Oxford University Hospitals NHS
NHS Foundation Trust

GS33 - Anomaly Scan Guideline

Category:	Guideline
Summary:	This document provides guidance for Oxford University Hospitals NHS Foundation Trust maternity staff and sonographers who are involved in performing anomaly scans as part antenatal care provision and monitoring of fetal wellbeing.
Equality impact assessed:	07/08/2024
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Related documents:	• Referral to the Fetal Medicine Unit (FMU) SOP • Referral When a Fetal Abnormality is Suspected Guideline • Growth Scan Guideline • Antenatal Screening Guideline • Diagnosis and Management of Placenta Praevia and Placenta Accreta Spectrum Guideline
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Further information:	N/A
This document replaces:	Anomaly Scan Guideline v2.0

This document is uncontrolled once printed.

It is the responsibility of all users to this document to ensure that the correct and most current version is being used.
This document contains many hyperlinks to other related documents.
All users must check these documents are in date and have been ratified appropriately prior to use.

Document History

Version valid from	Version number	Reason for review/update
19/05/2025	3.0	3 year review
19/12/2022	2.0	3 yearly review - Key Updates listed on page 5

Consultation Schedule

Who? Individuals or Committees	Rationale and/or Method of Involvement
Document Review Group (DRG)	MDT review and approval ahead of submission for ratification at MCGC

Contents

Who should read this document?

1. This document is intended to provide practical guidance for all health care practitioners involved in the fetal anomaly screening and growth scan pathways within OUH NHS Foundation Trust (OUHFT).

Gender inclusive language in maternity and perinatal services:

This guideline uses the terms woman, women and mother throughout. These should be taken to include people who do not identify as women but who are pregnant. Similarly, where/if the term parent(s) is used, this should be taken to include anyone who has main responsibility for caring for a baby.

Partner refers to the woman's chosen supporter. This could be the baby's father, the woman's partner, family member or friend, or anyone who the woman feels supported by and wishes to involve in her antenatal care.

Background/ Scope

2. **(Updated in v3.0)** The fetal anomaly scan should be offered to all pregnant women/people and is usually performed between 19+0 (minimum gestation 18+0) and 20+6 weeks' gestation.
3. **(New in v3.0)** It is a screening test for 11 detectable major structural anomalies and as such, will not enable all anomalies to be detected.
4. **(New in v3.0)** The scan should also inform the allocation of pre booked growth scans according to uterine artery Doppler and established risk factors (growth scan pathway)
5. The aims of this scan are to:
   - Identify serious fetal abnormalities, that are either incompatible with life or associated with morbidity, to allow women to make informed reproductive choices.
   - Identify abnormalities which may benefit from antenatal treatment.
   - Identify abnormalities which require early intervention following birth
   - Identify women at high risk of early onset impaired fetal growth.
   - Record appropriate images or video
   - Uterine artery Doppler is performed to aid risk assessment in all singleton pregnancies.
6. **(Updated in v3.0)** The NHS Fetal Anomaly Screening Programme (FASP) has issued standards for this scan assessment which include a number of fetal views that should be assessed on each anomaly scan. In addition, NHS FASP has listed 6 specific anatomical sections that must be imaged and stored for each anomaly scan and cardiac anatomy.
7. **(Updated in v3.0)** If a scan cannot be completed at first attempt, e.g. maternal body mass index (BMI), uterine fibroids, abdominal scarring, baby or babies in a sub-optimal position this should be documented on the report generated by Viewpoint, explained to the patient and a further scan no later than 23+0 weeks offered.
8. In the event of suboptimal imaging of the heart at anomaly scan, there should be a neonatal alert written on Badgernet to check neonatal oxygen saturations before discharge.
9. Normal variations of fetal anatomy do not require review in the Fetal Medicine Unit.
10. Abnormalities should be referred to the Fetal Medicine Unit using the Badgernet 'referrals' function.
11. Where there is uncertainty, a request for Fetal medicine scan review may be made using the Badgernet 'referrals 'function.
12. There is a separate Referral for Fetal Abnormality Guideline and Referral to FMU SOP for sonographers to follow when referring women with a suspected fetal anomaly.

Key Updates

13. **(Updated in v3.0)** The fetal anomaly scan is a screening test for 11 detectable major structural anomalies **(listed in Appendix 5)** and as such, not all anomalies will be detected by this scan.
14. **(Updated in v3.0)** The NHS Fetal Anomaly Screening Programme (FASP) has issued standards for this scan assessment which include a number of fetal views that should be assessed on each anomaly scan. In addition, NHS FASP has listed 6 specific anatomical sections and specified cardiac views that must be imaged and stored for each anomaly scan and cardiac anatomy.
15. **(Updated in v3.0)** Information around repeat anomaly scans if a scan cannot be completed after a first comprehensive attempt.
16. **(New in v3.0)** See **Appendix 4** for base menu ultrasound images that need to be stored.
17. **(Updated in v3.0)** Placental localisation information/ definitions and follow up, including referral to FMU amended.
18. **(Updated in v3.0)** The growth scan pathways have been altered. There are more risk factors listed for Pathway C, and Pathway D has been subdivided:
19. If the total Pulsatility Index (PI) is >/2.5 but <3 the woman should be allocated to D0
20. If total Pulsatility Index (PI) is ≥ 3.0 but <3.5 allocate to Pathway D1
21. If total Pulsatility Index (PI) is ≥ 3.5 allocate to pathway D2 and refer to Fetal Medicine.
    All women/people allocated to pathway D should receive an antenatal clinic appointment by 25 weeks gestation. Patient information and contact routes have been updated
22. **(New in v3.0)** Guidance on further assessment of fetal size following the anomaly scan has been added. In addition to repeat scans that may be offered as in accordance with the SGA/growth scan pathway, the anomaly scan measurements of the baby may also require earlier follow up.
23. **(New in v3.0)** The Growth Scan Pathway Information Consent Form has been updated and will cover growth scans from 24+0 weeks.

Aim(s)

24. The aims of this guideline are to:
    - Outline the screening scan protocol
    - Describe the growth scan pathway
    - Describe the pathway of care if an anomaly is suspected
    - Describe the pathway of care if an increased pregnancy risk is found
    - Outline the internal quality assurance arrangements.

Full Guideline

Pre-scan information

25. The verbal offer of an anomaly scan is usually made by the woman's midwife. If the woman chooses to decline the fetal anomaly scan, this must be respected, and her decision should

be documented in her digital maternity notes and on EPR.

26. Please inform women that the scan is a screening tool and has limitations. Inevitably, some conditions may be missed or misidentified.
27. Women should receive comprehensive information in a language appropriate to them (*Absolute Interpreting and Translations Ltd – Tetum interpreters will have to be booked in advance due to availability issues*).
28. A full bladder is not required but do not ask her to empty her bladder unless it is impairing views because an empty bladder can make placental site assessment less accurate.
29. Please ensure the woman has completed the Growth Scan Pathway Screening Questions

Basic Anatomical (non-cardiac) views (New in v3.0)

30. The main structures that should be identified and assessed to enable screening for a number of major conditions are outlined in **Appendix 3.**

31. Of these anatomical views assessed, the following images **should be stored** at the time of the anomaly scan **as a minimum**:
    - head circumference (HC) measurement and the atrium of the lateral ventricle
    - suboccipitobregmatic view demonstrating measurement of the transcerebellar diameter
    - coronal view of lips with nasal tip
    - abdominal circumference (AC) measurement
    - femur length (FL) measurement
    - sagittal (preferred) or coronal view of spine including sacrum
    - Fetal cardiac views x 5 (see Fetal Cardiac View section below)

*These are illustrated in **Appendix 4** together with schematic drawings of each view to illustrate key anatomical landmarks.

32. The following measurements are required:
    - Head circumference (HC)
    - Posterior horn of lateral ventricle (VP)
    - Transcerebellar diameter (TCD)
    - Nuchal Fold (NF)
    - Abdominal circumference (AC)
    - Femur length (FL)
    - Deepest vertical pool (DVP)
    - Uterine artery Doppler on both sides

*The best measurements should be selected on the ultrasound machine report function and

transferred automatically by DICOM, not be entering them manually, to avoid transcription error.

