



## C-section 2014

### Summary Recommendations

#### Notes on PROSPECT recommendations

PROSPECT provides clinicians with supporting arguments for and against the use of various interventions in postoperative pain based on published evidence and expert opinion. Clinicians must make judgements based upon the clinical circumstances and local regulations. At all times, local prescribing information for the drugs referred to must be consulted. Grades of recommendation (GoR) are assigned according to the overall level of evidence (LoE) on which the recommendations are based, which is determined by the quality and source of evidence.

An explanation of how study quality assessments are performed to determine the LoE and GoR can be found in [Appendix A: C-Section: Levels of evidence and grades of recommendation](#).

The AGREE II instrument ([Brouwers 2010](#)) is used internationally to assess the methodological rigour and transparency of practice guidelines. As far as possible, the methodology of the PROSPECT C-Section review meets the requirements of 'Domain 3: Rigour of development' of the AGREE II instrument:

- Systematic methods were used to search for evidence.
  - The criteria for selecting the evidence are clearly described.
  - The strengths and limitations of the body of evidence are clearly described.
  - The methods for formulating the recommendations are clearly described.
  - The health benefits, side effects, and risks have been considered in formulating the recommendations.
  - There is an explicit link between the recommendations and the supporting evidence.
  - The guideline has been externally reviewed by experts prior to its publication. [The evidence and recommendations will be submitted for peer-review after publication on the PROSPECT website]
  - A procedure for updating the guideline is provided. [Methodology is provided so that the systematic review can be updated as required]
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## Summary recommendations

Pre-operative interventions that are recommended for C-Section	
<p>Note: Unless otherwise stated, 'pre-operative' refers to interventions applied before surgical incision</p> <p>Note: Analgesics should be administered at the appropriate time (pre- or intra-operatively) to provide sufficient analgesia in the early recovery period</p>	
<b>Oral gabapentin</b>	<ul style="list-style-type: none"> <li>A single dose of pre-operative oral gabapentin is recommended (GoR A) for improving postoperative pain relief (LoE 1)</li> </ul>
Anaesthetic techniques and co-administered analgesics	
<b>Anaesthetic techniques: Combined spinal-epidural anaesthesia or spinal anaesthesia</b>	<ul style="list-style-type: none"> <li>Combined spinal-epidural anaesthesia or spinal anaesthesia are recommended (GoR A) based on procedure-specific evidence (LoE 1)</li> <li>There is no evidence of analgesic benefit to recommend general anaesthesia over neuraxial anaesthesia (i.e., epidural anaesthesia, spinal anaesthesia, and combined spinal epidural anaesthesia), due to lack of direct comparative studies focusing on postoperative analgesia (GoR D).</li> <li>However, neuraxial anaesthesia techniques are recommended for safety reasons (e.g., neuraxial anaesthesia obviates the need for airway manipulation and avoids the postoperative sedative effects of general anaesthetics) (GoR D)</li> </ul>
<b>Intrathecal opioid analgesia</b>	<ul style="list-style-type: none"> <li>Intrathecal morphine below 200 µg is recommended if the patient has received spinal anaesthesia (GoR A) based on procedure-specific evidence for improved postoperative analgesia (LoE 1)</li> <li>However, due to opioid-related side effects, including delayed respiratory depression, alternative analgesic techniques should be considered</li> </ul>
<b>Epidural opioid analgesia</b>	<ul style="list-style-type: none"> <li>Epidural opioids are recommended if the patient has received epidural anaesthesia (GoR A) based on procedure-specific evidence for improved postoperative analgesia (LoE 1)</li> <li>However, due to opioid related side effects, including delayed respiratory depression, alternative analgesic techniques should be considered</li> </ul>
Surgical techniques that are recommended for C-Section	
<b>Surgical techniques: Transverse abdominal incision and non-closure of the peritoneum</b>	<ul style="list-style-type: none"> <li>Transverse abdominal incision is recommended over vertical incision (GoR A, LoE 1). Amongst transverse incisions the Joel-Cohen incision and similar modifications are superior to the Pfannenstiel incision for outcomes related to postoperative pain (GoR A, LoE 1)</li> </ul>

