

CATEGORY: BEST PRACTICE STATEMENT

# Measurement of cervical length for prediction of preterm birth

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This statement has been developed and reviewed by the Women's Health Committee and approved by the RANZCOG Board and Council.

A list of Women's Health Committee Members can be found in Appendix A.

Disclosure statements have been received from all members of this committee.

**Disclaimer** This information is intended to provide general advice to practitioners. This information should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The document has been prepared having regard to general circumstances.

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## 1. Plain language summary

The length of the cervix in mid-pregnancy relates to the chance of early birth, with a greater risk of preterm birth, the shorter the cervix. Although most women with a short cervix in mid-pregnancy will still deliver at term, identifying women at risk of preterm birth may allow treatments to reduce that risk. In some locations the length of the cervix is assessed routinely at the ultrasound assessing the fetal anatomy at around 20 weeks. In others, cervical length assessment is performed only in women who have risk factors for preterm birth or who have symptoms such as uterine contractions prior to term.

## 2. Summary of recommendations

Recommendation 1	Grade
Acknowledging the challenges and continued debate surrounding universal cervical length screening, RANZCOG currently supports the use of initial transabdominal screening of low risk women with singleton pregnancies at the midtrimester scan, with additional transvaginal assessment for those with a short cervical length (<35 mm) or full cervical length unable to be clearly viewed.	Consensus-based recommendation

## 3. Introduction

The use of transvaginal ultrasound to screen for cervical length in high, but not low, risk pregnancies is recommended by SMFM <sup>1</sup> and SOGC <sup>2,3</sup> and is in wide-spread use across Australia and NZ. There is increasing data on the effectiveness of progesterone treatment <sup>4</sup> and cervical cerclage <sup>5</sup> for a short cervix in singleton pregnancies, and of the value of routine screening for low risk women, which is recommended by FIGO.<sup>6</sup> This document highlights some of the contemporary issues around this topic.

## 4. Should routine screening of low risk women for cervical length in the mid-trimester be adopted?

Wilson and Jungner defined the requirements for a screening program in 1968 <sup>7</sup>, and these can be applied to the issue of cervical length screening.

### 4.1 Is preterm birth an important health problem?

Preterm birth, defined as delivery before 37 weeks of gestation, is the leading cause of neonatal mortality and morbidity and also longer term consequences in later life, worldwide.<sup>8</sup> It is multifactorial in origin, with approximately two-thirds of all preterm births occurring spontaneously.<sup>9</sup> In Australia, 7% of pregnancies resulted in deliveries before 37 weeks during 2002, with approximately 3% births before 34 weeks of gestation. Although this is a small proportion of total births in Australia, it accounts for almost 70% of the total perinatal mortality.<sup>10</sup> In New Zealand 7.5% of pregnancies in 2017 ended before 37 weeks and 1.2% before 32 weeks. Infants born less than 37 weeks accounted for 65% of all neonatal deaths.<sup>11</sup>

There are many risk factors for spontaneous preterm birth, including previous spontaneous preterm birth<sup>12</sup>, use of assisted reproductive technologies<sup>13</sup>, excisional treatment for cervical intra-epithelial neoplasia<sup>14</sup>, congenital and acquired uterine pathologies<sup>15</sup> and fetal/intra-uterine factors, such as multiple pregnancy and polyhydramnios, infection, demographic factors and lifestyle issues. However, two thirds of women who experience preterm birth have no recognisable risk factors.<sup>16</sup>

## 4.2 Is there a latent phase?

Many studies have documented the association between a short cervix, as measured by transvaginal ultrasound, and preterm birth. In 1996, Iams et al. documented the normal range of cervical lengths at 24 and 28 weeks, and the associated risks for preterm birth.<sup>17</sup> These variables were documented at 16-22 weeks by Hibbard<sup>18</sup>, showing a mean cervical length of 38.5mm and the following outcomes for a short cervix:

Centile	Length	RR – PTB < 37/40
10 <sup>th</sup>	30 mm	3.8
5 <sup>th</sup>	27 mm	5.4
2.5 <sup>th</sup>	22 mm	6.3

Lower rates of short cervix in low risk women were found in a 2014 prospective cohort study of a universal transvaginal ultrasound cervical length screening program<sup>19</sup>, with only 1.3% of women with cervical length <25mm.

