The Royal Australian
and New Zealand College
of Obstetricians and Gynaecologists

Intrapartum Fetal Surveillance

Clinical Guidelines – Second Edition

Intrapartum Fetal Surveillance Clinical Guidelines

These Guidelines were commissioned by the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) and replace the previous version "Intrapartum Fetal Surveillance Clinical Guidelines" published in December 2002.

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This document is intended to provide general advice to Practitioners. It should never be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and needs of each woman.

The document has been prepared having regard to general circumstances. It is the responsibility of each Practitioner to have regard to the particular circumstances of each case, and the application of these guidelines in each case. In particular, clinical management must always be responsive to the needs of the individual woman and the particular circumstances of each pregnancy.

The document has been prepared having regard to the information available at the time of its preparation, and each Practitioner must have regard to relevant information, research or material which may have been published or become available subsequently.

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This document has been developed and revised with external funding from the Victorian Managed Insurance Authority (VMIA). The views or interests of the VMIA have not influenced the development of this document.

All members of the Guideline Review Group agreed to declare any interests or connections with relevant companies or other organisations prior to publication.

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Approved by RANZCOG Council 4 March 2006
Issue date: May 2006
Review date: December 2009

ISBN: 0-947340-12-2

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Preamble

Development of guidelines: 2000-2002

In September 2000 Victorian Managed Insurance Authority (VMIA) provided RANZCOG with a confidential report into obstetric cases reported to the authority between 1993 and 1998. The report identified cases in which the reviewers considered there were potentially avoidable factors resulting in an adverse outcome. Issues relating to the use and interpretation of cardiotocographs (CTGs) represented a high proportion of these cases. In response to this report the RANZCOG Council endorsed a submission from its Practice Improvement and Medico-legal Committees to develop an evidence-informed clinical practice guideline in intrapartum fetal surveillance. This submission was approved for funding by VMIA.

In 2001, Professor Bruce Barraclough, Chair, Australian Council for Safety and Quality in Health Care at the launch of the National Action Plan 2001, argued that improving the quality and safety of patient care was the most important challenge facing health professionals; "we must stop blaming individuals and put much greater effort into making our systems of care safer and better."[1] The Douglas Report: Inquiry into obstetric and gynaecological services at King Edward Memorial Hospital 1990–2000, published in November 2001, also highlights key clinical governance issues in obstetric and gynaecology services.[2] The report emphasises the importance of clinical risk management strategies based on the identification and analysis of risk in a framework that enables the establishment of processes to minimise risk. The development of clinical practice guidelines, along with strategies to ensure their implementation via an effective education and credentialing process, would provide a framework to support health professionals in the provision of safe, quality health care.

Clinical guidelines are an increasingly familiar part of clinical practice. Their principal aim is to improve the effectiveness and efficiency of clinical care through the identification of good clinical practice and desired clinical outcomes. The specific aim of the guidelines, in combination with continuing education, training and credentialing, is to reduce adverse perinatal outcomes related to inappropriate or inadequate intrapartum fetal surveillance. The guidelines do not diminish the responsibility of health professionals to make considered judgements about intrapartum fetal surveillance, taking into account the risk assessment and preferences of the individual woman in labour.

The RANZCOG established a Guideline Development Group and contracted The Royal Women's Hospital Division of Research and Education (Project Team) to assist in the development of these evidence-informed guidelines. While this project was funded and developed in Victoria there was an extensive consultation process outside the state when developing the original guidelines (Appendix A). A draft was circulated throughout Australia and New Zealand to Fellows, Diplomates, Midwives, the Royal Australian College of General Practitioners (RACGP), the Australian College of Rural and Remote Medicine (ACRRM) and consumers.

The initial phase of this project involved a search and critical appraisal of recent publications addressing the topic of intrapartum fetal surveillance. In view of the release in May 2001 in the United Kingdom of the Royal College of Obstetricians and Gynaecologists (RCOG)/National Institute for Clinical Excellence (NICE) Guidelines on the use of electronic fetal monitoring,[3] which included a comprehensive bibliography and evaluation of the literature, it was agreed to restrict the literature search and appraisal to articles published from July 2000 onwards and to integrate new literature with the existing evidence to that date.

In the opinion of the Guideline Development Group, the environment in which obstetrics is practised in Australia and New Zealand differed sufficiently from that of the United Kingdom to require a set of guidelines for use in the Australian and New Zealand setting. In particular, the health care system has a different public/private split and maternity care is provided in a range of facilities at level 1, 2 or 3, with varying degrees of obstetric back up. In addition, rural and provincial practitioners often provide services in isolation both professionally and geographically. There was also concern that the numbers of health care professionals practising obstetrics and midwifery in Australia were diminishing[4,5] and that local guidelines might have a role in mitigating this trend. Accordingly, the guidelines were produced in order to provide a foundation on which clinicians providing intrapartum care in Australia and New Zealand should base their practice.

In December 2002 the Clinical Guidelines for Intrapartum Fetal Surveillance were published with a planned revision date in 2004. Copies of the guidelines were widely circulated and have been freely available on the College website (www.ranzcog.edu.au). Users of the guidelines have been encouraged to provide feedback on any aspects that required clarification and any barriers or problems they expected or experienced in implementing the guidelines. The feedback from users was collated and held at College House.

Revision of guidelines: 2004-2006

In 2004, a Guideline Review Group was convened to oversee the revision process of the guidelines. This process involved a number of distinct but related steps including the review of feedback from clinicians (both medical and midwifery), a further literature update appraisal (from 2002-2005), an expert panel workshop and further drafting. Following the revision a workshop was convened where key stakeholders were invited to participate in multidisciplinary discussion of the revised guidelines prior to publication (Appendix B). Such external consultation facilitated dialog to ensure the guidelines were relevant to the needs of clinicians and consumers throughout Australia and New Zealand.

Thus, the following guidelines were produced in order to provide a foundation on which clinicians providing intrapartum care in Australia and New Zealand should base their practice. These guidelines are written as a general guide, subject to the clinician's expert judgement in any particular clinical situation. The Guideline Review Group and the Project Team have followed the process recommended by the National Health and Medical Research Council (NHMRC) for the development of guidelines (Appendix C).[6]

These guidelines have been developed using the best available evidence. Where insufficient high-level evidence was available, recommendations have been developed based on expert opinion and consensus.

Aims

The specific aim of the guidelines is, in combination with continuing education and training, to reduce adverse perinatal outcomes related to inappropriate or inadequate intrapartum fetal surveillance. This will be achieved by encouraging best practice in:

- Decisions relating to the use and interpretation of intermittent auscultation (IA) or electronic fetal monitoring (EFM),
- Decisions relating to the use of admission CTG, and
- Management of suspected fetal compromise both pre labour and intrapartum.

Introduction

The principal aim of intrapartum fetal surveillance is to prevent adverse perinatal outcomes arising from fetal metabolic acidosis/cerebral hypoxia related to labour. However, many factors contribute to the development and severity of an asphyxial injury (e.g. tissue perfusion, tissue substrate availability, the duration and severity of the insult) such that the relationship between metabolic acidosis and cerebral damage is complex. Therefore, the degree of tissue damage and subsequent injury does not necessarily relate directly to the extent of fetal metabolic acidosis arising during labour. Furthermore, it is clear that most often damage is actually sustained during pregnancy, prior to labour, rather than arising de novo during labour and delivery.

Nonetheless, the practice of fetal surveillance during labour would be expected to detect those fetuses at risk of compromise, allowing appropriate intervention and thereby increasing the likelihood of improved perinatal outcomes. Monitoring the health of the fetus during labour has therefore become a key component of modern maternity care. Traditionally, this was undertaken by simple regular auscultation of the fetal heart with a stethoscope. However, this approach was considered by many to be inadequate, particularly for high-risk pregnancies. Therefore, in an effort to reduce the incidence of intrapartum fetal mortality and morbidity, the use of intrapartum EFM, particularly continuous EFM, has steadily increased over the last 25 years.

