NICE National Institute for Health and Care Excellence

NICE guideline

Caesarean section

Clinical guideline

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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The application of the recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

Contents

This guideline replaces CG13.

Introduction

This guideline updates and replaces 'Caesarean section' (NICE clinical guideline 13). The recommendations are labelled according to when they were originally published (see 'About this guideline' for details).

This guideline has been developed to help ensure consistent quality care for women who:

- have had a caesarean section (CS) in the past and are now pregnant again or
- have a clinical indication for a CS or
- are considering a CS when there is no other indication.

It provides evidence-based information for healthcare professionals and women about:

- the risks and benefits of planned CS compared with planned vaginal birth
- specific indications for CS
- effective management strategies to avoid CS
- anaesthetic and surgical aspects of care
- interventions to reduce morbidity from CS
- organisational and environmental factors that affect CS rates.

For the update, a number of topics have been addressed where new evidence had a bearing on the original recommendations. These topics are listed in 'About this guidance'.

The guideline has not sought to define acceptable CS rates. Rather the purpose of this guideline is to enable healthcare professionals to give appropriate research-based advice to women and their families. This will enable women to make properly informed decisions.

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

Woman-centred care

This guideline offers best practice advice on the care of pregnant women who may require a CS.

Treatment and care should take into account women's needs and preferences. Pregnant women should be offered evidence-based information and support to enable them to make informed decisions about their care and treatment. If women do not have the capacity to make decisions, healthcare professionals should follow the Department of Health's advice on consent and the code of practice that accompanies the Mental Capacity Act. In Wales, healthcare professionals should follow advice on consent from the Welsh Assembly Government.

If the woman is under 16, healthcare professionals should follow the guidelines in 'Seeking consent: working with children'.

Good communication between healthcare professionals and pregnant women is essential. It should be supported by evidence-based written information tailored to the woman's needs. Treatment and care, and the information women are given about it, should be culturally appropriate. It should also be accessible to women with additional needs such as physical, sensory or learning disabilities, and to women who do not speak or read English.

If the woman agrees, families and carers should have the opportunity to be involved in discussions and decisions about treatment and care.

Families and carers should also be given the information and support they need.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Morbidly adherent placenta

- If a colour-flow Doppler ultrasound scan result suggests morbidly adherent placenta:
  - discuss with the woman the improved accuracy of magnetic resonance imaging (MRI) in addition to ultrasound to help diagnose morbidly adherent placenta and clarify the degree of invasion
  - explain what to expect during an MRI procedure
  - inform the woman that current experience suggests that MRI is safe, but that there is a lack of evidence about any long-term risks to the baby
  - offer MRI if acceptable to the woman. **[new 2011]**

Mother-to-child transmission of HIV

- Do not offer a CS on the grounds of HIV status to prevent mother-to-child transmission of HIV to:
  - women on highly active anti-retroviral therapy (HAART) with a viral load of less than 400 copies per ml **or**
  - women on any anti-retroviral therapy with a viral load of less than 50 copies per ml.

Inform women that in these circumstances the risk of HIV transmission is the same for a CS and a vaginal birth. **[new 2011]**

Maternal request for CS

- When a woman requests a CS because she has anxiety about childbirth, offer referral to a healthcare professional with expertise in providing perinatal mental health support to help her address her anxiety in a supportive manner. **[new 2011]**
- For women requesting a CS, if after discussion and offer of support (including perinatal mental health support for women with anxiety about childbirth), a vaginal birth is still not an acceptable option, offer a planned CS. **[new 2011]**

- An obstetrician unwilling to perform a CS should refer the woman to an obstetrician who will carry out the CS. **[new 2011]**

Decision-to-delivery interval for unplanned CS

- Use the following decision-to-delivery intervals to measure the overall performance of an obstetric unit:
  - 30 minutes for category 1 CS[1]
  - both 30 and 75 minutes for category 2 CS.

Use these as audit standards only and not to judge multidisciplinary team performance for any individual CS. **[new 2011]**

Timing of antibiotic administration

- Offer women prophylactic antibiotics at CS before skin incision. Inform them that this reduces the risk of maternal infection more than prophylactic antibiotics given after skin incision, and that no effect on the baby has been demonstrated. **[new 2011]**
- Offer women prophylactic antibiotics at CS to reduce the risk of postoperative infections. Choose antibiotics effective against endometritis, urinary tract and wound infections, which occur in about 8% of women who have had a CS. **[new 2011]**
- Do not use co-amoxiclav when giving antibiotics before skin incision. **[new 2011]**

Recovery following CS

- While women are in hospital after having a CS, give them the opportunity to discuss with healthcare professionals the reasons for the CS and provide both verbal and printed information about birth options for any future pregnancies. If the woman prefers, provide this at a later date. **[new 2011]**

Pregnancy and childbirth after CS

- Inform women who have had up to and including four CS that the risk of fever, bladder injuries and surgical injuries does not vary with planned mode of birth and that the risk of uterine rupture, although higher for planned vaginal birth, is rare. **[new 2011]**

[1] Category 1 CS is when there is immediate threat to the life of the woman or fetus, and category 2 CS is when there is maternal or fetal compromise which is not immediately life threatening.

1 Guidance

The following guidance is based on the best available evidence. The full guideline gives details and evidence of the methods used to develop the guidance.

Recommendations 1.3.1.1 and 1.3.1.2 have been removed from this guideline. See changes after publication for further details.

