

# Caesarean birth

31 March 2021

## Appendix A: benefits and risks of vaginal and caesarean birth

### Where has this data come from?

The information used to generate the tables below comes from published studies. These studies were conducted in a variety of countries (not just the United Kingdom) and published between 1996 and 2019. Evidence report A includes full information on each primary study but overall the committee agreed that the evidence was broadly applicable to the current UK context.

### Why is the risk of the outcome specifically in those planning caesarean birth labelled 'calculated' here?

The outcomes included in these tables are those from the full evidence review that the committee agreed were most likely to demonstrate actual differences due to the mode of birth. These decisions were based primarily on the relative effect measures (for example risk ratios, hazard ratios) because these had been adjusted to address potential confounding. However, it is best practice when discussing risk to provide information on absolute effects. For example, it can be misleadingly alarmist to be told you are twice as likely to die (accurate relative effect) if the underlying data shows your risk increases from 0.01% to 0.02% (actual absolute effect change). In the tables below rates have been presented as natural frequencies (in other words per 100, 000 women) as opposed to percentages as these are generally considered to be easier to interpret.

In order to estimate absolute risk differences in these tables, the adjusted relative effects (of caesarean birth compared to vaginal birth) were applied to appropriate vaginal birth risks for each outcome. For most of the outcomes below the source of this

information was the studies included in the analysis, but for some outcomes alternative sources had to be used (full information on this is available in evidence report A). This generates calculated caesarean birth risks which can then be subtracted from the vaginal birth risks to produce an absolute risk difference. Because the relative effects were derived from models that adjusted for confounding, presenting the actual reported risk in the caesarean birth arm in the tables below can lead to potentially confusing inconsistencies (but this information is included in evidence report A). Therefore the table below includes the estimated risk with vaginal birth, the calculated risk with caesarean birth and the absolute difference.

### **Does this mean that caesarean birth causes these outcomes?**

As the evidence in these tables is all derived from non-randomised studies, it is not possible to conclude that the mode of birth definitively causes any outcomes. Each study has adjusted for some potential confounding factors which makes it more likely that the difference in risk is related to the mode of birth but it is impossible to conclude for certain without large randomised studies which are unlikely ever to be conducted.

### **Is this evidence about planned or unplanned caesarean births?**

Ideally all evidence to inform these tables would be from “intention to treat” (ITT) type analyses (category A below) where studies would take all women planning to have a caesarean birth and compare them with women planning to have a vaginal birth. They would then analyse the women’s outcomes after birth in those groups, regardless of what mode of birth a woman ended up having. That is because there are a variety of reasons a woman may end up having a different mode of birth from her original plan and this type of analysis conveys exactly what the impact of her plan has been on her outcomes. Unfortunately, this type of evidence is rarely available and so the committee took a hierarchical approach to the evidence in their analyses preferentially including ITT type analysis, but if none was available they then included analyses done by the actual mode of birth (comparing a group of women who had had a vaginal birth with those who had had a caesarean birth). In this second category (category B below), ideally studies

would exclude unplanned (or emergency) caesarean births from the caesarean group as a substantial proportion of these are likely to represent women who originally planned for a vaginal birth but actually had an unplanned or emergency caesarean birth and they are likely to have worse outcomes than planned caesarean births. However again there was not always evidence available of this type and so for some outcomes the committee accepted evidence from a third category (category C below) where emergency caesarean births were included in the caesarean birth arm. For clarity, even these category C studies are not directly comparing only emergency caesarean births with vaginal birth, they just include a mix of emergency and non-emergency caesarean births in the caesarean birth group. All of the information below has been chosen to try and inform the decision around planning one mode of birth or other, however from outcome to outcome there were differing categories of evidence available and this is specified in the far right-hand column.

### **Why is the faecal incontinence outcome a comparison between caesarean birth and assisted vaginal birth?**

As with the discussion on planned or unplanned comparisons, the ideal evidence would compare the whole cohort of women planning to have a caesarean birth with those planning to have a vaginal birth regardless of their final mode of birth. As a consequence, where possible evidence including both assisted and unassisted vaginal births in a single group was prioritised. Women rarely get to choose whether their vaginal birth will be unassisted or assisted, the latter is typically a result of opting for a vaginal birth and some complication or delay arising. Unfortunately for the outcome of faecal incontinence the only available evidence was reported separately for caesarean birth compared to assisted and unassisted vaginal birth groups. The evidence showed that there was no difference in the risk of faecal incontinence between caesarean birth and unassisted vaginal birth but that there was a lower risk of faecal incontinence with caesarean birth compared to assisted vaginal births. Therefore this specific information is included in table 3 below.

