

Caesarean section

Clinical Guideline 13

April 2004

Developed by the National Collaborating Centre for
Women's and Children's Health

Clinical Guideline 13 Caesarean section

Issue date: April 2004

This document, which contains the Institute's full guidance on caesarean section, is available from the NICE website (www.nice.org.uk/CG013NICEguideline).

An abridged version of this guidance (a 'quick reference guide') is also available from the NICE website (www.nice.org.uk/CG013quickrefguide). Printed copies of the quick reference guide can be obtained from the NHS Response Line: telephone 0870 1555 455 and quote reference number N0478.

Information for the Public is available from the NICE website or from the NHS Response Line (quote reference number N0479 for a version in English and N0480 for a version in English and Welsh).

The quick reference guide for this guideline has been distributed to the following:

- Primary care trust (PCT) chief executives
- Local health board (LHB) chief executives
- NHS trust chief executives in England and Wales
- Strategic health authority chief executives in England and Wales
- Medical and nursing directors in England and Wales
- Clinical governance leads in England and Wales
- Audit leads in England and Wales
- NHS trust, PCT and LHB libraries in England and Wales
- Patient advice and liaison co-ordinators in England
- Consultant obstetricians in England and Wales
- Midwives in England and Wales
- NHS Director Wales
- Chief Executive of the NHS in England
- Chief Medical, Nursing and Pharmaceutical Officers in England and Wales
- Medical Director & Head of NHS Quality – Welsh Assembly Government
- Community health councils in Wales
- Commission for Healthcare Audit and Inspection
- NHS Clinical Governance Support Team
- Patient advocacy groups
- Representative bodies for health services, professional organisations and statutory bodies, and the Royal Colleges

This guidance is written in the following context.

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

National Institute for Clinical Excellence

MidCity Place
71 High Holborn
London
WC1V 6NA

www.nice.org.uk

ISBN: 1-84257-584-8

Published by the National Institute for Clinical Excellence
April 2004

Artwork by LIMA Graphics Ltd, Frimley, Surrey

© Copyright National Institute for Clinical Excellence, April 2004. All rights reserved. This material may be freely reproduced for educational and not-for-profit purposes within the NHS. No reproduction by or for commercial organisations is allowed without the express written permission of the National Institute for Clinical Excellence.

Contents

Key priorities for implementation	5
1 Guidance	7
1.1 Woman-centred care	7
1.2 Planned CS	9
1.3 Factors affecting likelihood of CS during intrapartum care	12
1.4 Procedural aspects of CS	14
1.5 Care of the baby born by CS	18
1.6 Care of the woman after CS	19
1.7 Recovery following CS	21
1.8 Pregnancy and childbirth following CS	22
2 Notes on the scope of the guidance	24
3 Implementation in the NHS	25
3.1 In general	25
3.2 Audit	25
4 Research recommendations	26
5 Full guideline	27
6 Related NICE guidance	27
7 Review date	28
Appendix A: Grading scheme	29
Appendix B: The Guideline Development Group	30
Appendix C: The Guideline Review Panel	32
Appendix D: Technical detail on the criteria for audit	33
Appendix E: Summary estimates of risks and benefits of CS	35

Key priorities for implementation

Making the decision

- When considering a caesarean section (CS), there should be discussion on the benefits and risks of CS compared with vaginal birth specific to the woman and her pregnancy.
- Maternal request is not on its own an indication for CS and specific reasons for the request should be explored, discussed and recorded. When a woman requests a CS in the absence of an identifiable reason, the overall benefits and risks of CS compared with vaginal birth should be discussed and recorded.

Carrying out the procedure

- The following interventions should be used to decrease morbidity from CS:
 - regional anaesthesia
 - antibiotic prophylaxis
 - thromboprophylaxis
 - antacids
 - anti-emetics.
- The risk of respiratory morbidity is increased in babies born by CS before labour but this risk decreases significantly after 39 weeks. Therefore, planned CS should not routinely be carried out before 39 weeks.

Reducing the likelihood of CS

- Women who have an uncomplicated singleton breech pregnancy at 36 weeks' gestation should be offered external cephalic version. Exceptions include women in labour, and women with a uterine scar or abnormality, fetal compromise, ruptured membranes, vaginal bleeding or medical conditions.
- Women should be informed that continuous support during labour from women with or without prior training reduces the likelihood of CS.

- Women with uncomplicated pregnancies should be offered induction of labour beyond 41 weeks, because this reduces the risk of perinatal mortality and the likelihood of CS.
- A partogram with a 4-hour action line should be used to monitor progress of labour of women in spontaneous labour with an uncomplicated singleton pregnancy at term, because it reduces the likelihood of CS.
- Consultant obstetricians should be involved in the decision making for CS, because this reduces the likelihood of CS.
- Electronic fetal monitoring is associated with an increased likelihood of CS. When CS is contemplated because of an abnormal fetal heart rate pattern, in cases of suspected fetal acidosis, fetal blood sampling should be offered if it is technically possible and there are no contraindications.

The following guidance is evidence based. The grading scheme used for the recommendations (A, B, C, D, or good practice point [GPP]) is described in Appendix A; a summary of the evidence on which the guidance is based is provided in the full guideline (see Section 5).

1 Guidance

The National Sentinel Caesarean Section Audit showed that the overall caesarean section (CS) rate was 21.5% in England and Wales. CS rates for maternity units ranged from 10% to 65% (inter-quartile range [IQR]: 18%, 24%). Ten per cent of women had CS before labour; the range between maternity units was 4% to 59% (IQR: 8%, 12%). Twelve per cent of women who went into labour had a CS; the range between maternity units was 2% to 22% (IQR: 10%, 14%). Some of the differences in CS rates observed may be explained by differences in the demographic and clinical characteristics of the population, such as maternal age, ethnicity, previous CS, breech presentation, prematurity and induction of labour.

Common primary indications reported for women having a primary CS (first CS) were failure to progress (25%), presumed fetal compromise (28%) and breech presentation (14%). The most common indications for women having a repeat CS were previous CS (44%), maternal request as reported by clinicians (12%), failure to progress (10%), presumed fetal compromise (9%) and breech presentation (3%).

This guideline focuses on CS, and factors that affect decisions about CS. It does not consider the effect these factors might have on other aspects of antenatal and intrapartum care.