	<ul style="list-style-type: none"> <li>• Non-closure of the peritoneum is recommended (GoR A) based on procedure-specific evidence for postoperative analgesia (LoE 1)</li> </ul>
<p><b>Intraoperative interventions that are recommended for C-Section</b></p> <p>Note: Unless otherwise stated, 'intra-operative' refers to interventions applied after incision and before wound closure. In C-Section, 'post-delivery' refers to administration after the umbilical cord is clamped and the baby is delivered.</p> <p>Note: Analgesics should be administered at the appropriate time (pre- or intra-operatively) to provide sufficient analgesia in the early recovery period</p>	
<b>Post-delivery IV NSAIDs</b>	<ul style="list-style-type: none"> <li>• Post-delivery NSAIDs are recommended (GoR A) based on procedure-specific evidence (LoE 1), even in breastfeeding women (LoE 3)</li> </ul>
<b>Post-delivery IV paracetamol</b>	<ul style="list-style-type: none"> <li>• Post-delivery paracetamol is recommended (GoR A) based on procedure-specific evidence (LoE 1)</li> </ul>
<b>Post-delivery iliohypogastric and ilioinguinal blocks</b>	<ul style="list-style-type: none"> <li>• Bilateral iliohypogastric and ilioinguinal blocks are recommended (GoR A) based on procedure-specific evidence for postoperative analgesia (LoE 1)</li> </ul>
<b>Post-delivery bilateral TAP blocks</b>	<ul style="list-style-type: none"> <li>• Bilateral TAP blocks are recommended (GoR A) based on procedure-specific evidence for postoperative analgesia (LoE 1)</li> </ul>
<b>Post-delivery wound infiltration with local anaesthetics</b>	<ul style="list-style-type: none"> <li>• Wound infiltration with local anaesthetics is recommended (GoR A) based on procedure-specific evidence (LoE 1)</li> </ul>
<p><b>Postoperative interventions that are recommended for C-Section</b></p> <p>Note: 'Postoperative' refers to interventions applied at or after wound closure</p> <p>Note: Analgesics should be administered at the appropriate time (pre- or intra-operatively) to provide sufficient analgesia in the early recovery period</p>	
<b>Oral NSAIDs</b>	<ul style="list-style-type: none"> <li>• Postoperative NSAIDs are recommended (GoR A) based on procedure-specific evidence (LoE 1), even in breastfeeding women (LoE 3)</li> </ul>
<b>Oral paracetamol</b>	<ul style="list-style-type: none"> <li>• Postoperative paracetamol is recommended (GoR A) based on procedure-specific evidence (LoE 1)</li> </ul>
<b>Systemic opioids as rescue analgesia</b>	<ul style="list-style-type: none"> <li>• Systemic opioids provide effective analgesia (GoR A, LoE 1), but are only recommended as rescue analgesics due to side effects (GoR D)</li> </ul>
<b>Continuous wound infusion with local anaesthetics</b>	<ul style="list-style-type: none"> <li>• Continuous wound infusion with local anaesthetics is recommended (GoR A) based on procedure-specific evidence (LoE 1)</li> </ul>

## Not recommended for C-Section

<b>NOT recommended for C-section</b>	
<b>Dexamethasone</b>	Pre-operative dexamethasone cannot be recommended at this time (GoR D) based on limited procedure-specific evidence
<b>Neuraxial clonidine</b>	Neuraxial clonidine is not recommended (GoR D), although procedure-specific evidence suggests it provides superior analgesia, because of side effects (e.g. hypotension)
<b>Ketamine</b>	Ketamine cannot be recommended at this time (GoR D) based on inconsistent procedure-specific evidence
<b>TENS</b>	TENS is not recommended (GoR D) based on limited procedure-specific evidence
<b>Wound infiltration with NSAIDs</b>	Wound infiltration with NSAIDs is not recommended at this time (GoR D) due to limited comparative data with systemic administration
<b>Continuous wound infusion with NSAIDs</b>	Continuous wound infusion with NSAIDs is not recommended (GoR D) based on limited procedure-specific evidence