The use of EFM for intrapartum fetal surveillance has now become entrenched in practice without robust randomised controlled trial (RCT) evidence to support it. The RCTs of continuous EFM which have been undertaken have suggested that its use is not associated with statistically significant improvements in long-term neonatal outcomes such as cerebral palsy, but that it is associated with significantly increased rates of (unnecessary) operative delivery. To a certain extent, the increased intervention can be minimised with the concomitant use of fetal blood sampling.[7] Nonetheless, not surprisingly, concerns about maternal hazards and small or absent perinatal benefit have led some authorities to advise against the routine use of continuous EFM for low risk labours.[3,8,9]

However, the interpretation of the available evidence is more complex. Firstly, it is widely acknowledged that the accumulated evidence of RCTs, when subjected to meta-analysis, still does not have sufficient patient numbers to validly assess effects on a rare outcome such as cerebral palsy.[10] It is therefore quite possible that continuous EFM does confer important benefits on neonatal outcomes but that these benefits have not been revealed by the trials undertaken to date. Indeed, there is other evidence, both from RCTs and cohort studies, using surrogate end points that would support the routine use of continuous EFM.[11,12] Secondly, it is now widely appreciated that the visual interpretation of continuously generated signals from the fetal heart, however derived, is subject to shortcomings in interpretation. Review of cases with poor outcomes repeatedly demonstrate that abnormal CTGs were misinterpreted and the resulting management inappropriate.[13,14] This likely arises, at least in part, because health care professionals have not been supported by comprehensive ongoing education and credentialing programs.

It is therefore not surprising that the apparent inconsistencies in the currently available evidence and apparent inadequacies of professional training in the use of intrapartum fetal surveillance have resulted in differences in practice.[15] However, the avoidance of adverse outcomes from intrapartum insult remains the objective of intrapartum fetal surveillance. This objective should be the same at all hospitals providing maternity services, regardless of their size or the casemix of their population. How this objective is met may vary according to local resources and patient mix but it is more likely to be met, and met consistently, through the provision of clinical guidelines pertaining to the practice of intrapartum fetal surveillance, supported by continuing professional development in the application and interpretation of fetal monitoring. It is hoped that these guidelines assist in these processes.

Guidelines and Good Practice Notes

1 Communication and information

Women are encouraged to involve themselves in making informed decisions together with their obstetrician, general practitioner or midwife about intrapartum fetal surveillance, based on accurate information and consideration of their particular risk factors, if any. RANZCOG has developed a patient information pamphlet to complement the guidelines, which can be obtained from RANZCOG (Appendix G).

Women should have the same level of general care and support, regardless of their decision about intrapartum fetal surveillance.

Guideline 1

During their pregnancy, women should be offered information on intrapartum fetal surveillance.

Grading of recommendation: C

Intrapartum fetal surveillance and its interpretation is a complex task which requires:

- A sound understanding of fetal physiological responses to hypoxia,
- Good pattern recognition skills, and
- The ability to integrate this knowledge with each clinical situation.

Case reviews have indicated that adverse perinatal outcomes are more likely to occur where there is lack of clear communication between clinicians caring for the individual woman and failure to use clear and consistent terminology.[9,16] A comprehensive education and credentialing program can best address these issues, enabling suitable competency assessment of health professionals to identify and minimise system errors, which contribute to poor fetal surveillance practices.[2]

Guideline 2

Institutions undertaking intrapartum care have a responsibility to ensure that health professionals have an understanding of the relevant maternal and fetal pathophysiology and are able to demonstrate competence in the interpretation of fetal surveillance options.

Grading of recommendation: C

Good Practice Note

The Guideline Review Group has assessed grading and classification systems for FHR interpretation. Without an adequate appreciation of the underlying pathophysiology such systems may mislead the user. The Guideline Review Group recommends that all health professionals should participate in an ongoing education program in fetal surveillance and that if used, the inclusion of grading/classification systems in such programs should be in addition to, rather than instead of, an understanding of fundamental physiology.

Hospitals and health services should ensure that the health professionals providing intrapartum care have access to regular training in intrapartum fetal surveillance. The Guideline Review Group recommends that training should occur in a multidisciplinary forum to optimise communication between professional groups.

2 Standardisation

Recent reports on strategies to reduce medical errors have highlighted the need to simplify systems and standardise procedures.[17,18] With respect to undertaking CTG monitoring, there is no evidence that any particular paper speed is preferable, but it is recognised that the paper speed selected should be familiar to all users. The Guideline Review Group endorses the RCOG/NICE recommendation for standard CTG settings.[3,19]

Guideline 3

Settings on CTG machines should be standardised to enable a consistent approach to teaching and interpretation of EFM traces, particularly as many health professionals move between different institutions in Australia and New Zealand.

Until there is clear evidence that interpretation based on one paper speed is superior to the others, it is recommended that the paper speed of 1cm per minute be adopted universally.

Grading of recommendation: C

Good Practice Note

Date and time settings on CTG machines should be validated whenever used.

CTGs should be labelled with the mother's name, hospital number, date and time of commencement.

Any intrapartum events that may affect the FHR (e.g. vaginal examination, obtaining a fetal blood sample (FBS), insertion/siting of an epidural) should be noted contemporaneously both on the CTG and in the maternal notes, including date, time and signature.

For women receiving continuous EFM, the CTG should be reviewed at least every 15-30 minutes. It should be regularly recorded, either by written or electronic entry, in the medical record that the CTG has been reviewed.

Health professionals should be aware that machines from different manufacturers use different vertical axis scales, and this can change the perception of fetal heart rate variability.

3 Which modality of intrapartum fetal surveillance should be used?

There is universal acceptance that the fetus in labour is at particular risk from hypoxic damage.[20] It is expected that the detection of fetal compromise enables appropriate and timely intervention, thereby reducing the incidence of adverse outcomes.[14]

Guideline 4

Fetal surveillance in labour, whether by intermittent auscultation or by electronic fetal monitoring, should be recommended to all women, in accordance with these guidelines.

Grading of recommendation: C

4 Intrapartum fetal surveillance in the absence of risk factors for fetal compromise

4.1 Admission CTG

The admission CTG is a commonly used screening test, which aims to identify, on admission to the delivery unit, the fetus at increased risk of intrapartum hypoxia. A number of cohort studies[21,22] and case control series[23] have suggested that the use of an admission CTG improves the prediction of important adverse perinatal outcomes including neonatal acidaemia, term neonatal encephalopathy,[23] long-term neurological impairment[24] and death.[21] In addition to these cohort studies, three RCTs[25,26,27] of admission CTG versus intermittent Doppler auscultation of the fetal heart rate have now been reported. None of the RCTs demonstrated any statistically significant improvements in immediate neonatal outcomes, suggesting that the true utility of the admission CTG may be less than predicted from the cohort and case control studies.

A recent systematic review of both the observational studies and RCTs concluded that the routine use of admission CTG was not beneficial in low risk women.[28] However, the authors of that review, and others,[29-31] have highlighted that the studies have not been of sufficient size to demonstrate statistically significant differences in the incidence of important but infrequent neonatal outcomes such as hypoxic ischaemic encephalopathy (HIE)[10,29-31] and it remains possible that admission CTG does confer some benefit. Indeed, in the Dundee trial,[25] there was a trend to a higher incidence of HIE in the Doppler IA group compared to the admission CTG group (0.8% vs 0.4%).

Importantly, in the Dublin trial,[27] the largest trial reported to date which therefore dominates the meta-analysis,[28] early amniotomy was performed and continuous EFM undertaken if meconium-stained liquor was observed. In Australia and New Zealand early amniotomy is less commonly practised and therefore less women with meconium stained liquor, an important intrapartum risk factor for fetal hypoxia, will be recognised early in labour. Thus, the possible benefits of admission CTG in Australian and New Zealand practice may be greater than would have been detectable in the Dublin trial.

One concern about admission CTG is that its use may increase intervention. The Dundee trial suggested that low risk women assigned to the admission CTG group were more likely to experience a number of additional interventions including continuous intrapartum EFM, augmentation of labour, epidural analgesia and operative delivery.[25] This finding argued against the routine use admission CTG, even if there was possible, though not probable, fetal benefit. The two subsequent RCTs[26,27] have failed to demonstrate such increased "flow-on" intervention when admission CTG is used, suggesting that the admission CTG does no harm. The systematic review concludes that routine use of admission CTG is associated with an increase in minor interventions only with no increase in operative delivery.[28]

In summary, there is no strong evidence that admission CTG in low risk pregnancies confers significant benefit, in terms of reducing adverse perinatal outcomes, nor does it appear to be associated with an increase in major interventions.

