

Ultrasound assessment of the
gravid cervix to assess for risk
of spontaneous preterm birth:

**EVIDENCE-BASED CLINICAL
PRACTICE GUIDELINE
FOR SONOGRAPHERS**

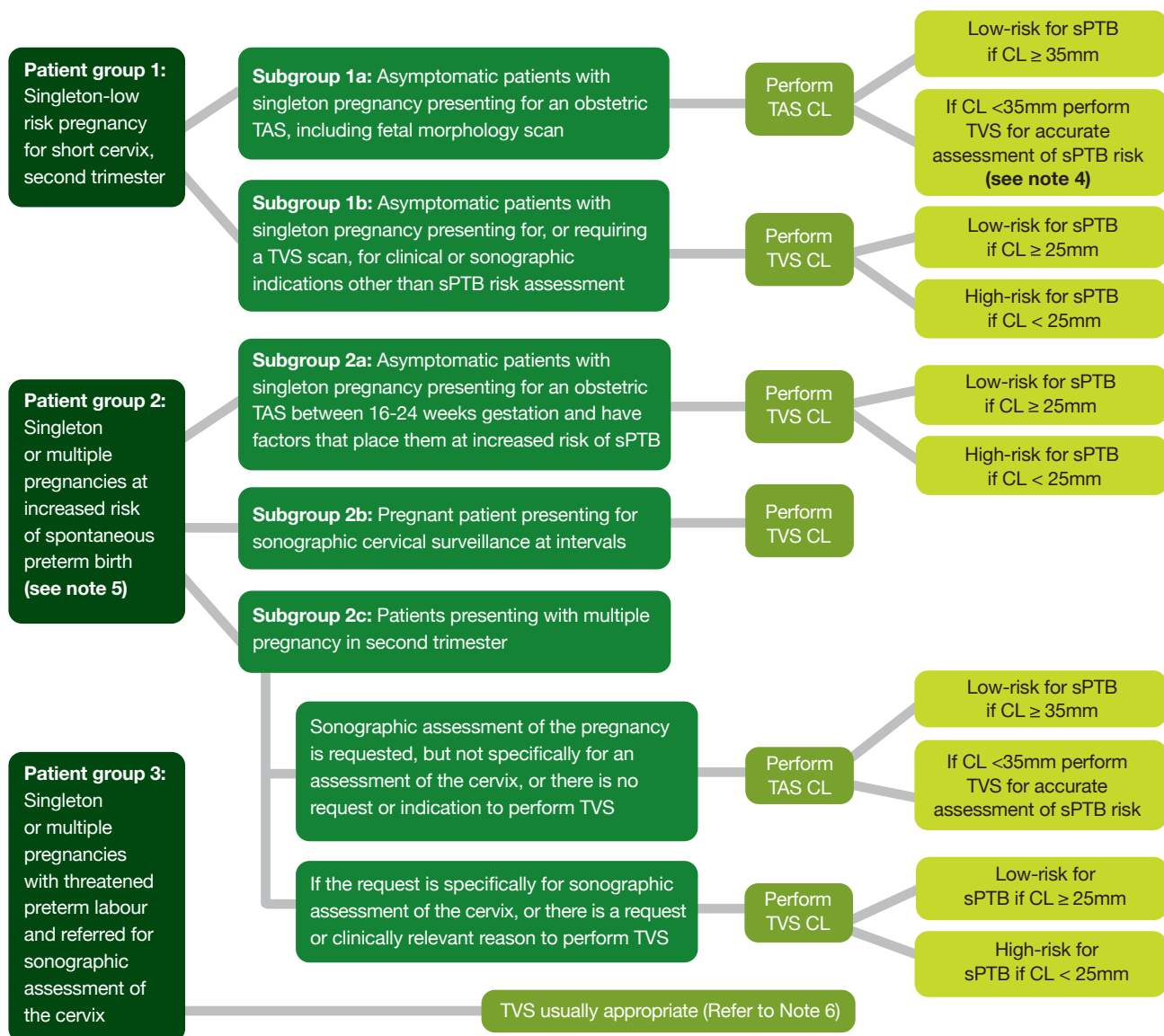
SHORT VERSION



ULTRASOUND ASSESSMENT OF THE GRAVID CERVIX TO ASSESS FOR RISK OF SPONTANEOUS PRETERM BIRTH: EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE FOR SONOGRAPHERS

This document is a short-form, condensed version of the ASA evidence-based clinical guideline: Ultrasound assessment of the gravid cervix to assess for risk of spontaneous preterm birth. It is intended as a quick reference guide for sonographers. Before using this version, sonographers should read the [full guideline](#). The recommendations in this guideline are intended to assist sonographers working in Australia and New Zealand in making decisions on when and how they should sonographically assess the gravid cervix.