## Overall Recommendations: Pain Management for Elective Caesarean Section Surgery

<b>Pre-operative</b>	Oral gabapentin
<b>Pre-/intra-operative anaesthetic technique</b>	CSEA or SpA*
<b>Intra-operative, post-delivery</b>	IV paracetamol + IV NSAID #
	Wound infiltration with LA <b>or</b> TAP blocks <b>or</b> iliohypogastric/ilioinguinal blocks
<b>Surgical technique</b>	Transverse incision†
	Non-closure of peritoneum
<b>Postoperative</b>	Oral paracetamol + oral NSAID + systemic opioid as rescue
	Continuous infusion with LA
<p>* IT morphine/epidural opioids are recommended, but alternative analgesic techniques such as wound infiltration with LA, TAP block, iliohypogastric and ilioinguinal blocks should be considered to avoid the potential opioid-related side effects of neuraxial opioids</p> <p># IV paracetamol and IV NSAID may not be necessary if neuraxial opioids are used</p> <p>† Amongst transverse incisions, the Joel-Cohen incision and similar modifications are superior to the Pfannenstiel incision for outcomes related to postoperative pain</p>	

# Evidence Review Process

## PROSPECT C-Section Subgroup and Working Group process

For each review, a Subgroup of the PROSPECT Working Group performs an initial evaluation of the evidence and also drafts clinical practice statements and recommendations, which are then discussed by the whole Working Group before a final consensus is reached. For the C-Section review, the Subgroup members were:

- Professor Marc Van De Velde (PROSPECT Working Group member)
- Professor Girish Joshi (PROSPECT Working Group member)
- Professor Narinder Rawal (PROSPECT Working Group member)

Dr Thomas Jaschinski (IFOM - Institut für Forschung in der Operativen Medizin, Universität Witten/Herdecke, Köln, Germany) provided support in conducting the literature search, preparing the evidence summary and coordinating the Subgroup and Working Group reviews of the evidence to prepare the final recommendations. The recommendations for postoperative pain management in C-Section were voted on by nine Working Group members to show the strength of consensus. The results of each vote are indicated within the PROSPECT recommendations sub-folders.

## Details of systematic literature review

### Literature search

- Systematic review of the literature from 1966–April 2014 using MEDLINE and EmBASE, following the protocol of the Cochrane Collaboration
- Inclusion of randomised/controlled studies assessing analgesic, anaesthetic or operative techniques in C-Section and reporting pain assessment, required analgesia or adverse events ([Appendix B: C-Section: Inclusion criteria](#), [Appendix C: C-Section: Search strategy](#))
- 137 studies included ([Appendix D: C-Section: Included studies](#))
- 139 studies excluded after full-text screening ([Appendix E: Excluded references](#))
- The most common reason for exclusion was that the study did not investigate an intervention affecting postoperative pain (63 studies)

# Appendix

## A. C-Section: Levels of evidence and grades of recommendation

	Study quality assessments					Level of Evidence (LoE)	Grade of recommendation (based on overall LoE, considering balance of clinical practice information and evidence)	
Study type	Statistical analyses and patient follow-up assessment		Allocation concealment*	Jadad scores	Additional assessment of overall study quality required to judge LoE		Procedure-specific	Transferable
Systematic review with homogenous results	N/A		N/A	N/A	N/A	1	A	B
Randomised controlled trial (RCT)	Statistics reported and >80% follow-up	AND	A	(1-5)	N/A	1	A (based on two or more studies or a single large, well-designed study)	B
			OR					
			B	(3-5)	N/A			
			OR					
RCT	Statistics not reported or questionable or <80% follow-up	AND/OR	B	(1-2)	Yes	2	B (or extrapolation from one procedure-specific LoE 1 study)	C
			OR					
			C	(1-5)	N/A			
			OR					
Non-systematic review, cohort study, case study (e.g. some adverse effects evidence)	N/A		N/A			3	C	
Clinical practice information (expert opinion); inconsistent evidence	N/A		N/A			4	D	

\*Allocation concealment: A, adequate; B, unclear; C, inadequate; D, not used]

## B. C-Section: Inclusion criteria

1. Women undergoing elective c-section
2. Comparison of two or more interventions (analgesia, anesthesia, operative techniques) affecting postoperative pain
3. At least one of the following outcomes are reported: pain assessment, required analgesia or time to first analgesic request
4. Randomised controlled trial
5. Patient population comprises at least 80% c-section or the statistical analyses are separately calculated and presented
6. Full text available (including studies only published as abstracts)
7. Full text is published in English
8. No multiple publication

There was no restriction by publication date.