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. [2004]

1.1.1.2 Give pregnant women evidence-based information about CS during the antenatal period, because about one in four women will have a CS. Include information about CS, such as:

- 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. [new 2011]

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. [2004]

1.1.2 Planning mode of birth

1.1.2.1 Discuss the risks and benefits of CS and vaginal birth with women, taking into account their circumstances, concerns, priorities and plans for future

pregnancies (including the risks of placental problems with multiple CS) (see box A and 1.7.1.8). **[new 2011]**

Box A Planned caesarean section compared with planned vaginal birth for women with an uncomplicated pregnancy and no previous caesarean section

Planned caesarean section may reduce the risk of the following in women:

- perineal and abdominal pain during birth and 3 days postpartum
- injury to vagina
- early postpartum haemorrhage
- obstetric shock.

Planned caesarean section may increase the risk of the following in babies:

- neonatal intensive care unit admission.

Planned caesarean section may increase the risk of the following in women:

- longer hospital stay
- hysterectomy caused by postpartum haemorrhage
- cardiac arrest.

Please refer to tables 1 and 2 in appendix C for full details, including the absolute and relative risks for each effect.

1.1.2.2 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. **[2004]**

1.1.2.3 A pregnant woman is entitled to decline 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 woman's options. **[2004, amended 2011]**

1.1.2.4 When a 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. **[2004, amended 2011]**

1.2 Planned CS

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. [2004]

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. [2004]

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. [2004]

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. [2004]

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. [2004]

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. **[2004]**

1.2.5 Placenta praevia

1.2.5.1 Women with a placenta that partly or completely covers the internal cervical os (minor or major placenta praevia) should be offered CS. **[2004, amended 2011]**

1.2.6 Morbidly adherent placenta

1.2.6.1 If low-lying placenta is confirmed at 32–34 weeks in women who have had a previous CS, offer colour-flow Doppler ultrasound as the first diagnostic test for morbidly adherent placenta. **[new 2011]**

1.2.6.2 If a colour-flow Doppler ultrasound scan result suggests morbidly adherent placenta:

- discuss with the woman the improved accuracy of magnetic resonance imaging (MRI) in addition to ultrasound to help diagnose morbidly adherent placenta and clarify the degree of invasion
- explain what to expect during an MRI procedure
- inform the woman that current experience suggests that MRI is safe, but that there is a lack of evidence about any long-term risks to the baby
- offer MRI if acceptable to the woman. **[new 2011]**

1.2.6.3 Discuss the interventions available for delivery with women suspected to have morbidly adherent placenta, including cross matching of blood and planned CS with a consultant obstetrician present. **[new 2011]**

1.2.6.4 When performing a CS for women suspected to have morbidly adherent placenta, ensure that:

- a consultant obstetrician and a consultant anaesthetist are present
- an experienced paediatrician is present
- a senior haematologist is available for advice

- a critical care bed is available
- sufficient cross-matched blood and blood products are readily available. **[new 2011]**

1.2.6.5 When performing a CS for women suspected to have morbidly adherent placenta, the consultant obstetrician should decide which other healthcare professionals need to be consulted or present. **[new 2011]**

1.2.6.6 All hospitals should have a locally agreed protocol for managing morbidly adherent placenta that sets out how these elements of care should be provided. **[new 2011]**

1.2.7 Predicting CS for cephalopelvic disproportion in labour

1.2.7.1 Pelvimetry is not useful in predicting 'failure to progress' in labour and should not be used in decision making about mode of birth. **[2004]**

1.2.7.2 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. **[2004]**

1.2.8 Mother-to-child transmission of maternal infections

HIV

1.2.8.1 As early as possible give women with HIV information about the risks and benefits for them and their child of the HIV treatment options and mode of birth so that they can make an informed decision. **[new 2011]**

1.2.8.2 Do not offer a CS on the grounds of HIV status to prevent mother-to-child transmission of HIV to:

- women on highly active anti-retroviral therapy (HAART) with a viral load of less than 400 copies per ml **or**
- women on any anti-retroviral therapy with a viral load of less than 50 copies per ml.

Inform women that in these circumstances the risk of HIV transmission is the same for a CS and a vaginal birth. **[new 2011]**

1.2.8.3 Consider either a vaginal birth or a CS for women on anti-retroviral therapy (ART) with a viral load of 50–400 copies per ml because there is insufficient evidence that a CS prevents mother-to-child transmission of HIV. **[new 2011]**

1.2.8.4 Offer a CS to women with HIV who:

- are not receiving any anti-retroviral therapy **or**
- are receiving any anti-retroviral therapy and have a viral load of 400 copies per ml or more. **[new 2011]**

1.2.8.5 Researchers and national bodies responsible for the collection of UK population data should continue to collect data about HIV diagnoses in pregnant women, including treatment, mode of birth, and mother-to-child transmission rates. **[new 2011]**

Hepatitis B virus

1.2.8.6 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. **[2004]**

Hepatitis C virus

1.2.8.7 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. **[2004]**

1.2.8.8 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. **[2004]**

Herpes simplex virus

1.2.8.9 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. **[2004]**

1.2.8.10 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. **[2004]**

1.2.9 Maternal request for CS

1.2.9.1 When a woman requests a CS explore, discuss and record the specific reasons for the request. **[new 2011]**

1.2.9.2 If a woman requests a CS when there is no other indication, discuss the overall risks and benefits of CS compared with vaginal birth and record that this discussion has taken place (see box A). Include a discussion with other members of the obstetric team (including the obstetrician, midwife and anaesthetist) if necessary to explore the reasons for the request, and ensure the woman has accurate information. **[new 2011]**

1.2.9.3 When a woman requests a CS because she has anxiety about childbirth, offer referral to a healthcare professional with expertise in providing perinatal mental health support to help her address her anxiety in a supportive manner. **[new 2011]**

