



# Caesarean section on maternal request

A systematic review and assessment of medical, health economic, ethical, and social aspects

## Summary and conclusions

### Background

Following a large increase in the number of caesarean sections until the year 2006 in Sweden, the share of caesarean sections has been stable around 18 percent. Around half of these are planned caesarean sections, most of them with various medical indications, and half are acute caesarean sections. The largest group of women who request a caesarean section without medical indication are multiparous women. There is a lack of a national consensus around what is to be considered as a caesarean section on maternal request, which means that statistics on this is uncertain. Amongst primiparous women, approximately 1–2 percent of births are caesarean sections on maternal request. Amongst multiparous women, this number is approximately 3–7 percent, depending on whether one includes caesarean sections where no clear medical indication is given.

Clinical practice in Sweden varies widely between maternity clinics and regions, as do the number of planned caesarean sections, and planned caesarean sections on maternal request. Written guidelines for planned caesarean sections are missing at most maternity clinics.

### Aim

The aim of this systematic review was to investigate the somatic risks for mother and child of a caesarean section on maternal request without medical indication, to perform a qualitative analysis of perceptions and experiences amongst women and healthcare staff, to conduct health economic analyses, and to discuss ethical aspects.

### Conclusions

#### Results from studies with quantitative methodology (complications):

▶ **For the mother**, there are risks for complications after both vaginal delivery and caesarean section, both in the short and long term. If also risks of complications during subsequent births are included, then the complications after caesarean section are somewhat more numerous and potentially more serious than after vaginal delivery. It should be noted, however, that serious complications are rare (Table 1).

- Examples of complications with **increased risk** following planned caesarean section without medical indication compared to planned vaginal delivery are infections, excessive bleeding, pulmonary embolism after birth, that the uterus ruptures or the placenta grows into the uterine wall at a subsequent delivery (all high certainty of evidence) and ileus in the long term after birth (moderate certainty of evidence).

- Examples of complications with **lowered risk** following caesarean section are complications that affect perineal function. In the short term, this includes anal sphincter injury (high certainty of evidence) and, in the long term, urinary stress incontinence (moderate certainty of evidence) and need for surgery due to pelvic floor problems (low certainty of evidence).

▶ **For the child**, there are slightly to moderately increased risks for complications with a planned caesarean section, if a medical indication is missing, compared to a planned vaginal delivery, both in the short and long term (Table 1). No lowered risks for the child after caesarean section without medical indication were found in the included studies.

- Examples of complications with **increased risk** after caesarean section are admission to neonatal intensive care unit (NICU), that the child suffers

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from respiratory morbidity after birth, and that the child develops asthma (moderate certainty of evidence) or diabetes during childhood (low certainty of evidence).

**Results from studies with qualitative methodology (perceptions and experiences):**

- ▶ Women who request a caesarean section without medical indication regarded caesarean section as being associated with lower risks than vaginal birth, while healthcare staff who meet these women held the opposite view (moderate certainty of evidence).
- ▶ The women considered themselves to have a right to demand a caesarean section, while the healthcare staff they meet had widely varying views regarding to what extent the woman has a right to choose the mode of delivery herself (moderate certainty of evidence).
- ▶ The women found it most important to get acceptance for their request for caesarean section, while the staff rather highlighted the importance of different types of support, as well as time for discussion and to treat the women with respect and understanding (moderate certainty of evidence).
- ▶ Healthcare staff thought that the high workload in the delivery units can complicate deliveries, result in negative birth experiences, limit the possibility of follow-up after delivery and thus lead to future requests for caesarean section (moderate certainty of evidence).