Section A: Cervical length assessment: summary of recommendations



KEY: CL; cervical length, sPTB; spontaneous preterm birth, TAS; transabdominal sonography; TVS; transvaginal sonography.

Notes:

1. This guideline does not over-ride, and should be used in combination with local protocols and practices, the preferences of patients and the preferences of referring obstetric care providers.
2. The recommendations in this guideline are organised by the risk status of *the patient for spontaneous preterm birth*.

Patients are considered low-risk for sPTB if they have:

- a singleton pregnancy with no moderate or high-risk factors for sPTB (table 1) 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:

- a singleton pregnancy with any moderate or high-risk factors for sPTB (table 1) and/or
- symptoms of sPTB (per vaginal bleeding or amniotic fluid loss, abdominal or pelvic pain, contractions) and/or
- a multiple pregnancy.

Table 1: Indicators for transvaginal sonography of the cervix and cervical length measurement in asymptomatic patients: Factors that increase risk for sPTB in pregnant patients

MODERATE-RISK FACTORS FOR sPTB	HIGH-RISK FACTORS FOR sPTB
Previous cervical surgery <ul style="list-style-type: none"> • 2 or more LLETZ • Previous cone biopsy • Previous 1 LLETZ of more than 10mm depth • Congenital uterine anomalies such as subseptate and bicornuate uterus and no history of previous preterm birth 	Previous sPTB at <34 weeks gestation And/or Previous pregnancy loss at 16-24 weeks gestation

KEY: LLETZ; Large Loop Excision of the Transformation Zone, sPTB; spontaneous preterm birth

3. All recommendations are subject to contraindications of TVS, TAS and TPS (refer to Section B). If TVS is contraindicated then TPS should be performed, unless contraindicated*. If both TVS or TPS are contraindicated, then TAS can be performed, although it lacks accuracy compared to TVS. A TVS or TPS measured CL is considered short if \leq than 25mm, and a TAS measured CL of <35mm indicates the cervix is at higher risk of being shortened.
4. Relating to Recommendation 1a, in addition if there is inadequate visualisation of the cervix, or if there is an appearance of an open or funnelling cervix, then TVS should be performed subject to contraindications and local protocols.
5. Relating to the recommendations for patient group 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 may 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.
6. Relating to patient group 3, 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.

Section B: 'How to' guidance

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. Sonographers may also refer to the [Image Gallery](#) to assist with interpretation of images.

Transvaginal sonographic imaging of the cervix (TVS)