## C. C-Section: Search strategy

Last update search conducted: 3rd April 2014

### Search in Medline and Embase using Embase as search engine

	Search term
1	('Clinical trial'/exp OR 'Randomized controlled trial'/exp OR 'Randomization'/exp OR 'Single blind procedure'/exp OR 'Double blind procedure'/exp OR 'Crossover procedure'/exp OR 'Placebo'/exp OR 'Randomised controlled trial':ab,ti OR 'Randomized controlled trial':ab,ti OR Rct:ab,ti OR 'Random allocation':ab,ti OR 'Randomly allocated':ab,ti OR 'Allocated randomly':ab,ti OR (allocated NEAR/2 random):ab,ti OR 'Single blind':ab,ti OR 'Double blind':ab,ti OR ((treble OR triple) NEAR/1 blind):ab,ti OR Placebo*:ab,ti OR 'Prospective study'/exp) NOT ('Case study'/exp OR 'Case report':ab,ti OR 'Abstract report'/exp OR 'letter'/exp)
2	'cesarean section'/exp OR caesarean:ab,ti OR cesarean:ab,ti OR cesarian:ab,ti OR 'c section':ab,ti
3	'pain'/exp OR 'pain assessment'/exp OR 'postoperative pain'/exp OR pain:ab,ti OR 'analgesia'/exp OR VAS:ab,ti OR anesthesia:ab,ti OR anaesthesia:ab,ti OR 'visual analogue scale':ab,ti OR VRS:ab,ti OR 'verbal rating scale':ab,ti OR NRS:ab,ti OR 'numerical rating scale':ab,ti
4	Limitation: English

### Search in CENTRAL using Cochrane Library as search engine

	Search term
1	MeSH descriptor: [Cesarean Section] explode all trees
2	caesarean OR cesarean OR cesarian OR c-section
3	1 OR 2
4	MeSH descriptor: [Pain] explode all trees
5	MeSH descriptor: [Pain Measurement] explode all trees
6	MeSH descriptor: [Pain, Postoperative] explode all trees
7	MeSH descriptor: [Analgesia] explode all trees

8	pain or VAS or visual analogue scale or VRS or verbal rating scale or NRS or numerical rating scale or anesthesia or anaesthesia
9	4 OR 5 OR 6 Or 7 OR 8
10	3 AND 9