**Health economic results:**

Health economic model analyses for Sweden that we conducted based on the results for the risk comparison between the two methods of birth, Swedish cost data and quality of life weights from the literature show:

- ▶ For primiparous women, the costs of birth and hospital care during the subsequent year are on average between 26000 and 32000 Swedish crowns higher per planned caesarean section without medical indication compared to planned vaginal birth in Sweden. For multiparous women, the cost increase lies between 29 000 and 36 000 Swedish crowns per planned caesarean section without medical indication. These results include costs for method of delivery and hospital costs for short-term complications for both mother and child.
- ▶ Planned vaginal delivery leads to lower costs for hospital care and somatic health gains compared to planned caesarean section without medical indication, also with a longer perspective of up to 20 years. The analyses consider costs for the method of delivery, hospital care costs for short- and long-term complications for mother and child, as well as the impact on quality of life of long-terms complications for mother and child. Although there are uncertainties around for example quality of life effects, the overall result remains unchanged in sensitivity analyses.
- ▶ The overall budget impact for somatic care of planned caesarean section in women without medical indication is estimated to between 75 and 93 million Swedish crowns per year in Sweden, based on a healthcare perspective with a focus on hospital costs.

**Method**

Systematic reviews were conducted in accordance with the international PRISMA guidelines and SBU's methods handbook for quantitative and qualitative studies. Moreover, health economic and ethical aspects were assessed.

For the questions regarding risks for maternal complications with a caesarean section on maternal request in the short-term and following a prior caesarean section, recent reports by the National Board of Health and Welfare using national registry data were deemed sufficient. Thus, no further literature search was performed for these outcomes.

The certainty of the results was assessed using GRADE (Question 1, results of studies using quantitative methodology) and GRADE-CERQual (Questions 2 and 3, results of studies using qualitative methodology), respectively. Statistics from the report by the National Board of Health and Welfare and the Medical Birth Registry were used as sources for the practice survey.

For the assessment of health economic aspects, the results of the systematic review of complication risks with different delivery methods were used, when the results were deemed to be of low, moderate or high certainty. National and regional registry data were

used for healthcare costs. We constructed a health economic model that weighs together the results regarding risks for mother and child and relates these to costs and impact on quality of life. The calculated costs after one year were used to estimate the budget impact on hospitalisation costs in Sweden.

Ethical, social, and societal aspects were illustrated through discussions in the project team, partly based on questions from SBU's ethical guideline for healthcare.

The protocol was registered in Prospero.

### **Inclusion criteria (PICOs)**

**Question 1:** *What are the risks and benefits for mother and child with a caesarean section on maternal request without medical indication compared to vaginal delivery?*

#### **Population**

Pregnant women, mothers, new-borns and children.

#### **Intervention**

Caesarean section on maternal request. Since existing registers not always contain information on whether a caesarean section happens on maternal request, planned caesarean sections without medical indication (for long-term maternal complications: all types of caesarean sections, including acute ones) were considered to be the same as caesarean sections on maternal request. It was required for the study results to be adjusted for potential confounders, which could have contributed to a decision to perform a caesarean section. This was assessed, amongst other instances, as part of the evaluation of risk of bias.

#### **Control**

Primarily planned vaginal delivery. Secondly, all types of vaginal deliveries. For short-term complications for the child, a comparison with planned vaginal delivery was required.

#### **Outcomes**

##### **Mother:**

1. Short-term complications, within 6 weeks after delivery.
2. Complications at subsequent delivery, after prior caesarean section.
3. Long-term complications, more than 1 year after delivery.

##### **Child:**

1. Short-term complications, within 28 days after birth, including perinatal/neonatal death.
2. Complications at subsequent delivery when the mother has had a prior caesarean section without medical indication.
3. Long-term complications, more than 1 year after birth.

All complications deemed to be clinically relevant for mother or child were included. Examples of outcomes that were excluded on this basis were results of a basic research nature, such as plasma levels of hormones, cytokines, and gene expression.

#### **Study design**

Randomised controlled trials and non-randomised studies with control group published in peer-reviewed journals.

#### **Exclusion criteria**

Multiple births and prematurity, and studies focusing on pregnant women/mothers with chronic diseases such as diabetes, rheumatoid diseases, cancer etc.

The project was restricted to somatic risks for the mother and child. Outcome measures for different forms of mental ill-health were excluded due to often ambiguous definitions in the field, considerable problems with confounders, and difficulties of following up in existing registries how women's wishes are handled.

**Language:** English, Swedish, Danish, or Norwegian.

**Search period:** From 2000 to 2021. Final search May 2021.

**Databases searched:** Final searches in Embase via Elsevier, Ovid MEDLINE, Scopus via Elsevier. Initial searches in Cochrane Library, CRD databases: DARE; HTA Database, NHS EED, Evidence Search (NICE) International HTA Database, KSR Evidence and Prospero, as well as CINAHL via EBSCO, Ovid Medline and PsycInfo.