33. The 11 physical conditions screened for at the mid-pregnancy anomaly scan and their detection rate thresholds are listed in **Appendix 5**
34. Cardiac conditions screened for at the mid-pregnancy anomaly scan and their detection rate thresholds are listed in **Appendix 6**

Fetal Cardiac Views

35. Fetal cardiac anomaly scanning should assess situs/laterality in addition to:
    - 4 chamber view (4CV): transverse section of the thorax including one complete rib and the crux of the heart
    - aorta/left ventricular outflow tract (LVOT) – shows the outflow tract of the left ventricle
    - pulmonary/right ventricular outflow tract (RVOT) – shows the outflow tract of the right ventricle only, or 3 vessel view (3VV): shows the outflow tract of the right ventricle including the pulmonary artery
    - 3 vessel and trachea view (3VT): shows the main pulmonary artery in direct communication with the ductus arteriosus, the transverse aortic arch and the superior vena cava
36. A summary of the structures that require assessment and an overview of key features that should be assessed in each view are outlined in **Appendix 6.**

37. Images of these four views must be stored, ideally be labelled as '4CH', 'LVOT' or 'RVOT' or '3VT'. It is also acceptable to store a short cineloop of the cardiac examination as a transverse 'sweep' (Carvalho et al. 2013, for further information/useful tips on scanning technique).
38. Examining outflow tract increases detection rates for major cardiac malformations above those achievable by four chamber view alone. The inclusion of outflow tracts is more likely to identify conotruncal anomalies such as tetralogy of Fallot, transposition of the great arteries, double outlet right ventricle and truncus arteriosus.

39. The use of colour flow Doppler is not a requirement but is encouraged as it may help provide additional information and improve detection of CHD.

40. An assessment of vessel number, size, alignment and arrangement can increase detection of certain anomalies that may have a normal four-chamber view including transposition of the great arteries, Tetralogy of Fallot and pulmonary atresia with a ventricular septal defect. The 3VT view, in assessing the relationship to the trachea, is more likely to enable detection of lesions such as coarctation of the aorta, right aortic arch and double aortic arch.

Biometry

41. In addition to repeat scans determined according to the growth scan pathway, the measurements of the baby at the anomaly scan may require earlier follow up. The following action should be taken:

EFW <10th centile:	Refer to *FMU for scan review* AND book a repeat scan in 4 weeks' time on level 4 (usually an FMU scan review only will occur)
Any of HC, AC or FL <5th centile:	Refer to *FMU for scan review* (usually an FMU scan review only will occur)

42. The woman should be told that you have requested an FMU review and that this may involve scan image review only, and not necessarily an appointment. If the latter is needed, the woman will be contacted by the FMU team, by telephone. Advice on care may also be given to the woman's clinical team.

43. Fetal biometry should not affect the allocated scan pathway.

Uterine Artery Doppler measurement

44. These are assessed in every singleton pregnancy at the time of the anomaly scan.
45. Occasionally only one will be obtainable and this is usually because of abnormal uterine anatomy. See **Appendix 8** for the technique.
46. Measurements of uterine artery must include both PI and PSV. The best measurements on each side should be selected in the ultrasound machine report function and transferred using DICOM. Please note if the PSV is <60cm/s the uterine artery has probably not been sampled or suboptimal angle correction used.
47. The scan pathways should be allocated using uterine artery Doppler results and other risk factors (see section…). Fetal biometry should not affect the allocated scan pathway.

Placental Localisation (Updated in v3.0)

48. The placental site should be recorded in the dropdown box on the anomaly screen on Viewpoint. There are 3 mutually exclusive categories:
    - Low anterior or low posterior placenta. The placenta is <20mm from the internal os but not over it.
    - Anterior or posterior placenta praevia. The placenta is over the internal os, usually confirmed by TVS.

- Anterior/ posterior/ fundal/ left lateral or right lateral high. The placenta is >/= 20mm from the internal os.

49. A placenta that is not low or praevia but is under the uterovesical fold (UVF) does not require referral and should not be recorded.
50. If the placenta is praevia, the woman should be referred to an antenatal clinic.
51. If the placenta is anterior low or is praevia, ask the woman if she has had a previous caesarean section or any other uterine surgery.

If there has been previous uterine surgery (Updated in v3.0):

52. For previous CS and anterior low placenta (<20mm from internal os) or placenta praevia (regardless of anterior or posterior) at 20 weeks, refer to FMU
53. For previous uterine surgery breaching the uterine cavity (e.g., myomectomy, classical uterine incision), regardless of placental location, also refer to FMU:

If there has not been previous uterine surgery/CS:

54. If praevia: Ensure an antenatal clinic appointment has been made
55. If praevia or low lying placenta also book a repeat scan at 32 weeks.
56. Explain these findings to the woman/pregnant person and that they should attend hospital if they have any vaginal bleeding. Avoid predicting mode of birth. If asked it is advisable to state: "most low-lying placentas are not by the time you give birth and even the diagnosis of placenta praevia at 20 weeks does not mean this will be confirmed later".

Amniotic Fluid (Updated in v3.0)

57. The deepest vertical pool (cord and limb-free) should be measured at the time of anomaly scan and recorded on Viewpoint. If this is normal, use the 'normal with AFI' function and enter the measurement under Pool Depth (PD), not the AFI, unless the PD is >8cm.

Polyhydramnios:

58. If deepest vertical pool is greater than 8cm, measure the amniotic fluid index (AFI). An AFI > 25cm is polyhydramnios.

- If the AFI is > 25cm but < 30cm, please refer to the antenatal clinic.
- If AFI is >/= 30cm, please refer to the FMU.
- If polyhydramnios is observed in women who are known to have pre-existing diabetes, they do not need referral. Any referral to FMU will be decided in the Diabetic Clinic.

Oligohydramnios:

59. If deepest vertical pool is <2cm, this is oligohydramnios. The woman should be referred to Maternity Assessment Unit the same day for review to exclude ruptured membranes. Please also refer to the FMU *for scan review*.

Normal variants

60. The term "soft marker" should not be used.

61. Normal variants that do NOT require referral to FMU include:

- Choroid plexus cysts unless associated with ventricular enlargement >10mm
- Dilated cisterna magna
- Echogenic foci in the heart
- 2 vessel cord (but this is a criterion for pathway C) **(New in v3.0)**

Other findings

62. Other findings that should be reported and referred to FMU *for scan review* include:

Nuchal fold ≥6mm
Ventriculomegaly >/=10mm
Echogenic bowel (with density equivalent to bone)
Unilateral or bilateral renal pelvic dilation (AP measurement >7mm)
Small measurements of HC, AC +/or FL below 5th centile or EFW <10th centile

63. If fibroids or ovarian cysts are detected these should be measured. Ensure the woman has been referred to an antenatal clinic.

64. Where the sonographer is unsure, the woman should be referred to FMU *for scan review*. Scan review or an appointment may follow.

Image Acquisition and Storage and Data Entry (Updated in v3.0)

65. Images stored reflect the overall quality of the examination

66. If there are factors that have made it more difficult to complete the scan and/or obtain good quality images, this should be documented in the "Comments" section of the report generated on Viewpoint. *Such factors might include obesity/raised BMI, body habitus, multiple uterine fibroids.* This should also be explained tactfully to the woman.

67. Data should be populated in Viewpoint using the DICOM connection. Ensure you select the best measurements using the 'report' function on the ultrasound machine before pressing 'transfer data'.

68. **(Updated in v3.0)** Use the standard growth scan chart set: of HC, AC, FL and EFW: 2 to a line and DO NOT create charts of uterine artery Doppler.

Outcomes of fetal anomaly scan **(Updated in v3.0)**

69. Outcomes from the anomaly scan should only be recorded using the dropdown diagnosis list. Please note that several diagnosis codes from the dropdown list can be used by using the 'shift' button

If no anomaly is identified:

70. The selected dropdown diagnosis list should be: 'anomaly scan: no evidence of a fetal abnormality at this stage'.

If a scan cannot be completed at first attempt:

71. The reasons for this should be documented in the report generated on Viewpoint, explained to the woman and a further scan from 21+0 to 23+0 weeks should be offered.
72. This should only be after a comprehensive attempt to view fetal anatomy has occurred.