1.2.9.4 Ensure the healthcare professional providing perinatal mental health support has access to the planned place of birth during the antenatal period in order to provide care. **[new 2011]**

1.2.9.5 For women requesting a CS, if after discussion and offer of support (including perinatal mental health support for women with anxiety about childbirth), a vaginal birth is still not an acceptable option, offer a planned CS. **[new 2011]**

1.2.9.6 An obstetrician unwilling to perform a CS should refer the woman to an obstetrician who will carry out the CS. **[new 2011]**

1.2.10 Body mass index

1.2.10.1 Do not use a body mass index (BMI) of over 50 alone as an indication for planned CS. **[new 2011]**

1.3 Factors affecting likelihood of CS during intrapartum care

1.3.1 Place of birth

1.3.1.1 This recommendation has been deleted. See changes after publication for details.

1.3.1.2 This recommendation has been deleted. See changes after publication for details.

1.3.2 Factors reducing 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. [2004]

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. [2004]

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 anuncomplicated singleton pregnancy at term, because it reduces the likelihood of CS. [2004]

1.3.2.4 Consultant obstetricians should be involved in the decision making for CS, because this reduces the likelihood of CS. [2004]

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. [2004]

1.3.3 No influence on likelihood of CS

1.3.3.1 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:

- 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. [2004]

1.3.3.2 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. [2004]

1.3.4 'Failure to progress' in labour and CS

1.3.4.1 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:

- active management of labour
- early amniotomy. [2004]

1.3.5 Eating during labour

1.3.5.1 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. [2004]

1.3.5.2 Women should be informed that having isotonic drinks during labour prevents ketosis without a concomitant increase in gastric volume. [2004]

1.4 Procedural aspects of CS

1.4.1 Timing of planned 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. **[2004]**

1.4.2 Classification of urgency

1.4.2.1 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. **[2004]**

1.4.3 Decision-to-delivery interval for unplanned CS

1.4.3.1 Perform category 1 and 2 CS[2] as quickly as possible after making the decision, particularly for category 1. **[new 2011]**

1.4.3.2 Perform category 2 CS[2] in most situations within 75 minutes of making the decision. **[new 2011]**

1.4.3.3 Take into account the condition of the woman and the unborn baby when making decisions about rapid delivery. Remember that rapid delivery may be harmful in certain circumstances. **[new 2011]**

1.4.3.4 Use the following decision-to-delivery intervals to measure the overall performance of an obstetric unit:

- 30 minutes for category 1 CS[2]

- both 30 and 75 minutes for category 2 CS.

Use these as audit standards only and not to judge multidisciplinary team performance for any individual CS. [new 2011]

1.4.4 Preoperative testing and preparation for CS

1.4.4.1 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. [2004]

1.4.4.2 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. [2004]

1.4.4.3 Pregnant women who are healthy and who have otherwise uncomplicated pregnancies should not routinely be offered the following tests before CS:

- grouping and saving of serum
- cross-matching of blood
- a clotting screen
- preoperative 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). [2004]

1.4.4.4 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. [2004]

1.4.5 Anaesthesia for CS

1.4.5.1 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 1.6.3.1). [2004]

1.4.5.2 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. **[2004]**

1.4.5.3 Women who are having induction of regional anaesthesia for CS should be cared for in theatre because this does not increase women's anxiety. **[2004, amended 2011]**

1.4.5.4 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. **[2004]**

1.4.5.5 Each maternity unit should have a drill for failed intubation during obstetric anaesthesia. **[2004]**

1.4.5.6 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. **[2004]**

1.4.5.7 Women having a CS should be offered antiemetics (either pharmacological or acupressure) to reduce nausea and vomiting during CS. **[2004]**

1.4.5.8 General anaesthesia for unplanned CS should include preoxygenation, cricoid pressure and rapid sequence induction to reduce the risk of aspiration. **[2004, amended 2011]**

1.4.5.9 Intravenous ephedrine or phenylephrine should be used in the management of hypotension during CS. **[2004]**

1.4.5.10 The operating table for CS should have a lateral tilt of 15°, because this reduces maternal hypotension. **[2004]**

1.4.6 Surgical techniques for CS

Methods to prevent HIV transmission in theatre

1.4.6.1 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. [2004]

1.4.6.2 General recommendations for safe surgical practice should be followed at CS to reduce the risk of HIV infection of staff. [2004]

Abdominal wall incision

1.4.6.3 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. [2004]

1.4.6.4 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. [2004]

Instruments for skin incision

1.4.6.5 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. [2004]

Extension of the uterine incision

1.4.6.6 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. [2004]

Fetal laceration

1.4.6.7 Women who are having a CS should be informed that the risk of fetal lacerations is about 2%. [2004]

Use of forceps

1.4.6.8 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. [2004]

Use of uterotonics

1.4.6.9 Oxytocin 5 IU by slow intravenous injection should be used at CS to encourage contraction of the uterus and to decrease blood loss. [2004]

Method of placental removal

1.4.6.10 At CS, the placenta should be removed using controlled cord traction and not manual removal as this reduces the risk of endometritis. [2004]

Exteriorisation of the uterus

1.4.6.11 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. [2004]

Closure of the uterus

1.4.6.12 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. [2004]

Closure of the peritoneum

1.4.6.13 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. [2004]

Closure of the abdominal wall

1.4.6.14 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. [2004]

Closure of subcutaneous tissue

1.4.6.15 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. [2004]

Use of superficial wound drains

1.4.6.16 Superficial wound drains should not be used at CS because they do not decrease the incidence of wound infection or wound haematoma. [2004]