#### D. C-Section: Included studies

1.	Abboud, T.K., et al., <i>Mini-dose intrathecal morphine for the relief of post-cesarean section pain: Safety, efficacy, and ventilatory responses to carbon dioxide</i> . Anesthesia and Analgesia, 1988. <b>67</b> (2): p. 137-143.
2.	Abboud, T.K., et al. <i>Epidural butorphanol or morphine for the relief of post-cesarean section pain: ventilatory responses to carbon dioxide</i> . Anesthesia and Analgesia, 1987. 887-93.
3.	Abboud, T.K., et al., <i>Transnasal butorphanol: A new method for pain relief in post-cesarean section pain</i> . Acta Anaesthesiologica Scandinavica, 1991. <b>35</b> (1): p. 14-18.
4.	Abouleish, E., et al., <i>Combined intrathecal morphine and bupivacaine for cesarean section</i> . Anesthesia and Analgesia, 1988. <b>67</b> (4): p. 370-4.
5.	Abuelghar, W.M., G. El-Bishry, and L.H. Emam, <i>Caesarean deliveries by Pfannenstiel versus Joel-Cohen incision: A randomised controlled trial</i> . Journal of the Turkish German Gynecology Association, 2013. <b>14</b> (4): p. 194-200.
6.	Ackerman, W.E., et al., <i>A comparison of the incidence of pruritus following epidural opioid administration in the parturient</i> . Canadian Journal of Anaesthesia, 1989. <b>36</b> (4): p. 388-391.
7.	Afolabi Bosede, B. and E.A. Lesi Foluso, <i>Regional versus general anaesthesia for caesarean section</i> . Cochrane Database of Systematic Reviews, 2012. DOI: 10.1002/14651858.CD004350.pub3.
8.	Agarwal, K., et al., <i>Comparative analgesic efficacy of buprenorphine or clonidine with bupivacaine in the caesarean section</i> . Indian Journal of Anaesthesia, 2010. <b>54</b> (5): p. 453-457.
9.	Alhashemi, J.A., et al., <i>Intravenous acetaminophen vs oral ibuprofen in combination with morphine PCIA after Cesarean delivery</i> . Canadian Journal of Anesthesia, 2006. <b>53</b> (12): p. 1200-1206.
10.	Altinbas, S.K., et al., <i>Parietal peritoneal closure versus non-closure at caesarean section: which technique is feasible to perform?</i> J Matern Fetal Neonatal Med, 2013. <b>26</b> (11): p. 1128-31.
11.	Al-Waili, N.S., <i>Efficacy and safety of repeated postoperative administration of intramuscular diclofenac sodium in the treatment of post-cesarean section pain: a double-blind study</i> . Archives of Medical Research, 2001. 148-54.
12.	Angle, P.J., et al., <i>A randomized controlled trial examining the effect of naproxen on analgesia during the second day after cesarean delivery</i> . Anesthesia and Analgesia, 2002. <b>95</b> (3): p. 741-745.
13.	Bamigboye, A.A. and G.J. Hofmeyr, <i>Closure versus non-closure of the peritoneum at caesarean section</i> . Cochrane Database Syst Rev, 2003(4): p. Cd000163.
14.	Bamigboye, A.A. and G.J. Hofmeyr, <i>Local anaesthetic wound infiltration and abdominal nerves block during caesarean section for postoperative pain relief</i> . Cochrane database of systematic reviews (Online), 2009(3): p. CD006954.
15.	Bansal, A., et al., <i>Comparison of epidural butorphanol and sufentanil for post- caesarean section analgesia</i> . Journal of Anaesthesiology Clinical Pharmacology, 2009. <b>25</b> (4): p. 473-476.
16.	Barkshire, K., et al., <i>A comparison of bupivacaine-fentanyl-morphine with bupivacaine-fentanyl-diamorphine for caesarean section under spinal anaesthesia</i> . International Journal of Obstetric Anesthesia, 2001. <b>10</b> (1): p. 4-10.