Even in the presence of extreme shortening or dilation of the cervix, progression to delivery is variable. There may be a phase of relatively stable cervical length, followed by a period of more rapid shortening before the onset of symptoms.<sup>20</sup> As such, the finding of a short cervix can be considered a latent phase, with sufficient time to permit medical intervention.

## 4.3 Is there an effective treatment?

The effectiveness of progestogen treatment to prevent preterm birth has been a subject of much controversy over the years. Women experiencing preterm birth are a heterogeneous group, making evaluation of risks and interventions difficult. Over the years, studies have utilised a variety of progestogen doses and routes of administration, with many studies evaluating intramuscular 17OHP.

Data on the use of natural micronized vaginal progesterone has been evaluated as a meta-analysis<sup>4</sup> of 5 RCT's comparing its use against placebo or no treatment, and including data from the 2016 OPPTIMUM trial.<sup>21</sup> Utilising a cut-off of 25 mm cervical length for treatment, daily vaginal progesterone was associated with a reduction in the risk of preterm delivery for singleton pregnancies before 33 weeks (RR 0.62). It also significantly decreased the risk of PTB under 28 weeks through to 36 weeks, with associated reduction in respiratory distress syndrome, composite neonatal morbidity and mortality, low birthweight and NICU admission. There was no difference in maternal adverse events, congenital anomalies or adverse childhood neurodevelopmental and health outcomes at 2 years of age. The use of progesterone is discussed in more detail in a separate RANZCOG clinical guideline (C-Obs 29b).<sup>22</sup>

Cervical cerclage may also be effective in reducing preterm birth in women with singleton pregnancies and a short cervix (RR 0.74), in particular in those with a previous preterm birth (RR 0.61) or mid-trimester pregnancy loss (RR 0.57)<sup>23</sup> and those with progressive cervical shortening in spite of progesterone.<sup>24</sup> Cervical cerclage may also be preferred for initial incidental finding of a very short (<10 mm) cervical length in the mid-trimester.<sup>5,25</sup> In the absence of clear benefit of cerclage over vaginal progesterone in otherwise low risk women with a short cervix, progesterone is generally the preferred treatment due to the lower risk of surgical complications.

Current evidence does not support the use of cervical pessaries to prevent preterm birth or improve neonatal outcomes in singleton or twin gestations.<sup>26</sup>

#### 4.4 Is there an accurate test?

Cervical length is most accurately measured by transvaginal ultrasound examination. Most normal ranges / likelihood ratios describing the risk of preterm labour have been calculated using a standardised technique for measurement. The patient should have an empty bladder and the vaginal probe should be placed in the anterior fornix, minimising pressure on the cervix, as this increases cervical length. The length of the endocervical canal should be measured from the internal to the external cervical os. As the cervix is dynamic, three measurements should be made over a five minute period and the shortest measurement reported for clinical use.<sup>27</sup>

There is reasonable intra- and inter-observer agreement for cervical length assessment performed with a standardised technique<sup>28</sup>, although variation potentially sufficient to affect clinical practice does occur.<sup>29</sup> Comparisons between transabdominal and transvaginal approaches for cervical length measurement suggest that initial transabdominal assessment may be an option.<sup>30,31,32,33</sup> Transabdominal measurements when the bladder is full are possible in 97% of women, but overestimate the transvaginal length measurement by about 6 mm.<sup>33</sup> With the bladder empty, the correlation is improved, but the cervix cannot be adequately visualised in 18% of women. These results are supported by the findings of other studies.<sup>34</sup> A 30 mm cut-off for transabdominal, full bladder approach resulted in only 38% sensitivity for short (<25 mm on TVUS) cervix. By contrast, use of a 36 mm transabdominal pre-void cut-off has been associated with 96% sensitivity for detecting a cervical length of 25 mm.<sup>32</sup> In both studies however, specificity was low and conversion to transvaginal assessment was estimated at around 60%.

Transperineal cervical assessment has not been as thoroughly studied<sup>35</sup>, but may provide an alternate option in women for whom transvaginal examination is recommended, but not acceptable or available.

#### 4.5 Is the test safe and acceptable to women?

Transvaginal examination in pregnancy has been shown to be safe, even in the setting of preterm, pre-labour rupture of membranes.<sup>36</sup> Over 90% of women consider transvaginal examination of cervical length to be associated with mild or no discomfort or embarrassment.<sup>37</sup> Transvaginal scan in the setting of an Early Pregnancy Unit is found to cause significant discomfort in <2% of women (irrespective of their pregnancy diagnosis) and 99% of women would agree to a repeat transvaginal assessment.<sup>38</sup> In Orzechowski's evaluation of a universal transvaginal cervical length screening program<sup>20</sup>, 75% of women accepted transvaginal assessment when offered.

#### 4.6 Are facilities for testing available?

All pregnant women in Australia and New Zealand are offered a mid-trimester ultrasound for assessment of fetal growth, anatomical structures and placental location. Cervical length measurement for preterm birth risk screening can be offered at this examination.

However, performing a transvaginal examination adds about 10 minutes to the length of a mid-trimester ultrasound assessment. Busy units performing large numbers of these examinations may not be able to absorb the additional time requirements of routine TV screening without an impact on other ultrasound services.<sup>33,39</sup> For women in rural and remote parts of Australia, access to transvaginal assessment may be limited by availability of equipment.<sup>39</sup>

## 4.7 Is testing cost-effective?

Several US studies of cost-effectiveness of routine transvaginal screening for low risk, singleton pregnancies have been published since 2010, supporting universal transvaginal screening<sup>40,41,42,43</sup> Rather than being cost-saving, as initially thought<sup>40,41</sup>, there may be a small increase in overall medical costs associated with the strategy.<sup>42</sup> The percentage reduction in total preterm births is small, and not considered to be worth the effort by some authors.<sup>44</sup> Published data for the cost-effectiveness of universal cervical length screening specific to the situation in New Zealand and Australia are currently lacking.

The question of who bears the additional cost of transvaginal scans is also a consideration.

Without additional support from Government funding, it will be borne by the radiological services (public and private) or by the women, if additional out-of-pocket fees are charged.

## 4.8 What is the situation in Australia and New Zealand?

In 2017, Newnham et al<sup>45</sup> published the results of a state-wide initiative to reduce preterm birth. Universal cervical length screening was 1 of 7 interventions introduced. Transabdominal approach was used for low-risk women, with transvaginal assessment recommended when the cervix measured <35 mm in length or could not be seen clearly from internal to external os. A transvaginal cervical length of  $\leq 25$  mm was considered shortened with 200mg vaginal progesterone nightly to be commenced. For cervical lengths <10 mm, cervical cerclage could be considered. In the full year following implementation of the 7 initiatives, the state's preterm birth rate was reduced by 7.6%. This program has subsequently been accepted for implementation by all Australian States and Territories.

The Australian TGA recently approved the use of vaginal progesterone for preterm birth prevention in women with a short ( $\leq 25$  mm) mid trimester cervical length or prior spontaneous preterm birth.

Routine transvaginal cervical length is not offered to low risk women in NZ. However, vaginal progesterone is funded in New Zealand for a cervical length of <25mm and history of preterm birth at or before 28 weeks.

## 4.9 Other considerations

The cost and effectiveness of any screening strategy depends on the prevalence of the condition in the community, quality of testing and physician/patient adherence to the recommended protocols for screening and intervention. Imaging services need to ensure suitable training of their sonographers and monitoring of image quality. Physicians need to treat when appropriate, whilst not ordering unnecessary investigations. Compliance with treatment may be particularly difficult for some women, due to the cost of the progesterone, and its requirement to be stored at <25 degrees.<sup>39</sup>

Screening programs also require ongoing monitoring of effectiveness. Continued surveillance of rates of short cervix, progesterone treatment and preterm birth will be required.

First trimester assessment of the cervix for incompetence and risk of preterm delivery has not been validated in trials for diagnostic accuracy of cervical length, nor for outcomes. It currently has limited clinical utility in identifying women at risk for preterm delivery.

Recommendation 1	Grade
Acknowledging the challenges and continued debate surrounding universal cervical length screening, RANZCOG currently supports the use of initial transabdominal screening of low risk women with singleton pregnancies at the midtrimester scan, with additional transvaginal assessment for those with a short cervical length (<35 mm) or full cervical length unable to be clearly viewed.	Consensus-based recommendation

## 5. Cervical length measurement in high risk women

### 5.1 Previous preterm birth

Meta-analysis has shown that women who have a previous history of preterm birth may benefit from vaginal progesterone or cervical cerclage.<sup>46</sup> There is some evidence to support cervical length surveillance in women with previous preterm birth with recourse to cervical cerclage in only those women who develop a short cervix.<sup>47</sup> Further research in this area would be of value, including defining those women who do better with progesterone or cerclage.