73. The selected dropdown diagnosis should be:

    - 'anomaly scan: unable to complete further appointment requested':

74. If at the second attempt the scan cannot be completed:

    - No further appointment should be made. This should be explained to the woman.

    - The selected dropdown diagnosis should be: 'anomaly scan: unable to complete examination at second attempt- screening incomplete'.

75. It is essential that two comprehensive attempts at an anomaly scan have been made before this diagnosis code is used.

76. If it is the cardiac views that are still incomplete at the second comprehensive attempt, an alert should be placed in Badgernet: 'Unable to complete fetal cardiac anomaly scan - please check neonatal oxygen saturations before discharge - if there are any concerns, the Neonatal Unit Registrar should be informed'.

Anomaly is identified or suspected:

- Discuss the findings with the woman and inform them that they will be referred to FMU. Record the finding on the report in the comments.
    - The selected dropdown diagnosis should be:
        - 'Anomaly scan- referred to FMU-anatomy'.

No anomaly is suspected but EFW <10th c or individual biometry <5th c

- The selected dropdown diagnosis should be:
    - 'Anomaly scan- referred to FMU- biometry'.

*Note where a the EFW is <10th c a further scan should be booked on level 4.

Uterine artery total PI>/=-3.5

- The selected dropdown diagnosis should be:
    - 'Anomaly scan- referred to FMU- uterine arteries'.

77. Referral to FMU is made in Badgernet (see Referral to FMU section). Note the scan review will not always require the woman to attend FMU in person (see Referral to Fetal Medicine Unit).

Outcome of Risk Assessment for Growth Scan pathway (Updated in v3.0)

78. For singleton pregnancies, ensure:
    - the woman/person has completed the growth pathway screening questions prior to the scan
    - PAPP-A results <0.31MoMs are visible (a low result will be flagged up as a message box in Viewpoint at the start of the scan). Please note that the PAPP-A Mom is integrated already into the pre-eclampsia screening which, if positive, will allocate pathway C
    - you have recorded whether there is a two vessel cord (single umbilical artery).

79. See Table 1 below:

- If the uterine artery Dopplers are abnormal, they should be allocated to pathway D0, D1 or D2 depending on the degree of abnormality (see Table 2).
- If the uterine artery Dopplers are normal, check whether the answer is yes to any of the questions (Table 2). If any are YES, they should be allocated to Pathway C. This should be the

case whenever the anomaly scan is being performed

- All other women should be allocated to pathway A. Additional scans may be requested by clinicians in an individualised manner according to existing other risk factors (eg previous pregnancy loss) or pregnancy developments.

80. For all women allocated to pathway D0 and D1, ensure they have an antenatal clinic appointment by 25+0 weeks.

81. For all those on Pathway D2 this appointment should be made by referral to FMU
82. An updated information leaflet should be given. If further discussion is required, the woman can e mail pathwayqueries.fetalmedicine@ouh.nhs.uk

(New in v3.0) Table 1: Growth Scan Pathway Screening Questions

Growth Scan Pathway Screening Questions		
For the mother:	Y	N
Have you had a baby (not a twin)) that weighed less than 2.5kg (5lb 9oz)?		
Are you 40 or over?		
Do you smoke at all (or were you told your CO level was >3ppm)?		
Was your booking BMI >/=35?		
Are you of Black or South Asian (Indian subcontinent including: Bangladesh, Bhuta, India, Maldives, Nepal, Pakistan, Sri Lanka, East Timor) ethnic origin?		
Do you have a congenital uterine abnormality?		
Do you have high Blood pressure (>/=140/90 or requiring treatment)?		
Are you taking aspirin (or were advised to do) so as a result of the 12 week screening test?		
For the sonographer:	Y	N
Low PAPP-A (<0.31MoMs) *NB: Low result will be flagged on Viewpoint*		
Is there a 2 vessel cord?		

(New in v3.0) Table 2: Pathway allocations for a singleton pregnancy

Pathway	Risk factors	Uterine artery	Interpretation	Action
A	**No *risk factors** (no boxes ticked yes)	**Total PI <2.5**	**Low risk for placental dysfunction**	**36 week growth scan**
C	**Any *risk factors**	**Total PI <2.5**	**Moderate risk of late placental dysfunction**	**32 and 36/40 growth scans**
D0	**Whether risk factors or not**	**Total PI ≥ 2.5, <3.0**	**Moderate risk of early placental dysfunction**	**28, 32 and 36/40 growth scans**
D1	**Whether risk factors or not**	**Total PI ≥ 3.0, <3.5**	**Higher risk of placental dysfunction**	**28, 32 36 and 39/40 growth scans**
D2	**Whether risk factors or not**	**Total PI ≥ 3.5**	**High risk of placental dysfunction**	**Refer fetal medicine**

83. **For twin pregnancy pathway allocation:**

Dichorionic twins:

- Growth scans should be booked at 24, 28, 32 and 36 weeks. The 24 week scan can be on any day of the week. if the woman is at the JR site other scan must be booked on a Thurs late am/ early pm

- Ensure that an antenatal clinic appt (Thurs pm only if JR site) has been made on the same day as the 28, 32 and 36 week one. An antenatal clinic is not needed at 24 weeks.

Monochorionic twins or high order multiple pregnancies:

- should have all scans, other than 12 week and anomaly scans, in the FMU.

Referral to Fetal Medicine Unit (Updated in v3.0)

84. Referral can be made for any reason (as above) and also if the sonographer requests it, although the commonest indications will be If an abnormality is suspected, the EFW is <10th centile, or the total utA PI is >/=3.5.

85. Referral should be made to FMU using Badgernet. Please ensure all details on the referral are completed correctly as incorrect entries may delay review.
86. Referral may also be for a scan review. Usually, these women will not require an appointment.
87. The FMU will triage referrals.
    - If, on review of the images/ woman's details, no appointment is required, the FMU will only contact them if specifically requested, an appointment is required or other advice is needed.

    - If an appointment is considered necessary, The FMU midwives will contact the woman by telephone. Referrals for suspected anomalies will usually be seen within 3 working days.

88. Following any remote or face to face review, the FMU Team will update the woman's Badgernet records accordingly, in the fetal medicine section.

Review

89. This guideline will be reviewed every 3 years, as set out in the Policy for the Development and Implementation of Procedural Documents.
90. N.B.Policies may need to be revised before this date, particularly if national guidance or local arrangements change, where implementation is unsuccessful or where audits necessitate a policy review.
91. If the approving committee of the policy has delegated the authority to approve supporting documents to another group, this should be documented here. E.g. The Trust Management Executive has delegated authority to the Health & Safety Committee for the approval of any further supporting or associated documents.

Implementation Plan

No.	Recommendation for Implementation	Action to be taken	Evidence of Action	Responsible Person	Date Action to be completed by	R.A.G. Action completion status[2]
1	Raise awareness of updated guideline	Include updated guideline in Monthly Guidelines Updates Table	Email circulating Monthly Guideline Updates Table sent to all maternity matrons to disseminate news of updates to their teams. Upload of Monthly Guideline Updates Table to SharePoint	Quality Team	Within 1 week of guideline being ratified at MCGC	
2	Raise awareness of updated guideline	Include QR code to Monthly Guidelines Updates Table in Maternity Bulletin 'And Breathe'	Publication of Maternity Bulletin including QR code to Monthly Guidelines Updates Table in every publication of Maternity News Booklet	Communications Manager – Chief Nursing Officers Team	Within 1 month of guideline launch date	

References

Dockree, S., Aye, C., Ioannou, C., Cavallaro, A., Black, R., Impey, L. and (2024), Adverse perinatal outcomes are strongly associated with degree of abnormality in uterine artery Doppler pulsatility index. Ultrasound Obstet Gynecol, 64: 504-512. https://doi.org/10.1002/uog.27668 (accessed 24/12/2024)

Fetal Anomaly Screening Programme (FASP) NHS: programme overview – www.gov.uk 18+0 to 20+6 weeks fetal anomaly scan national standards and guidance for England. http://fetalanomaly.screening.nhs.uk/standardsandpolicies (accessed 07/08/2024)

Fetal anomaly screening standards valid for data collected from 1 April 2022 - GOV.UK (www.gov.uk) (accessed 24/12/2024)

https://www.gov.uk/government/publications/fetal-anomaly-screening-programme-handbook/data (accessed 24/12/2024)

https://www.gov.uk/government/publications/fetal-anomaly-screening-programme-standards/fetal-anomaly-screening-standards-valid-for-data-collected-from-1-april-2022 (accessed 24/12/2024)

Appendix 1: Responsibilities

- It is the responsibility of all staff in the maternity Team performing Ultrasound scans to familiarise themselves with the location and content of this guideline.

