxytocin n=13/31 (42%) had a spontaneous VB and with no oxytocin n=82/118 (69%) had a spontaneous VB

CS: caesarean section; TOLAC: trial of labour after previous caesarean section; VB: vaginal birth

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

No full-text copies of articles were requested for this review and so there is no excluded studies list (see 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

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation (see Supplement 2 (Health economics)).

Evidence statements

Oxytocin in the case of delay or suspected delay in labour versus no oxytocin

Outcomes for the woman

Uterine rupture

Very low quality evidence from 1 prospective cohort study (N=2592) in women with a a previous caesarean section showed a clinically important difference in the incidence of uterine rupture with the rate being lower in women who did not have labour augmented with oxytocin compared to those who did have labour augmented with oxytocin. Very low quality evidence from 1 retrospective cohort study (N=504) in women with a previous caesarean section reported no events of uterine rupture in either group, therefore due to zero events no risk estimate could be calculated.

Febrile morbidity

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 retrospective cohort study (N=504) in women with a previous caesarean section showed no clinically important difference in the incidence of febrile morbidity between women who had labour augmented with oxytocin and those who did not have labour augmented with oxytocin.

Hysterectomy

Very low quality evidence from 1 retrospective cohort study (N=504) in women with a previous caesarean section reported no events of hysterectomy in either group, therefore due to zero events no risk estimate could be calculated.

Mortality

Very low quality evidence from 1 retrospective cohort study (N=504) in women with a previous caesarean section showed no mortality cases in either group, therefore due to zero events no risk estimate could be calculated.

Emergency caesarean section

Very low quality evidence from 1 retrospective cohort study (N=504) in women with a previous caesarean section showed a clinically important difference in the incidence of emergency caesarean section with the rate being lower in women who had labour augmented with oxytocin compared to those who did not have labour augmented with oxytocin.

Operative vaginal birth

Very low quality evidence from 2 retrospective cohort studies (N=504 and N=2592) in women with a previous caesarean section showed a clinically important difference in the incidence of operative vaginal birth with the rate being lower in women who did not have labour augmented with oxytocin compared to those who did have labour augmented with oxytocin.

Duration of intrapartum and postpartum stay

This outcome was included as it relates to the duration of hospital stay. Very low quality evidence from 1 retrospective cohort study (N=504) in women with a previous caesarean section reported the weighted mean hospital stay (in days) as 3.3 and 1.2 for women who had labour augmented with oxytocin and those who did not have labour augmented with oxytocin, respectively. However, the study authors did not report the standard deviation, thus no mean difference between the 2 groups could be calculated.

Emergency caesarean section versus continuation of labour

Outcomes for the woman

Uterine rupture

Very low quality evidence from 1 prospective cohort study (N=3274) in women with a previous caesarean section reported a clinically important difference in the incidence of uterine rupture with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section. Very low quality evidence from another prospective cohort study (N=5246) in women with a previous caesarean section showed no clinically important difference in the incidence of uterine rupture between the 2 groups of women. Very low quality evidence from 1 prospective (N=272) and 3 retrospective cohort studies in women with a previous caesarean section (N=40, N=230, and N=212) showed no events of uterine rupture in either group, therefore due to zero events no risk estimate could be calculated.

Dehiscence

Very low quality evidence from 1 prospective cohort study (N=1796) and 1 retrospective cohort study (N=308) in women with a previous caesarean section showed a clinically important difference in the incidence of dehiscence between women who gave birth vaginally and those who had an emergency caesarean section with the rate being lower in in women who gave birth vaginally compared to women who had an emergency caesarean section. However, very low quality evidence from 1 prospective cohort study (N=751) and 2 retrospective cohort studies (N=99 and N=207) in women with a previous caesarean section showed no clinically important difference in the incidence of dehiscence between the 2 groups of women.

Uterine rupture or dehiscence

Very low quality evidence from 1 prospective cohort study (N=5727) in women with a previous caesarean section reported a clinically important difference in the incidence of uterine rupture or dehiscence with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section.

Postpartum haemorrhage

This outcome was included as it might relate to major blood loss. Very low quality evidence from 1 retrospective cohort study (N=2222) in women with a previous caesarean section reported a clinically important difference in the incidence of postpartum haemorrhage with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section. Very low quality evidence from 1 prospective cohort study (N=5246) and 3 retrospective cohort studies (N=51, N=224, and N=522) in women with a previous caesarean section reported no clinically important difference in the incidence of postpartum haemorrhage between the 2 groups of women.

Blood transfusion

This outcome was included as it might relate to major blood loss. Very low quality evidence from 2 retrospective cohort studies (N=99 and N=230) in women with a previous caesarean section reported a clinically important difference in the number of women who required a blood transfusion with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section.

Febrile morbidity

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 2 prospective cohort studies (N=751 and N=1796) and 3 retrospective

cohort studies (N=99, N=230, and N=308) in women with a previous caesarean section reported a clinically important difference in the incidence of febrile morbidity with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section. Very low quality evidence from 1 retrospective cohort study (N=40) in women with a previous caesarean section reported no clinically important difference in the incidence of febrile morbidity between the 2 groups of women.

Febrile morbidity requiring antibiotics

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 retrospective study (N=216) in women with a previous caesarean section showed a clinically important difference in the incidence of febrile morbidity requiring antibiotics with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section.

Endometritis

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 prospective cohort study (N=5727) and 2 retrospective cohort studies (N=40 and N522) in women with a previous caesarean section reported a clinically important difference in the incidence of endometritis with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section. Very low quality evidence from 2 retrospective cohort studies (N=99 and N=207) in women with a previous caesarean section reported no clinically important difference in the incidence of endometritis in the 2 groups of women.

Chorioamnionitis

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 retrospective cohort study (N=522) in women with a previous caesarean section reported no clinically important difference in the incidence of chorioamnionitis between women who gave birth vaginally and those who had an emergency caesarean section.

Postpartum fever

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 retrospective cohort study (N=522) in women with a previous caesarean section reported a clinically important difference in the incidence of postpartum fever with the rate being lower in women who gave birth vaginally compared to women who had an emergency caesarean section.

Urinary tract infection

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 3 retrospective cohort studies (N=40, N=99, and N=216) in women with a previous caesarean section reported no clinically important difference in the incidence of urinary tract infection between the 2 groups of women.

Wound infection

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 retrospective cohort study (N=216) in women with a previous caesarean section reported no clinically important difference in the incidence of wound infection between women who gave birth vaginally and those had an emergency caesarean section. Very low quality evidence from 1 retrospective cohort

study (N=40) in women with a previous caesarean section showed no incidence of events of wound infection in wither group, therefore due to zero events no risk estimate could be calculated.

Placenta praevia as an indication for primary caesarean section

Very low quality evidence from 1 retrospective cohort study (N=242) in women with a previous caesarean section reported no clinically important difference in the rate of placenta praevia as an indication for primary caesarean section between women who gave birth vaginally and those had an emergency caesarean section. Very low quality evidence from 1 retrospective cohort study (N=83) in women with a previous caesarean section showed no events of placenta praevia as an indication for primary caesarean section in either group, therefore due to zero events no risk estimate could be calculated.

Hysterectomy

Very low quality evidence from 1 prospective cohort study (N=751) and 1 retrospective cohort study (N=2222) in women with a previous caesarean section reported no clinically important difference in the incidence of hysterectomy between women who gave birth vaginally and those had an emergency caesarean section. Very low quality evidence from 1 prospective cohort study (N=5727) and 2 retrospective (N=40 and N=308) cohort studies in women with a previous caesarean section showed no events of hysterectomy in either group, therefore due to zero events no risk estimate could be calculated.

Mortality

Very low quality evidence from 1 retrospective cohort study (N=2222) in women with a previous caesarean section reported no clinically important difference in the incidence of maternal mortality between women who gave birth vaginally and those who had an emergency caesarean section. Very low quality evidence from 1 prospective cohort study (N=272) and 6 retrospective cohort studies (N=40, N=83, N=99, N=230, N=242, and N=522) in women with a previous caesarean section showed no mortality cases in either group, therefore due to zero events no risk estimate could be calculated.

Duration of hospital stay

Very low quality evidence from 1 prospective (N=125) and 2 retrospective (N=216 and N=308) cohort studies in women with a previous caesarean section reported a clinically important difference in the average duration of hospital stay (days) with the duration being shorter in women who gave birth vaginally compared to women who had an emergency caesarean section. Very low quality evidence from 2 prospective (N=751 and N=1796) and 3 retrospective (N=40, N=99, and N=230) cohort studies in women with a previous caesarean section reported the average hospital stay ranging between 2.2 and 3.13 days for women who gave birth vaginally, and between 4.2 and 6.9 days for those who had an emergency caesarean section. However, the study authors did not report the standard deviation, thus no mean difference in duration of hospital stay could be calculated.

Outcomes for the baby

Hypoxic ischaemic encephalopathy

Very low quality evidence from 1 prospective cohort study (N=5727) in women with a previous caesarean section reported a clinically important difference in the incidence

of HIE with the rate being lower in babies born vaginally compared to those born via an emergency caesarean section.

Birth asphyxia

This outcome was included as it might relate to HIE. Very low quality evidence from 1 prospective cohort study (N=128) and 1 retrospective cohort study (N=522) in women with a previous caesarean section reported no clinically important difference in the incidence of birth asphyxia between babies born vaginally and those born via an emergency caesarean section.

Mortality

Very low quality evidence from 1 prospective cohort study (N=125) in women with a previous caesarean section reported no clinically important difference in incidence of mortality between babies born vaginally and those born via an emergency caesarean section. Very low quality evidence from 1 prospective cohort study (N=272) in women with a previous caesarean section reported no mortality cases in either group, therefore due to zero events no risk estimate could be calculated.

Perinatal mortality

Very low quality evidence from 1 prospective cohort study (N=128) and 2 retrospective cohort studies (N=242 and N=308n=550) in women with a previous caesarean section reported no clinically important difference in the incidence of perinatal mortality between babies born vaginally and those born via an emergency caesarean section. Very low quality evidence from 1 prospective cohort study (N=5728) in women with a previous caesarean section reported no perinatal mortality cases in either group, therefore due to zero events no risk estimate could be calculated.

Perinatal mortality (including stillbirths and neonatal deaths occurring from 28 completed weeks of gestation to 4 weeks after the birth; including babies weighing 500 g or less, with a gestational age of >=28 weeks, showing signs of life but dying within 7 days)

Very low quality evidence from 1 retrospective cohort study (N=856) in women with a previous caesarean section reported a clinically important difference in the incidence of perinatal mortality with the rate being lower in babies born vaginally compared to babies born via an emergency caesarean section.

Perinatal mortality (including stillbirths and neonatal deaths, corrected for congenital malformation, macerated stillbirths and cases of extreme prematurity)

Very low quality evidence from 1 retrospective cohort study (N=590) in women with a previous caesarean section reported no clinically important difference in the incidence of perinatal mortality between babies born vaginally and those born via an emergency caesarean section.

Mortality (birth to 28 days of life)

Very low quality evidence from 1 retrospective cohort study in women with a previous caesarean section (N=522) reported no events of mortality in either group, therefore due to zero events no risk estimate could be calculated.

Stillbirth

Very low quality evidence from 1 prospective cohort study (N=125) and 2 retrospective cohort studies (N=207 and N=685) in women with a previous caesarean section reported no clinically important difference in the incidence of stillbirth between babies born vaginally and those born via an emergency caesarean section.

Neuraxial analgesia versus no neuraxial analgesia

Outcomes for the woman

Uterine rupture

Very low quality evidence from 1 retrospective cohort study (N=7149) in women with a previous caesarean section showed no clinically important difference in the incidence of uterine rupture between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not. Another retrospective cohort study (N=237, very low quality evidence) in women with a previous caesarean section reported no uterine rupture cases in either group, therefor due to zero events no risk estimate could be calculated.

Dehiscence

Very low quality evidence from 2 retrospective cohort studies (N=237 and N=7149) in women with a previous caesarean section showed no clinically important difference in the incidence of dehiscence between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Postpartum haemorrhage

This outcome was included as it might relate to major blood loss. Very low quality evidence from 1 retrospective cohort study (N=7149) in women with a previous caesarean section showed no clinically important difference in the incidence of postpartum haemorrhage between the 2 groups of women.

Blood transfusion

This outcome was included as it might relate to postpartum haemorrhage. Very low quality evidence from 1 retrospective cohort study (N=237) in women with a previous caesarean section showed no clinically important difference in the need for blood transfusion between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Endometritis

This outcome was included as it might relate to infectious morbidity. Very low quality evidence from 1 retrospective cohort study (N=237) in women with a previous caesarean section showed no clinically important difference in the incidence of endometritis between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Emergency caesarean section

Very low quality evidence from 1 retrospective cohort study (N=7149) in women with a previous caesarean section showed a clinically important difference in the incidence of emergency caesarean section with the rate being lower in women who received neuraxial analgesia during a trial of labour after previous caesarean section compared to those who did not. Another retrospective cohort study (N=237, very low quality evidence) in women with a previous caesarean section showed no clinically

important difference in the number of an emergency caesarean section between the 2 groups of women.

Operative vaginal birth

Very low quality evidence from 2 retrospective cohort studies (N=237 and N=7149) in women with a previous caesarean section showed a clinically important difference in the number of operative vaginal births with the rate being lower in women who did not receive neuraxial analgesia during a trial of labour after previous caesarean section compared to those who received it.

Prolonged hospital stay (duration of hospital stay >3 days for vaginal birth and >4 days for caesarean section)

Very low quality evidence from 1 retrospective cohort study (N=7149) in women with a previous caesarean section showed no clinically important difference in prolonged hospital stay between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Dehiscence in oxytocin-stimulated labour

Very low quality evidence from 1 retrospective cohort study (N=76) in women with a previous caesarean section who were given oxytocin to stimulate labour showed no clinically important difference in the incidence of dehiscence between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Emergency caesarean section in oxytocin-stimulated labour

Very low quality evidence from 1 retrospective cohort study (N=76) in women with a previous caesarean section who were given oxytocin to stimulate labour showed no clinically important difference in the incidence of an emergency caesarean section between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Operative vaginal birth in oxytocin-stimulated labour

Very low quality evidence from 1 retrospective cohort study (N=76) in women with a previous caesarean section who were given oxytocin to stimulate labour showed no clinically important difference in the number of operative vaginal births between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Dehiscence in spontaneous labour

Very low quality evidence from 1 retrospective cohort study (N=43) in women with a previous caesarean section who had spontaneous labour showed no clinically important difference in the incidence of dehiscence between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Emergency caesarean section in spontaneous labour

Very low quality evidence from 1 retrospective cohort study (N=43) in women with a previous caesarean section who had spontaneous labour showed no clinically important difference in the incidence of an emergency caesarean section between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

Operative vaginal birth in spontaneous labour

Very low quality evidence from 1 retrospective cohort study (N=43) in women with a previous caesarean section who had spontaneous labour showed no clinically important difference in the number of operative vaginal births between women who received neuraxial analgesia during a trial of labour after previous caesarean section and those who did not.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee prioritised major maternal morbidities such as uterine rupture or dehiscence, major blood loss (>1000 ml), infectious morbidity, placenta praevia or accreta in future pregnancies, pelvic adhesions complicating any future abdominopelvic surgery, or hysterectomy as critical outcomes because these are serious and potentially life-impacting complications specific to women with 1 or more previous caesarean sections and likely to inform and influence recommendations for women and the choices they make about care.

The committee also rated the women's experience of labour and birth, including experience of her birth companion(s), separation of the woman and the baby and breastfeeding initiation as critical outcomes because they agreed this was essential information to support women's informed choice and they were aware that women's choice of intervention is often restricted when they have had a previous caesarean section. The committee considered major neonatal morbidities such as respiratory and HIE to be critical outcomes because these underpin the rationale for interventions that are often recommended currently to avoid neonatal morbidities and thus they affect the choices women make. The committee rated mortality in the baby from any cause as an important outcome rather than a critical outcome because it occurs less frequently than morbidity in the baby, but it was agreed that interventions are often recommended to avoid mortality and morbidity.

The committee rated maternal mortality as an important rather than critical outcome because it is rare. They rated emergency caesarean section and instrumental birth as important outcomes for all comparisons except continuation of labour versus emergency caesarean section) because these interventions are likely to impact negatively on the woman and her birth companion(s)' experience of labour and birth, the mother-baby breastfeeding relationship and the woman's perinatal mental health.

The quality of the evidence

No randomised controlled trials were identified. Included studies were either prospective or 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 bias and imprecision.

The committee agreed to downgrade the outcome febrile morbidly for indirectness because fever in labour is not a good proxy for infectious morbidity (fever in labour is not necessarily due to an infection). The committee discussed that fever is to be avoided because it can have harmful effects, but it is not a good proxy for infection.

Benefits and harms

Evidence was identified for 3 comparisons specified in the review protocol: emergency caesarean section versus continuation of labour; oxytocin versus no oxytocin; and regional (neuraxial) analgesia versus no regional (neuraxial) analgesia.

Based on the evidence and their expertise the committee agreed that women in labour with a previous caesarean section should be informed that a vaginal birth is associated with a small chance of uterine rupture, that performing an emergency caesarean section may be associated with increased risks of heavy bleeding (potentially needing a blood transfusion), infection, a longer hospital stay, and that future pregnancies may be complicated by, for example, placenta praevia or placenta accreta (see the NICE guideline on caesarean section (CG132) for further details).

There was no strong evidence to suggest a difference in outcomes for the baby between a vaginal birth or a repeat caesarean section, and the committee felt that healthcare professionals should inform women about this to aid decisions about mode of birth.

The committee emphasised that women with a previous caesarean section and who have also had a previous vaginal birth are likely to have a lower risk of complications during labour and women should be informed of this.

Although no evidence was found regarding routine insertion of an intravenous cannula versus no intravenous cannula, labour or birth in a birthing pool versus labour or birth without a birthing pool, amniotomy versus no amniotomy, fasting versus no fasting (or clear fluids only), limited mobility (supine position or being restricted to the bed) versus unlimited mobility (upright positions or being mobile) the committee felt confident in making recommendations regarding some of these interventions based upon their collective knowledge, experience and expertise while taking into consideration the effective use of NHS resources.

The committee agreed that for a woman in labour with a previous caesarean section the risk of needing intravenous access for an urgent blood transfusion would not necessarily be higher than for a woman in labour without a previous caesarean section. The committee also agreed that it was important to take women's experiences into account and they noted that inserting an intravenous cannula may be unpleasant for women. They decided, therefore, not to recommend routine insertion of an intravenous cannula. Based on their experience, many women in labour with a previous caesarean section would have an intravenous cannula inserted routinely in current practice, and so they emphasised that this was not necessary by including a 'do not routinely do' recommendation.

The committee discussed the evidence and agreed that healthcare professionals should inform women in labour with a previous caesarean section that using oxytocin for a delay in the first or second stage of labour, or using regional analgesia, is associated with a reduced chance of needing another caesarean section. However, augmentation of labour with oxytocin, and use of regional analgesia, might have an increased chance of an instrumental vaginal birth. The committee emphasised the importance of communicating this information to women so that they can make fully informed decisions about mode of birth. They also agreed that the increased chance of uterine rupture with augmentation of labour using oxytocin was a priority to be communicated to the woman, as this would be a more serious outcome than the chance of another caesarean section or the chance of an instrumental birth.

Based on their knowledge, experience and expertise, the committee agreed that women in labour with a previous caesarean section should be offered a full range of

options for pain relief, including labour and birth in water. Although no evidence was identified for inclusion for this aspect of the review, the committee agreed strongly that an absence of evidence in support of using the birthing pool should not be interpreted as meaning that labour and birth in water is contraindicated for this group of women.

No evidence was found for routine amniotomy in women in labour with a previous caesarean section. The committee used their experience and expertise to recommend that amniotomy should not be offered routinely. However, they recognised that amniotomy might sometimes be offered to women with a previous caesarean section: in line with the NICE guideline on intrapartum care for healthy women and babies (CG190) amniotomy might be offered if there was a delay in labour.

The committee was aware of recommendations in the NICE guideline on intrapartum care for healthy women and babies (CG190) with regard to food and drink in labour, controlling gastric acidity, and position in labour (including the latent first stage) and birth. In the absence of any evidence to modify routine practice for women in labour with a previous caesarean section, the committee agreed that the recommendations in the NICE guideline on intrapartum care for healthy women and babies (CG190) should be followed for this group of women.

There was no evidence for the use of scoring systems to direct management of labour and birth for women in labour with a previous caesarean section and the committee decided not to make any recommendations for this aspect of intrapartum care.

Cost effectiveness and resource use

The committee considered that there was no evidence to support routine intravenous cannulation for women in labour with a previous caesarean section and therefore noted that the recommendation not to routinely insert an intravenous cannula for these women would be cost saving for the NHS.

The committee did not think there was compelling clinical evidence to recommend one mode of birth over another for women in labour who have had a previous caesarean section. However, they believed that their recommendations supporting women's birth choices, including continuation of labour, could lead to cost savings for the healthcare system.

The committee noted that there is considerable variation in practice with how the first and second stages of labour are managed for women with a previous caesarean section, but they did not anticipate that their recommendations would have a significant resource impact for the NHS.

Other factors the committee took into account

The committee was aware that continuous cardiotocography is usually advised for women in labour who have had a previous caesarean section because of an increased risk of serious medical problems for the baby. They noted that the NICE guideline on caesarean section (CG132) recommends offering women planning a vaginal birth who have had a previous caesarean section continuous cardiotocography during labour. In terms of offering continuous cardiotocography to women in labour who have had a previous caesarean section , the committee noted that it is uncertain whether continuous cardiotocography allows risk to be identified sooner than if intermittent auscultation is used. The committee agreed to include

specific recommendations to offer continuous cardiotocography to women in labour with a previous caesarean section if using oxytocin for delay in the first or second stage of labour, or if performing amniotomy, while making a research recommendation to inform future guidance (see Appendix L – Research recommendations for further details).

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Appendices

Appendix A – Review protocol

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

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 previous caesarean section – management of the first and second stages of labour	
Review question in the scope	How should the first and second stages of labour be managed for women with previous caesarean section?	
Review question for the guideline	How should the first and second stages of labour be managed for women with previous caesarean section?	
Objective	The aim of this review is to determine how the first and second stages of labour should be managed for women with previous caesarean section. In developing the review protocol the committee was aware that the overall caesarean birth rate in England for 2013–2014 was 26.2% (HSCIC 2015)	
Population and directness	Women in the first or second stage of labour with 1 or more previous caesarean sections Studies in which up to 34% of the women have multiple pregnancy will be included. Evidence in which any of the women have multiple pregnancy should be downgraded for indirectness.	
Intervention	Intervention 1 Routine insertion of IV cannula Intervention 2 Oxytocin in the case of suspected or confirmed delay in labour Intervention 3 Emergency caesarean section Intervention 4 Labour or birth in a birth pool Intervention 5 Neuraxial analgesia Intervention 6 Amniotomy	

Item	Details	Working notes
	Intervention 7 Fasting (no food or drink) Intervention 8 Antacid prophylaxis (ranitidine, omeprazole or sodium citrate) Intervention 9 Limited mobility (supine, or restricted to the bed) Intervention 10 Use of scoring systems (for example, VBAC or TOLAC)	
Comparison	Comparison 1 No IV cannula Comparison 2 No oxytocin Comparison 3 Continuation of labour Comparison 4 Labour or birth without birth pool Comparison 5 No neuraxial analgesia (the woman will not be having neuraxial analgesia but she might be having pharmacological analgesia such as paracetamol, codeine, morphine or pethidine) Comparison 6 No amniotomy Comparison 7 • Not fasting • Clear fluids only Comparison 8 No antacid prophylaxis Comparison 9 Unlimited mobility (upright positions, or mobile) Comparison 10 No use of scoring systems	

Outcomes	Critical outcomes
	• for the woman:
	  ○ major morbidities:
	  - uterine rupture or dehiscence	

Item	Details	Working notes
	- major blood loss (>1000 ml) - infectious morbidity - placenta praevia and/or accreta in future pregnancies or pelvic adhesions complicating any future abdominopelvic surgery - hysterectomy ○ woman's experience of labour and birth, including experience of the birth companion, separation of the woman and baby and breastfeeding initiation • for the baby: ○ major morbidities (respiratory and HIE) <u>Important outcomes</u> • for the woman: ○ mortality ○ emergency caesarean section/operative vaginal birth for all comparisons except comparison 3 • for the baby: ○ mortality from any cause Outcomes of limited importance • for the woman: ○ admission to HDU/ITU and duration of hospital stay	
Importance of outcomes	Preliminary classification of the outcomes for decision making: • critical (up to 3 outcomes) • important but not critical (up to 3 outcomes) • of limited importance (1 outcome)	
Setting	All birth settings	
Stratified, subgroup and adjusted analyses	Groups that will be reviewed and analysed separately: • spontaneous versus induced labour • first stage of labour versus second stage of labour • number of previous caesarean sections • previous vaginal birth • women who had planned an elective section In the presence of heterogeneity, the following subgroups will be considered for sensitivity analysis: • women with previous uterine rupture • women with classical caesarean scar versus low transverse incision scar versus low vertical incision scar • women with complicated uterine scars • gestational age • presentation • additional obstetric complications • BMI • duration of labour • ruptured membranes • myomectomy	

Item	Details	Working notes
	Potential confounders: • maternal age • previous vaginal birth • duration of labour • BMI • size of the baby	
Language	English	
Study design	• Published full text papers only • Systematic reviews • RCTs • Only if RCTs unavailable or there is limited data to inform decision making: ○ prospective or retrospective comparative observational studies (including cohort and case-control studies) • Prospective study designs will be prioritised over retrospective study designs • Conference abstracts will not be considered	The committee agreed that as there were no prospective studies to be included for some intervention-comparison pairs that retrospective studies would be considered for all intervention-comparison pairs
Search strategy	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA and Embase. Limits (e.g. date, study design): All study designs. Apply standard animal/non-English language filters. No date limit. Supplementary search techniques: No supplementary search techniques were used. See appendix B for full strategies	
Review strategy	Appraisal of methodological quality: • 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 • if studies report only p-values, this information will be recorded in GRADE tables without an assessment of imprecision Synthesis of data: • meta-analysis will be conducted where appropriate • default MIDs 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 • 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	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 not prioritised for health economic analysis and so no formal dual weeding, study selection (inclusion/exclusion) or

Item	Details	Working notes
		data extraction into evidence tables will be undertaken. However, 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 selection and data extraction
Equalities	Equalities considerations will be considered systematically in relation to the available evidence and draft recommendations. The guideline scope includes women with cognitive or physical disability as populations for whom there may be equalities issues. 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.	
Notes/additional information	• Health & Social Care Information Centre (HSCIC). Hospital Episode Statistics. NHS Maternity Statistics – England, 2013-14, 2015 (http://content.digital.nhs.uk/catalogue/PUB16725/nhs-mate-eng-2013-14-summ-repo-rep.pdf)	
Key papers	• Birth after Previous Caesarean Birth, Green-top Guideline No. 45, 2015 (https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg45/) • Caesarean section. Clinical guideline [CG132], 2011 (https://www.nice.org.uk/guidance/cg132/resources/caesarean-section-35109507009733) • Metz T. et al. Simple, Validated Vaginal Birth After Cesarean Delivery Prediction Model for Use at the Time of Admission. Obstetrics and Gynecology 2013.122:571–8	

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; ERCS: elective repeat caesarean section; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HDU: high dependency unit; HSCIC: Health & Social Care Information Centre; HIE: hypoxic ischaemic encephalopathy; HTA: Health Technology Assessment; IV: intravenous; ITU: intensive therapy unit; MID: minimally important difference; NGA: National Guideline Alliance; NICE: National Institute for Health and Care Excellence; RCOG: Royal College of Obstetricians and Gynaecologists; RCT: randomised controlled trial; RoB: risk of bias; ROBIS: Risk of Bias in Systematic Reviews; SD: standard deviation; TOLAC: trial of labour after previous caesarean section; VBAC: vaginal birth after previous caesarean section

Appendix B – Literature search strategies

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

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

#	Searches
1	CESAREAN SECTION, REPEAT/
2	CESAREAN SECTION/ and (repeat$ or previous$).ti.
3	CESAREAN SECTION/ and (repeat$ or previous$).ab. /freq=2
4	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (repeat$ or previous$)).ti,ab.
5	VAGINAL BIRTH AFTER CESAREAN/
6	(vagina$ adj1 (birth$ or born or deliver$) adj2 after$ adj2 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
7	VBAC.ti,ab.
8	TRIAL OF LABOR/ and CESAREAN SECTION/
9	(trial adj2 labo?r adj3 after$ adj3 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
10	TOLAC.ti,ab.
11	or/1-10
12	CANNULA/
13	cannula?.ti,ab.
14	or/12-13
15	OXYTOCIN/
16	(Oxytocin? or Pitocin? or syntocinon?).mp.
17	or/15-16
18	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (emergenc$ or during labo?r$)).ti,ab.
19	HYDROTHERAPY/
20	hydrotherap$.ti,ab.
21	BATHS/
22	((birth$ or water) adj3 pool?).ti,ab.
23	(birth$ adj3 water).ti,ab.
24	or/19-23
25	ANALGESIA, EPIDURAL/
26	INJECTIONS, EPIDURAL/
27	((Spinal$ or spinous$) adj5 analges$).ti,ab.
28	epidural$.ti,ab.
29	CSE.ti,ab.
30	((central$ or regional$) adj5 neuraxial$ adj5 block$).ti,ab.