Closure of the skin

1.4.6.17 Obstetricians should be aware that the effects of different suture materials or methods of skin closure at CS are not certain. [2004]

Umbilical artery pH measurement

1.4.6.18 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. [2004]

Timing of antibiotic administration

1.4.6.19 Offer women prophylactic antibiotics at CS before skin incision. Inform them that this reduces the risk of maternal infection more than prophylactic antibiotics given after skin incision, and that no effect on the baby has been demonstrated. [new 2011]

1.4.6.20 Offer women prophylactic antibiotics at CS to reduce the risk of postoperative infections. Choose antibiotics effective against endometritis, urinary tract and wound infections, which occur in about 8% of women who have had a CS. [new 2011]

1.4.6.21 Do not use co-amoxiclav when giving antibiotics before skin incision. **[new 2011]**

Thromboprophylaxis for CS

1.4.6.22 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[3]. **[2004, amended 2011]**

Women's preferences during CS

1.4.6.23 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. **[2004]**

1.5 Care of the baby born by CS

1.5.1 Presence of paediatrician at CS

1.5.1.1 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. **[2004]**

1.5.2 Thermal care for babies born by CS

1.5.2.1 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. **[2004]**

1.5.3 Maternal contact (skin-to-skin)

1.5.3.1 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. **[2004]**

1.5.4 Breastfeeding

1.5.4.1 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. [2004]

1.6 Care of the woman after CS

1.6.1 High dependency unit/intensive therapy unit admission

1.6.1.1 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). [2004]

1.6.2 Routine monitoring after CS

1.6.2.1 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. [2004]

1.6.2.2 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. [2004]

1.6.2.3 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. [2004]

1.6.2.4 For women who have had 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. [2004]

1.6.3 Pain management after CS

1.6.3.1 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. [2004]

1.6.3.2 Patient-controlled analgesia using opioid analgesics should be offered after CS because it improves pain relief. [2004]

1.6.3.3 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. [2004]

1.6.4 Early eating and drinking after CS

1.6.4.1 Women who are recovering well after CS and who do not have complications can eat and drink when they feel hungry or thirsty. [2004]

1.6.5 Urinary catheter removal after CS

1.6.5.1 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 epidural 'top up' dose. [2004]

1.6.6 Respiratory physiotherapy after CS

1.6.6.1 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. [2004]

1.6.7 Length of hospital stay and readmission to hospital

1.6.7.1 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 apyrexial 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. [2004]

1.7 Recovery following CS

1.7.1.1 In addition to general postnatal care, women who have had a CS should be provided with:

- specific care related to recovery after CS
- care related to management of other complications during pregnancy or childbirth. [2004]

1.7.1.2 Women who have a CS should be prescribed and encouraged to take regular analgesia for postoperative pain, using:

- for severe pain, co-codamol with added ibuprofen
- for moderate pain, co-codamol
- for mild pain, paracetamol. [2004]

1.7.1.3 CS wound care should include:

- 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[4]. [2004]

1.7.1.4 Healthcare professionals caring for women who have had a CS and who have urinary symptoms should consider the possible diagnosis of:

- urinary tract infection
- stress incontinence (occurs in about 4% of women after CS)
- urinary tract injury (occurs in about 1 per 1000 CS). [2004]

1.7.1.5 Healthcare professionals caring for women who have had a CS and who have heavy and/or irregular vaginal bleeding should consider that this is more likely to be due to endometritis than retained products of conception. **[2004, amended 2011]**

1.7.1.6 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). **[2004]**

1.7.1.7 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). **[2004]**

1.7.1.8 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. **[2004]**

1.7.1.9 While women are in hospital after having a CS, give them the opportunity to discuss with healthcare professionals the reasons for the CS and provide both verbal and printed information about birth options for any future pregnancies. If the woman prefers, provide this at a later date. **[new 2011]**

1.8 Pregnancy and childbirth after CS

1.8.1 When advising about the mode of birth after a previous CS consider:

- maternal preferences and priorities
- the risks and benefits of repeat CS
- the risks and benefits of planned vaginal birth after CS, including the risk of unplanned CS. **[new 2011]**

1.8.2 Inform women who have had up to and including four CS that the risk of fever, bladder injuries and surgical injuries does not vary with planned mode of birth

and that the risk of uterine rupture, although higher for planned vaginal birth, is rare. **[new 2011]**

1.8.3 Offer women planning a vaginal birth who have had a previous CS:

- electronic fetal monitoring during labour
- care during labour in a unit where there is immediate access to CS and on-site blood transfusion services. **[2011]**

1.8.4 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[5]. **[2004, amended 2011]**

1.8.5 Pregnant women with both previous CS and a previous vaginal birth should be informed that they have an increased likelihood of achieving a vaginal birth than women who have had a previous CS but no previous vaginal birth. **[2004]**

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[2] Category 1 CS is when there is immediate threat to the life of the woman or fetus, and category 2 CS is when there is maternal or fetal compromise which is not immediately life-threatening.

[3] For more information see 'Venous thromboembolism: reducing the risk' (NICE clinical guideline 92).

[4] For more recent recommendations on wound care see 'Surgical site infection' (NICE clinical guideline 74).

[5] For more information see 'Induction of labour' (NICE clinical guideline 70).

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available.

The topics this guideline addresses are listed in the introduction. This guideline does not cover:

- pregnant women or babies with rare conditions or with complex or unusual comorbidities such as congenital heart disease
- women with clinical conditions that arise during pregnancy, such as pre-eclampsia or gestational diabetes, which require specialist care.