Pre-scanning considerations	<p>Contraindications:</p> <ul style="list-style-type: none"> • Patient does not provide consent. • Labour. • Unavailability of appropriate equipment (e.g. appropriate intracavity transducer, high level transducer disinfection facilities). • Unavailability of a sonographer who is competent in TVS assessment of the gravid cervix. <p>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.</p> <p>Other considerations:</p> <ul style="list-style-type: none"> • Placenta praevia +/- PV bleeding is not a contraindication, 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. In cases where there is active, heavy vaginal bleeding, the decision to use TVS will depend on the clinical context, referrer input, local protocols, and the patient's preferences. • Preterm premature rupture of membranes (PPROM) has been considered a contraindication for TVS due to the fear of it causing ascending infection and decreasing the latency period, however there is only weak evidence to support this. The decision to use TVS, or progress to TPS will depend on the clinical context, the referral, and local protocols. • Avoid recording images of the cervix when a uterine contraction is present; contraction of the uterus can make the lower uterine segment appear thicker.
	<p>Transducer:</p> <ul style="list-style-type: none"> • Select an intracavity transducer, suitable for transvaginal scanning and with a frequency which offers the best possible resolution while providing sufficient depth of field to demonstrate the cervix. • Cover with a single-use high quality transducer cover. Apply sterile, single use ultrasound gel between the transducer and transducer cover, and on the outside of the transducer. • If the patient has a latex sensitivity, then non-latex covers should be used. • Clean using high-level disinfectant procedures.
	<p>Bladder filling: Empty or partially filled bladder</p>
	<p>Patient position: Lithotomy; The patient is supine with the hips flexed, the legs abducted, and knees flexed. The pelvis may be elevated with a cushion or lowering the end of the examination couch.</p>
	<p>Pass the transducer along the vaginal canal under real time visualisation, and into the anterior vaginal fornix to obtain a sagittal view of the cervix</p>
Scanning tips	<p>Optimise the depth and width of field so that the cervix occupies between 50 and 75% of the image</p>
	<p>Avoid undue transducer pressure on the cervix, as this will falsely increase the cervical length or mask funnelling or an open cervix. 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. Excessive transducer pressure can be recognised if the antero-posterior measurement of the posterior portion of the cervix is thicker than the anterior portion.</p>
	<p>Care must be taken not to include the vaginal wall in the CL measurement as if included it will overstate the CL measurement.</p>
Image Interpretation tips	<p>Assess the lower uterine segment for vasa praevia, placenta praevia and low-lying placenta. Colour and pulsed wave Doppler should be used to identify low-lying vessels indicating vasa praevia. Measure the distance from the inferior edge of the placenta to the internal os, or in cases of funnelling, measure to the internal edge of the remaining endocervical canal.</p>
	<p>The anterior and posterior cervical portions of the cervix should be of similar thickness and echogenicity.</p>
	<p>Avoid misinterpreting a thickened lower uterine segment coming together in the midline, as a longer endocervical canal</p>
	<p>Visualisation of the internal os can be compromised in women who have a scar in the cervix due to a history of a full dilation caesarean section.</p>
	<p>Identify the internal os where the anterior and posterior cervical walls touch an internal V-shaped notch</p>
<p>Identify the external cervical os as an echogenic triangular area at the inferior portion of the endocervical canal</p>	
<p>A cervix of <25m measured by TVS is considered short and presents an increased risk for sPTB.</p>	

Transabdominal sonographic imaging of the cervix (TAS)

Pre-scanning considerations	<p>Contraindications:</p> <ul style="list-style-type: none"> • Patient does not provide consent. • Unavailability of appropriate equipment (e.g. appropriate transducer). • Unavailability of a sonographer who is competent in TAS assessment of the gravid cervix. <p>Note: Where TAS 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.</p>
	<p>Transducer: Select a curved array transducer with a frequency which offers the best possible resolution while providing sufficient depth of field to demonstrate the cervix.</p>
	<p>Bladder filling: An appropriately distended bladder 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. This will vary depending on each case, and may range from a post-void bladder to different levels of bladder filling, but not to a full bladder or over-distended bladder.</p>
	<p>Patient Position: Supine</p>
Scanning tips	<p>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</p>
	<p>Optimise visualisation of the cervix by utilising the amniotic fluid as a sonographic window. This can be achieved by insonating inferiorly through the amniotic fluid from a more superior position on the maternal abdomen.</p>
	<p>To capture optimal images of the cervix, assess it multiple times during the obstetric ultrasound examination. The cervical appearance can change due to its dynamic nature and changing appearances during different phases of bladder filling.</p>
	<p>Optimise the depth and width of field so that the cervix occupies between 50 and 75% of the image.</p>
Image Interpretation tips	<p>The internal os of a normal cervix will have a flattened T-shape appearance.</p>
	<p>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.</p>
	<p>The amnion may be visible especially in cases of a prominent mucus plug.</p>
	<p>The pressure from a full bladder can falsely elongate the cervix, making it difficult to assess the cervical glandular tissue delineating the true endocervical canal.</p>
	<p>Care must be taken not to include the vagina in the CL measurement as if included it will overstate the CL measurement</p>
	<p>A post void bladder (empty or with minimal filling) can improve visualisation of the full cervical length by reducing the compression of the endocervical canal and therefore alleviating the false elongation. After voiding, the cervix may appear 'curved', or 'vertical'.</p>
	<p>When a TAS CL of less than 35mm is measured, this is considered high-risk for a short cervix (TVS CL < 25mm)</p>

