

WHO recommendations
**non-clinical
interventions to
reduce unnecessary
caesarean sections**

Web annex 2:

Description of included
interventions



**World Health
Organization**

The guideline recommendations are available at
<http://www.who.int/reproductivehealth>



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TABLE 1. INTERVENTIONS TARGETED AT WOMEN

STUDY	INTERVENTION	DETAILS
Masoumi et al (2016)	Antenatal education programme on physiological childbirth (birth preparation training)	<ul style="list-style-type: none"> • Training preparation for childbirth was formed in eight sessions of two hours. These classes were held every two weeks from 20 to 34 weeks of pregnancy in the study hospital. • The content of these classes included the mother’s physical and mental changes, common problems and complications of pregnancy and ways to solve them, warning signs in pregnancy, nutrition and exercise during pregnancy and lactation, education about labour and the delivery process, and ways of coping with them, non-pharmacological methods for pain relief and the partner’s role as a coach during labour. • Ten to fifteen people were in one group. In each session, 40 minutes were spent on practical training in breathing, relaxation, massage techniques and special exercise.
Feinberg et al (2015)	Psychosocial couple-based prevention programme	<ul style="list-style-type: none"> • The psychosocial programme consisted of nine classes, with four classes weekly conducted during the second or third trimester of pregnancy and four classes weekly conducted within the first six months postpartum. • Classes focused on emotional self-management, conflict management, problem solving, communication and mutual support strategies that foster positive joint parenting of an infant. • A male-female facilitator team led each class; the female was a childbirth educator in all cases, and males came from various backgrounds but were experienced working with families and leading groups.
Fenwick et al (2015)	Psycho-education by telephone	<ul style="list-style-type: none"> • Two sessions of psycho-education provided by telephone at 24 and 34 weeks gestation, at a scheduled time convenient to the women. The sessions were around one-hour in duration (first session range: 22–125 min; second session range: 10–104 min). • The midwife-led counselling intervention aims to support the expression of feelings and provide a framework for women to identify and work through distressing elements of childbirth. The intervention develops women’s individual situational supports for the present and near future, affirming that negative events during childbirth can be managed, and developing a simple plan for achieving this. This combination of strategies diminishes emotional distress, builds constructive coping mechanisms and facilitates recovery.

<p>Wang, Li & Deng (2014)</p>	<p>Pelvic floor muscle training (PFMT) exercises with telephone follow-up</p>	<ul style="list-style-type: none"> • PFMT course topics included the female pelvic anatomy, the function of the female pelvic floor muscles, causes of pelvic floor muscle dysfunction, and possible symptoms. Using a discussion teaching method, the nurse explained the influence of pregnancy and delivery on the function of the pelvic floor muscles, the benefits of controlling the maternal and fetal body weight, and how to perform PFMT. Women were given guidance in the correct muscle contraction method by a pelvic floor physiotherapist while performing pelvic floor muscle strength measurements during the first antenatal examination. • Programme details: Training could be conducted at any time of day in a standing, supine or sitting position. The women were asked to empty the bladder and then contract the anal and vaginal muscles for no less than three seconds. The muscles were then relaxed. This contraction-relaxation sequence was repeated twice and followed by five rapid contractions of the perineal muscles. Women were instructed to repeat the exercises for 10–15 minutes two to three times a day; alternatively, contraction of the perineal muscles could be conducted 150–200 times per day at any time. The women were told to gradually prolong the duration of each contraction and the total training time. If the women felt unwell during the training, they were instructed to immediately stop the contraction movements. • The test group was followed up by telephone every two weeks until six weeks postpartum; they were given a one-to-one consultation regarding any problems or questions that may have arisen during their home practice, and they were encouraged to persistently practice PFMT at home. • The PFMT course was delivered in one session instructed by one full-time health education nurse.
<p>Valiani, Haghightdana & Ehsanpour (2014)</p>	<p>Childbirth training workshop</p>	<ul style="list-style-type: none"> • The educational workshop was held in three four-hour sequential weekly sessions in groups of 30 members separately. • Lecture, questions and answers, role play, problem solving and educational pamphlets were used to promote subjects' knowledge and group dynamicity, as well as to attain the highest participation of the subjects. • Educational content included issues on couples' communication, parental role, the role of the spouse in the mother's selection of delivery mode, attendance of the spouse or a relative at delivery stages, childbirth fear, delivery pain, delivery mechanism, pharmacological pain-relief techniques and their effects, non-pharmacological pain-relief methods, advantages and disadvantages of caesarean and vaginal delivery, indications and contraindications of caesarean, haemorrhage and infection after every mode of delivery, postpartum sorrow and depression, mother–infant attachment, breastfeeding, and infants' intelligence, growth and development.