How this guideline was developed

NICE commissioned the National Collaborating Centre for Women's and Children's Health to develop this guideline. The Centre established a Guideline Development Group (see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information about how NICE clinical guidelines are developed on the NICE website (www.nice.org.uk/HowWeWork). Information on how NICE clinical guidelines are developed is also available from the NICE website.

3 Implementation

NICE has developed tools to help organisations implement this guidance.

4 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The Guideline Development Group's full set of research recommendations is detailed in the full guideline (see section 5).

4.1 Decision-to-delivery interval (category 1 urgency)

What factors influence the decision-to-delivery interval when there is a category 1 level of urgency for CS?

Factors to be investigated could include:

- staff grade/level of experience
- skill mix in the multidisciplinary team
- task allocation
- methods of communication
- time of day
- availability of ongoing staff training about emergency procedures and levels of attendance.

The research could be conducted using simulation methods and video observation to determine what factors influence the decision-to-delivery interval for category 1 CS. The videos could also be used to train staff.

Why this is important

'Crash' CS is a psychologically traumatic event for women and their partners and is also stressful for clinical staff. Staff and resources may have to be obtained from other areas of clinical care. This should be undertaken as efficiently and effectively as possible, minimising anxiety and ensuring the safety of the mother and her baby.

For category 1 CS there is a recognised urgency to deliver as quickly as is reasonably possible. The majority of research in this area is quantitative and looks at the impact of the decision-to-delivery interval on various aspects of fetal and maternal outcomes rather than the interplay of factors that

can affect this time period itself. Much of this evidence is retrospective. Although some work has been conducted in the UK to examine where the systematic delays lie and how to avoid them (Tuffnell et al. 2001), more work is needed to determine how to optimise the decision-to-delivery interval. This work should use qualitative as well as quantitative research methods to assess which factors influence the decision-to-delivery interval for a category 1 CS. Evaluation of these factors could be used to inform future NICE guidance, for example, specific guidance for management of category 1 CS. Such information could also be used by hospitals for maternity services planning, and at a team level would assist with audit and ongoing evaluation and training of the multidisciplinary team.

A large amount of NHS and other state funding is used to provide continuing care for infants who are disabled as a result of birth asphyxia and in providing lifelong support for the child and their family. In addition, large sums of public money are spent on litigation and compensation in some of these cases through the Clinical Negligence Scheme for Trusts (CNST). If research helped to minimise the impact of birth asphyxia this would reduce the costs of continuing care to the state and the burden to the child, their family and the wider community.

More realistic and more relevant expectations for the decision-to-delivery interval based on evidence would inform debate in the legal system and may help to reduce the cost to the state of related litigation.

4.2 Decision-to-delivery interval (category 2 urgency)

A prospective study to determine whether the decision-to-delivery interval has an impact on maternal and neonatal outcomes when there is a category 2 level of urgency for CS.

Important primary outcomes would be:

- fetal wellbeing (such as cord blood gases, Apgar score at 5 minutes, hypoxic encephalopathy, neonatal respiratory problems, unanticipated admission to neonatal intensive care unit (NICU), duration of stay in the NICU)
- maternal wellbeing (such as haemoglobin levels on day 2, need for blood transfusion, duration of hospital stay controlled for prolonged neonatal stay and general health/wellbeing).

Valuable secondary outcomes could include:

- fetal trauma at delivery

- iatrogenic maternal bladder or bowel injury
- postoperative maternal infectious morbidity
- establishment of breastfeeding
- psychological outcomes for women, such as the development of postnatal depression/post-traumatic stress disorder.

Why this is important

This research is important to inform the ongoing debate about the management of category 2 CS. The 'continuum of risk' in this setting has been recognised. However, the majority of work in this area, looking at maternal and fetal outcomes, generally considers unplanned CS as a whole group without making any distinction between degrees of urgency. Furthermore much of this work is retrospective. The majority of women who undergo intrapartum CS fall into the category 2 level of urgency (Thomas et al. 2001) and therefore specific information for this group could affect and benefit many women and contribute to the delivery of equity of care.

Delay in delivery with a compromised fetus may result in major and long-term harm including cerebral palsy and other major long-term disability. The immediate and long-term effect on a family of the birth of a baby requiring life-long specialised care and support is enormous. If such harm could be avoided by appropriate haste this would be an important improvement in outcome. However, if such haste is of no benefit then any related risk of adverse maternal outcome needs to be minimised.

A large amount of NHS and other state funding is used to provide continuing care for infants who are disabled as a result of delay in delivery and in providing lifelong support for the child and their family. In addition, large sums of public money are spent on litigation and compensation in some of these cases through the Clinical Negligence Scheme for Trusts (CNST). If research helped to minimise the impact of delay in delivery this would reduce the costs of continuing care to the state and the burden to the child, their family and the wider community.

More realistic and more relevant expectations for the decision-to-delivery interval based on evidence would inform debate within the legal system and may help to reduce the cost to the state of related litigation.

4.3 National audit

Repeat of the National Caesarean Section Sentinel Audit.

The original CS guideline included a set of 'auditable standards'. It would be a straightforward task to produce an updated set of auditable standards based on the important topics covered in the updated guideline. These could include:

- consent
- indications (including maternal request)
- procedural aspects
- maternal and fetal outcomes.

Many of the outcomes documented in a new CS audit would relate directly to recommendations in this CS guideline update. Researchers may also want to consider categorising different reasons underlying maternal request for CS such as previous poor childbirth experience, longstanding fear of childbirth, belief that CS is safer for the baby etc.

An additional useful feature of the audit would be to record key related data, such as the proportion of CS deliveries for a breech presentation that had an attempted external cephalic version.