**Table 1 Outcomes for women that may be more likely with caesarean birth**

<b>Outcomes</b>	<b>Estimated risk with vaginal birth</b>	<b>Calculated risk with caesarean birth</b>	<b>Risk difference</b>	<b>Category of evidence</b>
Peripartum hysterectomy	About 80 women per 100,000 would be expected to have a peripartum hysterectomy (so 99,920 would not)	About 150 women per 100,000 would be expected to have a peripartum hysterectomy (so 99,850 would not)	About 70 more women per 100,000 who had a caesarean birth would be expected to have a peripartum hysterectomy; so for about 99,930 women per 100,000 the outcome was the same irrespective of the method of birth.	A - Planned mode of birth
Maternal death	About 4 women per 100,000 would be expected to die (so 99,996 would not)	About 24 women per 100,000 would be expected to die (so 99,976 would not)	About 20 more women per 100,000 who had a caesarean birth would be expected to die; so for about 99,980 women per 100,000 the outcome was the same irrespective of the method of birth.	A - Planned mode of birth
Length of hospital stay	About 2 and a half days on average	About 4 days on average	About 1 to 2 days longer on average with caesarean birth. <b>[2011]</b>	A - Planned mode of birth
Placenta accreta in future pregnancy	About 40 women per 100,000 would be expected to have a placenta accreta in a future pregnancy (so 99,960 would not)	About 100 women per 100,000 would be expected to have a placenta accrete in a future pregnancy (so 99,900 would not)	About 60 more women per 100,000 who had a caesarean birth would be expected to have a placenta accreta in a future pregnancy; so for about 99,940 women per 100,000 the outcome was the same irrespective of the method of birth.	C - Actual mode of birth (including planned and unplanned caesarean)
Uterine rupture in future pregnancy or birth	About 40 women per 100,000 would be expected to have a uterine rupture in a future pregnancy (so 99,960 would not)	About 1,020 women per 100,000 would be expected to have a uterine rupture in a future pregnancy (so 98,980 would not)	About 980 more women per 100,000 who had a caesarean birth would be expected to have a uterine rupture in a future pregnancy; so for about 99,020 women per 100,000 the outcome was the same irrespective of the method of birth.	C - Actual mode of birth (including planned and unplanned caesarean)

**Table 2 Outcomes for babies that may be more likely with caesarean birth**

<b>Outcomes</b>	<b>Estimated risk with vaginal birth</b>	<b>Calculated risk with caesarean birth</b>	<b>Risk difference</b>	<b>Category of evidence</b>
Neonatal mortality	About 30 babies per 100,000 would be expected to die (so 99,970 would not)	About 50 babies per 100,000 would be expected to die (so 99,950 would not)	About 20 more babies per 100,000 whose mothers had a caesarean birth would be expected to die; so for about 99,980 babies per 100,000 the outcome was the same irrespective of the method of birth.	A - Planned mode of birth
Asthma	About 1,500 per 100,000 children would be expected to have asthma (so 98,500 would not)	About 1,810 per 100,000 children would be expected to have asthma (so 98,190 would not)	About 310 more children per 100,000 whose mothers had a caesarean birth would be expected to have asthma; so for about 99,690 babies or children per 100,000 the outcome was the same irrespective of the method of birth.	B - Actual mode of birth (excluding unplanned caesarean)
Childhood obesity	About 4,050 per 100,000 children would be expected to be obese (so 95,950 would not)	About 4,560 per 100,000 children would be expected to be obese (so 95,440 would not)	About 510 more children per 100,000 whose mothers had a caesarean birth would be expected to be obese; so for about 99,490 children per 100,000 the outcome was the same irrespective of the method of birth.	B - Actual mode of birth (excluding unplanned caesarean)