<p>Rouhe et al (2013)</p>	<p>Psycho-education</p>	<ul style="list-style-type: none"> • The psycho-educative group therapy was led by four different psychologists with special group therapeutic skills in pregnancy-related issues. Each group consisted of a maximum of six nulliparous women. Each group was led by the same psychologist from the beginning to the end. The starting point of group therapy was planned to be at around the 26th week of pregnancy. Six group sessions were held during pregnancy, and one session with the newborns six to eight weeks after delivery. • Each two-hour session had a certain structure: a focused topic and a 30-minute guided relaxation exercise using compact disc audio developed for this purpose. This relaxation exercise guided the participants through stages of imaginary delivery in a relaxed state of mind with positive, calming and supportive suggestions. • The topics covered included: information about fear and anxiety, group therapy and about effects of relaxation; information about fear of childbirth, the normalization of individual reactions and about the stages of labour; hospital routines, birth process and pain relief (led by therapist and midwife); becoming a family, changes in relationship, parenthood and enhancing mutual understanding between becoming parents; becoming a mother, recognizing the signs of postnatal depression and bonding with the fetus; completing preparation for delivery and birth planning. • Meeting two to three months after delivery with newborns, discussion of delivery experiences, detection of trauma and depression symptoms, discussion of the mother–infant relationship.
<p>Sharifirad et al (2013)</p>	<p>Prenatal education for husbands</p>	<ul style="list-style-type: none"> • Husbands were divided into three 13- to 15-member groups and each group participated in an educational session for 90 minutes. • Educational content was about the mechanism of natural vaginal and caesarean deliveries as well as their advantages and disadvantages. • Various educational methods (lecture with picture slides, question and answer) and educational tools (overhead, pamphlet and whiteboard) were used. No educational session was held for pregnant women. • The training was done by an 'MSc expert' in health education.

<p>Bergström, Kieler & Waldenström (2009)</p>	<p>Antenatal education on natural childbirth preparation with training in breathing and relaxation techniques</p>	<ul style="list-style-type: none"> • Education model included four two-hr sessions during pregnancy and one follow-up session within 10 weeks after delivery. Classes started in the third trimester with groups of 12 people (six couples). • Focus was on preparation for natural childbirth. Information was given about non-pharmacological methods for pain relief and the partner's role as a coach during labour. In each session, 30 minutes were spent on practical training in breathing, relaxation and massage techniques. Psycho-prophylactic training between sessions was encouraged, and a booklet to facilitate homework was distributed. The attitude of the educator was encouraged to be in favour of natural birth. Information about breastfeeding was provided but no other postnatal issues were addressed. If possible, one of the sessions could include a visit to the delivery ward. • The sessions were led by one midwife.
<p>Bastani et al (2006)</p>	<p>Nurse-led applied relaxation training programme</p>	<ul style="list-style-type: none"> • Applied relaxation education based on Öst's description of applied relaxation, including progressive muscle relaxation and breathing – see Öst (1988) for details. • Seven 90-minute group-education sessions over seven weeks led by a nurse under the supervision of a clinical psychologist: session one: introductory group discussion of anxiety and stress-related issues in pregnancy, and the purpose of applied relaxation; session two: teaching subjects to relax with a shortened version of progressive relaxation; session three: includes "release-only" relaxation; session four: deep-breathing techniques; session five: "cue-controlled" relaxation; session six: "differential relaxation"; session 7: "rapid relaxation". • Participants are advised to practise the applied relaxation regularly and keep daily home-relaxation practice records during the study.
<p>Shorten et al (2005)</p>	<p>Decision-aid booklet</p>	<ul style="list-style-type: none"> • Decision-aid booklet constructed using the Ottawa Decision Framework as a format, incorporating evidence-based information, explicit-probability illustrations and values-clarification exercises. • Presents risks and benefits in a format that encourages the user to make individual judgements about the information, according to personal values, needs and priorities. • Decision booklet given at 28 weeks gestation.