1.1 Woman-centred care

1.1.1 Provision of information

- 1.1.1.1 Pregnant women should be offered evidence-based information and support to enable them to make informed decisions about childbirth. Addressing women's views and concerns should be recognised as being integral to the decision-making process.

C

- | | | |
|---------|--|-----|
| 1.1.1.2 | Pregnant women should be given evidence-based information about CS during the antenatal period, because about 1 in 5 women will have a CS. This should include information about CS such as: | GPP |
| | <ul style="list-style-type: none"> • indications for CS (such as presumed fetal compromise, failure to progress in labour, breech presentation) • what the procedure involves • associated risks and benefits • implications for future pregnancies, and birth after CS. | |
| 1.1.1.3 | Communication and information should be provided in a form that is accessible to pregnant women, taking into account the information and cultural needs of minority communities and women whose first language is not English or who cannot read, together with the needs of women with disabilities or learning difficulties. | GPP |

Information summarising the likely effect of CS on women's and children's health can be found in Appendix E.

1.1.2 Consent for CS

- | | | |
|---------|--|-----|
| 1.1.2.1 | Consent for CS should be requested after providing pregnant women with evidence-based information and in a manner that respects the woman's dignity, privacy, views and culture, while taking into consideration the clinical situation. | C |
| 1.1.2.2 | A competent pregnant woman is entitled to refuse the offer of treatment such as CS, even when the treatment would clearly benefit her or her baby's health. Refusal of treatment needs to be one of the patient's options. | D |
| 1.1.2.3 | When considering a CS, there should be discussion on the benefits and risks of CS compared with vaginal birth specific to the woman and her pregnancy. | GPP |
| 1.1.2.4 | When the decision is made to perform a CS, a record should be made of all the factors that influence the decision, and which of these is the most influential. | GPP |

1.1.3 Classification of urgency

- 1.1.3.1 The urgency of CS should be documented using the following standardised scheme in order to aid clear communication between healthcare professionals about the urgency of a CS:
1. immediate threat to the life of the woman or fetus
 2. maternal or fetal compromise which is not immediately life-threatening
 3. no maternal or fetal compromise but needs early delivery
 4. delivery timed to suit woman or staff.

C

1.2 Planned CS

Planned CS refers to a CS that is scheduled before the onset of labour for a specific clinical indication. This section deals only with decisions about the mode of delivery. Other aspects of management of specific conditions or complications of pregnancy are outside the scope of this guideline.

1.2.1 Breech presentation

- 1.2.1.1 Women who have an uncomplicated singleton breech pregnancy at 36 weeks' gestation should be offered external cephalic version. Exceptions include women in labour and women with a uterine scar or abnormality, fetal compromise, ruptured membranes, vaginal bleeding or medical conditions.
- 1.2.1.2 Pregnant women with a singleton breech presentation at term, for whom external cephalic version is contraindicated or has been unsuccessful, should be offered CS because it reduces perinatal mortality and neonatal morbidity.

A

A

1.2.2 Multiple pregnancy

- 1.2.2.1 In otherwise uncomplicated twin pregnancies at term where the presentation of the first twin is cephalic, perinatal morbidity and mortality is increased for the second twin. However, the effect of planned CS in improving outcome for the second twin remains uncertain and therefore CS should not routinely be offered outside a research context. **C**
- 1.2.2.2 In twin pregnancies where the first twin is not cephalic the effect of CS in improving outcome is uncertain, but current practice is to offer a planned CS. **GPP**
- 1.2.2.3 Planned CS for uncomplicated twin pregnancy should not be carried out before 38 weeks because this increases the risk of respiratory problems in these babies. **B**

1.2.3 Preterm birth and CS

- 1.2.3.1 Preterm birth is associated with higher neonatal morbidity and mortality. However, the effect of planned CS in improving these outcomes remains uncertain and therefore CS should not routinely be offered outside a research context. **C**

1.2.4 Small for gestational age and CS

- 1.2.4.1 The risk of neonatal morbidity and mortality is higher with 'small for gestational age' babies. However, the effect of planned CS in improving these outcomes remains uncertain and therefore CS should not routinely be offered outside a research context. **C**

1.2.5 Placenta Praevia

- 1.2.5.1 Women with a placenta that partly or completely covers the internal cervical os (grade 3 or 4 placenta praevia) should be offered CS. **D**

1.2.6 Predicting CS for cephalopelvic disproportion in labour

- 1.2.6.1 Pelvimetry is not useful in predicting 'failure to progress' in labour and should not be used in decision making about mode of birth. **A**

- 1.2.6.2 Shoe size, maternal height and estimations of fetal size (ultrasound or clinical examination) do not accurately predict cephalopelvic disproportion and should not be used to predict 'failure to progress' during labour.

B

1.2.7 Mother-to-child transmission of maternal infections

This section exclusively addresses CS as an intervention to reduce mother-to-child transmission of infections. Other interventions to reduce transmission of these infections to the baby are available but are outside the scope of this guideline.

- 1.2.7.1 HIV-positive women who are pregnant should be offered a planned CS because it reduces the risk of mother-to-child transmission of HIV.

A

- 1.2.7.2 Mother-to-child transmission of hepatitis B can be reduced if the baby receives immunoglobulin and vaccination. In these situations pregnant women with hepatitis B should not be offered a planned CS, because there is insufficient evidence that this reduces mother-to-child transmission of hepatitis B virus.

B

- 1.2.7.3 Women who are infected with hepatitis C should not be offered a planned CS because this does not reduce mother-to-child transmission of the virus.

C

- 1.2.7.4 Pregnant women who are co-infected with hepatitis C virus and HIV should be offered planned CS because it reduces mother-to-child transmission of both hepatitis C virus and HIV.

C

- 1.2.7.5 Women with primary genital herpes simplex virus (HSV) infection occurring in the third trimester of pregnancy should be offered planned CS because it decreases the risk of neonatal HSV infection.

C

- 1.2.7.6 Pregnant women with a recurrence of HSV at birth should be informed that there is uncertainty about the effect of planned CS in reducing the risk of neonatal HSV infection. Therefore, CS should not routinely be offered outside a research context.

