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Indications for, and timing of, planned caesarean section:

Systematic analysis of guidelines

Abstract

Background

There has been a worldwide rise in planned caesarean sections over recent decades, with significant variations in practice between hospitals and countries. Guidelines are known to influence clinical decision-making and, potentially, unwarranted clinical variation. The aim of this study was to review guidelines for recommendations in relation to the timing and indications for planned caesarean section as well as recommendations around the process of decision-making.

Method

A systematic search of national and international English-language guidelines published between 2008 and 2018 was undertaken. Guidelines were reviewed, assessed in terms of quality and extracted independently by two reviewers.

Findings

In total, 49 guidelines of varying quality were included. There was consistency between the guidelines in potential indications for caesarean section, although guidelines vary in terms of the level of detail. There was substantial variation in timing of birth, for example recommended timing of caesarean section for women with uncomplicated placenta praevia is between 36 and 39 weeks depending on the guideline. Only 11 guidelines provided detailed guidance on shared decision-

making. In general, national-level guidelines from Australia, and overseas, received higher quality ratings than regional guidelines.

Conclusion

The majority of guidelines, regardless of their quality, provide very limited information to guide shared decision-making or the timing of planned caesarean section, two of the most vital aspects of guidance. National guidelines were generally of better quality than regional ones, suggesting these should be used as a template where possible and emphasis placed on improving national guidelines and minimising intra-country, regional, variability of guidelines.

Keywords: clinical guidelines, guideline review, AGREE II, caesarean section, clinical variation

Statement of Significance

Problem

There has been a worldwide rise in planned caesarean sections over recent decades, with significant variations in practice between hospitals and countries.

What is Already Known

Guidelines are known to influence clinical decision-making and so, potentially, also unwarranted clinical variation.

What this Paper Adds

While there was consistency between the guidelines in potential indications for caesarean section, the majority of guidelines, provided very limited information to guide shared-decision making or the timing of planned caesarean section, two of the most vital aspects of guidance.

Background

There has been a worldwide rise in planned caesarean sections (CS) over recent decades,¹⁻³ often without a clear reason.¹⁻⁵ In Australia, the CS rate has increased from 31.9% in 1999⁶ to 34% in 2016.⁷ The most striking rise in CS rate is found in women with ‘low risk pregnancies’, i.e. healthy women with one baby in a cephalic position at term.⁸ This group constitutes 35–43% of the overall CS rate in high income countries.^{4,5}

Although CS is a relatively safe procedure, it carries the risk of maternal and neonatal complications,⁹ and is not always associated with clear improvements in maternal or neonatal outcomes.^{2,10-12} Furthermore, planned CS is associated with increasing rates of iatrogenic premature birth,^{13,14} and, in turn, potential adverse infant outcomes.^{13,15,16} Although the definition of ‘term’ birth is at or beyond 37 weeks gestation, babies born in the early term period, before 39 weeks, have a higher burden of morbidity and mortality, both at birth and potentially throughout their lives.^{13,15,16}

Despite these issues, CS rates continue to increase, and there is widespread variation in the incidence and timing of CS between countries and hospitals, even after adjusting for case mix or hospital factors.^{9,17-23} Variations in the rate and timing of CS cannot always be adequately explained by differences in women’s demographics, co-morbidities, or hospital factors.^{9,18-21,23}

In an attempt to understand the source of these variations, a growing body of literature highlights the different influences on decision-making to perform a CS.^{24,25} A recent systematic review by Panda et al. (2018)²⁵ mapped the different factors that influence decision-making for CS and found that decisions are informed by clinicians’ personal beliefs and attitudes, clinicians’ demographics, confidence and skills, and clinical guidelines and management policy.²⁵ This review identified seven

studies that reported on the role of guidelines and hospital policies on the decision-making process for performing CS,²⁶⁻³² and in turn, variations in practice.^{26,27,30,31}

Unexplained variations in practice raises concerns about the appropriateness of the intervention^{33,34} and suggests different practice styles and variability in the extent to which evidence-based clinical guidelines are followed.³⁵⁻³⁸ To address the high rate of unwarranted variation in the incidence and timing of planned CS, the Australian Commission on Safety and Quality in Healthcare's (ACSQHC) Australian Atlas of Healthcare Variation calls for greater adherence to guidelines on planned CS, and enhanced shared decision-making.³⁹ While greater adherence to clinical guidelines may indeed reduce clinical variation, it is also possible that practice variation stems from inconsistencies in the guidelines themselves.^{37,40} Clinical guidelines developed by different groups addressing the same clinical issue can result in conflicting recommendations,⁴¹ and vary in quality,⁴² making it hard for clinicians to provide consistent care and difficult for women to know what is likely to be best for them.

To explore any variations in the incidence and timing of planned CS, we conducted a review of CS guidelines to examine the areas of divergence and convergence, and also reviewed the guidelines for recommendations in relation to shared decision-making. Shared decision-making is an important strategy for reducing unwarranted variation in healthcare³⁹. Shared decision-making is defined as the process of involving the patient (the woman in maternity care) in making informed and preference-based decisions about their own care⁴³. The aim of this study was to review CS guidelines for recommendations in relation to the timing and indications for planned CS as well as recommendations around the process of decision-making. A secondary aim was to assess the quality of guidelines using the Appraisal of Guidelines for Research and Evaluation (AGREE II) Instrument⁴⁴, to gain insight into whether variation can be understood in light of varying guideline quality.