<p>Saisto et al (2001)</p>	<p>Intensive group therapy (cognitive behavioural therapy and childbirth psychotherapy)</p>	<ul style="list-style-type: none"> • Intensive group therapy by obstetrician who had attended a 185-hour course in cognitive therapy and 40 hours in childbirth psychology, and was qualified as a therapist in addition to having several years' experience in treating women suffering from fear of childbirth. • Therapy comprised provision of information and conversation regarding previous obstetric experiences, feelings and misconceptions. Appointments for the group therapy were based on routine obstetric check-ups to give assurance on the normal course of pregnancy. All women were allowed to phone for advice between sessions. Written information on the pros and cons of vaginal delivery and the modes of pain relief was provided.
<p>Navaee & Abedian (2015)</p>	<p>Role play education vs standard education using lectures</p>	<p>Role-playing group</p> <ul style="list-style-type: none"> • The role-playing group was divided into two subgroups of 10 subjects each and another two subgroups of nine subjects each (38 subjects). Each group was instructed in a 90-minute session about the advantages and disadvantages of normal delivery and caesarean. • In the warm-up stage, the researcher narrated two true stories about the individuals who were wondering about the selection of the mode of delivery due to fear of childbirth and asked the participants to voluntarily accept playing the role of the pregnant woman with the researcher and two co-researchers. Then the participants helped the researcher to prepare and process the scene (scene preparation was conducted with the needed equipment for role play in two scenarios), and the observers were asked to pay close attention to the scenarios, taking important notes, and to discuss them at the end of scenario. In scenarios, the reasons for mothers' fear of natural delivery and caesarean were discussed. In the first scenario, one of the participants (a pregnant woman) played the role of a woman who referred to a midwife's office to select the mode of delivery and witnessed the events occurring in the office. Then, she referred to the midwife and consulted with her about her concerns. • The second scenario was about a woman with a normal delivery and the benefits and complications experienced by her. The next step was similar to that in the first scenario. • In the third scenario, one of the co-researchers defended caesarean and another defended normal delivery before a "judge" (natural delivery and caesarean appeared like a human and the researcher is a judge). After these three scenarios, participants were asked to talk about their friends'/relatives' experiences of the two types of delivery <p>Standard education (lecture group)</p> <ul style="list-style-type: none"> • Two subgroups of 10 subjects each and two subgroups of nine subjects each) were instructed using slide presentation, marker and whiteboard in a 90-minute session. At the end of the session, participants' questions were answered.

<p>Eden et al (2014)</p>	<p>Computerized decision aid vs educational brochures</p>	<p>Computerized decision aid</p> <ul style="list-style-type: none"> • The decision aid was designed for women with low literacy and used multiple media (text, graphics, voice-over narration for all text). The reading level was sixth to eighth grade depending on the screen. This decision aid provided brief summaries of the medical evidence for the two options in plain language. • The decision aid intervention also provided an explicit-values clarification activity so that the women could set priorities around avoiding risk to herself, her baby and to future pregnancies while also considering cost and her desired birth and recovery experience. Value clarification helps the women to combine beliefs with their own values and helps them to recognize that they may have competing values. <p>Educational brochures</p> <ul style="list-style-type: none"> • The most current American College of Obstetricians and Gynecologists (ACOG) brochures on vaginal birth after caesarean (VBAC) published in August 1999, and on caesarean birth published in January 2005. The women could choose from the English or Spanish versions. The evidence-based brochures were developed by ACOG’s Committee on Patient Education. • The VBAC brochure provided a description of the delivery, vaginal delivery rate range, benefits and reasons for a VBAC, explanation of type of caesarean incision, and potential risks to mother and infant. Similarly, the caesarean brochure described the delivery and recovery, benefits and reasons for a repeat caesarean, and potential risks of caesarean to the mother.
<p>Fraser et al (1997)</p>	<p>Individualized prenatal education and support programme vs written information in pamphlet</p>	<p>Prenatal education and support programme</p> <ul style="list-style-type: none"> • Prenatal education and support programme provided by two individuals: a research nurse with experience in prenatal instruction and a resource person selected on the basis of communication skills and personal experience of a vaginal birth after caesarean section. • Two individualized contact with the research nurse on the day of randomization and four to six weeks later with the research nurse and resource person. <p>Pamphlet group</p> <ul style="list-style-type: none"> • Women in the written-information group received information on the benefits of vaginal birth over elective repeat caesarean section.