Guideline 5

There is insufficient evidence to confidently guide routine practice regarding the use of admission CTG in low risk women. Individual hospitals and/or attending clinicians should decide whether or not to routinely use admission CTG, weighing the increase in minor intervention against a possible fetal benefit in a small number of labours.

Grading of recommendation: B

Good Practice Note

Admission CTG offers an approach that may identify the unrecognised "at risk" fetus and may be particularly beneficial in women in whom early amniotomy is not planned/desired and in women between 41^{0} and 41^{6} weeks gestation.

4.2 Intermittent auscultation or continuous electronic fetal monitoring for low risk women?

The Cochrane systematic review comparing RCTs of IA and continuous EFM for low risk women in labour states that "the only clinically significant benefit from the use of routine continuous EFM monitoring was in the reduction in neonatal seizures."[7] While the Guideline Review Group agrees with this statement it believes that the statement may distract clinicians from the significant limitations with the RCT evidence. As discussed above, the meta-analysis of the current RCT literature does not have sufficient power to adequately address whether there are clinically important reductions in serious perinatal morbidity or mortality. This is due to the low incidence of these serious adverse outcomes in low risk populations.[32] For example, the Cochrane systematic review reports that there is a 33% reduction in perinatal mortality in the continuous EFM group, yet this does not reach statistical significance.[7] It is therefore possible that continuous EFM may confer some benefit albeit in a very small number of labours.

On the other hand, continuous EFM undoubtedly increases caesarean section and operative vaginal delivery rates. This increase can be minimised, though not negated, with the judicious use of fetal blood sampling.[7] Therefore, the increase in intervention rate with continuous EFM must be balanced against a possible but unproven benefit in a small number of low risk pregnancies. The decision regarding the use of EFM or IA must be reached jointly by the pregnant woman and her health professionals.

Guideline 6

Intermittent auscultation is recommended as a minimum for women who, at the onset of labour, are identified as having a low risk of developing fetal compromise.

Grading of recommendation: A

4.3 Method of intermittent auscultation

Intermittent auscultation is defined as the auscultation of the fetal heart using a hand held Doppler at regular intervals and for a pre-defined duration during labour. There is evidence that use of a Pinard stethoscope is not as accurate as a hand held Doppler in the detection of fetal heart rate abnormalities.[33,34] In the opinion of the Guideline Review Group it is preferable that the Doppler signal be on speaker mode.

In relation to the frequency of auscultation, there have been no clinical studies comparing different frequencies to guide practice. The Dublin study[11] used auscultation at 15 minute intervals and some authorities have accepted this frequency as appropriate without further evidence. Based upon this trial, the RCOG/NICE guidelines recommended 15 minute intervals of intermittent auscultation.[3] However, it has been highlighted that there is no high level evidence to support this recommendation[35] and the observational evidence of experts is that every 30 minutes is adequate and is a frequency of monitoring that is widespread established standard practice in Australia, New Zealand and many overseas countries.[8,33,34] Accordingly, it is recommended that IA should be undertaken at least every 15 – 30 minutes in the first stage of labour. In the second stage of labour, when fetal oxygenation is prone to change more rapidly, IA should be at least every 5 minutes in the absence of active pushing and toward the end and for at least 30 seconds after each contraction during active pushing in the second stage of labour.[35]

Guideline 7

Intermittent auscultation should be performed using Doppler ultrasound rather than a Pinard stethoscope.

Grading of recommendation: A

Guideline 8

When using intermittent auscultation it should be performed according to a standardised protocol:

- Auscultation should occur with Doppler signal on speaker mode.
- Each auscultation episode should commence toward the end of a contraction and continue for at least 30 seconds after the contraction has finished.

Auscultation should be undertaken:

- At least every 15-30 minutes in the active phase of the first stage of labour.
- At least every 5 minutes in the second stage of labour.
- Toward the end and for at least 30 seconds after each contraction during active pushing in the second stage of labour.

Grading of recommendation: C

4.4 Electronic fetal monitoring in low risk pregnancies

As discussed in the introduction and under section in 4.2, EFM has become entrenched in current maternity care without robust evidence in support. It is therefore important to consider the use of EFM in low risk pregnancies. EFM may be used continuously – and the potential benefits and disadvantages of continuous EFM have been summarised above – or intermittently. The place for intermittent EFM in low risk pregnancies has not been clearly defined. Intermittent EFM in conjunction with IA is sometimes used as an alternative to IA or continuous EFM in low risk pregnancies. EFM is useful to assess baseline variability which cannot be assessed with IA. One trial comparing intermittent EFM with continuous EFM reported equivalent outcomes in low risk women[15] but, as always, there were insufficient numbers of pregnancies studied to detect differences in the important, but rare, neonatal outcomes. Another trial compared intermittent EFM with IA.[33] In that trial the use of intermittent EFM was more able to detect abnormal fetal heart rate patterns than IA, was associated with an increased caesarean section rate compared to IA but did not confer any reductions in important adverse neonatal outcomes. Again numbers of pregnancies studied were small. Thus, there is currently insufficient evidence to either recommend or reject the use of intermittent EFM for a low risk pregnancy.[15,33] The available evidence suggests that while its use is reasonable, it is associated with increased intervention rates similar to continuous EFM. Accordingly, decisions regarding the use of either continuous or intermittent EFM in low risk pregnancies should balance the proven increased risks of intervention (caesarean section and instrumental vaginal delivery) against possible but unproven neonatal benefits in a small number of labours.

Guideline 9

The use of EFM, whether continuous or intermittent, in women with low risk of fetal compromise should be individualised, weighing the probable increase in intervention rates against a possible fetal benefit in a small number of labours.

Grading of recommendation: B

Good Practice Note

When using intermittent EFM in the first stage of labour it should be performed according to a standardised protocol:

- EFM should be undertaken for a minimum of 15 minutes at least every 2 hours.
- The episode of EFM should only be discontinued if the CTG is normal.
- IA should be undertaken according to Guideline 8 between episodes of EFM.

5 Intrapartum fetal surveillance in the presence of risk factors for fetal compromise

A number of antenatal and intrapartum risk factors have been shown to be associated with the development of neonatal encephalopathy, cerebral palsy or perinatal death (see algorithm). In the presence of any of these risk factors, continuous EFM should be recommended.[37-44]

Guideline 10

Continuous EFM should be recommended when either risk factors for fetal compromise have been detected antenatally, are detected at the onset of labour or develop during labour. (see algorithm)

Grading of recommendation: B

Good Practice Note

Where continuous EFM is required for the substantial part of labour, and if the EFM to date is considered to be normal, monitoring may be interrupted for short periods of up to 15 minutes to allow personal care (e.g. shower, toilet). Such interruptions should be infrequent and not occur immediately after any intervention that might be expected to alter the FHR (e.g. amniotomy, epidural insertion or top-up etc).

6 Management of fetal heart rate patterns considered suggestive of fetal compromise

Fetal compromise in labour may be due to a variety of pathologies including placental insufficiency, uterine hyperstimulation, maternal hypotension, cord compression and placental abruption. Identification and management of reversible abnormalities may prevent unnecessary intervention. In particular, when uterine hypertonus is associated with abnormal fetal heart rate patterns acute tocolysis has been shown to be useful.[45,46] However, if significant abnormalities persist, further evaluation or delivery is indicated.[7,37,47-50]

Guideline 11

In clinical situations where the FHR pattern is considered abnormal, immediate management includes:

- Identification of any reversible cause of the abnormality and initiation of appropriate action (e.g. correction of maternal hypotension, cessation of oxytocin and/or tocolysis for excessive uterine activity) and
- Initiation or maintenance of continuous EFM.
- Consideration of further fetal evaluation or delivery if a significant abnormality persists.

Grading of recommendation: A

Good Practice Note

Maternal repositioning may alleviate maternal hypotension or cord compression and improve fetal condition.

Cessation of an oxytocin infusion, if running, may alleviate contraction related fetal compromise.

All institutions should be familiar with and have a protocol for acute tocolysis. Regimens currently available include:

- Intravenous or subcutaneous terbutaline 250 micrograms.
- Sublingual GTN spray, 400 micrograms.
- Intravenous salbutamol 100 micrograms.

Good Practice Note

The normal CTG is associated with a low probability of fetal compromise and has the following features:

- Baseline rate 110-160.
- Baseline variability of 5-25 bpm.
- Accelerations 15bpm for 15 seconds.
- No decelerations.