C

1.2.8 Maternal request for CS

- 1.2.8.1 Maternal request is not on its own an indication for CS and specific reasons for the request should be explored, discussed and recorded.

GPP

- | | | |
|---------|--|-----|
| 1.2.8.2 | When a woman requests a CS in the absence of an identifiable reason, the overall benefits and risks of CS compared with vaginal birth should be discussed and recorded. | GPP |
| 1.2.8.3 | When a woman requests a CS because she has a fear of childbirth, she should be offered counselling (such as cognitive behavioural therapy) to help her to address her fears in a supportive manner, because this results in reduced fear of pain in labour and shorter labour. | A |
| 1.2.8.4 | An individual clinician has the right to decline a request for CS in the absence of an identifiable reason. However the woman's decision should be respected and she should be offered referral for a second opinion. | GPP |

1.3 Factors affecting likelihood of CS during intrapartum care

1.3.1 Place of birth

- | | | |
|---------|--|---|
| 1.3.1.1 | During their discussions about options for birth, healthy pregnant women with anticipated uncomplicated pregnancies should be informed that delivering at home reduces the likelihood of CS. | B |
| 1.3.1.2 | During their discussions about options for birth, healthy pregnant women with anticipated uncomplicated pregnancies should be informed that planned childbirth in a 'midwifery-led unit' does not reduce the likelihood of CS. | A |

1.3.2 Reducing likelihood of CS

The following interventions during intrapartum care have been shown to decrease the likelihood of CS:

- | | | |
|---------|--|---|
| 1.3.2.1 | Women should be informed that continuous support during labour from women with or without prior training reduces the likelihood of CS. | A |
| 1.3.2.2 | Women with an uncomplicated pregnancy should be offered induction of labour beyond 41 weeks because this reduces the risk of perinatal mortality and the likelihood of CS (see also the NICE Clinical Guideline on induction of labour; details in Section 6). | A |

- | | | |
|---------|---|---|
| 1.3.2.3 | A partogram with a 4-hour action line should be used to monitor progress of labour of women in spontaneous labour with an uncomplicated singleton pregnancy at term, because it reduces the likelihood of CS. | A |
| 1.3.2.4 | Consultant obstetricians should be involved in the decision making for CS, because this reduces the likelihood of CS. | C |
| 1.3.2.5 | Electronic fetal monitoring is associated with an increased likelihood of CS. When CS is contemplated because of an abnormal fetal heart rate pattern, in cases of suspected fetal acidosis, fetal blood sampling should be offered if it is technically possible and there are no contraindications (see also the NICE Clinical Guideline on electronic fetal monitoring; details in Section 6). | B |

1.3.3 No influence on likelihood of CS

- | | | |
|---------|--|---|
| 1.3.3.1 | <p>Women should be informed that the following interventions during intrapartum care have not been shown to influence the likelihood of CS, although they may affect other outcomes that are outside the scope of this guideline:</p> <ul style="list-style-type: none"> • walking in labour • non-supine position during the second stage of labour • immersion in water during labour • epidural analgesia during labour • the use of raspberry leaves. | A |
| 1.3.3.2 | <p>Women should be informed that the effects on the likelihood of CS of complementary therapies used during labour (such as acupuncture, aromatherapy, hypnosis, herbal products, nutritional supplements, homeopathic medicines and Chinese medicines) have not been properly evaluated and further research is needed before such interventions can be recommended.</p> | D |

- | | | |
|---------|---|---|
| 1.3.3.3 | The following aspects of intrapartum care have not been shown to influence the likelihood of CS for 'failure to progress' and should not be offered for this reason, although they may affect other outcomes which are outside the scope of this guideline: | A |
| | <ul style="list-style-type: none"> • active management of labour • early amniotomy. | |
| 1.3.3.4 | Women should be informed that eating a low-residue diet during labour (toast, crackers, low-fat cheese) results in larger gastric volumes, but the effect on the risk of aspiration if anaesthesia is required is uncertain. | A |
| 1.3.3.5 | Women should be informed that having isotonic drinks during labour prevents ketosis without a concomitant increase in gastric volume. | A |

1.4 Procedural aspects of CS

1.4.1 Timing of CS

- | | | |
|---------|--|---|
| 1.4.1.1 | The risk of respiratory morbidity is increased in babies born by CS before labour, but this risk decreases significantly after 39 weeks. Therefore planned CS should not routinely be carried out before 39 weeks. | B |
| 1.4.1.2 | Delivery at emergency CS for maternal or fetal compromise should be accomplished as quickly as possible, taking into account that rapid delivery has the potential to do harm. A decision-to-delivery interval of less than 30 minutes is not in itself critical in influencing baby outcome, but has been an accepted audit standard for response to emergencies within maternity services. | C |

1.4.2 Pre-operative testing before CS

- | | | |
|---------|--|---|
| 1.4.2.1 | Pregnant women should be offered a haemoglobin assessment before CS to identify those who have anaemia. Although blood loss of more than 1000 ml is infrequent after CS (it occurs in 4–8% of CS), it is a potentially serious complication. | C |
|---------|--|---|

1.4.2.2	Pregnant women having CS for antepartum haemorrhage, abruption, uterine rupture and placenta praevia are at increased risk of blood loss of more than 1000 ml and should have the CS carried out at a maternity unit with on-site blood transfusion services.	C
1.4.2.3	<p>Pregnant women who are healthy and who have otherwise uncomplicated pregnancies should not routinely be offered the following tests before CS:</p> <ul style="list-style-type: none"> • grouping and saving of serum • cross-matching of blood • a clotting screen • pre-operative ultrasound for localisation of the placenta, because this does not improve CS morbidity outcomes (such as blood loss of more than 1000 ml, injury of the infant, and injury to the cord or to other adjacent structures). 	C
1.4.2.4	Women having CS with regional anaesthesia require an indwelling urinary catheter to prevent over-distension of the bladder, because the anaesthetic block interferes with normal bladder function.	GPP
1.4.3 Anaesthesia for CS		
1.4.3.1	Pregnant women having a CS should be given information on different types of post-CS analgesia so that analgesia best suited to their needs can be offered (see recommendation 1.6.6).	GPP
1.4.3.2	Women who are having a CS should be offered regional anaesthesia because it is safer and results in less maternal and neonatal morbidity than general anaesthesia. This includes women who have a diagnosis of placenta praevia.	A
1.4.3.3	Women who are having induction of regional anaesthesia for CS should be cared for in theatre because this does not increase patient anxiety.	B
1.4.3.4	Women who are having a CS under regional anaesthesia should be offered intravenous ephedrine or phenylephrine, and volume pre-loading with crystalloid or colloid to reduce the risk of hypotension occurring during CS.	A