<p>Montgomery et al (2007)</p>	<p>Computer decision aids vs usual care</p>	<p>Two computer-based interventions delivered using a laptop computer, usually in the women’s own home:</p> <ul style="list-style-type: none"> • Information programme and website providing information and descriptions on outcomes for mother and baby associated with planned vaginal delivery, planned caesarean section and emergency caesarean section. Probabilities of having or not having the event are given and presented in numerical and pictorial format. • Decision analysis comprising four steps: draw up a decision tree that maps the likely outcomes of the strategies in question. Outcomes are assigned utilities that represent how an individual values a particular outcome. Probability information is included in the tree to represent the chance of each outcome occurring. Strategies are compared by calculating the weighted sum of the utilities of all possible outcomes. The recommended strategy is that with the highest expected utility value (the one that gives an individual the best chance of achieving an outcome that is valued). <p>Usual care: This comprised the usual level of care given by the obstetric and midwifery team. Women in the two intervention groups also received usual care.</p>
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References

Bastani F, Hidarnia A, Montgomery KS, Aguilar-Vafaei ME, Kazemnejad A (2006). Does relaxation education in anxious primigravid Iranian women influence adverse pregnancy outcomes? A randomised controlled trial. *J Perinat Neonatal Nurs.* 20(2):138–46.

Bergström M, Kieler H, Waldenström U (2009). Effects of natural childbirth preparation versus standard antenatal education on epidural rates, experience of childbirth and parental stress in mothers and fathers: a randomised controlled multicentre trial. *BJOG.* 116(9):1167–76. doi: 10.1111/j.1471-0528.2009.02144.x.

Eden KB, Perrin NA, Vesco KK, Guise JM (2014). A randomized comparative trial of two decision tools for pregnant women with prior cesareans. *J Obstet Gynecol Neonatal Nurs.* 43(5):568–79. doi: 10.1111/1552-6909.12485.

Feinberg ME, Roettger ME, Jones DE, Paul IM, Kan ML (2015). Effects of a psychosocial couple-based prevention program on adverse birth outcomes. *Matern Child Health J.* 19(1):102–11. doi: 10.1007/s10995-014-1500-5.

Fenwick J, Toohill J, Gamble J, Creedy DK, Buist A, Turkstra E et al (2015). Effects of a midwife psycho-education intervention to reduce childbirth fear on women’s birth outcomes and postpartum psychological wellbeing. *BMC Pregnancy Childbirth.* 15:284. doi: 10.1186/s12884-015-0721-y.

Fraser W, Maunsell E, Hodnett E, Moutquin J-M (1997). Randomized controlled trial of a prenatal vaginal birth after caesarean section education and support program. *Am J Obstet Gynecol.* 176(2):419–25.

- Masoumi SZ, Kazemi F, Oshvandi K, Jalali M, Esmaeili-Vardanjani A, Rafiei H (2016).** Effect of training preparation for childbirth on fear of normal vaginal delivery and choosing the type of delivery among pregnant women in Hamadan, Iran: a randomized controlled trial. *J Family Reprod Health.* 10(3):115–21.
- Montgomery AA, Emmett CL, Fahey T, Jones C, Ricketts I, Patel RR (2007).** Two decision aids for mode of delivery among women with previous caesarean section: randomised controlled trial. *BMJ.* 334(7607):1305. doi: 10.1136/bmj.39217.67101955.
- Navae M, Abedian Z (2015).** Effect of role play education on primiparous women’s fear of natural delivery and their decision on the mode of delivery. *Iran J Nurs Midwifery Res.* 20(1):40–6.
- Öst LG (1988).** Applied relaxation: Description of an effective coping technique. *Scand J Behav Ther.* 17(2):83–96. doi: 10.1080/16506078809456264.
- Rouhe H, Salmela-Aro K, Toivanen R, Tokola M, Halmesmäki E, Saisto T (2013).** Obstetric outcome after intervention for severe fear of childbirth in nulliparous women – randomised trial. *BJOG.* 120(1):75–84. doi: 10.1111/1471-0528.12011.
- Saisto T, Salmela-Aro K, Nurmi JE, Könönen T, Halmesmäki E (2001).** A randomized controlled trial of intervention in fear of childbirth. *Obstet Gynecol.* 98(5 Pt 1):820–6.
- Sharifirad G, Rezaeian M, Soltani R, Javaheri S, Mazaheri MA (2013).** A survey on the effects of husbands’ education of pregnant women on knowledge, attitude, and reducing elective cesarean section. *J Educ Health Promot.* 2:50. doi: 10.4103/2277-9531.119036.
- Shorten A, Shorten B, Keogh J, West S, Morris J (2005).** Making choices for childbirth: a randomised controlled trial of a decision-aid for informed birth after cesarean. *Birth.* 32(4):252–61. doi: 10.1111/j.0730-7659.2005.00383.x.
- Valiani M, Haghightdana Z, Ehsanpour S (2014).** Comparison of childbirth training workshop effects on knowledge, attitude, and delivery method between mothers and couples groups referring to Isfahan health centers in Iran. *Iran J Nurs Midwifery Res.* 19(6):653–8.
- Wang X, Li GY, Deng, ML (2014).** Pelvic floor muscle training as a persistent nursing intervention: Effect on delivery outcome and pelvic floor myodynamia. *International Journal of Nursing Sciences.* 1(1):48–52. doi: 10.1016/j.ijnss.2014.02.017.