**Client/patient involvement:** No.

**Question 2:** *What perceptions do women who express a wish for a caesarean section have about different methods of birth? What experiences do women have of their participation in the decision and the reception by healthcare staff when expressing a desire for caesarean section?*

**Question 3:** *What perceptions and experiences do healthcare staff have when women express a desire for a caesarean section and the healthcare staff find that a medical indication is missing?*

### Population

Women who approach the healthcare system with a desire for caesarean section. Healthcare staff who handle these requests.

### Setting

All types of settings.

### Outcomes

Perceptions and experiences of the meeting between healthcare staff and pregnant women who desire or have requested a caesarean section without medical indication. Attitudes and perceptions that are important for the experience of the meeting/meetings. Limitation: Reasons for request for caesarean section when there is no medical indication.

### Study design

Studies with qualitative methodology published in peer-reviewed journals.

**Language:** English, Swedish, Danish, or Norwegian.

**Search period:** From 2000 to 2021. Final search May 2021.

**Databases searched:** Final searches in CINAHL via EBSCO, Ovid MEDLINE, PsycInfo via EBSCO

and Scopus via Elsevier. The database SveMed+ was checked. Initial searches in Cochrane Library, CRD databases: DARE; HTA Database, NHS EED, Evidence Search (NICE) International HTA Database, KSR Evidence and Prospero, as well as CINAHL via EBSCO, Ovid Medline and PsycInfo.

**Client/patient involvement:** No.

## Results

### Results from studies using quantitative methodology (Complications)

We found no relevant randomised studies. The results are based on 49 non-randomised studies with control group, mainly registry studies with the aim to study the risks of planned caesarean section without medical indication compared to vaginal birth in a population of women with low risk (see Figure 1). The results in the included studies have been adjusted for potential confounders that may have contributed to a decision to perform a caesarean section based on an inherent difference between the groups. For maternal long-term complications, we included results for all types of caesarean sections, both acute and planned, the latter regardless of whether medical indications were present or not.

Overall, 12 outcomes showed an increased risk for the mother with caesarean section, compared to vaginal delivery, and six outcomes showed a lowered risk for the mother. For the child, 11 outcomes showed an increased risk with planned caesarean section compared to vaginal birth. No outcomes showed a lowered risk for the child with planned caesarean section compared to vaginal birth (Table 1). Results with very low certainty of evidence have not been included in the table below.

**Table 1** Outcomes for which there is an *increased* respectively *lowered* risk for the mother or child with caesarean section, compared with\* vaginal birth.

