

Caesarean section

How common is a caesarean section? (Epidemiology)

Caesarean section accounts for about 25% of all deliveries in England, with a similar rate throughout the UK. The proportion of caesarean deliveries increases with age group and, in 2020–21, accounted for 49% of deliveries to those women aged 40 and over. ^[1]

There is significant regional variation and an association between caesarean sections and both local deprivation and individual social class. ^[2]

Factors affecting caesarean section rate

Factors affecting the likelihood of caesarean section during intrapartum care include:

- Place of birth: planned delivery at home or in a midwifery-led unit reduces the likelihood of caesarean section.
- Continuous support during labour reduces the likelihood of caesarean section.
- Induction of labour beyond 41 weeks in women with an uncomplicated pregnancy, because this reduces the risk of perinatal mortality and the likelihood of caesarean section.
- A partogram with a four-hour action line used to monitor progress of labour of women in spontaneous labour with an uncomplicated singleton pregnancy at term reduces the likelihood of caesarean section.
- Consultant obstetricians should be involved in the decision making for caesarean section, because this reduces the likelihood of caesarean section.

- A Cochrane review found that cardiotocography (CTG) during labour is associated with reduced rates of neonatal seizures, but continuous CTG was associated with an increase in caesarean sections and instrumental vaginal births.^[3] When caesarean section 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 contra-indications.
- Active management of labour and early amniotomy have not been shown to influence the likelihood of caesarean section for failure to progress and should not be offered routinely.

There is no influence on the likelihood of caesarean section with walking in labour, non-supine position during the second stage of labour, immersion in water during labour, epidural analgesia during labour or the use of raspberry leaves.

The effects on the likelihood of caesarean section 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 are uncertain.^[4]

Caesarean section rates have been steadily increasing due to a higher number of sections for fetal distress, as diagnosed by cardiotocographic (CTG) monitoring in labour, and their increasing use for [breech](#) and [multiple pregnancy](#).

However, the greatest contribution to the current high caesarean rates comes from elective repeat caesarean section (ERCS). The following is based on National Institute for Health and Care Excellence (NICE) latest guidance.^[4]

Reasons for a caesarean section (indications)^[4]

Possible indications include:

- Malpresentation - eg, [breech](#), transverse lie.

- Morbidly adherent placenta if the [placenta is low-lying](#) and the woman has had a previous caesarean section. The initial diagnostic test for this should be colour-flow Doppler ultrasound at 32 to 34 weeks, with the offer of an MRI (with a discussion of the implications) if the scan suggests morbidly adherent placenta.
- [Placental abruption](#).
- [Multiple pregnancy](#).
- Severe [hypertensive disease in pregnancy](#).
- Fetal conditions: distress, iso-immunisation, very low birth weight.
- Failed induction of labour.
- Repeat caesarean section: see below.
- Pelvic cyst or [fibroid](#).
- Maternal infection (eg, [herpes](#), [HIV](#)) but see 'Mother-to-child transmission of maternal infections', below.

NICE have updated guidance on maternal choice for caesarean birth for those women or pregnant persons with no medical indication for a C-section but who are requesting one.

NICE have advised that these requests need to be discussed and documented. Pros and cons need to be discussed so women can make an informed choice. Mental health support should be offered for those with severe anxiety or fear around giving birth (tokophobia).

If, after an informed discussion about the options for birth (including the offer of mental health support if appropriate), the woman or pregnant person still requests a caesarean birth, the medical team should support their choice and offer a C-section within their obstetric unit.

Classification

Caesarean sections are classified by their urgency, dictated by the indication, into the following categories:^[5]

1. Immediate threat to the life of the woman or fetus:
 - 'Emergency section'.
 - Performed as quickly as possible.
 - Decision-to-delivery time will usually be within 30 minutes. This is not critical in influencing baby outcome but has been an accepted audit standard for response to emergencies within maternity services.
 - Possible indications:
 - [Cord prolapse](#).
 - Fetal distress in the first stage.
 - [Antepartum haemorrhage](#).
2. Maternal or fetal compromise which is not immediately life-threatening:
 - Decision-to-delivery time will usually be within 75 minutes.
 - Possible indications:
 - Failure to progress.
 - Transverse lie in labour.
3. No maternal or fetal compromise but needs early delivery:
 - Timing dependent on indication.
4. Delivery times to suit woman or staff:
 - Not routinely before 39 weeks.