Why this is important

During the 10 years since the National Caesarean Section Sentinel Audit was undertaken (2000–2001), many of the findings may have changed significantly. The audit examined who was having a CS and why, as well as the views of women having babies and the obstetricians looking after them. The audit found that a 20% CS rate was considered too high by 51% of obstetricians. UK CS rates now average about 25%.

A repeat of the CS Sentinel Audit would reveal any changes in indications and the views of women and obstetricians. The current literature does not adequately address the issue of maternal request for CS and this is one aspect the audit may address. Women's views on maternal request for CS when there are no obstetric indications are particularly relevant. Such requests may be on the rise and the reasons are not always clearly expressed or documented.

The methodology of the audit is established, making a repeat feasible. This should be given high priority because the benefit to the NHS would be significant.

4.4 Maternal request for CS

What support or psychological interventions would be appropriate for women who have a fear of vaginal childbirth and request a CS?

Interventions for evaluation could include:

- support from a named member of the maternity team
- continuity of carer
- formal counselling
- cognitive behavioural therapy.

Outcomes could include:

- mode of birth planned at term
- psychological outcomes (postnatal depression, post-traumatic stress disorder, self-esteem, mother–infant bonding)
- breastfeeding.

Why this is important

Fear of vaginal childbirth may stem from:

- fear of damage to the maternal pelvic floor
- damage to the baby during childbirth
- self-doubt on the ability to physically achieve vaginal birth
- previous childbirth experience
- unresolved issues related to the genital area.

Currently there is a wide variation in practice and limited resources lead to limited availability of effective interventions. Interventions that may be appropriate include:

- antenatal clinics dedicated to providing care for women with no obstetric indications who request a CS
- referral to a psychologist or a mental health professional
- referral to an obstetric anaesthetist
- intensive midwifery support.

Continuity of healthcare professional support from the antenatal to the intrapartum periods and 'one to one' midwifery care during labour are also often lacking and may make a difference to women who are anxious or afraid.

All of these interventions have different resource implications and there is no clear evidence to suggest that any are of benefit. The proposed research would compare in a randomised controlled trial two or more of these interventions in women requesting a CS. In the absence of any evidence, there is a case for comparing these interventions with routine antenatal care (that is, no special intervention).

This research is relevant because it would help to guide the optimal use of these limited resources and future guideline recommendations.

4.5 Risks and benefits of CS

What are the medium- to long-term risks and benefits to women and their babies of planned CS compared with planned vaginal birth?

The main focus would be the outcomes in women, which could be measured at 1 year (medium term) and 5–10 years (long term). These outcomes could include:

- urinary dysfunction
- gastrointestinal dysfunction
- dyspareunia
- breastfeeding
- psychological health.

Infant outcomes could include medical problems, especially ongoing respiratory and neurological problems.

Why this is important

Morbidities arising intraoperatively or in the days after a CS have been reasonably well described in the literature. Much less is known, however, about physical and emotional outcome measures in the longer term.

The Confidential Enquiries into Maternal Deaths in the UK, most recently published as 'Saving mothers' lives 2006–2008' (Cantwell R et al. 2011), devote a significant proportion of their work to investigating 'late' causes of maternal death. These include events arising in the medium term, namely, up to 1 year after a woman has given birth, many of which originate from the preceding pregnancy. The infectious, psychiatric and other conditions arising in or related to pregnancy do not always cause death but are responsible for arguably a greater burden of morbidity in the medium and long term, long after the pregnancy is over.

To provide more meaningful information to women when they are choosing their mode of birth, there is a pressing need to document medium- to long-term outcomes in women and their babies after a planned CS or a planned vaginal birth. First, it should be possible to gather data using standardised questions (traditional paper-based questionnaires and face-to-face interviews) about maternal septic morbidities and emotional wellbeing up to 1 year after a planned CS in a population of women who have consented for follow-up. Internet-based questionnaires could also be devised to achieve the high response rates required for a full interpretation of the data. Similarly, it would be important to collect high-quality data on infant morbidities after a planned CS compared with a planned vaginal birth. A long-term morbidity evaluation (between 5 and 10 years after the CS) would use similar methodology but assess symptoms related to urinary and gastrointestinal function.

5 Other versions of this guideline

5.1 Full guideline

The full guideline, 'Caesarean section' contains details of the methods and evidence used to develop the guideline. It is published by the National Collaborating Centre for Women's and Children's Health.

5.2 NICE pathway

The recommendations from this guideline have been incorporated into a NICE pathway.

5.3 Information for the public

A summary for patients and carers is available.

We encourage NHS and voluntary sector organisations to use text from this summary in their own information about caesarean section.

6 Related NICE guidance

- Multiple pregnancy. NICE clinical guideline 129 (2011).
- Hypertension in pregnancy. NICE clinical guideline 107 (2010).
- Venous thromboembolism – reducing the risk. NICE clinical guideline 92 (2010).
- Surgical site infection. NICE clinical guideline 74 (2008)
- Induction of labour. NICE clinical guideline 70 (2008).
- Diabetes in pregnancy. NICE clinical guideline 63 (2008).
- Antenatal care. NICE clinical guideline 62 (2008).
- Intrapartum care. NICE clinical guideline 55 (2007).
- Antenatal and postnatal mental health. NICE clinical guideline 45 (2007).
- Postnatal care. NICE clinical guideline 37 (2006).

7 Updating the guideline

NICE clinical guidelines are updated so that recommendations take into account important new information. New evidence is checked 3 years after publication, and healthcare professionals and patients are asked for their views; we use this information to decide whether all or part of a guideline needs updating. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations. Please see our website for information about updating the guideline.