Time period	Increased risk for woman (follow-up)	Certainty of evidence according to GRADE	NNH	Relative risk (95 % CI)
During or short time after childbirth (up to 6 weeks)	Excessive bleeding	⊕⊕⊕⊕	10	6.18 (6.00–6.37)
	Pulmonary embolism	⊕⊕⊕⊕	2300	1.72 (1.38–2.14)
	Infection in uterus	⊕⊕⊕⊕	480	1.12 (1.07–1.19)
	Urinary tract infection	⊕⊕⊕⊕	340	1.41 (1.32–1.52)
	Wound infection	⊕⊕⊕⊕	90	2.60 (2.47–2.75)
	Milk congestion	⊕⊕⊕○	80	1.53 (1.48–1.59)
	Antibiotic treatment	⊕⊕⊕⊕	30	1.33 (1.31–1.36)
Next pregnancy	Growth of placenta into uterine wall	⊕⊕⊕⊕	3500	10.9 (8.4–14.0)
Next childbirth	Uterine rupture	⊕⊕⊕⊕	190	24.4 (22.8–26.0)
Long time after childbirth (follow-up time)	Surgery for abdominal adhesions <sup>a</sup> (25 years)	⊕⊕⊕○	130	2.8 (2.6–3.1)
	Ileus surgery (12 years)	⊕⊕⊕○	450	2.25 (2.15–3.0)
	Surgery for abdominal wall hernia (25 years)	⊕⊕⊕○	80	3.2 (3.0–3.4)
Time period	Reduced risk for woman	Certainty of evidence according to GRADE	NNT	Relative risk (95 % CI)
During or short time after childbirth	Anal sphincter injury	⊕⊕⊕⊕	30	N/A <sup>b</sup>
Long time after childbirth (follow-up time)	Prolapse symptoms (20 years)	⊕⊕⊕○	60	0.52 (0.28–0.99)
	Prolapse surgery (25 years)	⊕⊕⊕○	70	0.2 (0.1–0.2)
	Stress incontinence symptoms (10 years)	⊕⊕⊕○	10	0.42 (0.31–0.59)
	Stress incontinence surgery (25 years)	⊕⊕⊕○	150	0.3 (0.2–0.3)
	Pelvic floor surgery <sup>c</sup> (20 years)	⊕⊕○○	460	0.68 (0.51–0.90)
Time period	Increased risk for child	Certainty of evidence according to GRADE	NNH	Relative risk (95 % CI)
Short time after childbirth	Breathing disorder <sup>d</sup>	⊕⊕⊕○	70	2.02 (1.49–2.73)
	Transfer to neonatal intensive care unit (NICU)	⊕⊕⊕○	20	1.92 (1.44–2.56)
Next childbirth	Next child after previous caesarean section Apgar score <7 at 5 minutes <sup>e</sup>	⊕⊕⊕○	180	1.60 (1.50–1.71)
Infant years	Treatment of respiratory tract infection in hospital <sup>f</sup>	⊕⊕⊕○	130	1.14 (1.09–1.19)
Toddler years	Gastrointestinal tract infections requiring hospital care	⊕⊕⊕○	130	1.21 (1.16–1.25)
Childhood	Asthma	⊕⊕⊕○	120	1.19 (1.17–1.21)
	Food allergy	⊕⊕○○	260	1.16 (1.11–1.21)
	Diabetes	⊕⊕○○	1800	1.11 (1.04–1.17)
	Overweight	⊕⊕○○	100	1.17 (1.07–1.29)
Later in life	Inflammatory bowel disease	⊕⊕○○	860	1.16 (1.03–1.30)
	Rheumatoid arthritis	⊕⊕⊕○	1700	1.17 (1.06–1.28)

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**Table 1** continued

Time period	Reduced risk for child	Certainty of evidence according to GRADE	NNT	Relative risk (95 % CI)
–	–	–	–	–

- <sup>a</sup> **Adhesions:** *Tissues connecting organs or organ to abdominal wall. This can lead to various consequences from no symptoms to serious complications like infertility or ileus.*
- <sup>b</sup> **N/A:** *Not applicable. The risk for anal sphincter injury after caesarean section with medical indication can be set to zero. A relative risk estimate can therefore not be calculated. The risk for anal sphincter injury following caesarean section with medical indication is about 2.9 % (NNT = 34).*
- <sup>c</sup> **Pelvic floor surgery:** *Includes surgery of all types of pelvic floor problems like prolapse, urinary and anal incontinence.*
- <sup>d</sup> **Breathing disorder:** *Often denoted respiratory morbidity in the included studies, including various types of breathing disorders from mild to severe, which also may need respiratory support and oxygen treatment.*
- <sup>e</sup> **Low Apgar score (<7 at 5 minutes):** *A scoring system which describes the new-born's status at 5 minutes after birth (0–10 points). Low Apgar score is associated with future morbidity.*
- <sup>f</sup> **Treatment of respiratory tract infection in hospital:** *Majority of children below 2 years of age.*