Perimortem caesarean ^[6]

A perimortem caesarean section is the surgical delivery of the fetus, performed at or near death of the mother.

- Should be performed following collapse if there is no cardiac output after four minutes. However, there are no clear, standardised guidelines as to when to perform the procedure.
- The procedure itself, though uncomplicated, creates intense anxiety and fear among providers.

- It is done rapidly, and, while preferably performed by an obstetrician, may be done by advanced prehospital providers, trauma surgeons, and emergency medicine physicians.
- Is performed primarily in the interests of maternal survival; confirming fetal well-being wastes time.
- No anaesthetic is necessary. A scalpel is the only essential equipment.

Method

- Ideally performed under spinal or epidural block. This has fewer risks and allows immediate contact between the baby and mother.
- There is evidence that prophylactic antibiotics result in fewer wound infections in non-elective and elective caesarean sections.^[7] They should be offered routinely before the skin incision. Women should be advised that:
 - Endometritis, urinary tract and wound infections occur in about 8% of women who have had a caesarean birth.
 - Using prophylactic antibiotics before skin incision reduces the risk of maternal infection more than prophylactic antibiotics given after skin incision, and that there is no known effect on the baby.^[4]

- Classical caesarean section (vertical incision) is now rarely used except in:
 - A very premature fetus with the lower segment poorly formed.
 - A transverse lying fetus with ruptured membranes and draining liquor.
 - Lower segment use made impossible by structural abnormality.
 - Constriction ring present.
 - Some fibroids.
 - Some cases of anterior [placenta praevia](#) with lower segment abnormally vascular.
 - Perimortem caesarean.

- Lower uterine segment incision is nearly always used now, as uterine rupture is much less common in subsequent pregnancies and it allows better healing, reduces infection and lowers postoperative complication rates:
 - 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.
 - The use of separate surgical knives to incise the skin and the deeper tissues is not recommended because it does not decrease wound infection.
 - 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.
 - Oxytocin 5 IU by slow intravenous injection should be used to encourage uterine contraction and to decrease blood loss.
 - The placenta should be removed using controlled cord traction, as this reduces the risk of endometritis.
 - The uterine incision should be closed in two layers.
 - Neither visceral nor parietal peritoneum should be sutured.
- Umbilical artery pH should be recorded after delivery.
- Appropriate thromboprophylaxis should be employed, according to guidelines and maternal risk factors.^[8]

Of the 191 women who died in the UK and Ireland in 2017–19 from direct and indirect causes during or up to 42 days after the end of their pregnancy:^[9]

- 116 women gave birth. Of these 116 women, 70 (60%) had a caesarean birth; 20% of these were perimortem as part of attempted resuscitation of the woman.
- A total of 20 babies were born by perimortem caesarean section:

- 8 (40%) were born after 32 weeks of gestation. Three out of the 8 babies born after 32 weeks' gestation survived (4 were stillborn and 1 died in the neonatal period) as did one out of the remaining 12 born at 32 weeks or less (10 were stillborn and 1 died in the neonatal period).
- Therefore, 4 (20%) of the total of 20 babies born by perimortem caesarean section survived, 14 (70%) were stillborn and 2 (10%) died in the neonatal period.

Planned caesarean section

The risk of respiratory morbidity is increased in babies born by caesarean section before labour but this risk decreases significantly after 39 weeks. Therefore, planned caesarean section should not routinely be carried out before 39 weeks.

Breech presentation

Women who have an uncomplicated singleton breech pregnancy at 36 weeks of 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. If external cephalic version is contra-indicated or has been unsuccessful, caesarean section should be offered because it reduces perinatal mortality and neonatal morbidity.