### 5.2 CIN and previous cervical excisional treatment

Women with untreated CIN have a slightly higher risk of preterm birth (RR 1.24). Excisional treatment of cervical dysplasia is associated with higher rates of preterm birth at all gestational ages. The risk is increased with increasing volume of tissue removal or ablation, and with multiple excisional procedures – see table.<sup>48</sup> Of those women with previous excisions, a midtrimester cervical length less than 25 or 30mm confers a greater risk of preterm birth (positive predictive value 30-50%) compared to a longer cervix (negative predictive value 94-95%).<sup>49,50</sup> Assessment of cervical length may therefore be useful to stratify risk for women with previous cervical excisions.

Relative Risks of CIN Rx	Ablation	LLETZ	Laser Cone	Cold knife Cone	Any treatment
PTL < 37 w	1.46	1.56	2.11	2.7	1.78
PTL < 32 w	1.59	2.13		3.07	2.40
PTL < 28 w	1.38 (NS)	2.57		4.52	2.54

### 5.3 Multiple pregnancy

Whilst cervical length also has predictive value in twin pregnancies, the evidence regarding therapeutic intervention for those with a short cervix is conflicting.<sup>51</sup> There may, at least, be some benefit in recognising multiple pregnancies at particular risk of preterm delivery, so that appropriate arrangements can be made to optimise outcomes should preterm birth occur.

### 5.4 Women symptomatic of preterm labour

Transvaginal ultrasound assessment of cervical length may be useful in diagnosing preterm labour. Knowledge of the cervical length can help to define management for women with symptoms and signs of threatened preterm labour at 24-34 weeks and may be associated with later gestational age at delivery.<sup>52</sup>

## 6. Other findings

### 6.1 Amniotic debris

Presence of intra-amniotic debris in women with a short cervix is an independent risk factor for preterm delivery.<sup>53</sup> It has been associated with higher levels of inflammatory markers and clinical chorio-amnionitis.<sup>54</sup> However, data regarding its utility as a predictor of preterm birth in low risk women is lacking.<sup>55</sup>

### 6.2 Cervical funnelling

Other sonographic features of the cervix such as funnelling<sup>53</sup> (effacement of the internal aspect of the cervix) and shortening in response to fundal pressure or uterine activity are known to be associated with preterm delivery – but may not add substantially to predictive modelling when compared to accurate measurement of cervical length alone.

## 7. Conclusion

Mid-pregnancy cervical length assessment is of value in identifying women at increased risk of preterm birth who may benefit from interventions such as vaginal progesterone or cervical cerclage. This may be used to further stratify risk in women with other identified preterm birth risk factors. Routine mid-pregnancy cervical length assessment in low risk women can be a cost-effective method of preterm birth reduction but implementation of such a policy is highly dependent upon local factors. If it is to be undertaken, cervical length assessment should be performed according to a standardised technique.

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## 9. Links to other College statements

[Evidence-based Medicine, Obstetrics and Gynaecology \(C-Gen 15\)](#)

[Progesterone Use in the second and third trimester \(C-Obs 29b\)](#)

## 10. Patient information

A range of RANZCOG Patient Information Pamphlets can be ordered via:

<http://www.ranzcog.edu.au/publication/womens-health-publications/patient-information-pamphlets.html>

## Appendices

### Appendix A Women's Health Committee Membership

Name	Position on Committee
Professor Yee Leung	Chair and Board Member
Dr Gillian Gibson	Deputy Chair, Gynaecology
Dr Scott White	Deputy Chair, Obstetrics
Associate Professor Ian Pettigrew	Member and EAC Representative
Dr Kristy Milward	Member and Councillor
Dr Will Milford	Member and Councillor
Dr Frank O'Keeffe	Member and Councillor
Prof Steve Robson	Member
Professor Sue Walker	Member
Dr Roy Watson	Member and Councillor
Dr Susan Fleming	Member and Councillor
Dr Sue Belgrave	Member and Councillor
Dr Marilyn Clarke	ATSI Representative
Associate Professor Kirsten Black	Member
Dr Thangeswaran Rudra	Member
Dr Nisha Khot	Member and SIMG Representative
Dr Judith Gardiner	Diplomate Representative
Dr Angela Brown	Midwifery Representative, Australia
Ms Adrienne Priday	Midwifery Representative, New Zealand
Ms Ann Jorgensen	Community Representative
Dr Rebecca Mackenzie-Proctor	Trainee Representative
Dr Leigh Duncan	Maori Representative
Prof Caroline De Costa	Co-opted member (ANZJOG member)
Dr Christine Sammartino	Observer