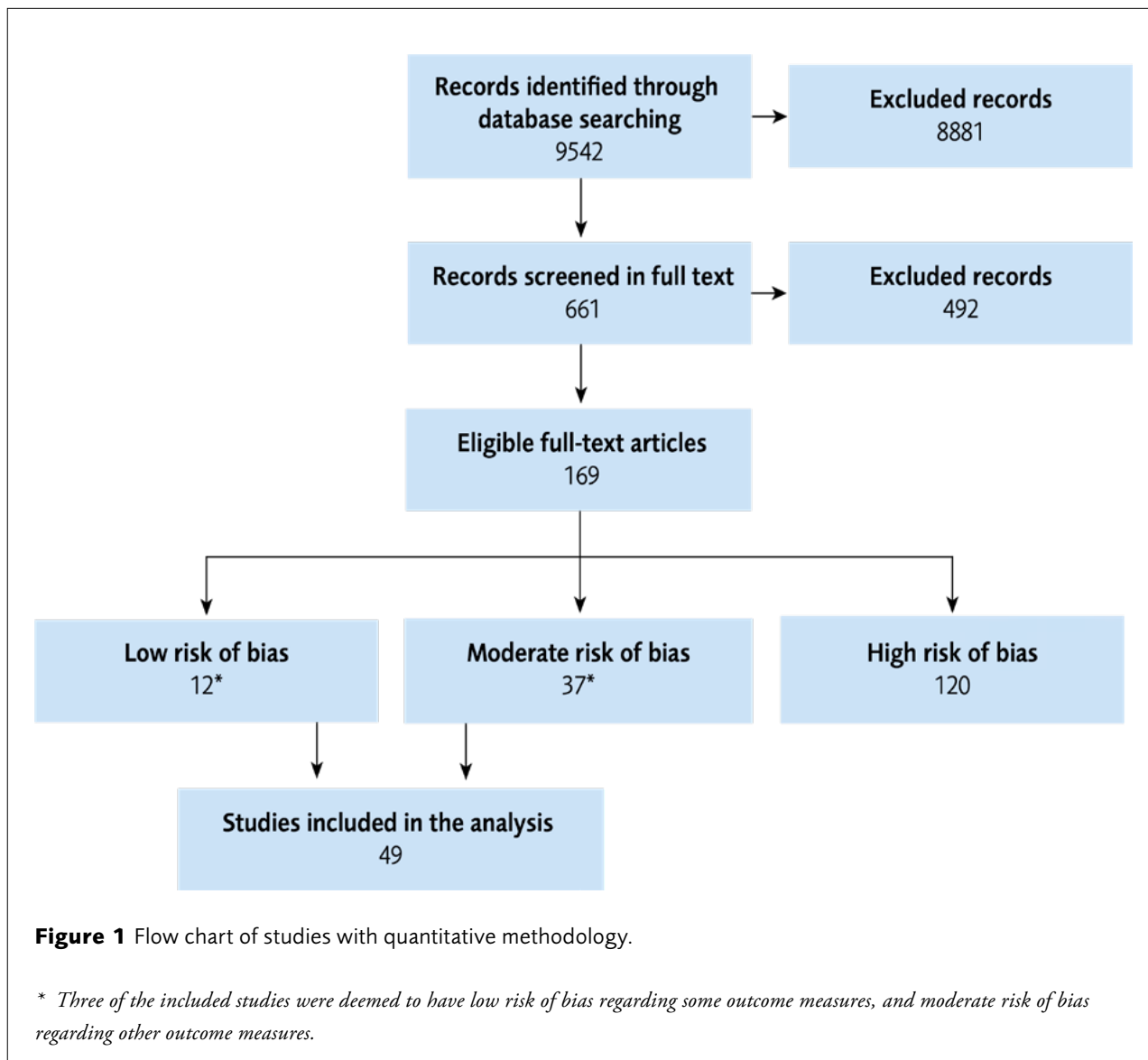
95 % CI = 95% confidence interval; NNH = Number Needed to Harm. The number of individuals who have to be exposed to a caesarean section to result in one extra case of the complication compared with vaginal delivery. Higher value means smaller absolute risk difference and less frequent complication; NNT = Number Needed to Treat. The opposite to NNH, number of individuals to be exposed to result in one fewer complication; Relative risk = A ratio between the risk for a complication after a caesarean section divided by the risk for the same complication after vaginal delivery. A relative risk of 0.8 means a relative risk reduction of 20 %.

**Certainty of evidence:**

- ⊕⊕⊕⊕ = High certainty: The result can be seen as correct.
- ⊕⊕⊕○ = Moderate certainty: The result is probably correct.
- ⊕⊕○○ = Low certainty: It is possible that the result is correct.