In the event of planned caesarean section, ultrasound should be carried out for uncomplicated singleton breech pregnancies as late as possible before the birth procedure, to check that the baby is still in the breech position.^[4]

Multiple pregnancy

If the first twin is cephalic, perinatal morbidity and mortality are increased for the second twin. However, the effect of planned caesarean section in improving outcome for the second twin remains uncertain and therefore caesarean section should not routinely be offered.

If the first twin is not cephalic, the effect of caesarean section in improving outcome is uncertain; however, current practice is to offer a planned caesarean section. Planned caesarean section for uncomplicated twin pregnancy should not be carried out before 38 weeks because this increases the risk of respiratory problems in these babies.

Preterm birth

Is associated with higher neonatal morbidity and mortality. However, the effect of planned caesarean section in improving these outcomes remains uncertain and therefore caesarean section should not routinely be offered.

Small for gestational age babies

The risk of neonatal morbidity and mortality is higher with small for gestational age babies. However, the effect of planned caesarean section in improving these outcomes remains uncertain and therefore caesarean section should not routinely be offered.

Placenta praevia

- Risk of placenta praevia is increased after previous caesarean section.
- If partly or completely covering the internal cervical os (major placenta praevia), delivery should be by caesarean section.
- Risk of the placenta being morbidly adherent (placenta accreta) is high in women who have had a previous caesarean and should be suspected if the placenta is under the previous caesarean scar: if there is a low-lying placenta at 32 weeks of gestation in a woman who has had a previous caesarean section, a colour-flow or 3-D power Doppler ultrasound should be offered:
 - If the Doppler scan is equivocal, MRI may help to diagnose placenta accreta; however, definitive diagnosis can only be made at surgery.

See also the separate [Placenta Praevia](#) and [Placenta Problems \(Placenta Accreta and Placental Abruption\)](#) articles.

Cephalopelvic disproportion

Pelvimetry is not useful in predicting failure to progress in labour and should not be used in decision making about mode of birth. Shoe size, maternal height and estimations of fetal size (ultrasound or clinical examination) do not accurately predict cephalopelvic disproportion and should also not be used.

Planned caesarean section risks and benefits^[4]

Benefits

Planned caesarean section may reduce the risk of:

- Perineal and abdominal pain during birth and three days postpartum.
- Injury to vagina.
- Early [postpartum haemorrhage](#).
- Obstetric shock.

Risks

Planned caesarean section may increase the risk of:

- Neonatal intensive care unit admission for the baby.
- For the mother, a longer hospital stay, hysterectomy (necessitated to stem postpartum haemorrhage) and cardiac arrest.

Mother-to-child transmission of maternal infections

HIV-positive women^[10]

- For women with a plasma viral load of less than 50 HIV RNA copies/mL at 36 weeks, and in the absence of obstetric contraindications, planned vaginal delivery should be supported.
- For women with a plasma viral load of 50–399 HIV RNA copies/mL at 36 weeks, pre-labour caesarean section (PLCS) should be considered, taking into account the actual viral load, the trajectory of the viral load, length of time on treatment, adherence issues, obstetric factors and the woman's views.
- Where the viral load is 400 HIV RNA copies/mL or above this level at 36 weeks, PLCS is recommended.

Provide women with HIV information about the benefits and risks for them and their baby of the HIV treatment options and mode of birth as early as possible in their pregnancy, so that they can make an informed decision. Obtain specialist advice about HIV in pregnancy from a sexual health specialist if necessary.

Hepatitis B

Do not offer pregnant women with hepatitis B a planned caesarean birth for this reason alone, as mother-to-baby transmission of hepatitis B can be reduced if the baby receives immunoglobulin and vaccination for [hepatitis B](#).

Hepatitis C

There is currently no known way of reducing vertical transmission of [hepatitis C](#) which is about 5% (up to 40% if the woman is also HIV-positive).

Do not offer women who are infected with hepatitis C a planned caesarean birth for this reason alone.

Offer pregnant women who are co-infected with hepatitis C virus and HIV a planned caesarean birth to reduce mother-to-baby transmission of hepatitis C virus and HIV.