#	Searches
31	(neuraxial$ adj5 analges$).ti,ab.
32	or/25-31
33	ANALGESIA, PATIENT-CONTROLLED/
34	(patient? adj3 control$ adj3 analges$).ti,ab.
35	ANALGESIA, OBSTETRICAL/
36	(obstetric$ adj3 analges$).ti,ab.
37	or/33-36
38	AMNION/su [Surgery]
39	Amniotom$.ti,ab.
40	(artificial$ adj3 ruptur$ adj3 membrane?).ti,ab.
41	AROM.ti,ab.
42	or/38-41
43	FASTING/
44	fasting.ti,ab.
45	(no adj3 (food? or drink$)).ti,ab.
46	"nil by mouth".ti,ab.
47	or/43-46
48	exp ANTACIDS/
49	(Antacid? or Aluminum Hydroxide or Bismuth or Calcium Carbonate or Magnesium Hydroxide or Magnesium Oxide or sodium citrate).mp.
50	RANITIDINE/
51	Ranitidine.mp.
52	OMEPRAZOLE/
53	omeprazole.mp.
54	or/48-53
55	BED REST/
56	(bed? adj3 rest$).ti,ab.
57	SUPINE POSITION/
58	supine$.ti,ab.
59	(limit$ adj3 mobil$).ti,ab.
60	or/55-59
61	(scor$ adj3 (system? or tool?)).ti,ab.
62	(scor$ adj3 (VBAC or TOLAC)).ti,ab.
63	(screen$ adj3 (system? or tool?)).ti,ab.
64	or/61-63
65	11 and 14
66	11 and 17
67	11 and 18
68	11 and 24
69	11 and 32
70	11 and 37

#	Searches
71	11 and 42
72	11 and 47
73	11 and 54
74	11 and 60
75	11 and 64
76	or/65-75
77	limit 76 to english language
78	LETTER/
79	EDITORIAL/
80	NEWS/
81	exp HISTORICAL ARTICLE/
82	ANECDOTES AS TOPIC/
83	COMMENT/
84	CASE REPORT/
85	(letter or comment*).ti.
86	or/78-85
87	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
88	86 not 87
89	ANIMALS/ not HUMANS/
90	exp ANIMALS, LABORATORY/
91	exp ANIMAL EXPERIMENTATION/
92	exp MODELS, ANIMAL/
93	exp RODENTIA/
94	(rat or rats or mouse or mice).ti.
95	or/88-94
96	77 not 95

Database: Cochrane Central Register of Controlled Trials

#	Searches
1	CESAREAN SECTION, REPEAT/
2	CESAREAN SECTION/ and (repeat$ or previous$).ti.
3	CESAREAN SECTION/ and (repeat$ or previous$).ab. /freq=2
4	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (repeat$ or previous$)).ti,ab.
5	VAGINAL BIRTH AFTER CESAREAN/
6	(vagina$ adj1 (birth$ or born or deliver$) adj2 after$ adj2 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
7	VBAC.ti,ab.
8	TRIAL OF LABOR/ and CESAREAN SECTION/
9	(trial adj2 labo?r adj3 after$ adj3 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
10	TOLAC.ti,ab.

#	Searches
11	or/1-10
12	CANNULA/
13	cannula?.ti,ab,kw.
14	or/12-13
15	OXYTOCIN/
16	(Oxytocin? or Pitocin? or syntocinon?).mp.
17	or/15-16
18	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (emergenc$ or during labo?r$)).ti,ab.
19	HYDROTHERAPY/
20	hydrotherap$.ti,ab,kw.
21	BATHS/
22	((birth$ or water) adj3 pool?).ti,ab.
23	(birth$ adj3 water).ti,ab.
24	or/19-23
25	ANALGESIA, EPIDURAL/
26	INJECTIONS, EPIDURAL/
27	((Spinal$ or spinous$) adj5 analges$).ti,ab.
28	epidural$.ti,ab.
29	CSE.ti,ab.
30	((central$ or regional$) adj5 neuraxial$ adj5 block$).ti,ab.
31	(neuraxial$ adj5 analges$).ti,ab.
32	or/25-31
33	ANALGESIA, PATIENT-CONTROLLED/
34	(patient? adj3 control$ adj3 analges$).ti,ab.
35	ANALGESIA, OBSTETRICAL/
36	(obstetric$ adj3 analges$).ti,ab.
37	or/33-36
38	AMNION/su [Surgery]
39	Amniotom$.ti,ab,kw.
40	(artificial$ adj3 ruptur$ adj3 membrane?).ti,ab.
41	AROM.ti,ab.
42	or/38-41
43	FASTING/
44	fasting.ti,ab,kw.
45	(no adj3 (food? or drink$)).ti,ab.
46	"nil by mouth".ti,ab.
47	or/43-46
48	exp ANTACIDS/
49	(Antacid? or Aluminum Hydroxide or Bismuth or Calcium Carbonate or Magnesium Hydroxide or Magnesium Oxide or sodium citrate).mp.

#	Searches
50	RANITIDINE/
51	Ranitidine.mp.
52	OMEPRAZOLE/
53	omeprazole.mp.
54	or/48-53
55	BED REST/
56	(bed? adj3 rest$).ti,ab.
57	SUPINE POSITION/
58	supine$.ti,ab.
59	(limit$ adj3 mobil$).ti,ab.
60	or/55-59
61	(scor$ adj3 (system? or tool?)).ti,ab.
62	(scor$ adj3 (VBAC or TOLAC)).ti,ab.
63	(screen$ adj3 (system? or tool?)).ti,ab.
64	or/61-63
65	11 and 14
66	11 and 17
67	11 and 18
68	11 and 24
69	11 and 32
70	11 and 37
71	11 and 42
72	11 and 47
73	11 and 54
74	11 and 60
75	11 and 64
76	or/65-75

Database: Cochrane Database of Systematic Reviews

#	Searches
1	CESAREAN SECTION, REPEAT.kw.
2	CESAREAN SECTION.kw. and (repeat$ or previous$).ti.
3	CESAREAN SECTION.kw. and (repeat$ or previous$).ab. /freq=2
4	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (repeat$ or previous$)).ti,ab.
5	VAGINAL BIRTH AFTER CESAREAN.kw.
6	(vagina$ adj1 (birth$ or born or deliver$) adj2 after$ adj2 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
7	VBAC.ti,ab.
8	(TRIAL OF LABOR and CESAREAN SECTION).kw.
9	(trial adj2 labo?r adj3 after$ adj3 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.

#	Searches
10	TOLAC.ti,ab.
11	or/1-10
12	CANNULA.kw.
13	cannula?.ti,ab.
14	or/12-13
15	OXYTOCIN.kw.
16	(Oxytocin? or Pitocin? or syntocinon?).mp.
17	or/15-16
18	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (emergenc$ or during labo?r$)).ti,ab.
19	HYDROTHERAPY.kw.
20	hydrotherap$.ti,ab.
21	BATHS.kw.
22	((birth$ or water) adj3 pool?).ti,ab.
23	(birth$ adj3 water).ti,ab.
24	or/19-23
25	ANALGESIA, EPIDURAL.kw.
26	INJECTIONS, EPIDURAL.kw.
27	((Spinal$ or spinous$) adj5 analges$).ti,ab.
28	epidural$.ti,ab.
29	CSE.ti,ab.
30	((central$ or regional$) adj5 neuraxial$ adj5 block$).ti,ab.
31	(neuraxial$ adj5 analges$).ti,ab.
32	or/25-31
33	ANALGESIA, PATIENT-CONTROLLED.kw.
34	(patient? adj3 control$ adj3 analges$).ti,ab.
35	ANALGESIA, OBSTETRICAL.kw.
36	(obstetric$ adj3 analges$).ti,ab.
37	or/33-36
38	AMNION.kw.
39	Amniotom$.ti,ab.
40	(artificial$ adj3 ruptur$ adj3 membrane?).ti,ab.
41	AROM.ti,ab.
42	or/38-41
43	FASTING.kw.
44	fasting.ti,ab.
45	"nil by mouth".ti,ab.
46	or/43-45
47	ANTACIDS.kw.
48	(Antacid? or Aluminum Hydroxide or Bismuth or Calcium Carbonate or Magnesium Hydroxide or Magnesium Oxide or sodium citrate).mp.

#	Searches
49	RANITIDINE.kw.
50	Ranitidine.mp.
51	OMEPRAZOLE.kw.
52	omeprazole.mp.
53	or/47-52
54	BED REST.kw.
55	(bed? adj3 rest$).ti,ab.
56	SUPINE POSITION.kw.
57	supine$.ti,ab.
58	(limit$ adj3 mobil$).ti,ab.
59	or/54-58
60	(scor$ adj3 (system? or tool?)).ti,ab.
61	(scor$ adj3 (VBAC or TOLAC)).ti,ab.
62	(screen$ adj3 (system? or tool?)).ti,ab.
63	or/60-62
64	11 and 14
65	11 and 17
66	11 and 18
67	11 and 24
68	11 and 32
69	11 and 37
70	11 and 42
71	11 and 46
72	11 and 53
73	11 and 59
74	11 and 63
75	or/64-74

Database: Database of Abstracts of Reviews of Effects

#	Searches
1	CESAREAN SECTION, REPEAT.kw.
2	CESAREAN SECTION.kw. and (repeat$ or previous$).tw.
3	CESAREAN SECTION.kw. and (repeat$ or previous$).tx.
4	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (repeat$ or previous$)).tw,tx.
5	VAGINAL BIRTH AFTER CESAREAN.kw.
6	(vagina$ adj1 (birth$ or born or deliver$) adj2 after$ adj2 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).tw,tx.
7	VBAC.tw,tx.
8	(TRIAL OF LABOR and CESAREAN SECTION).kw.
9	(trial adj2 labo?r adj3 after$ adj3 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).tw,tx.

#	Searches
10	TOLAC.tw,tx.
11	or/1-10
12	CANNULA.kw.
13	cannula?.tw,tx.
14	or/12-13
15	OXYTOCIN.kw.
16	(Oxytocin? or Pitocin? or syntocinon?).mp.
17	or/15-16
18	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (emergenc$ or during labo?r$)).tw,tx.
19	HYDROTHERAPY.kw.
20	hydrotherap$.tw,tx.
21	BATHS.kw.
22	((birth$ or water) adj3 pool?).tw,tx.
23	(birth$ adj3 water).tw,tx.
24	or/19-23
25	ANALGESIA, EPIDURAL.kw.
26	INJECTIONS, EPIDURAL.kw.
27	((Spinal$ or spinous$) adj5 analges$).tw,tx.
28	epidural$.tw,tx.
29	CSE.tw,tx.
30	((central$ or regional$) adj5 neuraxial$ adj5 block$).tw,tx.
31	(neuraxial$ adj5 analges$).tw,tx.
32	or/25-31
33	ANALGESIA, PATIENT-CONTROLLED.kw.
34	(patient? adj3 control$ adj3 analges$).tw,tx.
35	ANALGESIA, OBSTETRICAL.kw.
36	(obstetric$ adj3 analges$).tw,tx.
37	or/33-36
38	AMNION.kw.
39	Amniotom$.tw,tx.
40	(artificial$ adj3 ruptur$ adj3 membrane?).tw,tx.
41	AROM.tw,tx.
42	or/38-41
43	FASTING.kw.
44	fasting.tw,tx.
45	"nil by mouth".tw,tx.
46	or/43-45
47	ANTACIDS.kw.
48	(Antacid? or Aluminum Hydroxide or Bismuth or Calcium Carbonate or Magnesium Hydroxide or Magnesium Oxide or sodium citrate).mp.

#	Searches
49	RANITIDINE.kw.
50	Ranitidine.mp.
51	OMEPRAZOLE.kw.
52	omeprazole.mp.
53	or/47-52
54	BED REST.kw.
55	(bed? adj3 rest$).tw,tx.
56	SUPINE POSITION.kw.
57	supine$.tw,tx.
58	(limit$ adj3 mobil$).tw,tx.
59	or/54-58
60	(scor$ adj3 (system? or tool?)).tw,tx.
61	(scor$ adj3 (VBAC or TOLAC)).tw,tx.
62	(screen$ adj3 (system? or tool?)).tw,tx.
63	or/60-62
64	11 and 14
65	11 and 17
66	11 and 18
67	11 and 24
68	11 and 32
69	11 and 37
70	11 and 42
71	11 and 46
72	11 and 53
73	11 and 59
74	11 and 63
75	or/64-74

Database: Health Technology Assessment

#	Searches
1	CESAREAN SECTION, REPEAT/
2	CESAREAN SECTION/ and (repeat$ or previous$).tw.
3	CESAREAN SECTION/ and (repeat$ or previous$).tw.
4	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (repeat$ or previous$)).tw.
5	VAGINAL BIRTH AFTER CESAREAN/
6	(vagina$ adj1 (birth$ or born or deliver$) adj2 after$ adj2 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).tw.
7	VBAC.tw.
8	TRIAL OF LABOR/ and CESAREAN SECTION/
9	(trial adj2 labo?r adj3 after$ adj3 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).tw.

#	Searches
10	TOLAC.tw.
11	or/1-10
12	CANNULA/
13	cannula?.tw.
14	or/12-13
15	OXYTOCIN/
16	(Oxytocin? or Pitocin? or syntocinon?).mp.
17	or/15-16
18	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (emergenc$ or during labo?r$)).tw.
19	HYDROTHERAPY/
20	hydrotherap$.tw.
21	BATHS/
22	((birth$ or water) adj3 pool?).tw.
23	(birth$ adj3 water).tw.
24	or/19-23
25	ANALGESIA, EPIDURAL/
26	INJECTIONS, EPIDURAL/
27	((Spinal$ or spinous$) adj5 analges$).tw.
28	epidural$.tw.
29	CSE.tw.
30	((central$ or regional$) adj5 neuraxial$ adj5 block$).tw.
31	(neuraxial$ adj5 analges$).tw.
32	or/25-31
33	ANALGESIA, PATIENT-CONTROLLED/
34	(patient? adj3 control$ adj3 analges$).tw.
35	ANALGESIA, OBSTETRICAL/
36	(obstetric$ adj3 analges$).tw.
37	or/33-36
38	AMNION/su [Surgery]
39	Amniotom$.tw.
40	(artificial$ adj3 ruptur$ adj3 membrane?).tw.
41	AROM.tw.
42	or/38-41
43	FASTING/
44	fasting.tw.
45	(no adj3 (food? or drink$)).tw.
46	"nil by mouth".tw.
47	or/43-46
48	exp ANTACIDS/

#	Searches
49	(Antacid? or Aluminum Hydroxide or Bismuth or Calcium Carbonate or Magnesium Hydroxide or Magnesium Oxide or sodium citrate).mp.
50	RANITIDINE/
51	Ranitidine.mp.
52	OMEPRAZOLE/
53	omeprazole.mp.
54	or/48-53
55	BED REST/
56	(bed? adj3 rest$).tw.
57	SUPINE POSITION/
58	supine$.tw.
59	(limit$ adj3 mobil$).tw.
60	or/55-59
61	(scor$ adj3 (system? or tool?)).tw.
62	(scor$ adj3 (VBAC or TOLAC)).tw.
63	(screen$ adj3 (system? or tool?)).tw.
64	or/61-63
65	11 and 14
66	11 and 17
67	11 and 18
68	11 and 24
69	11 and 32
70	11 and 37
71	11 and 42
72	11 and 47
73	11 and 54
74	11 and 60
75	11 and 64
76	or/65-75

Database: Embase

#	Searches
1	REPEAT CESAREAN SECTION/
2	CESAREAN SECTION/ and (repeat$ or previous$).ti.
3	CESAREAN SECTION/ and (repeat$ or previous$).ab. /freq=2
4	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (repeat$ or previous$)).ti,ab.
5	VAGINAL BIRTH AFTER CESAREAN/
6	(vagina$ adj1 (birth$ or born or deliver$) adj2 after$ adj2 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
7	VBAC.ti,ab.
8	"TRIAL OF LABOR"/ and CESAREAN SECTION/

#	Searches
9	(trial adj2 labo?r adj3 after$ adj3 (c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$))).ti,ab.
10	TOLAC.ti,ab.
11	or/1-10
12	CANNULA/
13	cannula?.ti,ab.
14	or/12-13
15	*OXYTOCIN/
16	(Oxytocin? or Pitocin? or syntocinon?).ti.
17	(Oxytocin? or Pitocin? or syntocinon?).ab. /freq=2
18	or/15-17
19	((c?esar#an$ or c section$ or csection$ or (deliver$ adj3 abdom$)) adj3 (emergenc$ or during labo?r$)).ti,ab.
20	HYDROTHERAPY/
21	hydrotherap$.ti,ab.
22	BATH/
23	((birth$ or water) adj3 pool?).ti,ab.
24	WATER BIRTH/
25	(birth$ adj3 water).ti,ab.
26	or/20-25
27	EPIDURAL ANALGESIA/
28	*EPIDURAL DRUG ADMINISTRATION/
29	((Spinal$ or spinous$) adj5 analges$).ti,ab.
30	epidural$.ti.
31	epidural$.ab. /freq=2
32	CSE.ti,ab.
33	((central$ or regional$) adj5 neuraxial$ adj5 block$).ti,ab.
34	(neuraxial$ adj5 analges$).ti,ab.
35	or/27-34
36	PATIENT CONTROLLED ANALGESIA/
37	(patient? adj3 control$ adj3 analges$).ti,ab.
38	OBSTETRIC ANALGESIA/
39	(obstetric$ adj3 analges$).ti,ab.
40	or/36-39
41	AMNIOTOMY/
42	Amniotom$.ti,ab.
43	(artificial$ adj3 ruptur$ adj3 membrane?).ti,ab.
44	AROM.ti,ab.
45	or/41-44
46	DIET RESTRICTION/
47	fasting.ti,ab.

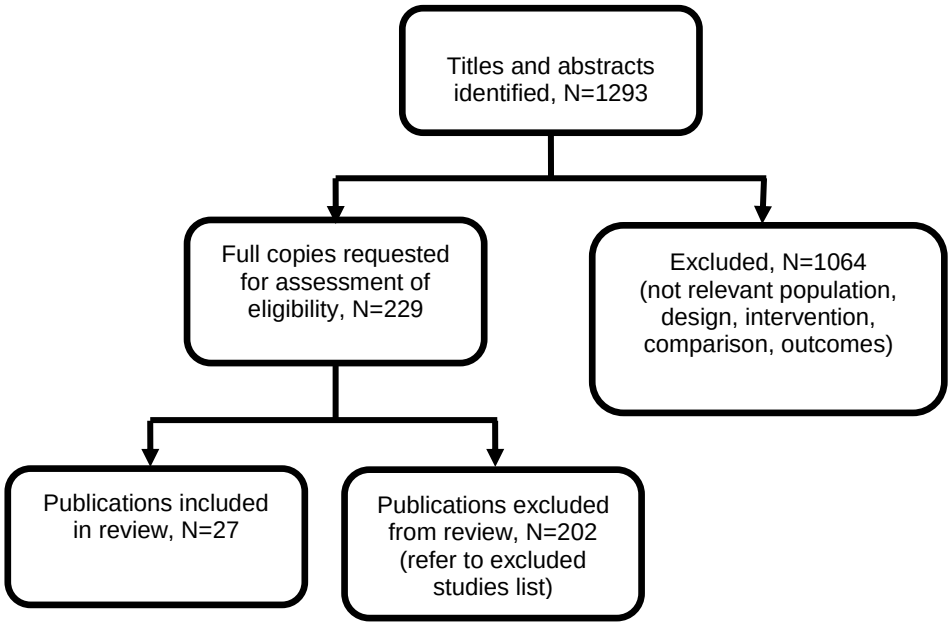
#	Searches
48	(no adj3 (food? or drink$)).ti,ab.
49	"nil by mouth".ti,ab.
50	or/46-49
51	exp ANTACID AGENT/
52	(Antacid? or Aluminum Hydroxide or Bismuth or Calcium Carbonate or Magnesium Hydroxide or Magnesium Oxide).mp.
53	CITRATE SODIUM/
54	sodium citrate.mp.
55	RANITIDINE/
56	Ranitidine.mp.
57	OMEPRAZOLE/
58	omeprazole.mp.
59	or/51-58
60	BED REST/
61	(bed? adj3 rest$).ti,ab.
62	SUPINE POSITION/
63	supine$.ti,ab.
64	(limit$ adj3 mobil$).ti,ab.
65	or/60-64
66	(scor$ adj3 (system? or tool?)).ti,ab.
67	(scor$ adj3 (VBAC or TOLAC)).ti,ab.
68	(screen$ adj3 (system? or tool?)).ti,ab.
69	or/66-68
70	11 and 14
71	11 and 18
72	11 and 19
73	11 and 26
74	11 and 35
75	11 and 40
76	11 and 45
77	11 and 50
78	11 and 59
79	11 and 65
80	11 and 69
81	or/70-80
82	limit 81 to english language
83	letter.pt. or LETTER/
84	note.pt.
85	editorial.pt.
86	CASE REPORT/ or CASE STUDY/
87	(letter or comment*).ti.

#	Searches
88	or/83-87
89	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
90	88 not 89
91	ANIMAL/ not HUMAN/
92	NONHUMAN/
93	exp ANIMAL EXPERIMENT/
94	exp EXPERIMENTAL ANIMAL/
95	ANIMAL MODEL/
96	exp RODENT/
97	(rat or rats or mouse or mice).ti.
98	or/90-97
99	82 not 98

Appendix C – Clinical evidence study selection

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

Figure 1: Flow diagram of clinical article selection for intrapartum care for women with previous caesarean section – management of the first and second stages of labour



Appendix D – Excluded studies

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

Clinical studies

Study	Reason for exclusion
Abraham, C., Adeyekun, M., Demissie, S., Patterns of oxytocin use in those undergoing trial of labor after cesarean (TOLAC), Obstetrics and Gynecology, 129, 147S, 2017	Conference abstract
Acmaz, G., Boztosun, A., Yuvaci, H., Inal, A., Muderris, I. I., Is spinal anesthesia really innocent?, HealthMED, 6, 945-949, 2012	Not relevant population as all women had an elective caesarean section (CS)
Adair, C. D., Sanchez-Ramos, L., Gaudier, F. L., Kaunitz, A. M., McDyer, D. C., Briones, D., Labor induction in patients with previous cesarean section, American Journal of Perinatology, 12, 450-4, 1995	Not relevant comparison, that is, women with a previous CS versus those with no previous CS
Aisien, A. O., Oronsaye, A. U., Vaginal birth after one previous caesarean section in a tertiary institution in Nigeria, Journal of Obstetrics & Gynaecology, 24, 886-90, 2004	No data were reported for the relevant comparison, that is, vaginal birth versus an emergency CS were reported
Al-Suleiman, S. A., El-Yahia, A. R., Al-Najashi, S., Rahman, J., Rahman, M. S., Outcome of labour in patients with a lower segment caesarean scar, Journal of Obstetrics and Gynaecology, 9, 199-208, 1989	Some women had labour induced with either oxytocin or prostaglandin
Al-Zirqi, I., Daltveit, A. K., Forsen, L., Stray-Pedersen, B., Vangen, S., Risk factors for complete uterine rupture, American Journal of Obstetrics & Gynecology, 216, 165.e1-165.e8, 2017	The article describes risk factors for uterine rupture in women with a previous CS
Al-Zirqi,I., Stray-Pedersen,B., Forsen,L., Vangen,S., Uterine rupture after previous caesarean section.[Erratum appears in BJOG. 2010 Jul;117(8):1041], BJOG: An International Journal of Obstetrics and Gynaecology, 117, 809-820, 2010	No outcomes were reported for the relevant comparison, that is, vaginal birth versus an emergency CS
Anonymous, Trial of labor after cesarean section is safe, Journal of Family Practice, 53, 766-768, 2004	Short description of a systematic review on the incidence and consequences of uterine rupture in women with previous CS
Armon, S., Tevet, A., Avitan, T., Rosen, H., Grisaro-Granovsky, S., Samueloff, A., Oxytocin use during trial of labot after cesarean section (TOLAC)-is it really that dangerous?, American Journal of Obstetrics and Gynecology, 206, S297, 2012	Poster
Asaad, K., Alaily, B., Oxytocin use and delivery outcome in women with one previous caesarean section and pre-labour rupture of the membranes at term, Journal of Obstetrics and Gynaecology, 14, 420-422, 1994	Induction of labour
Ashwal, E., Hiersch, L., Melamed, N., Ben-Zion, M., Brezovsky, A., Wiznitzer, A., Yogev, Y., Pregnancy	Not relevant comparison, that is, induced versus spontaneous labour

Study	Reason for exclusion
outcome after induction of labor in women with previous cesarean section, Journal of Maternal-Fetal and Neonatal Medicine, 28, 386-391, 2015	
Balachandran,L., Vaswani,P.R., Mogotlane,R., Pregnancy outcome in women with previous one cesarean section, Journal of Clinical and Diagnostic Research, 8, 99-102, 2014	No data for the comparison vaginal birth versus emergency CS were reported
Bas-Lando, M., Haouzi, F., Ioscovich, A., Farkash, R., Samueloff, A., Granovsky, S. G., Epidural analgesia is safe at TOLAC for the mother and neonate, American Journal of Obstetrics and Gynecology, 212, S332, 2015	Poster
Beall, M., Eglinton, G. S., Clark, S. L., Phelan, J. P., Vaginal delivery after cesarean section in women with unknown types of uterine scar, 29, 31-5, 1984	Not relevant comparison, that is, low transverse scar versus unknown types of scar
Belachew, Johanna, Eurenius, Karin, Mulic-Lutvica, Ajlana, Axelsson, Ove, Placental location, postpartum hemorrhage and retained placenta in women with a previous cesarean section delivery: a prospective cohort study, Upsala journal of medical sciences, 122, 185-189, 2017	No relevant comparison was reported
Bhat, B. P. R., Savant, R., Kamath, A., Outcome of a post caesarean pregnancy in a tertiary center of a developing country, Journal of Clinical and Diagnostic Research, 4, 2005-2009, 2010	Descriptive study about the commonest indication for elective and emergency CS. No relevant comparison
Bider, D., Barkai, G., Carp, H. J. A., Mashiach, S., The use of oxytocin after a previous Caesarean section - A review and report on a series, Archives of Gynecology and Obstetrics, 247, 15-19, 1990	Narrative review on the use of oxytocin for women with a previous CS
Black, M., Kilonzo, M., Bhattacharya, S., Morbidity of intended birth mode after previous caesarean section, Archives of Disease in Childhood: Fetal and Neonatal Edition, 98, 2013	Conference abstract
Boatin, A. A., Adu-Bonsaffoh, K., Wylie, B. J., Obed, S. A., Evaluating Facility-Based Decision-Making in Women with a Prior Cesarean Delivery and Association with Maternal and Perinatal Outcomes, Maternal & Child Health Journal, 11, 11, 2017	Multiple pregnancies were included. The study authors did not report how many. Moreover, the context of antenatal care and labour is quite different from the UK context. The study authors reported that "antenatal care, and thus the chance for early counseling and decision-making, often occurs much less frequently... Additionally, evidence from sub-Saharan Africa suggests that most women with a prior CD [caesarean delivery] present in established labor whether or not TOLAC [trial of labour after caesarean] is appropriate" (p. 1846)
Braverman, J. A., Redman, E. K., Facco, F. L., Himes, K. P., Do the "right" candidates for vaginal birth after cesarean delivery choose a trial of labor?, American Journal of Obstetrics and Gynecology, 218, S350-S351, 2018	Conference abstract

Study	Reason for exclusion
Bregar, A. T., Vaginal birth after cesarean section, Journal of Perinatal Medicine, 45, 253, 2017	Conference abstract
Bretelle, F., Cravello, L., Shojai, R., Roger, V., D'Ercole, C., Blanc, B., Vaginal birth following two previous cesarean sections, European Journal of Obstetrics, Gynecology, & Reproductive Biology, 94, 23-6, 2001	No data for the emergency CS group were reported
Bridle, L., VBAC to the future, Practising Midwife, 13, 29-30, 2010	Narrative article about vaginal birth after caesarean section (VBAC)
Brody, C. Z., Kosasa, T. S., Nakayama, R. T., Hale, R. W., Vaginal birth after cesarean section in Hawaii. Experience at Kapiolani Medical Center for Women and Children, Hawaii Medical Journal, 52, 38-42, 1993	No data for any of the relevant comparisons were reported
Cahill, A., Odibo, A., Allsworth, J., Macones, G., Frequent epidural dosing is a marker for impeding uterine rupture in patients attempting Vaginal Birth After Cesarean (VBAC), American Journal of Obstetrics and Gynecology, 201, S18, 2009	Conference abstract
Cahill,A.G., Odibo,A.O., Allsworth,J.E., Macones,G.A., Frequent epidural dosing as a marker for impending uterine rupture in patients who attempt vaginal birth after cesarean delivery, American Journal of Obstetrics and Gynecology, 202, 355-355, 2010	The article examines the association between epidural dosing and the risk of uterine rupture in women who attempted VBAC. Not relevant comparison, that is, women with a uterine rupture versus those with no uterine rupture
Cahill,A.G., Stamilio,D.M., Odibo,A.O., Peipert,J.F., Stevens,E.J., Macones,G.A., Does a maximum dose of oxytocin affect risk for uterine rupture in candidates for vaginal birth after cesarean delivery?, American Journal of Obstetrics and Gynecology, 197, 495-495, 2007	Not stated in the article why oxytocin was given
Cahill,A.G., Waterman,B.M., Stamilio,D.M., Odibo,A.O., Allsworth,J.E., Evanoff,B., Macones,G.A., Higher maximum doses of oxytocin are associated with an unacceptably high risk for uterine rupture in patients attempting vaginal birth after cesarean delivery, American Journal of Obstetrics and Gynecology, 199, 32-35, 2008	The article examines the effect of maximum oxytocin dose on uterine rupture risk in women attempting VBAC. Not relevant comparison, that is, women with a uterine rupture versus those with no uterine rupture
Catling-Paull, C., Johnston, R., Ryan, C., Foureur, M. J., Homer, C. S., Clinical interventions that increase the uptake and success of vaginal birth after caesarean section: a systematic review, Journal of Advanced Nursing, 67, 1646-61, 2011	Relevant studies from this review were assessed separately for inclusion
Centre for Reviews and Dissemination, Trial of labour after Caesarean section in sub-Saharan Africa: a meta-analysis (Structured abstract), Database of Abstracts of Reviews of Effects, 2015	The review explicitly focuses on sub-Saharan Africa
Centre for Reviews and Dissemination, Elective repeat Cesarean delivery versus trial of labor: a meta-analysis of the literature from 1989 to 1999 (Structured abstract), Database of Abstracts of Reviews of Effects, 2015	Not relevant comparison, that is, TOL versus elective CS
Centre for Reviews and Dissemination, Trial of labor or repeated Cesarean section: the woman's choice	Not relevant comparison, that is, trial of labour (TOL) versus elective CS

Study	Reason for exclusion
(Structured abstract), Database of Abstracts of Reviews of Effects, 2015	
Centre for Reviews and Dissemination, Clinical interventions that increase the uptake and success of vaginal birth after caesarean section: a systematic review (Provisional abstract), Database of Abstracts of Reviews of Effects, 2015	Relevant studies from this review were assessed separately for inclusion
Centre for Reviews and Dissemination, Systematic review of the risk of uterine rupture with the use of amnioinfusion after previous cesarean delivery (Structured abstract), Database of Abstracts of Reviews of Effects, 2015	Not relevant intervention
Centre for Reviews and Dissemination, Cesarean childbirth and psychosocial outcomes: a meta-analysis (Structured abstract), Database of Abstracts of Reviews of Effects, 2015	The article describes the differences between vaginal and caesarean birth on psychological outcomes of childbirth. Not specified whether the women had a previous CS
Centre for Reviews and Dissemination, Vaginal birth after cesarean (VBAC). Volume 1: evidence report and appendices (Structured abstract), Database of Abstracts of Reviews of Effects, 2015	Not relevant comparison, that is, TOL versus elective CS
Centre for Reviews and Dissemination, Prostaglandine E2 par voie vaginale dans les ruptures prematurees des membranes a terme avec col defavorable: meta-analyse [Vaginal administration prostaglandin E2 in premature ruptured membranes at term with an unfavorable cervix] (Structured abstract), Database of Abstracts of Reviews of Effects, 2015	A full-text copy of the article could not be obtained
Chattopadhyay, S. K., Sherbeeni, M. M., Anokute, C. C., Planned vaginal delivery after two previous caesarean sections, British Journal of Obstetrics & Gynaecology, 101, 498-500, 1994	No data for any of the relevant comparisons were reported
Chibber, R., Al-Harmi, J., Foda, M., Mohammed, K. Z., Al-Saleh, E., Mohammed, A. T., Induction of labor in grand multiparous women with previous cesarean delivery: how safe is this?, Journal of Maternal-Fetal & Neonatal Medicine, 28, 366-70, 2015	Not relevant comparison, that is, women with a previous CS who had an induction with vaginal prostaglandin E2 versus those who had a spontaneous labour
Chua, S., Arulkumaran, S., Singh, P., Ratnam, S. S., Trial of labour after previous caesarean section: obstetric outcome, Australian & New Zealand Journal of Obstetrics & Gynaecology, 29, 12-7, 1989	No data for any of the relevant comparisons were reported
Chummun, K., Walsh, J., Shackleton, A., Boylan, P., Use of oxytocin in multiparous women in labour, Irish Journal of Medical Science, 180, S157-S158, 2011	Conference abstract
Cieminski, A., Mode of delivery in women with prior cesarean section the effect of non medical factors and obstetric history, Ginekologia i Poloznictwo, 21, 57-64, 2011	A full-text copy of the article could not be obtained
Cleary-Goldman,J., Cornelisse,K., Simpson,L.L., Robinson,J.N., Previous cesarean delivery: understanding and satisfaction with mode of delivery in a subsequent	No relevant outcomes for the relevant comparison, that is, vaginal birth

Study	Reason for exclusion
pregnancy in patients participating in a formal vaginal birth after cesarean counseling program, American Journal of Perinatology, 22, 217-221, 2005	versus an emergency CS, were reported
Cnattingius,R., Hoglund,B., Kieler,H., Emergency cesarean delivery in induction of labor: an evaluation of risk factors, Acta Obstetricia et Gynecologica Scandinavica, 84, 456-462, 2005	The study examines factors that influence the risk of CS in women with induced labour
Cogan,A., Barlow,P., Benali,N., Murillo,D., Manigart,Y., Belhomme,J., Rozenberg,S., An audit about labour induction, using prostaglandin, in women with a scarred uterus, Archives of Gynecology and Obstetrics, 286, 1399-1406, 2012	A mixed population as not all women had a previous CS, some of them had a scarred uterus due to myomectomy. Also, labour was induced with oxytocin or prostaglandins
Colmorn, L. B., Krebs, L., Klungsoyr, K., Jakobsson, M., Tapper, A. M., Gissler, M., Lindqvist, P. G., Kallen, K., Gottvall, K., Bordahl, P. E., Bjarnadottir, R. I., Langhoff-Roos, J., Mode of first delivery and severe maternal complications in the subsequent pregnancy, Acta Obstetricia et Gynecologica Scandinavica, 03, 03, 2017	The article describes factors associated with a successful VBAC. No data on emergency CS were reported
Coltart, T. M., Davies, J. A., Katesmark, M., Outcome of a second pregnancy after a previous elective caesarean section, British Journal of Obstetrics & Gynaecology, 97, 1140-3, 1990	No relevant outcomes for the comparison vaginal birth versus an emergency CS were reported
Cong, A., de Vries, B., Ludlow, J., Does previous caesarean section at full dilatation increase the likelihood of subsequent spontaneous preterm birth?, Australian and New Zealand Journal of Obstetrics and Gynaecology, 2017	The study examines whether CS performed at full dilatation is a risk factor for spontaneous preterm birth
Connolly,G., Razak,A., Conroy,R., Harrison,R., McKenna,P., A five year review of scar dehiscence in the Rotunda Hospital, Dublin, Irish Medical Journal, 94, 176-178, 2001	Not relevant comparison, that is, women with a previous CS and scar dehiscence and those with no scar dehiscence
Cowan,R.K., Kinch,R.A., Ellis,B., Anderson,R., Trial of labor following cesarean delivery, Obstetrics and Gynecology, 83, 933-936, 1994	No comparative data between women who had a vaginal birth and those who had a CS were reported
Dadhwal,V., Mittal,S., Kumar,S., Anandlakshmi,P.N., Vimala,N., Vaginal birth after cesarean delivery: Variables affecting outcome, JK Science, 5, 11-14, 2003	The article describes variables predicting VBAC
Dalia, A., Roziah, H., Jas Diyana, J., Mokhtar, A., Rozihan, I., The success rate of trial of labour after caesarean section: Does intrapartum epidural analgesia affect the outcomes?, Journal of Obstetrics and Gynaecology Research, 41, 127-128, 2015	Poster
Damodaran, S., Khatri, P., Mahmood, T. A., Monaghan, S. C., Waterbirths in Fife: A 6-year observational study, Journal of Obstetrics and Gynaecology, 30, 759, 2010	Conference abstract
Dekker, G. A., Chan, A., Luke, C. G., Priest, K., Riley, M., Halliday, J., King, J. F., Gee, V., O'Neill, M., Snell, M., Cull, V., Cornes, S., Risk of uterine rupture in Australian women attempting vaginal birth after one prior caesarean section: a retrospective population-based cohort study.[Erratum appears in BJOG. 2010 Dec;117(13):1672], BJOG: An	Not relevant comparison

Study	Reason for exclusion
International Journal of Obstetrics & Gynaecology, 117, 1358-65, 2010	
DiNapoli, M., Moroz, L., Son, M., D'Alton, M., Gyamfi-Bannerman, C., Skin incision to delivery interval and risk for neonatal morbidity in emergent cesarean, American Journal of Obstetrics and Gynecology, 212, S403, 2015	Conference abstract
Dinsmoor,M.J., Brock,E.L., Predicting failed trial of labor after primary cesarean delivery, Obstetrics and Gynecology, 103, 282-286, 2004	Not relevant comparison as the article compares 3 different scoring systems to predict the likelihood of successful VBAC
Dodd, J., Crowther, C., Induction of labour for women with a previous Caesarean birth: a systematic review of the literature, Australian & New Zealand Journal of Obstetrics & Gynaecology, 44, 392-5, 2004	Not relevant comparison, that is, oxytocin versus prostaglandins
Dodd, Jodie M., Crowther, Caroline A., Grivell, Rosalie M., Deussen, Andrea R., Elective repeat caesarean section versus induction of labour for women with a previous caesarean birth, Cochrane Database of Systematic Reviews, 2017	No studies were included in this review
Dogan, A., Ertas, I. E., Uyar, I., Karaca, I., Bozgeyik, B., Toz, E., Ozeren, M., Preoperative Association of Abdominal Striae Gravidarum with Intraabdominal Adhesions in Pregnant Women with a History of Previous Cesarean Section: a Cross-sectional Study, Geburtshilfe und Frauenheilkunde, 76, 268-272, 2016	The study evaluates an association between abdominal striae gravidarumand intraabdominal adhesions in pregnant women undergoing a repeat CS
Don, J. R., Pathiraja, R., Silva, D., Jayawardane, M., Trial of labour after caesarean section (TOLAC): An audit, BJOG: An International Journal of Obstetrics and Gynaecology, 125, 82, 2018	Poster
Durukan, O. B., Liberto, A. D., Gitas, G., Piana, J., Ertan, A. K., Intended vaginal birth after cesarean section, retrospective analysis of an eight years period from a single perinatal center in Germany, Journal of the Turkish German Gynecology Association, 17, S45, 2016	Conference abstract
Eden,K.B., McDonagh,M., Denman,M.A., Marshall,N., Emeis,C., Fu,R., Janik,R., Walker,M., Guise,J.M., New insights on vaginal birth after cesarean: can it be predicted?, Obstetrics and Gynecology, 116, 967-981, 2010	Relevant studies from this review were assessed separately for inclusion
Egic, A., Orlic, N. K., Mojovic, D., Milovanovic, Z., Vuceljic, J., Krsmanovic, S., Major risk factors of maternal adverse outcome in women with two or more previous cesarean sections, Vojnosanitetski Pregled, 73, 751-756, 2016	Not relevant comparison, that is, women who had an emergency CS versus an elective CS
Egwuatu, V. E., Ezeh, I. O., Vaginal delivery in Nigerian women after a previous cesarean section, International Journal of Gynaecology & Obstetrics, 32, 1-6, 1990	Not relevant comparison, that is, women with previous CS versus those with no previous CS
El-Sayed, M., Mohamed, S., El-Sayed, A., Outcomes of induction of labour in women with one previous caesarean section: An 11-year experience of a district general hospital	Conference abstract

Study	Reason for exclusion
in the UK, BJOG: An International Journal of Obstetrics and Gynaecology, 124, 35, 2017	
Emms, A., Moorth, V., Raut, N., Vaginal birth after caesarean section audit, BJOG: An International Journal of Obstetrics and Gynaecology, 122, 170-171, 2015	Poster
Eriksen,N.L., Buttino,L.,Jr., Vaginal birth after cesarean: a comparison of maternal and neonatal morbidity to elective repeat cesarean section, American Journal of Perinatology, 6, 375-379, 1989	Not relevant comparison, that is elective CS versus TOL after CS (TOLAC)
Ezechi,O.C., Kalu,B.K.E., Njokanma,F.O., Ndububa,V., Nwokoro,C.A., Okeke,G.C.E., Trial of labour after a previous caesarian section delivery: A private hospital experience, Annals of African Medicine, 4, 113-117, 2005	Not relevant comparison, that is, women who had an emergency CS versus those who had an elective CS
Farrell, K., Burke, N., Hession, M., Morrison, J., Morbidity from failed VBAC versus morbidity from other unplanned cesarean delivery in parous women, American Journal of Obstetrics and Gynecology, 210, S275-S276, 2014	Conference abstract
Fayyaz, M., Lallemant, C., Sengupta, S., An audit of Induction of Labour in women aiming for a vaginal birth after having had one previous lower uterine segment caesarean section; demonstrating use of Foley's Catheter for cervical ripening, BJOG: An International Journal of Obstetrics and Gynaecology, 123, 153, 2016	Poster
Fenwick, J., Gamble, J., Mawson, J., Women's experiences of Caesarean section and vaginal birth after Caesarian: a Birthrites initiative, International Journal of Nursing Practice, 9, 10-7, 2003	A qualitative study on women's experiences of CS
Finley, B. E., Gibbs, C. E., Emergent cesarean delivery in patients undergoing a trial of labor with a transverse lower-segment scar, American Journal of Obstetrics & Gynecology, 155, 936-9, 1986	No relevant outcomes were reported
Fisler, R. E., Cohen, A., Ringer, S. A., Lieberman, E., Neonatal outcome after trial of labor compared with elective repeat cesarean section, Birth, 30, 83-8, 2003	Not relevant comparison, that is, women who had an elective CS versus those who underwent TOL
Fitzpatrick, K. E., Kurinczuk, J. J., Alfirevic, Z., Spark, P., Brocklehurst, P., Knight, M., Uterine rupture by intended mode of delivery in the UK: a national case-control study, PLoS Medicine / Public Library of Science, 9, e1001184, 2012	The study examines risk factors for uterine rupture in women with a previous CS
Flamm, B. L., Vaginal birth after caesarean (VBAC), Best Practice & Research in Clinical Obstetrics & Gynaecology, 15, 81-92, 2001	A narrative review on VBAC
Flamm, B. L., Goings, J. R., Fuelberth, N. J., Fischermann, E., Jones, C., Hersh, E., Oxytocin during labor after previous cesarean section: results of a multicenter study, Obstetrics & Gynecology, 70, 709-12, 1987	Mixed population as women were given oxytocin for various reasons not only for labour delay
Flamm, B. L., Newman, L. A., Thomas, S. J., Fallon, D., Yoshida, M. M., Vaginal birth after cesarean delivery: results of a 5-year multicenter collaborative study, Obstetrics and gynecology, 76, 750-4, 1990	No relevant outcomes were reported

Study	Reason for exclusion
Flamm,B.L., Geiger,A.M., Vaginal birth after cesarean delivery: an admission scoring system, Obstetrics and Gynecology, 90, 907-910, 1997	Not relevant comparison as the article focuses on a scoring system to predict the chance of vaginal birth after CS
Fobelets, Maaike, Beeckman, Katrien, Buyl, Ronald, Daly, Deirdre, Sinclair, Marlene, Healy, Patricia, Grylka-Baeschlin, Susanne, Nicoletti, Jane, Gross, Mechthild M., Morano, Sandra, Putman, Koen, Mode of birth and postnatal health-related quality of life after one previous cesarean in three European countries, Birth (Berkeley, Calif.), 2017	No relevant comparison was reported
Follette, L. L., Lo, A., Koblentz, J., Main, E. K., Provider commitment is key for high vaginal birth after cesarean delivery rate in a community hospital, Obstetrics and Gynecology, 125, 88S, 2015	Poster
Frias Aldeguer, L., Crispin Milart, P. H., Adiego Burgos, B., Ortega Carbonell, A. M., Cobos Del Alamo, B., Victor Albi Gonzalez, M., Delivery route after cesarean section: Description of our results, Journal of Maternal-Fetal and Neonatal Medicine, 23, 242, 2010	Poster
Fruscalzo, A., Salmeri, M. G., Cendron, A., Londero, A. P., Zanni, G., Introducing routine trial of labour after caesarean section in a second level hospital setting, Journal of Maternal-Fetal & Neonatal Medicine, 25, 1442-6, 2012	Not relevant comparison, that is, elective CS versus TOLAC
Garg, V. K., Ekuma-Nkama, E. N., Vaginal birth following two cesarean deliveries - Are the risks exaggerated?, Annals of Saudi Medicine, 24, 276-279, 2004	Results presented for a mixed population, that is, women who had an emergency CS or an elective CS
Gee, H., Delivery following previous Caesarean section, Current Obstetrics and Gynaecology, 10, 86-90, 2000	Narrative article on management of labour after a previous CS
Gellman, E., Goldstein, M. S., Kaplan, S., Shapiro, W. J., Vaginal delivery after cesarean section. Experience in private practice, JAMA, 249, 2935-7, 1983	No relevant outcomes were reported
Goetzl, L., Shipp, T. D., Cohen, A., Zelop, C. M., Repke, J. T., Lieberman, E., Oxytocin dose and the risk of uterine rupture in trial of labor after cesarean, Obstetrics & Gynecology, 97, 381-4, 2001	Not relevant comparison, that is, women with uterine rupture versus those with no uterine rupture
Goldman, G. A., Kaplan, B., Rabinerson, D., Biran, G., Amster, R., Ben-Rafael, Z., Vaginal delivery following caesarean section-the use of oxytocin and prostaglandins, Journal of Obstetrics & Gynaecology, 18, 328-30, 1998	Mixed population as women were given oxytocin for induction or augmentation
Gomer, H., Coatleven, F., Vandenbossche, F., Chabanier, P., Horovitz, J., Dallay, D., Artificial inducement of labour on cicatricial uteri, International Journal of Gynecology and Obstetrics, 107, S145, 2009	Conference abstract
Gonen,R., Tamir,A., Degani,S., Ohel,G., Variables associated with successful vaginal birth after one cesarean section: a proposed vaginal birth after cesarean section score, American Journal of Perinatology, 21, 447-453, 2004	The article describes the development of a scoring system for the prediction of successful VBAC. No relevant outcomes were reported