### Appendix B Overview of the development and review process for this statement

#### *i. Steps in developing and updating this statement*

This statement was developed in November 2008. The Women's Health Committee carried out the following steps in reviewing this statement:

- Declarations of interest were sought from all members prior to reviewing this statement.
- Structured clinical questions were developed and agreed upon.
- An updated literature search to answer the clinical questions was undertaken.
- At the November 2021 Committee meeting, the recommendations were reviewed and updated (where appropriate) based on the available body of evidence and clinical expertise. Recommendations were graded as set out below in Appendix B part iii)

#### *ii. Declaration of interest process and management*

Declaring interests is essential in order to prevent any potential conflict between the private interests of members, and their duties as part of the Women's Health Committee.

A declaration of interest form specific to guidelines and statements was developed by RANZCOG and approved by the RANZCOG Board in September 2012. The Women's Health Committee members were

required to declare their relevant interests in writing on this form prior to participating in the review of this statement.

Members were required to update their information as soon as they become aware of any changes to their interests and there was also a standing agenda item at each meeting where declarations of interest were called for and recorded as part of the meeting minutes.

There were no significant real or perceived conflicts of interest that required management during the process of updating this statement.

*iii. Grading of recommendations*

Each recommendation in this College statement is given an overall grade as per the table below, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence and Grades of Recommendations for Developers of Guidelines.<sup>31</sup> Where no robust evidence was available but there was sufficient consensus within the Women’s Health Committee, consensus-based recommendations were developed or existing ones updated and are identifiable as such. Consensus-based recommendations were agreed to by the entire committee. Good Practice Notes are highlighted throughout and provide practical guidance to facilitate implementation. These were also developed through consensus of the entire committee.

Recommendation category		Description
Evidence-based	A	Body of evidence can be trusted to guide practice
	B	Body of evidence can be trusted to guide practice in most situations
	C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
	D	The body of evidence is weak and the recommendation must be applied with caution
Consensus-based		Recommendation based on clinical opinion and expertise as insufficient evidence available
Good Practice Note		Practical advice and information based on clinical opinion and expertise

## Appendix C Full Disclaimer

### Purpose

This Statement has been developed to provide general advice to practitioners about women’s health issues concerning cervical length measurement for prediction of preterm birth and should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any person. It is the responsibility of each practitioner to have regard to the particular circumstances of each case. Clinical management should be responsive to the needs of the individual person and the particular circumstances of each case.

### Quality of information

The information available in measurement of cervical length for prediction of preterm birth (C-Obs 27) is intended as a guide and provided for information purposes only. The information is based on the Australian/New Zealand context using the best available evidence and information at the time of preparation. While the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) had

endeavoured to ensure that information is accurate and current at the time of preparation, it takes no responsibility for matters arising from changed circumstances or information or material that may have become subsequently available. The use of this information is entirely at your own risk and responsibility. For the avoidance of doubt, the materials were not developed for use by patients, and patients must seek medical advice in relation to any treatment. The material includes the views or recommendations of third parties and does not necessarily reflect the views of RANZCOG or indicate a commitment to a particular course of action.

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#### Exclusion of liability

The College disclaims, to the maximum extent permitted by law, all responsibility and all liability (including without limitation, liability in negligence) to you or any third party for any loss or damage which may result from your or any third party's use of or reliance of this guideline, including the materials within or referred to throughout this document being in any way inaccurate, out of context, incomplete or unavailable for all expenses, losses, damages, and costs incurred.

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These terms and conditions will be constructed according to and are governed by the laws of Victoria, Australia.

11.

Version	Date of Version	Pages revised / Brief Explanation of Revision
v1.1	Nov / 2008	WHC
v2.1	Jul / 2012	WHC
v3.1	Jul / 2017	WHC

Policy Version:	Version 4.1
Policy Owner:	Women's Health Committee
Policy Approved by:	RANZCOG Council/Board
Review of Policy:	Nov / 2026