Appendix A: The Guideline Development Group, National Collaborating Centre and NICE project team

Guideline Development Group

Malcolm Griffiths (Chair) Consultant Obstetrician and Gynaecologist, Luton and Dunstable Hospital, Luton

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NICE project team

Christine Carson Programme Director, Centre for Clinical Practice

Ben Doak Guideline Commissioning Manager

Elaine Clydesdale Guideline Coordinator

Ruaraidh Hill Technical Lead

Prasanth Kandaswamy Health Economist

Ann Greenwood Editor

Appendix B: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

Professor Mike Drummond – Chair Director, Centre for Health Economics, University of York

Dr Graham Archard General Practitioner, Dorset

Ms Catherine Arkley Lay member

Dr David Gillen Medical Director, Wyeth Pharmaceutical

Dr Ruth Stephenson Consultant in Anaesthetics Clinical Ethics Lead, NHS Grampian

Appendix C: Planned CS compared with planned vaginal birth

The following tables are also in the full version of the guideline; see pages 29–34 in the pdf version and pages 23–28 in the Word version.

Table 1 Summary effect on women's health of planned CS compared with planned vaginal birth for women with an uncomplicated pregnancy and no previous CS

Effects around the time of birth	Finding for planned CS	Finding for planned vaginal birth (including % unplanned CS in planned vaginal birth group)	Absolute effect	Relative effect (95% confidence interval)	Evidence quality and reference
Studies suggest may be reduced after a planned CS					
Perineal and abdominal pain during birth[a]	Median score 1.0	Median score 7.3 (10.3%)	6.3 lower	NC	Very low
Perineal and abdominal pain 3 days postpartum[5]	Median score 4.5	Median score 5.2 (10.3%)	0.7 lower	NC	Very low
Injury to vagina	0.0%	0.56% (14.7%)	6 fewer per 1000 (from 6 fewer to 2 fewer)	NC	Very low
Early postpartum haemorrhage	1.1%	6.0% (35%)	49 per 1000 (from 4 fewer to 56 fewer)	OR 0.23 (0.06 to 0.94)	Low
	3.9%	6.2% (8.3%)	23 fewer per 1000 (from 35 fewer to 6 fewer)	RR 0.06 (0.4 to 0.9)	Very low

Obstetric shock	0.006%	0.018% (8.2%)	12 fewer per 100,000 (from 17 fewer to 0.1 fewer)	RR 0.33 (0.11 to 0.99)	Very low
Studies suggest may be reduced after planned vaginal birth					
Length of hospital stay	3.2 days	2.6 days (35%)	0.6 days longer	Mean difference 1.58 (1.27 to 2.17)	Low
	3.96 days	2.56 days (8.2%)	1.4 days longer	Adjusted mean difference 1.47 (1.46 to 1.49)	Very low
Hysterectomy due to post-partum haemorrhage	0.03%	0.01% (8.2%)	14 more per 100,000 (from 3 more to 33 more)	RR 2.31 (1.30 to 4.09)	Very low
Cardiac arrest	0.19%	0.03% (8.2%)	15 more per 10,000 (from 11.5 more to 19.5 more)	RR 4.91 (3.95 to 6.11)	Very low
No difference found in studies					
Perineal and abdominal pain 4 months postpartum[5]	Median score 0.0	Median score 0.17 (10.3%)	0.17 lower	NC	Very low

Injury to bladder/ ureter	0.0%	0.14% (14.7%)	1 fewer per 1000 (from 2 fewer to 2 more)	NC	Very low
Injury to cervix	0.0%	0.28% (14.7%)	3 fewer per 1000 (from 3 fewer to 1 more)	NC	Very low
Iatrogenic surgical injury	0.00%	0.07% (14.7%)	7 fewer per 10,000 (from 10 fewer to 30 more)	NC	Very low
Pulmonary embolism	0.00%	0.003% (14.7%)	2 fewer per 10,000 (from 2 fewer to 40 more)	NC	Very low
Wound infection	0.01%	0.00% (35%)	1 more per 10,000	p = 1.0	Low
	1.5%	0.9% (8.3%)	6 more per 1000 (from 1 fewer to 19 more)	RR 1.7 (0.9 to 3.2)	Very low
Intraoperative trauma	0.1%	0.3% (8.3%)	1 fewer per 1000 (from 3 fewer to 7 more)	RR 0.5 (0.1 to 3.5)	Very low
Uterine rupture	0.02%	0.03% (8.2%)	13 fewer per 100,000 (from 22 fewer to 2.2 more)	RR 0.51 (0.25 to 1.07)	Very low

Assisted ventilation or intubation	0.01%	0.005% (8.2%)	7 more per 100,000 (from 0 fewer to 22 more)	RR 2.21 (0.99 to 4.90)	Very low
Acute renal failure	0.004%	0.001% (8.2%)	2 more per 100,000 (from 9 fewer to 13 more)	RR 2.17 (0.58 to 8.14)	Very low
Conflicting findings from studies					
Maternal death	9/737 (cases/ controls)	49/9133 (cases/controls) (Of maternal deaths occurring in the planned vaginal birth group 13/49 (26.5%) were women who gave birth by unplanned CS)	NC	OR 2.28 (1.11 to 4.65)	Very low
	0.00%	0.00% (14.7)	No difference (no events)	NC	Very low
	0.00%	0.002% (8.2%)	1.8 fewer per 10,000 (from 2 fewer to 6 more)	NC	Very low
Deep vein thrombosis	0.00%	0.03% (14.7%)	0.7 fewer per 1000 (from 0.2 fewer to 4 more)	NC	Very low