Method

We conducted a systematic guideline review of guidelines that addressed indications for, and timing of, planned CS published in English between 2008 and 2018. Australian guidelines were included, as well as guidelines from English-speaking countries considered somewhat similar to Australia in terms of their availability and delivery of healthcare, namely New Zealand (NZ), the United States (US), the United Kingdom (UK), Ireland and Canada. Guidelines from professional bodies and national governments, and where applicable, state governments (e.g. Australia), were included. Key international guidelines were also considered. Guidelines developed at local health district (LHD) or hospital level were excluded unless they are the guidelines used nationally or across the state (e.g. King Edward Memorial Hospital in Perth often provides the guidance for the whole of the state of Western Australia). Guidelines devoted specifically to CS and general guidelines in relation to maternity care were included, providing the guideline included a recommendation in relation to indications or timing of CS.

To identify guidelines, we searched the internet and the electronic database PubMed, using the key words 'caesarean section' OR 'cesarean section' AND 'guideline' and the individual indications for CS (e.g. previous caesarean section) in combination with 'guideline'. Guidelines were also purposively sought from key national authorities in relation to obstetrics and maternity care in each of the six countries, specifically: Australian Health Departments; Australian National Health and Medical Research Council (NHMRC); New Zealand Guidelines Group (NZGG); Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG); Royal College of Obstetricians and Gynaecologists (RCOG), United Kingdom; National Institute of Clinical Excellence (NICE), United Kingdom; the Scottish Intercollegiate Guidelines Network (SIGN); Institute of Obstetricians and Gynaecologists, Royal College of Physicians of Ireland; and the Society of Obstetricians and

Gynaecologists of Canada (SOGC). Guidelines from national bodies that could not be accessed without member access were excluded (e.g. Women's Healthcare Australasia and American College of Obstetricians and Gynecologists). International guidelines were purposely sought from the World Health Organization.

The guidelines were independently reviewed by two reviewers. Recommendations in relation to the reasons for, and timing of, CS were extracted using a purposely designed data extraction template. Recommendations in relation to the following possible indications for a planned CS were systematically extracted: vasa praevia, placenta praevia, fetal growth restriction, pre-eclampsia, maternal cardiac disease, maternal elevated body mass index (BMI), previous caesarean section, twin pregnancy, breech, abnormal fetal lie or presentation, maternal request, mental health reason, active genital herpes, significant prior uterine surgery, previous adverse fetal outcome, previous severe perineal outcome, pelvic structural deformities, and 'other' indications.

The quality of the guidelines was assessed using the Appraisal of Guidelines for Research and Evaluation (AGREE II) Instrument.⁴⁴ The AGREE II Instrument is a valid and reliable tool for assessing the quality of guidelines, which evaluates six domains: scope and purpose; stakeholder involvement; rigour of development; clarity and presentation; applicability; and editorial independence. The instrument has been endorsed by the World Health Organization and is widely accepted as the gold standard for the development of quality clinical guidelines.⁴⁵ Two assessors independently appraised each guideline, with a third reviewer to resolve discrepancies.

In the first instance, the appraisers' scores for each of the six domains were entered into a spreadsheet, and calculated as a percentage. Discrepancies of greater than 30% were discussed at a consensus meeting and resolved (so the difference between the score was less than 30%). The final score was calculated by averaging the scores. As each of the six domains evaluates discrete aspects

of the guideline quality, the six domains were considered independently and were not aggregated into a single quality score. The guidelines were also given an overall assessment score of between 1 and 7. In terms of the use of the guideline in practice, following the approach used in similar studies⁴⁶ a guideline was labelled as 'strongly recommended' if most domain scores (at least four of six) were greater than 60%. Guidelines were 'recommended with provisions or alterations' if most domain scores were between 30% and 60%, or at least two domain scores were no less than 60%. This label was also given to guidelines that had insufficient or lacking information for some items; however, if provisions or alterations were performed, then the guidelines were still considered for use in practice, especially when no other guidelines on the same clinical topic were available. A guideline was labelled as 'not recommended' if most of the domain scores were less than 30%. Given this was a review of guidelines study, ethical approval was not required.

Results

This review identified 49 guidelines for inclusion, from Australia (n=25), Australia and New Zealand (n=4), New Zealand (n=2), America (n=2), Canada (n=2), Ireland (n=6), the United Kingdom (n=7) and one international guideline (from the international society for the study of hypertension in pregnancy).⁴⁷ The quality of included guidelines varied, with 16 assessed as 'strongly recommended', 17 assessed as 'recommended with provisions or alterations' and 16 assessed as 'not recommended' (see Table 1). The vast majority of these guidelines (47/49) provided recommendations in relation to indications for planned CS and 18 commented on the timing of planned CS. A total of 35 guidelines commented on shared-decision making, of which eleven provided guidance beyond a single sentence.