All other CTGs are by this definition abnormal and require further evaluation taking into account the full clinical picture.

The following features are unlikely to be associated with significant fetal compromise when occurring in isolation:

- Baseline rate 100-109.
- Absence of accelerations.
- Early decelerations.
- Variable decelerations without complicating features.

The following features may be associated with significant fetal compromise and require further action, such as described in Guideline 10:

- Fetal tachycardia.
- Reduced baseline variability.
- Complicated variable decelerations.
- Late decelerations.
- Prolonged decelerations.

The following features are very likely to be associated with significant fetal compromise and require immediate management, which may include urgent delivery:

- Prolonged bradycardia (<100 bpm for >5 minutes).
- Absent baseline variability.
- Sinusoidal pattern.
- Complicated variable decelerations with reduced baseline variability.
- Late decelerations with reduced variability.

See Appendix E for definitions

6.1 Fetal blood sampling

The increased intervention rates associated with EFM can be reduced with the use of fetal blood sampling (FBS).[7] Accordingly, the RCOG guidelines recommend that units employing EFM should have access to FBS facilities.[3] However, in Australia and New Zealand many women birth in hospitals where undertaking FBS may delay a necessary delivery and thereby worsen outcomes. Therefore, the Guideline Review Group recognise that while FBS facilities are desirable, particularly in larger units that have ready access to operative delivery if required, it is not practical for all hospitals to provide FBS.

In the past, some hospitals that may have wished to provide FBS were unable to because of the costs of maintaining the necessary hardware. More recently, the introduction and validation of scalp lactate measurement[50,51] has provided an affordable

alternative. Indeed, in a trial comparing FBS for pH measurement with FBS for lactate, there were significantly less failed procedures in the lactate measurement group[50] suggesting that lactate measurement is easier to perform – requiring less sample volume – and so more likely to be appropriately utilised. If FBS is performed, the scalp pH or lactate result should be interpreted taking into account any previous measurement, the rate of progress in labour and other clinical circumstances.

Good Practice Note

Units employing EFM are strongly encouraged to have access to fetal blood sampling facilities.

The use of scalp lactate rather than pH measurement will provide an easier and more affordable adjunct to EFM for most units.

In situations where FBS is contraindicated or not possible, decisions regarding delivery should take into account the severity of the FHR abnormality and the clinical situation.[9, 52-55]

Guideline 12

Delivery should be expedited where:

- Significant fetal acidosis is suspected.
- There is clear evidence of serious fetal compromise (FBS should not be undertaken).
- CTG abnormalities are of a degree requiring further assessment, but FBS is contraindicated, clinically inappropriate or not feasible.

Grading of recommendation: B

Good Practice Note

If FBS is undertaken it is recommended that the woman be in the left-lateral position or lithotomy with a wedge in place. Contraindications to FBS include:

- Clear evidence on continuous EFM of serious, sustained fetal compromise.
- Fetal bleeding disorders (e.g. suspected fetal thrombocytopenia).
- Face presentation.
- Maternal infection* (e.g. HIV, hepatitis viruses, herpes simplex virus and suspected intrauterine sepsis).

FBS is not generally recommended in pregnancies at less than 34 weeks of gestation because delivery may be inappropriately delayed in a small "at risk" fetus that may sustain damage earlier than would be expected in a term fetus.

It is recommended that umbilical cord arterial and venous blood should be collected at the time of delivery to confirm acid-base status when a FBS has been performed intrapartum.

*Group B Streptococcus carrier status does not preclude FBS

7 Maintaining standards in intrapartum fetal surveillance

7.1 Education

It is acknowledged that these guidelines need to be complemented by a comprehensive and ongoing education and competency testing program for health professionals. The Guideline Review Group is aware of a number such programs currently available in Australia and New Zealand, including the RANZCOG Fetal Surveillance Education Program. Further information about the Fetal Surveillance Education Program and other education resources is available through RANZCOG. It is anticipated that RANZCOG will develop and maintain a register of such programs/resources. As detailed in Guideline 2, the Guideline Review Group believed that institutions providing birthing services have a responsibility to ensure that the relevant health professionals are appropriately skilled in fetal surveillance. Accordingly, it is recommended that institutions ensure that their staff have access to suitable educational resources, such as the Fetal Surveillance Education Program.

7.2 Clinical audit and practice review

Health professionals with responsibility for the intrapartum care of women should review their current practice in line with these guidelines. These guidelines are likely to improve clinical practice and outcomes where they become a foundation of routine clinical care. Institutions and health professionals are encouraged to develop and undertake regular audits of guideline implementation and regular reviews of clinical practice. It is believed that such audits and reviews are best undertaken in a multidisciplinary environment. Aspects of care and guideline implementation that are suitable for audit include:

- Women receiving continuous EFM and indications for such monitoring.
- Women with indications for continuous EFM who did not receive it.
- Delivery interventions arising from monitoring.
- Poor perinatal outcomes.
- Fetal scalp samplings.
- Maternal satisfaction.

RANZCOG has developed and piloted an audit tool to facilitate the ongoing monitoring of CTGs (Appendix H).

In addition to formal audits it is recommended that health professionals participate in regular practice review meetings such as CTG reviews and reviews of intrapartum interventions triggered by fetal surveillance.

Local evaluation of the use of fetal surveillance should address:

- Education of health professionals.
- Provision of information for women.
- Competency assessment of health professionals.
- Availability of monitoring equipment including FBS.
- Timely access to operative delivery.

Guideline 13

All health professionals should participate in regular multi-disciplinary clinical audits focussing on maternal and perinatal outcomes in relation to intrapartum fetal surveillance.

Grading of recommendation: C

Good Practice Note

The Guideline Review Group recommends the following practices to assist with clinical audit and education:

- Regular CTG review meetings.
- Paired (arterial and venous) umbilical cord blood analysis following abnormal FHR pattern, operative deliveries, low apgars <7 at 5 minutes.
- Review of the use of FBS where available.

7.3 Maintenance of competence

Health professionals with responsibility for performing and interpreting continuous EFM should receive regular training with assessment to ensure maintenance of competence. RANZCOG is aware that there are no validated competency testing resources. Accordingly, it is planned to develop such a resource to complement the Fetal Surveillance Education Program and other education programs.

7.4 Local implementation

It is anticipated that these guidelines will provide the basis for hospital policies and procedures, which will take into account the constraints of local resources. The implementation of these guidelines should be undertaken as part of the quality improvement program for each hospital. Hospitals should review existing service provision against these guidelines. This review should identify the resources required to implement these guidelines.

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Intrapartum Fetal Surveillance

Clinical Guidelines – Summary of Guidelines and Good Practice Notes

Communication and information

Guideline 1

During their pregnancy, women should be offered information on intrapartum fetal surveillance.

Grading of recommendation: C

Guideline 2

Institutions undertaking intrapartum care have a responsibility to ensure that health professionals have an understanding of the relevant maternal and fetal pathophysiology and are able to demonstrate competence in the interpretation of fetal surveillance options.

Grading of recommendation: C

Good Practice Note

The Guideline Review Group has assessed grading and classification systems for FHR interpretation. Without an adequate appreciation of the underlying pathophysiology such systems may mislead the user. The Guideline Review Group recommends that all health professionals should participate in an ongoing education program in fetal surveillance and that if used, the inclusion of grading/classification systems in such programs should be in addition to, rather than instead of, an understanding of fundamental physiology.

Hospitals and health services should ensure that the health professionals providing intrapartum care have access to regular training in intrapartum fetal surveillance. The Guideline Review Group recommends that training should occur in a multidisciplinary forum to optimise communication between professional groups.

Standardisation

Guideline 3

Settings on CTG machines should be standardised to enable a consistent approach to teaching and interpretation of EFM traces, particularly as many health professionals move between different institutions in Australia and New Zealand.

Until there is clear evidence that interpretation based on one paper speed is superior to the others, it is recommended that the paper speed of 1cm per minute be adopted universally.

Grading of recommendation: C

Good Practice Note

Date and time settings on CTG machines should be validated whenever used.

CTGs should be labelled with the mother's name, hospital number, date and time of commencement.

Any intrapartum events that may affect the FHR (e.g. vaginal examination, obtaining a fetal blood sample (FBS), insertion/siting of an epidural) should be noted contemporaneously both on the CTG and in the maternal notes, including date, time and signature.