Genital herpes simplex virus (HSV) infection ^[11]

Primary [genital HSV](#) occurring at the time of delivery has a risk of neonatal HSV infection, which is otherwise estimated to be 41%. Recurrent genital HSV at the time of delivery is associated with a low risk of neonatal HSV (0-3% for vaginal delivery).

Offer women with primary genital herpes simplex virus (HSV) infection occurring in the third trimester of pregnancy a planned caesarean birth to decrease the risk of neonatal HSV infection.

Do not routinely offer pregnant women with recurrent HSV infection a planned caesarean birth outside of the context of research.

Vaginal birth after caesarean

- In the UK the rates of vaginal birth after caesarean (VBAC) dropped from 45.9% in 1988 to 36% between 2001 and 2011, due to concerns about maternal safety.^[12]
- Subsequent evidence has emerged of the relative safety of VBAC but the rates have not recovered.
- In a national cohort of women, over half of those who had had one previous caesarean, attempted a VBAC and almost two thirds successfully achieved a vaginal birth.^[13]
- A systematic review of qualitative research suggests that women who had been very keen for a vaginal birth prior to their caesarean, were more likely to attempt VBAC, whereas women who had had a distressing birth experience were more likely to request a repeat caesarean.^[12] Those women with an open mind are more strongly influenced by written information and personalised expert advice. This confirms the importance of addressing a woman's ideas, concerns and expectations as well as imparting information and, as first-trimester preferences for either VBAC or ERCS persist in over 70% of women, this should be done as early as possible, starting at the time of the first caesarean.

Repeat caesarean section^[4]

Women who have had up to and including four caesarean sections should be advised that the risk of fever, bladder injuries and surgical injuries does not vary with planned mode of birth. The risk of uterine rupture, although higher for planned vaginal birth, is rare. Therefore, the decision about mode of birth after a previous caesarean section should take into consideration:

- Maternal preferences and priorities.
- Risk of uterine rupture: a rare complication. One systematic review found an additional risk of 2.7 symptomatic ruptures per 1,000 when comparing trial of labour with ERCS.^[14] In the 2009–2012 Confidential Enquiry into Maternal Deaths in the UK and Ireland, four women died due to uterine rupture; none had previously had a caesarean.

- Risk of perinatal mortality and morbidity: 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 caesarean section (about 1 per 10,000). The effect of planned vaginal birth or planned repeat caesarean section on [cerebral palsy](#) is uncertain.

Women who have had a previous caesarean section should be offered electronic fetal monitoring during labour and care during labour, in a unit where there is immediate access to caesarean section and on-site blood transfusion services.

Women who have had a previous caesarean section can be offered induction of labour but 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.

Women who have had five or more caesarean sections have greater maternal morbidity, largely due to placenta praevia and accreta. They also have higher rates of preterm delivery, most likely due to antepartum haemorrhage.^[15]

Management of caesarean sections

- Before caesarean birth, carry out a full blood count to identify anaemia, antibody screening, and blood grouping with saving of serum. Do not routinely carry out cross-matching of blood, clotting screen or pre-operative ultrasound for localisation of the placenta.^[4]
- 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.
- Isotonic drinks during labour prevent ketosis without a concomitant increase in gastric volume.
- Timing will depend on the reason for the caesarean (see 'Classification', above).

- Intraoperative blood cell salvage:
 - Blood shed during an operation is collected, filtered and washed to produce autologous red blood cells for transfusion to the patient.
 - Intraoperative blood cell salvage is an effective technique for blood replacement but there are theoretical safety concerns when it is used in obstetric practice.
 - This procedure should only be performed by multidisciplinary teams who develop regular experience of intraoperative blood cell salvage.
- Women who have needed an emergency caesarean section should have the reasons explained to them before they are discharged from hospital. Printed information should also be given as to their options for delivery in future pregnancies.

Post-delivery management

Offer and facilitate early skin-to-skin contact between the woman and her baby.

Offer women who have had a caesarean birth and who wish to breastfeed support to help them to start breastfeeding as soon as possible after the birth of their baby.