Insert Table 1

Shared decision-making and timing of planned CS

Most guidelines (35/49) make reference to the importance of considering women's preferences in decision making in relation to the timing and mode of birth. However, in the majority of these (24/35) the guidance around shared decision-making is very brief and generic, consisting of comments such as "women's preference should be considered and documented" and "women should be counselled on the risks and benefits of different options".⁴⁷⁻⁷⁰

Eleven guidelines provide in-depth guidance on shared decision making.^{50,56,61,63,65,71-76} These guidelines stipulate that women should have the opportunity to make informed decisions about their care;^{56,61,65,71,72,76} that women should be provided with evidence-based information that includes the risks and benefits of their options;^{61,65,71-73} that 'good communication', that addresses women's concerns, should be integral to the decision-making process;⁷¹⁻⁷³ that information is presented in an accessible and culturally appropriate manner;^{72,73} and that partners and families are appropriately engaged in the decision-making process.⁷¹⁻⁷³ Three of these guidelines stipulate that women have the right to decline the offer of a CS, and that this should be respected.^{50,65,73} Five guidelines provide examples of the information women should be told in relation to specific indications for CS, namely in relation to, breech pregnancy,^{74,76} previous CS,^{73,74} placenta praevia,⁶³ and twin pregnancy^{74,75} (as discussed below).

Eighteen guidelines comment on the timing of planned CS.^{61-64,68,69,71,72,77-86} Four of these regard timing for planned CS more broadly, and indicate that CS should be planned after 38 weeks unless there are medical indications requiring earlier intervention,⁶¹ "as close as possible to 39 weeks",⁷² or "not before 39 weeks" unless there are maternal, fetal or obstetric risks.^{62,71} Sixteen provide

recommendations in terms of timing of planned CS for specific indications, namely placenta praevia,^{61,63,77,79,83} vasa praevia,^{64,77,78,80-82} breech presentation,^{69,71} and twin pregnancy.^{68,84-86} Some guidelines provide a vague recommendation regarding timing, stating that CS should be planned 'prior to the onset of labour' (for vasa praevia and placenta praevia).^{80,82}

One guideline provides specific guidance about shared decision-making in relation to timing, stating that all women and their families should be informed of both the risks of maternal and neonatal morbidity incurred by birth prior to 39+0 weeks, and the risks of spontaneous labour occurring prior to a planned CS, and that these discussions should take place well before 39 weeks to allow women and families to consider both the risks and benefits.⁷¹

Indications for planned CS

A total of 47/49 guidelines provided a recommendation in relation to indications for planned CS (Table 2). The indications most frequently discussed include breech presentation (n=10), previous CS (n=8), and twin pregnancy (n=8), followed by placenta praevia (n=7), vasa praevia (n=7), preeclampsia (n=7), fetal growth restriction (n=4), elevated maternal BMI (n=3), abnormal fetal lie or presentation (n=3), maternal request, including mental health reasons (n=2), maternal cardiac disease (n=1), and active genital herpes (n=1). No guidelines provided recommendations for planned CS due to previous adverse fetal outcome, previous severe perineal trauma, significant prior uterine surgery or pelvic structural deformities.

Insert Table 2

Singleton breech presentation

Ten guidelines provide a recommendation in relation to the timing and mode of birth for a breech presentation indicating that women may be offered a planned CS at term.^{48,49,67,69-71,73,74,76,87} Most of these indicate that prior to offering a CS, women with uncomplicated breech presentation at or near term should first be offered external cephalic version (ECV) unless contraindications exist,^{67,69,73,74,76} the woman has had a previous CS,⁴⁹ or the woman does not wish to have a vaginal birth.⁷⁶ Six guidelines state that vaginal birth is also a reasonable option, providing there are no risk factors and the facility has the required experience and infrastructure.^{48,67,70,74,76,87}

Two guidelines comment on timing, stating that CS for breech presentation should be scheduled no earlier than 39+0 weeks⁷¹ or 38.5 weeks.⁶⁹ Seven guidelines comment on shared decision-making stating that women should be counselled on the risks and benefits of their different options,^{48,49,67,69,70,74,76} and the decision regarding mode of birth should consider each woman's wishes and preferences.^{70,76} One guideline stipulates the specific information on mortality and morbidity that women should be told to help inform decision-making.⁷⁴

Previous caesarean section

Eight guidelines address CS following a previous CS, and consistently indicate that CS should not be routinely offered but may be indicated depending on individual circumstances.^{50-53,61,65,71,73} A repeat CS is recommended in women with previous uterine rupture,^{51,52} classical caesarean scar,^{50-52,65} or multiple prior CS.^{51,65,73} Other potential indications for repeat CS identified in guidelines include where the pregnancy interval (birth to due date/actual birth date) is less than 18 months (one guideline),⁶⁵ when the woman is aged 40 or over (two guidelines),^{50,52} or obese (one guideline)⁵⁴ or when there is suspected fetal macrosomia (one guideline).⁶⁵ In relation to twin pregnancy, one guideline states that twin pregnancy is not an indication for a repeat CS⁵² while another indicates

twin pregnancy may be an indication.⁶⁵ One guideline addresses the timing of a repeat CS, stating that planned birth before 39+0 weeks is not recommended.⁷¹

The majority of the guidelines indicate that maternal preferences should be considered in the decision-making.^{50-53,61,65,73} Shared decision-making should also take into account a woman's plans for future pregnancies^{50,51,65} and ideally should be informed by the hospital's own rates of uterine rupture and VBAC.⁵¹ One guideline highlights that women with both previous CS and a previous vaginal birth should be informed that they have an increased likelihood of achieving a vaginal birth than women who have had a previous CS but no previous vaginal birth.⁷³ Two guidelines stipulate that women have the right to have their wishes respected.^{50,65}