17.	Bauchat, J.R., et al., <i>Low-dose ketamine with multimodal postcesarean delivery analgesia: A randomized controlled trial</i> . International Journal of Obstetric Anesthesia, 2011. <b>20</b> (1): p. 3-9.
18.	Behdad, S., et al., <i>Comparison of postoperative analgesic effect of tramadol and bupivacaine subcutaneous infiltration in patients undergoing cesarean section</i> . Acta Clinica Croatica, 2013. <b>52</b> (1): p. 93-98.
19.	Benhamou, D., et al., <i>Intrathecal clonidine and fentanyl with hyperbaric bupivacaine improves analgesia during cesarean section</i> . Anesthesia and Analgesia, 1998. <b>87</b> (3): p. 609-613.
20.	Bilgen, S., et al., <i>Effect of three different doses of ketamine prior to general anaesthesia on postoperative pain following caesarean delivery: A prospective randomized study</i> . Minerva Anesthesiologica, 2012. <b>78</b> (4): p. 442-449.
21.	Binder, P., et al., <i>Hi-TENS combined with PCA-morphine as post caesarean pain relief</i> . Midwifery, 2011. <b>27</b> (4): p. 547-552.
22.	Binsted, R.J., <i>Epidural morphine after caesarean section</i> . Anaesthesia and Intensive Care, 1983. <b>11</b> (2): p. 130-134.
23.	Blanco, J., et al. <i>Epidural analgesia for post-caesarean pain relief: a comparison between morphine and fentanyl</i> . European Journal of Anaesthesiology, 1987. 395-9.
24.	Bonnet, M.P., et al., <i>Analgesic efficacy and adverse effects of epidural morphine compared to parenteral opioids after elective caesarean section: A systematic review</i> . European Journal of Pain, 2010. <b>14</b> (9): p. 894.e1-894.e9.
25.	Buggy, D.J., et al., <i>Motor block during patient-controlled epidural analgesia with ropivacaine or ropivacaine/fentanyl after intrathecal bupivacaine for Caesarean section</i> . British Journal of Anaesthesia, 2000. <b>85</b> (3): p. 468-470.
26.	Bunting, P. and I. McConachie, <i>Ilioinguinal nerve blockade for analgesia after caesarean section</i> . Br J Anaesth, 1988. <b>61</b> (6): p. 773-5.
27.	Camann, W.R., et al., <i>Does epidural administration of butorphanol offer any clinical advantage over the intravenous route? A double-blind, placebo-controlled trial</i> . Anesthesiology, 1992. <b>76</b> (2): p. 216-220.
28.	Caranza, R., I. Teyapalan, and D.J. Buggy, <i>Central neuraxial opioid analgesia after caesarean section: Comparison of epidural diamorphine and intrathecal morphine</i> . International Journal of Obstetric Anesthesia, 1999. <b>8</b> (2): p. 90-93.
29.	Cardoso, M.M., et al., <i>Effect of dexamethasone on prevention of postoperative nausea, vomiting and pain after caesarean section: a randomised, placebo-controlled, double-blind trial</i> . European Journal of Anaesthesiology, 2013. <b>30</b> (3): p. 102-5.
30.	Cardoso, M.M.S.C., et al., <i>Small doses of intrathecal morphine combined with systemic diclofenac for postoperative pain control after caesarean delivery</i> . Anesthesia and Analgesia, 1998. <b>86</b> (3): p. 538-541.
31.	Carvalho, B., et al., <i>Valdecoxib for postoperative pain management after cesarean delivery: A randomized, double-blind, placebo-controlled study</i> . Anesthesia and Analgesia, 2006. <b>103</b> (3): p. 664-670.
32.	Carvalho, B., et al., <i>Continuous subcutaneous instillation of bupivacaine compared to saline reduces interleukin 10 and increases substance P in surgical wounds after cesarean delivery</i> . Anesth Analg, 2010. <b>111</b> (6): p. 1452-9.
33.	Carvalho, B., et al., <i>Intrathecal fentanyl added to bupivacaine and morphine for cesarean delivery may induce a subtle acute opioid tolerance</i> . Int J Obstet Anesth, 2012. <b>21</b> (1): p. 29-34.
34.	Carvalho, B., et al., <i>Postoperative subcutaneous instillation of low-dose ketorolac but not hydromorphone reduces wound exudate concentrations of interleukin-6 and interleukin-10 and improves analgesia following cesarean delivery</i> . Journal of Pain, 2013. <b>14</b> (1): p. 48-56.
35.	Chen, L.K., et al., <i>Patient -controlled epidural ropivacaine as a post-Cesarean analgesia: Acomparison with epidural morphine</i> . Taiwanese Journal of Obstetrics and Gynecology, 2011. <b>50</b> (4): p. 441-446.