1.4.3.5	Each maternity unit should have a drill for failed intubation during obstetric anaesthesia.	D
1.4.3.6	To reduce the risk of aspiration pneumonitis, women should be offered antacids and drugs (such as H ₂ receptor antagonists or proton pump inhibitors) to reduce gastric volumes and acidity before CS.	B
1.4.3.7	Women having a CS should be offered antiemetics (either pharmacological or acupuncture) to reduce nausea and vomiting during CS.	A
1.4.3.8	General anaesthesia for emergency CS should include preoxygenation, cricoid pressure and rapid sequence induction to reduce the risk of aspiration.	GPP
1.4.3.9	Intravenous ephedrine or phenylephrine should be used in the management of hypotension during CS.	A
1.4.3.10	The operating table for CS should have a lateral tilt of 15°, because this reduces maternal hypotension.	A

1.4.4 Surgical techniques for CS

The following recommendations for surgical techniques apply to pregnancies at term where there is a lower uterine segment. Techniques may need modification in situations such as repeat CS or placenta praevia.

1.4.4.1	Healthcare professionals should wear double gloves when performing or assisting at CS on women who have tested positive for HIV, to reduce the risk of HIV infection of healthcare professionals during surgery.	A
1.4.4.2	General recommendations for safe surgical practice should be followed at CS to reduce the risk of HIV infection of staff.	C
1.4.4.3	CS should be performed using a transverse abdominal incision because this is associated with less postoperative pain and an improved cosmetic effect compared with a midline incision.	B
1.4.4.4	The transverse incision of choice should be the Joel Cohen incision (a straight skin incision, 3 cm above the symphysis pubis; subsequent tissue layers are opened bluntly and, if necessary, extended with scissors and not a knife), because it is associated with shorter operating times and reduced postoperative febrile morbidity.	A

1.4.4.5	The use of separate surgical knives to incise the skin and the deeper tissues at CS is not recommended because it does not decrease wound infection.	B
1.4.4.6	When there is a well formed lower uterine segment, blunt rather than sharp extension of the uterine incision should be used because it reduces blood loss, incidence of postpartum haemorrhage and the need for transfusion at CS.	A
1.4.4.7	Women who are having a CS birth should be informed that the risk of fetal lacerations is about 2%.	C
1.4.4.8	Forceps should only be used at CS if there is difficulty delivering the baby's head. The effect on neonatal morbidity of the routine use of forceps at CS remains uncertain.	C
1.4.4.9	Oxytocin 5 IU by slow intravenous injection should be used at CS to encourage contraction of the uterus and to decrease blood loss.	C
1.4.4.10	At CS, the placenta should be removed using controlled cord traction and not manual removal as this reduces the risk of endometritis.	A
1.4.4.11	Intraperitoneal repair of the uterus at CS should be undertaken. Exteriorisation of the uterus is not recommended because it is associated with more pain and does not improve operative outcomes such as haemorrhage and infection.	A
1.4.4.12	The effectiveness and safety of single layer closure of the uterine incision is uncertain. Except within a research context, the uterine incision should be sutured with two layers.	B
1.4.4.13	Neither the visceral nor the parietal peritoneum should be sutured at CS because this reduces operating time and the need for postoperative analgesia, and improves maternal satisfaction.	A
1.4.4.14	In the rare circumstances that a midline abdominal incision is used at CS, mass closure with slowly absorbable continuous sutures should be used because this results in fewer incisional hernias and less dehiscence than layered closure.	B

1.4.4.15	Routine closure of the subcutaneous tissue space should not be used, unless the woman has more than 2 cm subcutaneous fat, because it does not reduce the incidence of wound infection.	A
1.4.4.16	Superficial wound drains should not be used at CS because they do not decrease the incidence of wound infection or wound haematoma.	A
1.4.4.17	Obstetricians should be aware that the effects of different suture materials or methods of skin closure at CS are not certain.	C
1.4.4.18	Umbilical artery pH should be performed after all CS for suspected fetal compromise, to allow review of fetal wellbeing and guide ongoing care of the baby.	B
1.4.4.19	Women having a CS should be offered prophylactic antibiotics, such as a single dose of first-generation cephalosporin or ampicillin, to reduce the risk of postoperative infections (such as endometritis, urinary tract and wound infection), which occur in about 8% of women who have had a CS.	A
1.4.4.20	Women having a CS should be offered thromboprophylaxis because they are at increased risk of venous thromboembolism. The choice of method of prophylaxis (for example, graduated stockings, hydration, early mobilisation, low molecular weight heparin) should take into account risk of thromboembolic disease and follow existing guidelines.	D
1.4.4.21	Women's preferences for the birth, such as music playing in theatre, lowering the screen to see the baby born, or silence so that the mother's voice is the first the baby hears, should be accommodated where possible.	GPP

1.5 Care of the baby born by CS

1.5.1	An appropriately trained practitioner skilled in the resuscitation of the newborn should be present at CS performed under general anaesthesia or where there is evidence of fetal compromise.	C
1.5.2	Babies born by CS are more likely to have a lower temperature, and thermal care should be in accordance with good practice for thermal care of the newborn baby.	GPP

