australasian sonographers association

ULTRASOUND ASSESSMENT OF THE GRAVID CERVIX TO ASSESS FOR RISK OF PRETERM BIRTH:

Evidence-based guideline for Sonographers

Draft for Public Consultation

CONTENTS

Ultrasound assessment of the gravid cervix to assess for risk of spontaneous preterm birth: evidence-based clinical practice guideline for sonographers.

SECTION A: **PRELIMINARY INFORMATION**

DEFINITIONS AND ABBREVIATIONS

Asymptomatic patient	For the purpose of this guideline, an asymptomatic patient is free of symptoms of spontaneous preterm birth; PV bleeding, PV amniotic fluid loss, pain, contractions.	**Preterm labour**	The onset of labour before 37 weeks of pregnancy. The onset of labour refers to regular uterine contractions (at least one every 10 minutes), associated with cervical change or rupture of fetal membranes.
Cervical insufficiency (formerly called cervical incompetence)	Refers to the inability to support a full-term pregnancy due to a functional or structural defect of the cervix, often characterised by dilatation and shortening (effacement) of the cervix prior to 37 weeks gestation.	**Preterm premature rupture of membranes (PPROM)**	Rupture of the amniotic sac membranes before 37 weeks gestation.
Cervical length (CL)	The length of the closed endocervical canal, or the distance between the external os of the cervix and the internal os of the cervix. If the endocervical canal is open, then only the length of the closed endocervical canal is measured as the cervical length.	**Rupture of membranes**	Rupture of the amniotic sac membranes.
Clinical practice guideline (CPG)	Systematically developed statement(s) based on the best available evidence to guide practitioners in their decision making about appropriate health care for patients in specific circumstances.	**Second trimester**	The middle trimester of pregnancy defined as the period from 13 weeks and 0 days to 27 weeks and 6 days of gestation.
Endocervical canal (cervical canal)	Canal within the cervix which connects the uterine cavity to the vaginal canal. It extends between the external os and internal os of the cervix.	**Spontaneous preterm birth (SPTB)**	Spontaneous labour and childbirth between 20+0 and 36+6 weeks of pregnancy following either preterm labour or PPROM.
Lithotomy position	Position used for transvaginal sonography examinations, the patient is supine, with the hips flexed (80-100degrees), the legs abducted, and knees flexed.	**Symptomatic patient**	For the purpose of this guideline, a symptomatic patient has symptoms of spontaneous preterm birth; PV bleeding, PV amniotic fluid loss, pain, contractions.
LLETZ	Large Loop Excision of the Transformation Zone. A surgical procedure for diagnosis and treatment of pre-cancerous cells of the cervix identified during a colposcopy and cervical biopsy.	**Threatened preterm labour**	The onset of regular uterine contractions, without cervical change or rupture of fetal membranes prior to 37+0 weeks gestation.
Low-lying placenta	The placental edge is located within 2 cm of the cervical internal os, but not covering it. If present in the second trimester, a review in third trimester is indicated to determine placental location prior to delivery. A low-lying placenta present prior to delivery is associated with bleeding and may be an indication for caesarean section.	**Transabdominal sonography (TAS)**	Ultrasound technique where images are acquired using an appropriate transducer placed on the abdominal wall.
Obstetric care providers	Medical or health professionals who provide primary or secondary care to obstetric patients during their pregnancy.	**Transperineal sonography (TPS)**	Ultrasound technique where ultrasound images are acquired using an appropriate transducer placed on the perineum.
Placenta praevia	When the placenta covers the internal cervical os in the third trimester of pregnancy.	**Transvaginal sonography (TVS)**	Sometimes referred to as endovaginal sonography; sonographic technique where ultrasound images are acquired using a specialised, intracavity ultrasound transducer inserted into the vagina.
Preterm	Gestational age less than 37+0 completed weeks.	**Vasa praevia**	The presence of fetal vessels covering the cervical internal os or located within 2cm of the cervical internal os.
Preterm birth (PTB)	Childbirth before 37 weeks of pregnancy.		

EXECUTIVE SUMMARY

Spontaneous preterm birth (sPTB) has a rising incidence worldwide and is the leading cause of perinatal morbidity and mortality. [1, 2] Sonographers and ultrasound imaging play an important role in assessing a pregnant patient's risk of sPTB because ultrasound imaging can detect a shortened cervix, one of the most common contributors to sPTB.

The target audience for this clinical practice guideline (CPG) are sonographers in Australia and New Zealand who perform obstetric ultrasound examinations. There are three recognised sonographic approaches to assessing the gravid cervix; transvaginal sonography (TVS), transabdominal sonography (TAS) and transperineal sonography (TPS). The recommendations in this CPG are intended to assist sonographers in making decisions on which sonographic approach to use when assessing the cervix and its length in pregnant patients.

Recommendations in this CPG are organised by the following patient groups; 1) patients at low-risk for sPTB, 2) patients at increased risk for sPTB and 3) patients with symptoms of threatened preterm labour. This CPG also provides detailed guidance on how to assess the cervix and measure cervical length (CL) using TVS, TPS and TAS, together with minimum sonographer reporting requirements, considerations relating to contraindications, safety, acceptability, feasibility, cost effectiveness, and sonographer training. Supplements to this CPG include an Image Gallery to guide sonographers in the acquisition and interpretation of images, Patient information, and a Short-form guide (includes minimum sonographer reporting guidelines and example sonographer worksheet). Sonographers should use the recommendations in this CPG in combination with local protocols and practices, the preferences of patients and referring obstetric care providers. The contents of this CPG do not constitute professional advice for those seeking information about their personal obstetric care and should not be considered a substitute for seeking the professional advice of an obstetric care or other health provider.

This CPG differs from existing evidence-based CPGs on the use of ultrasound in preterm birth risk assessment, in that it is tailored to sonographers and that it answers questions that sonographers need guidance on, rather than guidance for questions relevant to obstetric care providers.

This CPG was developed using evidence-based methods. Important steps in its development were 1) the development of questions that the CPG would answer 2) drawing on existing evidence-based CPGs to answer the questions and to inform the CPG, 3) undertaking literature searches when existing CPGs had deficits, and 4) consulting with stakeholders. The decision to draw on existing CPGs, rather than developing a de novo guideline, was made as this method is regarded to be more efficient, less time consuming and less expensive. It also allowed for review of existing evidence-based CPGs, thus reducing any contradictions between this CPG and existing evidence-based CPGs used by other professional groups involved in the care of obstetric patients.

For each recommendation in this CPG there is an evidence table and summary statement to explain the rationale and underpinning evidence for the recommendation.

FUNDING ORGANISATION

The development of this CPG was funded by the Australasian Sonographers Association (ASA).

A volunteer guideline development group was convened for the purpose of developing the CPG. A list of the guideline development group members can be found in appendix 1. Disclosure statements have been received by all members of the guideline development group.

This CPG has been endorsed by **<information to be added after public consultation>**

SUMMARY LIST OF RECOMMENDATIONS

PATIENT GROUP	PATIENT SUBGROUP	RECOMMENDATION	QOE# SOR^
PATIENT GROUP 1: Singleton, low-risk singleton pregnancy for short cervix, second trimester	**Subgroup1a:** Asymptomatic patients with singleton pregnancy presenting for an obstetric TAS, including fetal morphology scan.	**Recommendation 1a:** • Routine screening of cervical length using TVS is not recommended for low-risk pregnancies. • When performing a mid-pregnancy TAS obstetric scan, including fetal morphology scans, sonographers should include an assessment of the cervix with TAS, including a TAS CL measurement. • In the absence of risk factors for preterm birth, a TAS CL of 35mm or greater is considered low-risk for a short cervix. • If the TAS CL measures less than 35mm, or there is inadequate visualisation of the cervix*, then a TVS assessment of the cervix should be performed, if not contraindicated*. • If TVS is contraindicated*, then TPS could be performed if not contraindicated*. ***refer to Section D**	**QOE:** Consistent support for recommendation **SOR:** Strong
	Subgroup1b: Asymptomatic patients with asingleton pregnancy presenting for, or requiring a TVS scan, for any clinical or sonographic indications other than sPTB risk assessment.	**Recommendation 1b:** Sonographers should extend the TVS examination to sonographically assess the cervix and to measure the CL.	**QOE:** Consensus decision **SOR:** Strong

KEY: CL; cervical length, sPTB; spontaneous preterm birth, TVS; transvaginal sonography, TPS; transperineal sonography, TAS; transabdominal sonography* refer to section D, # Quality of Evidence (for explanation see appendix 2), ^ strength of evidence (for explanation see appendix 2)

PATIENT GROUP	PATIENT SUBGROUP	RECOMMENDATION	QOE# SOR^
PATIENT GROUP 2: Singleton or multiple pregnancies at increased risk of spontaneous preterm birth (sPTB)	**Important notes about recommendations for sonographic assessment of the cervix in patient group 2.** ***Note 1:*** *Relating to the recommendations 2(a-c), a TAS assessment of the fetus and uterus may also be required, depending on indications on the referral and local protocols. This could include a full morphology scan, or a limited scan which would typically include assessment of fetal lie and presentation, fetal heart activity, fetal biometry, amniotic fluid volume and placental position. A TAS of the lower uterine segment and cervix can identify any prolapse of membranes, fetal parts or the cord into the cervix or vagina indicating preterm labour which is a contraindication to TVS. Dedicated TVS assessment of the cervix as part of cervical surveillance may only require a curtailed TAS assessment or no TAS prior to TVS.* ***Note 2:*** *When following these recommendations local protocols and the preferences of referring obstetric care provider(s) and the patient should be considered.*		
	Subgroup 2a: Patients with singleton pregnancy presenting for obstetric TAS between 16-24 weeks gestation and have factors that place them at increased risk of sPTB. ***(Note:*** *this recommendation does not apply to patients presenting for sonographic cervical surveillance; instead refer to Subgroup 2b).*	**Recommendation 2a:** • Sonographers should measure and assess the cervix using the TVS approach. • A TVS measured cervical length of <25mm is considered short and a high-risk factor for sPTB. • If TVS is contraindicated*, then TPS should be performed if not contraindicated. TAS measured cervical length lacks accuracy and should only be performed if TVS and TPS are contraindicated*, A TAS CL of less than 35mm indicates an increased probability that the cervix is short. ***refer to Section D**	**QOE:** Consistent support for recommendation **SOR:** Strong
	Subgroup 2b: Pregnant patient presenting for sonographic cervical surveillance at intervals, as directed by the patient's obstetric care provider(s).	**Recommendation 2b:** Sonographic cervical surveillance should be undertaken using TVS unless contraindicated.* If TVS is contraindicated*, then TPS should be performed, unless contraindicated.* TAS measured cervical length lacks accuracy and should only be performed if TVS and TPS are contraindicated.* ***refer to Section D**	**QOE:** Consistent support for recommendation **SOR:** Strong
	Subgroup 2c: Patients presenting with multiple pregnancy in second trimester	**Recommendation 2c:** • If the patients' obstetric care provider(s) requests a sonographic assessment of the pregnancy, but not specifically for an assessment of the cervix, or any other condition requiring a TVS, then the sonographer should measure and assess the cervix using TAS. • If the TAS CL measures <35mm, a TVS CL measurement should be considered#. • If the patient's obstetric care provider(s) specifically requests a sonographic assessment of the cervix, or there is a clinically relevant reason to perform TVS, then the sonographer should measure and assess the cervix using TVS, unless it is contraindicated*. • If TVS is contraindicated* then TPS should be performed, unless contraindicated*. If both TVS or TPS are contraindicated, then TAS can be performed. A TVS or TPS measured CL is considered short if ≤ than 25mm, and a TAS measured CL of <35mm indicates the cervix is at higher risk of being shortened. ***refer to Section D**	**QOE:** consistent support for recommendation **SOR:** Strong
PATIENT GROUP 3: Singleton or multiple pregnancies with threatened preterm labour (symptomatic patients) and referred for a sonographic assessment of the cervix		**Recommendation 3:** a. In the setting of threatened preterm labour, and when the referring obstetric provider specifically requests an assessment of the cervix, it is usually appropriate to proceed with a TVS assessment of the cervix, including CL measurement, unless contraindicated*#.	**QOE:** consensus decision **SOR:** Strong
		b. Prior to undertaking the TVS assessment, the sonographer should ask the patient if there has been any change in symptoms (such as excessive bleeding or amniotic fluid loss) since visiting their obstetric care provider and perform a survey TAS to assess fetal heart activity, fetal lie, placental position, and the presence of membranes of fetal parts bulging into the cervix or vagina or cord prolapse. These assessments may change the clinical context for the patient resulting in revisions to the patient's ultrasound imaging pathway, including using a TPS approach or cancelling the sonographic assessment. Sonographers should assist in the revised ultrasound imaging pathway by sharing all relevant information with referring obstetric care provider(s), reporting physician(s) and the patient.	**QOE:** consistent support for recommendation **SOR:** Strong

KEY: CL; cervical length, sPTB; spontaneous preterm birth, TVS; transvaginal sonography, TPS; transperineal sonography, TAS; transabdominal sonography* refer to section D, # Quality of Evidence (for explanation see appendix 2), ^ strength of evidence (for explanation see appendix 2)

ACKNOWLEDGEMENTS

<information to be added after public consultation>

DISCLAIMER

The information in this CPG, as outlined above, is general in nature and does not constitute professional advice.

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DATE OF CLINICAL PRACTICE GUIDELINE AND TIMELINE FOR UPDATING

<information to be added after public consultation>

SUPPLEMENTARY MATERIALS

The following supplementary materials are available as supporting documents to the CPG.

Image Gallery | **Patient information** | **Short-form guide**

CONTACT FOR CORRESPONDENCE

<information to be added after public consultation>

SECTION B: **BACKGROUND**

Spontaneous preterm birth (sPTB) has a rising incidence worldwide and is the leading cause of perinatal morbidity and mortality.[1, 2]

sPTB is a multifactorial condition, the causes of which include infection and inflammation, cervical insufficiency, reduced progesterone action, uterine overdistension and malformations, vascular conditions, and allergy induced mechanisms. [2] The most important epidemiological risk factor for sPTB is a prior history of sPTB. Patients with no prior preterm birth have a decreased risk of sPTB in subsequent pregnancies [3] and conversely, patients who have had a previous sPTB are at increased risk for sPTB. [2] However, a history of prior sPTB as a sole predictor for sPTB is not always useful as patients with a prior sPTB are only represented in 10% of deliveries before 34 weeks of gestation. Also, nearly 50 % of patients who experience sPTB are in their first pregnancy, and therefore present with no prior gestational history. [4] Sonographers play an important role in assessing a pregnant patient's risk of sPTB by sonographically assessing the cervix in the mid trimester. Ultrasound imaging can detect a shortened cervix which is one of the most common pathways to sPTB. [2] Accurate identification of a short gravid cervix prompts preventative therapies, such as vaginal progesterone treatment or cerclage, which can reduce the risk of sPTB and the incidence of preterm births. [2, 5]

Sonographers can choose to assess the gravid cervix using three different sonographic approaches; transvaginal sonography (TVS), transabdominal sonography (TAS) and transperineal sonography (TPS). TVS is considered the gold standard for measurement of CL, as a short cervix identified using TVS measurements is the best predictor of sPTB. [6] TPS is considered as an alternative approach if TVS is contraindicated. TAS is also an option however visualisation of the cervix can be suboptimal, and CL measurements can be inaccurate due to technical limitations of this technique. There is considerable debate amongst obstetric care providers as to whether TVS measurements to determine CL should be offered in all pregnancies, or only in those with risk factors for sPTB. [7] In this CPG, TVS is recommended for all high-risk patients, for patients with a shortened cervix measured on TAS and where TVS is not contraindicated. Risk factors can be classified as modifiable (e.g. infections of the urinary or genital tract, substance abuse including smoking, poor access to health care and physical abuse) or non-modifiable (e.g. previous spontaneous preterm birth, short cervix (effacement of the cervix), previous cervical surgery (such as electrosurgical excision procedures and cold knife conisation, cervical resection at a depth of greater than 10–12 mm), congenital uterine anomaly (such as unicornuate uterus or uterus didelphys) and fibroids)). [2]

The recommendations in this CPG are intended to assist sonographers in making decisions on when and how they should sonographically assess the gravid cervix. The recommendations in this guideline are not intended to override existing, established local protocols, and the preferences of obstetric care providers and patients. Therefore this CPG should be used in combination with local protocols and practices, the preferences of patients and the preferences of referring obstetric care providers. The recommendations in this CPG are organised by the sPTB risk status of the patient. This requires sonographers to understand the risk status of their patients. For the purpose of this CPG patients are considered low-risk if they have no history of sPTB or previous cervical therapy. [8] Patients are considered to be at increased risk if they have moderate or high-risk factors for sPTB (see table 2) or exhibit symptoms of sPTB (per vaginal bleeding or amniotic fluid loss, abdominal or pelvic pain, contractions).

Many CPGs are available on the topic of ultrasound assessment for sPTB, however most are focussed on the clinical management of patients, rather than providing answers to questions that arise in the clinical practice of sonographers. While the technical requirements of the ultrasound assessment are often included in these CPGs, few guide the clinical decisions that sonographers need to make. This CPG aims to address this gap. Its primary purpose is to provide evidence-based guidance for sonographers on when and how to sonographically assess the gravid cervix using TVS, TPS or TAS. Each recommendation in this CPG is supported by an evidence table and a summary statement collated from best evidence existing CPGs (refer to Table 3 in Appendix 2 for list of best evidence CPGs). The evidence table includes an Overall Level of Evidence rating, and a Strength of recommendation rating. Please refer to 'Notations for recommendations' in Appendix 2 for information on how these ratings were derived. The summary statement provides an explanation and justification for each recommendation.

The methodology used to develop this CPG is described in Appendix 2. Key features of developing the CPG plan were 1) to develop questions that the CPG would answer, 2) draw on existing evidence based clinical practice CPGs to inform the CPG, 3) undertake literature searches when existing CPGs had deficits, and 3) consult with stakeholders. The decision to draw on existing CPGs, rather than developing a de novo CPG, was regarded as a more efficient, less time consuming and less expensive approach compared to de novo CPG development which requires teams of methodologists and experts to search, critique and debate the evidence base. This approach also enabled review of existing evidence-based CPGs developed for other professional groups involved in the care of obstetric patients, to ensure the recommendations in this CPG did not contradict any existing CPGs in use by these professionals.

TARGET AUDIENCE

The target audience for this CPG are sonographers in Australia and New Zealand who perform obstetric ultrasound examinations.

Sonographers are specialist allied health professionals who perform diagnostic examinations using high frequency ultrasound on patients who are referred to a sonography service after consultation with their health/medical practitioner. Sonographers work collaboratively with a reporting physician, such as a radiologist or obstetrician, to interpret the ultrasound images and provide a report to the referring obstetric care provider(s). At the time of writing sonographers practicing within the Australian Medicare framework are accredited and listed with the Australian Sonography Accreditation Registry (ASAR) as either an Accredited Medical Sonographer (AMS) or Accredited Student Sonographer (ASS). In New Zealand, sonographers hold a current annual practising certificate issued by the New Zealand Medical Radiation Technologists Board (NZMRTB).

SCOPE OF THE CLINICAL PRACTICE GUIDELINE (CPG)

This CPG makes recommendations on the appropriate sonographic approaches to assess the gravid cervix to identify changes in the cervix that place the pregnancy at risk for sPTB.

Recommendations are provided to guide sonographers when they are scanning pregnant patients 1) at low-risk for sPTB, 2) at increased risk for sPTB (moderate and high-risk) and 3) those with symptoms of threatened preterm labour. Recommendations may be applicable to singleton pregnancies only, to multiple pregnancies only, or to both singleton and multiple pregnancies. Each recommendation specifies about if it applies to singleton, to multiple or to both singleton and multiple pregnancies.

This CPG also provides detailed guidance for sonographers on how to assess the cervix and measure CL using TVS, TPS and TAS. Minimum sonographer reporting requirements are provided together with considerations relating to contraindications, safety, acceptability, feasibility, cost effectiveness, and sonographer training.

The CPG is relevant to sonographers working in private and/or hospital settings, and to those working in general or specialist settings. The equipment needed to meet the recommendations in this CPG would be available in most comprehensive or specialised ultrasound imaging departments in Australia and New Zealand. There may be exceptions in some rural and remote areas. [9]

The CPG is limited to B-mode sonography. Currently there is insufficient data to recommend the use of 3-D TVUS to assess the gravid cervix, although it may be of benefit in the future. [10] Similarly, for elastography, currently there are insufficient technical standards and normal reference values to recommend elastography for assessing the gravid cervix. [10]

Sonographic assessment of the lower uterine segment and abnormal placentation is referred to in this CPG, but specific technical guidance is not provided. The CPG does not provide recommendations on the care management of patients, as this is beyond the scope of the sonographer's role. However, in writing this CPG, consideration was given to existing CPGs intended for referring obstetric care providers to avoid providing contradictory advice.

The CPG provides general advice and recommendations which does not override local protocols, and the preferences of obstetric care providers and patients which must also be considered.

Table 1 demonstrates the clinical questions relevant to sonographic assessment of the gravid cervix which form the foundation of this clinical practice guideline.

Table 1: Questions used to develop Clinical Practice Guideline: Ultrasound assessment of the gravid cervix to assess for risk of preterm birth.

Pre-sonographic assessment	What is the expected time commitment?
	What patient preparation is required?
	What equipment should be used?
	What are the indications for gravid cervix assessment, and when should different imaging techniques be performed?
	What are the contraindications to different imaging techniques to assess the gravid cervix?
	How should the transducer be prepared?
	Are there any important safety considerations?
Sonographic Assessment	How to locate and identify cervix, internal os, external os?
	How to acquire images to measure to measure cervical length?
	How to make measurement of cervical length?
	What are the normal appearances of the cervix?
	What sonographic appearances indicate a shortened or insufficient cervix?
	What are the limitations and pitfalls in assessing and measuring the cervix? Can they be overcome?
	Does colour Doppler have a role?
	Does elastography have a role?
Post-sonographic assessment	How should transducers be cleaned?
	How should the examination be documented?
	How do limitations and pitfalls impact on interpretation of the results?
Level of education and training	What are the minimum sonographer education and training/competency/credentialling requirements?

SECTION C: **RECOMMENDATIONS AND SUMMARY STATEMENTS DESCRIBING SONOGRAPHIC APPROACHES TO ASSESS THE GRAVID CERVIX IN SPECIFIC PATIENT GROUPS**

This section provides recommendations based on the risk status of the patient for sPTB.

Each recommendation is supported by an evidence table collated from relevant best evidence existing CPGs (refer to Table 3, Appendix 2 for list of best evidence CPGs).

The evidence table includes an *Overall Level of Evidence* rating, and a *Strength of recommendation* rating. Refer to 'Notations for recommendations' in Appendix 2 (table 4 and table 5) for information on how these ratings are derived. A summary statement provides an evidence-based explanation and justification for each recommendation.

Patients are considered low-risk for sPTB if they have a singleton pregnancy with no moderate or high-risk factors for SPTB (table 2), and/or no symptoms of sPTB (per vaginal bleeding or amniotic fluid loss, abdominal or pelvic pain, contractions).

Patients are considered high-risk for sPTB if they have moderate or high-risk factors for sPTB (table 2), and/or symptoms of sPTB (per vaginal bleeding or amniotic fluid loss, abdominal or pelvic pain, contractions) and/or have a multiple pregnancy).

Table 2: Indicators for TVS measurements of CL in asymptomatic patients: Factors that increase risk for sPTB in pregnant patients

Moderate-risk factors for sPTB [16]	High-risk factors for sPTB [20]
Previous cervical surgery • 2 Or more lletz • Previous cone biopsy • Previous 1 lletz of more than 10mm depth • Congenital uterine anomalies such as subseptate and bicorporeal uterus and no history of previous preterm birth	Previous sPTB at <34 weeks gestation And/or Previous pregnancy loss at 16-24 weeks gestation

PATIENT GROUP 1: LOW-RISK SINGLETON PREGNANCY FOR SHORT CERVIX, SECOND TRIMESTER

Subgroup 1a: *Asymptomatic patients with singleton pregnancy presenting for an obstetric TAS , including fetal morphology scan.*

Recommendation 1a: Routine screening of cervical length using TVS is not recommended for low-risk pregnancies. When performing a mid-pregnancy TAS obstetric scan, including fetal morphology scans, sonographers should include an assessment of the cervix with TAS, including a TAS CL measurement. In the absence of risk factors for preterm birth, a TAS CL of 35mm or greater is considered low-risk for a short cervix. If the TAS CL measures less than 35mm, or there is inadequate visualisation of the cervix*, then a TVS assessment of the cervix should be performed, if not contraindicated*. If TVS is contraindicated*, then TPS could be performed if not contraindicated*.

***refer to Section D**

Summary Statement

Subject to local procedures, contraindications and preferences of obstetric care providers and patients, recommendation 1a advises that for all singleton, asymptomatic, low-risk for sPTB pregnancies presenting in the second trimester for TAS for any clinical reason, the sonographer should include assess and measure the cervix with TAS. This provides a first stage screen to identify a short cervix. A TAS CL of 35 mm or greater precludes a TVS CL of less than 25mm with over 95% sensitivity. [14]

TVS assessment in this group is not routinely recommended because universal TVS screening for a short cervix has not been widely adopted in Australia and New Zealand, even though evidence is building to perform TVS assessment of CL at 18-24 weeks gestation in low-risk pregnancies. [14] Arguments for universal screening include that it reduces the incidence of sPTB; whereas selective screening of patients with risk factors would miss nearly 40% of patients with a short cervix, including women in their first pregnancy who have no history of previous sPTB. [2] Barriers to the adoption of universal TVS CL screening include lack of evidence that it prevents preterm delivery or reduces neonatal morbidity or mortality, [13] resource or cost implications, [9, 15] the unknown prevalence in population prevalence of sPTB , [9, 15] and variance of the views and perceptions of medical practitioners. [26] Before a universal screening program is implemented a feasibility analysis is required to assess the availability of preventive interventions and sufficient resources including funding, skills and equipment. [2] While universal TVS CL screening in Australia and New Zealand is not yet recommended, [7, 11, 12] individual medical practitioners may opt to use it in the management of their patients.

Instead of a TVS universal screening program, Australian and New Zealand sonographers can use TAS measurements of the cervix to provide a first stage TAS assessment of the cervix, followed by a second stage TVS assessment if deemed necessary. The timing of the morphology scan coincides with the optimum time to perform CL measurements. This two-staged recommendation is consistent with 2017 and updated 2022 guidelines published by The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. [7, 14] This approach reduces the need for TVS in a proportion of pregnancies, an examination which is less comfortable, and adds more time to the examination compared to TAS. TVS should be offered as a second stage assessment if the TAS CL measurement is less than 35mm, or if the full CL is unable to be clearly viewed. [7, 14, 16]

It is also supported by a state-wide West Australian study in which one of the interventions was to encourage sonographers undertaking morphology scans to measure CL transabdominally and proceed to TVS only if the cervix was not clearly imaged, or if the TAS measured CL was less than 35mm. The results demonstrated that the two-stage ultrasound approach combined with other interventions reduced sPTBs by 7.6%. [17] The lower limit threshold for the length of a normal cervix measured with TAS varies slightly with both 35mm [7, 14] and 36mm recommended. [10] Sensitivities of greater than 96% to detect a TVS short cervix (<25mm) have been achieved by using either of these lower limit cut-offs. [9] The lower limit threshold of less than 35 mm was chosen in this recommendation (1a) to be consistent with the 2022 Royal Australian and New Zealand College of Obstetricians and Gynaecologists guideline. [7, 14]

Table 3: Evidence table for Recommendation 1a.

Existing CPG	Recommendations in existing CPG relevant to Recommendation 1a	Evidence rating (as published in existing CPG)	Standardised evidence rating*
ACR Appropriateness Criteria® Assessment of Gravid Cervix. [10] 2020	Assessment of gravid cervix. Nulliparous or no history of sPTB. Initial imaging		
	US cervix TVS: may be appropriate	Strong	😊😊😊
	US cervix TPS: may be appropriate	Limited	😊😊
	US cervix TAS: usually appropriate	Limited	😊😊
ACOG 234: Prediction and prevention of preterm birth [11] 2021	The cervix should be visualized at the 18 0/7–22 6/7 weeks of gestation anatomy assessment in individuals without a prior preterm birth, with either a transabdominal or endovaginal approach.	Level B (A-C)	😊😊 ☹☹
Measurement of cervical length for prediction of preterm birth (RANZCOG) [7] 2022	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 mid-trimester scan, with additional transvaginal assessment for those with a short cervical length (<35 mm) or full cervical length unable to be clearly viewed.	Consensus	😊
Society for Maternal-Fetal Medicine Publications Committee. Progesterone and preterm birth prevention: translating clinical trials data into clinical practice. [12] 2012	TVS CL screening in singleton gestations without prior PTB cannot yet be universally mandated.	Level B (A-C)	😊😊
Prevention of spontaneous preterm birth. French College of Gynaecologists and Obstetricians. [13] 2017	Although the implementation of TVS universal screening might be considered by physicians individually, this screening cannot be universally mandated	Professional consensus	😊
ISUOG Practice Guidelines: Role of ultrasound in the prediction of spontaneous preterm birth [2] 2022	When feasible, TVS CL measurement should be performed at the second-trimester scan to screen for PTB	C (3/5)	😊😊 ☹☹
Overall Level of evidence#	**Consistent support for recommendation**		√√
Strength of Recommendation 1a (strong/weak) ^	**Strong**		

CPG; clinical practice guideline, *Refer to table 4, appendix 2 for explanations of standardised evidence ratings, # Refer to table 5, appendix 2 for explanations of level of evidence ratings, ^Refer to appendix 2 for explanation of strength of recommendation ratings.

Subgroup 1b: *Asymptomatic patients with a singleton pregnancy presenting for, or requiring a TVS scan, for any clinical or sonographic indications other than sPTB risk assessment*

Recommendation 1b: Sonographers should extend the TVS examination to sonographically assess the cervix and to measure the CL. A consensus decision was made for this recommendation in the absence of any available evidence.

Summary Statement

This recommendation applies when sonographers are performing TVS on the pregnant patient for reasons other than to assess the cervix, or a TVS has been specifically requested by the referring obstetric care provider or the reporting physician. TVS is optimal for visualisation of the lower uterine segment including assessment of the placenta and low presenting fetal parts. Subject to local procedures, contraindications and preferences of obstetric care providers and patients, if a sonographer is performing an ultrasound in the second trimester on a low-risk patient, and there is also a need for TVS assessment due to clinical or sonographic indications, then the TVS examination should also include an assessment of the cervix, including CL measurement. This approach represents little or no increase in resource utilisation, patient inconvenience or patient discomfort, whilst providing an accurate measurement of CL to assess the risk for sPTB.

Table 4: Level of evidence and Strength of recommendation for Recommendation 1b

Overall Level of evidence [#]	Consensus decision
Strength of recommendation 1b (strong/weak)	Strong

[#] Refer to table 5, appendix 2 for explanations of level of evidence ratings, ^Refer to appendix 2 for explanation of strength of recommendation ratings.

PATIENT GROUP 2: SINGLETON OR MULTIPLE PREGNANCIES AT INCREASED RISK OF SPONTANEOUS PRETERM BIRTH (SPTB)

Important notes about recommendations for sonographic assessment of the cervix in patient group 2.

Note 1: *Relating to the recommendations 2(a-c), a TAS assessment of the fetus and uterus may also be required, depending on indications on the referral and local protocols. This could include a full morphology scan, or a limited scan which would typically include assessment of fetal lie and presentation, fetal heart activity, fetal biometry, amniotic fluid volume and placental position. A TAS of the lower uterine segment and cervix can identify any prolapse of membranes, fetal parts or the cord into the cervix or vagina indicating preterm labour which is a contraindication to TVS. Dedicated TVS assessment of the cervix as part of cervical surveillance may only require a curtailed TAS assessment or no TAS prior to TVS.*

Note 2: *When following these recommendations local protocols and the preferences of referring obstetric care provider(s) and the patient should be considered.*

Subgroup 2a: *Patients with singleton pregnancy presenting for obstetric TAS between 16-24 weeks gestation and have factors that place them at increased risk of sPTB.* ***(note:*** *this recommendation does not apply to patients presenting for sonographic cervical surveillance; instead refer to Subgroup 2b)*

Recommendation 2a: Sonographers should measure and assess the cervix using the TVS approach. A TVS measured cervical length of <25mm is considered short and a high-risk factor for sPTB. If TVS is contraindicated*, then TPS should be performed if not contraindicated. TAS measured cervical length lacks accuracy and should only be performed if TVS and TPS are contraindicated*, A TAS CL of less than 35mm indicates an increased probability that the cervix is short.

***refer to Section D**

Table 5: Evidence table for Recommendation 2a

Existing CPG	Recommendations in existing CPG relevant to Recommendation 2a	Evidence rating (as published in CPG)	Standardised evidence rating*
Prevention of spontaneous preterm birth. French College of Gynaecologists and Obstetricians. [13] 2017	Within asymptomatic population at high-risk, cervical length makes it possible to estimate the risk of preterm delivery.	2/4	😊😊
	The shorter the cervix at an early stage, the greater the risk of preterm delivery.	3/4	😊😊
ACR Appropriateness Criteria® Assessment of Gravid Cervix. [10] 2020	Assessment of gravid cervix. History of prior preterm birth. Initial imaging.		
	TVS usually appropriate.	Strong	😊😊😊
	TPS may be appropriate.	Limited	😊😊
	TAS usually not appropriate.	Strong	😊😊😊
Cervical assessment by ultrasound for preventing preterm delivery. Cochrane database of systematic reviews. [18] 2019	There are limited data on the effects of knowing the cervical length, measured by ultrasound, for preventing preterm births, which preclude us from drawing any conclusions.	Insufficient evidence	
ACOG 234: Prediction and prevention of preterm birth [11] 2021	Because of the relatively high detection rate and predictive value in individuals with prior preterm birth, and because treatment is available, serial endovaginal ultrasound measurement of cervical length beginning at 16 0/7 weeks of gestation and repeated until 24 0/7 weeks of gestation for individuals with a singleton pregnancy and a prior spontaneous preterm birth is recommended.	A (A-C)	😊😊😊
Guideline No. 401: Sonographic cervical length in Singleton Pregnancies: techniques and clinical applications. Journal of Obstetrics and Gynaecology Canada. [6] 2020	TVS is the preferred approach for cervical assessment to identify women at increased risk of spontaneous preterm birth, and it can be offered to women at increased risk of preterm birth.	II-2B (3/5)	😊😊
	TPS can be offered to women at increased risk of preterm birth if TVS is either unacceptable or unavailable.	II-2B (3/5	😊😊
Society for Maternal-Fetal Medicine. The role of routine cervical length screening in selected high-and low-risk women for preterm birth prevention. [19] 2016	We recommend routine TVS CL screening for women with a singleton pregnancy and history of prior spontaneous PTB.	A(A-C)	😊😊😊
ISUOG Practice Guidelines: Role of ultrasound in the prediction of spontaneous preterm birth [2] 2022	CL ≤ 25 mm can be used as a cut-off for the initiation of measures to prevent PTB in asymptomatic singleton pregnancies, irrespective of risk factors (GOOD PRACTICE POINT).	Good practice point 1/5	😊
Overall Level of evidence#	**Consistent support for recommendation**		√√
Strength of Recommendation 2a (strong/weak)^	**Strong**		

CPG; clinical practice guideline *Refer to table 4, appendix 2 for explanations of standardised evidence ratings # Refer to table 5, appendix 2 for explanations of level of evidence ratings ^Refer to appendix 2 for explanation of strength of recommendation ratings.

Summary Statement

In patients at increased risk of sPTB, TVS measurements of CL can identify a short cervix, which is associated with a high-risk of PTB. [13] Current evidence suggests that, in an asymptomatic population, using a TVS CL threshold CL of 25mm or less will identify pregnancies at high-risk of preterm birth and which could then be offered therapeutic intervention. [5, 12]

Subject to local procedures, contraindications and preferences of obstetric care providers and patients, recommendation 2a requires sonographers to understand if their patients presenting for any obstetric scan are at increased risk of sPTB, in order to identify patients who should also be offered TVS and TVS CL measurement. Table 2 summarises the risk factors (moderate and high) which indicate when patients should be offered TVS assessment of the cervix, in addition to other relevant obstetric ultrasound assessments, such as fetal morphology.

If the patient has one or more of the risk factors listed in table 5 or is experiencing symptoms of sPTB (per vaginal bleeding or amniotic fluid loss, abdominal or pelvic pain, contractions) sonographers should assess the cervix with TVS. If the referring obstetric care provider(s) has not indicated relevant risk factors on the referral, or if risk factors or symptoms are unclear when the sonographer elicits a patient history, then the sonographer should communicate with the referring obstetric care provider(s) to obtain relevant clinical information.

TPS is an alternative when TVS is contraindicated. Although this approach is often considered more challenging, with training accurate results can be achieved. [21] TAS should only be performed if both TAS and TPS are contraindicated. A TAS CL of 35mm or greater rules out a TVS CL of less than 25mm with over 95% sensitivity. [14] Contraindications to each ultrasound approach can be found in Section D of this CPG. Decisions on the ultrasound approach used should be made with consultation with the patient.

While CL is relatively stable over the first two semesters in the general obstetric population, [6] the optimal time for measuring it is between 16-24 weeks gestation. [19] CL measurements in the first trimester and early second semester have not been validated either for diagnostic accuracy or for clinical outcomes; [7, 19] the lower uterine segment is underdeveloped at this time, making it difficult to differentiate from the endocervical canal. [19] TVS CL measurements which are above 25mm (the lower threshold for normal) in gestations less than 20 weeks at high-risk of preterm birth, does not preclude preterm birth. [5] CL measurement has little clinical value after 24 weeks gestation as this is considered the upper limit for initiating interventions, [19] with some exceptions. [6]

Subgroup 2b: *patients with singleton or multiple pregnancies presenting for sonographic cervical surveillance at intervals, as directed by the patient's obstetric care provider(s)*

Recommendation 2b: Sonographic cervical surveillance should be undertaken using TVS unless contraindicated*. If TVS is contraindicated*, then TPS should be performed, unless contraindicated*. TAS measured cervical length lacks accuracy and should only be performed if TVS and TPS are contraindicated*.

***refer to Section D**

Summary Statement

Sonographers may be asked to perform serial or surveillance TVS measurements of CL, to follow-up on a short measurement seen on a previous scan, or where there is a history of preterm delivery, [11, 13] including patients on progesterone therapy. The obstetric care provider(s) will typically direct the timing and frequency of serial ultrasound measurements and their interpretation of those measurements in the context of the patient's clinical history, clinical management and stage of pregnancy, together with their own preferences and protocols. Previous CL measurements will also influence their approach. For instance, patients with a history of sPTB may be monitored every 2 weeks if TVS CL is long and closed, or every week if the TVS CL is shorter. [2]

CL normally decreases as the pregnancy progresses, [22] remaining relatively constant in pregnancy until 26 weeks gestation. In pregnancies that go on to deliver preterm, the rate of CL shortening is variable, ranging from 0.5mm to 8mm per week, [6] with greater shortening occurring after 26 weeks. [22] One millimetre of CL shortening has been reported to be associated with a 3% increase in odds of sPTB. [23] Sonographers with training and experience in TVUS CL measurements can achieve good repeatability and interobserver agreement, with reported mean differences of CL less than 1mm (range 0.33-0.73mm). [24]

TVS CL surveillance may be offered as a safe alternative compared to clinically indicated cerclage and data indicates that only 42% of pregnancies undergoing TVS CL surveillance will require an ultrasound indicated cerclage. [6] The value of TVS CL surveillance post cerclage has been debated, with little evidence available to support it. [2] [6]

Sonographers should aim to achieve high quality, accurate, and repeatable CL measurements to reduce measurement error. TVS is the most accurate approach to measure CL. [6] Subject to local procedures, contraindications and preferences of obstetric care providers and patients, sonographers should use TVS for CL surveillance. The gestational age at the time of the scan and any increase, decrease or no change in CL since the previous scan(s) should be noted.

Table 6: Evidence table for Recommendation 2b

Existing CPG	Recommendations in existing CPG relevant to Recommendation 2b	Evidence rating (as published in existing CPG)	Standardised evidence rating*
ACOG 234: Prediction and prevention of preterm birth [11] 2021	Because of the relatively high detection rate and predictive value in individuals with prior preterm birth, and because treatment is available, serial endovaginal ultrasound measurement of cervical length beginning at 16 0/7 weeks of gestation and repeated until 24 0/7 weeks of gestation for individuals with a singleton pregnancy and a prior spontaneous preterm birth is recommended.	A (A-C)	😊😊😊
Prevention of spontaneous preterm birth. French College of Gynaecologists and Obstetricians. [13] 2017	Data in the literature are insufficient to justify recommending the routine or repeated measurement of cervical length by transvaginal ultrasound except in women with a history of preterm delivery.	Professional consensus	😊
Guideline No. 401: Sonographic cervical length in Singleton Pregnancies: techniques and clinical applications. Journal of Obstetrics and Gynaecology Canada. [6] 2020	Cervical length surveillance is a safe option for patients with a prior sonography indicated cerclage, unclear history of cervical insufficiency and prior sPTB when compared with routine cerclage base on clinical assessment, it may reduce the need for subsequent cerclage.	II-2B	😊😊
ISUOG Practice Guidelines: Role of ultrasound in the prediction of spontaneous preterm birth [2] 2022	In women with singleton gestation and prior spontaneous PTB, TVS CL screening every 2 weeks between 14–16 and 24 weeks if CL is ≥ 30 mm should be considered. If TVS CL is 26–29 mm, TVS CL could be repeated weekly.	Good practice point 1/5	😊
	Follow-up CL measurements should be considered after initiation of progesterone, as women with shortening cervix despite progesterone treatment may benefit from cervical cerclage.	C (3/5)	😊😊
	There is a lack of evidence regarding CL follow-up after cerclage placement, so this practice cannot be recommended at this time.	Good practice point 1/5	😊
Overall Level of evidence#	**Consistent support for recommendation**		√√
Strength of Recommendation 2b (strong/weak)^	**Strong**		

CPG; clinical practice guideline, *Refer to table 4, appendix 2 for explanations of standardised evidence ratings, # Refer to table 5, appendix 2 for explanations of level of evidence ratings, ^Refer to appendix 2 for explanation of strength of recommendation ratings.

Subgroup 2c: *Patients presenting with multiple pregnancy in the second trimester*

<u>Recommendation 2c:</u> If the patients' obstetric care provider(s) requests a sonographic assessment of the pregnancy, but not specifically for an assessment of the cervix, or any other condition requiring a TVS, then the sonographer should measure and assess the cervix using TAS. If the TAS CL measures <35mm, a TVS CL measurement should be considered using local protocols, contraindications, and the preferences of obstetric care providers(s) and the patient as guidance for decision making.

If the patient's obstetric care provider(s) specifically requests a sonographic assessment of the cervix, or there is a clinically relevant reason to perform TVS, then the sonographer should measure and assess the cervix using TVS, unless it is contraindicated*.

If TVS is contraindicated* then TPS should be performed, unless contraindicated*. If both TVS or TPS are contraindicated, then TAS can be performed. A TVS or TPS measured CL is considered short if ≤ than 25mm, and a TAS measured CL of <35mm indicates the cervix is at higher risk of being shortened.

***refer to Section D**

Summary Statement

Although the risk of a short cervix is significantly higher in multiple pregnancies, and multiple pregnancies with a short cervix have higher risk of PTB compared to singleton pregnancies [19], there is conflicting evidence regarding the therapeutic interventions for a short cervix in twin or multiple pregnancies. [7] Therefore, decisions about TVS screening for short cervix in multiple pregnancies are best made by obstetric care provider(s) who have a good understanding of each individual patient's clinical history and presentation. Imaging departments may have developed their own protocols in consultation with their referring obstetric care providers.

If assessment for a short cervix is requested, then TVS is the preferred method in twins. [27] The optimum cut-off is dependent on gestational age, but pragmatically it has been recommended that a TVS CL represents a short cervix if ≤ 25mm. [7]

Whilst evidence is lacking to support using TAS to screen for a short cervix in multiple pregnancies, pragmatically it makes sense to at least make a TAS assessment of the cervix in this high-risk group in case there are obvious sonographic signs of a short (CL < 35mm) or open cervix.

Table 7: Evidence table for Recommendation 2c

Existing CPG	Recommendations in existing CPG relevant to Recommendation 2c	Evidence rating (as published in existing CPG)	Standardised evidence rating*
Twin pregnancies: Guidelines for clinical practice from the French College of Gynaecologists and Obstetricians [25] 2011	No study has shown that the identification by transvaginal ultrasound of a group at risk of preterm delivery makes it possible to reduce the frequency of such deliveries in asymptomatic patients carrying twins. If transvaginal ultrasound is performed, information about a long cervix (>30 mm) is more pertinent than that of a shortened cervix (<25 mm).	Professional Consensus	😊
ACR appropriateness criteria® multiple gestations. Journal of the American College of Radiology. [26] 2017	At the time of the routine anatomic survey, a cervical length assessment may be performed via transvaginal US to determine whether the patient should be triaged into a higher-risk group for preterm delivery (usually appropriate).	None provided	
ISUOG Practice Guidelines: Role of ultrasound in twin pregnancy. [27] 2017	Cervical length measurement is the preferred method of screening for preterm birth in twins; 25 mm is the cut-off most commonly used in the second trimester.	B	😊😊😊
No. 260-ultrasound in twin pregnancies. Journal of Obstetrics and Gynaecology Canada. [28] 2017	When ultrasound is used to screen for preterm birth in a twin gestation, endovaginal ultrasound measurement of the cervical length should be performed.	II-2	😊😊
Society for Maternal-Fetal Medicine. The role of routine cervical length screening in selected high-and low-risk women for preterm birth prevention. [19] 2016	At this time available data does not indicate adequate clinical benefit to justify routine screening of all women with multiple gestations.	2B	😊😊
ISUOG Practice Guidelines: Role of ultrasound in the prediction of spontaneous preterm birth [2] 2022	CL measurement is the preferred method for screening for PTB in twins; 25 mm is a pragmatic cut-off between 18 and 24 gestational weeks.	Good practice point (1/5)	😊
Overall Level of evidence#	**Consistent support for recommendation**		√√
Strength of Recommendation 2c (strong/weak)^	**Strong**		

CPG; clinical practice guideline, *Refer to table 4, appendix 2 for explanations of standardised evidence ratings, # Refer to table 5, appendix 2 for explanations of level of evidence ratings, ^Refer to appendix 2 for explanation of strength of recommendation ratings.

PATIENT GROUP 3: SINGLETON OR MULTIPLE PREGNANCIES WITH THREATENED PRETERM LABOUR (SYMPTOMATIC PATIENTS) AND REFERRED FOR A SONOGRAPHIC ASSESSMENT OF THE CERVIX

Recommendation 3:

c) In the setting of threatened preterm labour, and when the referring obstetric provider specifically requests an assessment of the cervix, it is usually appropriate to proceed with a TVS assessment of the cervix, including CL measurement, unless contraindicated*.

d) Decision-making on whether to proceed with a TVS examination should be made following any established local protocols, or in consultation with the patient's obstetric care provider(s) and the patient. Prior to undertaking the TVS assessment, the sonographer should ask the patient if there has been any change in symptoms (such as excessive bleeding or amniotic fluid loss) since visiting their obstetric care provider and perform a survey TAS to assess fetal heart activity, fetal lie, placental position, and the presence of membranes of fetal parts bulging into the cervix or vagina or cord prolapse. These assessments may change the clinical context for the patient resulting in revisions to the patient's ultrasound imaging pathway, including using a TPS approach or cancelling the sonographic assessment. Sonographers should assist in the revised ultrasound imaging pathway by sharing all relevant information with referring obstetric care provider(s), reporting physician(s) and the patient.

***refer to Section D**

Summary Statement for recommendation 3

Ultrasound assessment of the cervix does not have a primary role in threatened preterm labour. [2, 20, 30] If sonographers are requested to assess the cervix sonographically in a patient presenting with threatened preterm labour, they should be cautious in their approach. Threatened preterm labour can progress rapidly to preterm labour which is a contraindication to TVS. [31] Threatened preterm labour also carries a higher risk of changing fetal presentation and prolapse of umbilical cord. [32] These factors intensify the need for interdisciplinary team-work and communication. [33]

It is recommended to begin with a TAS because its only contraindication is patient refusal. While in this setting there is no consistent evidence for lack of safety in TVS, there have been concerns of precipitating bleeding in the setting of undiagnosed abnormal placentation, [33] and the increased risk of chorioamnionitis in Preterm premature rupture of membranes (PPROM). [34] TAS can also be a rapid method of making a number of assessments which provide valuable information to the patient's obstetric care provider(s); fetal lie and presentation, fetal heart activity, movement and breathing, placental position, placental masses or retroplacental haemorrhages, the presence of oligohydramnios, if the cervix is open or closed, identification of prolapses of the amniotic membranes or fetal parts, [33] and identification of cord prolapse and other worrying cord presentations (i.e. cord below cervix, cord between cervix and fetal presenting part, cord alongside fetal presenting part) [35]. However, some of these conditions or presentations may not always be visible on TVS or TAS.

If TVS is deemed appropriate after the initial TAS assessment, and possibly after consultation with reporting physicians and obstetric care providers, TVS can be undertaken. The clinical predictive value of TVS is uncertain for threatened PTB and more research is needed, however TVS measurements of CL may help stratify risk of PTB and prevent unnecessary intervention and prolong the pregnancy. [6, 14] Treatments to delay delivery are important to reduce risks of fetal death and long or short-term disabilities. [14, 19] There is some, limited evidence demonstrating that knowledge of TVS measured CL, in singleton pregnancies with symptoms of preterm labour, appears to prolong pregnancy by approximately four days. [18] CL has also been shown to predict women with threatened preterm labour who will deliver in 7 days (CL<15mm), and those who deliver beyond 7 days (CL $\geq$ 15 mm). [36]

TVS provides the best detail compared to TPS or TAS to assess the cervix in women with threatened PTB preterm labour, however there is not sufficient evidence to support its routine use in predicting labour, or to distinguish true labour from false labour. [14] TPS is an adequate alternative to TVS, if TVS is contraindicated (see section D). There has been little research on the use of TAS to inform the use of TAS to evaluate the cervix for threatened PTB. [10]

Table 8: Evidence table for Recommendation 3a

Existing CPG	Recommendations in existing CPG relevant to Recommendation 3a	Evidence rating (as published in existing CPG)	Standardised evidence rating*
ACR Appropriateness Criteria® Assessment of Gravid Cervix. [10] 2020	**Assessment of gravid cervix. Suspected preterm labour**		
	US cervix TVS: usually appropriate	Limited	😊😊
	US cervix TPS: may be appropriate	Strong	😊😊😊
	US cervix TAS: may be appropriate	Expert consensus	😊
National Institute for Health and Care Excellence. Preterm labour. (New guideline 25.) [29] 2015	If the clinical assessment suggests that the woman is in suspected preterm labour and she is 30+0 weeks pregnant or more, consider transvaginal ultrasound measurement of cervical length as a diagnostic test to determine likelihood of birth within 48 hours	'consider'	😊
Guideline No. 401: Sonographic cervical length in Singleton Pregnancies: techniques and clinical applications. Journal of Obstetrics and Gynaecology Canada. [6] 2020	In women presenting with suspected preterm labour and intact membranes, TVS assessment of cervical length may be used to help stratify the risk of preterm delivery and prevent unnecessary intervention without harm. This information may result in a reduction in late preterm birth, but it is unclear whether it makes a significant clinical difference	II-2B	😊😊
Prevention of spontaneous preterm birth. French College of Gynaecologists and Obstetricians. [13] 2017	Among symptomatic patients, routine ultrasound measurement of cervical length at admission is not associated with a significant reduction in the preterm delivery rate	LE3	☹☹
	Because of the excellent negative predictive value of ultrasound cervical measurement and its lower interobserver variability, it is useful to measure cervical length by ultrasound before deciding to transfer the mother to a more specialized hospital	Professional consensus	😊
ISUOG Practice Guidelines: Role of ultrasound in the prediction of spontaneous preterm birth [2] 2022	In women with singleton gestation and threatened PTL between 22 + 0 and 33 + 6 weeks, TVS CL measurement is recommended to assess the risk of PTB	C (3/5)	☹☹
	There is insufficient evidence to support the benefit of CL measurement in symptomatic women with twin pregnancy and PTL, or to suggest optimal cut-offs to guide clinical management	Good practice point	😊
Overall Level of evidence#	**Consistent support for recommendation**		√√
Strength of Recommendation 3a (strong/weak)	**Strong**		

CPG; clinical practice guideline, *Refer to table 4, appendix 2 for explanations of standardised evidence ratings, # Refer to table 5, appendix 2 for explanations of level of evidence ratings, ^Refer to appendix 2 for explanation of strength of recommendation ratings.

A consensus decision was made for recommendation 3b in the absence of available evidence (Table 9).

Table 9: Level of evidence and Strength of recommendation for Recommendation 3a

Overall Level of evidence	Consensus decision
Strength of Recommendation 3 (strong/weak)	Strong

Refer to table 5, appendix 2 for explanations of level of evidence ratings, ^Refer to appendix 2 for explanation of strength of recommendation ratings.

SECTION D: **'HOW TO' GUIDANCE FOR TVS, TPS, TAS**

The following sections provide 'how to guidance' to sonographically assess the gravid cervix using B-mode sonography for each of three techniques; TVS, TPS and TAS. Notations are included in this section, to indicate where relevant images are available in the ***Image Gallery*** (supplementary material).

Existing CPGs were consulted (including best evidence and low evidence CPGs), to inform this section (refer to Appendix 2 for list of CPGs 1-44). This guidance should be read in conjunction with other ASA guidelines listed in Section F. Sonographers should also be aware that if during scanning they have concerns about imminent preterm delivery based on either clinical or sonographic finding, then the patient's obstetric care provider(s) should be contacted promptly, adhering to local protocols.

TRANSVAGINAL SONOGRAPHIC IMAGING OF THE CERVIX (TVS)

Introduction

This section assumes knowledge and skill competency in routine TVS scanning.

TVS cervical assessment is regarded as the most detailed, complete, accurate, and reproducible assessment of the cervix compared to TPS and TAS. It provides detailed assessment of the internal os, the first site where predisposing changes for sPTB occur. [10] TVS is superior to other approaches because it enables higher frequencies to be used due to the shorter distance between the transducer and cervix. [10]

TVS measured CL is the reference standard to identify a short cervix; a predictor of sPTB. [10] Intra- and interobserver variability of CL measurements from TVS images has been reported at 10%. [37] CL should be obtained according to a standardised technique to reduce measurement variability and because most normal ranges / likelihood ratios describing the associated risk of PTB have been calculated using a standardised CL measurement technique. [14]

During TVS cervical assessment, it is recommended the lower uterine segment should also be assessed for vasa previa, placenta previa and low-lying placenta. Colour and pulsed wave Doppler should be used to identify low-lying vessels indicating vasa previa. [38, 39] The distance from the inferior edge of the placenta to the internal os, or in cases of funnelling, to the internal edge of the remaining endocervical canal should be measured. Refer to ASA Guideline: Vasa praevia diagnosis in the mid trimester ultrasound (link provided in Section F). Adding this assessment to the scan represents little or no increase in resource utilisation but provides an opportunity to identify these placental conditions with high resolution ultrasound imaging.

Contraindications of TVS*

- Patient does not provide consent. [40]
- Labour. [31]
- Unavailability of appropriate equipment (e.g. appropriate intracavity transducer, high level transducer disinfection facilities).
- Unavailability of a sonographer (or other health/medical professional) who is competent in TVS assessment of the gravid cervix.

***Note:** Where TVS is indicated under these guidelines, but contraindicated by the criteria above, then this may be discussed with the referrer/reporting specialist to ensure the appropriate examination/care is provided.*

Other considerations

- Placenta praevia +/- PV bleeding is not a contraindication to TVS, however TVS should be used discriminately, and care should be taken while advancing the transducer into the vagina. Real-time imaging should be used, so that the relationship between the transducer tip and the cervix can be continually assessed. [10] In cases where there is active, heavy vaginal bleeding, the decision to use TVS will depend on the clinical context, referrer input, local procedures, and the patient's preferences.
- PPROM has been considered a contraindication for TVS due to the fear of it causing ascending infection and decreasing the latency period. However, as small study has demonstrated that TVS does not increase these complications. [41] With only weak evidence available, the decision to use TVS, or progress to TPS will depend on guidance of the obstetric care provider and/or local processes.

Pre-scanning considerations

- Transducer selection: intracavity transducer, which is suitable for transvaginal scanning and with a frequency which offers the best possible resolution while providing sufficient depth of ultrasound field to demonstrate the cervix.
- The transducer should be covered with a single-use high quality transducer cover (eg. condom, pre-packaged commercial specific transducer cover, or surgical drapes). Sterile, single use ultrasound gel should be applied between the transducer and transducer cover, and on the outside of the transducer cover (ASA Clinical Statement: The safe use and storage of ultrasound gel, (refer to Section F)).
- The patient should be asked if they have a latex sensitivity, and if so, special non-latex covers should be used. [42] A high-level disinfected transducer should always be used; i.e. the transducer should always be cleaned between use of different patients using disinfectant procedures outlined in ASA Practice Update: Disinfection of intracavity ultrasound transducers (refer to Section F).
- The patient should empty their bladder prior to the examination. [2] A filled bladder can obscure funnelling and falsely increase CL. [43, 44] The presence of some urine in the bladder may not affect visualisation of the cervix and can be useful to visualise the interfaces between the uterus, placenta and bladder wall when assessing for abnormal placentation in the lower uterine segment.
- The patient should be scanned whilst in the lithotomy position; [6, 45] having the legs abducted allows a full range of movements whilst scanning. [46] Elevation of the pelvis can assist in allowing for a larger range of transducer movements. This can be achieved either using a cushion placed under the pelvis, or by lowering the end of the examination couch.

Scanning and image recording

To image the cervix, the transducer should be passed along the vaginal canal under real time visualisation, and into the anterior vaginal fornix to obtain a sagittal view of the cervix. [6, 14, 46, 47] The bladder will be seen anteriorly with the amniotic fluid and fetal presenting part behind the bladder. [45] The depth and width of field should be optimised so that the cervix occupies between 50 and 75% of the image. [6, 39, 46]

Undue transducer pressure on the cervix should be avoided, because this will falsely increase CL or mask funnelling or an open cervix. [14, 45, 46] Transducer pressure can be reduced by withdrawing the transducer once it is inserted and the cervix seen, and then gently reapplied to obtain the best image. [6, 38, 39, 47] Excessive transducer pressure can be recognised if the antero-posterior measurement of the posterior portion of the cervix is thicker than the anterior portion **(Image 20)**. [45] Avoid recording images of the cervix when a uterine contraction is present; contraction of the uterus can make the lower uterine segment appear thicker **(Image 23)**. Visualisation of the internal os can also be compromised in women who have a scar in the cervix due to a history of a full dilation caesarean section.

Interpreting images

The anterior and posterior cervical portions of the cervix should be of similar thickness and echogenicity. [44] Care should be taken to avoid misinterpreting a thickened lower uterine segment coming together in the midline, as a longer endocervical canal. [46] The internal os can be recognised where the anterior and posterior cervical walls touch an internal V-shaped notch. The external cervical os can be seen as an echogenic triangular area at the inferior portion of the endocervical canal. [6, 38, 39, 44, 47]

A cervix of ≤25mm measured by TVS is considered short and presents an increased risk for sPTB. [7] Other assessments of the cervix have been studied but none have proved more reliable or predictive than CL, and there is insufficient evidence to demonstrate that adding other assessments to CL measurement improves its the predictive accuracy. [44] These additional assessments include cervical index (funnel length +1/functional length), anterior and posterior cervical width, uterocervical angle, endocervical canal contour (straight vs. curved), cervical position (horizontal vs. vertical) and lower uterine segment thickness. [44]

Table 10 lists and explains the minimum reporting requirements for an assessment of the gravid cervix. An example worksheet/checklist is provided in Appendix 3. Sonographers should also record any information obtained from the patient and/or referring obstetric care provider(s) relating to clinical signs, risk factors, contraindications and consent, and document limitations of the sonographic examination or deviations from this CPG or relevant local protocols. If an open cervix is identified, then this requires immediate management, and an obstetric care provider should be immediately informed so that appropriate action can be taken. [48] If a short cervix is identified, then a same day phone discussion with the referring obstetric care provider is required. [48] Notification of abnormal findings to the obstetric care provider is a joint responsibility between the sonographer and the reporting physician. At minimum, the sonographer should make these findings available to the reporting physician at the time of ultrasound examination who can communicate the findings to relevant obstetric care providers. If a reporting physician is not available to communicate these findings within appropriate timeframes, then the sonographer should take alternate actions to ensure an obstetric care provider is informed and the patient can be managed appropriately.

Table 10: Minimum sonographer reporting requirements for an assessment of the gravid cervix

Minimum requirements for image recording	Notes
Bladder [44]	The inferior portion of the bladder should be visualised on images of the cervix for orientation purposes.
Sagittal view of cervix including the following anatomical features: 1) Internal os, 2) External os, 3) Full length of endocervical canal seen as area of increased echogenicity, can be used to help demarcate the internal os), 4) Body of cervical corpus, and 5) Cervical/vaginal interface to help demarcate external os.	This image should be used to measure cervical length. To take this measurement, at minimum, anatomic features 1-4 should be visible on the image. [6] To measure, electronic calipers should be placed where the anterior and posterior walls of the cervix touch at the internal os and external os and not beyond to the outermost edge of the cervical tissue **(Images 1-4).** As the cervix is a dynamic structure, the cervix should be observed over 3-5 minutes to allow time to capture the shortest measurement. Three measurements should be performed and the shortest, most accurate measurement recorded (rather than taking an average measurement). [6] [14, 19, 38, 39, 46, 47] If the endocervical canal is curved, either use a straight line, sum segmental measurements, trace method or spline method **(Image 5)**. [37] [6, 39] The straight-line measurement is recommended, as it has greater reproducibility between measurers [38], and any differences in CL using different measurement techniques are unlikely to be clinically significant as short cervixes are usually straight. [37] If a lower uterine contraction is present, the CL should be measured from an image taken following relaxation of the contraction **(Image 23).** If this is not possible, during a contraction, the prominence of the cervical glandular tissue or cervical mucosa in the endocervical canal can be used to delineate the internal os from the lower uterine segment. [38]
Image of funnelling (effacement of the internal aspect of the cervix) is present. **Refer to Images 9-13**	Use the endocervical mucosa to provide accurate assessment of the amount of funnelling. A thickened lower uterine segment can mimic funnelling; this can be recognised by the absence of mucosa extending along the walls of the funnel. [46] Note that quantifying the extent of funnelling (funnel width, funnel length, percent funnelling (funnel length divided by total CL.) does not appear to be useful as this can change during the ultrasound examination [6] [19, 39, 47,] and has not been shown to be an independent predictor of spontaneous preterm birth. [39] The shape of funnelling can be recorded. Funnelling progresses from a normal T shape, to Y, then V, and finally a U shape. U-shaped funnelling is more likely to be associated with sPTB compared to a V-shaped funnel, although this is subjective. [44] If funnelling is present, the CL measurement is made of the remaining closed cervix, (from tip of funnel to external os). [6]
Images of undeveloped or 'immature' lower uterine segment if present. **Refer to Image 14**	This occurs into early second trimester, and is more common in primiparous patients. The cervix can appear quite curved and have a 'horizontal' orientation in relation to the maternal vagina making it difficult to visualise the cervix and the external os. To improve visualisation, withdraw the transducer to delineate the landmarks. A lower frequency may be used to image the full length of the cervical mucosa to the internal os. [38]
Images of amniotic fluid sludge if present. **Refer to Images 6 and 11**	Amniotic fluid sludge appears as echogenic aggregates close to the internal os or within a funnel. It likely represents microbial invasion of the amniotic cavity. [39] While it is an independent risk factor for spontaneous preterm delivery, preterm rupture of membranes and histological chorioamnionitis in asymptomatic patients at high-risk for sPTB, [39] there is insufficient evidence to demonstrate that adding these to the CL measurement improves the predictive accuracy. [44]
Images of any amnion-chorion separation if present. **Refer to Image 15**	While there is no clear evidence, it is reasonable to assume that risks of PPROM or sPTB increases when short CL and amnion-chorion separation are both present. [6]
Endocervical canal dilation if present. **Refer to Image16**	The endocervical canal is in most cases represented by a thin line. Sometimes, often in the third trimester, it may have a thin layer of hypoechoic contents. This most likely represents an accumulation of mucus, but needs to be differentiated from a thin cervical funnel. If the fetal membranes (chorion and amnion) are located at the level of the internal os, and they are not prolapsing into the endocervical canal, then the presence of an endocervical dilation is unlikely **(Image 21).** [39]
Images of cerclage if in situ. **Refer to Images 2, 17-19**	If the patient has cerclage in situ, the location of the stitches should be identified and recorded in images. Cerclage is seen as two bright spots in the anterior and posterior walls of the cervix. CL should be measured as it has good predictive accuracy even in when a cerclage is in place. [44] An additional 2 measurements may be made; 1) from the internal os to the level of the cerclage, and 2) from the level of the cerclage to the external os. [44]

TRANSABDOMINAL SONOGRAPHIC IMAGING OF THE CERVIX (TAS)

Introduction

Most pregnant patients in Australia and New Zealand are offered TAS in the mid-trimester. This scan also provides an opportunity to assess for a shortened cervix using TAS as a first stage screen. If the TAS CL is <35mm or the cervix is not adequately visualised, then a second stage TVS assessment, including CL measurement should be made to more accurately assess the cervix and CL (see Recommendation 1a).

Contraindications*

- Patient does not provide consent.
- Unavailability of appropriate equipment (eg. appropriate transducer or high-level disinfectant equipment and materials).
- Unavailability of a sonographer (or other health/medical professional) who is competent in TAS assessment of the gravid cervix or high-level disinfectant equipment and materials).

***Note:** Where TVS is indicated under these guidelines, but contraindicated by the criteria above, then this may be discussed with the referrer/reporting specialist to ensure the appropriate examination/care is provided.*

Pre-scanning considerations

Transducer selection: curved array transducer with a frequency which offers the best possible resolution while providing sufficient depth of ultrasound field to demonstrate the cervix should be selected.

The patient should be scanned in the supine position. [6]

Optimal bladder filling is required to balance the trade-off between adequate visualisation of the cervix and the artificial elongation of the cervix that occurs with bladder filling. The CL can measure 6mm longer with a full bladder compared to an empty bladder [9] and an overfull bladder can also increase the chance of a lower uterine contraction developing **(Images 29-30)**, making it difficult to define the true CL. [49] If the cervix can be adequately visualised when the bladder's deepest urine pocket is <5cm (measured vertically-anterior to posterior), then TAS CL measurements will not be significantly different from TVS measurements of CL. [50]

Scanning and image recording

Scan using oblique and parasagittal movements of the transducer to delineate the full length of the cervical mucosa and internal and external os in the most horizontal orientation possible, to improve identification of the internal and external os and allow accurate placement of calipers. Refer to Images 25-27 for acceptable TAS images of the cervix.

From a cephalad approach on the maternal abdomen, use a caudal tilt of the transducer, to utilise the amniotic fluid as a window for visualisation of the cervix. [49] The cervix should be assessed multiple times during the course of the obstetric ultrasound examination, due to dynamic nature of the cervix, and its changing appearances during different phases of bladder filling to capture optimal images of the cervix. [49]

The depth and width of field should be optimised so that the cervix occupies between 50 and 75% of the image. [6, 39, 46] The sonographer should aim to record the same structures, including the same landmarks used for a measurement of the CL, that are described in Table 10 for TVS. [6] However, TAS has multiple technical limitations including sub-optimal visualisation of the cervix due to decreased imaging resolution, poor sonographic windows and bladder distention **(Images 31-32),** shadowing or obscuration by the fetus, bladder edge-artifact obscuring portions of the cervix (Image 28), unexplained obscuration of the cervix, large body habitus and the potential for a short CL to be missed. [6, 10]

Interpreting images

The internal os of a normal cervix will have a flattened T-shape appearance. The amnion may be visible especially in cases of a prominent mucus plug. The external os often appears as a very slight indentation. Use the posterior wall of the cervix as a guide when placing the caliper delineating the external os. [38]

The pressure from a full bladder can falsely elongate the cervix **(Image 31),** making it difficult to assess the cervical glandular tissue delineating the true endocervical canal, and potentially also masking the presence of premature rupture of membranes (PROM). A post void bladder (empty or with minimal filling) can improve visualisation of the full CL, by reducing the compression of the endocervical canal and therefore alleviating the false elongation **(Image 34)**. [50] After voiding, the cervix may appear 'curved', or 'vertical' **(Image 36)**. [49]

When a TAS CL of less than 35mm is measured, this is considered high-risk for a short cervix (TVS CL <25mm) [7] and a TVS should be offered to the patient as appropriate for a more accurate identification of a shortened cervix, and prediction for sPTB. Although TAS CL when measured with an empty bladder correlates with TVS CL, a higher cut-off is required for TAS CL to accommodate overestimation of CL which may occur with the bladder distension required for adequate visualisation **(Image 38).** [39, 49]

TRANSPERINEAL SONOGRAPHIC IMAGING OF THE CERVIX (TPS)

Introduction

TPS measurements of CL appear to be comparable to TVS [43], but it has been less studied. [6, 10] It is an alternative to TVS, when TVS is contraindicated. [6, 10] TPS is often perceived as technically challenging to perform and interpret, but with training accurate results can be achieved. [21] As with all ultrasound assessments of the cervix TPS should be performed by sonographers trained and competent in the technique. [2]

Contraindications*

- Patient does not provide consent.
- Unavailability of appropriate equipment (eg. appropriate transducer or high-level disinfectant equipment and materials).
- Unavailability of a sonographer (or other health/medical professional) who is competent in TPS assessment of the gravid cervix.

***Note:** Where TVS is indicated under these guidelines, but contraindicated by the criteria above, then this may be discussed with the referrer/reporting specialist to ensure the appropriate examination/care is provided.*

Pre-scanning considerations

- Transducer selection: curved array transducer with a frequency which offers the best possible resolution while providing sufficient depth of ultrasound field to demonstrate the cervix should be selected. The transducer should be covered with a clean cover (freezer bag, or gloves) and clean gel used as a coupling agent. [6, 48]
- The patient should be scanned with an empty bladder, and whilst in the lithotomy position with the hips elevated to reduce rectal gas over the external os. [46, 49]
- The transducer should be covered with a single-use high quality transducer cover. The patient should be asked if they have a latex sensitivity, and if so, special non-latex covers should be used. [42] Sterile, single use ultrasound gel should be applied between the transducer and transducer cover, and on the outside of the transducer cover (ASA Clinical Statement: The safe use and storage of ultrasound gel, refer to Section F).
- Transducers used during TPS are at risk of coming into contact with mucous membranes, blood or body fluids and therefore a high-level disinfected transducer should always be used. [42] I.e., the transducer should always be reprocessed using high-level disinfection between use of different patients, or between TAS and TPS examinations of the same patient.

Scanning and image recording

The transducer is placed on the on the labia majora or perineum of the patient in a sagittal plane along the direction of the vagina. Slight oblique movements may be needed to delineate the internal and external os, the cervical corpus, and the endocervical canal in its full length. [6, 39, 49]

The sonographer should aim to record the same structures, including the same landmarks used for a measurement of the CL, that are described in Table 10 for TVS **(Image 39)**. [6] Technical limitations include obscuration of the cervix by adjacent bowel/rectal gas **(Image 40).** This can be alleviated by using an elevated lithotomy patient position, and by scanning with a slightly anterior approach on the labia with a slight posterior angulation to help overcome the shadowing from gas. [49] Another technical issue is the distance to the gravid cervix from the transducer face, which usually requires a lower frequency transducer than used in the TAS approach, and therefore more difficult to delineate the landmarks of the external os, cervical glandular tissue and internal os. This is more problematic when a lower uterine contraction is present. [49] Sonographers may also lack experience in this technique.

Interpreting images

Ideally, the full length of the echogenic endocervical canal should ideally be seen, and the hypoechoic cervical glandular tissue may also be visible. The internal os is recognised as the point where the anterior and posterior walls of the cervix come together and should have a flattened T-shape appearance or a small V-shaped notch. The external os is recognised as the point adjacent to the endocervical canal where the cervix meets the vagina. This may be seen as a small echogenic area in some patients. The posterior cervical corpus can be used to guide for calliper placement at the elevated external os. [49] Refer to **Image 41** for an example of a short cervix measured on TPS.

While TPS is often considered challenging; this sonographic approach should not be discounted as recent studies using contemporary equipment have demonstrated that high correlations and small mean differences between TPS CL and TVS CL are achievable. [21] Similarly, high accuracy of TPS when using a minimum threshold for normal CL of < 25mm high accuracy has been demonstrated (sensitivity 88.07%, specificity 91.67%, positive predictive value 96.0%, negative predictive value, 77.19%, accuracy 89.17%). [51] TPS CL appears to be shorter than TVS CL at 14-20 weeks gestation, but accuracy improves as pregnancy progresses. [49]

SECTION E: **SAFETY, ACCEPTABILITY, FEASIBILITY AND COST EFFECTIVENESS OF SONOGRAPHIC ASSESSMENT OF THE GRAVID CERVIX**

In this CPG, unless otherwise indicated, TVS is the method of first choice to assess the gravid cervix in pregnancies at high-risk of sPTB and threatened preterm labour.

In most instances, TAS is the method of first choice to screen for a short cervix in pregnancies at low-risk of sPTB before proceeding to TVS if the TAS measurement is less than 35mm.

All recommendations are subject to the acceptability of the ultrasound method to the patient and their consent. Patient preferences will be influenced by communications with their referring obstetric care provider(s) and the sonographer, information they have gained from other sources and any previous experiences. While acceptance rates for TVS are as high as 75% [52], this does not mean TVS is preferred over TA or TPS. A number of studies have demonstrated that TVS is more often associated with discomfort, pain, and is more often less acceptable compared to TAS or TPS. [49, 53]

The recommendations should be feasible in most settings in Australia and New Zealand, as the equipment including transducer types to meet these recommendations would be available in most comprehensive or specialised ultrasound imaging departments. The exception may be in rural and remote areas. [9] Sonographers should clearly communicate to referring obstetric care provider(s) and reporting clinicians if the unavailability of appropriate equipment has compromised the quality of the examination, or restricted adherence to this guideline document.

Whilst ultrasound cervical assessment is considered safe with no evidence of harms, [6, 12] care should be taken to minimise risks (refer to contraindications, and other ASA guidelines).

TVS CL screening is considered cost-effective in populations at increased risk of sPTB, but its cost effectiveness in low-risk populations is argued. [9] Some studies have demonstrated cost-effectiveness, others have suggested there may an increase in the overall medical costs associated with the strategy. [7] Specific to the situation in Australia and New Zealand, there have been no cost-effectiveness studies published.

If TVS assessment of the cervix is added to a routine mid-trimester obstetric scan, the additional time and resource needs translates into additional costs which must be borne by either the patient or the imaging department [7] and can potentially limit resource allocation to other ultrasound services. It has been stated that adding a TVS cervical assessment should only take 3-5 minutes [10] and does not significantly increase the time for completion of ultrasound examination. [5] However, it is likely these statements are made without considering the time required for the associated activities with the TVS procedure, such as explanation of the procedure, patient voiding, reconfiguration of the scanning room. A recent study, considered this additional time, and found that adding a TVS CL assessment to a morphology scan prolonged the examination by 25%. ([54] Additional time and resources are also required for the high-level disinfection of transvaginal transducers. The approach of using TAS for a first stage cervical assessment (recommendation 2) at the time of a routine mid trimester scan, decreases the number of TVS assessments and associated additional resource load on the imaging department and reduces patient inconvenience. [53]

SECTION F: **SONOGRAPHER TRAINING**

For accurate and reproducible results for ultrasound assessment of the gravid cervix, whether using TVS, TAS or TPS, it is important that sonographers are adequately trained, follow standardised ultrasound techniques, and apply quality assurance methods.

At the time of writing the minimum requirements for sonographers to practice in Australia within the Medicare framework, is that they are accredited and listed with the Australian Sonography Accreditation Registry (ASAR) as either an Accredited Medical Sonographer (AMS) or Accredited Student Sonographer (ASS). In New Zealand, sonographers must hold a current annual practising certificate issued by the New Zealand Medical Radiation Technologists Board (NZMRTB).

In Australia, the competency standards specifically state that sonographers should have the underpinning knowledge required to sonographically assess the gravid cervix. [55] The competency standards applicable to New Zealand sonographers do not provide specific requirements relating to sonographic assessment of the gravid cervix. [56] While obstetric sonography is included in the curriculum of Australia and New Zealand pre-accreditation or pre-registration courses, sonographers may not have competency in sonographic assessment of the gravid cervix. Additional post-graduate training maybe required to achieve competency.

Sonographers undertaking obstetric examinations, should take responsibility, with support from employers and colleagues, to develop and/or maintain competent skill levels in assessing the gravid cervix using the techniques described in this CPG. This can be achieved through inhouse or external training sessions. The TVS method can be rapidly learned, with an adequate technique achieved in beginners with no previous ultrasound experience after simple theoretical training, followed by two practice sessions, and only 23 scans performed with trainer supervision. [56] TPS for cervical assessment is often perceived as more challenging, however an inexperienced operator with specific training was able to achieve good TPS CL measurements which correlated closely to TVS CL measurements, with only small mean differences. [21] Regular education can increase competency, [9] and quality can be regularly monitored via audits integrating constructive, educative feedback on selected images, CL measurements and sonographer reports.

SECTION G: **REFERENCE TO OTHER GUIDELINES**

This guideline should be read in conjunction with the following guidelines

ASA Clinical Statement: Disinfection of Intracavity and Semi-critical ultrasound transducers
Clinical-Guideline-Disinfection-of-intracavity-and-semi-critical-ultrasound-transducers-MAR22.pdf (sonographers.org)

ASA Guideline: Intimate examinations, consent and chaperones
UPDATE---PUB_0602_GUIDELINE-Intimate-examinations-Consent-and-Chaperones-Jan22.pdf (sonographers.org)

ASA Clinical Statement: Infection Prevention and Control
UPDATE---PUB_0874_CS-Infection-Prevention-and-control-update.pdf (sonographers.org)

ASA Clinical Statement: The safe use and storage of ultrasound gel
PUB_0872_Safe_Use_and_Storage_of_Ultrasound_Gel_FEB21.pdf (sonographers.org)

ASA Guideline: Vasa praevia diagnosis in the mid trimester ultrasound
Vasa praevia diagnosis in the mid trimester ultrasound - Humphries-Hart - 2020 - Sonography - Wiley Online Library

REFERENCES
(includes references in appendices)

1. World Health Organization. “WHO recommendations on interventions to improve preterm birth outcomes.” (2015).

2. Coutinho CM, Sotiriadis A, Odibo A, Khalil A, D’Antonio F, Feltovich H, Salomon LJ, Sheehan P, Napolitano R, Berghella V, da Silva Costa F. ISUOG Practice Guidelines: role of ultrasound in the prediction of spontaneous preterm birth. Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2022 Sep;60(3):435-56.

3. Offiah I, O’Donoghue K, Kenny L. Clinical risk factors for preterm birth. Preterm Birth: Mother and Child. Rijeka, Croatia: InTech. 2012 Jan 27:73-94.

4. Taylor BK. Sonographic assessment of cervical length and the risk of preterm birth. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2011 Sep 1;40(5):617-31.

5. 23. Risk of Preterm Birth. [Internet] Department of Health, Australian Government; 2019 [cited 2021 Dec 20]. Available from: https://www.health.gov.au/resources/pregnancy-care-guidelines/part-d-clinical-assessments/risk-of-preterm-birth.

6. Lim KI, Butt K, Nevo O, Crane JM. Guideline No. 401: sonographic cervical length in Singleton Pregnancies: techniques and clinical applications. Journal of Obstetrics and Gynaecology Canada. 2020 Nov 1;42(11):1394-413.

7. Measurement of cervical length for prediction of preterm birth. Best practice statement. [Internet] Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG); 2022 [cited 2022 Apr 4]. Available from: https://ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Measurement-of-cervical-length-for-prediction-of-preterm-birth-(C-Obs-27)_Board-approved-March-2022.pdf?ext=.pdf.

8. Preterm birth prevention-low risk women pathway. [Internet] North Metropolitan Health Service, Government of Western Australia; 2021 [cited 2021 Dec 20]. Available from: https://www.kemh.health.wa.gov.au/~/media/HSPs/NMHS/Hospitals/WNHS/Documents/Clinical-guidelines/Obs-Gyn-Guidelines/Preterm-Birth-Prevention-Low-Risk.pdf?thn=0.

9. Pedretti MK, Kazemier BM, Dickinson JE, Mol BW. Implementing universal cervical length screening in asymptomatic women with singleton pregnancies: challenges and opportunities. Australian and New Zealand Journal of Obstetrics and Gynaecology. 2017 Apr;57(2):221-7.

10. on Gyn EP, Oliver ER, Maturen KE, Feldstein VA, Poder L, Shipp TD, Simpson L, Strachowski LM, Sussman BL, Weber TM, Winter T. ACR Appropriateness Criteria® Assessment of Gravid Cervix. Journal of the American College of Radiology. 2020 May 1;17(5):S26-35.

11. Hoffman MK. Prediction and prevention of spontaneous preterm birth: ACOG practice bulletin, number 234. Obstetrics & Gynecology. 2021 Dec 1;138(6):945-6.

12. Society for Maternal-Fetal Medicine Publications Committee. Progesterone and preterm birth prevention: translating clinical trials data into clinical practice. American journal of obstetrics and gynecology. 2012 May 1;206(5):376-86.

13. Komatsu Y, McKain L, Powell M. Prevention of spontaneous preterm birth: Guidelines for clinical practice from the French College of Gynaecologists and Obstetricians (CNGOF). European Journal of Obstetrics and Gynecology and Reproductive Biology. 2017 Dec 1;219:130.

14. Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). Measurement of Cervical Length for Prediction of Preterm Birth C-Obs 27. 2017

15. Butt K, Crane J, Hutcheon J, Lim K, Nevo O. No. 374-universal cervical length screening. Journal of Obstetrics and Gynaecology Canada. 2019 Mar 1;41(3):363-74.

16. Preterm labour and birth.[Internet] Queensland Clinical Guidelines. Queensland Health; 2020 [cited 2021 Dec 20]. Available from: https://www.health.qld.gov.au/__data/assets/pdf_file/0019/140149/g-ptl.pdf.

17. Newnham JP, White SW, Meharry S, Lee HS, Pedretti MK, Arrese CA, Keelan JA, Kemp MW, Dickinson JE, Doherty DA. Reducing preterm birth by a statewide multifaceted program: an implementation study. American journal of obstetrics and gynecology. 2017 May 1;216(5):434-42.

18. Berghella V, Saccone G. Cervical assessment by ultrasound for preventing preterm delivery. Cochrane database of systematic reviews. 2019(9).

19. McIntosh J, Feltovich H, Berghella V, Manuck T, Society for Maternal-Fetal Medicine (SMFM. The role of routine cervical length screening in selected high-and low-risk women for preterm birth prevention. American journal of obstetrics and gynecology. 2016 Sep 1;215(3):B2-7.

20. Preterm birth prevention-high risk women pathway. [Internet] North Metropolitan Health Service, Government of Western Australia; 2021 [cited 2022 April 8]. Available from: https://www.kemh.health.wa.gov.au/~/media/HSPs/NMHS/Hospitals/WNHS/Documents/Clinical-guidelines/Obs-Gyn-Guidelines/Preterm-Birth-Prevention-High-Risk.pdf?thn=0.

21. Krief D, Foulon A, Tondreau A, Diouf M, Sergent F, Gondry J, Chevreau J. Transperineal ultrasound in routine uterine cervix measurement. Archives of Gynecology and Obstetrics. 2022 Mar 23:1-7.

22. Salomon, L.J., Diaz-Garcia, C., Bernard, J.P. and Ville, Y., 2009. Reference range for cervical length throughout pregnancy: non-parametric LMS-based model applied to a large sample. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology, 33(4), pp.459-464.

23. Moroz LA, Simhan HN. Rate of sonographic cervical shortening and the risk of spontaneous preterm birth. American journal of obstetrics and gynecology. 2012 Mar 1;206(3):234-e1.

24. Kuusela P, Wennerholm UB, Fadl H, Wesström J, Lindgren P, Hagberg H, Jacobsson B, Valentin L. Second trimester cervical length measurements with transvaginal ultrasound: A prospective observational agreement and reliability study. Acta obstetricia et gynecologica Scandinavica. 2020 Nov;99(11):1476-85.

25. Vayssière C, Benoist G, Blondel B, Deruelle P, Favre R, Gallot D, Jabert P, Lemery D, Picone O, Pons JC, Puech F. Twin pregnancies: guidelines for clinical practice from the French College of Gynaecologists and Obstetricians (CNGOF). European Journal of Obstetrics & Gynecology and Reproductive Biology. 2011 May 1;156(1):12-7.

26. Glanc P, Nyberg DA, Khati NJ, Deshmukh SP, Dudiak KM, Henrichsen TL, Poder L, Shipp TD, Simpson L, Weber TM, Zelop CM. Acr appropriateness criteria® multiple gestations. Journal of the American College of Radiology. 2017 Nov 1;14(11):S476-89.

27. Khalil A, Rodgers M, Baschat A, Bhide A, Gratacos E, Hecher K, Kilby MD, Lewi L, Nicolaides KH, Oepkes D, Raine-Fenning N. ISUOG Practice Guidelines: role of ultrasound in twin pregnancy. Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2016 Feb;47(2):247-63.

28. Morin L, Lim K. No. 260-ultrasound in twin pregnancies. Journal of Obstetrics and Gynaecology Canada. 2017 Oct 1;39(10):e398-411.

29. Preterm labour. (New guideline 25). [Internet]. National Institute for Health and Care Excellence; 2015 [cited 2021 Dec 20]. Available from: http://www.nice.org.uk/guidance/ng25.

30. Perinatal Practice Guideline. Preterm Labour and Birth. Prevention, Diagnosis and Management. [Internet]. Department for Health and Ageing, Government of South Australia;2021 [cited 2021 Dec 21]. Available from: https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/clinical+resources/clinical+programs+and+practice+guidelines?finderTab=tab-1&az=az-p.

31. Ghi T, Eggebø T, Lees C, Kalache K, Rozenberg P, Youssef A, Salomon LJ, Tutschek B. ISUOG Practice Guidelines: intrapartum ultrasound. Ultrasound in Obstetrics & Gynecology. 2018 Jul;52(1):128-39.

32. Kido K, Kobayashi K, Ryo E, Ayabe T. Transperineal Ultrasound in Preterm Labor. In Intrapartum Ultrasonography for Labor Management 2021 (pp. 399-403). Springer, Cham.

33. Go Acevedo HG, Rahman MH, Moreno MA. Sonography 3rd Trimester And Placenta Assessment, Protocols, And Interpretation. In StatPearls [Internet] 2022 Jun 11. StatPearls Publishing.

34. Nahlawi S, Gari N. Sonography Transvaginal Assessment, Protocols, And Interpretation. In StatPearls [Internet] 2022 Jun 11. Statpearls Publishing.

35. Wong L, Kwan AH, Lau SL, Sin WT, Leung TY. Umbilical cord prolapse: revisiting its definition and management. American Journal of Obstetrics and Gynecology. 2021 Oct 1;225(4):357-66.

36. Tsoi E, Akmal S, Rane S, Otigbah C, Nicolaides KH. Ultrasound assessment of cervical length in threatened preterm labor. Ultrasound in obstetrics & gynecology. 2003 Jun;21(6):552-5.

37. Cervical length screening. [Internet]. New Zealand Ministry of Health; 2019 [cited 2021 Dec 20]. Available from: https://www.health.govt.nz/our-work/life-stages/maternity-services/new-zealand-obstetric-ultrasound-guidelines/cervical-length-screening.

38. O'Hara S, Zelesco M, Sun Z, Lee E. The maternal cervix: Why, when and how? Sonography. 2015;2:74-83.

39. Kagan KO, Sonek J. How to measure cervical length. Ultrasound in Obstetrics & Gynecology. 2015 Mar;45(3):358-62.

40. Diagnostic Imaging Accreditation Scheme Standards [Internet]. Australian Commission on Safety and Quality in Health Care. 2022 [cited 2022 Aug 3]. Available from: https://www.safetyandquality.gov.au/standards/diagnostic-imaging/diagnostic-imaging-accreditation-scheme-standards#part-2-pre-procedure-standards.

41. Carlan SJ, Richmond LB, O'brien WF. Randomized trial of endovaginal ultrasound in preterm premature rupture of membranes. Obstetrics & Gynecology. 1997 Mar 1;89(3):458-61.

42. Australasian Society for Ultrasound in Medicine (ASUM), Basseal JM, Westerway SC, Juraja M, van de Mortel TF, McAuley TE, Rippey J, Meyer-Henry S, Maloney S, Ayers A, Jain S. Guidelines for reprocessing ultrasound transducers. Australasian Journal of Ultrasound in Medicine. 2017 Feb;20(1):30-40.

43. Cervical Incompetence Imaging. [Internet]. Medscape; 2022 [cited 2022 Dec 14]. Available from: https://emedicine.medscape.com/article/402598-overview?icd=login_success_email_match_norm#a3

44. Ultrasound evaluation of the gravid cervix.[Internet]. Obgyn Key; 2017 [cited 2021 Dec 20]. Available from: https://obgynkey.com/ultrasound-evaluation-of-the-gravid-cervix/

45. Williams M, Iams JD. Cervical length measurement and cervical cerclage to prevent preterm birth. Clinical obstetrics and gynecology. 2004 Dec 1;47(4):775-83.

46. Cervical assessment. [Internet]. The Fetal MedicineFoundation; [Cited 2022 March 14]. Available from: https://fetalmedicine.org/fmf-certification-2/cervical-assessment-1#:~:text=The%20requirements%20for%20obtaining%20the%20FMF%20certificate%20of,20%20mm%29%20and%20one%20of%20a%20normal%20cervix.

47. [CG] Transvaginal ultrasound evaluation of the cervix - measurement of cervical length. [Internet]. National Health Service. Greater Glasgow and Clyde; 2017 [Cited 2021 Dec 20]. Available from: https://obsgynhandbook.nhsggc.org.uk/nhsggc-obstetrics-gynaecology-guidelines/guidelines-library/ultrasound/cg-transvaginal-ultrasound-evaluation-of-

the-cervix-measurement-of-cervical-length/.

48. New Zealand Ultrasound Obstetric Guidelines. [Internet]. New Zealand Government, Ministry of Health; 2019 [cited 2023 March 29]. Available from: https://www.sonographers.org/publicassets/99e4ff78-1589-ea11-90fb-0050568796d8/new-zealand-obstetric-ultrasound-guidelines-2019-dec19.pdf#:~:text=NEW%20ZEALAND%20OBSTETRIC%20ULTRASOUND%20GUIDELINES%202019%201%20Introduction,is%20clinically%20appropriate%20and%20uniformly%20of%20high%20quality.

49. O'Hara S, Zelesco M, Sun Z. Cervical length for predicting preterm birth and a comparison of ultrasonic measurement techniques. Australasian journal of ultrasound in medicine. 2013 Aug;16(3):124-34.

50. Saul LL, Kurtzman JT, Hagemann C, Ghamsary M, Wing DA. Is transabdominal sonography of the cervix after voiding a reliable method of cervical length assessment?. Journal of Ultrasound in Medicine. 2008 Sep;27(9):1305-11.

51. Usman A, Shafique M, Jalil J, Amin U, Zafar SI, Qamar K. Comparison of diagnostic accuracy of transperineal sonography with the transvaginal ultrasonography in determining accurate cervical length. Pakistan Armed Forces Medical Journal. 2019 Feb 1(1):136-41.

52. Naim A, Haberman S, Burgess T, Navizedeh N, Minkoff H. Changes in cervical length and the risk of preterm labor. American journal of obstetrics and gynecology. 2002 May 1;186(5):887-9.

53. Stamilio D, Carlson LM. Transabdominal ultrasound is appropriate. American Journal of Obstetrics and Gynecology. 2016 Dec 1;215(6):739-43.

54. Ginsberg Y, Zipori Y, Khatib N, Schwake D, Goldstein I, Shrim A, Weiner Z, Beloosesky R. It is about time. The advantage of transabdominal cervical length screening. The Journal of Maternal-Fetal & Neonatal Medicine. 2022 Dec 17;35(24):4797-802.

55. Childs J, Thoirs K, Osborne B, Halligan T, Stoodley P, Quinton A, Lombardo P, McDonald S, Slade D, Chandler A, Edwards C. Professional Competency Framework for Sonographers. [Internet]. 2021.

56. Policy: Competence Standards for Medical Imaging and Radiation Therapy Practitioners in Aotearoa New Zealand. [Internet]. New Zealand Medical Radiation Technologists Board; 2018 [cited 2022 Oct 10]. Available at: https://www.mrtboard.org.nz/assets_mrtb/Uploads/2018-Jul-V2-MRT-Competence-Standards.pdf

56. Vayssiere C, Moriniere C, Camus E, Le Strat Y, Poty L, Fermanian J, Ville Y. Measuring cervical length with ultrasound: evaluation of the procedures and duration of a learning method. Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2002 Dec;20(6):575-9.

58. Grimmer K, Dizon JM, Milanese S, King E, Beaton K, Thorpe O, Lizarondo L, Luker J, Machotka Z, Kumar S. Efficient clinical evaluation of guideline quality: development and testing of a new tool. BMC medical research methodology. 2014 Dec;14(1):1-0.

59. Koc EM, Aksoy H, Ayhan Baser D, Baydar Artantas A, Kahveci R, Cihan FG. Evaluation of clinical practice guideline quality: comparison of two appraisal tools. International Journal for Quality in Health Care. 2020 Dec;32(10):663-70.

60. American College of Radiology. ACR-ACOG-AIUM-SMFM-SRU practice parameter for the performance of standard diagnostic obstetrical ultrasound. 2020.

61. Obstetrical Ultrasound Imaging Guidelines. [Internet]. MedSolutions Inc.; 2009 [cited 2021 Dec 20] Available from: https://files.nc.gov/ncdma/documents/Providers/Programs_Services/Radiology/OBUltrasound.pdf.

62. Bonney E. Ultrasound of cervical length: why, when and how. [Internet]. The British Medical Ultrasound Society; [cited 2021 Dec 20]. Available from: https://www.bmus.org/media/resources/files/Elizabeth_Bonney_BMUS_Oct_2017.pdf#:~:text=Ultrasound%20of%20cervical%20length%3A%20why%2C%20when%20and%20how,Consultant%20Obstetrician%20Leeds%20Teaching%20Hospitals%20NHS%20Trust%20elizabeth.bonney%40nhs.net.

63. UW Ultrasound. Second/Third trimester guidelines. [Internet]. University of Washington. [cited 2021 Dec 20]. Available from: https://depts.washington.edu/usrad/protocols/obstetric/.

64. American College of Obstetricians and Gynecologists. ACOG practice bulletin no. 127: Management of preterm labor. Obstetrics and gynecology. 2012 Jun;119(6):1308-17.

65. Perinatal Practice Guideline. Cervical Insufficiency and Cerclage. [Internet]. Department for Health and Ageing, Government of South Australia; 2017 [cited 2021 Dec 20]. Available from: Cervical-insufficiency-cerclage-WCHN-PPG-22052012.pdf

66. Di Renzo, G.C., Roura, L.C., Facchinetti, F., Antsaklis, A., Breborowicz, G., Gratacos, E., Husslein, P., Lamont, R., Mikhailov, A., Montenegro, N. and Radunovic, N., 2011. Guidelines for the management of spontaneous preterm labor: identification of spontaneous preterm labor, diagnosis of preterm premature rupture of membranes, and preventive tools for preterm birth. The Journal of Maternal-Fetal & Neonatal Medicine, 24(5), pp.659-667.

67. ACOG Practice Bulletin No. 142. Cerclage for the management of cervical insufficiency. Obstet Gynecol. 2014;123(2 Pt 1):372-9.

68. Routine measurement of cervical length at time of mid trimester anomaly scan in all women. [Internet]. New Zealand Maternal Fetal Medicine Network; 2022 [cited 2022 Dec 14]. Available from: C:\Users\thoir\Downloads\NZMFMN Routine measurement of cervical length.pdf

69. ALTAY M, BAYRAM M, Biri AA, Büyükbayrak EE, Deren Ö, Ercan F, EROĞLU D, ESMER AÇ, İNAN C, KANIT H, KARAŞAHİN KE. Guideline on Preterm Labor and Delivery by the Society of Specialists in Perinatology (Perinatoloji Uzmanları Derneği-PUDER), Turkey. Journal of Clinical Obstetrics & Gynecology. 2020;30(3):118-30.

70. Guidelines for the Performance of Second (Mid) Trimester Ultrasound. [Internet]. Australasian Society for Ultrasound in Medicine; 2018 [Cited 2021 Dec 20]. Available from: https://www.asum.com.au/files/public/SoP/curver/Obs-Gynae/Guidelines-for-the-Performance-of-Second-Mid-Trimester-Ultrasound.pdf.

71. Salomon LJ, Alfirevic Z, Berghella V, Bilardo C, Hernandez-Andrade E, Johnsen SL, Kalache K, Leung KY, Malinger G, Munoz H, Prefumo F. Practice guidelines for performance of the routine mid-trimester fetal ultrasound scan. Ultrasound in Obstetrics & Gynecology. 2011 Jan;37(1):116-26.

72. Meijer-Hoogeveen M. Sonography of the cervix at term gestation: Utrecht University; 2007.

73. Withanawasam N, Tara S. The shortened cervix in pregnancy:'Investigation and current management recommendations for primary caregivers'. Australian Journal of General Practice. 2019 Mar;48(3):121-3. 2019;48(3):121-3.

74. Preterm labour. [Internet] North Metropolitan Health Service. Government of Western Australia; 2020 [cited 2021 Dec 20]. Available from: https://www.wnhs.health.wa.gov.au/~/media/HSPs/NMHS/Hospitals/WNHS/Documents/Clinical-guidelines/Obs-Gyn-Guidelines/Preterm-Labour.pdf?thn=0

75. AIUM Practice Parameter for the Performance of Limited Obstetric Ultrasound Examinations by Advanced Clinical Providers. J Ultrasound Med. 2018;37(7):1587-96.

76. Salomon, L.J., Alfirevic, Z., Berghella, V., Bilardo, C.M., Chalouhi, G.E., Costa, F.D.S., Hernandez-Andrade, E., Malinger, G., Munoz, H., Paladini, D. and Prefumo, F., 2022. ISUOG Practice Guidelines (updated): performance of the routine mid-trimester fetal ultrasound scan. Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology.

77. Berghella V. Short cervix before 24 weeks: Screening and management in singleton pregnancies. [Internet]: UptoDate. Wolters Kluwer;2022 [cited 2022 Dec 14]. Available from: https://www.uptodate.com/contents/short-cervix-before-24-weeks-screening-and-management-in-singleton-pregnancies#.

78. Grimmer K, Louw Q, Dizon JM, van Niekerk SM, Ernstzen D, Wiysonge C. Standardising evidence strength grading for recommendations from multiple clinical practice guidelines: a South African case study. Implementation Science. 2018 Dec;13(1):1-8.

APPENDICES

APPENDIX 1: GUIDELINE DEVELOPMENT GROUP AND AFFILIATIONS

Member	Affiliations
Peter Coombs	Standards of Practice, Editorial Board Sonography ASA Ultrasound, Monash Health Imaging Department of Medical Imaging and Radiation Sciences, Monash University
Dr Ann Quinton	Academic Central Queensland University, Senior Sonographer Nepean Hospital, NSW Health ASA Special Interest Group for Women's health
Sarah Srayko	Sonographer, Pacific Radiology Group, New Zealand ASA Special Interest Group for Women's Health Active member of ASA, NZMRTB, ARDMS and Sonography Canada
Dr Nayana Parange	Professorial Lead, Associate Professor Medical Sonography, Allied Health and Human Performance, University of South Australia ASA Special Interest Group for Women's health
Michelle Pedretti	Chief Sonographer, King Edward Memorial Hospital for Women, PhD Student - Statewide implementation of cervical length screening for the prevention of preterm birth, Outreach team member of the Western Australian Prevention of Preterm Birth Participant in the Expert Panel Meeting – The National Preterm Birth Prevention Collaborative
Sandra O'Hara	Sandra O'Hara Deputy Ultrasound Supervisor, SKG Radiology. Associate Editor - Australasian Journal of Ultrasound in Medicine. Newcastle Obstetrics and Specialist Ultrasound, Senior Sonographer
Sophie OBrien	Hunter Imaging Group, Sonographer Supervisor ASA Special Interest Group for Women's health
Paula Kinnane	Academic Central Queensland University, Senior Sonographer Royal Brisbane Womens Hospital ASA Special Interest Group for Women's health
Dr Jacqueline Spurway	Standards of Practice ASA, Chief Sonographer Orange Hospital and Western NSW LHD Clinical Co-ordinator Ultrasound Services
Dr Kerry Thoirs	Guideline Development Group Coordinator, Editor-in-Chief, Australasian Sonographers Association, Adjunct Associate Professor, University of South Australia

APPENDIX 2: HOW GUIDELINE WAS DEVELOPED

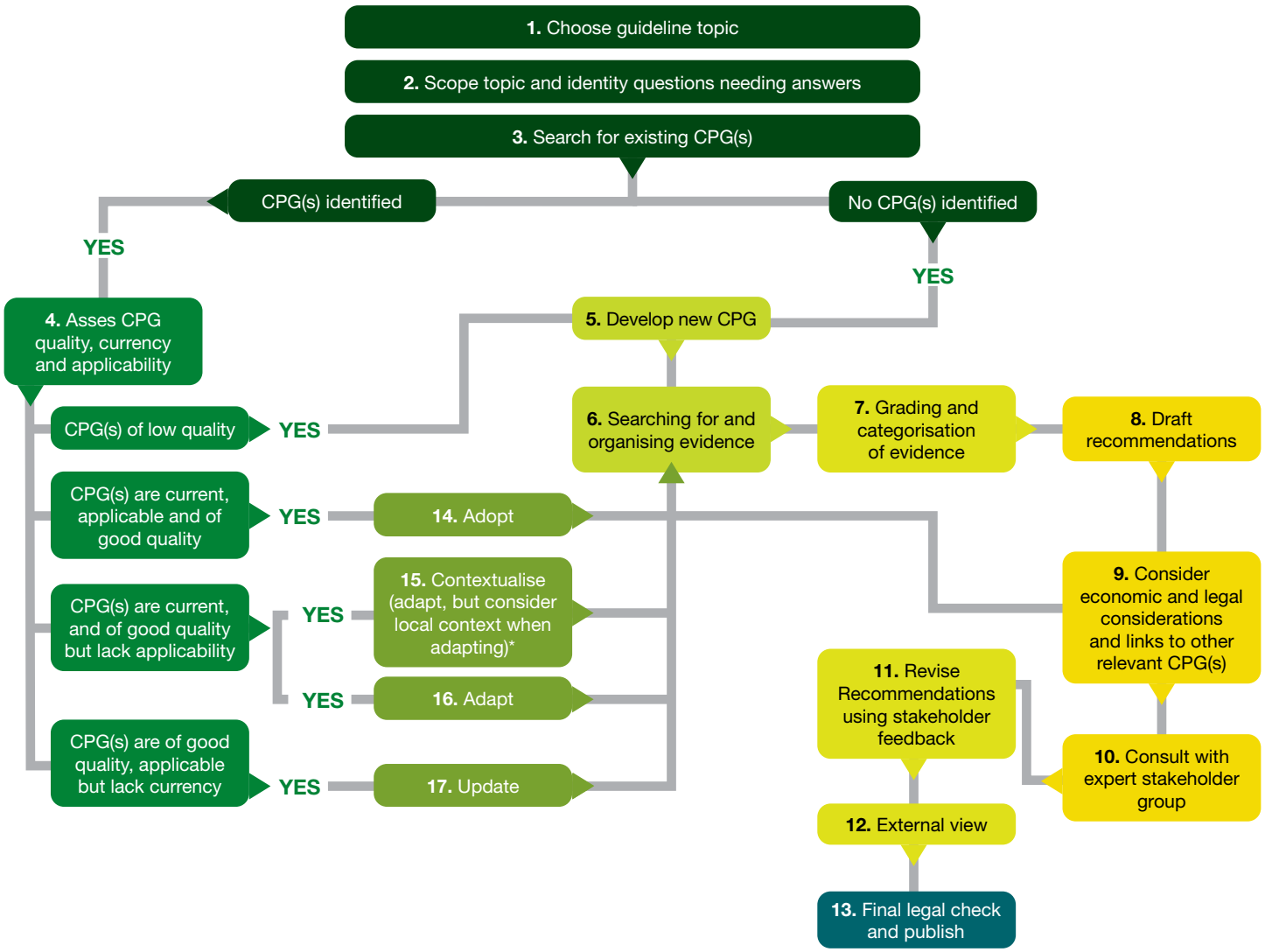
An overarching plan was created to develop the guideline and future guidelines for sonographers (figure 1).

Key features of the plan were 1) to develop questions that the guideline would answer, 2) draw on existing evidence based clinical practice guidelines (CPGs) to inform the guideline, 3) undertake literature searches when existing CPGs have deficits, and 3) consult with stakeholders. The decision to draw on existing CPGs, rather than developing a de novo guideline, was regarded as more efficient as de novo guideline development is time consuming and expensive, requiring teams of methodologists and experts to search, critique and debate the evidence base. This approach also enabled review of existing evidence-based guidelines developed for other professional groups involved in the care of obstetric patients, to ensure the recommendations in this guideline did not contradict any existing guidelines in use for these professionals. Table 1 provides a timeline of key guideline development activities.

Guideline Development Group

A Guideline Development Group was established to set up to develop questions the guideline would address, to advise on stakeholder groups, to source underpinning evidence, to categorise and grade evidence and to draft and write. A series of questions and topics that should be addressed in the guideline was developed (Table 1, Section B).

Figure 1 Flow diagram of general plan of guideline development.



Key: CPG; clinical practice guideline

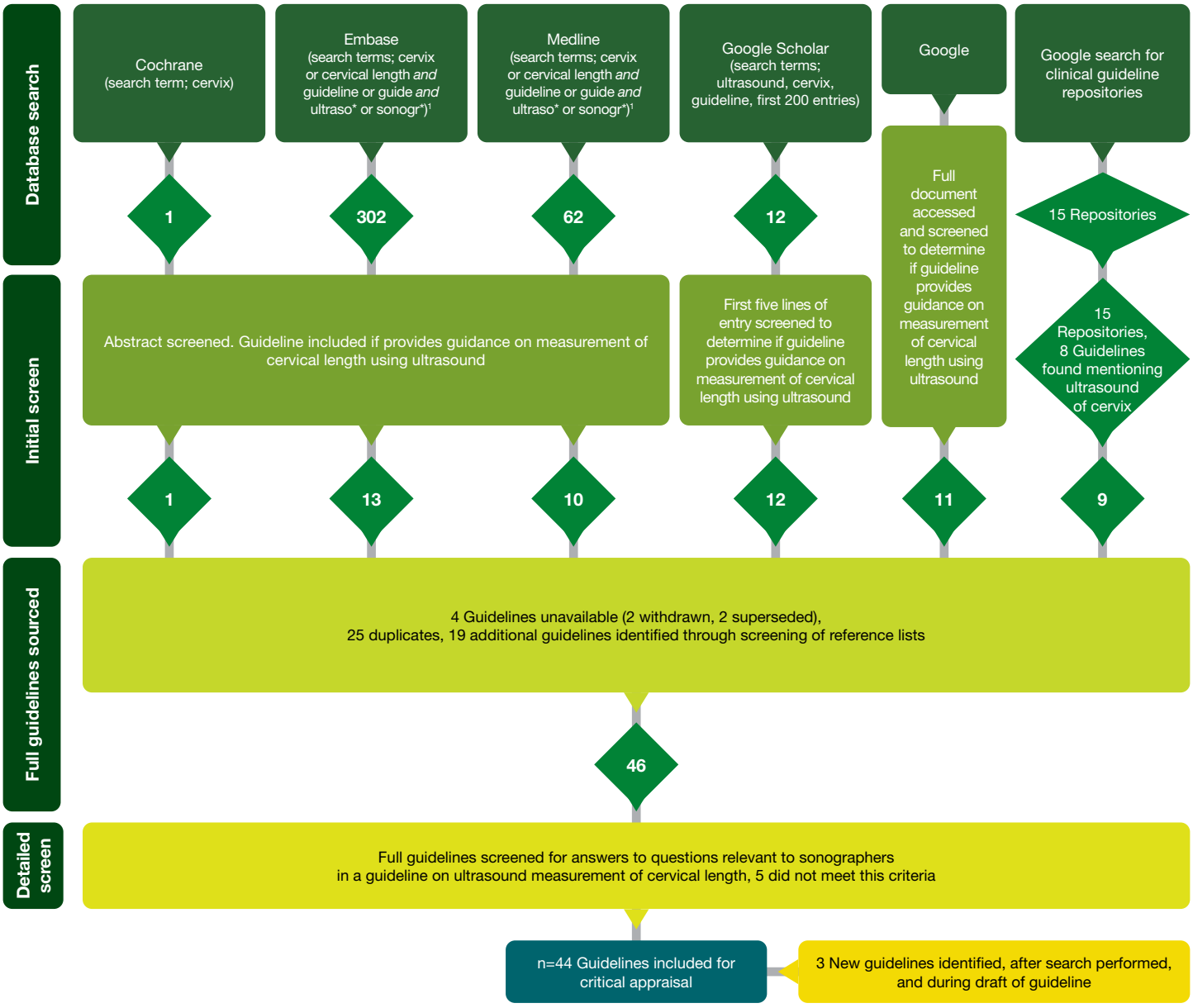
Table 1: Calendar of key guideline development activities

Date	Activity
8.11.21	Guideline development group Zoom: Initial discussions about guideline development and approach.
6.12.21	Guideline development group Zoom meeting: discussions on questions that need answering in guideline, and initiating process to identify existing relevant guidelines.
7.3.22	Guideline development group discussion on identified existing guidelines, discussion on draft format and content.
April May	Online survey; questions about draft guideline.
8.7.22 and 4.7.22	Guideline development group Zoom meeting; discussion on revisions to guideline based on survey results.
10.7.22-31.7.22	Revised draft distributed to members and Worksheet (1) send out to group to elicit comments on draft recommendations.
7.8.22-12.9.22	Revised draft distributed to members and Worksheet (2) send out to group to elicit comments on draft recommendations.
10.10.22	Guideline development group Zoom meeting; discussion on revisions to guideline based on feedback from Worksheet (2).
18.10.22	Final draft distributed, legal advice sought.
November -December 22	Feedback collated.
January-February 2023	Stakeholder consultation.
28.3.22	Guideline development group Zoom meeting; discussion on stakeholder consultation and amendments to draft.
<information to be added after public consultation>	Public consultation.

Literature search and appraisal

A literature search was performed to identify existing CPGs that may be relevant to the guideline. Figure 2 outlines the results.

Figure 2: Flow chart of search strategy and results of literature search to identify existing relevant clinical practice guidelines



1 search limited by english language; 2000-17.12.2021

Results of search of search engines and CPG repositories

a) Twelve electronic documents were retrieved from Google Scholar and allocated for detailed screening. The documents were identified using search terms: ultrasound; cervix; guide. The first five lines of the first 200 entries were screened. Documents were retrieved if it appeared to be a CPG, or if it provided a 'how to' description.

b) Eleven electronic documents were retrieved from Google and allocated for detailed screening. The documents were identified using search terms: ultrasound; cervix; guide. The first five lines of the first 200 entries were screened. Documents were retrieved if it appeared to be a guideline, or if it provided a 'how to' description. Patient information documents were not included.

c) A total of nine electronic documents were retrieved from fifteen CPG repositories (table 2) and allocated for detailed screening. The CPG repositories were identified via a Google search using the search terms: cervix; ultrasound; preterm. Each of these repositories were searched for guidelines relating to ultrasound and preterm birth.

Table 2: CPG repositories searched for relevant clinical guidelines

	Guideline repository	Identified guidelines (n)
1.	Australian Clinical Practice Guidelines	–
2.	Queensland Clinical guidelines	1
3.	Clinical Guidelines health direct	–
4.	Agency for Clinical Innovation NSW	–
5.	NICE	1
6.	Royal Women's Hospital, Victoria	–
7.	The Department of Health, Australian Government	1
8.	NHMRC	1
9.	SA Health	2
10.	Fetal surveillance Education program RANZCOG	1
11.	Medscape	1
12.	UptoDate,	1
13.	Agency for Healthcare Research and Quality	–
14.	NIH	–
15.	NHS	–

Results of database searches

a) One electronic document was retrieved from the Cochrane database and allocated for detailed screening after a search using 'cervix' as the sole search term.

b) The Embase data base was searched using search terms; Cervix; cervical length; ultraso*; sonograph*;guide*
The search was limited by English language and date (1947 to 2021 December 17). 302 documents were identified. After initial screening of abstracts for their potential to inform the development of a guideline for sonographers to assess the gravid cervix sonographically, the full text versions of 13 documents were allocated for detailed screening.

c) The Medline database was searched using search terms; Cervix; cervical length; ultraso*; sonograph*;guide*
The search was limited by English language and date (1946 to 2021 December 17). Sixty-two documents were identified. After initial screening of abstracts for their potential to inform the development of a guideline for sonographers to assess the gravid cervix sonographically, the full text versions of ten documents were allocated for detailed screening.

d) One new relevant guideline was identified while the guideline was being drafted, after the formal search.

Detailed Screen of retrieved documents

Fifty-six documents were screened in detail selected for full text retrieval and detailed screening. Detailed screening was undertaken to select existing CPGs that would inform the new guideline. Four CPGs were not available for detailed screening due to their withdrawal (n=2) or being superseded (n=2) and 25 were duplicates. An additional 19 CPGs were identified by examining reference lists of CPGs identified by the above search strategy. A total of 46 documents were retrieved and underwent a detailed screen.

For a document to pass the detailed screen it had to address at least one of the questions relevant to a sonographer guideline on ultrasound of the gravid cervix (Table 1) that had been identified by the Guideline Development Group. Forty-one documents passed the detailed screen and were progressed to critical appraisal. Three new CPGs were identified after the search process, and during the drafting of the guideline, each of which were also subjected to a detailed screen.

Critical appraisal of existing guidelines

Methods

Each of the 44 documents which passed the detailed screen were critically appraised using the iCAHE Guideline Quality Checklist (Appendix 4) and rated with a quality score (-/14). The iCAHE Guideline Quality Checklist was chosen because it offered a simple, single-user tool that is easy to implement in busy settings, does not require specific training prior to use and it does not require a scoring rubric, as compared against the more commonly used AGREEII instrument, which has 23 questions, a complex 1–7 scoring system, and requires multiple testers to make a judgment on guideline quality. The iCAHE Guideline Quality Checklist has good reported inter-rater agreement, takes less time than AGREEII, [5, 58] and there are no significant differences between its scores and the scores of the AGREEII instrument (p=0.063), and ranks of CPGs according to their average total scores is similar between instruments. [59] It was appropriate to use this simpler instrument, as a large sample of relevant CPGs were identified.

Few of these were targeted explicitly towards the towards the clinical questions that need answering by sonographers, instead focussing on clinical management decision making, which is outside the scope of practice of sonographers. Using the less resource intensive iCAHE critical appraisal tool, effort could be transferred from the critical appraisal process to selecting and adapting narrative and recommendations from the existing CPGs that were relevant and applicable to sonographic clinical practice.

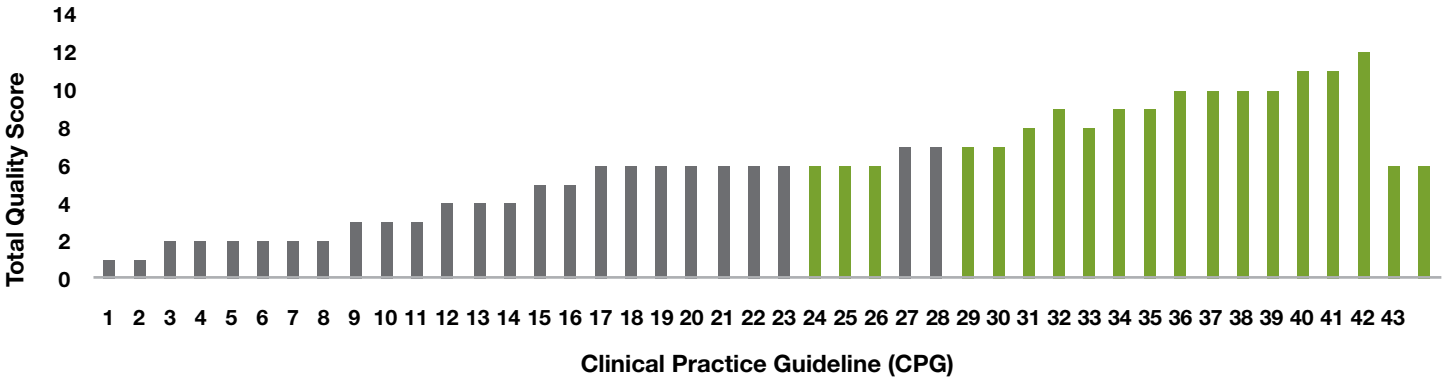
Results

The average score of the 44 critically appraised CPGs was 6.95 (median 6.02, range 1-12) out of a possible score of 14 (figure 3a).

The CPGs were stratified into two categories based on the 'underlying evidence' domain of the iCAHE Guideline Quality Checklist 1) best evidence and 2) least evidence. To qualify as 'best evidence', the CPG had to score an underlying evidence score of '2' or above (maximum possible evidence score=4). In the low evidence group total scores ranged from 1-7 (average 4.04, median 4), with all recording a zero score in the 'evidence' subcategory. In the best evidence group total scores ranged from 6-12 (average 8.63, median 9) and scores in the 'evidence' subcategory ranging from 2-4 (figure 3b).

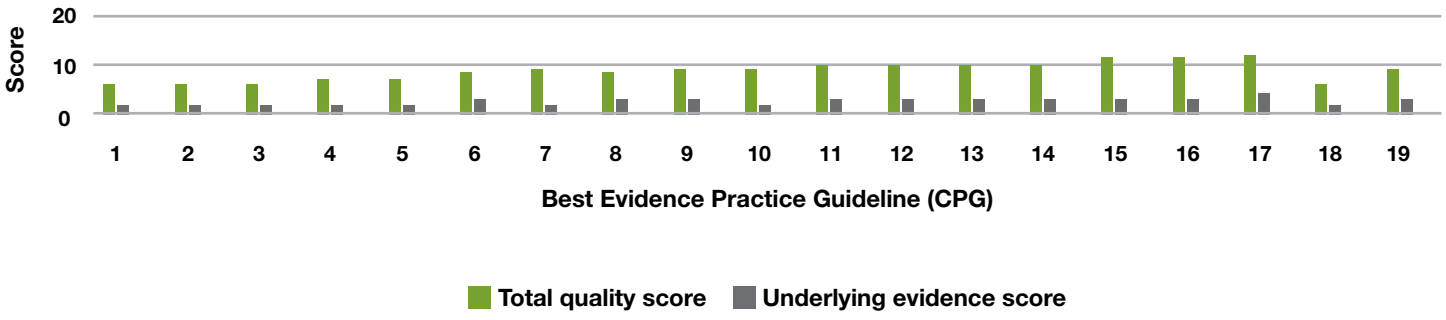
Figure 3: Quality scores for identified existing clinical practice guidelines ((see 3c for key to guideline numbers and titles).

3a: Total quality scores for each identified existing clinical practice guidelines



KEY: grey bars indicate low evidence CPGs, green bars represent best evidence CPGs

3b: Total quality scores and Underlying evidence scores for identified existing clinical practice guidelines rated as having the best evidence



3c: Key to CPGs listed in figures 3a and 3b

1	Cervical length screening. New Zealand Ministry of Health [37]	23	2019. ACR-ACOG-AIUM-SMFM-SRU practice parameter for the performance of standard diagnostic obstetrical ultrasound. [60]
2	Obstetrical Ultrasound Imaging Guidelines. MedSolutions Inc. [61]	24	Society for Maternal-Fetal Medicine. The role of routine cervical length screening in selected high-and low-risk women for preterm birth prevention. 2016 [19]
3	Bonney Elizabeth, Ultrasound of cervical length:why, when and how. The British Medical Ultrasound Society [61]	25	ACOG 234: Prediction and prevention of preterm birth [11]
4	UW Ultrasound. Second/Third trimester guidelines. University of Washington. [63]	26	ACOG practice bulletin no. 127: Management of preterm labor. 2012 [64]
5	Ultrasound evaluation of the gravid cervix. Obgyn Key. [44]	27	Perinatal Practice Guideline. Cervical Insufficiency and Cerclage. Department for Health and Ageing, Government of South Australia [65]
6	Guidelines for the management of spontaneous preterm labor: identification of spontaneous preterm labor, diagnosis of preterm premature rupture of membranes, and preventive tools for preterm birth. The Journal of Maternal-Fetal & Neonatal Medicine. 2011 [66]	28	No. 374-universal cervical length screening. Journal of Obstetrics and Gynaecology Canada. 2019 [15]
7	Why, when and how?. *Sonography*, 2: 74– 83. [38]	29	Pregnancy Care Guidelines. 23. Risk of Preterm birth. Australian Government. Department of Health. [5]
8	Cervical Incompetence Imaging. Medscape. [43]	30	ACOG Practice Bulletin No. 142. Cerclage for the management of cervical insufficiency.2014 [67]
9	Routine measurement of cervical length at time of mid trimester anomaly scan in all women. New Zealand Maternal Fetal Medicine Network [68]	31	Cervical assessment by ultrasound for preventing preterm delivery. Cochrane database of systematic reviews. 2019. [18]
10	How to measure cervical length. Ultrasound in Obstetrics & Gynecology. 2015 [39]	32	Measurement of cervical length for prediction of preterm birth. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. [14]
11	GUIDELINE ON PRETERM LABOR AND DELIVERY by the Society of Specialists in Perinatology (Perinatoloji Uzmanları Derne i-PUDER), Turkey. [69]	33	Society for Maternal-Fetal Medicine Publications Committee. Progesterone and preterm birth prevention: translating clinical trials data into clinical practice. 2012 [12]
12	Guidelines for the Performance of Second (Mid) Trimester Ultrasound. Australasian Society for Ultrasound in Medicine [70]	34	Prevention of spontaneous preterm birth. French College of Gynaecologists and Obstetricians. 2017 [13]
13	Preterm birth prevention-low risk women pathway. North Metropolitan Health Service, Government of Western Australia [8]	35	Measurement of cervical length for prediction of preterm birth (RANZCOG 2022) [7]
14	Practice guidelines for performance of the routine mid- trimester fetal ultrasound scan. Ultrasound in Obstetrics & Gynecology. 2011 [71]	36	Twin pregnancies: guidelines for clinical practice from the French College of Gynaecologists and Obstetricians 2011 [25]
15	Sonography of the cervix at term gestation (Doctoral dissertation, Utrecht University). [72]	37	No. 260-ultrasound in twin pregnancies. Journal of Obstetrics and Gynaecology Canada. 2017 [28]
16	The shortened cervix in pregnancy: 'Investigation and current management recommendations for primary caregivers. Australian Journal of General Practice. 2019 [73]	38	ISUOG Practice Guidelines: role of ultrasound in twin pregnancy. 2016 [27]
17	[CG] Transvaginal ultrasound evaluation of the cervix - measurement of cervical length. NHS. Greater Glasgow and Clyde. [47]	39	Acr appropriateness criteria® multiple gestations. Journal of the American College of Radiology. 2017 [26]
18	Perinatal Practice Guideline. Preterm Labour and Birth. Prevention, Diagnosis and Management. Department for Health and Ageing, Government of South Australia [30]	40	Guideline No. 401: Sonographic cervical length in Singleton Pregnancies: techniques and clinical applications. Journal of Obstetrics and Gynaecology Canada. 2020 [6]
19	Preterm labour and birth. Queensland Clinical Guidelines, Queensland Health. [16]	41	National Institute for Health and Care Excellence. Preterm labour. (New guideline 25.) 2015. Australia [29]
20	Preterm labour. North Metropolitan Health Service, Government of Western Australia [74]	42	ACR Appropriateness Criteria® Assessment of Gravid Cervix. 2020 [10]
21	(2018), AIUM Practice Parameter for the Performance of Limited Obstetric Ultrasound Examinations by Advanced Clinical Providers. [75]	43	Salomon LJ, Alfirevic, Z., Berghella, V., Bilardo, C.M., Chalouhi, G.E., Costa, F.D.S., Hernandez-Andrade, E., Malinger, G., Munoz, H., Paladini, D. and Prefumo, F. ISUOG Practice Guidelines (updated): performance of the routine mid-trimester fetal ultrasound scan. Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2022 [76]
22	Short cervix before 24 weeks: Screening and management in singleton pregnancies. UptoDate. Wolters Kluwer. [76]	44	Coutinho, C.M., Sotiriadis, A., Odibo, A., Khalil, A., D'Antonio, F., Feltovich, H., Salomon, L.J., Sheehan, P., Napolitano, R., Berghella, V. and da Silva Costa, F. (2022), ISUOG Practice Guidelines: role of ultrasound in the prediction of spontaneous preterm birth. Ultrasound Obstet Gynecol. https://doi.org/10.1002/uog.26020 [2]

Data extraction from existing guidelines and draft of guideline

Data in the existing CPGs that addressed the clinical questions the guideline was planned to address, was extracted to develop draft recommendations and associated summary statements, 'how to' guides, and safety, feasibility and cost-effectiveness statements for the guideline. Primary sources for developing recommendations in this guideline were the best evidence guidelines, and secondary sources were least evidence guidelines and other identified relevant literature sources.

It was decided, after reviewing recommendations in existing recommendations and their underpinning evidence, that these recommendations would be adapted into new recommendations which had relevance for the clinical practice and scope of practice for sonographers. Caution was applied in adapting the recommendations so as not to contradict their original intent.

A draft of the guideline was developed by the guideline development group using the following methods;
1) online group zoom meetings, 2) individual anonymous online survey and 3) individual worksheets.

Notations of recommendations

For each new recommendation in this guideline which had underpinning evidence an evidence table was constructed. Recommendations without underpinning evidence, were based on and notated as 'consensus decision'

The evidence table included 1) existing recommendations from best evidence CPGs that were relevant to the new recommendation, with its published evidence rating, 2) a standardised evidence rating, 3) an overall level of evidence rating for the new recommendation and 4) a strength of recommendation rating. Explanations of 2,3 and 4 are provided below.

Standardised evidence rating

Evidence rating methods across the identified best evidence CPGs were inconsistent (table 3). To standarise these ratings the evidence rating for each existing recommendation was converted to either strongly, moderately, or weakly in support of or in opposition to the new recommendation. This was judged by one guideline development group member who assessed if the evidence rating fell in the lower third (weak), the middle third (moderate), or the upper third (strong) of the existing guidelines evidence scale (assuming equal distance between each rating). Each recommendation from existing evidence-based guidelines was given a standardised evidence rating based on its published the evidence rating. A summary of the evidence rating methods used for each of the best evidence guidelines are summarised in Table 3. 'Face' notations were used to denote the standardised evidence ratings (table 4). [78]

Table 3. 'Face' notations were used to denote the standardised evidence ratings (table 4). [78]

Best evidence guideline number and title		Year published	Evidence rating method (rating, higher numbers indicate higher evidence rating)	Scores for relevant recommendations Maximum possible score (range of possible scores)
24.	Society for Maternal-Fetal Medicine. The role of routine cervical length screening in selected high-and low-risk women for preterm birth prevention. [19]	2016	Recommendation; 1(3), 2(2), Best practice (1) Evidence; A(3), B(2), C(1)	R3 (1-3) E3 (1-3)
25.	ACOG 234: Prediction and prevention of preterm birth [11]	2021	Evidence based recommendations; A(3), B(2), C(1)	E3 ((1-3)
26.	ACOG practice bulletin no. 127: Management of preterm labor. [64]	2012	Evidence based recommendations; A(3), B(2), C(1)	E3 ((1-3)
29.	Pregnancy Care Guidelines. 23. Risk of Preterm birth. Australian Government. Department of Health. [5]	2019	Evidence based recommendations; A (6), B (5), C (4), D (3) Consensus based recommendations (2), Practice points (1)	E6 (1-6)
30.	ACOG Practice Bulletin No. 142. Cerclage for the management of cervical insufficiency. [67]	2014	Level of recommendations: based on good or consistent scientific evidence (3), B based on limited or inconsistent scientific evidence (2), C primarily based on expert opinion and consensus (1)	R3 (1-3)
31.	Cervical assessment by ultrasound for preventing preterm delivery. Cochrane database of systematic reviews. [18]	2019	Type of studies, number of studies	-
32.	Measurement of cervical length for prediction of preterm birth. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. [14]	2017	Recommendation classification: A(6), B(5), C(4), D(3), Consensus-based (2), Good practice note (1)	R6 (1-6)
33.	Society for Maternal-Fetal Medicine Publications Committee. Progesterone and preterm birth prevention: translating clinical trials data into clinical practice. [12]	2012	Quality of evidence: I(5), II-1(4), II-2 (3), II-3 (2), III (1) Recommendation classification: A (3), B (2), C (1).	E5 (1-5) R3 (1-3)
34.	Prevention of spontaneous preterm birth. French College of Gynaecologists and Obstetricians. [13]	2017	Quality of evidence: LE1 (4), LE2 (3), LE3 (2), LE4 (1) Classification of recommendations: A(4), B(3), C(2), professional consensus (1)	E4 (1-4), R4(1-4)
35.	Measurement of cervical length for prediction of preterm birth (RANZCOG) [7] ***Note:*** *updated version of number 32*	2022	Recommendation classification: A(6), B(5), C(4), D(3), Consensus-based (2), Good practice note (1)	R6 (1-6)
36.	Twin pregnancies: guidelines for clinical practice from the French College of Gynaecologists and Obstetricians [25]	2011	Quality of evidence: LE1 (4), LE2 (3), LE3 (2), LE4 (1) Classification of recommendations: A(4), B(3), C(2), professional consensus (1)	E4 (1-4), R4(1-4)
37.	No. 260-ultrasound in twin pregnancies. Journal of Obstetrics and Gynaecology Canada. [28]	2017	Quality of evidence: I (5), II-1(4), II-2 (3), II-3 (2), III (1) Classification of recommendations: A (6), B (5), C(4), D(3), E(2), L(1).	E5 (1-5), R6 (1-6)
38.	ISUOG Practice Guidelines: role of ultrasound in twin pregnancy. [27]	2016	Quality of evidence:1++ (8), 1+(7), 1-(6),2++(5), 2+(4), 2-(3), 3(2),4(1) Grades of recommendation: A(5), B(4), C(3), D(2), good practice point (1)	E8 (1-8), R5 (1-5)

39.	Acr appropriateness criteria® multiple gestations. Journal of the American College of Radiology. [26]	2017	Appropriateness: Usually not appropriate (1), May be appropriate (2), Usually appropriate (3) Evidence: Strong (5), Moderate (4), Limited (3), Expert consensus (2), Expert opinion (1)	A3(1-3) E(1-5)
40.	Guideline No. 401: Sonographic cervical length in Singleton Pregnancies: techniques and clinical applications. Journal of Obstetrics and Gynaecology Canada. [6]	2020	Quality of evidence: I (5), II-1(4), II-2 (3), II-3 (2), III (1) Classification of recommendations: A (6), B (5), C(4), D(3), E(2), L(1).	E5 (1-5), R6 (1-6)
41.	National Institute for Health and Care Excellence. Preterm labour. (New guideline 25.) [29]	2015	Type of studies, number of studies Clear and strong evidence(1): recommendation worded as 'offer' Less clear evidence(2): recommendation worded as 'consider'	E(1-2)
42.	ACR Appropriateness Criteria® Assessment of Gravid Cervix. [10]	2020	Appropriateness: Usually not appropriate (1), May be appropriate (2), Usually appropriate (3) Evidence: Strong (5), Moderate (4), Limited (3), Expert consensus (2), Expert opinion (1)	A3(1-3) E(1-5)
43.	ISUOG Practice Guidelines (updated): performance of the routine mid-trimester fetal ultrasound scan. [76] ***Note:*** *updated version of number 38.*	2022	Quality of evidence:1++ (8), 1+(7), 1-(6),2++(5), 2+(4), 2-(3), 3(2),4(1) Grades of recommendation: A(5), B(4), C(3), D(2), good practice point (1)	E4/5 (1-8) R3 (1-5)
44.	ISUOG Practice Guidelines: Role of ultrasound in the prediction of spontaneous preterm birth [2]	2022	Quality of evidence:1++ (8), 1+(7), 1-(6),2++(5), 2+(4), 2-(3), 3(2),4(1) Grades of recommendation: A(5), B(4), C(3), D(2), good practice point (1)	E4/5 (1-8) R3 (1-5)

A: refers to appropriateness, E: refers to Quality of evidence, R: refers to recommendation classification

Table 4: 'Face' notations of standardised evidence ratings (adapted from [78])

Standardised evidence rating for recommendations from existing evidence-based guidelines	Notation
Strongly in support of	😊😊😊
Moderately in support of	😊😊
Weakly in support of	😊
Strongly in opposition to	☹☹☹
Moderately in opposition to	☹☹
Weakly in opposition to	☹

Overall Evidence Rating

An Overall Level of Evidence Rating for the new recommendation was determined by assessing the standardised evidence ratings for each existing recommendation underpinning the new recommendation using the criteria outlined in table 5.

Table 5: Explanation of overall level of evidence ratings (adapted from [78])

Overall Level of evidence	Explanation	Notation
Consistent strong support for recommendation	The evidence underpinning existing relevant guidelines is mostly strongly in support of recommendation (😊😊😊)	√√√
Consistent support for recommendation	The evidence underpinning existing relevant guidelines is mostly moderately in support of recommendation (😊😊)	√√
Weak support for recommendation	The evidence underpinning existing relevant guidelines is mostly weakly in support of recommendation (😊)	√
Consistent strong opposition for recommendation	The evidence underpinning existing relevant guidelines is mostly strongly in opposition of recommendation (☹☹☹)	xxx
Consistent opposition for recommendation	The evidence underpinning existing relevant guidelines is mostly moderately in opposition of recommendation (☹☹)	xx
Weak support against recommendation	The evidence underpinning existing relevant guidelines is mostly weakly in opposition of recommendation (☹)	x
No evidence	Consensus decision	❁

Strength of recommendation rating

Each recommendation given a “Strength of Evidence’ rating, as either ‘strong’ or ‘weak’.

Initially, each guideline development group member was invited to rate the strength of recommendation based on the overall level of evidence, the balance between benefits and harm, and the balance between benefits and costs.

After individuals rated each recommendation, the results were collated and presented scores the majority rating (strong/weak) was allocated as the strength of recommendation. Individual ratings are presented in appendix 5.

Consultation

1. Stakeholder consultation (January-February 2023)

Invited	Responded
The Royal Australian and New Zealand College of Radiologists	√
Australian Diagnostic Imaging Association	
The Royal Australian and New Zealand College of Obstetricians and Gynaecologists	
Australian Sonographer Accreditation Registry	
The Australasian Society for Ultrasound in Medicine	√
Australian Society of Medical Imaging and Radiation Therapy	
Medical Radiation Practice Board of Australia	
New Zealand Medical Radiation Technologists Board	
British Medical Ultrasound Society	√
Australian Preterm Birth Prevention Alliance	
Women’s Healthcare Australasia	
Jean Hailes for Women’s Health	
Women’s Health Action	
Consumers Health Forum of Australia	

2. **Public consultation: to be determined; stakeholders and ASA partners invited to distribute to members, ASA to promote member feedback.** <information to be added after public consultation>

APPENDIX 3: MINIMUM SONOGRAPHER REPORTING REQUIREMENTS (CHECKLIST)

This checklist example can be adapted into a sonographer worksheet or reporting template. It may be copied, distributed, edited, remixed, and built upon on the condition that appropriate credit is given, and any changes are indicated.

Patient name	**Age**	**Date**	**Gestational age**	**Identified as increased risk by referring obstetric care provider, or using increased risk criteria in Table 5 in Section C of this guideline (Y/N)**	**Risk factors**
	TAS			TVS	TPS
Consent obtained.					
CL measurement.					
Method of cervical length measurement (i.e. straight line, sum of segments, trace or spline method).					
Was shortening of the cervix observed in response to uterine activity?					
The anterior and posterior walls of the cervix are of similar width and echogenicity.					
Was funnelling observed? Y/N					
If funnelling was observed, what shape did it take?					
Y, V, or U shape.					
Was amniotic sludge observed?					
Was amniotic-chorionic separation observed?					
Was the endocervical canal dilated?					
Was cervical cerclage present?					
Was the placenta low-lying?					
Provide measurement of distance to internal os if present					
Was a vasa praevia identified?					
Comment on quality of images including any limitations to the scan.					
Comment on the quality of the cervical length measurement, including any limitations to the measurement.					
Other: eg., information obtained from the patient and/or referring clinician relating to clinical signs, comparison of current sonographic appearance to previous scans, contraindications and consent, or examination limitations or deviations from the guideline or local protocol.					

APPENDIX 4: iCAHE GUIDELINE QUALITY CHECK LIST

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Guideline: **Guideline producer:** **Link:**

Availability	Comments
Is the guideline readily available in full text?	(1)
Does the guideline provide a complete reference list?	(1)
Does the guideline provide a summary of its recommendations?	(1)
Dates	
Is there a date of completion available?	(1)
Does the guideline provide an anticipated review date	(1)
Does the guideline provide dates for when literature was included?	(1)
Underlying Evidence	
Does the guideline provide an outline of the strategy they used to find underlying evidence?	(1)
Does the guideline use a hierarchy to rank the quality of the underlying evidence?	(1)
Does the guideline appraise the quality of the evidence which underpins its recommendations?	(1)
Does the guideline link the hierarchy and quality of underlying evidence to each recommendation?	(1)
Guideline developers	
Are the developers of the guideline clearly stated?	(1)
Does the qualifications and expertise of the guideline developer(s) link with the purpose of the guideline and its end users?	(1)
Guideline purpose and users	
Are the purpose and target users of the guideline stated?	(1)
Ease of use	
Is the guideline readable and easy to navigate?	(1)
Score	**TOTAL /14**

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APPENDIX 5: SUMMARY OF INDIVIDUAL RATINGS TO DETERMINE STRENGTH OF RECOMMENDATION RATINGS

Recommendation	Rater						
	1	2	3	4	5	6	7
1a	S	S	S	S	S	S	S
1b	S	S	S	S	S	W	W
2a	S	S	S	S	S	S	S
2b	S	S	S	S	S	S	S
2c	S	S	–	S	S	S	S
3a	S	W	–	S	S	S	S
3b	S	S	–	S	S	S	W

Key: S; strong recommendation, W; weak recommendation

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