Appendix 2: Definitions

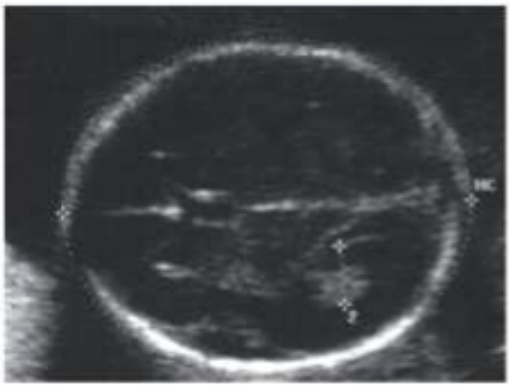
AC	Abdominal circumference
AFI	Amniotic Fluid Index
AP	Antero-posterior
BN	Badgernet
CHD	Congenital Heart Disease
EPR	Electronic Patient Record
FASP	Fetal Anomaly Screening Programme
FMU	Fetal Medicine Unit
PD	Pool depth
PI	Pulsatility Index
PSV	Peak Systolic Velocity
TV	Transvaginal
Ut Art	Uterine Artery
Viewpoint	Software used to store scan examination data and to generate scan reports

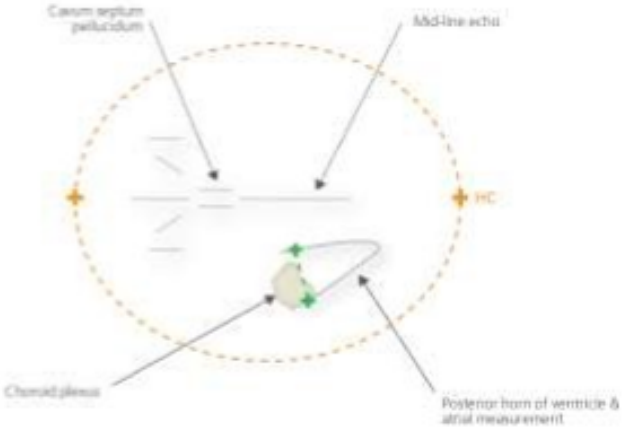
Appendix 3: Overview of anatomical views to be assessed at the anomaly scan

Area		Structures assessed	View	Image stored
1	Head & neck	Skull Neck: Skin fold (NF) Brain: • Cavum septum pellucidum (CSP) • Ventricular atrium (Va & Vp) • Cisterna magna (CM) • Cerebellum (TCD)	Shape Transventricular view to identify CSP, measure BPD, HC & Vp) Transcerebellar view to measure TCD, CM, NF	Transventricular view Suboccipitobregmatic view for posterior fossa and neck
2	Face	Lips, nostrils Profile	Coronal view to visualise intact lip: view to include nostrils and lips; sagittal view to assess profile	Coronal view of lips and nasal tip
3	Chest	Heart Situs/laterality - 4-chamber view - outflow tracts Lungs	See cardiac protocol- Appendix 3 Determine left and right side of fetus from position of fetus in uterus Transverse section of thorax including complete rib and crux of heart Aorta and left ventricular outflow tract & Pulmonary/right ventricular outflow tract/3VV/3VT Look for any echogenic or cystic areas.	Transverse thoracic - 4-chamber view - outflow tracts
4	Abdomen	Stomach and short intrahepatic section of umbilical vein Abdominal wall Renal Pelvis Bladder	Transverse; if stomach bubble not visible, ensure it is present by waiting to see it fill. Check early for stomach in exam, if not visible, again at then end. If still not visible, rescan in 30minutes. If still not visible, refer to PND. Transverse (demonstrate intact) Transverse- measure if AP looks increased Transverse	Abdominal circumference showing AC measurement
5	Spine	Vertebrae Skin covering	Sagittal, transverse& coronal Sagittal	Sagittal view of spine including sacrum and skin covering
6	Limbs	Femora Tibia & fibia Humerus Radius/ulna Hands- metacarpals Feet- metatarsals Orientation of feet to lower legs	Both visible; femur length (one leg only) Visible (both legs) Visible (both arms) Visible (both arms) Visible (both hands, not counted) Visible (both feet, not counted) Coronal view to examine for talipes	Femur length (one leg only) demonstrating FL measurement
7	Uterine cavity	Amniotic fluid Placenta		Subjective volume Visible and position noted

Appendix 4: Base menu of anatomical images to be stored

Head circumference and ventricular atrium



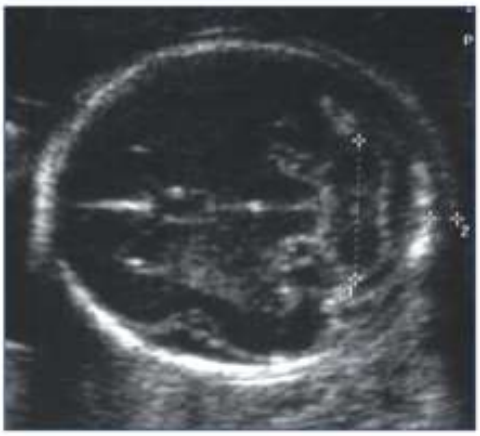


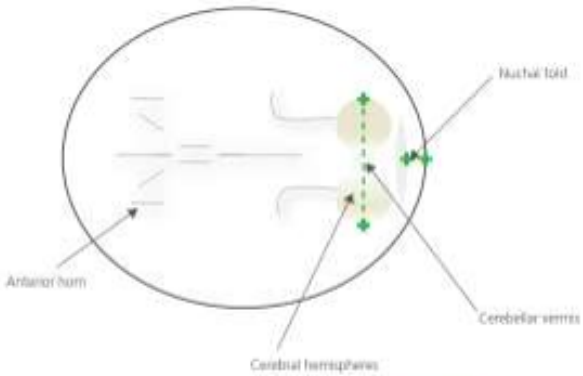
Head circumference denoted by orange dotted line and caliper markings (-)
Ventricular atrial measurement denoted by green dotted line and caliper markings (+)

Essential criteria for imaging acquisition (in bold measurements required by FASP):

1. Image should be stored
2. Symmetry: The two hemispheres should be symmetrical
3. Anterior and posterior ventricles should be visible
4. Cavum of the septum pellucidum should be visible
5. No cerebellum should be visualised
6. Ellipse placement should adequate to the size of the head
7. **HC callipers** placement should be along the outer border of the skull
8. Callipers of the BPD should be placed "outer to outer"
9. **Vp callipers** placement should be "inner to inner" perpendicular to the ventricular cavity
10. Region of interest size should be more than 30% of the total picture size

Transcerebellar diameter (TCD) and nuchal fold (NF).