For women receiving continuous EFM, the CTG should be reviewed at least every 15-30 minutes. It should be regularly recorded, either by written or electronic entry, in the medical record that the CTG has been reviewed.

Health professionals should be aware that machines from different manufacturers use different vertical axis scales, and this can change the perception of fetal heart rate variability.

Which modality should be used

Guideline 4

Fetal surveillance in labour, whether by intermittent auscultation or by electronic fetal monitoring, should be recommended to all women, in accordance with these guidelines.

Grading of recommendation: C

Low risk women

Guideline 5

There is insufficient evidence to confidently guide routine practice regarding the use of admission CTG in low risk women. Individual hospitals and/or attending clinicians should decide whether or not to routinely use admission CTG, weighing the increase in minor intervention against a possible fetal benefit in a small number of labours.

Grading of recommendation: B

Good Practice Note

Admission CTG offers an approach that may identify the unrecognised "at risk" fetus and may be particularly beneficial in women in whom early amniotomy is not planned/desired and in women between 41^{0} and 41^{6} weeks gestation.

Low risk women (cont'd)

Guideline 6

Intermittent auscultation is recommended as a minimum for women who, at the onset of labour, are identified as having a low risk of developing fetal compromise.

Grading of recommendation: A

Guideline 7

Intermittent auscultation should be performed using Doppler ultrasound rather than a Pinard stethoscope.

Grading of recommendation: A

Guideline 8

When using intermittent auscultation it should be performed according to a standardised protocol:

- Auscultation should occur with Doppler signal on speaker mode.
- Each auscultation episode should commence toward the end of a contraction and continue for at least 30 seconds after the contraction has finished.

Auscultation should be undertaken:

- At least every 15-30 minutes in the active phase of the first stage of labour.
- At least every 5 minutes in the second stage of labour.
- Toward the end and for at least 30 seconds after each contraction during active pushing in the second stage of labour.

Grading of recommendation: C

Guideline 9

The use of EFM, whether continuous or intermittent, in women with low risk of fetal compromise should be individualised, weighing the probable increase in intervention rates against a possible fetal benefit in a small number of labours.

Grading of recommendation: B

Good Practice Note

When using intermittent EFM in the first stage of labour it should be performed according to a standardised protocol:

- EFM should be undertaken for a minimum of 15 minutes at least every 2 hours.
- The episode of EFM should only be discontinued if the CTG is normal.
- IA should be undertaken according to Guideline 8 between episodes of EFM.

Risk of fetal compromise

Guideline 10

Continuous EFM should be recommended when either risk factors for fetal compromise have been detected antenatally, are detected at the onset of labour or develop during labour. (see algorithm)

Grading of recommendation: B

Good Practice Note

Where continuous EFM is required for the substantial part of labour, and if the EFM to date is considered to be normal, monitoring may be interrupted for short periods of up to 15 minutes to allow personal care (e.g. shower, toilet). Such interruptions should be infrequent and not occur immediately after any intervention that might be expected to alter the FHR (e.g. amniotomy, epidural insertion or top-up etc).

Guideline 11

In clinical situations where the FHR pattern is considered abnormal, immediate management includes:

- Identification of any reversible cause of the abnormality and initiation of appropriate action (e.g. correction of maternal hypotension, cessation of oxytocin and/or tocolysis for excessive uterine activity) and
- Initiation or maintenance of continuous EFM.
- Consideration of further fetal evaluation or delivery if a significant abnormality persists.

Grading of recommendation: A

Good Practice Note

Maternal repositioning may alleviate maternal hypotension or cord compression and improve fetal condition.

Cessation of an oxytocin infusion, if running, may alleviate contraction related fetal compromise.

All institutions should be familiar with and have a protocol for acute tocolysis. Regimens currently available include:

- Intravenous or subcutaneous terbutaline 250 micrograms.
- Sublingual GTN spray, 400 micrograms.
- Intravenous salbutamol 100 micrograms.

Risk of fetal compromise (cont'd)

Good Practice Note

The normal CTG is associated with a low probability of fetal compromise and has the following features:

- Baseline rate 110-160.
- Baseline variability of 5-25 bpm.
- Accelerations 15bpm for 15 seconds.
- No decelerations.

All other CTGs are by this definition abnormal and require further evaluation taking into account the full clinical picture.

The following features are unlikely to be associated with significant fetal compromise <u>when occurring in isolation:</u>

- Baseline rate 100-109.
- Absence of accelerations.
- Early decelerations.
- Variable decelerations without complicating features.

The following features <u>may be</u> associated with significant fetal compromise and require further action, such as described in Guideline 10:

- Fetal tachycardia.
- Reduced baseline variability.
- Complicated variable decelerations.
- Late decelerations.
- Prolonged decelerations.

The following features <u>are very likely to be</u> associated with significant fetal compromise and require immediate management, which may include urgent delivery:

- Prolonged bradycardia (<100 bpm for >5 minutes).
- Absent baseline variability.
- Sinusoidal pattern.
- Complicated variable decelerations with reduced baseline variability.
- Late decelerations with reduced variability.

See Appendix E for definitions

Good Practice Note

Units employing EFM are strongly encouraged to have access to fetal blood sampling facilities.

The use of scalp lactate rather than pH measurement will provide an easier and more affordable adjunct to EFM for most units.

Guideline 12

Delivery should be expedited where:

- Significant fetal acidosis is suspected.
- There is clear evidence of serious fetal compromise (FBS should not be undertaken).
- CTG abnormalities are of a degree requiring further assessment, but FBS is contraindicated, clinically inappropriate or not feasible.

Grading of recommendation: B

Good Practice Note

If FBS is undertaken it is recommended that the woman be in the left-lateral position or lithotomy with a wedge in place. Contraindications to FBS include:

- Clear evidence on continuous EFM of serious, sustained fetal compromise.
- Fetal bleeding disorders (e.g. suspected fetal thrombocytopenia).
- Face presentation.
- Maternal infection* (e.g. HIV, hepatitis viruses, herpes simplex virus and suspected intrauterine sepsis).

FBS is not generally recommended in pregnancies at less than 34 weeks of gestation because delivery may be inappropriately delayed in a small "at risk" fetus that may sustain damage earlier than would be expected in a term fetus.

It is recommended that umbilical cord arterial and venous blood should be collected at the time of delivery to confirm acid-base status when a FBS has been performed intrapartum.

*Group B Streptococcus carrier status does not preclude FBS

Maintaining standards and practice review

Guideline 13

All health professionals should participate in regular multidisciplinary clinical audits focussing on maternal and perinatal outcomes in relation to intrapartum fetal surveillance.

Grading of recommendation: C

Good Practice Note

The Guideline Review Group recommends the following practices to assist with clinical audit and education:

- Regular CTG review meetings.
- Paired (arterial and venous) umbilical cord blood analysis following abnormal FHR pattern, operative deliveries, low apgars <7 at 5 minutes.
- Review of the use of FBS where available.

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Intrapartum Fetal Surveillance

Clinical Guidelines – Algorithm

ASK THE QUESTION!
Are there any identifiable antenatal risk factors?

NO

YES

Intermittent auscultation using a hand held Doppler

OR

EFM Intermittent or Continuous

normal

abnormal

EFM

abnormal

normal

Continuous EFM

ASK THE QUESTION!
Has an intrapartum risk factor developed?

NO

YES

Antenatal risk factors

Increased risk of fetal compromise, including:

- abnormal antenatal CTG
- abnormal Doppler umbilical artery velocimetry
- suspected or confirmed intrauterine growth restriction
- oligohydramnios or polyhydramnios
- prolonged pregnancy >42 weeks
- multiple pregnancy
- breech presentation
- antepartum haemorrhage
- prolonged rupture of membranes (>24 hours)
- known fetal abnormality which requires monitoring
- prior uterine scar/caesarean section
- pre-eclampsia
- diabetes (on insulin or poorly controlled or with fetal macrosomia)
- other current or previous obstetric or medical conditions which constitute a significant risk of fetal compromise

Intrapartum risk factors

- induction of labour with prostaglandin/oxytocin
- abnormal auscultation or CTG
- oxytocin augmentation
- epidural analgesia
- abnormal vaginal bleeding in labour
- maternal pyrexia 38°C
- meconium or blood stained liquor
- absent liquor following amniotomy
- active first stage of labour >12 hours (ie regular uterine activity, cervix 4cm dilated)
- active second stage (ie pushing) >1 hour where delivery is not imminent
- pre-term labour less than 37 completed weeks

Disclaimer: This algorithm is for general guidance only and is subject to a clinician's expert judgement. The algorithm should not be relied upon as a substitute for clinical advice

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Evaluation

The College is committed to the ongoing evaluation of the guidelines and encourages all health professionals to provide feedback on the Feedback sheet, which can be accessed via the RANZCOG website (www.ranzcog.edu.au) or a hard copy obtained from College House, Melbourne.