Study	Reason for exclusion
Graham, A. R., Trial labor following previous cesarean section, 149, 35-45, 1984	No relevant outcomes were reported
Granovsky-Grisaru, S., Shaya, M., Diamant, Y. Z., The management of labor in women with more than one uterine scar: is a repeat cesarean section really the only "safe" option?, Journal of Perinatal Medicine, 22, 13-7, 1994	Not relevant comparison, that is, TOLAC versus elective CS
Grantz, K. L., Gonzalez-Quintero, V., Troendle, J., Reddy, U. M., Hinkle, S. N., Kominiarek, M. A., Lu, Z., Zhang, J., Labor patterns in women attempting vaginal birth after cesarean with normal neonatal outcomes, American Journal of Obstetrics & Gynecology, 213, 226.e1-6, 2015	Not relevant comparison, that is, women undergoing VBAC and nulliparous women
Grossetti,E., Vardon,D., Creveuil,C., Herlicoviez,M., Dreyfus,M., Rupture of the scarred uterus, Acta Obstetricia et Gynecologica Scandinavica, 86, 572-578, 2007	No data for the relevant comparison, that is, vaginal birth versus an emergency CS, were reported
Grylka-Baeschlin, S., Petersen, A., Karch, A., Gross, M. M., Labour duration and timing of interventions in women planning vaginal birth after caesarean section, Midwifery, 34, 221-9, 2016	Not relevant comparison, that is, comparison between multiparous women planning a first VBAC with primiparous women and multiparous women planning a second vaginal birth
Guerra, V., Arenas, B., Rodriguez, A. B., Nieto, L., Duro, J., De La Torre, A. J., Management, complications and outcomes in patients with previous cesarean, Journal of Perinatal Medicine, 43, 2015	Conference abstract
Guise, J. M., McDonagh, M. S., Osterweil, P., Nygren, P., Chan, B. K., Helfand, M., Systematic review of the incidence and consequences of uterine rupture in women with previous caesarean section, BMJ, 329, 19-25, 2004	Systematic review reporting on TOL and elective CS. Potentially relevant studies from this review were assessed separately for inclusion
Hanley, M. L., Smulian, J. C., Lake, M. F., McLean, D. A., Vintzileos, A. M., Analysis of repeat cesarean delivery indications: implications of heterogeneity, American Journal of Obstetrics & Gynecology, 175, 883-8, 1996	No relevant outcomes were reported
Harper,L.M., Cahill,A.G., Boslaugh,S., Odibo,A.O., Stamilio,D.M., Roehl,K.A., MacOnes,G.A., Association of induction of labor and uterine rupture in women attempting vaginal birth after cesarean: A survival analysis, American Journal of Obstetrics and Gynecology, 206, 51-51, 2012	Not relevant comparison, that is, women with uterine rupture versus women with no uterine rupture
Hayashi, R. H., Dystocias, cesarean section, and puerperium, Current Opinion in Obstetrics & Gynecology, 1, 172-6, 1989	Review on dystocia, caesarean section and the puerperium
Hoffman,M.K., Sciscione,A., Srinivasana,M., Shackelford,D.P., Ekbladh,L., Uterine rupture in patients with a prior cesarean delivery: the impact of cervical ripening, American Journal of Perinatology, 21, 217-222, 2004	Not relevant comparison, that is, women with uterine rupture versus women with no uterine rupture
Hood, D. D., Holubec, D. M., Elective repeat cesarean section. Effect of anesthesia type on blood loss, Journal of Reproductive Medicine, 35, 368-72, 1990	No data on relevant comparison, that is, an emergency CS versus vaginal birth, were reported

Study	Reason for exclusion
Horenstein, J. M., Eglinton, G. S., Tahilramaney, M. P., Boucher, M., Phelan, J. P., Oxytocin use during a trial of labor in patients with previous cesarean section, Journal of Reproductive Medicine, 29, 26-30, 1984	Mixed population as in some women labour was induced or augmented with oxytocin
Horenstein,J.M., Phelan,J.P., Previous cesarean section: the risks and benefits of oxytocin usage in a trial of labor, American Journal of Obstetrics and Gynecology, 151, 564-569, 1985	Mixed population as women were given oxytocin for induction or augmentation
Janarthanan, C., Ghosh, S. M., Hinshaw, K., Misra, U., Outcomes for trial of labour after caesarean section (TOLAC) and effect of epidural analgesia, Anaesthesia, 67, 79, 2012	Conference abstract
Jozwiak,M., Dodd,J.M., Methods of term labour induction for women with a previous caesarean section, The Cochrane database of systematic reviews, 3, CD009792-, 2013	Not relevant comparison, that is, the focus in on induction of labour
Kaimal, A. J., Grobman, W. A., Bryant, A., Norrell, L., Bermingham, Y., Atshuler, A., Thiet, M. P., Gonzalez, J., Bacchetti, P., Moghadassi, M., Kuppermann, M., Women's preferences regarding the processes and outcomes of trial of labor after cesarean and elective repeat cesarean delivery, American Journal of Obstetrics and Gynecology, Conference: 37th annual meeting of the society for maternal-fetal medicine: the pregnancy meeting. United states. Conference start:. 20170123. Conference end: 20170128 216, S516, 2017	Conference abstract
Kalok, A., Zabil, S. A., Jamil, M. A., Lim, P. S., Shafiee, M. N., Kampan, N., Shah, S. A., Mohamed Ismail, N. A., Antenatal scoring system in predicting the success of planned vaginal birth following one previous caesarean section, Journal of Obstetrics and Gynaecology, 38, 339-343, 2018	No relevant outcomes were reported
Knight, H. E., Gurol-Urganci, I., van der Meulen, J. H., Mahmood, T. A., Richmond, D. H., Dougall, A., Cromwell, D. A., Vaginal birth after caesarean section: a cohort study investigating factors associated with its uptake and success, BJOG: An International Journal of Obstetrics & Gynaecology, 121, 183-92, 2014	No relevant outcomes for the comparison vaginal birth versus emergency CS were reported
Kobelin, C. G., Intrapartum management of vaginal birth after cesarean section, Clinical Obstetrics & Gynecology, 44, 588-93, 2001	Narrative review on intrapartum management of TOL in women who have undergone one or more previous CS
Kunzier, N. N., Bilal, S., Dinglas, C., Calixte, R., Cioffi, J., Vintzileos, A. M., The use of a vaginal birth after cesarean delivery prediction tool in patients scheduled for repeat cesarean delivery, American Journal of Obstetrics and Gynecology, 214, S236-S237, 2016	Conference abstract
Lao, T. T., Leung, B. F., Labor induction for planned vaginal delivery in patients with previous cesarean section, Acta Obstetricia et Gynecologica Scandinavica, 66, 413-6, 1987	Focus is on induction of labour

Study	Reason for exclusion
Lappen, J. R., Hackney, D. N., Bailit, J. L., Outcomes of term induction in trial of labor after cesarean delivery, Obstetrics and Gynecology, 126, 115-123, 2015	Induction included various methods such as amniotomy, oxytocin or both and prostaglandins. No results were reported for oxytocin only
Lavin,J.P., Stephens,R.J., Miodovnik,M., Barden,T.P., Vaginal delivery in patients with a prior cesarean section, Obstetrics and Gynecology, 59, 135-148, 1982	Review on vaginal birth in women with previous CS. Relevant studies from this review were assessed separately for inclusion
Lawrence, R. F., Vaginal delivery after caesarean section, The Journal of obstetrics and gynaecology of the British Empire, 60, 237-43, 1953	No relevant outcomes were reported
Leung,A.S., Farmer,R.M., Leung,E.K., Medearis,A.L., Paul,R.H., Risk factors associated with uterine rupture during trial of labor after cesarean delivery: A case-control study, American Journal of Obstetrics and Gynecology, 168, 1358-1363, 1993	Not relevant comparison, that is, women with uterine rupture versus women with no uterine rupture
Lin,C., Raynor,B.D., Risk of uterine rupture in labor induction of patients with prior cesarean section: an inner city hospital experience, American Journal of Obstetrics and Gynecology, 190, 1476-1478, 2004	No relevant outcomes were reported for relevant comparisons
Lin,K., Weighing benefits and harms of vaginal birth after cesarean delivery, American Family Physician, 82, 1272-1277, 2010	Conference abstract
Lucovnik, M., Blajic, I., Verdenik, I., Mirkovic, T., Stopar Pintaric, T., Impact of epidural analgesia on cesarean and operative vaginal delivery rates classified by the Ten Groups Classification System, International journal of obstetric anesthesia, 2018	No relevant outcomes were reported
Lydon-Rochelle,M.T., Cahill,A.G., Spong,C.Y., Birth after previous cesarean delivery: short-term maternal outcomes, Seminars in Perinatology, 34, 249-257, 2010	Not relevant comparison, that is, elective repeat CS versus TOLAC
Macones,G.A., Peipert,J., Nelson,D.B., Odibo,A., Stevens,E.J., Stamilio,D.M., Pare,E., Elovitz,M., Sciscione,A., Sammel,M.D., Ratcliffe,S.J., Maternal complications with vaginal birth after cesarean delivery: a multicenter study, American Journal of Obstetrics and Gynecology, 193, 1656-1662, 2005	Not relevant comparison, that is, vaginal birth versus elective CS, also women with uterine rupture versus those with no uterine rupture
Maher, N., Summerhill, N., Vaginal birth after caesarean section and its success-can we do better?, Irish Journal of Medical Science, 180, S152, 2011	Conference abstract
Mansoor, M., Kashif, S., To study uterine rupture & fetal distress in patients with previous LSCS, Pakistan Journal of Medical and Health Sciences, 4, 105-108, 2010	No relevant data regarding the outcomes of vaginal birth and emergency CS were reported
Martin, J. N., Jr., Harris, B. A., Jr., Huddleston, J. F., Morrison, J. C., Propst, M. G., Wiser, W. L., Perlis, H. W., Davidson, J. T., Vaginal delivery following previous cesarean birth, American Journal of Obstetrics & Gynecology, 146, 255-63, 1983	Not relevant population as the CS group included women who were scheduled for TOLAC but later indicated a preference for CS

Study	Reason for exclusion
Mauldin,J.G., Newman,R.B., Prior cesarean: A contraindication to labor induction?, Clinical Obstetrics and Gynecology, 49, 684-697, 2006	Narrative review on labour induction in women with a previous CS
McBeth, C., Epidural opioids and previous caesarean section, International Journal of Obstetric Anesthesia, 4, 251-3, 1995	Case report
McCloud, K., Pierce, S. J., McCormack, J., Can a change in protocol increase rates of vaginal birth after Caesarean?, Archives of Disease in Childhood: Fetal and Neonatal Edition, 95, 2010	Conference abstract
McConnell, E. L., Jr., Hemostatic Role of Preoperative Intravenous Oxytocin in Repeat Cesarean Section, Obstetrics & Gynecology, 24, 303-8, 1964	All participants had an elective CS
McDonagh,M.S., Osterweil,P., Guise,J.M., The benefits and risks of inducing labour in patients with prior caesarean delivery: A systematic review, BJOG: An International Journal of Obstetrics and Gynaecology, 112, 1007-1015, 2005	Focus is on induction of labour
McGarry, J. A., The management of patients previously delivered by caesarean section, Journal of Obstetrics & Gynaecology of the British Commonwealth, 76, 137-43, 1969	No data for the relevant comparison (vaginal birth versus emergency CS) reported
Meehan, F. P., Trial of scar with induction/oxytocin in delivery following prior section, Clinical & Experimental Obstetrics & Gynecology, 15, 117-23, 1988	No relevant outcomes were reported
Meehan, F. P., Burke, G., Trial of labour following prior section; a 5 year prospective study (1982-1987), European Journal of Obstetrics, Gynecology, & Reproductive Biology, 31, 109-17, 1989	No data for the relevant comparison, that is, women who had a vaginal birth versus an emergency CS
Metz, T. D., Stoddard, G. J., Henry, E., Jackson, M., Holmgren, C., Esplin, S., Simple, validated vaginal birth after cesarean delivery prediction model for use at the time of admission, Obstetrics & Gynecology, 122, 571-8, 2013	Validation of a tool for predicting the likelihood of successful TOLAC after a primary caesarean birth. No data for the comparison (use of scoring system versus no use of scoring system) were reported
Metz, T. D., Stoddard, G. J., Henry, E., Jackson, M., Holmgren, C., Esplin, S., VBAC prediction model for use at the time of admission, Reproductive Sciences, 19, 230A, 2012	Conference abstract
Micek, M., Kosinska-Kaczynska, K., Godek, B., Krowicka, M., Szymusik, I., Wielgos, M., Birth after a previous cesarean section - what is most important in making a decision?, Neuroendocrinology Letters, 35, 718-23, 2014	Some women who underwent VBAC had their labour induced
Molloy, B. G., Sheil, O., Duignan, N. M., Delivery after caesarean section: review of 2176 consecutive cases, British Medical Journal Clinical Research Ed., 294, 1645-7, 1987	No relevant outcomes for the relevant comparison, that is, vaginal birth versus an emergency CS, were reported
Montgomery,A.A., Emmett,C.L., Fahey,T., Jones,C., Ricketts,I., Patel,R.R., Peters,T.J., Murphy,D.J., Two decision aids for mode of delivery among women with	The article examines the effects of 2 computer-based decision aids on decisional conflict and actual mode of

Study	Reason for exclusion
previous caesarean section: Randomised controlled trial, British Medical Journal, 334, 1305-1309, 2007	birth among women with 1 previous caesarean section
Mootabar, H., Dwyer, J. F., Surur, F., Dillon, T. F., Vaginal delivery following previous cesarean section in 1983, 22, 155-60, 1984	No data for the relevant comparison were reported
Muhammad, S., Chandraharan, E., Madha, S., Ghosh, M., Pillay, O., Objective study of various predictors of success of vaginal delivery in women induced with previous caesarean section. A ten year experience in a tertiary hospital, BJOG: An International Journal of Obstetrics and Gynaecology, 123, 163-164, 2016	Poster
Narayana Swamy, M., Allen, J., Zuokumor, P., Antacid prophylaxis in obstetric patients, Anaesthesia, 67, 71, 2012	Conference abstract
Novas, J., Myers, S. A., Gleicher, N., Obstetric outcome of patients with more than one previous cesarean section, 160, 364-7, 1989	No relevant outcomes were reported
O'Connor, K. M., How safe is induction of labour following a previous caesarean section?, Journal of Obstetrics and Gynaecology, 4, 86-87, 1983	Induction with prostaglandins
Olza, I., Serrano, E., Drozdowskyj,, The Experience of "aPOYOCESAREAS": Lessons learned from an internet-based support group for spanish women recovering from caesareans, Archives of Women's Mental Health, 14, S42-S43, 2011	Conference abstract
Ong, S., Herd, D., Use of oxytocin after previous caesarean section, Journal of Obstetrics and Gynaecology, 18, 93-94, 1998	Conference abstract
Ophir, E., Odeh, M., Hirsch, Y., Bornstein, J., Uterine rupture during trial of labor: controversy of induction's methods, Obstetrical & Gynecological Survey, 67, 734-45, 2012	This review focuses on induction of labour
Pal, J. A., Ramzan, S., Parveen, T., Jan, A., Momin, S., Use of oxytocins in a uterus with previous Cesarean Section, Pakistan Journal of Medical Sciences, 16, 87-91, 2000	No relevant outcomes were reported
Pansari, N., Comparative study of trial of labour after cesarean (TOLAC) versus planned repeat Cesarean delivery (PRCD), Journal of Obstetrics and Gynaecology Research, 41, 41, 2015	Conference abstract
Patel, M. D., Maitra, N., Patel, P. K., Sheth, T., Vaishnav, P., Predicting Successful Trial of Labor After Cesarean Delivery: Evaluation of Two Scoring Systems, Journal of Obstetrics and Gynecology of India, 1-7, 2017	Not relevant comparison as the study compares the performance of the 2 calculators in the successful prediction of VBAC
Paterson, C. M., Saunders, N. J., Mode of delivery after one caesarean section: audit of current practice in a health region, BMJ, 303, 818-21, 1991	No relevant outcomes for the relevant comparison, that is, vaginal birth versus emergency CS, were reported
Pauerstein, C. J., Karp, L., Muher, S., Trial of labor after low segment cesarean section, Southern Medical Journal, 62, 925-8, 1969	No relevant outcomes were reported. Case series

Study	Reason for exclusion
Pettersen-Dahl, A., Murzakanova, G., Sandvik, L., Laine, K., Maternal body mass index as a predictor for delivery method, Acta Obstetricia et Gynecologica Scandinavica, 97, 212-218, 2018	No relevant comparison was reported
Phelan, J. P., Ahn, M. O., Diaz, F., Brar, H. S., Rodriguez, M. H., Twice a cesarean, always a cesarean?, Obstetrics & Gynecology, 73, 161-5, 1989	No data for the relevant comparison, that is, vaginal birth versus emergency CS were reported
Plunkett, E. V. E., Jagannathan, S., Gowni, R., Hasan, K., A service evaluation study to establish the usefulness of combined spinal epidural anaesthesia for women having repeat (>2) caesarean sections, International Journal of Obstetric Anesthesia, 22, S36, 2013	Conference abstract
Qazi, Q., Akhter, Z., Khan, A. H., Maternal and foetal outcome in successful vaginal birth after caesarean section versus repeat caesarean section, Journal of Postgraduate Medical Institute, 27, 414-418, 2013	Poorly written article with no reliable data presentation
Raja,J.F., Bangash,K.T., Mahmud,G., VBAC scoring: Successful vaginal delivery in previous one caesarean section in induced labour, Journal of the Pakistan Medical Association, 63, 1147-1151, 2013	The study describes a development of a scoring system for the prediction of successful vaginal birth after CS. No relevant comparison
Ram, Maya, Hiersch, Liran, Ashwal, Eran, Nassie, Daniel, Lavie, Anat, Yogev, Yariv, Aviram, Amir, Trial of labor following one previous cesarean delivery: the effect of gestational age, Archives of Gynecology and Obstetrics, 297, 907-913, 2018	No relevant comparison was reported
Reid, A. J., VBAC: Is It Safe for Your Patients?, Canadian Family Physician, 32, 2123-7, 1986	Narrative review on the safety of VBAC
Rietveld, A. L., Kok, N., Kazemier, B. M., de Groot, C. J., Teunissen, P. W., Trial of labor after cesarean: attempted operative vaginal delivery versus emergency repeat cesarean, a prospective national cohort study.[Erratum for J Perinatol. 2015 Apr;35(4):258-62; PMID: 25474557], Journal of Perinatology, 35, 310, 2015	Erratum for another article
Riva, H. L., Teich, J. C., Vaginal delivery after cesarean section, American Journal of Obstetrics and Gynecology, 81, 501-10, 1961	No relevant comparison, that is, emergency CS versus vaginal birth
Robson, M., Oxytocin should not be used to augment labour: AGAINST: the need for oxytocin is greatest in nulliparous women, BJOG: An International Journal of Obstetrics & Gynaecology, 122, 1543, 2015	Letter
Rosen,M.G., Dickinson,J.C., Westhoff,C.L., Vaginal birth after cesarean: a meta-analysis of morbidity and mortality, Obstetrics and Gynecology, 77, 465-470, 1991	Relevant studies from this review were assessed separately for inclusion
Rudra, T., McAree, T., Are prostagladins safer for IOL for women having vbac after one caesarean section?, International Journal of Gynecology and Obstetrics, 119, S817, 2012	Conference abstract
Sakala, E. P., Kaye, S., Murray, R. D., Munson, L. J., Oxytocin use after previous cesarean: why a higher rate of	Mixed population as women were given oxytocin not only for labour

Study	Reason for exclusion
failed labor trial?, Obstetrics & Gynecology, 75, 356-9, 1990	augmentation but also for labour induction
Saldana,L.R., Schulman,H., Reuss,L., Management of pregnancy after cesarean section, American Journal of Obstetrics and Gynecology, 135, 555-561, 1979	No relevant outcomes were reported
Sananes, N., Rodriguez, M., Stora, C., Pinton, A., Fritz, G., Gaudineau, A., Aissi, G., Boudier, E., Viville, B., Favre, R., Nisand, I., Langer, B., Efficacy and safety of labour induction in patients with a single previous Caesarean section: a proposal for a clinical protocol, Archives of Gynecology and Obstetrics, 290, 669-676, 2014	Focus is on induction of labour
Schneider,J., Gallego,D., Benito,R., Trial of labor after an earlier cesarean section. A conservative approach, Journal of Reproductive Medicine, 33, 453-456, 1988	Not relevant comparison, that is, elective CS versus TOL
Scott, J. R., Intrapartum management of trial of labour after caesarean delivery: evidence and experience, BJOG: An International Journal of Obstetrics & Gynaecology, 121, 157-62, 2014	Review on intrapartum management of TOL after previous CS and vaginal birth after CS
Segal, D., Sheiner, E., Yohai, D., Shoham-Vardi, I., Katz, M., Early amniotomy - High risk factor for cesarean section, European Journal of Obstetrics Gynecology and Reproductive Biology, 86, 145-149, 1999	No relevant data for women with a previous CS were reported
Shearer, V. E., Ramin, S. M., Wallace, D. H., Dax, J. S., Gilstrap, L. C., 3rd, Fetal effects of prophylactic ephedrine and maternal hypotension during regional anesthesia for cesarean section, Journal of Maternal-Fetal Medicine, 5, 79-84, 1996	All participants had an elective repeat CS
Sheehan, S., Carey, M., Murphy, D., A cohort study of 500 patients recruited to ECSSIT - Elective Caesarean Section Syntocinon Infusion Trial, International Journal of Gynecology and Obstetrics, 107, S492, 2009	Conference abstract
Shimonovitz,S., Botosneano,A., Hochner-Celnikier,D., Successful first vaginal birth after cesarean section: a predictor of reduced risk for uterine rupture in subsequent deliveries, Israel Medical Association Journal: Imaj, 2, 526-528, 2000	The article describes the relationship between the number of VBACs and the incidence of uterine rupture. No relevant comparison, that is, women with rupture versus women with no rupture
Shmueli, A., Salman, L., Nassie, D. I., Wiznitzer, A., Chen, R., Ashwal, E., Hiersch, L., Yogev, Y., Aviram, A., The intriguing association between epidural anesthesia and mode of delivery among women in trial of labor after a previous cesarean delivery, American Journal of Obstetrics and Gynecology, 216, S536-S537, 2017	Poster
Silver, R. K., Gibbs, R. S., Predictors of vaginal delivery in patients with a previous cesarean section, who require oxytocin, American Journal of Obstetrics & Gynecology, 156, 57-60, 1987	The study considers predictors of a successful vaginal birth in women with previous CS. Also, some women had labour induced or augmented with oxytocin
Singh, A. P., Moye, A., Kitching, M., Gladwell, K., Anaesthetic interventions in VBAC: A 2-year review,	Conference abstract

Study	Reason for exclusion
International Journal of Obstetric Anesthesia, 21, S46, 2012	
Smith,G.C., White,I.R., Pell,J.P., Dobbie,R., Predicting cesarean section and uterine rupture among women attempting vaginal birth after prior cesarean section, PLoS Medicine / Public Library of Science, 2, e252-, 2005	The article describes the development of a model to predict the risk of emergency CS among women attempting vaginal birth
Smith,J.G., Merrill,D.C., Oxytocin for induction of labor, Clinical Obstetrics and Gynecology, 49, 594-608, 2006	The article describes the physiology of oxytocin and its potential complications when inducing labour
Soltsman, Sofia, Perlitz, Yuri, Ben Ami, Moshe, Ben Shlomo, Izhar, Uterine rupture after previous low segment transverse cesarean is rarely catastrophic, The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians, 31, 708-712, 2018	Not clear from the article whether CS was emergency only or also included elective CS
Sondgeroth, K. E., Stout, M. J., Graseck, A. S., Roehl, K. A., Macones, G. A., Cahill, A. G., Progress of induced labor in trial of labor after cesarean delivery, American Journal of Obstetrics & Gynecology, 213, 420.e1-5, 2015	No relevant comparison, that is, induced labour versus spontaneous labouring
Spaans, W. A., Sluijs, M. B., van Roosmalen, J., Bleker, O. P., Risk factors at caesarean section and failure of subsequent trial of labour, European Journal of Obstetrics, Gynecology, & Reproductive Biology, 100, 163-6, 2002	The study examines whether the course of labour before the first CS is related to failure of TOLAC in the subsequent pregnancy
Stenson, D., Wallstrom, T., Sjostrand, M., Akerud, H., Gemzell-Danielsson, K., Wiberg-Itzel, E., Induction of labor in women with a uterine scar, Journal of Maternal-Fetal & Neonatal Medicine, 29, 3286-91, 2016	No relevant data for the comparison oxytocin versus no oxytocin were reported
Stronge, J. M., McQuillan, K., Robson, M., et al.,, Factors affecting mode of delivery in labour following a single previous birth by caesarean section, 16, 353-357, 1996	No relevant outcomes were reported
Sudhof, L. S., Has, P., Rouse, D. J., Hughes, B. L., Choice of Trial of Labor after Cesarean and Association with Likelihood of Success, American Journal of Perinatology, 2018	No relevant comparison was reported
Sudhof, L., Lopes, V., Rouse, D., Anderson, B., Choice of trial of labor after cesarean and association with likelihood of success, American Journal of Obstetrics and Gynecology, 212, S398-S399, 2015	Conference abstract
Tahilramaney, M. P., Boucher, M., Eglinton, G. S., Beall, M., Phelan, J. P., Previous cesarean section and trial of labor. Factors related to uterine dehiscence, Journal of Reproductive Medicine for the Obstetrician and Gynecologist, 29, 17-21, 1984	Same study population as an included article (Eglinton 1984) with more relevant data
Tanaka, K., Lee, P. L., Ballard, E., O'Rourke, P., Haran, M., Vaginal birth after caesarean with induction of labour, BJOG: An International Journal of Obstetrics and Gynaecology, 122, 225, 2015	Conference abstract

Study	Reason for exclusion
Thisted, Dorthe L. A., Mortensen, Laust H., Hvidman, Lone, Krebs, Lone, Operative technique at caesarean delivery and risk of complete uterine rupture in a subsequent trial of labour at term. A registry case-control study, PLoS ONE, 12, e0187850, 2017	No relevant data for the analgesia versus no analgesia comparison could be extracted
Umeadi,U.P., Mehta,R., Thomas,S., Delivery outcome after induction of labour using prostaglandin in women with one previous caesarean section, Journal of Obstetrics and Gynaecology, 27, 810-811, 2007	Not relevant intervention, that is, use of prostaglandins
van Gelderen, C. J., England, M. J., Naylor, G. A., Katzeff, T. C., Labour in patients with a caesarean section scar. The place of oxytocin augmentation, South African Medical Journal. Suid-Afrikaanse Tydskrif Vir Geneeskunde, 70, 529-32, 1986	No relevant outcomes reported
Veridiano, N. P., Thorner, N. S., Ducey, J., Vaginal delivery after cesarean section, International Journal of Gynecology and Obstetrics, 29, 307-311, 1989	No outcomes for the relevant comparison were reported
Vilchez, G., Dai, J., Bahado-Singh, R. O., Maulik, D., Sokol, R. J., Analysis of planned trial of labor vs. planned repeat cesarean and the effect of expectant management at each gestational age at term, American Journal of Obstetrics and Gynecology, 214, S211-S212	Conference abstract
Vilchez, G., Gill, N., Dai, J., Chelliah, A., Jaramillo, H., Sokol, R., Rupture in the scarred uterus, American Journal of Obstetrics and Gynecology, 212, S94-S95, 2015	Poster
Wagner, M., What every midwife should know about ACOG and VBAC. Critique of ACOG Practice Bulletin #5, July 1999, "Vaginal birth after previous cesarean section", Midwifery Today with International Midwife, 41-3, 2001	Narrative article about guidelines on VBAC
Wali,A., Placenta previa/accreta: Repeat cesarean section regional vs. general, Journal of Anaesthesiology Clinical Pharmacology, 15, 510-523, 1999	Narrative article about incidence, diagnosis and management of placenta praevia
Warren, J. B., Hamilton, A., Clinical Inquiry: What's the best way to predict the success of a trial of labor after a previous C-section?, Journal of Family Practice, 64, E3-7, 2015	Description of scoring tools to predict the success of TOL after a previous CS
Weimar,C.H., Lim,A.C., Bots,M.L., Bruinse,H.W., Kwee,A., Risk factors for uterine rupture during a vaginal birth after one previous caesarean section: a case-control study, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 151, 41-45, 2010	Not relevant comparison, that is, women with uterine rupture versus women with no uterine rupture
Weinstein, D., Benshushan, A., Ezra, Y., Rojansky, N., Vaginal birth after cesarean section: current opinion, International Journal of Gynaecology & Obstetrics, 53, 1-10, 1996	Narrative review on the management of vaginal birth after previous CS
Weinstein, D., Benshushan, A., Tanos, V., Zilberstein, R., Rojansky, N., Predictive score for vaginal birth after cesarean section, American Journal of Obstetrics and Gynecology, 174, 192-198, 1996	No data for relevant comparison, that is, scoring system versus no scoring system used, were reported