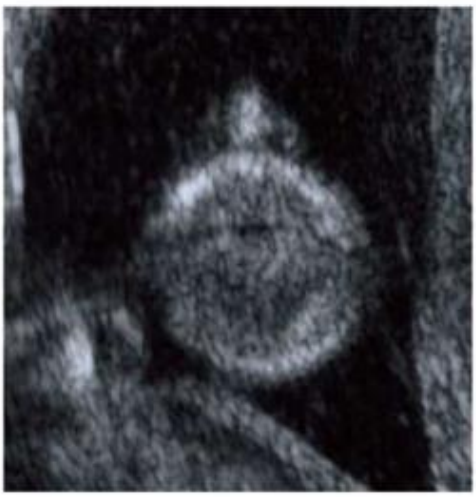


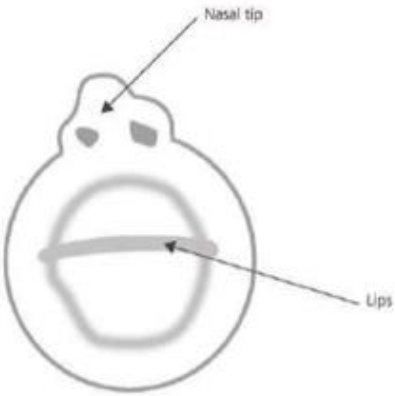
Transcerebellar diameter and nuchal fold diameter denoted by green dotted line and caliper marking

Essential criteria for imaging acquisition (in bold measurements required by FASP):

1. Image should be stored
2. Symmetry: The two hemispheres should be symmetrical
3. Cerebellum should be visualised at itsmaximum diameter
4. Cavum of the septum pellucidum should be visible
5. **TCD** callipers placement should be outer to outer the cerebellar hemispheres
6. CM callipers should be placed between the cerebellar vermis and the internal side of the occipital bone
7. NF calliper placement should be from the outer border of the skull to the outer border of the skin
8. Region of interest size should be more than 30% of the total picture size

Nasal tip and lips

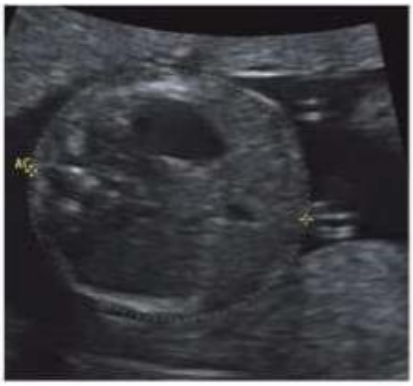


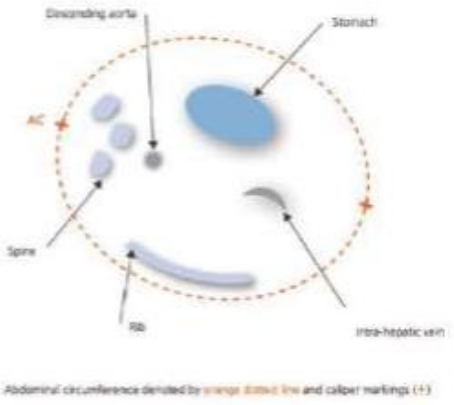


Essential criteria for imaging acquisition:

1. Image should be stored
2. Upper lip visible
3. Two nostrils visible
4. Two lip angles visible
5. Region of interest size should be more than 30% of the total picture size

Abdominal circumference





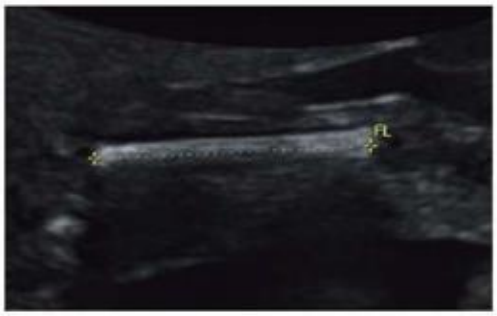
Abdominal circumference denoted by orange dotted line and caliper markings (+)

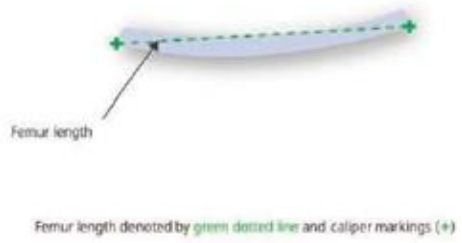
Essential criteria for imaging acquisition (in bold measurements required by FASP):

1. Image should be stored
2. AC should be as circular as possible
3. Stomach bubble visible
4. Umbilical vein anterior 1/3rd and level of portal sinus
5. No kidney present
6. Single straight rib
7. **AC** calliper placement on the outer border of the skin
8. Region of interest size should be more than 30% of the total picture size

Note: If the stomach is not visible, please ensure that it is present by waiting to see it fill. Check for it early in your examination and if not visible, again at the end. If still not visible rescan in approximately 30 minutes. If still not visible, refer to FMU.

Femur Length



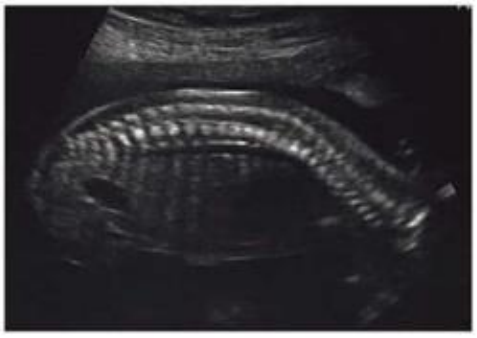


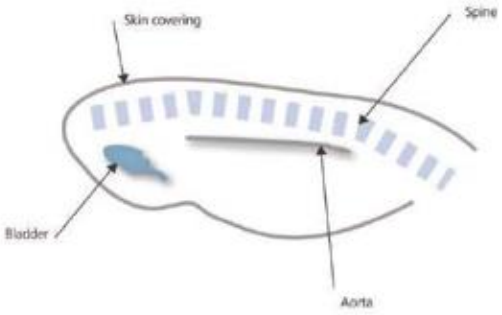
Femur length denoted by green dotted line and caliper markings (+)

Essential criteria for imaging acquisition (in bold measurements required by FASP):

1. Image should be stored
2. Ends of the femur clearly visible
3. Angle of the femur less than 45 degrees to the ultrasound beam
4. **FL** callipers placed outer to outer in the middle of the femur extremities
5. Region of interest size should be more than 30% of the total picture size

Longitudinal view of spine





Essential criteria for imaging acquisition (in bold measurements required by FASP):

1. Image should be stored
2. Dorsal spine visible
3. Sacrum visible
4. Alignment of vertebrae visible from the dorsal level to the sacrum
5. Continuity of skin line
6. Amniotic fluid visible beyond skin dorsally
7. Region of interest size should be more than 30% of the total picture size

Appendix 5: Detectable physical conditions and their detection rate thresholds (%):

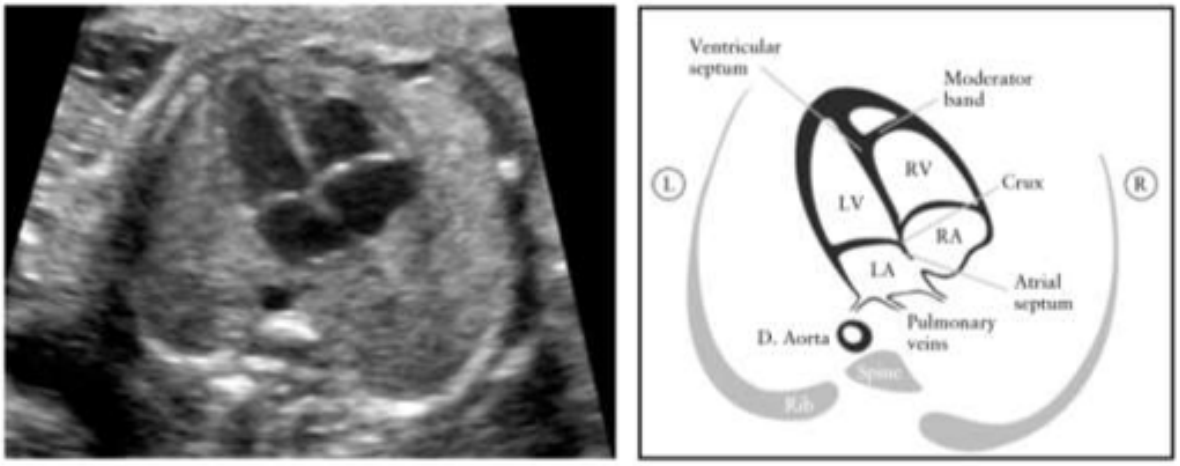
Anencephaly	98
Spina Bifida	90
Cleft Lip	75
Congenital Diaphragmatic hernia	60
Gastroschisis	98
Exomphalos	80
Serious cardiac abnormalities inc transposition of the great arteries, atrioventricular septal defect, tetralogy of fallot and hypoplastic left heart syndrome	50
Bilateral renal agenesis	84
Severe skeletal dysplasia	60
Edwards syndrome	95
Patau syndrome	95

Appendix 6: Detectable Cardiac Conditions and their Detection Rate Thresholds (%)

Condition	Acceptable threshold	Achievable threshold
Transposition of the great arteries (TGA)	greater than or equal to 70%	greater than or equal to 99%
Atrioventricular septal defect (AVSD)	greater than or equal to 50%	greater than or equal to 80%
Tetralogy of Fallot (	greater than or equal to 55%	greater than or equal to 85%
Hypoplastic left heart syndrome	greater than or equal to 80%	greater than or equal to 99%
Coarctation of aorta	Not set	Not set
Congenital diaphragmatic hernia (CDH)	greater than or equal to 60%	greater than or equal to 70%

Appendix 7: Fetal cardiac anomaly scan

Four chamber view



(from Carvalho et al, 2013)

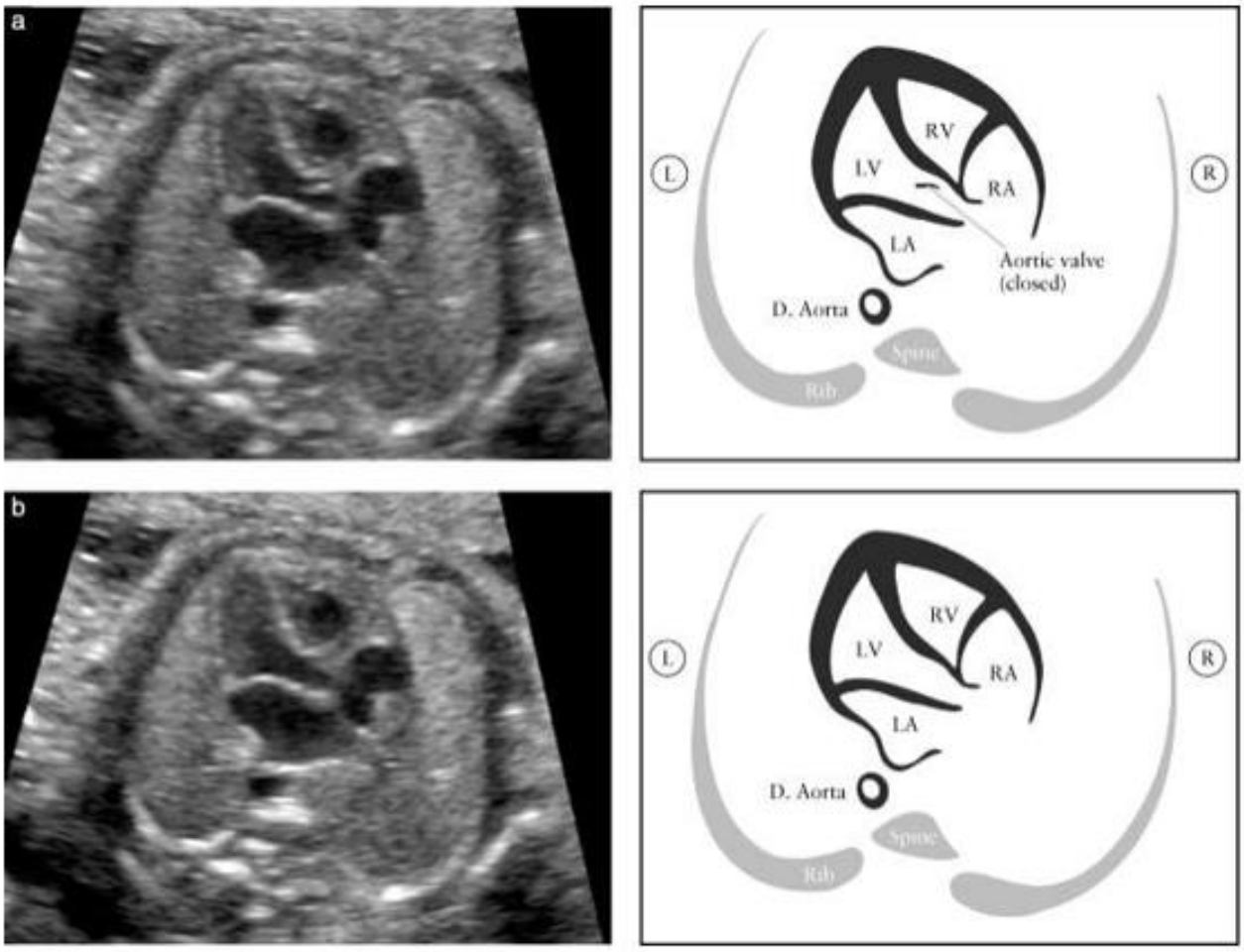
Assessment of fetal situs/laterality and the four chamber view
Situs and general aspects • Fetal laterality (identify right and left sides of fetus) • Stomach and heart on left • Heart occupies a third of thoracic area • Majority of heart in left chest • Cardiac axis (apex) points to left by 45°±20° • Four chambers present • Regular cardiac rhythm • Pericardial effusion not larger than 2mm **Atrial chambers** • Two atria, approximately equal in size • Foramen ovale flap in left atrium • Atrial septum primum present (near to crux) • Pulmonary veins (at least 2) entering left atrium

Ventricular chambers • Two ventricles, approximately equal in size • No ventricular wall hypertrophy • Moderator band at right ventricular apex • Ventricular septum intact (apex to crux) **Atrioventricular junction and valves** • Intact cardiac crux • Two atrioventricular valves open and move freely • Differential offsetting: tricuspid valve leaflet inserts on ventricular septum closer to cardiac apex than does mitral valve and allows identification of the right ventricle

Outflow tract views

6. In assessment of the LVOT and RVOT, it is important to ascertain normality of the two great vessels, including their connection to the appropriate ventricles, their relative size and position and adequate opening of their arterial valves. If any of these features appear abnormal, referral to fetal cardiology should be made using standard PND/FMU referral form. A normal examination requires that the great vessels are approximately equal in size (PA very slightly larger) and cross each other at right angles from their origins as they exit from the respective ventricles (normal "cross-over").

Left ventricular outflow tract

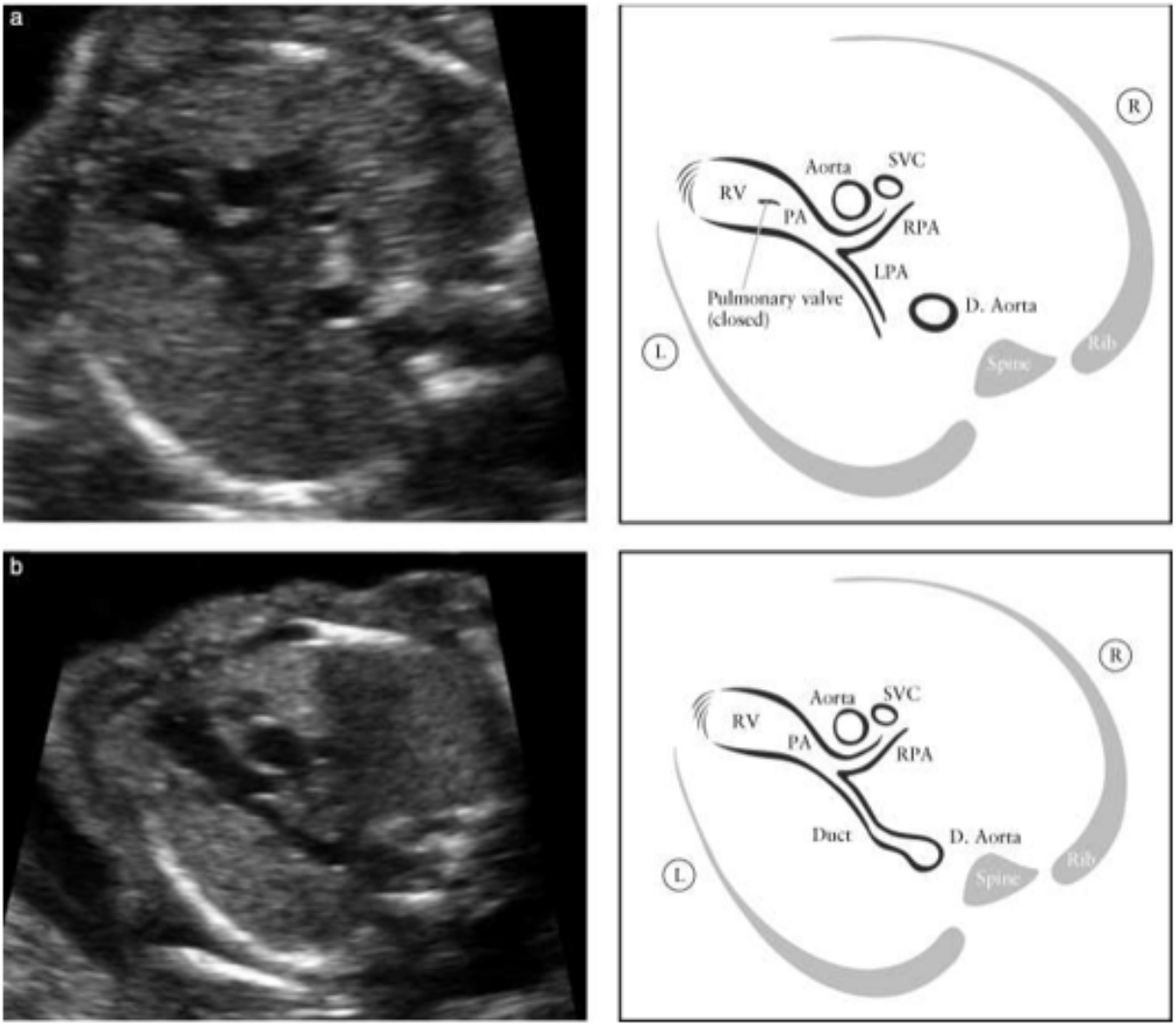


(from Carvalho et al., 2013)

7. The LVOT view demonstrates a vessel connected to the left ventricle. A normal LVOT will demonstrate continuity between the interventricular septum and the anterior wall of this vessel, which in the normal heart corresponds to the aorta (identified by head and neck vessels arising from it). The aortic valve should not be thickened and should open freely.

8. A LVOT view must be stored as part of the fetal cardiac anomaly scan. The valve is closed in (a) and open in (b) – a cine loop will show both, either view would be acceptable as a frozen image.

Right ventricular outflow tract

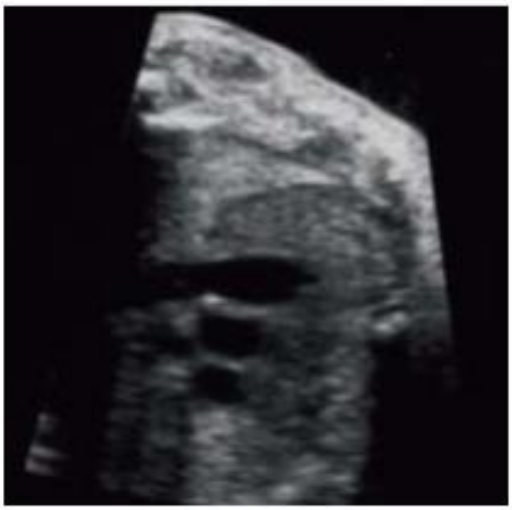


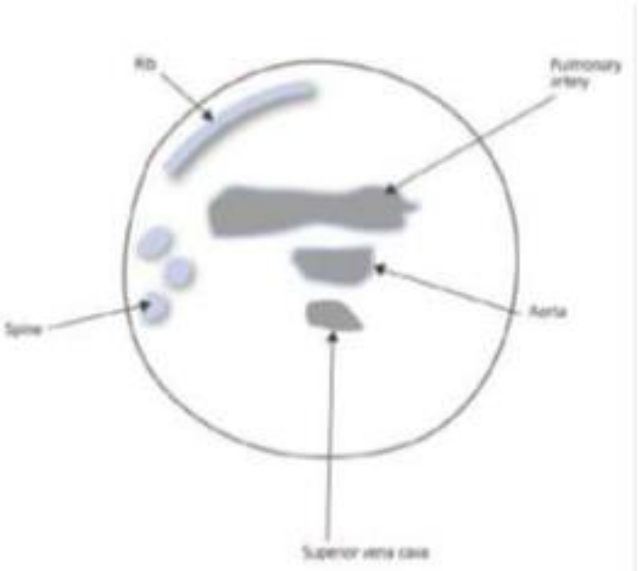
(*from Carvalho et al, 2013*)

9. This view shows a vessel connected to the morphological right ventricle (RV). This vessel divides early thereby identifying it as the pulmonary artery. The pulmonary artery is slightly larger than the aorta which it crosses at almost right angles. The pulmonary artery divides into right and left branches and then continues posteriorly as the ductus arteriosus to join the artery just after its third head/neck branch. The pulmonary valve should not be thickened and should open freely. In (a) the bifurcation of the PA into both pulmonary arteries can be seen.

10. A RVOT view must be stored as part of the fetal cardiac anomaly scan. The valve is closed in (a) and open in (b) – a cine clip is preferred but either view would be acceptable as a stored image.

Three vessel view (3VV)

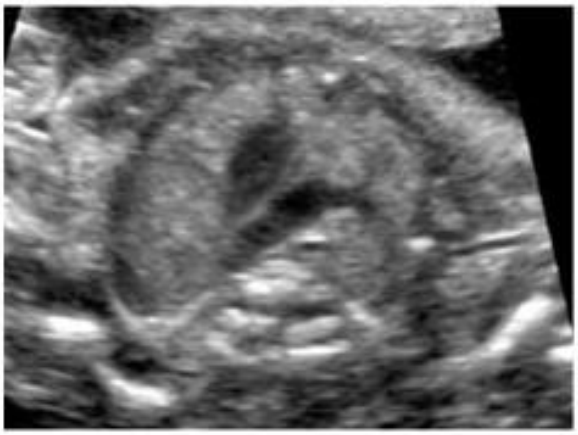


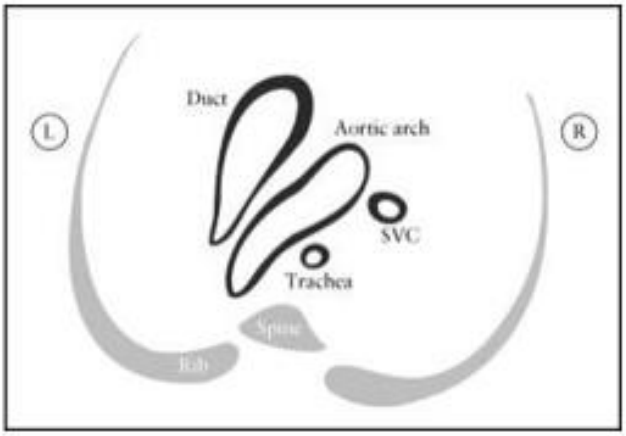


The 3VV view best demonstrates the relationship between the pulmonary artery, aorta and superior vena cava (SVC) in the upper mediastinum. It is important to note the correct position and alignment of the 3 vessels as well as their relative size. The pulmonary artery, to the left, is the largest of the three and the most anterior, whereas the SVC is the smallest and most posterior.