	0.06%	0.03% (8.2%)	32 more per 100,000 (from 14 more to 59 more	RR 2.20 (1.51 to 3.20)	Very low
Blood transfusion	1.7%	1.9% (35%)	2 fewer per 1000 (from 14 fewer to 34 more)	OR 0.87 (0.27 to 2.78)	Low
	0.3%	0.3% (14.7%)	0 fewer per 1000 (from 2 fewer to 5 more)	RR 0.89 (0.20 to 3.99)	Very low
	0.3%	0.4% (8.3%)	1 fewer per 1000 (from 2 fewer to 5 more)	RR 0.7 (0.2 to 2.7)	Very low
	0.02%	0.07% (8.2%)	41 fewer per 100,000 (from 53 fewer to 23 fewer)	RR 0.20 (0.20 to 0.64)	Very low
Infection – wound and postpartum	1.1%	0.8% (14.7%)	3 more per 1000 (from 2 fewer to 11 more)	RR 1.36 (0.75 to 2.4)	Very low
	0.6%	0.21% (8.2%)	390 more per 100,000 (from 323 more to 464 more)	RR 2.85 (2.52 to 3.21)	Very low

Hysterectomy	0.6%	0.1% (35%)	5 more per 1000	p = 0.13	Low
	0.1%	0.01% (14.7%)	1 more per 1000 (from 0 more to 5 more)	RR 9.09 (1.36 to 60.33)	Very low
	0.06%	0.02% (8.2%)	41 more per 100,000 (from 23.6 more to 68 more)	RR 3.60 (2.44 to 5.31)	Very low
Anaesthetic complications	0.4%	0.3% (14.7%)	1 more per 1000 (from 2 fewer to 11 more)	RR 1.24 (0.34 to 4.59)	Very low
	0.53%	0.21% (8.2%)	319 more per 100,000 (from 257 more to 389 more)	RR 2.5 (2.22 to 2.86)	Very low
CS, caesarean section; OR, odds ratio; RR, relative risk; NC, not calculable					
[a] score/10, higher scores indicate higher pain levels					

Table 2 Summary effect on babies' health of planned CS compared with planned vaginal birth for women with an uncomplicated pregnancy and no previous CS

Effects around the time of birth	Finding for planned CS	Finding for planned vaginal birth (including % unplanned CS in vaginal birth group	Absolute effect	Relative effect (95% confidence interval)	Evidence quality and reference
Studies suggest may be reduced after planned vaginal birth					
NICU admission	13.9%	6.3% (35%)	76 more per 1000 (from 31 more to 134 more)	RR 2.20 (1.4 to 3.18)	Low
No difference found in studies					
Hypoxic-ischaemic Encephalopathy (CNS depression, seizures, pH < 7)	0.2%	0.2% (14.7%)	0 fewer per 1000 (from 2 fewer to 5 more)	RR 0.81 (0.22 to 3.00)	Very low
Intracranial haemorrhage	0.00%	0.01% (14.7%)	0.2 fewer per 1000 (from 0.4 fewer to 3 more)	NC	Very low
Neonatal respiratory morbidity	12.0%	11.5% (14.7%)	5 more per 1000 (from 14 fewer to 27 more)	RR 1.04 (0.88 to 1.23)	Very low
Conflicting findings from studies					
Neonatal mortality	0.0%	0.1% (14.7%)	1 fewer per 1000 live births (from 1 fewer to 2 more)	NC	Very low
	0.17%	0.07% (7.9%)	1 more per 1000 live births (from 1 more to 2 more)	RR 2.4 (2.20 to 2.65)	Very low

Apgar score at 5 mins < 7	0.0%	0.5% (14.7%)	5 fewer per 1000 (from 5 fewer to 1 fewer)	NC	Very low
	0.6%	1.2% (35%)	6 fewer per 1000 (from 9 fewer to 157 more)	RR 0.44 (0.07 to 2.51)	Very low
CS, caesarean section; NICU, neonatal intensive care unit; CNS, central nervous system; RR, relative risk; NC, not calculable					

Changes after publication

February 2013: Minor maintenance.

August 2012: Recommendations 1.3.1.1 and 1.3.1.2 have been removed from this guideline. The topic 'place of birth' will be addressed by the update of the clinical guideline 'Intrapartum care' which is currently in development. In the meantime, see the current intrapartum care guideline for current guidance on place of birth.

About this guideline

This guidance updates and replaces NICE clinical guideline 13 (published April 2004).

New and updated recommendations have been included on:

- the risks and benefits of planned caesarean section (CS) compared with planned vaginal birth
- care of women considered at risk of a morbidly adherent placenta
- appropriate care and choices for women who are HIV positive
- care of women requesting a CS without a clinical indication
- decision-to-delivery intervals to be used as audit standards
- timing of the administration of antibiotics for CS
- appropriate care and choices for women who have previously had a CS.

Recommendations are marked as **[2004]**, **[2011]**, or **[new 2011]**:

- **[2004]** indicates that the evidence has not been updated and reviewed since 2004
- **[2004, amended 2011]** indicates that the evidence has not been updated and reviewed since 2004 but a small amendment has been made to the recommendation.
- **[2011]** indicates that the evidence has been reviewed but no changes have been made to the recommendation
- **[new 2011]** indicates that the evidence has been reviewed and the recommendation has been updated or added.

NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

The guideline was developed by the National Collaborating Centre for Women's and Children's Health, which is based at the Royal College of Obstetricians and Gynaecologists. The Collaborating Centre worked with a group of healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

The methods and processes for developing NICE clinical guidelines are described in The guidelines manual.

The recommendations from this guideline have been incorporated into a NICE Pathway. We have produced a summary for patients and carers. Tools to help you put the guideline into practice and information about the evidence it is based on are also available.

Your responsibility

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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