Twin pregnancy

Eight guidelines provide a recommendation in relation to the timing and mode of birth for women with a twin pregnancy.^{48,68,73-75,84-86} Most of these indicate that, for twin pregnancy where the presentation of the first twin is cephalic, vaginal birth is appropriate,^{48,73-75,84-86} especially if the twin pregnancy is dichorionic diamniotic (DCDA) and there is no evidence of fetal compromise.^{73,84-86}

The mode of birth for women with monochorionic twins is more controversial and is recommended to be either by CS or IOL.⁸⁴ One guideline provides further guidance in relation to monochorionic twins, stating that it is appropriate to aim for a vaginal birth of monochorionic diamniotic (MCDA) twins (unless there are other specific clinical indications for CS),⁶⁸ but not for monochorionic monoamniotic (MCMA) twins.⁶⁸ This guideline also recommends that women with a monochorionic twin pregnancy complicated by twin-to-twin transfusion syndrome (TTTS) should also be offered birth by CS.⁶⁸ Three guidelines recommend that CS is indicated when the first twin is not cephalic for

all twin pregnancies.⁷³⁻⁷⁵ Two guidelines stipulate that breech presentation of the second twin is not an indication for birth by CS.^{74,86}

In relation to timing of birth, for women with DCDA twin pregnancies, planned birth, by either CS or IOL, can be offered from 37+0 weeks,^{85,86,88} and for MCDA twin pregnancies by 37⁸⁴ or 36+0 weeks.^{85,86,88} One guideline recommends that MCMA twins should be born by CS between 32+0 and 34+0 weeks⁶⁸, and monochorionic twin pregnancies previously complicated by TTTS and treated should be born between 34+0 and 36+6 weeks of gestation.⁶⁸ One guideline recommended that women with a breech presentation of the first twin may be offered CS at 38 weeks gestation.⁸⁶

In relation to shared decision-making, three guidelines indicate that maternal views should be considered in the decisions in relation to mode of birth.^{68,74,75} Two of these guidelines indicate what information women should be provided to help decision-making,^{74,75} stating that women should be informed that the evidence is limited in relation to twin pregnancy where the first twin is breech,⁷⁴ and that where the first twin is born vaginally, the prospect of requiring a CS for the second twin is approximately 4%.⁷⁵

Placenta praevia

Seven guidelines identified placenta praevia as an indication for a planned CS.^{61,63,73,77,79,80,83} Two others state that mode of birth for low-lying placenta/minor placenta praevia should be based on clinical judgement supplemented by sonographic information.^{63,73} Planned CS is indicated for women in the third trimester of pregnancy with a placenta that partly or completely covers the internal cervical os (major placenta praevia),⁷³ or in most cases with a placental edge less than 20 mm from the internal os (minor placenta praevia) especially when the placental edge is thicker (over 10 mm)

and/or contains a sponge-like echo or marginal 'sinus'.⁶³ The quoted success rates of vaginal birth when the placental edge is between 10 and 20 mm from the internal os vary widely (56% and 93%, respectively).⁶³ The quality of the supporting evidence was stated to be poor, making a recommendation for a specific mode of birth based on ultrasound findings difficult in at least two guidelines.^{63,73}

There was no consensus on timing for women presenting with uncomplicated placenta praevia (without bleeding or further risk factors). Different guidelines stated that planned birth should be considered between 36+0 and 37+0 weeks of gestation,⁶³ at 37 weeks gestation,⁷⁷ or between 38 and 39 weeks.⁷⁹ One of these also stated that CS should be considered between 34+0 to 36+6 weeks for women presenting with placenta praevia and a history of vaginal bleeding or other associated risk factors for preterm birth.⁶³ When placenta praevia is accompanied with major haemorrhage, two guidelines state that an emergency CS should be performed,^{61,83} although only one gives a gestational timeframe for this, suggesting that for women presenting with bleeding placenta praevia from 34 weeks, late preterm birth should be considered.⁶³ Only one guideline addresses shared decision-making in relation to placenta praevia, stating that decisions regarding the mode of birth should take into account the woman's preferences.⁶³

Vasa praevia

Seven guidelines identified vasa praevia diagnosed during pregnancy as an indication for a planned CS.^{61,64,77,78,80-82} In relation to timing, this varied from, birth should be planned between 34 and 37 weeks gestation,⁷⁸ by 35 weeks,⁸¹ between 34 and 36 weeks⁶⁴ or 'prior to the onset of labour'^{80,82}

Four guidelines state that in the presence of vaginal bleeding from suspected vasa praevia, or signs of acute fetal compromise, an immediate CS should be undertaken.^{64,77,80,81} No guidelines specifically address shared-decision making in the context of vasa praevia.

Preeclampsia

Seven guidelines address preeclampsia, noting that the preferred mode of birth is generally vaginal unless contraindicated for maternal or fetal reasons.^{47,56-60,66} One guideline recommends CS when specific Doppler waveforms are present on ultrasound⁴⁷ or, in very preterm gestations of <34 weeks (two guidelines)^{47,58} or <28 weeks (one guideline).⁶⁶ Three guidelines state that decisions about mode of birth should be informed by clinical circumstances and the woman's preference.^{47,56-60,66}

Abnormal fetal lie or presentation

Three guidelines identify abnormal fetal lie that cannot be corrected as an indication for CS.^{49,89,90}

One guideline provides three birth options stating that a decision should be made in consultation with the woman. The options are 1) planned CS; 2) expectant management if no contraindications, or 3) external version of the fetus to longitudinal lie and then commence an induction of labour (P.2).⁸⁹

Fetal growth restriction

Four guidelines indicate fetal growth restriction may be an indication for a planned CS.⁹¹⁻⁹⁴ These guidelines do not support planned CS for all growth restricted fetuses, but CS may be indicated in cases of absent or reversed end diastolic flow in the umbilical artery⁹¹⁻⁹⁴ or at very preterm gestations (<34 weeks) depending on underlying aetiology, parity, reproductive history and cervical favourability.⁹² No guidelines specifically address shared decision-making in relation to timing or mode of birth for women with fetal growth restriction.

Elevated maternal Body Mass Index

Three guidelines address elevated maternal BMI (defined as either >40 or >50 kg/m²), indicating that BMI alone is not an indication for CS.^{54,55,73} One of these guidelines states that women with elevated BMI who have had a previous CS are more likely to have a CS.⁵⁴ Two guidelines state that the decision in relation to mode of birth should consider the preferences of the woman and that risks should be discussed in a manner that supports shared decision-making.^{54,55} One stipulates that women with BMI of > 40 should be informed that if an emergency CS or operative birth becomes required there may be difficulties with establishing intravenous access or siting epidural anaesthesia.⁵⁵

Maternal request, including mental health reasons

Two guidelines comment on request for a medically unnecessary CS, stating that if after a process of shared decision-making a woman maintains a request for CS, the obstetrician may offer a CS or refer the woman to another obstetrician.^{73,95} One states that the obstetrician may decline a CS if she/he believes there are significant health concerns for mother or baby if this course of action is pursued; or the woman appears to not have an understanding sufficient to enable informed consent to the procedure.⁹⁵

Two guidelines state that clinicians should discuss the overall risks and benefits of CS compared with vaginal birth, and ensure the woman has accurate information.^{73,95} When a woman requests a CS because she has anxiety about childbirth, one guideline recommends offering referral to a

healthcare professional with expertise in providing perinatal mental health support.⁷³ If after discussion and mental health support the woman still wants a CS, this can be offered.⁷³

Maternal Cardiac Disease

Only one guideline addresses mode of birth for maternal cardiac disease, and indicates that vaginal birth is preferred unless the woman has an obstetric or specific cardiac condition requiring CS.⁹⁶ This does not provide guidance in terms of timing or shared decision-making.

Active genital herpes

One guideline identifies that women with primary genital herpes simplex virus (HSV) infection in the third trimester should be offered planned CS because it decreases the risk of neonatal HSV infection, despite a lack of certainty that it will reduce transmission.⁷³ This guideline does not provide guidance in terms of timing or shared decision making.

Discussion

This review identified 49 guidelines, from Australia, New Zealand, America, Canada, Ireland, the United Kingdom and one international guideline. Overall there is consistency between the guidelines in terms of which conditions are considered potential indications for CS, although guidelines vary substantially in terms of the level of detail provided. For example, in relation to twin pregnancy, few guidelines differentiate between monochorionic and diamniotic twin pregnancy,^{68,73,84-86} despite chorionicity being a major determinant of perinatal outcome in twin pregnancy.⁹⁷

There is considerable variation in the guidelines in relation to the timing of CS and the extent to which shared decision-making is emphasised. Only 18 of the 49 guidelines commented on the timing of planned CS, four of which regard timing for planned CS more broadly. These guidelines provided three different time frames (after 38 weeks, close to 39 weeks, not before 39 weeks). Guidance was also sparse for the timing of some CS indications, for example only one guideline addressed the timing of a repeat CS, stating that planned birth before 39+0 weeks is not recommended.⁷¹ For other indications, in particular, placenta praevia, there is variation in the recommended timing of CS with a range of 36-39 weeks. This is a considerable range (from late preterm to “term”) for a condition that occurs in 1 in 200 pregnancies, and has available data regarding maternal and neonatal outcomes of doing CS for this indication at these gestations.⁹⁸ Recommendations in relation to vasa praevia also varied considerably,^{64,78,80-82} although given the relative rarity of vasa praevia this variance in guidance is more understandable.

The majority of guidelines also provide very limited information to guide shared decision-making. While most (35 of 49) commented on shared decision-making or the importance of considering women’s preferences, only 11 guidelines provided guidance in relation to shared decision-making beyond a single sentence. Only three guidelines stipulate that women have the right to decline the offer of a CS, and that this should be respected. An assessment of the quality of the guidelines using the AGREE II tools indicates that this variation cannot be explained by guideline quality. Of the 11 guidelines that provide guidance in relation to shared decision-making, five are rated as ‘strongly recommended’,^{56,63,65,73,74} two as ‘recommended with alterations’^{71,75} and four as ‘not recommended’.^{50,61,72,76} This is of particular concern as a lack of guidelines that address shared decision-making has been identified as a key issue by a number of studies investigating clinicians’ views of factors influencing their decision to perform a CS.^{29,30} This is consistent with a growing body of literature that women do not feel adequately engaged in decision-making about mode of birth, and that many feel they were pressured into a planned CS.⁹⁹⁻¹⁰⁴

There is a need for clinical guidelines to provide more detail in relation to how to actively engage women in decisions about their own care, i.e. into shared decision-making. Shared decision-making refers to a process of decision making where the clinician's medical knowledge is considered as well as the woman's values, beliefs and preferences^{43,105}, and is now widely recognised as an integral component to the provision of high-quality maternity care¹⁰⁶⁻¹⁰⁸. Shared decision-making is not only associated with improved satisfaction and outcomes^{107,109}, but is increasingly put forward as a strategy to reduce the overuse of interventions¹¹⁰ and reduce unwarranted clinical variation^{34,39,111}. While shared decision-making should occur across areas of health care¹¹¹, it is of particular importance when multiple reasonable treatment options exist¹¹², as is often the case for planned CS.

Shared decision-making is not only important when an intervention or treatment is recommended or indicated, but also when an intervention is requested by the patient, the woman in this context.

While estimates vary between countries, a large minority of women request a CS without a medical reason^{113,114}, and this request is often granted without a process of shared decision-making¹¹³. A study by Fenwick et al. (2010) found that obstetricians accept maternal requests for CS without making enquiries or sharing information about this choice.¹¹³ A study by Bettes et al. (2007)²⁶ found that one of the reasons for this is a lack of hospital policy and/or guidelines specific to the management of maternal request, suggesting that to reduce unwarranted CS guidelines need to address CS on maternal request. As noted, this review identified only two guidelines that addressed CS on maternal request. Given a majority of women who request CS without a medical reason do so due to fear of childbirth,¹¹⁵⁻¹¹⁸ it is important for guidelines to address this issue, and provide guidance on how clinicians can support women with childbirth fear. A number of studies show that childbirth fear can be alleviated with appropriate counselling and information sharing.^{117,119,120}

A lack of guidelines or insufficient detail in the existing guidelines is a challenge for clinicians and women. A lack of guidance has been identified by a number of studies as a key-contributing factor to the decision to perform a CS.^{27,29-32} Studies that investigated how clinical decisions in relation to planned CS were made consistently identified a lack of guidelines or insufficient detail in the existing guidelines as a key factor in the decision to perform a CS.^{27,29-32}

A lack of guidelines or limited detail in existing guidelines likely contributes to clinical variation. For example, only one of the included guidelines addresses the timing of a repeat CS, stating that planned birth before 39+0 weeks is not recommended.⁷¹ Schemann et al. (2016) investigated compliance rates in hospitals in one Australian state (New South Wales) with this guideline recommendation, and found that compliance rates ranged from 32.5% to 83.7%. Overall, 34.7% of low-risk planned repeat CS occurred before 39 weeks gestation. This study also identified large variation in timing between hospitals, highlighting the need for more strategies to improve guideline adherence.²³

This review highlights a need for improvement in the quality of guidelines, specifically a need for guidelines to provide more detail about the conditions for which planned CS is indicated, the timing of CS and the process of shared decision-making. Although there were exceptions, in general, national guidelines from Australia and overseas (particularly the United Kingdom) were rated of higher quality than state-based guidelines. National guidelines in particular scored more highly in terms of stakeholder involvement and editorial independence. Therefore, focus on continuous improvement of national guidelines and use of these as a template, and minimising intra-country regional variation of guidelines, may help reduce unwarranted variation arising from existing CS guidelines.

However, clinical variation in the rate of CS cannot be explained by variability in guideline

recommendations alone, and may stem from suboptimal guideline implementation. Suboptimal guideline adherence is a key contributing factor to unwarranted or unexplained variation in care,³⁶⁻³⁸ as clinical guidelines are often not, or only partially, implemented.³⁶⁻³⁸ The development and implementation of strategies to enhance guideline adherence is thus an important area of focus,^{35,36} in addition to improving the quality and detail of the guidelines themselves.

Conclusion

Overall there is consistency between the guidelines in terms of which conditions are considered potential indications for planned CS. However, many guidelines fail to sufficiently address the most controversial aspects of planned CS, namely timing of birth, shared decision-making processes and maternal choice.

There remains a need for clinical guidelines to provide more detail to guide clinicians and women, in particular in relation to the timing of birth and shared decision-making, to help reduce unwarranted CS variation. As national guidelines were generally of good quality, with better stakeholder involvement and editorial independence than state-based guidelines, a focus on further improvement of national guidelines and then a push to preferential use of national guidelines may help improve practices around planned CS.

The review provides an up to date assessment of CS guidelines, systematically analysed by two reviewers for both content and quality. Limitations include inclusion of English-language guidelines only, as there may have been additional valuable guidance not published in English.

Conflict of Interest

The authors have no conflict of interest to declare. The Editor-in-Chief, Caroline Homer, played no role in the decision to peer review or ultimately accept this paper due to being a co-author. This was managed by the Deputy Editor Linda Sweet to avoid any perception or reality of conflict of interest.