Study	Reason for exclusion
Wu, Shao-Wen, Dian, He, Zhang, Wei-Yuan, Labor Onset, Oxytocin Use, and Epidural Anesthesia for Vaginal Birth after Cesarean Section and Associated Effects on Maternal and Neonatal Outcomes in a Tertiary Hospital in China: A Retrospective Study, Chinese medical journal, 131, 933-938, 2018	No relevant comparison was reported
Yasseen, Iii A. S., Bassil, K., Sprague, A., Urquia, M., Maguire, J. L., Late preterm birth and previous cesarean section: a population-based cohort study, Journal of Maternal-Fetal and Neonatal Medicine, 1-8, 2018	The article examines the association between previous CS and late (34-36 weeks) preterm birth
Zagorzycki, M. T., Brinkman, C. R., 3rd, The effect of general and epidural anesthesia upon neonatal Apgar scores in repeat cesarean section, Surgery, Gynecology & Obstetrics, 155, 641-5, 1982	Not relevant population as all participants had an elective CS
Zelop, C. M., Shipp, T. D., Repke, J. T., Cohen, A., Caughey, A. B., Lieberman, E., Uterine rupture during induced or augmented labor in gravid women with one prior cesarean delivery, American Journal of Obstetrics & Gynecology, 181, 882-6, 1999	No results for the relevant comparison, that is, oxytocin versus no oxytocin, were reported
Zelop, C. M., Shipp, T. D., Repke, J. T., Cohen, A., Lieberman, E., Effect of previous vaginal delivery on the risk of uterine rupture during a subsequent trial of labor, American Journal of Obstetrics & Gynecology, 183, 1184-6, 2000	Not relevant comparison, that is, women with and without previous vaginal birth
Zimmer,E.Z., Jakobi,P., Itskovitz-Eldor,J., Weizman,B., Solt,I., Glik,A., Weiner,Z., Adverse effects of epidural analgesia in labor, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 89, 153-157, 2000	Not relevant population as not all participants had a previous CS

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 previous caesarean section – management of the first and second stages of labour

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Brock, C. O., Govindappagari, S., Gyamfi-Bannerman, C., Outcomes of Operative Vaginal Delivery during Trial of Labor after Cesarean Delivery, American Journal of Perinatology, 2016 **Ref Id** 652415 **Country/ies where the study was carried out** USA **Study type** Prospective cohort	**Sample size** N=5727 women with a previous caesarean section (CS) undergoing trial of labour (TOLAC) and fully dilated cervices and spontaneous labour; n=5640/5727 had a vaginal birth, n=87/5727 had an emergency CS **Characteristics** Maternal age (average (SD)): vaginal birth (VB) group = 28.45 (SD not reported), emergency CS group = 29.16 (5.68). Obese: vaginal birth group = 47.8%, emergency CS group = 51.7%. Previous CS for failure to progress: vaginal birth	**Interventions** Emergency CS	**Details** This was a secondary analysis of the MFMU Network Cesarean Registry designed to consider perinatal outcomes in women undergoing operative vaginal birth with a prior uterine scar. The primary (parent) study was a 4-year prospective observational study that enrolled women from 19 academic medical centres in the USA between 1999 and 2002 to identify characteristics of women likely to have a successful vaginal birth after previous caesarean birth	**Results** **For the woman** Uterine rupture/dehiscence: emergency CS group = 5/87 (5.7%) vaginal birth group = 11/5640 (0.2%) Endometritis: emergency CS group = 6/87 (6.9%) vaginal birth group = 59/5640 (1%) Hysterectomy: emergency CS group = 0/87 vaginal birth group = 0/5640 **For the baby** Perinatal mortality: emergency CS group = 0/87 (0.0%)	**Limitations** 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 collected from a CS registry. The non-exposed group was drawn from the same database 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 for the relevant outcomes for this review).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To explore whether operative vaginal birth in the second stage of labour is associated with less maternal and neonatal morbidity than proceeding directly to labour followed by repeat CS **Study dates** Between 1999 and 2002 **Source of funding** Assistance from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, the Maternal-Fetal Medicine Units (MFMU) Network, and the study Protocol Subcommittee acknowledged by the study authors	group = 27.5%, emergency CS group = 57.5%. n=3413 (61%) in VB group had previous VB, n=17 (19.5%) in emergency CS group had previous VB **Inclusion criteria** Women from the Cesarean Registry with singleton, nonanomalous pregnancies attempting TOLAC that reached the second stage of labour with at least +2 station. Women with known low transverse scars were included, also women with an unknown scar type (these were assumed to be low transverse because these represent the majority of caesarean births) **Exclusion criteria** Women with prior classical, low vertical, J or T incisions were excluded,			vaginal birth group = 0/5640 (0.0%) Hypoxic ischaemic encephalopathy: emergency CS group = 1/87 (1.15%) vaginal birth group = 1/5640 (0.02%)	Outcome: low risk of bias (outcomes were collected from the CS registry; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study). **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	also those with multiple prior incisions, those who gave birth before 34 or after 41 weeks of gestation				
Full citation Carlsson, C., Nybell-Lindahl, G., Ingemarsson, I., Extradural block in patients who have previously undergone caesarean section, British Journal of Anaesthesia, 52, 827-30, 1980 **Ref Id** 652430 **Country/ies where the study was carried out** Sweden **Study type** Retrospective cohort **Aim of the study** To report outcomes among 119 women who	**Sample size** N=119 women with previous CS (n=77 had extradual analgesia, n=42 had conventional analgesia) **Characteristics** Maternal age (average (range)): epidural group = 29.6 (23-36), no epidural group = 28.3 (22-39). Oxytocin was given to n=59 of the 77 women from the extradual analgesia group. Of these, labour was induced in n=25 and in n=34 spontaneous labour was accelerated; n=68 (88%) women gave birth vaginally. Oxytocin was given to n=17 of the 42 women in the conventional analgesia group. Of these, labour	**Interventions** Extradural block	**Details** Extradural block was given to n=77 (65%) women and n=42 (35%) received ketobemidone 0.8=1.0 ml i.m. or nitrous oxygen intermittently or both. Each CS was performed through a low transverse uterine incision. When the cervix was dilated to 4 cm, the extradural block was administered. The extradural space was entered with a Tuohy needle between L2-L3 or L3-L4, a catheter was inserted and advanced 4-5 cm. Bupivacaine 0.25% 6-8 ml was administered initially. When pain recurred, repeat doses were given. No vasopressor drugs were given but as a precaution against hypotension, an i.v. infusion of approximately 200 ml of buffered saline solution was administered. All women were monitored with cardiotocography and the fetal	**Results** **For the woman** Emergency CS: extradural block group: spontaneous labour = 1/18 (5.5%), oxytocin stimulation = 8/59 (13.5%) conventional analgesia group: spontaneous labour = 1/25 (4%), oxytocin stimulation = 4/17 (23.5%) Instrumental birth (forceps or vacuum extraction): extradural block group: spontaneous labour = 5/18 (27.7%), oxytocin stimulation = 20/59 (33.9%) conventional analgesia group: spontaneous labour = 3/25 (12%), oxytocin	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: high risk of bias (no clear description of the derivation of the exposed group; no clear description of the non-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 and the description of the study population was minimal). Outcome: unclear risk of bias (it was not reported how outcomes were collected; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
underwent a caesarean section (CS) previously **Study dates** Between January 1977 and June 1979 **Source of funding** Not reported	was induced in n=4 and in n=13 spontaneous labour was accelerated; n=37 (88%) women gave birth vaginally. No previous vaginal birth (VB n=66/77 (86%) in extradural analgesia group, n=32/42 (76%) in no extradural group **Inclusion criteria** Not reported **Exclusion criteria** Not reported		heart rate was recorded by scalp electrode. Oxytocin was administered as an i.v. infusion using an IVAC 501 infusion pump	stimulation = 1/17 (5.9%) Scar dehiscence: extradural block group: spontaneous labour = 0/18, oxytocin stimulation = 2/59 (3.4%) conventional analgesia group: spontaneous labour = 0/25, oxytocin stimulation = 0/17	**Other information** None
Full citation Chelmow, D., Laros, R. K., Jr., Maternal and neonatal outcomes after oxytocin augmentation in patients undergoing a trial of labor after prior cesarean delivery, Obstetrics & Gynecology, 80, 966-71, 1992 **Ref Id**	**Sample size** N=504 women with a previous CS undergoing TOLAC; n=62 were given oxytocin, n=442 were not given oxytocin **Characteristics** No description of the study population was reported.	**Interventions** Use of oxytocin for the augmentation of labour	**Details** Data were drawn from a database containing more than 300 items of information about each mother-baby pair cared for during birth for at the study author's institution. Intrapartum data were obtained at birth and the remainder of the maternal and neonatal data were extracted from antenatal records and hospital	**Results** **For the woman:** Mortality: Oxytocin group = 0/62 No oxytocin group = 0/442 Uterine rupture: Oxytocin group = 0/62 No oxytocin group = 0/442 Hysterectomy: Oxytocin group = 0/62	**Limitations** 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 had TOLAC were reviewed. The non-exposed group was drawn from the same hospital as the

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
652441 **Country/ies where the study was carried out** USA **Study type** Retrospective cohort **Aim of the study** To examine the use of oxytocin and epidural anaesthesia in terms of maternal and neonatal outcomes in 504 women undergoing a trial of labour (TOLAC) after a previous CS **Study dates** Between November 1975 and July 1990 **Source of funding** Not reported	n=442 labours were not augmented with oxytocin, n=62 labours were augmented with oxytocin n=185 (37%) out of 504 had labour abnormalities such as prolonged latent phase, slow slope active phase, active phase arrest for the first stage and persistent occiput posterior, deep transverse arrest, arrest of descent and prolonged second stage; and n=62 (34%) out of 185 required oxytocin augmentation. n=291 (58%) women had a successful TOAC. In the oxytocin group n=31/46 (67%) of women who gave birth vaginally had a spontaneous vaginal birth (VB), n=15/46 (33%) had an assisted VB; in the no oxytocin group n=194/245 (79%) had a spontaneous VB, n=51/245 (21%) had an assisted VB Birthweight was significantly different between the 2 groups: 3490 g in the non-oxytocin		charts at the time of discharge from the hospital. Most women had either continuous or intermittent electronic fetal heart rate and external uterine activity monitoring or intermittent auscultatory fetal heart rate monitoring. Conduction anaesthesia was used by 57.5% of the women. The study authors reported that there was set protocol for the management of dysfunctional labour in their institution. Typically, for first-stage abnormalities, the membranes would be ruptured artificially if they had not already ruptured. If this did not correct the dysfunction, oxytocin would be started at 0.5 mU/minute, increasing to 1 mU/minute after 40 minutes and then increasing by 1 mU/minute every 40 minutes until either the labour abnormality was corrected or 3 contractions were achieved in 10 minutes If the cervix were favourable, oxytocin would be used to augment contractions. Second-stage abnormalities were sometimes managed by	No oxytocin group = 0/442 <u>Emergency CS:</u> Oxytocin group = 16/62 (26%) No oxytocin group = 197/442 (45%) <u>Operative birth:</u> Oxytocin group = 15/62 (24%) No oxytocin group = 51/442 (11.5%) <u>Febrile morbidity:</u> Oxytocin group = 20/62 (32%) No oxytocin group = 110/442 (25%) <u>Length of intra- and postpartum stay (weighted average, days)*:</u> Oxytocin group = 3.3 No oxytocin group = 1.2 *calculated by the NGA technical team	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 and there was no description of the population). 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) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	group and 3613 g in the oxytocin group **Inclusion criteria** Singleton pregnancy, vertex presentation, gestational age at birth of at least 37 weeks, spontaneous labour **Exclusion criteria** Women with known or suspected risk factors for an abnormal labour or poor maternal or perinatal outcome known before admission such as cancer, congenital heart disease, chronic hypertension, lupus erythematosus, antenatally diagnosed fetal anomalies or death, preeclampsia and chorioamnionitis. Also women with known prior classical CS, low vertical CS entering the active segment or unknown incision types with history		oxytocin augmentation if infrequent contractions were thought to contribute to the dysfunction		

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	of suggestive of a vertical incision				
Full citation Dhall, K., Mittal, S. C., Grover, V., Dhall, G. I., Childbirth following primary cesarean section - Evaluation of a scoring system, International Journal of Gynecology and Obstetrics, 25, 199-205, 1987 **Ref Id** 652486 **Country/ies where the study was carried out** India **Study type** Retrospective cohort **Aim of the study** To describe outcomes of childbirth in 1184 women with previous CS and to evaluate standardised, easily determined and	**Sample size** N=1184 women with a previous CS, n=590/1184 (49.8%) had a trial of labour (TOLAC) that resulted in n=452/590 vaginal births and n=138/590 emergency CSs; n=594/1184 (50.2%) had an elective CS **Characteristics** n=248/590 (42%) had a previous vaginal birth (VB) and n=342/590 (58%) did not have a previous VB **Inclusion criteria** Carefully screened uncomplicated pregnancies with non-recurrent indications for primary CS had a TOLAC. Women with a history of 2 or more CSs, previous classical CS, lie other than longitudinal in the current	**Interventions** Emergency CS	**Details** Women in whom TOLAC was unsuccessful due to various reasons (not reported) had an emergency CS. Second stage of labour was shortened by applying outlet forceps and the uterine cavity was explored whenever indicated. Pitocin-induced labour occurred in n=59/132 (44.7%) vaginal births and there were n=73/132 (55.3%) CSs (not reported whether emergency or elective CS)	**Results** **For the baby** Perinatal mortality (includes stillbirths and neonatal deaths), corrected for congenital malformation, macerated stillbirths, cases of extreme prematurity): emergency CS group = 21.7/1000 (n=138 in this group, therefore the number of cases calculated* to be 3/138) vaginal birth group = 4.4/1000 (n=452 in this group, therefore the number of cases calculated* to be 2/452) elective CS group = 18.5/1000 *calculated by the NGA technical team	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: high risk of bias (it was not reported how the cohort was derived; 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: unclear risk of bias (there was no description of the study population). Outcome: high risk of bias (it was not reported how outcomes were collected; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
easily recorded factors for selection of women for TOLAC **Study dates** Between January 1979 and December 1983 **Source of funding** Not reported	pregnancy, suspected case of macrosomia and past history of chronic endometritis with suspected poor wound healing had an elective CS **Exclusion criteria** Not reported				
Full citation Durnwald,C., Mercer,B., Vaginal birth after Cesarean delivery: predicting success, risks of failure, Journal of Maternal-Fetal and Neonatal Medicine, 15, 388-393, 2004 **Ref Id** 60015 **Country/ies where the study was carried out** USA **Study type**	**Sample size** N=768 women with a previous CS; n=522/768 (68%) underwent a trial of labour (TOLAC) and of these n=344/522 had a vaginal birth and n=178/522 had an emergency CS; n=246/768 (32%) had an elective CS **Characteristics** Maternal age (average): vaginal birth group = 24.5, emergency CS group = 25.1 Spontaneous labour: vaginal birth group =	**Interventions** Emergency CS	**Details** A retrospective review of all women who gave birth to their first live-born singleton baby by CS and gave birth in their subsequent pregnancy at the same hospital	**Results** **For the woman** <u>Mortality:</u> emergency CS group = 0/178 vaginal birth = 0/344 elective CS group = 0/246 <u>Postpartum haemorrhage:</u> emergency CS group = 2/178 (1.1%) vaginal birth = 3/344 (0.9%) elective CS group = not reported <u>Infectious morbidity - chorioamnionitis:</u> emergency CS group = 13/178 (7.3%)	**Limitations** 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 all women who had TOLAC at the hospital had their maternal and infant charts reviewed; 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

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Retrospective cohort **Aim of the study** To identify predictors of successful vaginal birth after caesarean section (VBAC) in women after 1 low transverse caesarean section (CS) and no other births and to assess perinatal morbidity associated with a failed VBAC attempt **Study dates** Between January 1989 and December 2001 **Source of funding** The study was supported in part by a grant from the National Center for Research Resources (MOI-RR-000080)	85.2%, emergency CS group = 76.4% Oxytocin use: vaginal birth group = 49.7%, emergency CS group = 70.8% In those who achieved TOLAC, n=293/344 (85%) had spontaneous labour and in those who failed TOLAC n=136/178 (76%) had spontaneous labour **Inclusion criteria** Women with a previous CS **Exclusion criteria** Women with an extension into the upper segment of the uterus or conversion to a T-incision at the time of low transverse CS and those with prior uterine surgery in which TOLAC was contraindicated. Also women who gave birth via an intervening viable pregnancy at another institution, those giving birth in the first or second			vaginal birth = 18/344 (5.2%) elective CS group = 0/246 <u>Infectious morbidity - postpartum fewer:</u> emergency CS group = 20/178 (11.2%) vaginal birth = 7/344 (2%) elective CS group = 6/246 (2.4%) <u>Infectious morbidity - endometritis:</u> emergency CS group = 17/178 (9.6%) vaginal birth = 7/344 (2%) elective CS group = 3/246 (2%) **For the baby** <u>Mortality (birth to 28 days of life):</u> emergency CS group = 0/178 vaginal birth = 0/344 elective CS group = 0/246 <u>Birth asphyxia*:</u> emergency CS group = 0/178 vaginal birth = 1/344 (0.3%)	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 hospital charts; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	pregnancy before 23 weeks of gestation, and those with multiple pregnancy in the subsequent pregnancy			elective CS group = 0/246 *defined as acidaemia (umbilical cord arterial blood pH <7.00), persistent low Apgar score and evidence of neonatal neurological sequelae	
Full citation Flamm, B. L., Dunnett, C., Fischermann, E., Quilligan, E. J., Vaginal delivery following cesarean section: use of oxytocin augmentation and epidural anesthesia with internal tocodynamic and internal fetal monitoring, American Journal of Obstetrics & Gynecology, 148, 759-63, 1984 **Ref Id** 652545 **Country/ies where the study was carried out** USA **Study type**	**Sample size** N=230 women with a previous caesarean section (CS) undergoing TOLAC; n=181/230 (78.7%) had a vaginal birth and n=49/230 (21.3%) had an emergency CS **Characteristics** n=94/230 (41%) labours were induced or augmented with Pitocin (oxytocin); n=181/230 (78.7%) women had a vaginal birth; epidural anaesthesia was used by n=73 women	**Interventions** Emergency CS	**Details** N=230 women attempted TOLAC; n=128 at 1 Medical center (women there were predominantly indigent and Hispanic) and n=102 at another (women there mainly middle class and Caucasian)	**Results** **For the woman** Mortality: emergency CS group = 0/49 vaginal birth group = 0/181 Uterine rupture: emergency CS group = 0/49 vaginal birth group = 0/181 Febrile morbidity: emergency CS group = 11/49 (22.4%) vaginal birth group = 3/181 (1.7%) Anaemia requiring a blood transfusion: emergency CS group = 5/49 (10%) vaginal birth group = 2/181 (1%) Hospital stay (days):	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: high risk of bias (it was not reported how the cohort was derived; 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 and there was minimal description of the study population). Outcome: high risk of bias (it was not reported how outcomes were collected; follow-up was long enough for outcomes to occur; data

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Retrospective cohort **Aim of the study** To evaluate the role of regional anaesthesia and oxytocin augmentation of labour in women attempting a trial of labour after caesarean section (TOLAC) **Study dates** Between 1979 and 1982 **Source of funding** Not reported	**Inclusion criteria** Not reported **Exclusion criteria** Contraindications to TOLAC were prior uterine incision other than transverse or unknown uterine scar, multiple pregnancy, breech presentation, woman not interested in attempting TOLAC. More than 1 prior CS was a contraindication to TOLAC, however some exceptions were made. Cephalopelvic disproportion was not considered to be a contraindication to TOLAC			emergency CS group = 4.9 vaginal birth group = 2.3	were presented for all women covered by the study) **Other information** None
Full citation Grisaru-Granovsky, S., Bas-Lando, M., Drukker, L., Haouzi, F., Farkash, R., Samueloff, A., Ioscovich, A., Epidural analgesia at trial of labor after cesarean (TOLAC): a significant adjunct to successful vaginal birth after	**Sample size** N=7149 women undergoing TOLAC; among these n=4081 used an epidural and n=3068 did not use an epidural **Characteristics**	**Interventions** Epidural use	**Details** The study was conducted using a computerised medical records database at a single obstetric centre. Data on demographic and obstetric characteristics, the course of birth and any complications were obtained from the electronic database	**Results** **For the woman** <u>Emergency CS:</u> epidural group = 356/4081 (8.7%) no epidural group = 361/3068 (11.8%) <u>Instrumental birth:</u> epidural group = 479/4081 (11.7)	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: unclear risk of bias (although computerised medical records for all women who had TOLAC in a single obstetric centre were reviewed and used for data

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
cesarean (VBAC), Journal of Perinatal Medicine, 05, 05, 2017 **Ref Id** 652580 **Country/ies where the study was carried out** Israel **Study type** Retrospective cohort **Aim of the study** To evaluate the association between epidural analgesia and the outcomes of a trial of labour after caesarean section (TOLAC) **Study dates** Between 2006 and 2013 **Source of funding**	Jewish ethnicity: epidural group = 3837 (94%), no epidural group = 2804 (91.4%) Maternal age (average (SD)): epidural group = 30.6 (5.1), no epidural group = 31.8 (5.5) Gestational age at birth (weeks, average (SD)): epidural group = 39.5 (1.5), no epidural group = 39.4 (1.9) Labour induction: epidural group = 272 (6%), no epidural group = 99 (3.2%) Oxytocin use during labour: epidural group = 1018 (24.9%), no epidural group = 268 (8.7%) More than 1 VBAC: epidural group = 2652 (65%), no epidural group =2607 (85%) Previous vaginal birth (VB): n=2652/4081 (65%) in epidural group, n=2542/3068 (83%) in no epidural group Spontaneous VB: n=3246/4081 (80%) in epidural group,		management software, which was updated during labour. The database was periodically audited by technical personnel to validate the information recorded. All women had complete data regarding outcomes targeted for reviewed as part of the study (because the data were retrieved from a clinical dataset which was updated during labour). Epidural analgesia would be offered upon request. All women would sign an epidural analgesia informed consent form after receiving explanatory information from anaesthesia staff on duty. Epidural analgesia would be performed in the L3–L5 lumbar area with a loss-of-resistance technique. The loading dose was 10 ml bupivacaine 0.1% solution with 2 µg/ml fentanyl and continued with patient-controlled analgesia. The patient-controlled analgesia protocol included a 10 ml/hour continuous infusion rate of bupivacaine/fentanyl solution (in a concentration similar to the loading dose), the lock-out	no epidural group = 85/3068 (2.8%) Uterine rupture*: epidural group = 12/4081 (0.3%) no epidural group = 6/3068 (0.2%) Dehiscence**: epidural group = 6/4081 (0.1%) no epidural group = 3/3068 (0.1%) Postpartum haemorrhage***: epidural group = 98/4081 (2.4%) no epidural group = 77/3068 (2.5%) Prolonged hospitalisation****: epidural group = 616/4081 (15.1%) no epidural group = 448/3068 (14.6%) *the rupture includes the myometrium, peritoneum and fetal membranes **the rupture of the myometrium at the previous scar with intact peritoneum and/or fetal membranes	analysis, the cohort is likely to be overrepresentative of women with more than 1 VBAC with no epidural as the group with no epidural included significantly more of women with these characteristics compared to those who had an epidural (85% versus 65%). 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 medical records; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
No specific funding was received to undertake the study	n=2622/3068 (86%) in no epidural group **Inclusion criteria** All women with a single live fetus in cephalic presentation at 24–42 weeks of gestation and who were eligible for TOLAC under the departmental admission and management protocol. Eligibility criteria for TOLAC were: confirmation of a single previous low-transverse segment CS either by a written operative report or telephone confirmation performed and documented in the admission notes by the obstetrician overseeing the admission; estimated fetal weight <4200 g (either by clinical assessment or ultrasound examination within 1 week of admission); TOLAC was offered irrespective of the number of layers of the uterine closure at the CS.		interval was 15 minutes with a patient-controlled bolus injection of 5 ml as a rescue dose. No epidural would be offered/administered after full dilation	***blood loss of >1000 ml within 24 hours of the birth and/or transfusion of blood products within 72 hours of the birth and/or a drop-in haemoglobin concentration of >3 g/dl ****duration of hospital stay >3 days for a vaginal birth and >4 days for CS	None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	A diagnosis of dystocia of labour for the previous CS was not considered to be a contraindication for TOLAC **Exclusion criteria** Women who gave birth via planned CS or at the time of admission were referred for CS without a TOLAC. Multiple pregnancies, home or ambulance births, non-vertex presentations, women who declined TOLAC, and women who were either not eligible for TOLAC or because of maternal and/or fetal complications at admission indicating the necessity of an emergency CS without TOLAC				
Full citation Gupta, P., Jahan, I., Jograjiya, G. R., Is vaginal delivery safe after previous lower segment caesarean section in developing	**Sample size** N=367 women with a previous caesarean section (CS); n=128/367 (35%) underwent TOLAC (n=76/128 had a vaginal birth, n=52/128 had an emergency CS),	**Interventions** Emergency CS	**Details** The study was conducted in the Department of Obstetrics and Gynaecology from November 2007 to October 2009. Oxytocin was used in few women for acceleration of	**Results** **For the baby** <u>Perinatal mortality:</u> emergency CS group = 2/52 (3.8%) vaginal birth group = 1/76 (1%)	**Limitations** 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

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
country?, Nigerian Medical Journal, 55, 260-5, 2014 **Ref Id** 652589 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** To assess mode of birth in a trial of labour after caesarean section (TOLAC), incidence of successful vaginal birth and indications for a repeat CS **Study dates** Between November 2007 and October 2009 **Source of funding** None reported	n=239/367 (65%) had an elective CS **Characteristics** 85.65% of women were aged between 20 and 30 years; most of the women were from villages (85.8%); 65.12% of women had no prior antenatal booking (they were unbooked and were unsupervised prior to their admission for the birth); 52.3% of women were from lower socioeconomic status; 73.84% of women were at >37 weeks of gestation and 7.6% were at >40 weeks of gestation. Of those who achieved a vaginal birth (VB), n=40/76 (53%) gave birth without augmentation of labour **Inclusion criteria** Women with one previous lower segment CS, live pregnancy with haemoglobin ≥8 g/dl.		labour, with careful monitoring of fetal cardiac activity by cardiotocography (CTG), assessment of integrity of the previous CS scar clinically, and with careful vital monitoring	elective CS group = 0/242 Birth asphyxia: emergency CS group = 8/52 (15%) vaginal birth group = 4/76 (5%) elective CS group = 3/242 (1%)	women included in the study were recruited from a department of obstetrics and gynaecology. The non-exposed group was drawn from the same department 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 department of obstetrics and gynaecology; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria Women with gestational age <34 weeks, intrauterine fetal death, live pregnancy with haemoglobin <8 g/dl and other medical disorders				
Full citation Hehir, M. P., Mackie, A., Robson, M. S., Simplified and standardized intrapartum management can yield high rates of successful VBAC in spontaneous labor, Journal of Maternal-Fetal & Neonatal Medicine, 30, 1504-1508, 2017 **Ref Id** 652610 **Country/ies where the study was carried out** Ireland **Study type** Retrospective cohort	**Sample size** N=4704 women with a previous CS. n=3071/4704 (65.3%) underwent TOLAC, n=1633/4705 (35%) had an elective CS. Analysis includes only women in spontaneous labour: n=3071 had TOLAC, of those n=2222 had spontaneous labour, of those n=1611/2222 had vaginal birth and n=611/2222 had an emergency CS **Characteristics** The study included all secundiparous women (women in their second pregnancy) with 1 previous	**Interventions** Emergency CS	**Details** Women wishing to attempt TOLAC would receive standard antenatal care and be seen on a weekly basis from their 36th week of gestation. The history of their previous birth would be examined to ensure there were no absolute contraindications to TOLAC. Women with a medical indication for a repeat CS would be advised accordingly, however, those without a clear indication for repeat CS would be advised of the advantages of a vaginal birth. Spontaneous labour would be awaited and the women would be allowed to progress to 41 weeks of gestation	**Results** **For the woman** Mortality: emergency CS group = 0/611 (0%) vaginal birth group = 1/1611 (0.06%) Postpartum haemorrhage*: emergency CS group = 23/611 (3.8%) vaginal birth group = 10/1611 (0.6%) *defined as estimated blood loss >1000 ml Hysterectomy: emergency CS group = 2/611 (0.3%) vaginal birth group = 2/1611 (0.1%)	**Limitations** 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 all women who had TOLAC and were in spontaneous labour in 1 hospital were included; 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).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To compare demographics and characteristics in women who had a successful trial of labour after caesarean section (TOLAC) with those who required a repeat caesarean section (CS). To examine rates of significant adverse outcomes and complications in women attempting TOLAC **Study dates** Between January 2001 and December 2011 **Source of funding** Not reported	CS in spontaneous labour at term (437 completed weeks of gestation). Maternal age (mean (SD)): vaginal birth group = 32.1 (4.6), emergency CS group = 32.8 (4.6) >40 weeks of gestation: vaginal birth group = 23.1%, emergency CS group = 31.8% Oxytocin augmentation: vaginal birth group = 235/1611 (14.5%), emergency CS group = 251/611 (41%) **Inclusion criteria** Only secundiparous women (women in their second pregnancy) with 1 previous CS in spontaneous labour at term (437 completed weeks of gestation) **Exclusion criteria** Not reported				Comparability: high risk of bias (the study did not control for any factor). Outcome: low risk of bias (outcomes were collected from the hospital; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None
Full citation	**Sample size**	**Interventions** Emergency CS	**Details**	**Results** **For the baby**	**Limitations**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Kishor, T., Singh, C., Barman, S. D., Gupta, A. N., Study of vaginal delivery in patients with one previous lower segment caesarean section, Australian & New Zealand Journal of Obstetrics & Gynaecology, 26, 245-8, 1986 **Ref Id** 650101 **Country/ies where the study was carried out** India **Study type** Retrospective cohort **Aim of the study** To evaluate practice related to a trial of vaginal labour for women with a previous lower-segment caesarean section (CS) **Study dates**	N=1315 women with a previous CS, n=685/1315 (52%) had a trial of labour after CS (TOLAC); of these n=473/685 had a vaginal birth and n=212/685 had an emergency CS **Characteristics** Of those who achieved a vaginal birth (VB) n=395/473 (84%) had spontaneous labour; of those who did not achieve VB n=31/212 (15%) had spontaneous labour. Of those who achieved VB n=120/473 (25%) had 1 previous CS and >=1 VB; of those who did not achieve VB n=42/212 (20%) had 1 previous CS and >=1 VB **Inclusion criteria** Criteria for TOLAC were: 1 prior lower-segment CS for a non-recurrent indication without any postoperative		All births following CS in a hospital in India were studied. The records of women who attempted TOLAC were analysed. n=21% (144) women were given pitocin (oxytocin) for induction or augmentation of labour; n=541 women were not given pitocin	<u>Stillbirth:</u> emergency CS group = 0/212 vaginal birth group = 11/473 (2.3%)	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 records for all women who had TOLAC were reviewed; 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 and there was no description of the study population). 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)

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From January 1980 to December 1984 **Source of funding** Not reported	morbidity, no adverse obstetric history, no evidence of cephalopelvic disproportion on clinicalhadiographic assessment in the current pregnancy. Breech presentation per se was not considered to be a contraindication to TOLAC **Exclusion criteria** Not reported				**Other information** None
Full citation Kwee,A., Bots,M.L., Visser,G.H., Bruinse,H.W., Obstetric management and outcome of pregnancy in women with a history of caesarean section in the Netherlands, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 132, 171-176, 2007 **Ref Id** 52764	**Sample size** N=4569 women with a previous CS; n=3274/4569 (71%) attempted a trial of labour after caesarean section (TOLAC), of whom n=2487/3274 had a vaginal birth and n= 787/3274 had an emergency CS; n=1295/4569 (28%) had an elective CS **Characteristics** No characteristics of the population reported in the article.	**Interventions** Emergency CS. Oxytocin use	**Details** Thirty-six hospitals in the Netherlands participated in this study (38% of all hospitals in the Netherlands), proving representative sample of hospitals in the Netherlands. The following data were collected: number and order of previous CS and vaginal births, mode of birth in the current pregnancy, induction/augmentation of labour, presence of uterine rupture or scar dehiscence. Births >=16 weeks of gestation were included	**Results** **Comparison emergency CS versus vaginal birth** **For the woman** <u>Uterine rupture*:</u> emergency CS group = 46/787 (5.8%) vaginal birth group = 2/2487 (0.08%) elective CS group = 1/1295 (0.08%) *defined as a separation of the uterine wall with clinical symptoms such as fetal heart abnormalities,	**Limitations** 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 collected from n=38 hospitals. The non-exposed group was drawn from the same hospitals 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

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out The Netherlands **Study type** Prospective cohort **Aim of the study** To examine mode of birth, use of oxytocin or prostaglandins and occurrence of uterine rupture among women with a previous caesarean section (CS) **Study dates** Between April 2002 and March 2003 **Source of funding** Not reported	Labour was induced (using oxytocin, prostaglandins, combination of the 2, sulproston, misoprostol, or other means) in n=682/3274 (20.8%) of women and augmented with oxytocin in n=536/3274 (16.4%) of women undergoing TOLAC. Of those attempting TOLAC, 92% had 1 previous CS followed by 1 previous vaginal birth (VB), and 73% had 1 previous VB followed by 1 previous CS **Inclusion criteria** Women with a previous CS **Exclusion criteria** Not reported			abdominal pain, vaginal bleeding, signs of intra-abdominal bleeding, haematuria, loss of engagement of the presenting fetal part or maternal shock. <u>Uterine dehiscence**:</u> emergency CS group = 23/787 (2.9%) vaginal birth group = not reported elective CS group = 18/1295 (1.4%) **defined as separation of the uterine wall without symptoms **Comparison oxytocin versus no oxytocin** **For the woman** <u>Uterine rupture*:</u> augmentation with oxytosin = 10/536 (1.9%) no augmentation with oxytocin = 17/2056 (0.8%) *defined as a separation of the	could not occur before labour). Comparability: high risk of bias (the study did not control for any factor and there is no description of the population). Outcome: low risk of bias (outcomes were collected from hospitals; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				uterine wall with clinical symptoms such as fetal heart abnormalities, abdominal pain, vaginal bleeding, signs of intra-abdominal bleeding, haematuria, loss of engagement of the presenting fetal part or maternal shock	
Full citation Meehan, F. P., Burke, G., Casey, C., Sheil, J. G., Delivery following cesarean section and perinatal mortality, American Journal of Perinatology, 6, 90-4, 1989 **Ref Id** 395923 **Country/ies where the study was carried out** Ireland **Study type** Retrospective cohort	**Sample size** N=1498 women with a previous CS.; n=844/1498 (56%) underwent a trial of labour after caesarean section (TOLAC) of whom n=702/844 had a vaginal birth and n=142/844 had an emergency CS; n=654/1498 (44%) had an elective CS. N=1479 babies were born to women with a previous CS (n=19 multiple pregnancies) **Characteristics**	**Interventions** Emergency CS	**Details** The records of all women with a scarred uterus who gave birth at a hospital in Ireland between 1 April 1972 and 31 March 1982 were reviewed using computerised analysis	**Results** **For the baby** <u>Perinatal mortality rate per 1000*:</u> emergency CS group = 90.0/1000 (n=144 babies were born in this group, therefore the number of cases was calculated** to be 13/144) vaginal birth group = 36.5/1000 (n=712 babies babies were born in this group, therefore the number of cases was calculated** to be 26/712) elective CS group = 10.6/1000 (n=662	**Limitations** 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 had TOLAC were reviewed. 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).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To present the perinatal mortality rate in a series of 1498 consecutive women who had at least 1 previous caesarean section and who gave birth at the Regional Hospital, Galway (RHG), Ireland over a 10-year period between 1972 and 1982 **Study dates** Between 1972 and 1982 **Source of funding** Not reported	There were n=285 (34%) women undergoing TOLAC with induction of labour and another 559 (66%) women experienced spontaneous onset of labour. In the latter group, 216 (39%) of labours were accelerated, 180 by artificial rupture of the membranes (ARM) alone, 42 by ARM plus oxytocin and 36 by oxytocin alone. In 3 women prostaglandin alone was used **Inclusion criteria** Women with a previous CS **Exclusion criteria** Not reported			babies babies were born in this group) *perinatal mortality refers to stillbirths and neonatal deaths occurring from 28 completed weeks of gestation to 4 weeks after birth. It includes babies weighing 500 g or less, with a gestational age of >=28 weeks, showing signs of life but dying within 7 days **calculated by the NGA technical team	Comparability: high risk of bias (the study did not control for any factor and there was no description of the population). 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). **Other information** None
Full citation Miller, M., Leader, L. R., Vaginal delivery after caesarean section, Australian & New Zealand Journal of Obstetrics &	**Sample size** N=318 women with a previous CS; n=125 (39%) had a trial of labour after caesarean section (TOLAC) of whom n=80/125 had a vaginal birth and n=45/125 had an	**Interventions** Emergency CS	**Details** Participants were consecutive women with at least 1 previous CS giving birth at a hospital in Australia. The medical records of these women were examined and details of all previous pregnancies including	**Results** **For the woman** <u>Antibiotics postoperatively:</u> emergency CS group = 15/45 (33%) vaginal birth group = not reported	**Limitations** 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

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Gynaecology, 32, 213-6, 1992 **Ref Id** 395948 **Country/ies where the study was carried out** Australia **Study type** Prospective cohort **Aim of the study** To review the management for women with a previous caesarean section (CS) giving birth in a Sydney teaching hospital, to determine variables that may influence the likelihood of a vaginal birth and to assess perinatal and maternal morbidity associated with a vaginal birth after CS **Study dates**	emergency CS; n=193/318 had an elective CS (61%) **Characteristics** Maternal age (average, years (SD)): emergency CS = 31.13 (5.04), vaginal birth = 31.46 (4.71), elective CS = 32.09 (4.59) Gestation (average, weeks (SD)): emergency CS = 38.73 (2.73), vaginal birth = 38.28 (3.41), elective CS = 37.99 (1.98) n=155/248 (62.5%) women with private health insurance had an elective CS compared to n=38/70 (54.3%) women with public health insurance. n=88/125 (64%) of those having TOLAC received oxytocin in labour; n=61/125 (48.8%) had epidural analgesia **Inclusion criteria** Women with a previous CS		the first CS, the conduct of labour in the current pregnancy and perinatal and maternal complications were collected. The indication for CS was taken to be the main indication listed in the operation notes and postpartum fever was defined as a temperature of 38 “C or more on 2 occasions more than 24 hours apart	elective CS group = 26/193 (13.5%) Hospital stay (average, days (SD)): emergency CS group = 7.03 (1.57) vaginal birth group = 4.92 (2.03) elective CS group = 6.98 (2.05) **For the baby** Mortality: emergency CS group = 1/45 (2.2%) vaginal birth group = 1/80 (1.3%) elective CS group = 1/193 (0.5%) Stillbirth: emergency CS group = 0/45 vaginal birth group = 1/80 (1.3%) elective CS group = 0/193	consecutive prospective sample of women in a hospital was recruited and their hospital records were examined. 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 hospital records; follow-up was long enough for outcomes to occur; data were presented for all participants in the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Between July 1989 and June 1990 **Source of funding** Not reported	**Exclusion criteria** Not reported				
Full citation Paul, R. H., Phelan, J. P., Yeh, S. Y., Trial of labor in the patient with a prior cesarean birth, American Journal of Obstetrics and Gynecology, 151, 297-304, 1985 **Ref Id** 652821 **Country/ies where the study was carried out** USA **Study type** Prospective cohort **Aim of the study** To provide observations and outcome measures related to the first year of	**Sample size** N=751 women with a previous caesarean section (CS) undergoing TOLAC of whom n=614/751 had a vaginal birth and n=137/751 had an emergency CS; an elective CS was performed in n=157/458 women who did not have TOLAC **Characteristics** No description of the population was reported in the article **Inclusion criteria** Women with a previous CS	**Interventions** Emergency CS	**Details** The medical centre in which the study was conducted served mainly women of a low socio-economic status who often present for care late in pregnancy. The study authors reported that previous medical records and historical information were often difficult to obtain	**Results** **For the woman** <u>Dehiscence*:</u> emergency CS group = 5/137 (3.6%) vaginal birth group = 11/614 (1.8%) *defined as a palpable and/or visualised uterine defect <u>Febrile mordbidity:</u> emergency CS group = 37/137 (27%) vaginal birth group = 14/614 (2.3%) <u>Hysterectomy:</u> emergency CS group = 2/137 (1.5%) vaginal birth group = 5/614 (0.8%) <u>Hospital stay (days):</u> emergency CS group = 4.3 vaginal birth group = 2.3	**Limitations** 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 women who had TOLAC were reviewed. 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 and there was no description of the population).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
an ongoing prospective evaluation regarding trial of labour after caesarean section (TOLAC) **Study dates** Between July 1982 and June 1983 **Source of funding** Not reported	**Exclusion criteria** Women having a known previous classical uterine incision or having more than 1 previous CS; women with multiple pregnancies; women with a malpresentation other than breech				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). **Other information** None
Full citation Raynor, B. D., The experience with vaginal birth after cesarean delivery in a small rural community practice, American Journal of Obstetrics and Gynecology, 168, 60-62, 1993 **Ref Id** 650284 **Country/ies where the study was carried out**	**Sample size** N=51 women with a previous caesarean section (CS) undergoing a trial of labour after caesarean section (TOLAC) of whom n=31 (60.8%) had a vaginal birth and n=20 (39.2%) had an emergency CS **Characteristics** Among the women, 71.6% were black, 80.7% had a low transverse scar, 16.9% had an unknown scar and 2.4% had a vertical	**Interventions** Emergency CS	**Details** The antenatal and hospital records of all women with a history of previous CS and who gave birth at the study author's hospital were reviewed	**Results** **For the woman** <u>Postpartum haemorrhage (not defined):</u> emergency CS group = 1/20 (5%) vaginal birth group = 4/31 (12.9%)	**Limitations** 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 records of all women who had TOLAC were reviewed; 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

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
USA **Study type** Retrospective cohort **Aim of the study** To determine the success and safety of vaginal birth after caesarean birth in a small rural hospital setting **Study dates** Between October 1988 and January 1991 **Source of funding** Not reported	scar; 49% received oxytocin; n=3 had a previous vaginal birth (VB) after CS (no further details reported) **Inclusion criteria** Women with at least 1 previous CS, an unknown uterine scar and a breech presentation **Exclusion criteria** Women with fetal malformations or a vertical scar				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 hospital records; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None
Full citation Rietveld, A. L., Kok, N., Kazemier, B. M., de Groot, C. J., Teunissen, P. W., Trial of labor after cesarean: attempted operative vaginal delivery versus emergency repeat cesarean, a prospective national cohort	**Sample size** N=5246 undergoing an operative trial of labour after CS (TOLAC) of whom n=5027 had an operative vaginal birth and n=219 had an emergency CS	**Interventions** Emergency CS	**Details** The data were extracted from the Netherlands Perinatal Registry which contains information on pregnancies, births and neonatal (re)admissions until 28 days after the birth. The database consists of 3 different registries: the midwifery	**Results** **For the woman** <u>Uterine rupture:</u> emergency CS = 2/219 (0.9%) vaginal birth = 1/5027 (0.02%) Adjusted odds ratio (95% CI) = 0.82 (0.66 to 1.02);	**Limitations** 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 for women undergoing an operative

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
study.[Erratum appears in J Perinatol. 2015 Apr;35(4):310; PMID: 25813679], Journal of Perinatology, 35, 258-62, 2015 **Ref Id** 652865 **Country/ies where the study was carried out** The Netherlands **Study type** Prospective cohort **Aim of the study** To compare maternal and neonatal outcomes from operative vaginal birth after caesarean section (CS) and emergency repeat CS **Study dates** Between 1 January 2000 and 31 December 2007	**Characteristics** Maternal age (average) in the whole cohort was 32.2 years; in 26.3% the first birth was a CS All women had 1 previous CS only **Inclusion criteria** Women with a history of CS who gave birth via a repeat CS or by operative vaginal birth in their second pregnancy. The definition of an emergency CS was a CS that was not elective or planned and which was undertaken for either a maternal or fetal indication. The definition of operative vaginal birth was birth by vacuum or forceps extraction. The Netherlands Perinatal Registry does not contain data on timing of intervention and so women in the first and second stage of labour were included in the emergency cesarean group		registry, the obstetrics registry and the neonatology registry. The registry covers approximately 95% of all births in the Netherlands. Induction of labour with attempted operative vaginal birth occurred in 48.2% of women	adjusted for non-reassuring fetal status, macrosomia and ethnicity <u>Postpartum haemorrhage*:</u> emergency CS = 9/219 (4.1%) vaginal birth = 355/5027 (7.1%) Unadjusted odds ratio (95% CI) = 46.3 (4.18 to 512.8); numbers too small to calculate an adjusted odds ratio RR = 0.58 (0.3 to 1.11)** *defined as blood loss of >1000ml **calculated by the NGA technical team	vaginal birth were sampled from the Netherlands Perinatal Registry; the database consists of 3 different registries (the midwifery registry, the obstetrics registry and the neonatology registry) all of which are linked by a validated linkage procedure; the non-exposed group was drawn from the same registry 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 for postpartum haemorrhage as the study did not control for any factor for this outcome; low risk of bias for uterine rupture as the study did control for some factors for this outcome. Outcome: low risk of bias (outcomes were collected from the registry; follow-up was long enough for outcomes to occur; data were presented for all

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported	**Exclusion criteria** Women at < 37 or > 42 weeks of gestation at the start of labour in their current pregnancy, multiple pregnancy, non-cephalic (breech or transverse) presentation or antepartum fetal demise				women covered by the study) **Other information** None
Full citation Sakala, E. P., Kaye, S., Murray, R. D., Munson, L. J., Epidural analgesia. Effect on the likelihood of a successful trial of labor after cesarean section, Journal of Reproductive Medicine, 35, 886-90, 1990 **Ref Id** 430754 **Country/ies where the study was carried out** USA **Study type**	**Sample size** N=237 women with a previous caesarean section (CS) who underwent TOLAC of whom n=87 (37%) received epidural analgesia and n=150 (63%) did not; of the 150 women in the no-epidural group n=46 received no labour analgesia and n=104 received narcoticsedative combinations (no further details reported) **Characteristics** Maternal age (average (SD)): epidural group =	**Interventions** Epidural analgesia	**Details** Data for the study were obtained from perinatal data recorded on LLUMC's OBSTAT, a comprehensive, relational database including more than 90 categories of antenatal, intrapartum and neonatal data. The decision to administer epidural analgesia was made jointly by the obstetric and anesthesiology resident/attending staff on the basis of the woman's request and medical and obstetric indications. After preloading with 750 ml of Ringer's lactate, the epidural catheter was placed by the anesthesiology	**Results** **For the woman** <u>Uterine rupture:</u> epidural group = 0/87 no epidural group = 0/150 <u>Blood transfusion:</u> epidural group = 1/87 (1%) no epidural group = 4/150 (3%) <u>Scar dehiscence:</u> epidural group = 4/87 (5%) no epidural group = 1/150 (1%) <u>Emergency CS:</u> epidural group = 11/87 (12%) no epidural group = 25/150 (17%)	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: unclear risk of bias (the cohort is likely to be somewhat representative of the average population as hospital charts of all women who had TOLAC were reviewed; 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). Although the study authors reported that

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Retrospective cohort **Aim of the study** To determine whether adverse outcomes are associated with use of epidural analgesia in trial of labour after caesarean section (TOLAC), whether use of epidural analgesia influences the chance of successful TOLAC, and what factors are associated with failed TOLAC when epidural analgesia is used **Study dates** Between October 1984 and April 1986 **Source of funding** Not reported	27.2 (4.4), no epidural group = 27.4 (5.0) Gestational age (weeks (SD)): epidural group = 37.9 (4.2), no epidural group = 37.9 (4.4) Cervical examination on admission: dilation (cm (SD)): epidural group = 3 (1.5), no epidural group = 3.8 (2.5) Of those who received epidural analgesia and oxytocin n=18/40 (45%) had a spontaneous vaginal birth (VB) and with no oxytocin n=30/46 (65%) had a spontaneous VB. Of those who did not receive epidural analgesia but received oxytocin n=13/31 (42%) had a spontaneous VB and with no oxytocin n=82/118 (69%) had a spontaneous VB **Inclusion criteria** At least 1 previous low segment transverse CS		resident/attending staff at the L-2 to L-4 level. Following a test dose, a continuous infusion/intermittent bolus was given with either 0.125% or 0.25% bupivacaine. During the first stage of labour the analgesia was titrated to maternal comfort. It the woman's expulsive efforts were considered effective, the analgesia was continued through the second stage of labour; otherwise it was allowed to wear off. Electronic fetal monitoring was used for all labour	<u>Operative vaginal birth*:</u> epidural group = 28/87 (37%) no epidural group = 29/150 (23%) <u>Endometritis:</u> epidural group = 6/87 (7%) no epidural group = 7/150 (5%) *expressed as a % of vaginal births	after excluding women who received oxytocin from the analysis, there was no difference in the operative vaginal birth rate between the epidural and the no epidural groups, they did not report how many women received oxytocin. Comparability: high risk of bias (the study did not control for any factor). Outcome: low risk of bias (outcomes were collected from the hospital records; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study). **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	with the woman requesting TOLAC **Exclusion criteria** Breech presentation, multiple pregnancy and obstetric contraindications to labour				
Full citation Stovall, T. G., Shaver, D. C., Solomon, S. K., Anderson, G. D., Trial of labor in previous cesarean section patients, excluding classical cesarean sections, Obstetrics & Gynecology, 70, 713-7, 1987 **Ref Id** 652948 **Country/ies where the study was carried out** USA **Study type** Prospective cohort	**Sample size** N=396 women with a previous caesarean section (CS); n=272/396 (68.7%) underwent TOLAC of whom n=216/272 (79%) had a vaginal birth and n=56/272 (20%) had an emergency CS **Characteristics** No description of the population was reported in the article **Inclusion criteria** Women with a previous lower uterine segment transverse CS or previous	**Interventions** Emergency CS	**Details** Women who gave birth at a hospital in Tennessee, USA participated in the study. Women with a previous CS were screened in the antenatal clinic and instructed regarding risks and benefits of TOLAC. Dystocia as an indication for the primary CS was not considered a contraindication to TOLAC. Women who had an obstetric indication for induction were allowed to undergo TOLAC. Induction or augmentation with oxytocin was used when needed, after internal monitoring was initiated. Oxytocin was used in N=133, of whom n=35 (26%) were in the CS group and n=98 (74%)	**Results** **For the woman** Mortality: emergency CS = 0/56 vaginal birth = 0/216 Uterine rupture*: emergency CS = 0/56 vaginal birth = 0/216 *defined as dehiscence that required a surgical intervention or blood component replacement **For the baby** Mortality: emergency CS = 0/56 vaginal birth = 0/216	**Limitations** 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 women attending an antenatal clinic were screened for inclusion in the study; the non-exposed group was drawn from the same clinic 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 and

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To determine maternal and neonatal outcomes of a trial of labour after caesarean section (TOLAC) and to examine whether in this context the use of epidural anaesthesia and oxytocin could be safely liberalised **Study dates** During a 1-year period ending 31 July 1986 **Source of funding** Not reported	lower uterine segment vertical CS, regardless of number, were allowed to undergo TOLAC unless there was an obstetric contraindication **Exclusion criteria** Women who had a previous classical CS, a previous 'low vertical' CS in a preterm pregnancy (such as a preterm breech birth), a lower uterine segment transverse scar or a lower uterine segment vertical scar, a failed TOLAC after the primary CS		were in the vaginal birth group. Epidural was used in N=153, of whom n=39 (26%) were in the CS group and n=114 (74%) were in the vaginal birth group. The type of uterine scar was documented from hospital records and previous operative reports		there was no description of the population). 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). **Other information** None
Full citation Lai, S. F., Sidek, S., Delivery after a lower segment caesarean section, Singapore medical journal, 34, 62-6, 1993 **Ref Id** 755435	**Sample size** N=130 women with a previous CS; n=99/130 (76%) had TOLAC of whom n=64/99 had a vaginal birth and n=35/99 had an emergency CS; n=31/130 (24%) had an elective CS	**Interventions** Emergency CS	**Details** Medical records of 130 consecutive women with a previous transverse lower segment CS in a hospital in Singapore were reviewed. An elective CS was performed for: women with a uterine tear during the previous CS and those who with 2 or more	**Results** **For the woman** <u>Mortality:</u> emergency CS group = 0/35 vaginal birth group = 0/64 elective CS group = 0/31 <u>Dehiscence:</u>	**Limitations** 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 records of all women who had TOLAC

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out Singapore **Study type** Retrospective cohort **Aim of the study** To report on the safety of a trial of labour after caesarean section (TOLAC) and the use of oxytocin infusion in women with a previous transverse lower segment caesarean section (CS); also to consider factors that would influence outcomes and to examine associated maternal morbidities **Study dates** Between January and June 1989 **Source of funding** Not reported	**Characteristics** Spontaneous labour occurred in most women undergoing TOLAC. Oxytocin infusion was given to induce and to augment labour in carefully selected cases. Vaginal birth (VB) was successful in n=64/99 (65%). Of those who achieved a VB n=33/64 (52%) had a previous VB; of those who did not achieve a VB n=7/35 (20%) had a previous VB. Spontaneous and not augmented labour: n=38/64 (59%) in the VB group, n=28/35 (80%) in the emergency CS group. Spontaneous and augmented labour: n=17/64 (27%) in the VB group, n=5/35 (9%) in the emergency CS group		previous CSs; also women with multiple pregnancy and those whose pregnancies were complicated by breech presentation, macrosomia, a contracted pelvis, placenta praevia major, severe medical conditions and poor obstetric history	emergency CS group = 1/35 (2.9%) vaginal birth group = 0/64 elective CS group = 0/31 <u>Blood transfusion:</u> emergency CS group = 8/35 (22.9%) vaginal birth group = 4/64 (6.25%) elective CS group = 2/31 (6.5%) <u>Febrile morbidity:</u> emergency CS group = 6/35 (17%) vaginal birth group = 1/64 (1.6%) elective CS group = 3/31 (9.7%) <u>Endometritis:</u> emergency CS group = 1/35 (2.9%) vaginal birth group = 2/64 (3%) elective CS group = 1/31 (3.2%) <u>Urinary tract infection:</u> emergency CS group = 3/35 (8.6%) vaginal birth group = 0/64 elective CS group = 1/31 (3.2%)	were reviewed; 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 hospital records; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Inclusion criteria Not reported **Exclusion criteria** Not reported			Hospital stay (days): emergency CS group = 6.9 vaginal birth group = 2.7 elective CS group = 6.7	
Full citation Baker, K., Vaginal delivery after lower uterine cesarean section, Surgery, gynecology & obstetrics, 100, 690-6, 1955 **Ref Id** 755751 **Country/ies where the study was carried out** UK **Study type** Retrospective cohort **Aim of the study** Not reported	**Sample size** N=100 women with a previous caesarean section (CS); n=83/100 (83%) had a trial of labour after CS (TOLAC) of whom n=74/83 had a vaginal birth and n=9/83 had an emergency CS; n=17/100 (17%) had an elective CS **Characteristics** Of those who achieved a vaginal birth (VB), n=47/74 (64%) had a spontaneous VB and n=27/74 (36%) had an operative VB **Inclusion criteria** Women with a history of at least 1 previous CS	**Interventions** Emergency CS	**Details** During the 2-year period of the study author's residence at a hospital in the UK, 100 women with a previous CS gave birth. All the operations were of the lower segment type, the incision in the uterus was placed transversely	**Results** **For the woman** Mortality: emergency CS group = 0/9 vaginal birth group = 0/74 elective CS = 0/17 Placenta praevia as an indication for primary CS emergency CS group = 0/9 vaginal birth group = 0/74 elective CS group = 3/17 (17.6%)	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: high risk of bias (it was not reported how the cohort was derived; 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 and there was no description of the population). Outcome: high risk of bias (it was not reported how outcomes were collected; follow-up was long enough for outcomes to occur; data were presented for all

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Not reported	**Exclusion criteria** Not reported				women covered by the study) **Other information** None
Full citation Morewood, G. A., O'Sullivan, M. J., McConney, J., Vaginal delivery after cesarean section, Obstetrics and gynecology, 42, 589-95, 1973 **Ref Id** 755754 **Country/ies where the study was carried out** Jamaica **Study type** Retrospective cohort **Aim of the study**	**Sample size** N=423 women with a previous CS; n=243/423 (57.4%) had a trial of labour after CS (TOLAC) of whom n=171 had a vaginal birth and n=72 had an emergency CS; n=180/423 (42.6%) had an elective CS **Characteristics** No description of the population was reported in the article **Inclusion criteria** Only those women having their first CS and all subsequent pregnancies in the study author's hospital	**Interventions** Emergency CS	**Details** The records of all women undergoing CS in a university hospital in Jamaica were reviewed. In women who were not in established labour 6-12 hours after operative amniotomy, carefully titrated intravenous oxytocin was administered to start uterine contractions	**Results** **For the woman** <u>Mortality:</u> emergency CS group = 0/71 vaginal birth group = 0/171 elective CS group = 0/180 <u>Uterine rupture:</u> emergency CS group = 0/71 vaginal birth group = 0/171 elective CS group = 0/180 <u>Placenta praevia as an indication for primary CS</u> emergency CS group = 1/71 (1.4%) vaginal birth group = 15/171 (8.8%)	**Limitations** 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 records of all women who had TOLAC were reviewed; 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 and

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To review statistics on pregnancies with previous caesarean section (CS) and to examine factors identifying women in whom vaginal birth would be feasible anatomically and without obstetric risk **Study dates** Between 1960 and 1969 **Source of funding** Not reported	were included; the previous CS was restricted to low segment transverse procedures **Exclusion criteria** Women with a previous classic CS			elective CS group = not reported **For the baby** <u>Perinatal mortality:</u> emergency CS group = 0/71 vaginal birth group = 7/171 (4.1%) elective CS group = 2/180 (1.1%)	there was no description of the population). 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) **Other information** None
Full citation Eglinton, G. S., Phelan, J. P., Yeh, S., Diaz, F. P., Wallace, T. M., Paul, R. H., Outcome of a trial of labor after prior cesarean delivery, Journal of Reproductive Medicine, 29, 3-8, 1984 **Ref Id** 663409	**Sample size** N=308 women with a previous caesarean section (CS) undergoing TOLAC of whom n=240/308 (78%) had a vaginal birth and n=68/308 (22%) had an emergency CS **Characteristics** No description of the population was reported in the article	**Interventions** Emergency CS	**Details** At an estimated 34 weeks of gestation, women with previous CS were referred to the study author's hospital for consideration of TOLAC. This large county hospital services an indigent and primarily Hispanic population; only women with defined risk factors would be referred to special high-risk antenatal clinics at the hospital. The data for the study were collected retrospectively	**Results** **For the woman** <u>Dehiscence*:</u> emergency CS group = 4/68 (6%) vaginal birth group = 2/240 (0.8%) *defined as defects that were palpable and/or visualised and required no intervention <u>Febrile morbidity**:</u> emergency CS group = 27/68 (40%)	**Limitations** 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 collected from hospital charts; the non-exposed group was drawn from the same data basis as the exposed group; there is certainty that the outcomes of interest were not present

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out USA **Study type** Retrospective cohort **Aim of the study** To report the results of a system-wide policy in the study author's hospital allowing a trial of labour after caesarean section (TOLAC) and vaginal birth in selected women with previous CS **Study dates** During 1980 **Source of funding** Not reported	**Inclusion criteria** Women with a history of a single previous low transverse uterine incision **Exclusion criteria** Women who had multiple prior incisions, an incision known to be vertical or an unknown type of prior incision		through individual chart reviews. The indications for use of oxytocin were the same as for women with an unscarred uterus	vaginal birth group = 6/240 (2.5%) **defined as a temperature of 100.4 F orally on 2 separate occasions beyond the first 24 hours following surgery <u>Hysterectomy:</u> emergency CS group = 0/68 vaginal birth group = 0/240 <u>Hospital stay (average (SD)):</u> emergency CS group = 5 (1.4) vaginal birth group = 2.4 (1) **For the baby** <u>Perinatal mortality:</u> emergency CS group = 1/68 (1.5%) vaginal birth group = 7/240 (3%)	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 and there was no description of the population). Outcome: low risk of bias (outcomes were collected from hospital charts; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None
Full citation Hadley,C.B., Mennuti,M.T., Gabbe,S.G., An evaluation of the relative risks of a	**Sample size** n=40 underwent TOLAC of whom n=32 had a vaginal birth and n=8 had an emergency caesarean	**Interventions** Emergency CS	**Details** The hospital charts of all women with a history of previous CS who gave birth at	**Results** **For the woman** <u>Mortality:</u> emergency CS group = 0/8	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
trial of labor versus elective repeat cesarean section, American Journal of Perinatology, 3, 107-114, 1986 **Ref Id** 170563 **Country/ies where the study was carried out** USA **Study type** Retrospective cohort **Aim of the study** To report a retrospective experience of a trial of labour after caesarean section (TOLAC) over an 18-month period in a group of medically indigent women cared for at a large teaching institution **Study dates** Between July 1982 and December 1983	section (CS); n=35 had an elective CS **Characteristics** Maternal age (mean): vaginal birth = 23.7, emergency CS = 23.5, elective CS = 24.1 All women undergoing CS received prophylactic antibiotics consisting of 3 doses of a cephalosporin during and after the CS. Of those who achieved a vaginal birth (VB), n=23/32 (72%) had a spontaneous labour and n=9/32 (28%) had an assisted VB **Inclusion criteria** Women with no other medical/surgical complications of pregnancy, 1 previous low transverse CS, singleton fetus in vertex presentation, 37 weeks of gestation by clinical and/or ultrasound evaluation or fetal pulmonary maturity		a University of Pennsylvania hospital were reviewed. Oxytocin was given to n=4/32 from the vaginal birth group and n=4/8 from the emergency CS group	vaginal birth group = 0/32 elective CS group = 0/35 <u>Uterine rupture:</u> emergency CS group = 0/8 vaginal birth group = 0/32 elective CS group = 0/35 <u>Hysterectomy:</u> emergency CS group = 0/8 vaginal birth group = 0/32 elective CS group = 0/35 <u>Febrile morbidity</u> <u>Fever during labour:</u> emergency CS group = 0/8 vaginal birth group = 2/32 (6%) elective CS group = 0/35 <u>Postpartum endometritis:</u> emergency CS group = 4/8 (50%) vaginal birth group = 2/32 (6%) elective CS group = 7/35 (20%)	Selection: low risk of bias (the cohort is likely to be somewhat representative of the average population as data were collected from hospital 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 hospital charts; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported	confirmed analysis of amniotic fluid **Exclusion criteria** More than 1 previous CS, uterine scar other than low transverse, history of previous uterine surgery, twin pregnancy, active herpes genitalis, malpresentation of the fetus, inability to obtain adequate consent for TOLAC, fetal macrosomia, history of postpartum endometritis, abnormal prepartum testing or other (no further details reported)			<u>Urinary tract infection:</u> emergency CS group = 0/8 vaginal birth group = 1/32 (3%) elective CS group = 1/35 (2.8%) <u>Wound infection:</u> emergency CS group = 0/8 vaginal birth group = 0/32 elective CS group = 1/35 (2.8%) <u>Hospital stay (mean):</u> emergency CS group = 5.63 vaginal birth group = 3.13 elective CS group = 5.89	
Full citation Jarrell, M. A., Ashmead, G. G., Mann, L. I., Vaginal delivery after cesarean section: a five-year study, Obstetrics & Gynecology, 65, 628-32, 1985 **Ref Id** 650068	**Sample size** N=216 women with a previous CS who underwent a trial of labour after CS (TOLAC) of whom n= 142/216 (66%) had a vaginal birth and n=74/216 (34%) had an emergency CS; n=388 had an elective CS	**Interventions** Emergency CS	**Details** Data for this study were collected from review of obstetric logs of a Medical Center Hospital in the USA. An intensive retrospective review of hospital and antenatal records was conducted for all women giving birth with a previous CS. No oxytocin was used for TOLAC	**Results** **For the woman** <u>Febrile morbidity:</u> <u>Febrile, requiring antibiotics:</u> emergency CS group = 5/74 (6.7%) vaginal birth group = 1/142 (0.7%) elective CS = 10/388 (2.5%) <u>Wound infection:</u>	**Limitations** 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 collected from hospital charts; the non-exposed group was drawn from the same hospital as

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out USA **Study type** Retrospective cohort **Aim of the study** To report a retrospective analysis of data collected over a 5-year period, involving a relatively homogeneous patient population from a single institution giving birth with a history of previous caesarean section (CS) **Study dates** Between January 1978 and December 1982 **Source of funding** Not reported	**Characteristics** Women with a previous vaginal birth: vaginal birth group = 23/142, emergency CS group = 14/74 Status on admission: latent phase: vaginal birth (VB) group = 56/142, emergency CS group = 84/74. Of those who achieved a VB, n=33/142 (23%) had a previous VB; of those who had an emergency CS, n=10/74 (14%) had a previous VB **Inclusion criteria** Women with a previous CS **Exclusion criteria** Women with a classic uterine incision or T incision had an elective CS			emergency CS group = 2/74 (2.7%) vaginal birth group = 0/142 elective CS = 2/388 (0.5%) <u>Urinary tract infection:</u> emergency CS group = 3/74 (4%) vaginal birth group = 3/142 (2.1%) elective CS = 7/388 (1.8%) <u>Hospital stay (SD):</u> emergency CS group = 5.4 (2.6) vaginal birth group = 2.9 (1.3) elective CS = 5.4 (1.1)	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 hospital charts; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None
Full citation	**Sample size**	**Interventions** Emergency CS	**Details**	**Results** **For the woman**	**Limitations**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Meier, P. R., Porreco, R. P., Trial of labor following cesarean section: a two-year experience, 144, 671-8, 1982 **Ref Id** 763739 **Country/ies where the study was carried out** USA **Study type** Retrospective cohort **Aim of the study** To explore the effectiveness of obstetric management for most women with a previous caesarean section (CS) being a trial of labour after CS (TOLAC) with repeat CS reserved only for obstetric indications **Study dates**	N=207 women with a previous CS undergoing TOLAC of whom n=175/207 (84.5%) had a vaginal birth and n=32/207 (15.5%) had an emergency CS; n=62 women had an elective CS **Characteristics** The majority of patients in the hospital where the study was carried out were from middle- or upper-middle class income levels **Inclusion criteria** Women with a previous CS **Exclusion criteria** Women were excluded if they had any recurrent obstetric or medical reason requiring a repeat CS; no obvious cephalopelvic disproportion		The previous low-transverse uterine incision was documented by an operative note or by a telephone conversation with the Medical Records Department if the primary procedure was performed elsewhere. The use of oxytocin for induction or augmentation of labour was at the discretion of the managing physician, although its use was encouraged to follow traditional obstetric guidelines. Pitocin induction/augmentation was given to 34/175 (19%) women in the vaginal birth group. Women with more than 1 previous CS were not excluded a priori from a TOLAC if they fulfilled the other inclusion criteria	<u>Dehiscence:</u> emergency CS group = 1/32 (3%) vaginal birth group = 0/175 <u>Endometritis:</u> emergency CS group = 1/32 (3%) (no antibiotics prior surgery) vaginal birth group = 2/175 (1.1%) **For the baby** <u>Stillbirth:</u> emergency CS group = 0/32 vaginal birth group = 1/175 (0.6%)	Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: high risk of bias (no clear description of the derivation of the cohort; no clear description of the non-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 and there is no description of the population). Outcome: high risk of bias (it was not reported how outcomes were collected; follow-up was long enough for outcomes to occur; data were presented for all women covered by the study) **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Between January 1980 and December 1981 **Source of funding** Not reported					
Full citation Phelan, J. P., Clark, S. L., Diaz, F., Paul, R. H., Vaginal birth after cesarean, 157, 1510-5, 1987 **Ref Id** 763742 **Country/ies where the study was carried out** USA **Study type** Prospective cohort **Aim of the study** To add to previous observations and describe the study author's experience caring for women with 2 previous	**Sample size** N=1796 women with a previous CS undergoing TOLAC of whom n=1465/1796 (82%) had a vaginal birth and n=331/1796 (18%) had an emergency CS **Characteristics** No description of the population was reported in the article **Inclusion criteria** Women's acceptance, 1 or 2 previous CS, and unknown type of scar **Exclusion criteria**	**Interventions** Emergency CS	**Details** The study population consisted of women who gave birth at a hospital in Los Angeles, USA. Oxytocin was administered according to the American College of Obstetricians and Gynecologists' guidelines. Oxytocin was used for n=793/1796 (44%) of women undergoing TOLAC (for induction of labour in n=59 and augmentation of labour in n=734)	**Results** **For the woman** Dehiscence*: emergency CS group = 17/331 (5.1%) vaginal birth group = 22/1465 (1.5%) *defined as scar separation that required no intervention Febrile morbidity: emergency CS group = 106/331 (32%) vaginal birth group = 53/1465 (3.6%) Hospital stay (average): emergency CS group = 4.2 vaginal birth group = 2.2	**Limitations** Limitations assessed with the Newcastle-Ottawa Quality Assessment Scale: Selection: high risk of bias (no clear description of the derivation of the cohort; no clear description of the non-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 and there was no description of the population). Outcome: high risk of bias (it was not reported how outcomes were collected; follow-up was long enough for outcomes to occur; data were presented for all

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
caesarean sections (CSs) who underwent a trial of labour after CS (TOLAC) **Study dates** Between July 1982 and June 1984 **Source of funding** Not reported	Multiple pregnancy, known classical scar, or malpresentation				women covered by the study) **Other information** None
Full citation Yetman, T. J., Nolan, T. E., Vaginal birth after cesarean section: a reappraisal of risk, 161, 1119-23, 1989 **Ref Id** 763743 **Country/ies where the study was carried out** USA **Study type** Retrospective cohort	**Sample size** N=535 women with a previous CS. n=224/535 (42%) underwent a trial of labour after CS (TOLAC) of whom n=137/224 (61%) had a vaginal birth and n=87/224 (39%) had an emergency CS **Characteristics** No description of the population was reported in the article	**Interventions** Emergency CS	**Details** Labour and birth record books were used for the analysis. To identify vaginal birth after CS attempts that were not recorded in the primary record books, operating room record books for the same period were examined to identify all repeat CSs performed because of indications implying attempted vaginal birth. All inpatient hospital records of identified women were obtained from hospital archives and a chart review was performed to search for markers of maternal or fetal	**Results** **For the woman** Haemorrhage (during or after birth and requiring blood transfusion in the postpartum period): emergency CS group = 4/87 (4.6%) vaginal birth group = 4/137 (3%)	**Limitations** 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 collected from hospital records; the non-exposed group was drawn from the same database 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).

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To assess morbidity associated with attempted vaginal birth after caesarean section (CS) at a tertiary level military obstetric hospital **Study dates** Between January 1986 and December 1987 **Source of funding** Not reported	**Inclusion criteria** Women with previous CS **Exclusion criteria** Not reported		morbidity that might be related to vaginal birth after CS		Comparability: high risk of bias (the study did not control for any factor and there was no description of the population). 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) **Other information** None

Appendix F – Forest plots

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

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

Appendix G – GRADE tables

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

Table 3: Clinical evidence profile for oxytocin in the case of delay or suspected delay in labour versus no oxytocin, outcomes for the woman

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Oxytocin	No oxytocin	Relative (95% CI)	Absolute	Quality	Importance
Uterine rupture												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/62 (0%)	0/442 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Kwee 2007)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	None	10/536 (1.9%)	17/2056 (0.83%)	RR 2.26 (1.04 to 4.9)	104 more per 10,000 (from 3 more to 322 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Febrile morbidity												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	None	20/62 (32.3%)	110/442 (24.9%)	RR 1.3 (0.87 to 1.92)	75 more per 1000 (from 32 fewer to	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Oxytocin	No oxytocin	Relative (95% CI)	Absolute	Quality	Importance
										229 more)		
Hysterectomy												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/62 (0%)	0/442 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
Mortality												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/62 (0%)	0/442 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Emergency caesarean section												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Serious[2]	None	16/62 (25.8%)	197/442 (44.6%)	RR 0.58 (0.37 to 0.89)	187 fewer per 1000 (from 49 fewer to 281 fewer)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Operative vaginal birth												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	None	15/62 (24.2%)	51/442 (11.5%)	RR 2.1 (1.26 to 3.49)	127 more per 1000 (from 30 more to	⨁⊖⊖⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Oxytocin	No oxytocin	Relative (95% CI)	Absolute	Quality	Importance
										287 more)		
1 (Kwee 2007)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	None	119/536 (22.2%)	265/2056 (12.9%)	RR 1.72 (1.42 to 2.09)	93 more per 1000 (from 54 more to 140 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Duration of intrapartum and postpartum stay												
1 (Chelmow 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Not estimable[a]	None	Weighted average 3.3 days (n=62)	Weighted average 1.2 days (n=442)	-	-	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT

CI: confidence interval; RR: risk ratio
1 The quality of the evidence was downgraded by 1 level due to high risk of comparability bias (the study did not control for any factor), no description of the population reported
2 The quality of the evidence was downgraded by 1 level because the 95% CI crosses 1 default MID threshold
a The effect was not estimable because no standard deviation was reported

Table 4: Clinical evidence profile for emergency caesarean section versus continuation of labour, outcomes for the woman

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
Uterine rupture												

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Flamm 1984)	Observational studies	Very serious [1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/49 (0%)	0/181 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/8 (0%)	0/32 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Morewood 1973)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/71 (0%)	0/171 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Rietveld 2015)	Observational studies	No serious risk of bias	No serious inconsistency	No serious indirectness	Serious[4]	None	2/219 (0.91%)	1/5027 (0.02%)	OR 0.82[b] (0.66 to 1.02)	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Stovall 1987)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/56 (0%)	0/216 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
Uterine rupture[a]												
1 (Kwee 2007)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	No serious imprecision	None	46/787 (5.8%)	2/2487 (0.08%)	RR 72.68 (17.68 to 298.73)	58 more per 1000 (from 13 more to	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
										239 more)		
Dehiscence												
1 (Eglinton 1984)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	No serious imprecision	None	4/68 (5.9%)	2/240 (0.83%)	RR 7.06 (1.32 to 37.72)	50 more per 1000 (from 3 more to 306 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	1/35 (2.9%)	0/64 (0%)	RR 5.42 (0.23 to 129.55)	-[i]	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Meier 1982)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Very serious[5]	None	1/32 (3.1%)	0/175 (0%)	RR 16.00 (0.67 to 384.34)	-[i]	⨁⊖⊖⊖ VERY LOW	CRITICAL
Dehiscence[c]												
1 (Paul 1985)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Very serious[5]	None	5/137 (3.6%)	11/614 (1.8%)	RR 2.04 (0.72 to 5.77)	19 more per 1000 (from 5 fewer to 85 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
Dehiscence[d]												
1 (Phelan 1987)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	No serious imprecision	None	17/331 (5.1%)	22/1465 (1.5%)	RR 3.42 (1.84 to 6.37)	36 more per 1000 (from 13 more to 81 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Uterine rupture or dehiscence												
1 (Brock 2016)	Observational studies	Serious [7]	No serious inconsistency	No serious indirectness	No serious imprecision	None	5/87 (5.7%)	11/5640 (0.2%)	RR 29.47 (10.46 to 83.01)	56 more per 1000 (from 18 more to 160 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Postpartum haemorrhage												
1 (Durnwald 2004)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	2/178 (1.1%)	3/344 (0.87%)	RR 1.29 (0.22 to 7.64)	3 more per 1000 (from 7 fewer to 58 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Emergency CS**	**Vaginal birth**	**Relative (95% CI)**	**Absolute**	**Quality**	**Importance**
1 (Raynor 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	1/20 (5%)	4/31 (12.9%)	RR 0.39 (0.05 to 3.22)	79 fewer per 1000 (from 123 fewer to 286 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Postpartum haemorrhage[e]												
1 (Hehir 2017)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	No serious imprecision	None	23/611 (3.8%)	10/1611 (0.62%)	RR 6.06 (2.9 to 12.67)	31 more per 1000 (from 12 more to 72 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Postpartum haemorrhage[e]												
1 (Rietveld 2015)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Serious[4]	None	9/219 (4.1%)	355/5027 (7.1%)	RR 0.58 (0.3 to 1.11)	30 fewer per 1000 (from 49 fewer to 8 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
Postpartum haemorrhage[f]												
1 (Yetman 1989)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Very serious[5]	None	4/87 (4.6%)	4/137 (2.9%)	RR 1.57 (0.4 to 6.13)	17 more per 1000 (from 18 fewer to 150 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Blood transfusion												
1 (Flamm 1984)	Observational studies	Very serious [1]	No serious inconsistency	No serious indirectness	No serious imprecision	None	5/49 (10.2%)	2/181 (1.1%)	RR 9.23 (1.85 to 46.16)	91 more per 1000 (from 9 more to 499 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Serious[4]	None	8/35 (22.9%)	4/64 (6.3%)	RR 3.66 (1.18 to 11.29)	166 more per 1000 (from 11 more to 643 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
Febrile morbidity[g]												
1 (Eglinton 1984)	Observational studies	Serious [3]	No serious inconsistency	Serious[8]	No serious imprecision	None	27/68 (39.7%)	6/240 (2.5%)	RR 15.88 (6.84 to 36.89)	372 more per 1000 (from 146 more to 897 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Febrile morbidity												
1 (Flamm 1984)	Observational studies	Very serious [1]	No serious inconsistency	Serious[8]	No serious imprecision	None	11/49 (22.4%)	3/181 (1.7%)	RR 13.54 (3.93 to 46.66)	208 more per 1000 (from 49 more to 757 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	Serious[8]	Very serious[5]	None	0/8 (0%)	2/32 (6.3%)	RR 0.73 (0.04 to 13.95)	17 fewer per 1000 (from 60 fewer to 809 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	Serious[8]	No serious imprecision	None	6/35 (17.1%)	1/64 (1.6%)	RR 10.97 (1.38 to 87.52)	156 more per 1000 (from 6 more to 1000 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Paul 1985)	Observational studies	Serious [3]	No serious inconsistency	Serious[8]	No serious imprecision	None	37/137 (27%)	14/614 (2.3%)	RR 11.84 (6.59 to 21.29)	247 more per 1000 (from 127 more to 463 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Phelan 1987)	Observational studies	Very serious [6]	No serious inconsistency	Serious[8]	No serious imprecision	None	106/331 (32%)	53/1465 (3.6%)	RR 8.85 (6.51 to 12.04)	284 more per 1000 (from 199 more to 399 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Febrile morbidity requiring antibiotics												

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Jarrell 1985)	Observational studies	Serious [2]	No serious inconsistency	Serious[8]	Serious[4]	None	5/74 (6.8%)	1/142 (0.7%)	RR 10.22 (1.17 to 89.15)	65 more per 1000 (from 1 more to 621 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Endometritis												
1 (Brock 2016)	Observational studies	Serious [7]	No serious inconsistency	No serious indirectness	No serious imprecision	None	6/87 (6.9%)	59/5640 (1%)	RR 6.59 (2.92 to 14.86)	58 more per 1000 (from 20 more to 145 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Durnwald 2004)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	No serious imprecision	None	17/178 (9.6%)	7/344 (2%)	RR 4.69 (1.98 to 11.11)	75 more per 1000 (from 20 more to 206 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	No serious imprecision	None	4/8 (50%)	2/32 (6.3%)	RR 8.0 (1.77 to 36.22)	438 more per 1000 (from 48 more to 1000 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious [5]	None	1/35 (2.9%)	2/64 (3.1%)	RR 0.91 (0.09 to 9.73)	3 fewer per 1000 (from 28 fewer to 273 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Meier 1992)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Very serious [5]	None	1/32 (3.1%)	2/175 (1.1%)	RR 2.73 (0.26 to 29.27)	20 more per 1000 (from 8 fewer to 323 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Chorioamnionitis												
1 (Durn	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious [5]	None	13/178 (7.3%)	18/344 (5.2%)	RR 1.4 (0.7 to 2.78)	21 more per	⨁⊖⊖⊖	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
wald 2004)										1000 (from 16 fewer to 93 more)	VERY LOW	
Postpartum fever												
1 (Durnwald 2004)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	No serious imprecision	None	20/178 (11.2%)	7/344 (2%)	RR 5.52 (2.38 to 12.81)	92 more per 1000 (from 28 more to 240 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Urinary tract infection												
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	0/8 (0%)	1/32 (3.1%)	RR 1.22 (0.05 to 27.53)	7 more per 1000 (from 30 fewer to 829 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Jarrell 1985)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	3/74 (4.1%)	3/142 (2.1%)	RR 1.92 (0.4 to 9.27)	19 more per 1000	⨁⊖⊖⊖ 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		
										(from 13 fewer to 175 more)		
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	3/35 (8.6%)	0/64 (0%)	RR 12.64 (0.67 to 237.9)	-[i]	⨁⊖⊖⊖ VERY LOW	CRITICAL
Wound infection												
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/8 (0%)	0/32 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Jarrell 1985)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious[5]	None	2/74 (2.7%)	0/142 (0%)	RR 9.83 (0.47 to 207.41)	-[i]	⨁⊖⊖⊖ VERY LOW	CRITICAL
Placenta praevia as an indication for primary caesarean section												
1 (Baker 1955)	Observational studies	Very serious [9]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/9 (0%)	0/74 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Morewood 1973)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Serious[4]	None	1/71 (1.4%)	15/171 (8.8%)	RR 0.16 (0.02 to 1.19)	74 fewer per 1000 (from	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
										86 fewer to 17 more)		
Hysterectomy												
1 (Brock 2016)	Observational studies	Serious [7]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/87 (0%)	0/5640 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Eglinton 1984)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/68 (0%)	0/240 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/8 (0%)	0/32 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Hehir 2017)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious [5]	None	2/611 (0.33%)	2/1611 (0.12%)	RR 2.64 (0.37 to 18.68)	2 more per 1000 (from 1 fewer to 22 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Paul 1985)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Very serious [5]	None	2/137 (1.5%)	5/614 (0.81%)	RR 1.79 (0.35 to 9.14)	6 more per 1000 (from 5	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
										fewer to 66 more)		
Mortality												
1 (Baker 1955)	Observational studies	Very serious [9]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/9 (0%)	0/74 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Durnwald 2004)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/178 (0%)	0/344 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Flamm 1984)	Observational studies	Very serious [1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/49 (0%)	0/181 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Hadley 1986)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/8 (0%)	0/32 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Hehir 2017)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Very serious [5]	None	0/611 (0%)	1/1611 (0.06%)	RR 0.88 (0.04 to 21.52)	0 fewer per 1000 (from 1 fewer to 13 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/35 (0%)	0/64 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Morewood 1973)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/71 (0%)	0/171 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Stovall 1987)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/56 (0%)	0/216 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Duration of hospital stay												
1 (Eglinton 1984)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	No serious imprecision	None	68	240	-	MD 2.60 higher (2.24 to 2.96 higher)	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
1 (Flamm 1984)	Observational studies	Very serious [1]	No serious inconsistency	No serious indirectness	Not estimable[h]	None	Average hospital stay 4.9 days (n=49)	Average hospital stay 2.3 days (n=181)	-	-	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
1 (Hadl	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable[h]	None	Average hospital stay 5.6	Average hospital stay 3	-	-	⨁⊖⊖⊖	NOT IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
ey 1986)							days (n=8)	days (n=32)			VERY LOW	
1 (Jarrell 1985)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	No serious imprecision	None	74	142	-	MD 2.50 higher (1.87 to 3.13 higher)	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
1 (Lai 1993)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	Not estimable[h]	None	Average hospital stay 6.9 days (n=35)	Average hospital stay 2.7 days (n=64)	-	-	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
1 (Miller 1992)	Observational studies	Serious [2]	No serious inconsistency	No serious indirectness	No serious imprecision	None	45	80	-	MD 2.11 higher (1.47 to 2.75 higher)	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
1 (Paul 1985)	Observational studies	Serious [3]	No serious inconsistency	No serious indirectness	Not estimable[h]	None	Average hospital stay 4.3 days (n=137)	Average hospital stay 2.3 days (n=614)	-	-	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
1 (Phelan 1987)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Not estimable[h]	None	Average hospital stay 4.2 days (n=331)	Average hospital stay 2.2 days	-	-	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
								(n=1465)				

CI: confidence interval; CS: caesarean section; MD: mean difference; MID: minimally important difference; OR: odds ratio; RR: risk ratio
1 High risk of selection bias as it is not reported how the cohort was derived; high risk of comparability bias as the study did not control for any factor and there is a minimal description of the population reported); high risk of outcome selection bias as it is not reported how outcomes were collected
2 High risk of comparability bias as the study did not control for any factor
3 High risk of comparability bias as the study did not control for any factor and there is no description of the population
4 The quality of the evidence was downgraded by 1 level because the 95% CI crosses 1 default MID threshold
5 The quality of the evidence was downgraded by 2 levels because the 95% CI crosses both default MID thresholds
6 High risk of selection bias as it is not reported how the cohort was derived; high risk of comparability bias as the study did not control for any factor and there is no description of the population; high risk of outcome selection bias as it is not reported how outcomes were collected
7 High risk of comparability bias as the study did not control for any factor for outcomes relevant to the guideline review
8 The quality of the evidence was downgraded by 1 level for indirectness (requested by the committee) as fever in labour is not a good proxy for infectious morbidity, many fevers in labour are not necessarily due to an infection
9 High risk of selection bias as it is not reported how the cohort was derived; high risk of comparability bias as the study did not control for any factor and there is no description of the population; high risk of outcome selection bias as it is not reported how outcomes were collected
a Defined as a separation of the uterine wall with clinical symptoms, such as fetal heart abnormalities, abdominal pain, vaginal bleeding, signs of intra-abdominal bleeding, haematuria, loss of engagement of the presenting fetal part or maternal shock
b OR adjusted for non-reassuring fetal status, macrosomia and ethnicity
c Defined as a palpable or visualised uterine defect
d Defined as scar separation that required no intervention
e Defined as estimated blood loss >1000 ml
f Defined as during or after birth and requiring a transfusion in the postpartum period
g Defined as a temperature of 100.4 F orally on 2 separate occasions beyond the first 24 hours following surgery
h The effect was not estimable because no standard deviation was reported
i Absolute effect not estimable because 0 events in the control group

Table 5: Clinical evidence profile for emergency caesarean section versus continuation of labour, outcomes for the baby

Quality assessment							Number of babies		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
Hypoxic ischaemic encephalopathy												
1 (Brock 2016)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	No serious imprecision	None	1/87 (1.1%)	1/5640 (0.02%)	RR 64.83 (4.09 to 1028.07)	11 more per 1000 (from 1 more to 182 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Birth asphyxia[a]												
1 (Durnwald 2004)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	0/178 (0%)	1/344 (0.29%)	RR 0.64 (0.03 to 15.69)	1 fewer per 1000 (from 3 fewer to 43 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Birth asphyxia												
1 (Gupta 2014)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Serious[3]	None	8/52 (15.4%)	4/76 (5.3%)	RR 2.92 (0.93 to 9.21)	101 more per 1000 (from 4 fewer to 432 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Mortality												

Quality assessment							Number of babies		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Stovall 1987)	Observational studies	Serious[4]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/56 (0%)	0/216 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Miller 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	1/45 (2.2%)	1/80 (1.3%)	RR 1.78 (0.11 to 27.74)	10 more per 1000 (from 11 fewer to 334 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Perinatal mortality												
1 (Brock 2016)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/87 (0%)	0/5641 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Eglinton 1984)	Observational studies	Serious[4]	No serious inconsistency	No serious indirectness	Very serious[2]	None	1/68 (1.5%)	7/240 (2.9%)	RR 0.5 (0.06 to 4.03)	15 fewer per 1000 (from 27 fewer to 88 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Gupta 2014)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	2/52 (3.8%)	1/76 (1.3%)	RR 2.92 (0.27 to 31.41)	25 more per 1000 (from 10 fewer to	⨁⊖⊖⊖ VERY LOW	IMPORTANT

Quality assessment							Number of babies		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
										400 more)		
1 (Morewood 1973)	Observational studies	Serious[4]	No serious inconsistency	No serious indirectness	Very serious[2]	None	0/71 (0%)	7/171 (4.1%)	RR 0.16 (0.01 to 2.75)	34 fewer per 1000 (from 41 fewer to 72 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Perinatal mortality[b]												
1 (Meehan 1989)	Observational studies	Serious[4]	No serious inconsistency	No serious indirectness	No serious imprecision	None	13/144 (9%)	26/712 (3.7%)	RR 2.47 (1.30 to 4.69)	54 more per 1000 (from 11 more to 135 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Perinatal mortality[c]												
1 (Dhall 1987)	Observational studies	Very serious[5]	No serious inconsistency	No serious indirectness	Serious[3]	None	3/138 (2.2%)	2/452 (0.44%)	RR 4.91 (0.83 to 29.10)	17 more per 1000 (from 1 fewer to 124 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Mortality (birth to 28 days of life)												

Quality assessment							Number of babies		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Emergency CS	Vaginal birth	Relative (95% CI)	Absolute	Quality	Importance
1 (Durnwald 2004)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/178 (0%)	0/344 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Stillbirth												
1 (Kishor 1986)	Observational studies	Serious[4]	No serious inconsistency	No serious indirectness	Very serious[2]	None	0/212 (0%)	11/473 (2.3%)	RR 0.1 (0.01 to 1.63)	21 fewer per 1000 (from 23 fewer to 15 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Meier 1982)	Observational studies	Very serious[6]	No serious inconsistency	No serious indirectness	Very serious[2]	None	0/32 (0%)	1/175 (0.57%)	RR 1.78 (0.07 to 42.7)	4 more per 1000 (from 5 fewer to 238 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Miller 1992)	Observational studies	Serious[1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	0/45 (0%)	1/80 (1.3%)	RR 0.59 (0.02 to 14.12)	5 fewer per 1000 (from 12 fewer to 164 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT

CI: confidence interval; CS caesarean section; RR: risk ratio.
1 High risk of comparability bias as the study did not control for any factor
2 The quality of the evidence was downgraded by 2 levels because the 95% CI crosses both default MID thresholds

3 The quality of the evidence was downgraded by 1 level because the 95% CI crosses 1 default MID threshold
4 High risk of comparability bias as the study did not control for any factor and there is no description of the population
5 High risk of selection bias as the study did not report how the cohort was derived, high risk of outcome bias as the study did not report how outcomes were collected, unclear risk of comparability bias as there is no description of the population
6 High risk of selection bias as there is no clear description of the derivation of the cohort and no clear description of the non-exposed group, high risk of comparability bias as the study did not control for any factor and there is no description of the population, high risk of outcome bias as it is not reported how outcomes were collected
a Defined as acidaemia (umbilical cord arterial blood pH <7.00), persistent low Apgar score and evidence of neonatal neurological sequelae
b Defined as stillbirths and neonatal deaths occurring from 28 completed weeks of gestation to 4 weeks after the birth. Includes babies weighing 500 g or less, with a gestational age of >=28 weeks, showing signs of life but dying within 7 days
c Includes stillbirths and neonatal deaths, corrected for congenital malformation, macerated stillbirths, and cases of extreme prematurity

Table 6: Clinical evidence profile for neuraxial analgesia versus no neuraxial analgesia, outcomes for the woman

Quality assessment							Number of women		Effect			
Number of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Neuraxial analgesia**	**No neuraxial analgesia**	**Relative (95% CI)**	**Absolute**	**Quality**	**Importance**
Uterine rupture												
1 (Grisaru-Granovsky 2017)	Observational studies	Very serious [1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	12/4081 (0.29%)	6/3068 (0.2%)	RR 1.5 (0.56 to 4.0)	1 more per 1000 (from 1 fewer to 6 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
1 (Sakala 1990)	Observational studies	Serious[3]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/87 (0%)	0/150 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
Dehiscence												
1 (Grisaru-	Observational studies	Very serious [1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	6/4081 (0.15%)	3/3068 (0.1%)	RR 1.50 (0.38 to 6.01)	0 more per 1000 (from 1	⨁⊖⊖⊖ VERY LOW	CRITICAL

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Neuraxial analgesia	No neuraxial analgesia	Relative (95% CI)	Absolute	Quality	Importance
Granovsky 2017)										fewer to 5 more)		
1 (Sakala 1990)	Observational studies	Serious[3]	No serious inconsistency	No serious indirectness	Very serious[2]	None	4/87 (4.6%)	1/150 (0.67%)	RR 6.90 (0.78 to 60.72)	39 more per 1000 (from 1 fewer to 398 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Postpartum haemorrhage[a]												
1 (Grisaru-Granovsky 2017)	Observational studies	Very serious[1]	No serious inconsistency	No serious indirectness	Very serious[2]	None	98/4081 (2.4%)	77/3068 (2.5%)	RR 0.96 (0.71 to 1.28)	1 fewer per 1000 (from 7 fewer to 7 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Blood transfusion												
1 (Sakala 1990)	Observational studies	Serious[3]	No serious inconsistency	No serious indirectness	Very serious[2]	None	1/87 (1.1%)	4/150 (2.7%)	RR 0.42 (0.05 to 3.86)	15 fewer per 1000 (from 25 fewer to 76 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Endometritis												

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Neuraxial analgesia	No neuraxial analgesia	Relative (95% CI)	Absolute	Quality	Importance
1 (Sakala 1990)	Observational studies	Serious[3]	No serious inconsistency	No serious indirectness	Very serious[2]	None	6/87 (6.9%)	7/150 (4.7%)	RR 1.48 (0.51 to 4.26)	22 more per 1000 (from 23 fewer to 152 more)	⨁⊖⊖⊖ VERY LOW	CRITICAL
Emergency caesarean section												
1 (Grisaru-Granovsky 2017)	Observational studies	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[4]	None	358/4081 (8.8%)	361/3068 (11.8%)	RR 0.74 (0.65 to 0.85)	31 fewer per 1000 (from 18 fewer to 41 fewer)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
1 (Sakala 1990)	Observational studies	Serious[3]	No serious inconsistency	No serious indirectness	Very serious[2]	None	11/87 (12.6%)	25/150 (16.7%)	RR 0.76 (0.39 to 1.47)	40 fewer per 1000 (from 102 fewer to 78 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Operative vaginal birth												
1 (Grisaru-	Observational studies	Very serious[1]	No serious inconsistency	No serious indirectness	Serious[4]	None	479/4081 (11.7%)	85/3068 (2.8%)	RR 4.24 (3.38 to 5.31)	90 more per 1000 (from 66	⨁⊖⊖⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Neuraxial analgesia	No neuraxial analgesia	Relative (95% CI)	Absolute	Quality	Importance
Granovsky 2017)										more to 119 more)		
1 (Sakala 1990)	Observational studies	Very serious [5]	No serious inconsistency	No serious indirectness	Serious[4]	None	28/87 (32.2%)	29/150 (19.3%)	RR 1.66 (1.06 to 2.60)	128 more per 1000 (from 12 more to 309 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Prolonged hospital stay (duration of hospital stay >3 days for vaginal birth and >4 days for caesarean section)												
1 (Grisaru-Granovsky 2017)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	No serious imprecision	None	616/4081 (15.1%)	448/3068 (14.6%)	RR 1.03 (0.92 to 1.16)	4 more per 1000 (from 12 fewer to 23 more)	⨁⊖⊖⊖ VERY LOW	NOT IMPORTANT
Dehiscence in oxytocin-stimulated labour												
1 (Carlsson 1980)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Very serious[2]	None	2/59 (3.4%)	0/17 (0%)	RR 1.5 (0.08 to 29.84)	-[i]	⨁⊖⊖⊖ VERY LOW	CRITICAL
Emergency caesarean section in oxytocin-stimulated labour												
1 (Carlsson 1980)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Very serious[2]	None	8/59 (13.6%)	4/17 (23.5%)	RR 0.58 (0.2 to 1.68)	99 fewer per 1000	⨁⊖⊖⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Neuraxial analgesia	No neuraxial analgesia	Relative (95% CI)	Absolute	Quality	Importance
										(from 188 fewer to 160 more)		
Operative vaginal birth in oxytocin-stimulated labour												
1 (Carlsson 1980)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Serious[4]	None	20/59 (33.9%)	1/17 (5.9%)	RR 5.76 (0.83 to 39.88)	280 more per 1000 (from 10 fewer to 1000 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT
Dehiscence in spontaneous labour												
1 (Carlsson 1980)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Not estimable due to 0 events	None	0/18 (0%)	0/25 (0%)	-	-	⨁⊖⊖⊖ VERY LOW	CRITICAL
Emergency caesarean section in spontaneous labour												
1 (Carlsson 1980)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Very serious[2]	None	1/18 (5.6%)	1/25 (4%)	RR 1.39 (0.09 to 20.77)	16 more per 1000 (from 36 fewer to 791 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT

Quality assessment							Number of women		Effect			
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Neuraxial analgesia	No neuraxial analgesia	Relative (95% CI)	Absolute	Quality	Importance
Operative vaginal birth in spontaneous labour												
1 (Carlsson 1980)	Observational studies	Very serious [6]	No serious inconsistency	No serious indirectness	Very serious[2]	None	5/18 (27.8%)	3/25 (12%)	RR 2.31 (0.63 to 8.47)	157 more per 1000 (from 44 fewer to 896 more)	⨁⊖⊖⊖ VERY LOW	IMPORTANT

CI: confidence interval; RR: risk ratio
1 The quality of the evidence was downgraded by 2 levels due to unclear risk of selection bias as, although computerised medical records of all women who had a trial of labour after caesarean section in a single obstetric centre had their records reviewed and used for data analysis, the cohort is likely to be over-representative of women with more than 1 vaginal birth after caesarean section with no epidural as the group with no epidural included significantly more of these women compared to those who had an epidural (85% versus 65%). High risk of comparability bias (the study did not control for any factor)
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 due to high risk of comparability bias (the study did not control for any factor
4 The quality of the evidence was downgraded by 1 level because the 95% CI crosses 1 default MID threshold
5 The quality of the evidence was downgraded by 2 levels due to unclear risk of selection bias as: although the study authors reported that after women who received oxytocin were excluded from the analysis, there was no difference in the operative vaginal birth rate between the epidural and the no epidural groups, they did not report how many women received oxytocin. High risk of comparability bias (the study did not control for any factor)
6 The quality of the evidence was downgraded by 2 levels due to high risk of selection bias (no clear description of the derivation of the cohort; no clear description of the non-exposed group. High risk of comparability bias (the study did not control for any factor). Also unclear risk of outcome bias (not reported how outcomes were collected)
a Defined as loss of >1000 ml blood within 24 hours of birth or transfusion of blood products within 72 hours of birth or a drop-in haemoglobin concentration of >3 g/dl
b Absolute effect not estimable because 0 events in the control group

Appendix H – Economic evidence study selection

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

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 previous caesarean section – management of the first and second stages of labour

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 previous caesarean section – management of the first and second stages of labour

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 previous caesarean section – management of the first and second stages of labour

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

Appendix L – Research recommendations

Intrapartum care for women with previous caesarean section – management of the first and second stages of labour

What is the clinical and cost effectiveness of intermittent auscultation compared with continuous cardiotocography for women in labour who have had a previous caesarean section?

Why this is important

The committee was aware that women at low risk of intrapartum complications have lower rates of intervention (such as caesarean section) and no difference in outcomes for the baby when fetal monitoring with intermittent auscultation is used rather than continuous cardiotocography. This is reflected in recommendations in the NICE guideline on intrapartum care for healthy women and babies (CG190). The committee was also aware that for women

planning vaginal birth after a previous caesarean section, continuous cardiotocography is usually advised because of an increased risk of serious medical problems for the baby. However, it is uncertain whether offering continuous cardiotocography to women in labour who have had a previous caesarean section allows risk to be identified sooner than if intermittent auscultation is used. The committee agreed that a randomised controlled trial is needed to compare continuous cardiotocography with intermittent auscultation for women in labour who have had a previous caesarean section. The trial should evaluate clinical and cost effectiveness and consider both short- and long-term outcomes such as mortality in the baby, neonatal unit admission, requirement for respiratory ventilation, development of neonatal encephalopathy, developmental delay at 2 years, caesarean section, and woman's experience of labour and birth.

Research recommendation rationale

Research question	**What is the clinical and cost effectiveness of intermittent auscultation compared with continuous cardiotocography for women in labour who have had a previous caesarean section?**
Importance to 'patients' or the population	Continuous cardiotocography may be advised routinely for women planning a vaginal birth after a previous caesarean section. However, it is not certain that offering continuous cardiotocography in labour improves outcomes for either the woman or the baby compared with intermittent auscultation. It may lead to unnecessary interventions such as caesarean section without any benefit to the baby
Relevance to NICE guidance	The recommended research would facilitate development of a future update of this NICE guideline
Relevance to NHS	The efficient use of continuous cardiotocography is expected to improve outcomes for women and their babies and lead to a net saving for the NHS by reducing unnecessary interventions when the risk to the baby is insufficient to warrant use of continuous cardiotocography in preference to intermittent auscultation
National priorities	The ability to provide clear guidance on whether continuous cardiotocography is more clinically and cost effective than intermittent auscultation for women in labour who have had a previous caesarean section would: • improve care and outcomes • reduce costs associated with unnecessary interventions • reduce variations in practice
Current evidence base	The question of whether continuous cardiotocography is more clinically and cost effective than intermittent auscultation for women in labour who have had a previous caesarean section was not prioritised for consideration in the development of this guideline, but it could fit within the scope of a

Research question	What is the clinical and cost effectiveness of intermittent auscultation compared with continuous cardiotocography for women in labour who have had a previous caesarean section?
	future update. The recommended research should include an initial systematic review of the existing evidence base to inform the specifics of the recommended randomised controlled trial, for example in terms of the sample size needed to power the trial, outcomes to be prioritised and duration of follow-up
Equalities	No specific equalities issues were identified

Research recommendation PICO

Criterion	Explanation
Population	Women in labour who have had a previous caesarean section
Intervention	Continuous cardiotocography
Comparator	Intermittent auscultation
Outcomes	For the woman: • mode of birth (caesarean section) • woman's experience of labour and birth, including experience of the birth companion For the baby: • mortality • neonatal unit admission • requirement for respiratory ventilation • hypoxic ischaemic encephalopathy • developmental delay at 2 years

Criterion	Explanation
Study design	Randomised controlled trial
Timeframe	Sufficient duration of follow up to allow evaluation of outcomes for the baby, including developmental delay at 2 years