\*) The outcomes and comparisons in the report are grouped as follows:

- *Complication risks for the woman during short time period after childbirth (at delivery and up to 6 weeks after). Caesarean section with medical indication versus planned vaginal delivery.*
- *Complication risks at next childbirth after a previous caesarean section. Planned caesarean section without medical indication versus planned vaginal delivery.*
- *Complication risks for the woman in the long term after childbirth. All types of caesarean sections versus planned vaginal delivery.*
- *Complication risks for the child during short time period after birth (neonatal period). Planned caesarean without medical indication versus planned vaginal delivery.*
- *Complication risks for the child at next childbirth after a previous caesarean. Planned caesarean section without medical indication versus planned vaginal delivery.*
- *Complication risks for the child in the long term. Planned caesarean section without medical indication versus planned vaginal delivery.*



### Results from studies using qualitative methodology (Perceptions and experiences)

Relevant data from 13 included studies using qualitative methodology (Questions 2 and 3, see Figure 2) were summarised in two thematic syntheses, one for the women’s perspective and one for the healthcare staff’s perspective (Table 2).

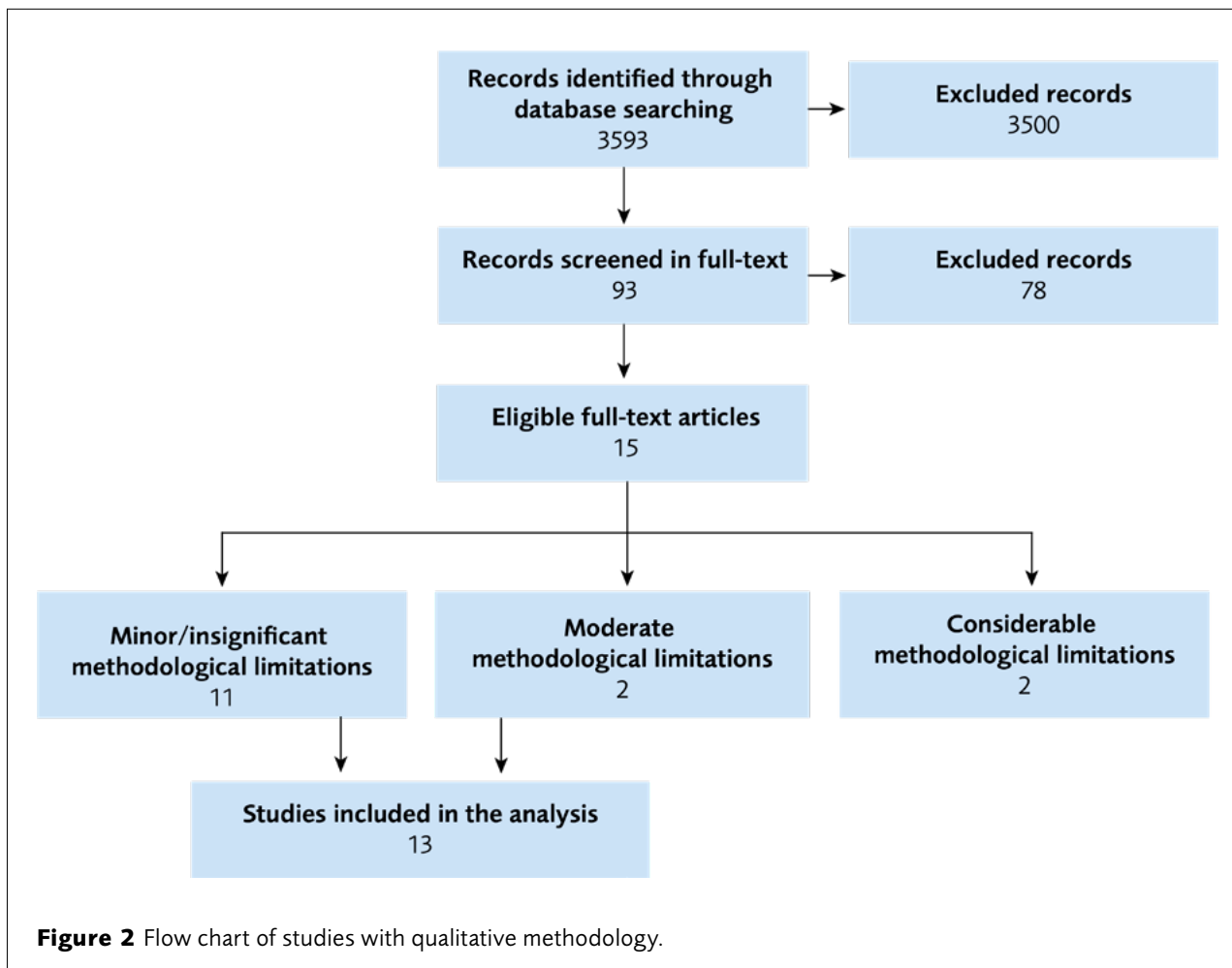
When the statements of women and healthcare staff are compared, it becomes clear that they have differing views regarding:

1. **Risk:** The women thought that caesarean section is a safer method of delivery compared to vaginal delivery, while the healthcare staff who meet these women think the opposite.
2. **Right to a caesarean section:** The women considered it their right to receive a caesarean section if they so wish, while the healthcare staff who meet

them had widely varying viewpoints regarding to what extent the woman has a right to choose the mode of delivery herself.

3. **Support:** The healthcare staff thought that support for the woman means to meet her respectfully and with understanding, time for discussion, and guiding her to the best solution for her. The women thought that support primarily means that the healthcare staff accept their wish to receive a caesarean section.

In addition, healthcare staff thought that the high workload in maternity care can complicate deliveries, result in negative birth experiences, limit the possibility of follow-up after delivery and thus lead to future requests for caesarean section.



**Table 2** Summarised results from the 13 included studies and assessment of certainty of the results: Perceptions and experiences of women and healthcare staff, respectively, when the woman expresses a desire for caesarean section and the healthcare staff find that a medical indication is missing.

<b>Perspective of the women – themes level 3 (Certainty of evidence)</b>	<b>Perspective of the staff– themes level 3 (Certainty of evidence)</b>
<p><b>Risks and advantages with caesarean section</b></p> <p>The women requesting a caesarean section often regarded vaginal delivery as being associated with risks and caesarean section as a more predictable and controlled mode of delivery, associated with small or no risks. Potential risks were minimized or ignored. The women put their trust in the competence of the surgical team and handed over the responsibility for the delivery to them. After having experienced a caesarean section, however, the women could re-evaluate their view regarding risk.</p> <p>The women's view of the information about risks they had been given varied, ranging from adequate, insufficient to contradictory. The health care staff's acceptance of their preferred mode of delivery was more important to them than receiving information about risks. (Moderate certainty of evidence ⊕⊕⊕○)</p>	<p><b>View of risks</b></p> <p>The health care staff considered caesarean section to be associated with more risks than vaginal delivery. They expressed concerns regarding the increasing prevalence of caesarean sections and emphasized that when deciding upon mode of delivery, the woman needs to be informed about the consequences and risks associated with caesarean section. (Moderate certainty of evidence ⊕⊕⊕○)</p>

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**Table 2** continued

<b>Perspective of the women – themes level 3 (Certainty of evidence)</b>	<b>Perspective of the staff– themes level 3 (Certainty of evidence)</b>
<p><b>Support and acceptance of preferred mode of delivery</b> The women considered it their right to gain acceptance of their preferred mode of delivery. Many of the women also received this acceptance. Sometimes, however, the women's preference was rejected. Also, the women could regard the decision process considering mode of delivery as unserious with a lack of support. The women often had to repeat and defend their decision about mode of delivery, which they considered to be well motivated. Some women renegotiated their attitudes towards mode of delivery through experience of birth or professional support in the decision process. (Moderate certainty of evidence ⊕⊕⊕○)</p>	<p><b>Experiences of meeting women who request a caesarean section</b> The health care staff viewed the women's request for a caesarean section to be grounded in a misunderstanding regarding advantages and disadvantages concerning caesarean section, and that it was challenging to manage the requests. The staff also highlighted that the high workload in delivery units can complicate deliveries, result in negative birth experiences, limit the possibility of follow-up after delivery and thus lead to future requests for caesarean section. (Moderate certainty of evidence ⊕⊕⊕○)</p>
	<p><b>Factors that affect the decision about mode of delivery</b> The health care staff had widely varying views regarding to what extent the woman has a right to choose the mode of delivery herself. Members of the staff also had different opinions regarding medical indications for caesarean section, including if fear of birth constitutes such an indication or not. The staff emphasized that evidence is an important basis for the decision, but also that factors such as the organization and capacity of the health care system affected the decision. (Moderate certainty of evidence ⊕⊕⊕○)</p>
	<p><b>Views upon how women requesting a caesarean section should be handled</b> The healthcare staff considered it important to give the woman many different types of support, evidence-based information and time for dialogue early during the pregnancy, and to treat the women with respect and understanding and at the same time discuss alternatives to caesarean section. These measures were perceived as being able to enhance women's ability to give birth and thus reduce the number of requests for, as well as the prevalence of, caesarean sections. (Moderate certainty of evidence ⊕⊕⊕○)</p>

### Health economic assessment

The health economic model analyses indicate that, in a Swedish context, planned vaginal birth is consistently cost saving and leads to long-term somatic health gains, compared to planned caesarean section without medical indication. Apart from the uncertainty around the relative risks for complications, there is uncertainty particularly regarding the duration of several long-term complications and their impact on quality of life. However, a range of sensitivity analyses indicate that the overall result remains stable when the input values are varied.

In this project, we have not analysed possible complications in terms of mental ill-health that are related to different methods of delivery. This means that we have not been able to include psychological aspects related to different methods of delivery, such as traumatic birth experiences, in our health economic model. There may be psychological aspects that influence the

aggregated effect of planned caesarean section on maternal request compared to planned vaginal delivery. However, it is not possible to comment on the size of this effect based on our report.

The health economic model estimates cover direct medical costs, mostly focused on hospital care. This means that costs for outpatient care or due to reduced working ability are not included in the calculations. However, sensitivity analyses where yearly outpatient care costs are assumed for complications that are reduced with planned caesarean section indicate that this type of cost likely does not have any major impact on results.

### Ethical and societal aspects

The presented results apply to planned caesarean section without medical indication. A planned caesarean section on maternal request without medical indication exposes the child to increased short- and

long-term complications. Although the absolute risk increases often are small, this constitutes an ethical problem. Moreover, the fact that different maternity clinics and healthcare staff can handle women's requests for caesarean section in different ways also constitutes an ethical problem, since it leads to unequal care.

## Discussion

An argument that is sometimes put forward in favour of caesarean section concerns complications that can occur if the child gets stuck in the birth canal (for example clavicle fracture or nerve damage affecting the arms), and that these cannot occur with a planned caesarean section. According to data from the Swedish Medical Birth Registry, the risk of a child getting stuck with its shoulders is 1/350 (0.3 %) with planned vaginal delivery for pregnancies that have lasted 39 weeks or more. In a Swedish context, there is an important knowledge gap regarding the consequences of a child getting stuck and more research is needed.

The women and healthcare staff had different views on caesarean section without medical indication and, furthermore, totally different expectations on what the meeting between them should result in. This is something that both the women and healthcare staff may need to prepare for. Moreover, these differences in views between the groups remain unchanged even after earlier pregnancies and deliveries. This indicates a need for better dialogue between healthcare staff and the women, foremost regarding the risks associated with different methods of delivery. Some of the

included studies have a context that possibly differs from Swedish circumstances. This was handled as part of the assessment of the certainty of the results.

Caesarean section without medical indication leads to increased costs of care for the delivery and treatment of somatic complications, and there is a risk of displacement effects concerning other healthcare. However, we cannot comment on the psychological consequences associated with different methods of delivery in relation to the mother's wishes, or how these impact on cost-effectiveness.

## Conflicts of interest

In accordance with SBU's requirements, the experts and scientific reviewers participating in this project have submitted statements about conflicts of interest. These documents are available at SBU's secretariat. SBU has determined that the conditions described in the submissions are compatible with SBU's requirements for objectivity and impartiality.

## Appendices

- Characteristics of included studies
- Included studies – health economics
- Search strategies
- Excluded studies

## The full report in Swedish

The full report in Swedish [Kejsarsnitt på kvinnans önskemål – fördelar och nackdelar för kvinna och barn](#)

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