TABLE 2. INTERVENTIONS TARGETED AT HEALTH-CARE PROFESSIONALS

STUDY	INTERVENTION	DETAILS
Hemminki et al (2008)	Education of public health nurses on childbirth classes	<ul style="list-style-type: none"> • Further training of public health nurses (PHNs) to pay more attention to mode of delivery in childbirth classes and informational material given to pregnant women. • Intervention consisted of (a) joint educational session (1.5–2 hours) to all PHNs in the maternal health clinic (MHC) by experienced midwifery teacher using instructional conversation in small groups, (b) leaflet on childbirth and preparation to give to pregnant women, including discussion of content during childbirth classes and other visits from week 32 onwards, (c) file of evidence-based research material on the same topics for each MHC, and (d) a questionnaire to PHNs on their opinions and knowledge of childbirth before each educational session.
Althabe et al (2004)	Evidence-based clinical practice guidelines plus mandatory second opinion	<ul style="list-style-type: none"> • Mandatory second opinion by attending physician before caesarean section. Physician providing second opinion had to be a person with clinical qualifications equal to or higher than those of the attending physician, working at the same hospital, selected by the obstetrics department for the trial and who agreed to follow the clinical guidelines. Guidelines were prepared as decision flow charts for six primary indications for caesarean section.
Liang et al (2004)	Peer review plus mandatory second opinion	<ul style="list-style-type: none"> • Peer review included pre-caesarean consultation and post-caesarean surveillance. Two physicians appointed as consultants for the pre-caesarean surveillance. Second opinion by a consultant required for all caesarean sections. Every caesarean case presented at weekly meetings by chief resident.
Scarella et al (2011)	Audit and feedback using the Robson classification	<ul style="list-style-type: none"> • Initial audit and feedback to the maternity and midwifery staff on main contributors to overall caesarean section rate using the Robson classification (examples of caesarean sections performed without clinical justification shown and discussed, emphasizing the need to safely reduce the number of caesarean sections in the groups of interest). • Caesarean section rate audited monthly following initial meeting; feedback on change in caesarean section rates, by individual letters provided to all staff. • Medical-midwifery staff meetings held every three months to present changes in caesarean section rate according the Robson classification, and the rate of five-minute Apgar scores below seven – as aggregate data and also divided according to the different duty-day shift that rotates through the week, ranking them from worst to best according to their caesarean section rates in the groups of interest. A report of the caesarean section data also provided by letter to every member of the maternity staff.

Mohammadi, Källestål & Essén (2012)	Audit and feedback plus financial incentive	<ul style="list-style-type: none"> • Clinical audit and feedback: review of random sample of caesarean section patients for indication with financial incentive to practitioners who meet the criteria.
Chaillet et al (2015)	Evidence-based clinical practice guidelines plus audit and feedback	<ul style="list-style-type: none"> • Implementation of evidence-based clinical practice guidelines (on-site training in evidence-based clinical practice, facilitation by local opinion leader, supervision), audits of indications for caesarean delivery and provision of feedback to health professionals.
Poma (1998)	Audit and feedback plus 24-hour in-house coverage by dedicated physician	<ul style="list-style-type: none"> • Implementation of labour management and caesarean delivery guidelines, with review of every caesarean delivery that did not meet guidelines and confidential individual feedback; 24-hour in-house coverage established (attending physician on premises to manage labour and complications); and attempts made to achieve the goal of an annual caesarean delivery rate of less than 15%.
Lomas et al (1991)	Audit and feedback plus local opinion leader education	<ul style="list-style-type: none"> • Audit and feedback group: (a) agreed on criteria for use of caesarean section on women with previous caesarean sections based on guidelines, (b) medical audits of the charts of all women with a previous caesarean section and comparison of actual practice with agreed criteria, and (c) meetings of the whole department every three months for feedback and discussion of the audit. • Local opinion leader group: (a) four physicians identified as opinion leaders through a survey of 300 physicians attended a one-and-a-half-day workshop on the evidence for practice guidelines and the principles of behaviour change, (b) two mailings to colleagues with information on the practice guidelines, with a letter of support from the local opinion leader; opinion leader hosted a meeting with an expert speaker with knowledge and credibility in the area of VBAC and maintained formal and informal educational contacts, recording these in a log book. • Control group: mailed copy of practice guideline with exhortatory letter highlighting the portion of the guideline on caesarean section, stating that the guideline was endorsed by the national obstetric specialty society, and requesting implementation of the recommendations.