Three vessel view and trachea view (3VT)

A 3VT view must be stored as part of the fetal cardiac anomaly scan. A cine clip is preferred but a stored image would be acceptable.





11. The trachea is usually identified as a hyperechogenic ring surrounding a small fluid-filled space. This view best demonstrates the transverse aortic arch and its relationship with the trachea. In the normal heart, both the aortic arch and the ductal arch are located to the left of the trachea, in a "V"-shaped formation.

Appendix 8: Uterine Artery Doppler

1. The purpose of this guidance is to standardise and optimise the technique of Doppler signal acquisition. Poor acquisition reduces the effectiveness of the screening test and creates work for others.

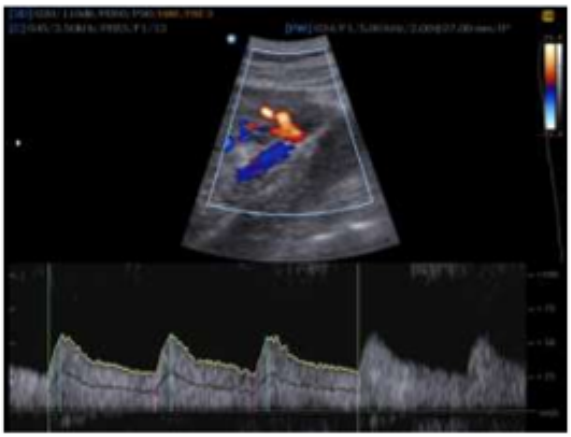
Obtaining optimum measurements

2. The UtA Doppler signal should be obtained at the apparent crossover with the external iliac artery using Color Doppler. If the correct anatomic site cannot be identified the UtA tract closest to the iliac artery should be insonated.

3. In case of an early bifurcation of the UtA the larger vessel should be insonated. The uterine artery will always have a velocity of >60cm/sec. If the velocity is less you may be insonating an arcuate vessel.

4. In rare cases there is only one vessel because of a uterine abnormality. If only one vessel can be insonated a PI of >/=1.25 should be considered high risk and the patient managed as the total PI was >/=2.5.

Normal uterine artery



5. Once 4-6 cycles are obtained and frozen, press the 'uterine artery' (left or right) option, then Autotrace. Limit the section autotraced to the best 3 consecutive similar waveforms. In case excessive background noise and signal is poor, a manual trace can be used. Store the best image of both sides. Use the 'send report' function to ensure they are stored in Viewpoint; in the event of a lost connection, manually enter both PI and RI for each side.

6. The following 6 criteria must be satisfied for any of the Doppler measurements obtained.

Magnification	50% of the screen (zoom box) and sample gate in centre of vessel
Angle	less than 30%

Sweep speed	4 - 6 waves insonated with constant signal
Clearance of the IMAGE	Velocity and colour gain correction (no veins signal)
Anatomic Site	UtA: before the bifurcation above the iliac vessels
Velocity Scale	75% of the peak systolic velocity

Appendix 9: Sonographer audit

- Regular audits of anomaly scan images are performed, and individual feedback will be provided. Individual training needs will be identified through this, annual appraisal and supervision.

Appendix 10: Equality Impact Assessment

1. Information about the policy, service or function

What is being assessed?			
New Policy/Procedure	[ ]	New Service/Function	[ ]
Existing Policy/Procedure	[x]	Existing Service/Function	[ ]
Staff member completing assessment: Marie Barnard			
Name of policy/service/function: **Anomaly Scan Guideline**			
Details about the policy/service/function: This document provides guidance for all clinical maternity staff. It is particularly relevant for those staff performing antenatal anomaly ultrasound scans for women who choose to have this aspect of care within the Oxford University Hospitals (OUH) NHS Foundation Trust.			

Review Date: 07/08/2024	**Date assessment completed:**
Signature of staff member completing assessment: **Marie Barnard**	**Signature of staff member approving assessment:**

2. Screening Stage

Who benefits from this policy, service or function? Who is the target audience? (*tick all that apply*)					
Women	[x]	Family/Carers	[ ]	Not applicable	[ ]
Staff	[x]	Other (*specify*):			
Does the policy, service or function involve direct engagement with the target audience?					
Yes	[x]	Continue with full equality impact assessment			
No	[ ]	Full equality impact assessment not required			

3. Research Stage

Notes:

If there is no impact for a particular group or characteristic, mention this in the Reasoning column and refer to evidence where applicable.

[1]Race categories follow those used in the National Census by the Office for National Statistics. Consideration should be given to the specific communities within broad categories such as Bangladeshi people.

[2]Please select age groups which may be impacted by the policy, service or function and complete as appropriate.

[3]Religion or Belief covers a wide range of groupings, the most common of which are Muslims, Buddhists, Jews, Christians, Sikhs and Hindus; it also covers people who do not have a faith. Consider these individually and collectively when determining impacts.

Characteristic		Positive Impact	Negative Impact	Neutral Impact	Not Enough Information	Reasoning
Sex and Gender Reassignment	Men (incl. trans men)			x		All genders of pregnant people will have equal access to the care detailed in this guideline
	Women and birthing people (incl. trans women and birthing people)			x		
	Non-binary people			x		
Race[1]	Asian or Asian British			x		Consideration should be taken if the pregnant person is not able to read written English. Pictorial explanations may need to be used. If the pregnant person is not able to communicate using English then language line should be used for consultations.
	Black or Black British			x		
	Mixed Race			x		
	White British			x		
	White Other			x		
	Other:			x		

Disability	Disabled people			x		If the pregnant person has a learning disability an advocate should be in attendance. If the pregnant person has a hearing loss they should be asked if they wish to have a British Sign Language interpreter in attendance
	Carers			x		
Age[2]				x		This guideline is relevant to pregnant people of all ages
				x		
				x		
Sexual Orientation				x		This guideline does not discriminate with regards to sexual orientation, as all people will have equal access to the care described in this guideline.
Religion or Belief[3]				x		This guideline does not discriminate with regards to belief or religion, as all people will have equal access to the care described in this guideline.

Pregnancy and Maternity		x				The advice in this guideline is for pregnant people so will have a positive impact on this group.
Marriage or Civil Partnership				x		This guideline does not discriminate with regards to marriage or civil partnership, as all people will have equal access to the care described in this guideline.
Other Groups /Characteristics	For example: homeless people, sex workers, rural isolation.			x		This guideline does not discriminate with regards to social situations, as all people will have equal access to the care described in this guideline.

List the sources of information used in the table below
OUH Trust Equality impact Assessment Procedure Guideline – available via trust intranet **Annual Equality and Diversity Report, Workforce Race Equality Standard Data or the Equality Delivery System 2 report**

Using the table below, list any protected groups you will target during the consultation process, and give a summary of those consultations.	
Group	**Summary of consultation**

List any other individuals/groups that have been or will be consulted on this policy, service or function.
This guideline will be reviewed prior to publication by relevant subject matter experts, Service Users, Midwives, Obstetricians, Consultant Obstetricians and Pharmacy if medications are involved.

4. Summary Stage

Outcome Measures List the key benefits that are intended to be achieved through implementation of this policy, service or function and state whether or not you are assured that these will be equitably and fairly achieved for all protected groups. If not, state actions that will be taken to ensure this.
The key aims/benefits of the implementation of this guideline will be to ensure all pregnancy people accessing the OUHFT for intrapartum care will receive the best evidence based and safe care in relation to having an Anomaly Scan.
Positive Impact List any positive impacts that this policy, service or function may have on protected groups as well as any actions to be taken that would increase positive impact.
As above

Unjustifiable Adverse Effects List any identified unjustifiable adverse effects on protected groups along with actions that will be taken to rectify or mitigate them.
No unjustifiable adverse effects are predicted
Justifiable Adverse Effects List any identified unjustifiable adverse effects on protected groups along with justifications and any actions that will be taken to mitigate them.
No justifiable adverse effects are predicted

Equality Impact Assessment Action Plan

Complete this action plan template with actions identified during the Research and Summary Stages

Identified Risk	Recommended Actions	Lead	Resource Implications	Review Date	Completion Date