Transperineal sonographic imaging of the cervix (TPS)

Pre-scanning considerations	<p>Contraindications:</p> <ul style="list-style-type: none"> • Patient does not provide consent. • Unavailability of appropriate equipment (eg. appropriate transducer) including high level disinfectant equipment and materials • Unavailability of a sonographer who is competent in TPS assessment of the gravid cervix. <p>Note: Where TPS 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.</p>
	<p>Transducer:</p> <ul style="list-style-type: none"> • Select a curved array transducer with a frequency which offers the best possible resolution while providing sufficient depth of ultrasound field to demonstrate the cervix. • Cover with a single-use high quality transducer cover. Apply sterile, single use ultrasound gel should between the transducer and transducer cover, and on the outside of the transducer cover • If the patient has a latex sensitivity, then non-latex covers should be used • Clean using high-level disinfectant procedures
	<p>Bladder filling: Empty</p>
	<p>Patient position: Lithotomy; supine, legs abducted, pelvis elevated</p>
Scanning tips	<p>Place the transducer on the labia or perineum of the patient, just posterior to the symphysis pubis, 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.</p>
	<p>To overcome obscuration of the cervix by adjacent bowel/rectal gas use an elevated lithotomy patient position, and scan using a slightly anterior approach on the labia with a slight posterior angulation.</p>
	<p>A lower transducer frequency may be required to achieve depth of field to demonstrate the cervix; this may make it 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.</p>
Image Interpretation tips	<p>Ideally, the full length of the echogenic endocervical canal should be seen, and the hypoechoic cervical glandular tissue may also be visible.</p>
	<p>Identify the internal os 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.</p>
	<p>Identify the external os as the point adjacent to the endocervical canal where the cervix meets the vagina. This may be seen as a small echogenic interface in some patients. The posterior cervical corpus can be used to guide for calliper placement at the elevated external os.</p>

Section C: minimum sonographer reporting requirements

The minimum image recording requirements are summarised in the table below. The recording requirements apply to TVS, but sonographers should also aim to demonstrate the same features with TPS and TAS even though they are limited technically by decreased imaging resolution, poor sonographic windows and large body habitus.

An example worksheet is also provided which can be adapted into a departmental 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.

IMPORTANT: 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. If a short cervix is identified, then a same day phone discussion with the referring obstetric care provider is required. 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.

Minimum sonographer reporting requirements for an assessment of the gravid cervix

MINIMUM REQUIREMENTS FOR IMAGE RECORDING	NOTES
Bladder	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. 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. 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). The straight-line measurement technique is recommended to measure CL, as it has greater reproducibility between measurers, and any differences in CL using different measurement techniques are unlikely to be clinically significant as short cervixes are usually straight. If the endocervical canal is curved, the straight line measurement technique should also be used. Other measurement techniques such as sum segmental measurements, trace or spline techniques should not be used. If a lower uterine contraction is present, the CL should be measured from an image taken following relaxation of the contraction). 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.
Image of funnelling (effacement of the internal aspect of the cervix) is present.	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. 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 and has not been shown to be an independent predictor of spontaneous preterm birth. 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).
Images of undeveloped or 'immature' lower uterine segment if present.	This occurs into early second trimester, and is more common in primiparous patients. During the TVS, the lower cervix may be oriented parallel with the vagina and ultrasound beam, leading to suboptimal imaging. Withdrawing the transducer and gently re-inserting it into the anterior fornix may assist in identifying the CL. A lower frequency may also be used.

MINIMUM REQUIREMENTS FOR IMAGE RECORDING	NOTES
Images of amniotic fluid sludge if present.	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. 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, there is insufficient evidence to demonstrate that adding these to the CL measurement improves the predictive accuracy.
Images of any amnion-chorion separation if present.	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.
Endocervical canal dilation if present.	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.
Images of cerclage if in situ.	If the patient has cerclage in situ, the location of the stitches should be identified and recorded in images. Cerclage is seen as two echogenic foci 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. 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.

Example of sonographer worksheet (this worksheet may be adapted for use within imaging departments)

Patient name	Age	Date	Gestational age	Identified as increased risk by referring obstetric care provider, or using increased risk criteria in Table 1 of this short-form version of the 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: e.g. 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.					

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