1.5.3	Early skin-to-skin contact between the woman and her baby should be encouraged and facilitated because it improves maternal perceptions of the infant, mothering skills, maternal behaviour, and breastfeeding outcomes, and reduces infant crying.	A
1.5.4	Women who have had a CS should be offered additional support to help them to start breastfeeding as soon as possible after the birth of their baby. This is because women who have had a CS are less likely to start breastfeeding in the first few hours after the birth, but, when breastfeeding is established, they are as likely to continue as women who have a vaginal birth.	A
1.6 Care of the woman after CS		
1.6.1	After CS, women should be observed on a one-to-one basis by a properly trained member of staff until they have regained airway control and cardiorespiratory stability and are able to communicate.	D
1.6.2	Healthcare professionals caring for women after CS should be aware that, although it is rare for women to need intensive care following childbirth, this occurs more frequently after CS (about 9 per 1000).	B
1.6.3	After recovery from anaesthesia, observations (respiratory rate, heart rate, blood pressure, pain and sedation) should be continued every half hour for 2 hours, and hourly thereafter provided that the observations are stable or satisfactory. If these observations are not stable, more frequent observations and medical review are recommended.	GPP
1.6.4	For women who have had intrathecal opioids, there should be a minimum hourly observation of respiratory rate, sedation and pain scores for at least 12 hours for diamorphine and 24 hours for morphine.	GPP
1.6.5	For women who have epidural opioids or patient-controlled analgesia with opioids, there should be routine hourly monitoring of respiratory rate, sedation and pain scores throughout treatment and for at least 2 hours after discontinuation of treatment.	GPP

1.6.6	Women should be offered diamorphine (0.3–0.4 mg intrathecally) for intra- and postoperative analgesia because it reduces the need for supplemental analgesia after a CS. Epidural diamorphine (2.5–5 mg) is a suitable alternative.	A
1.6.7	Patient-controlled analgesia using opioid analgesics should be offered after CS because it improves pain relief.	GPP
1.6.8	Providing there is no contraindication, non-steroidal anti-inflammatory drugs should be offered post-CS as an adjunct to other analgesics, because they reduce the need for opioids.	A
1.6.9	Women who are recovering well after CS and do not have complications can eat and drink when they feel hungry or thirsty.	A
1.6.10	Removal of the urinary bladder catheter should be carried out once a woman is mobile after a regional anaesthetic and not sooner than 12 hours after the last 'top up' dose.	D
1.6.11	Routine respiratory physiotherapy does not need to be offered to women after a CS under general anaesthesia, because it does not improve respiratory outcomes such as coughing, phlegm, body temperature, chest palpation and auscultatory changes.	A
1.6.12	Women who have had a CS should be offered the opportunity to discuss with their healthcare providers the reasons for the CS and implications for the child or future pregnancies.	GPP
1.6.13	Length of hospital stay is likely to be longer after a CS (an average of 3–4 days) than after a vaginal birth (average 1–2 days). However, women who are recovering well, are afebrile and do not have complications following CS should be offered early discharge (after 24 hours) from hospital and follow-up at home, because this is not associated with more infant or maternal readmissions.	A

1.7 Recovery following CS

1.7.1	<p>In addition to general postnatal care, women who have had a CS should be provided with:</p> <ul style="list-style-type: none">• specific care related to recovery after CS• care related to management of other complications during pregnancy or childbirth.	GPP
1.7.2	<p>Women who have a CS should be prescribed and encouraged to take regular analgesia for postoperative pain, using:</p> <ul style="list-style-type: none">• for severe pain, co-codamol with added ibuprofen• for moderate pain, co-codamol• for mild pain, paracetamol.	D
1.7.3	<p>CS wound care should include:</p> <ul style="list-style-type: none">• removing the dressing 24 hours after the CS• specific monitoring for fever• assessing the wound for signs of infection (such as increasing pain, redness or discharge), separation or dehiscence• encouraging the woman to wear loose, comfortable clothes and cotton underwear• gently cleaning and drying the wound daily• if needed, planning the removal of sutures or clips.	D
1.7.4	<p>Healthcare professionals caring for women who have had a CS and who have urinary symptoms should consider the possible diagnosis of:</p> <ul style="list-style-type: none">• urinary tract infection• stress incontinence (occurs in about 4% of women after CS)• urinary tract injury (occurs in about 1 per 1000 CS).	D
1.7.5	<p>Healthcare professionals caring for women who have had a CS and who have irregular vaginal bleeding should consider that this is more likely to be due to endometritis than retained products of conception.</p>	D

1.7.6	Women who have had a CS are at increased risk of thromboembolic disease (both deep vein thrombosis and pulmonary embolism), so healthcare professionals need to pay particular attention to women who have chest symptoms (such as cough or shortness of breath) or leg symptoms (such as painful swollen calf).	D
1.7.7	Women who have had a CS should resume activities such as driving a vehicle, carrying heavy items, formal exercise and sexual intercourse once they have fully recovered from the CS (including any physical restrictions or distracting effect due to pain).	GPP
1.7.8	Healthcare professionals caring for women who have had a CS should inform women that after a CS they are not at increased risk of difficulties with breastfeeding, depression, post-traumatic stress symptoms, dyspareunia and faecal incontinence.	D

1.8 Pregnancy and childbirth following CS

1.8.1	<p>The risks and benefits of vaginal birth after CS compared with repeat CS are uncertain. Therefore the decision about mode of birth after a previous CS should take into consideration:</p> <ul style="list-style-type: none"> • maternal preferences and priorities • a general discussion of the overall risks and benefits of CS (see Appendix E) • risk of uterine rupture • risk of perinatal mortality and morbidity. 	GPP
-------	---	-----

- 1.8.2 Pregnant women who have a previous CS and who want to have a vaginal birth should be supported in this decision. They should be informed that:
- uterine rupture is a very rare complication, but is increased in women having a planned vaginal birth (35 per 10,000 women compared with 12 per 10,000 women having planned repeat CS)
 - the risk of an intrapartum infant death is small for women who have a planned vaginal birth (about 10 per 10,000), but higher than for a planned repeat CS (about 1 per 10,000)
 - the effect of planned vaginal birth or planned repeat CS on cerebral palsy is uncertain.
- 1.8.3 Women who have had a previous CS should be offered:
- electronic fetal monitoring during labour
 - care during labour in a unit where there is immediate access to CS and on-site blood transfusion services.
- 1.8.4 Women who have had a previous CS can be offered induction of labour, but both women and healthcare professionals should be aware that the likelihood of uterine rupture in these circumstances is increased to:
- 80 per 10,000 when labour is induced with non-prostaglandin agents
 - 240 per 10,000 when labour is induced using prostaglandins.
- 1.8.5 During induction of labour, women who have had a previous CS should be monitored closely, with access to electronic fetal monitoring and with immediate access to CS, because they are at increased risk of uterine rupture.
- 1.8.6 Pregnant women with both previous CS and a previous vaginal birth should be informed that they have an increased likelihood of a vaginal birth than women who have had a previous CS but no previous vaginal birth.

B

GPP

B

GPP

B

2 Notes on the scope of the guidance

All NICE guidelines are developed in accordance with a scope document that defines what the guideline will and will not cover. The scope of this guideline was established at the start of the development of this guideline, following a period of consultation; it is available from www.nice.org.uk/article.asp?a=24324

The guideline offers best practice advice on the care of pregnant women who are making decisions about mode of birth, and care during and following CS.

The guideline provides an overview of risks and benefits of CS for the woman and her baby, including specific circumstances such as women with a previous CS, breech pregnancy, multiple pregnancy, maternal infections, and women requesting CS. It also includes information on management strategies that reduce the likelihood of a CS, and on best practices for intrapartum, intraoperative and postoperative care. It does not include advice on interventions that affect outcomes other than CS.

This guideline is of relevance to those who work in or use the NHS in England and Wales:

- professional groups who share in caring for pregnant women, such as obstetricians, midwives, anaesthetists, paediatricians and general practitioners
- those with responsibilities for commissioning and planning maternity services such as PCT commissioners, and public health and trust managers
- pregnant women and their families.

CS is the end of a number of clinical pathways, therefore it is not possible to cover all the clinical decisions that may lead to a CS in one guideline. The guideline does not offer advice on the risks and benefits of CS for specific clinical conditions arising during pregnancy such as pre-eclampsia. Nor does it address the needs of pregnant women or babies with rare conditions such as maternal congenital heart disease or monozygotic twins.

3 Implementation in the NHS

3.1 In general

Local health communities should review their existing practice on CS against this guideline as they develop their Local Delivery Plans. The review should consider the resources required to implement the recommendations set out in Section 1, the people and processes involved and the timeline over which full implementation is envisaged. It is in the interests of women that the implementation timeline is as rapid as possible.

Relevant local clinical guidelines, care pathways and protocols should be reviewed in the light of this guidance and revised accordingly.

The guideline will complement the Children's National Service Framework (England and Wales) which is in development and which will produce standards for service configuration, with emphasis on how care is delivered and by whom, including issues of ensuring equity of access to care for disadvantaged women and women's views about service provision. (For more information, see www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/ChildrenServices/ChildrenServicesInformation/fs/en for England and www.wales.nhs.uk/sites/page.cfm?orgid=334&pid=934 for Wales.)

Further information on caesarean section may be obtained from evidence-based websites such as the Cochrane Library (www.update-software.com/clibng/cliblogon.htm) and the National Electronic Library for Health (www.nelh.nhs.uk/maternity).

The Pregnancy Book (published by health departments in England and Wales) may also be a useful resource for parents (see Section 1.1.1).

3.2 Audit

Suggested audit criteria are listed in Appendix D. These can be used as the basis for local clinical audit, at the discretion of those in practice.

4 Research recommendations

The following research recommendations have been identified for this NICE guideline, not as the most important research recommendations, but as those that are most representative of the full range of recommendations. The Guideline Development Group's full set of research recommendations is detailed in the full guideline produced by the National Collaborating Centre for Women's and Children's Health (see Section 5). Research should be carried out only within good quality studies approved by a research ethics committee and with explicit patient consent.

- RCTs are needed of planned CS compared with planned vaginal birth, and should include evaluation of the short- and long-term health effects (benefits and harms) of CS for women with previous CS, uncomplicated twin pregnancy at term, 'small for gestational age' infant, preterm birth, women with HIV on HAART (highly active anti-retroviral therapy) or with low viral loads. To facilitate pooling of results in meta-analysis these should be measured consistently across trials.
- RCTs should be carried out to evaluate the effect on CS rates of intrapartum interventions such as place of birth (home birth), delayed admission, use of parenteral analgesia such as pethidine, and strategies for managing 'failure to progress' in labour.
- Further evaluation and explanation is needed to determine the impact of some demographic factors, clinical factors (such as ethnic group, increase in body mass index) and attitudinal factors on CS rates.
- Qualitative and quantitative research is needed on women's views about childbirth (including the place of birth, and preference for mode of birth).
- Evaluation is needed of surgical care to reduce maternal and neonatal morbidity (such as skin closure, analgesia such as infiltration of incision with local anaesthetic, and optimal thromboprophylaxis).

5 Full guideline

The National Institute for Clinical Excellence commissioned the development of this guidance from the National Collaborating Centre for Women's and Children's Health. The Centre established a Guideline Development Group, which reviewed the evidence and developed the recommendations. The full guideline, *Caesarean section*, is published by the National Collaborating Centre for Women's and Children's Health; it is available on its website (www.rcog.org.uk/mainpages.asp?PageID=117), the NICE website (www.nice.org.uk/CG013fullguideline) and on the website of the National Electronic Library for Health (www.nelh.nhs.uk).

The members of the Guideline Development Group are listed in Appendix B. Information about the independent Guideline Review Panel is given in Appendix C.

The booklet *The Guideline Development Process – An Overview for Stakeholders, the Public and the NHS* has more information about the Institute's guideline development process. It is available from the Institute's website and copies can also be ordered by telephoning 0870 1555 455 (quote reference N0472).

6 Related NICE guidance

National Institute for Clinical Excellence (2001) The use of electronic fetal monitoring: the use and interpretation of cardiotocography in intrapartum fetal surveillance. *NICE Inherited Clinical Guideline C*, London: National Institute for Clinical Excellence. Available from www.nice.org.uk

National Institute for Clinical Excellence (2001) Induction of labour. *NICE Inherited Clinical Guideline D*, London: National Institute for Clinical Excellence. Available from www.nice.org.uk

National Institute for Clinical Excellence (2003) Antenatal care: routine care for the healthy pregnant woman. *NICE Clinical Guideline 6*, London: National Institute for Clinical Excellence. Available from www.nice.org.uk

NICE is in the process of developing the following guidance:

- Intrapartum care: management and delivery of care to women in labour. Clinical guideline. (Publication expected January 2006.)
- Postnatal care: routine post natal care of recently delivered women and their babies. Clinical guideline. (Publication expected summer 2006.)

7 Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin earlier than 4 years if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

A version of this guideline for pregnant women, their partners and the public is available from the NICE website (www.nice.org.uk) or from NHS Response Line (0870 1555 455; quote reference number N0479 for an English version and N0480 for an English and Welsh version).

A quick reference guide for health professionals is also available from the NICE website (www.nice.org/CG013quickrefguide) or from the NHS Response Line (telephone 0870 1555 455; quote reference number N0478).

Appendix A: Grading scheme

The grading scheme and hierarchy of evidence used in this guideline (see Table) is adapted from Eccles and Mason (2001).

Recommendation grade	Evidence
A	Directly based on category I evidence
B	Directly based on: <ul style="list-style-type: none"> category II evidence, or extrapolated recommendation from category I evidence
C	Directly based on: <ul style="list-style-type: none"> category III evidence, or extrapolated recommendation from category I or II evidence
D	Directly based on: <ul style="list-style-type: none"> category IV evidence, or extrapolated recommendation from category I, II, or III evidence
Good practice point (GPP)	The view of the Guideline Development Group
Evidence category	Source
I	Evidence from: <ul style="list-style-type: none"> meta-analysis of randomised controlled trials (Ia), or at least one randomised controlled trial (Ib)
II	Evidence from: <ul style="list-style-type: none"> at least one controlled study without randomisation (IIa), or at least one other type of quasi-experimental study (IIb)
III	Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case-control studies
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities
Adapted from Eccles M, Mason J (2001) How to develop cost-conscious guidelines. <i>Health Technology Assessment</i> 5 (16)	

Appendix B: The Guideline Development Group

Dr John Sandars (Group Leader)

General Practitioner, Stockport, Cheshire, and Part-Time Lecturer, University of Manchester

Mrs Debbie Chippington Derrick

Caesarean Birth and VBAC Coordinator, National Childbirth Trust, London

Mrs Jill Demilew

Consultant Midwife, King's College Hospital, London

Mrs Christine Ruby

Senior Lecturer in Midwifery and Women's Health, University College Worcester, and Midwife, Powys Local Health Board

Dr Michael Wee

Lead Consultant Obstetric Anaesthetist, Poole Hospital NHS Trust, Poole, Dorset

Dr Bryan Beattie

Consultant Obstetrician and Fetal Medicine, University Hospital of Wales, Cardiff

Mrs Shaheen Chaudhry

Freelance Consultant, Facilitator and Trainer, Bristol

Dr John Madar

Consultant Neonatologist, Derriford Hospital, Plymouth, Devon

Dr Gwyneth Lewis

Director of the United Kingdom Confidential Enquiries into Maternal Deaths

Professor David James

Professor of Fetomaternal Medicine and Director of Medical Education, Queen's Medical Centre, Nottingham

Ms Jane Thomas

Director, National Collaborating Centre for Women's and Children's Health (NCC-WCH), and Honorary Consultant Obstetrician and Gynaecologist, Oxford

Dr Heather Brown

Research Fellow, NCC-WCH

Dr Shantini Paranjothy
Research Fellow, NCC-WCH

Mr Alex McNeil
Informatics Specialist, NCC-WCH

Miss Anna Bancsi
Work Programme Co-ordinator, NCC-WCH

Dr Hannah-Rose Douglas
Health Economist, London School of Hygiene Tropical Medicine

Appendix C: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring its quality. The Panel includes experts on guideline methodology, health professionals and people with experience of the issues affecting patients and carers. The members of the Guideline Review Panel were as follows.

Miss Helen Spiby (Chair)

Senior Lecturer (evidence-based practice in midwifery),
Mother and Infant Research Unit, University of Leeds

Mrs Carol Youngs

Policy Director, British Dyslexia Association

Dr Monica Lakhanpaul

Senior Lecturer in Child Health, University of Leicester, and
Consultant Paediatrician, Leicester City West Primary Care Trust and
Leicester Royal Infirmary

Mr Vincent Argent

Consultant Obstetrician and Gynaecologist,
Eastbourne District General Hospital

Mrs Christine Oppenheimer

Consultant in Obstetrics and Gynaecology, Leicester Royal Infirmary,
and Honorary Senior Lecturer in Medical Education, University of
Leicester

Dr Jenny Tyrell (resigned 31 December 2003)

Consultant Paediatrician, Royal United Hospital, Bath

Appendix D: Technical detail on the criteria for audit

Measures that could be used as a basis for an audit

One or more audits could be carried out on the investigation and management of caesarean section.

Criterion	Exception	Definition of terms
Overall CS rate and the percentage of CS performed for the four major determinants (presumed fetal compromise, 'failure to progress' in labour, breech presentation, multiple pregnancy) and maternal request		
Making the decision		
Percentage of women having CS that have a documented discussion on benefits and risks of CS compared with vaginal birth specific to the woman and her pregnancy		
Percentage of women requesting a CS that have a documented discussion on the reasons for the request		
Carrying out the procedure		
Percentage of CS carried out using a regional block		Regional block – spinal or epidural anaesthesia
Percentage of CS where the woman receives prophylactic antibiotics		
Percentage of CS where an appropriate method of thromboprophylaxis is used		
Percentage of CS where antacids are given prior to regional or general anaesthesia		
Percentage of CS where antiemetics are given prior to regional or general anaesthesia		
Percentage of planned CS carried out after 39 weeks	Specific clinical indications	

Criterion	Exception	Definition of terms
Reducing the likelihood of CS		
Percentage of women who have an uncomplicated singleton breech pregnancy at 36 weeks' gestation that have a documented offer of external cephalic version	Women in labour, women with a uterine scar or abnormality, fetal compromise, ruptured membranes, vaginal bleeding and medical conditions	
Percentage of women in labour that have continuous support during labour, provided by women with or without prior training, for example a doula, a childbirth educator or a female relative		
Percentage of women with uncomplicated pregnancies beyond 41 weeks with documented offer of induction of labour		
Percentage of women in spontaneous labour with an uncomplicated singleton pregnancy at term monitored using a partogram with a 4-hour action line		Partogram – graphic representation of labour progress
Percentage of documented involvement of consultant obstetricians in the decision making for CS	Women not having CS	
Percentage of CS for abnormal fetal heart rate pattern, suspected fetal acidosis, in which fetal blood sampling is undertaken	Severely abnormal fetal heart rate pattern; contraindications to fetal blood sampling	

Appendix E: Summary estimates of risks and benefits of CS

The following tables show an overview of the risks and benefits comparing CS with vaginal birth for women and babies.

In most cases, the figures in Table 1 compare planned CS with planned vaginal birth. It is inevitable that in some cases, even though a vaginal birth is planned, a CS may become necessary for a number of reasons, for example, if there is a threat to the life of the pregnant woman or her baby. The risks and benefits of CS will be different in these emergency situations depending on the clinical context.

However, the data for many of the outcomes for which the risk is increased after a CS are from observational studies, and reflect the absolute and relative risks for women who actually had either a vaginal birth or CS. These outcomes are identified in the table by a footnote (a). Care needs to be taken in interpretation of this data as there is usually more than one explanation for the associations seen and it is not possible to disentangle the effects of CS from the reasons for CS.

Table 1: Effect of CS compared with vaginal birth on women's health

	Absolute risk		Relative risk (95% confidence interval)	Evidence level
	CS	Vaginal birth	CS compared with vaginal birth	
Effects around the time of birth				
<i>Reduced after CS</i>				
Perineal pain	2%	5%	0.3 (0.2, 0.6)	Ib
<i>Increased after CS</i>				
Abdominal pain	9%	5%	1.9 (1.3, 2.8)	Ib
Bladder injury ^a	0.1%	0.003%	36.6 (10.4, 128.4)	III
Ureteric injury ^a	0.03%	0.001%	25.2 (2.6, 243.5)	III
Need for further surgery such as laparotomy or dilatation and curettage ^a	0.5%	0.03%	17.5 (9.4, 32.1)	IIb
Hysterectomy ^{a,d}	0.8% 0.7%	0.01% 0.02%	95.5 (67.7, 136.9) 44.0 (22.5, 85.8)	IIb
Admission to intensive care unit ^a	0.9%	0.1%	9.0 (7.2, 11.2)	III
Thromboembolic disease ^a	Overall risk 0.04–0.16%		3.8 (2.0, 4.9)	IIb
Length of stay ^b	3–4 days	1–2 days		Ib
Readmission to hospital ^a	5.3%	2.2%	2.5 (1.1, 5.4)	IIb
Maternal death ^a	82.3 per million	16.9 per million	4.9 (3.0, 8.0)	III
<i>Not different</i>				
Haemorrhage ^c (blood loss in excess of 1000 ml)	0.5%	0.7%	0.8 (0.4, 4.4)	Ia
Infection ^c (wound infection or endometritis)	6.4%	4.9%	1.3 (1.0, 1.7)	Ia
Genital tract injury (extension of uterine incision, cervical laceration)	0.6%	0.8%	1.2 (0.4, 3.4)	Ia
<i>continued</i>				

Table 1 *continued*: Effect of CS compared with vaginal birth on women's health

	Absolute risk		Relative risk (95% confidence interval)	Evidence level
	CS	Vaginal birth	CS compared with vaginal birth	
Long-term effects				
<i>Reduced after CS</i>				
Urinary incontinence (at 3 months after birth)	4.5%	7.3%	0.6 (0.4, 0.9)	Ib
Utero-vaginal prolapse ^a	Overall prevalence 5%		0.6 (0.5, 0.9)	III
<i>Not different (at 3 months after birth)</i>				
Faecal incontinence	0.8%	1.5%	0.5 (0.2, 1.6)	Ib
Back pain	11.3%	12.2%	0.9 (0.7, 1.2)	Ib
Postnatal depression	10.1%	10.8%	0.9 (0.7, 1.2)	Ib
Dyspareunia	17.0%	18.7%	0.9 (0.7, 1.1)	Ib
Implications for future pregnancies				
<i>Increased after CS</i>				
Having no more children ^a	42%	29%	1.5 (1.1, 2.0)	IIb
Placenta praevia in a future pregnancy ^d	0.7%	0.5%	1.4 (1.1, 1.6)	IIb
	0.8%	0.5%	1.6 (1.3, 2.0)	IIb
	0.4%	0.2%	1.3 (1.0, 1.7)	IIb
Uterine rupture in a future pregnancy ^a	0.4%	0.01%	42.2 (31.1, 57.2)	IIb
Antepartum stillbirth in a future pregnancy ^a	0.4%	0.2%	1.6 (1.2, 2.3)	IIb
<p>^a The data for these outcomes are from observational studies and reflect the absolute and relative risks for women who actually had either a vaginal birth or CS. Care needs to be taken in interpretation of this data as there is usually more than one explanation for the association seen and it is not possible to disentangle the effect of CS from the reasons for CS.</p> <p>^b The data provided are averages for length of hospital stay.</p> <p>^c In these randomised controlled trials (RCTs) antibiotics and oxytocics were used as prophylaxis against infection and haemorrhage at CS.</p> <p>^d The numbers for these risks are based on data from more than one observational study.</p>				

Table 2: Effect of CS compared with vaginal birth on babies' health

	Absolute risk		Relative risk (95% confidence interval)	Evidence level
	CS	Vaginal birth	CS compared with vaginal birth	
More likely after a planned CS				
Respiratory morbidity ^a	3.5%	0.5%	6.8 (5.2, 8.9)	III
No difference				
Neonatal mortality ^a (excludes breech)	0.1%	0.1%	1.1 (0.1, 8.4)	IIb
Intracranial haemorrhage ^{a,b}	0.04%	0.03%	1.4 (0.8, 2.6)	IIb
	0.008%	0.01%	0.6 (0.1, 2.5)	
Brachial plexus injuries ^a	Overall risk 0.05%		0.5 (0.1, 1.9)	III
Cerebral palsy ^a	Overall risk 0.02%			III
<p>^a The data for these outcomes are from observational studies and reflect the absolute and relative risks for women who actually had either a vaginal birth or CS. Care needs to be taken in interpretation of this data as there is usually more than one explanation for the association seen and it is not possible to disentangle the effect of CS from the reasons for CS.</p> <p>^b The two sets of numbers for intracranial haemorrhage are based on data from two separate observational studies.</p>				



*National Institute for
Clinical Excellence*

**National Institute for
Clinical Excellence**

MidCity Place
71 High Holborn
London
WC1V 6NA

www.nice.org.uk