Analgesia following caesarean section^[4]

Options for pain relief after caesarean birth should be discussed with the mother. They should be advised that:

- Pain after caesarean birth can be controlled using oral or injectable medicines.
- Their choice of pain relief medicines after caesarean birth will depend on the severity of pain and whether they had spinal/epidural or general anaesthesia.
- If they wish to breastfeed, they will usually be able to do this and care for their baby while taking pain relief medicines.

Immediately postpartum analgesia:

- Women should be offered diamorphine (0.3 to 0.4 mg intrathecally) for analgesia to reduce the need for supplemental analgesia after a caesarean birth. Epidural diamorphine (2.5 to 5 mg) is a suitable alternative where intrathecal diamorphine has not been given. As of March 2021, this is an off-label use of diamorphine.
- For women who have had spinal or epidural anaesthesia, oral morphine sulfate (or, if they cannot take oral medication, intravenous, intramuscular or subcutaneous morphine) should be offered.
- Intravenous patient-controlled analgesia (PCA) using morphine should be considered for women who have had a general anaesthetic for caesarean birth.

Short-term postpartum analgesia:

- Paracetamol and (unless contra-indicated) a non-steroidal anti-inflammatory drug (NSAID) such as ibuprofen should be used in combination after caesarean birth, to reduce the need for opioids, and to allow them to be stepped down and stopped as early as possible.
- If paracetamol is insufficient or NSAIDs cannot be taken, consider adding dihydrocodeine to paracetamol or changing to co-dydramol. Paracetamol, NSAIDs, dihydrocodeine or co-dydramol should be given regularly, not as required.
- However, codeine or co-codamol should not be offered to breastfeeding women because of the risk of serious neonatal sedation and respiratory depression.
- If the woman is in severe pain and other pain relief is not sufficient, consider other causes for the pain and make the woman aware that while stronger pain relief is available, it can increase sedation and respiratory suppression in the neonate.
- For breastfeeding women, use opioid analgesics (for example, morphine, dihydrocodeine, tramadol or oxycodone) at the lowest effective dose and for the shortest duration, and not for more than three days without close supervision.
- If opioids are being used, laxatives and antiemetics may be needed.

Post-discharge analgesia:

- If, after a caesarean birth, a woman is discharged home on opioids, advise the woman to contact their healthcare provider if they are concerned about their baby (for example drowsiness, breathing difficulties, constipation or difficulty feeding).
- Women should be advised that some over-the-counter medicines contain codeine, and should not be taken while breastfeeding because this can lead to serious neonatal sedation and respiratory depression.
- Laxatives and antiemetics may need to be considered as long as the woman is taking opioids.

Complications of caesarean sections

- Lung aspiration.
- [Pulmonary embolus](#).
- [Postpartum haemorrhage](#).
- Infection: being overweight and obesity are significant risk factors for infection post-caesarean. ^[16]
- Longer stay in hospital may lead to difficulties in bonding and adjustment difficulties for the mother and the rest of the family.

Prognosis

The balance of maternal and fetal risks between caesarean section and vaginal delivery is difficult; in an emergency scenario it is almost impossible to differentiate the consequences of caesarean section from the indication for the operation.

Further reading

- [Quality standard for caesarean section](#); NICE, Jun 2013 – updated Mar 2021
- [Intrapartum care for healthy women and babies](#); NICE Guideline (Dec 2014 – updated Dec 2022)

- [Placenta Praevia and Placenta Accreta: Diagnosis and Management](#); Royal College of Obstetricians and Gynaecologists (September 2018)

Disclaimer: This article is for information only and should not be used for the diagnosis or treatment of medical conditions. Egton Medical Information Systems Limited has used all reasonable care in compiling the information but makes no warranty as to its accuracy. Consult a doctor or other healthcare professional for diagnosis and treatment of medical conditions. For details see our [conditions](#).

Authored by:	Peer Reviewed by: Dr Krishna Vakharia, MRCGP	
Originally Published: 20/11/2023	Next review date: 19/10/2023	Document ID: doc_1898

View this article online at: patient.info/doctor/caesarean-section

Discuss Caesarean section and find more trusted resources at [Patient](#).



To find out more visit www.patientaccess.com
or download the app



Follow us