Review

It is recommended that these Guidelines be updated no later than 2009.

Classification of Levels of Evidence

The definitions of the types of evidence used in these guidelines have been adapted by the Guideline Review Group from the National Health and Medical Research Council (NHMRC).[6]

Levels of Evidence

I Evidence obtained from a systematic review of all relevant randomised controlled trials.
II Evidence obtained from at least one properly designed randomised controlled trial.
III-1 Evidence obtained from well-designed pseudorandomised controlled trials (alternate allocation or some other method).
III-2 Evidence obtained from comparative studies (including systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3 Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.
IV Evidence obtained from case series, either post test or pre test/post test.

Note: The Guideline Review Group agreed that evidence gathered from expert opinion should be considered as Level IV.

The definitions of the grades of recommendation used in these guidelines have been adapted from "The Use of Electronic Fetal Monitoring" by the RCOG NICE guidelines.

Grading of Recommendation*

A Requires adequate randomised controlled trial evidence as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence levels I, II).
B Requires the availability of well-conducted clinical studies on the topic of the recommendation (evidence levels III-1, III-2, III-3).
C Requires evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities. Indicates an absence of directly applicable clinical studies of good quality (evidence level IV).

Good Practice Notes

Recommended good practice based on the clinical experience of the Guideline Review Group

*Adapted from RCOG Guidelines.[3] Good Practice Notes are based on the clinical experience of the Guideline Review Group.

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Appendix A

Consultation process: development of the guidelines 2000-2002

1 Purpose of consultation

The purpose of this consultation was to obtain comment from those involved in maternity services as providers (obstetricians and midwives) and as users (consumer groups) on draft guidelines, good practice notes and clinical practice algorithms for intrapartum fetal surveillance.

For each guideline, good practice note and clinical practice algorithm, comment was invited on the issues of:

- Clarity,
- Feasibility,
- Evidence base,
- Support,
- Implementation, and
- Additional comments.

2 Who was consulted?

The RANZCOG Guideline Development Group provided names of 64 representatives of various special interest groups to be consulted including RACGP, ACCRM and ACMI, to the Royal Women's Hospital (RWH) Project Team.

3 Process of consultation

An initial mailout was conducted on 15 November 2001. Two subsequent mailouts were requested to include greater representation from other states.

Those invited to comment were provided with a covering letter, a copy of the Draft Clinical Guidelines document, response framework and a prepaid return addressed envelope.

Telephone reminders to all (with the exception of New Zealand participants) regarding the mailouts were undertaken on 20 December 2001 and 7 January 2002.

4 Who responded?

Of the sixty-six invited to comment, forty-three responded by 11 January 2002.

State	Total distributed	Total returned
Victoria	28	19
NSW	9	5
WA	4	2
Tasmania	1	1
SA	5	3
Queensland	10	8
ACT	2	1
New Zealand	7	4

Key personnel from special interest groups were invited to comment.

	Total distributed	Total returned
Obstetricians	48	35
GPs	11	4
Midwives	5	4
Consumer Groups	2	0

Appendix B

Consultation process: revision of guidelines 2004-2006

1 Review of feedback

The College encouraged feedback from users of the guideline in the key areas of clarity and barriers to implementation. Users were also invited to provide additional comments. All comments were collated and considered in the revision process.

2 Literature appraisal

The literature search was extended to include and update recent references with particular emphasis on admission CTGs.

3 Multidisciplinary workshop

The College invited key stakeholders to participate in a multidisciplinary workshop designed to facilitate discussion between relevant medical, midwifery and consumer bodies. Feedback was sought from participants to ensure the relevance of the guidelines to Australian and New Zealand practice.

For each guideline, good practice note and clinical practice algorithm, comment was invited on the issues of:

- Clarity,
- Feasibility,
- Evidence base,
- Support,
- Implementation, and
- Additional comments.

The following stakeholders were invited to join the members of the Guideline Review Group in a multidisciplinary workshop conducted at College House on 17 February 2006.

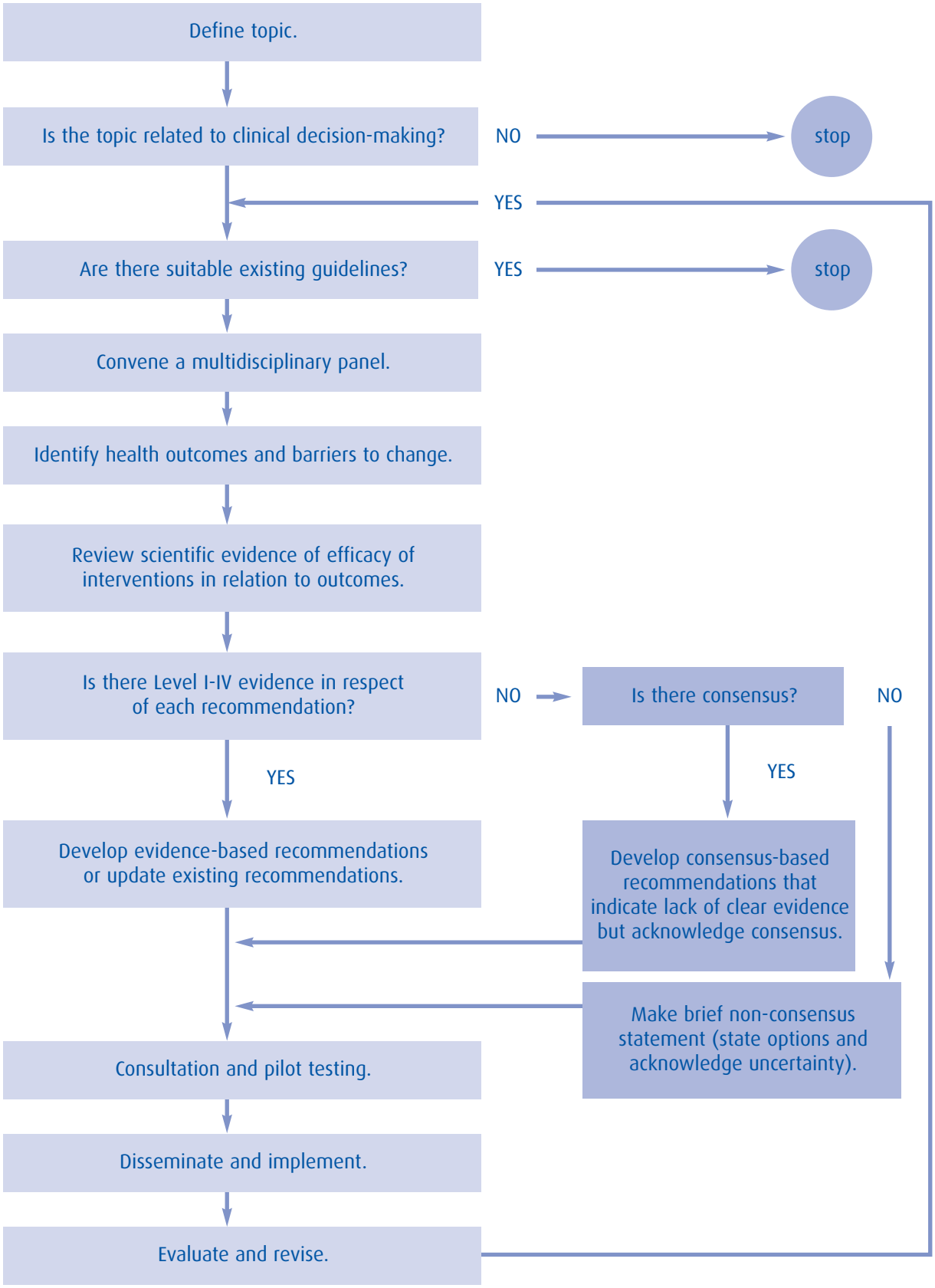
Stakeholder	Represented by
Australian College of Midwives Incorporated	Ms H Cooke
Australian College of Rural and Remote Medicine	Dr R Stewart
Department of Human Services Victoria	Ms W Dawson
King Edward Memorial Hospital	Ms K Reid
Maternity Coalition	Ms L Arnott
New Zealand College of Midwives	Ms N Campbell
RANZCOG GP Obstetric Advisory Committee (Chair)	Dr J Taylor
The Three Centres (Southern Health)	Dr C Tippett
The Three Centres (Southern Health)	Ms H Gillies
The Three Centres (Mercy Hospital for Women)	Dr B White
The Three Centres (Mercy Hospital for Women)	Ms D Patterson
The Three Centres (Royal Women's Hospital)	Ms T Farrell

Stakeholder	Apologies received from
Royal Australian College of General Practitioners	Representative
The Three Centres (Royal Women's Hospital)	Professor J Oats
Victorian Managed Insurance Authority	Dr P Kirker

Participation in this workshop did not indicate endorsement of the guidelines by the individual or organisation.