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Table 1: Included guidelines and quality assessment using the AGREE criteria

Author, year	Title	Country	Scope and Purpose %	Stakeholder involvement %	Rigor of development %	Clarity of presentation %	Applicability %	Editorial independence %	Overall Guideline Assessment
Caesarean section guidelines									
ACOG (2014) ¹	Safe prevention of the primary caesarean section	America	71	26	33	38	14	14	3; not recommended
King Edward Memorial Hospital (2013)* ²	Caesarean Section. Pre-operative management. Caesarean birth: Elective.	Australia	76	21	36	71	14	14	3; recommended with provisions or alterations
NICE (2011) ³	Caesarean section	UK	90	69	62	93	44	53	5.5; strongly recommended
NSW Ministry of Health (2016) ⁴	Timing of Planned or Pre-labour CS at Term	Australia	57	36	35	55	25	14	3.5; recommended with provisions or alterations
RANZCOG (2014b)* ⁵	Timing of Elective CS at Term	Australia	95	59	54	33	14	64	4; recommended with provisions or alterations
SA Maternal & Neonatal Clinical Network (2014) ⁶	Caesarean section. South Australian Perinatal Practice Guidelines	Australia	24	24	22	29	23	17	2; not recommended
Guidelines about specific indicators									
ACOG (2018) ⁷	Mode of Term Singleton Breech Delivery.	America	66	28	28	57	14	14	2.5; not recommended
ACT Health (2015) ⁸	Antepartum Haemorrhage (APH) including placenta praevia, placental abruption and vasa praevia	Australia	61	47	18	62	43	14	3; recommended with provisions or alterations
ACT Health (2017) ⁹	Placenta Praevia and Abnormally Invasive Placenta (AIP)	Australia	81	43	30	43	21	14	3; recommended with provisions or alterations
Institute of Obstetricians and Gynaecologists (2012) ¹⁰	Management of multiple pregnancy	Ireland	76	57	61	83	30	25	4; recommended with provisions or alterations
Institute of Obstetricians and Gynaecologists (2013) ¹¹	Delivery-after-previous-Caesarean-Section	Ireland	76	62	39	57	25	14	3.5; recommended with provisions or alterations

Institute of Obstetricians and Gynaecologists (2016a) ¹²	The diagnosis and management of severe pre-eclampsia and eclampsia	Ireland	83	66	55	81	46	14	3.5; recommended with provisions or alterations
Institute of Obstetricians and Gynaecologists (2016b) ¹³	The Management of Hypertension in Pregnancy	Ireland	88	64	35	52	32	14	3.5; recommended with provisions or alterations
Institute of Obstetricians and Gynaecologists (2017a) ¹⁴	Fetal-Growth-Restriction-Recognition-Diagnosis-and-Management	Ireland	76	57	38	45	28	14	3.5; recommended with provisions or alterations
Institute of Obstetricians and Gynaecologists (2017b) ¹⁵	The Management of Breech Presentation	Ireland	90	64	38	64	26	28	4; recommended with provisions or alterations
ISSHP (2018) ¹⁶	The hypertensive disorders of pregnancy: ISSHP classification, diagnosis & management recommendations for international practice.	International	81	62	70	66	41	100	5; strongly recommended
King Edward Memorial Hospital (2015a) ¹⁷	Complications of pregnancy: Abnormalities of lie/presentation - unstable lie at or near term.	Australia	40	14	25	41	14	14	2; not recommended
King Edward Memorial Hospital (2015b) ¹⁸	Complications of pregnancy: Multiple pregnancy	Australia	47	23	17	57	14	14	2; not recommended
King Edward Memorial Hospital (2016a) ¹⁹	Increased Body Mass Index: management of a woman with	Australia	76	21	36	71	14	14	3; not recommended
King Edward Memorial Hospital (2016b) ²⁰	Small for Gestational Age and Intrauterine Growth Restriction	Australia	67	38	36	76	21	14	3; not recommended
King Edward Memorial Hospital (2018b) ²¹	Birth after previous caesarean section	Australia	81	23	38	66	14	14	3; not recommended
King Edward Memorial Hospital (2018c) ²²	Breech Presentation	Australia	69	21	29	66	14	14	2.5; not recommended
King Edward Memorial Hospital (2018d) ²³	Cardiac Disease	Australia	64	21	27	55	14	14	3; not recommended
King Edward Memorial Hospital (2018a) ²⁴	Antepartum Haemorrhage	Australia	71	14	34	71	21	14	2; not recommended
Ministry of Health (2018) ²⁵	Diagnosis and treatment of hypertension and pre-eclampsia in pregnancy in New Zealand	New Zealand	90	80	90	80	75	80	6, strongly recommended
NICE (2010) ²⁶	Hypertension in pregnancy: diagnosis and management	United Kingdom	90	97	85	93	47	17	5; strongly recommended

NSW Ministry of Health (2011) ²⁷	Management of Hypertensive disorders of pregnancy	Australia	90	45	38	60	45	28	4; recommended with provisions or alterations
NSW Ministry of Health (2014) ²⁸	Supporting Women in their Next Birth After Caesarean Section	Australia	90	45	40	60	43	31	4; recommended with provisions or alterations
NSW Ministry of Health (2017) ²⁹	Maternity - Supporting Women Planning a Vaginal Breech Birth	Australia	90	45	40	60	43	31	4; recommended with provisions or alterations
New Zealand Maternal Fetal Medicine Network (2014) ³⁰	Guideline for the management of suspected small for gestational age singleton pregnancies and infants after 34 weeks' gestation	New Zealand	61	47	50	66	40	14	4; recommended with provisions or alterations
Queensland Health (2015b) ³¹	Obesity in pregnancy	Australia	86	74	56	86	61	78	6; strongly recommended
Queensland Health (2015a) ³²	Hypertensive disorders of pregnancy	Australia	95	61	52	76	71	64	6; strongly recommended
Queensland Health (2015c) ³³	Vaginal birth after caesarean (VBAC)	Australia	86	61	55	80	65	64	6, strongly recommended
RANZCOG (2013)RANZCOG ³⁴	Caesarean Delivery on Maternal Request	Australia/ New Zealand	90	83	87	85	23	57	5.5; strongly recommended
RANZCOG (2014a) ³⁵	Management of monochorionic twin pregnancy	Australia/ New Zealand	71	76	59	76	25	57	5; strongly recommended
RANZCOG (2016a) ³⁶	Management of breech presentation at term	Australia/ New Zealand	81	85	61	81	42	64	5; strongly recommended
RANZCOG (2016b) ³⁷	Vasa praevia	Australia/ New Zealand	81	85	61	81	42	64	5; strongly recommended
RCOG (2015) ³⁸	Birth after previous caesarean birth	United Kingdom	93	55	86	76	52	60	5.5; strongly recommended
RCOG (2016) ³⁹	Management of Monochorionic Twin Pregnancy.	United Kingdom	90	54	86	81	52	60	5.5, strongly recommended
RCOG (2017) ⁴⁰	Management of Breech Presentations	United Kingdom	86	57	88	97	51	60	6; strongly recommended
RCOG (2018b) ⁴¹	Vasa Praevia: Diagnosis and Management	United Kingdom	86	50	90	76	60	60	6; strongly recommended
RCOG (2018a) ⁴²	Placenta Praevia and Placenta Accreta: Diagnosis and Management	United Kingdom	86	50	90	76	60	60	6; strongly recommended
SA Department of Health (2013) ⁴³	Antepartum haemorrhage or bleeding in the second half of pregnancy	Australia	28	14	21	42	14	14	2.5; not recommended

SA Department of Health (2011) ⁴⁴	Fetal growth (restricted).	Australia	50	31	27	57	23	14	3; not recommended
SA Department of Health and Ageing (2018a) ⁴⁵	Breech presentation	Australia	50	31	29	57	23	14	3; not recommended
SA Department of Health and Ageing (2018b) ⁴⁶	Twin pregnancy	Australia	50	31	27	57	23	14	3; not recommended
SA Department of Health and Ageing (2018c) ⁴⁷	Unstable lie of the fetus	Australia	50	31	27	57	23	14	3; not recommended
SMFM (2015) ⁴⁸	Diagnosis and management of vasa previa	Canada	90	38	28	71	14	42	3; recommended with provisions or alterations
SOGC (2009) ⁴⁹	Guidelines for the Management of Vasa Previa	Canada	43	57	62	88	28	57	3.5; recommended with provisions or alterations

*only addresses timing, no information on indications.

Table 2: Indications for CS

Name of guideline	Abnormal fetal lie or presentation	Active genital herpes	Maternal Elevated Body Mass Index	Breech presentation	Cardiac disease – Maternal	Fetal growth restriction	Human immunodeficiency virus	Maternal request	Twin pregnancy - first twin cephalic	Twin pregnancy – first twin not cephalic	Placenta praevia	Previous caesarean section	Vasa praevia	Pre-eclampsia
CS guidelines														
ACOG (2014) ¹				WC					N					
NICE (2011) ³		Y	N	M			M	M	N	Y 36/37	Y	WC		
NSW Ministry of Health (2016) ⁴				M >39								M >39		
SA Maternal & Neonatal Clinical Network (2014) ⁶											M	M	Y	
Guidelines about specific indicators														
ACOG (2018) ⁷				M WC										
ACT Health (2015) ⁸											Y		Y <labo ur onset	
ACT Health (2017) ⁹											Y 38-39			
Institute of Obstetricians and Gynaecologists (2012) ¹⁰									N	Y				
Institute of Obstetricians and Gynaecologists (2013) ¹¹												M		
Institute of Obstetricians and Gynaecologists (2016a) ¹²														M

RCOG (2017) ⁴⁰				M WC					N	Y				
RCOG (2018b) ⁴¹													Y 34-36	
RCOG (2018a) ⁴²											Y 36-37			
SA Department of Health (2013) ⁴³											Y 37		Y	
SA Department of Health (2011) ⁴⁴						M								
SA Department of Health and Ageing (2018a) ⁴⁵				M >38.5										
SA Department of Health and Ageing (2018b) ⁴⁶								M 36/37	Y 36-38					
SA Department of Health and Ageing (2018c) ⁴⁷	Y													
SMFM (2015) ⁴⁸													Y 34-37	
SOGC (2009) ⁴⁹													Y <labo ur onset	

WC= Woman's Choice; Y= Yes; N=No; Blank = not mentioned; M= Maybe