36.	Choi, D.M.A., A.P. Kliffer, and M.J. Douglas, <i>Dextromethorphan and intrathecal morphine for analgesia after Caesarean section under spinal anaesthesia</i> . British Journal of Anaesthesia, 2003. <b>90</b> (5): p. 653-658.
37.	Chung, C.J., et al., <i>The efficacy of intrathecal neostigmine, intrathecal morphine, and their combination for post-cesarean section analgesia</i> . Anesthesia and Analgesia, 1998. <b>87</b> (2): p. 341-346.
38.	Cohen, S., et al., <i>The primary action of epidural fentanyl after cesarean delivery is via a spinal mechanism</i> . Anesthesia and Analgesia, 2002. <b>94</b> (3): p. 674-679.
39.	Cohen, S.E., et al., <i>Ketorolac and spinal morphine for postcesarean analgesia</i> . International Journal of Obstetric Anesthesia, 1996. <b>5</b> (1): p. 14-18.
40.	Cohen, S.E. and W.A. Woods, <i>The role of epidural morphine in the postcesarean patient: efficacy and effects on bonding</i> . Anesthesiology, 1983. <b>58</b> (6): p. 500-504.
41.	Cooper, D.W., D.M. Ryall, and W.R. Desira, <i>Extradural fentanyl for postoperative analgesia: Predominant spinal or systemic action?</i> British Journal of Anaesthesia, 1995. <b>74</b> (2): p. 184-187.
42.	Cooper, D.W., et al., <i>Patient-controlled extradural analgesia with bupivacaine, fentanyl, or a mixture of both, after Caesarean section</i> . British Journal of Anaesthesia, 1996. <b>76</b> (5): p. 611-615.
43.	Cooper, D.W., et al., <i>Patient-controlled analgesia: Epidural fentanyl and i.v. morphine compared after Caesarean section</i> . British Journal of Anaesthesia, 1999. <b>82</b> (3): p. 366-370.
44.	Culebras, X., et al., <i>Advantages of intrathecal nalbuphine, compared with intrathecal morphine, after cesarean delivery: An evaluation of postoperative analgesia and adverse effects</i> . Anesthesia and Analgesia, 2000. <b>91</b> (3): p. 601-605.
45.	Dahl, V., et al., <i>High-dose diclofenac for postoperative analgesia after elective caesarean section in regional anaesthesia</i> . International Journal of Obstetric Anesthesia, 2002. <b>11</b> (2): p. 91-94.
46.	Daley, M.D., et al., <i>A comparison of epidural and intramuscular morphine in patients following cesarean section</i> . Anesthesiology, 1990. <b>72</b> (2): p. 289-294.
47.	Davies, S.J., et al., <i>Maternal experience during epidural or combined spinal-epidural anesthesia for cesarean section: A prospective, randomized trial</i> . Anesthesia and Analgesia, 1997. <b>85</b> (3): p. 607-613.
48.	Davis, K.M., M.A. Esposito, and B.A. Meyer, <i>Oral analgesia compared with intravenous patient-controlled analgesia for pain after cesarean delivery: A randomized controlled trial</i> . American Journal of Obstetrics and Gynecology, 2006. <b>194</b> (4): p. 967-971.
49.	Demiraran, Y., et al., <i>Tramadol and levobupivacaine wound infiltration at Cesarean delivery for postoperative analgesia</i> . Journal of Anesthesia, 2013. <b>27</b> (2): p. 175-179.
50.	Dieterich, M., et al., <i>Pain management after cesarean: a randomized controlled trial of oxycodone versus intravenous piritramide</i> . Archives of gynecology and obstetrics, 2012. <b>286</b> (4): p. 859-865.
51.	Dodd, J.M., E.R. Anderson, and S. Gates, <i>Surgical techniques for uterine incision and uterine closure at the time of caesarean section</i> . Cochrane database of systematic reviews (Online), 2008(3): p. CD004732.
52.	Dottrens, M., K. Rifat, and D.R. Morel, <i>Comparison of extradural administration of sufentanil, morphine and sufentanil-morphine combination after Caesarean section</i> . British Journal of Anaesthesia, 1992. <b>69</b> (1): p. 9-12.
53.	Draisci, G., et al., <i>Safety and effectiveness of coadministration of intrathecal sufentanil and morphine in hyperbaric bupivacaine-based spinal anesthesia for cesarean section</i> . Journal of Opioid Management, 2009. <b>5</b> (4): p. 197-202.
54.	Duale, C., et al., <i>Epidural versus intrathecal morphine for postoperative analgesia after Caesarean section</i> . British Journal of Anaesthesia, 2003. <b>91</b> (5): p. 690-694.
55.	Eisenach, J.C., et al., <i>An isobolographic study of epidural clonidine and fentanyl after cesarean section</i> . Anesthesia and Analgesia, 1994. <b>79</b> (2): p. 285-290.

56.	Eslamian, L., et al., <i>Transversus abdominis plane block reduces postoperative pain intensity and analgesic consumption in elective cesarean delivery under general anesthesia</i> . Journal of Anesthesia, 2012. <b>26</b> (3): p. 334-338.
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## E: Excluded references

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**Inclusion criteria 5 not fulfilled: population comprises at least 80% C-Section or the statistical analyses are separately calculated and presented**

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**Inclusion criteria 6 not fulfilled: full text available (including studies only published as abstracts)**

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#### Inclusion criteria 7 not fulfilled: full text is published in English

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