**Table 3 Outcomes for women that may be less likely with caesarean birth**

<b>Outcomes</b>	<b>Estimated risk with vaginal birth</b>	<b>Calculated risk with caesarean birth</b>	<b>Risk difference</b>	<b>Category of evidence</b>
Urinary incontinence occurring more than 1 year after birth	About 48,700 per 100,000 women would be expected to have urinary incontinence (so 51,300 would not)	About 27,520 per 100,000 women would be expected to have urinary incontinence (so 72,480 would not)	About 21,180 fewer women per 100,000 who had a caesarean birth would be expected to have urinary incontinence, so for about 78,820 women per 100,000 the outcome was the same irrespective of the method of birth.	B - Actual mode of birth (excluding unplanned caesarean)

Outcomes	Estimated risk with vaginal birth	Calculated risk with caesarean birth	Risk difference	Category of evidence
Faecal incontinence occurring more than 1 year after birth; compared to assisted vaginal birth	About 15,100 per 100,000 women would be expected to have faecal incontinence after assisted vaginal birth	About 7,410 per 100,000 women would be expected to have faecal incontinence (so 92,590 would not)	About 7,690 fewer women per 100,000 who had a caesarean birth would be expected to have faecal incontinence; so for about 92,310 women per 100,000 the outcome was the same irrespective of the method of birth.	B - Actual mode of birth (excluding unplanned caesarean)
Vaginal tear: third- and fourth-degree tears	About 560 per 100,000 women would be expected to have a third- or fourth-degree vaginal tear (so 99,440 would not)	About 0 per 100,000 women would be expected to have a third- or fourth-degree vaginal tear (so 100,000 would not)	About 560 fewer women per 100,000 who had a caesarean birth would be expected to have third- or fourth-degree vaginal tear; so for about 99,440 women per 100,000 the outcome was the same irrespective of the method of birth. <b>[2011]</b>	A - Planned mode of birth
Pain during birth, 3 days after birth and 4 months after birth (as measured with the Visual Analogue Scale [VAS]; 0 is no pain, 10 is most severe pain)	Median pain score of 8 (during birth), 4 (3 days after birth) and 0 (4 months after birth)	Median pain score of 1 (during birth), 5 (3 days after birth) and 0 (4 months after birth)	Reduction in pain score with caesarean birth compared with vaginal birth of 7 (during birth), reduction in pain score with vaginal birth compared with caesarean birth of 1 (3 days after birth) and no difference between vaginal birth and caesarean birth (4 months after birth) <b>[2011]</b>	A - Planned mode of birth

More details on the differences in risk, how they were estimated and uncertainty in the evidence including confidence intervals are provided in appendix M of evidence review A.

The outcomes labelled **[2011]** in the table are outcomes which were not reviewed in the 2021 update of this guideline but that the committee agreed, at least qualitatively, were still applicable and so were carried forward into these tables. Limited information on the source of this evidence is included in appendix P of evidence review A.

In addition to Tables 1, 2 and 3, there were a number of outcomes where the evidence identified showed there was no difference between caesarean or vaginal birth (Box 1) and an additional set of outcomes where there was insufficient evidence or conflicting evidence about the risk with caesarean or vaginal birth (Box 2).

**Box 1 Outcomes for women and babies that are likely to be similar for caesarean or vaginal birth**

Outcomes for women:

- thromboembolic disease
- major obstetric haemorrhage
- postnatal depression
- faecal incontinence (occurring more than 1 year after birth; compared to unassisted vaginal birth)

Outcomes for babies/children:

- admission to neonatal unit
- infection
- persistent verbal delay
- infant mortality (up to 1 year)

More details on the differences in risk, how they were estimated and uncertainty in the evidence including confidence intervals are provided in appendix M of evidence review A.

### **Box 2 Outcomes for women and babies that have conflicting or limited evidence about the risk with caesarean or vaginal birth**

Outcomes for women:

- ITU admission
- stillbirth in a subsequent pregnancy.

Outcomes for babies/children:

- respiratory morbidity
- cerebral palsy
- autism spectrum condition
- type 1 diabetes.

More details on the differences in risk, how they were estimated and uncertainty in the evidence including confidence intervals are provided in appendix M of evidence review A.

## **Update information**

**June 2022:** in table 3 we have updated the outcome name 'pain during birth' to more closely match the study; added scores for an extra time point; and updated the estimated risk with vaginal birth, calculated risk with caesarean birth and risk difference.

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