References

Althabe F, Belizán JM, Villar J, Alexander S, Bergel E, Ramos S et al (2004). Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomised controlled trial. *Lancet*. 363(9425):1934–40. doi: 10.1016/S0140-6736(04)16406-4.

Chaillet N, Dumont A, Abrahamowicz M, Pasquier JC, Audibert F, Monnier P et al (2015). A cluster-randomized trial to reduce cesarean delivery rates in Quebec. *N Engl J Med.* 372(18):1710–21. doi: 10.1056/NEJMoa1407120.

Hemminki E, Heikkilä K, Sevón T, Koponen P (2008). Special features of health services and register based trials – experiences from a randomized trial of childbirth classes. *BMC Health Serv Res.* 8:126. doi: 10.1186/1472-6963-8-126.

Liang WH, Yuan CC, Hung JH, Yang ML, Yang MJ, Chen YJ et al (2004). Effect of peer review and trial of labor on lowering cesarean section rates. *J Chin Med Assoc.* 67(6):281–6.

Lomas J, Enkin M, Anderson GM, Hannah WJ, Vayda E, Singer J (1991). Opinion leaders vs adult and feedback to implement practice guidelines. Delivery after previous cesarean section. *JAMA.* 265(17):2202–7.

Mohammadi S, Källestål C, Essén B (2012). Clinical audits: a practical strategy for reducing cesarean section rates in a general hospital in Tehran, Iran. *J Reprod Med.* 57(1–2):43–8.

Poma PA (1998). Effect of departmental policies on cesarean delivery rates: a community hospital experience. *Obstet Gynecol.* 91(6):1013–8.

Scarella A, Chamy V, Sepúlveda M, Belizán JM (2011). Medical audit using the Ten Group Classification System and its impact on the cesarean section rate. *Eur J Obstet Gynecol Reprod Biol.* 154(2):136–40. doi: 10.1016/j.ejogrb.2010.09.005.

TABLE 3. DIFFERENT TYPES OF PHYSICIAN STAFFING MODELS

STUDY	INTERVENTION	DETAILS
Rosenstein et al (2015)	Expanded access to collaborative 24-hour midwifery-labourist care model	<ul style="list-style-type: none"> • Expansion of a labourist model that includes 24-hour in-hospital midwifery coverage to privately insured patients (labourist: generally designates an obstetrician who provides in-house labour and delivery coverage without competing clinical duties). • One midwife and one labourist present in-house 24 hours a day, working collaboratively to provide primary labour management for all private and public patients.
Reference		
<p>Rosenstein MG, Nijagal M, Nakagawa S, Gregorich SE, Kuppermann M (2015). The association of expanded access to a collaborative midwifery and laborist model with cesarean delivery rates. <i>Obstet Gynecol.</i> 126(4):716–23. doi: 10.1097/AOG.0000000000001032.</p>		

TABLE 4. FINANCIAL INTERVENTIONS TARGETED AT HEALTH-CARE PROFESSIONALS

STUDY	INTERVENTION	DETAILS
Keeler & Fok (1996)	Equalizing physician fees for vaginal and caesarean section delivery	<ul style="list-style-type: none"> • Revision to fee schedule for obstetric and other procedures, including equalizing the fees for vaginal and caesarean sections.
Lo (2008)	<ol style="list-style-type: none"> 1. Increase physician fees for VBAC fee to the same level as caesarean section 2. Increase in vaginal birth physician fees to that of caesarean section 	<ul style="list-style-type: none"> • National Health Insurance Taiwan equalized the fee for VBAC to that of a caesarean in April 2003. In May 2005, the fee for vaginal birth was raised to the equivalent of that of a caesarean section.

References

Keeler EB, Fok T (1996). Equalizing physician fees had little effect on cesarean rates. *Med Care Res Rev.* 53(4):465–71.

Lo JC (2008). Financial incentives do not always work – an example of cesarean sections in Taiwan. *Health Policy.* 88(1):121–9. doi: 10.1016/j.healthpol.2008.02.013.