Appendix C

NHMRC Clinical practice guidelines flowchart



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Appendix D

Project management

1 Guideline Review Group: 2004-2006

The Guideline Review Group is a multi-professional team brought together on a project basis, to review and revise the guidelines.

Professor E Wallace
Consultant (Chair)
Department of Obstetrics and Gynaecology
Monash Medical Centre and Southern Health
Victoria

Dr J Dowd
Clinical Director
Emergency Department
Royal Women's Hospital
Victoria

Professor D Ellwood
Director of Fetal Medicine Unit
Department of Obstetrics and Gynaecology
The Canberra Hospital
Australian Capital Territory

Dr J Hornbuckle
Consultant in Maternal Fetal Medicine
King Edward Memorial Hospital
Western Australia

Dr P Kirker
Health Risks Consultant
DHS Public Healthcare Programme
Victorian Managed Insurance Authority
Victoria

Dr H Merkur
Visiting Medical Officer
Western Sydney Area Health Service
New South Wales

Dr D Morris
Director of Obstetric Training
Women's and Children's Hospital
South Australia

Professor M Permezel
Head of Department of Obstetrics and Gynaecology
Mercy Hospital for Women
Victoria

Dr E Uren
Consultant
Department of Obstetrics and Gynaecology
South West Health Care Warrnambool
Victoria

Dr E Weaver
Consultant Obstetrician
Chair of Continuing Professional Development Committee
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Ms V Jenkins
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Mr M Beaves
Program Manager
Fetal Surveillance Education Program

Ms S Fischer
Program Co-ordinator
Fetal Surveillance Education Program

Ms H Peterson
Program Administrator
Fetal Surveillance Education Program

2 Guideline Development Group: 2001-2002

The Guideline Development Group was a multi-professional team brought together on a project basis, to consider the evidence and develop the guidelines.

Dr M O'Connor
(Chair to May 2002)
Director of Delivery Suites
Royal Women's Hospital
Victoria

Associate Professor E Wallace
Consultant (Chair May 2002)
Maternal Fetal Medicine
Monash Medical Centre
Victoria

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Head of Department of Obstetrics and Gynaecology
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Dr E McCarthy
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Ms L Dunlop
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3 Reference Group

Members of the Reference Group were invited to attend a meeting at College House on 8 February 2002. The Reference Group members were further consulted with the final draft in July 2002.

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Appendix E

Descriptions of fetal heart rate (FHR) patterns[1]

Term	Definition
Baseline fetal heart rate:	The mean level of the FHR when this is stable, excluding accelerations and decelerations. It is determined over a time period of 5 or 10 minutes and expressed in bpm. Preterm fetuses tend to have values towards the upper end of this range. A trend to a progressive rise in the baseline is important as well as the absolute values
Normal Baseline:	FHR 110 –160 bpm
Bradycardia:	<110 bpm
Tachycardia:	>160 bpm
Baseline variability:	The minor fluctuations in baseline FHR. It is assessed by estimating the difference in beats per minute between the highest peak and lowest trough of fluctuation in one minute segments of the trace
Normal baseline variability:	5 – 25 bpm between contractions
Reduced baseline variability:	3 – 5 bpm
Absent baseline variability:	< 3 bpm
Increased baseline variability:	> 25 bpm
Sinusoidal:	A regular oscillation of the baseline FHR resembling a sine wave. This smooth, undulating pattern is persistent, has a relatively fixed period of 2 –5 cycles per minute and an amplitude of 5 –15 bpm above and below the baseline. Baseline variability is absent and there are no accelerations.
Accelerations:	Transient increases in FHR of 15 bpm or more above the baseline and lasting 15 seconds. Accelerations in the preterm fetus may be of lesser amplitude and shorter duration. The significance of no accelerations on an otherwise normal CTG is unclear.
Decelerations:	Transient episodes of decrease of FHR below the baseline of more than 15 bpm lasting at least 15 seconds, conforming to one of the patterns below:
Early decelerations:	Uniform, repetitive decrease of FHR with slow onset early in the contraction and slow return to baseline by the end of the contraction.
Variable decelerations:	Repetitive or intermittent decreasing of FHR with rapid onset and recovery. Time relationships with contraction cycle may be variable but most commonly occur simultaneously with contractions.
Complicated variable decelerations:	The following additional features increase the likelihood of fetal hypoxia: • Rising baseline rate or fetal tachycardia. • Reducing baseline variability. • Slow return to baseline FHR after the end of the contraction. • Large amplitude (by 60 bpm or to 60 bpm) and/or long duration (60 secs). • Loss of pre and post deceleration shouldering (abrupt brief increases in FHR baseline). • Presence of post deceleration smooth overshoots (temporary increase in FHR above baseline).
Prolonged decelerations:	Decrease of FHR below the baseline of more than 15 bpm for longer than 90 seconds but less than 5 minutes.
Late decelerations:	Uniform, repetitive decreasing of FHR with, usually, slow onset mid to end of the contraction and nadir more than 20 seconds after the peak of the contraction and ending after the contraction. In the presence of a non-accelerative trace with baseline variability <5 bpm, the definition would include decelerations <15 bpm

[1]*Modified from the RCOG Evidence-based Clinical Guidelines Number 8, May 2002 p11.*

Appendix F

Abbreviations

bpm	Beats per minute
CTG	Cardiotocograph(y)
EFM	Electronic fetal monitoring
FBS	Fetal blood sampling
FHR	Fetal heart rate
HIE	Hypoxic ischaemic encephalopathy
IA	Intermittent auscultation
RCT	Randomised controlled trial
VE	Vaginal examination

Appendix G

Patient information pamphlet

To order patient information pamphlets, please contact: Mi-tec Medical Publishing, PO Box 24, Camberwell VIC 3124
(t) +61 3 9888 6262 (f) +61 3 9888 6465 (w) http://www.mitec.com.au (e) orders@mitec.com.au

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists

Fetal Monitoring during Pregnancy and Labour

A Guide for Women

Fetal monitoring during pregnancy and labour is needed in order to observe your baby's heart-rate pattern. The heart-rate pattern is an important sign of the baby's well-being.

Measurement of your baby's heartbeat is one of the simpler methods of assessing your baby's well-being during pregnancy and labour. Fetal monitoring can also provide an early warning of a threat to the baby's well-being, so that doctors and midwives can take any necessary action. Your midwife or doctor can use one of two common methods to check your baby's heartbeat:

- Ultrasound (or Doppler)
- Electronic fetal monitoring.

Doppler ultrasound

The doctor or midwife may use a small, hand-held ultrasound device called a Doppler. It translates movement of the baby's heart into sounds that can be heard. It is often used during antenatal visits. Used during labour, it allows the mother to move around freely when she is not being monitored. In labour, intermittent detection of the fetal heart rate is very reliable for normal, low-risk deliveries. The baby's heartbeat is usually checked every 15 to 30 minutes during the early stages of labour, then every five minutes, and after every contraction in the later stages when the mother has started to push her baby out).

Doppler ultrasound being used to monitor the baby's heartbeat.

SAMPLE

Electronic fetal monitoring

Electronic fetal monitoring (EFM) is the continuous or intermittent measurement of the baby's heartbeat and (during labour) of the mother's contractions. EFM may be used during antenatal visits and during labour and delivery.

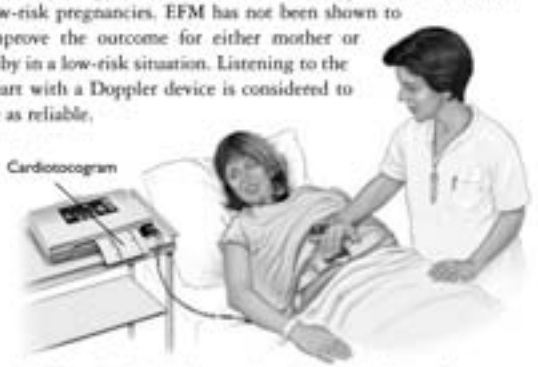
During the later stages of pregnancy, your doctor or midwife may want to monitor electronically the baby's heart beat to check that the baby is well. This is usually done for special reasons and is not done routinely in all pregnancies.

During labour, the aim is to detect the response of the baby's heart rate to contractions. Two sensors are held in place against the mother's abdomen with belts around her waist and hips. One sensor uses ultrasound to pick up the baby's heartbeat and the other detects uterine contractions. Together, the one recording is called a cardiotocogram (CTG). It is displayed on paper and often on a visual screen. A baby who is not coping well may show specific signs that a doctor or midwife can detect on CTG recordings.

Some doctors and hospitals recommend a CTG trace on admission to the labour ward to reassure the mother and doctor that the baby is well.

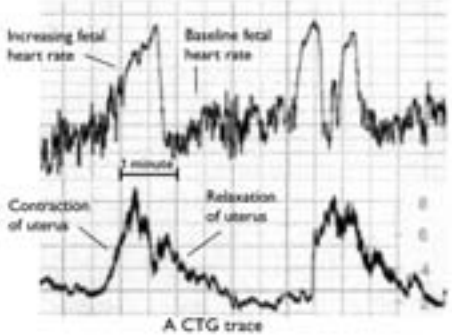
Electrode placement: Uncommonly, the baby's heartbeat may need to be detected by the use of a small electrode (called a clip) that is attached to the baby's skin. The mother's waters must have broken and her cervix must have opened a little for the electrode to be applied.

Low-risk pregnancies: EFM is not routinely recommended for low-risk pregnancies. EFM has not been shown to improve the outcome for either mother or baby in a low-risk situation. Listening to the heart with a Doppler device is considered to be as reliable.



A CTG machine being used to monitor the baby's heartbeat and the uterine contractions during labour.

Dear Doctor: When you discuss this pamphlet with your patient, remove this sticker and put it on the patient's medical history or card. This will remind you and the patient that this pamphlet has been provided. Some doctors ask their patients to sign the sticker to confirm receipt of the pamphlet.



A CTG trace

Edition number: 1

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Practice Review activities associated with the Fetal Surveillance Education Program

Points in the category of PR&CRM can be claimed on the completion of each stage

Stage	Activity	PR&CRM Points
OPTIONAL **STAGE ONE** Pre-education Intervention audit *To be undertaken prior to the workshop*	Perform an audit (may be retrospective) of the previous 30 consecutive deliveries or all deliveries for 3 months*	**1 point per hour in the PR&CRM category**
STAGE TWO Fetal Surveillance Education Program	• Completion of the Pre-Test • Participation in the workshop • Completion of the Post-Test • Completion of the Evaluation Feedback sheet	**6 CPD points in the PR&CRM category**
OPTIONAL **STAGE THREE** Follow-up activities *To be undertaken 3-6 months after the workshop or ongoing*	Set goals, develop action plan and implement, monitor and evaluate the outcome of the changes made and any adverse events/complications Fellow may choose to do an audit of the following 30 consecutive deliveries or all deliveries for 3 months **Bonus 1 point per hour in the PR&CRM category** Conduct regular multidisciplinary meetings to review obstetric cases and deliveries	**5 CPD points in the PR&CRM category** **PLUS** **1 point/hour in the PR&CRM category for clinical meetings**

Please keep a summary of your activity as verification documentation

To claim points in the Practice Review & Clinical Risk Management category, enter the title of the activity and the amount of points on your Annual Points Claim form.

Completion of this activity – 6 Points in PR&CRM + optional points

For queries, contact PR&CRM staff on +61 3 9417 1699 or prcrm@ranzcog.edu.au

Updated 01/05/06

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PR&CRM ACTIVITY WORKSHEET

Name:	Fellowship ID:

1. TITLE OF ACTIVITY

Fetal Surveillance Education Program

2. DATA COLLECTION – Brief summary of results (eg. Audit of 30 consecutive deliveries or all deliveries for 3 months) **(OPTIONAL)***

3. COMPLETE THE FETAL SURVEILLANCE EDUCATION PROGRAM
(please attach certificate of attendance)

4. ACTION PLAN

Part A: Identify Issues & Set Goals – From the program you completed, document some areas where you think improvements can be made to your clinical practice

Part B: Develop Action Plan – Document how you plan to achieve your goals

Part C: Implement Action Plan – Put your plan into practice

Please turn over →

Part D: **Monitor and evaluate** – Document what positive changes have resulted and how you have assessed the changes made*

Part E: **Challenges** – Document what challenges you faced and how you overcame them

5. EVALUATE THE EFFECTIVENESS OF THE PROGRAM

6. WHAT OTHER THINGS COULD YOU DO IN THIS AREA?

* bonus 1 point per hour in the PR&CRM category can be claimed for each audit (pre and post)

Please keep a summary of your activity as verification documentation

To claim points in the Practice Review & Clinical Risk Management category, enter the title of the activity and the amount of points on your Annual Points Claim form.

Completion of this activity – 5 points in PR&CRM

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Audit Tool for Intrapartum CTG Fetal Surveillance

Date: Patient ID:

---

1. What was/were the indication(s) for CTG monitoring?

a. antenatal risk factors ☐ Yes* ☐ No

*If yes please specify:

b. intrapartum risk factors ☐ Yes* ☐ No

*If yes please specify:

---

2. If the indication for CTG monitoring was <u>not</u> medical, who initiated the monitoring?

Doctor initiated ☐
Midwife initiated ☐
Patient initiated ☐

---

3. Was admission CTG performed? ☐ Yes* ☐ No

*If yes, was the CTG ☐ Normal ☐ Abnormal

---

4. Was the use of a CTG in line with RANZCOG clinical practice guidelines?

☐ Yes ☐ No

Please turn over →

5. Was there clear documentation on the CTG of:

a. the patient's name? ☐ Yes ☐ No

b. the patient's hospital number? ☐ Yes ☐ No

---

6. Does the date and time on the CTG correlate with the date and times in the patient's/client's medical history? (ie. Are the date and time settings on the CTG machine correct?)

☐ Yes ☐ No

---

7. Is the CTG of generally high quality:

a. with well recorded fetal heart rate? ☐ Yes ☐ No

b. with well recorded uterine activity? ☐ Yes ☐ No

---

8. Was the CTG : ☐ Normal ☐ Abnormal

---

9. If the CTG was abnormal:

a. did it influence management? ☐ Yes ☐ No

b. did it influence/affect delivery? ☐ Yes ☐ No

---

10. In the patient's history, is a written/stamped report of the CTG :

a. present ☐ Yes ☐ No

b. appropriate/accurate ☐ Yes ☐ No

c. signed ☐ Yes ☐ No

ACKNOWLEDGEMENTS: *Dr. Bruce Warton and staff at The Western District Health Service are thanked for their help in developing and piloting the audit tool.*

RANZCOG Fellows: please keep a summary of your activity as verification documentation

To claim points in the Practice Review & Clinical Risk Management category, enter the title of the activity and the amount of points on your Annual Points Claim form.

For queries, contact PR&CRM staff on +61 3 9417 1699 or prcrm@ranzcog.edu.au

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Feedback Sheet

Intrapartum Fetal Surveillance

Clinical Guidelines – Second Edition

We value your feedback on the RANZCOG Intrapartum Fetal Surveillance Clinical Guidelines. Your suggestions and comments will enable the guidelines to continue to evolve and meet the needs of clinical practice in Australia and New Zealand.

Were there any aspects of the guidelines that need clarification? please specify

What barriers or problems do you expect in implementing these guidelines? please specify

Additional comments

Please fax this form back to RANZCOG +61 3 9419 0672 or email: fsep@ranzcog.edu.au

Your contact details (optional)

Name: Organisation:

Tel: Fax: