

# Obstetric Ultrasound Handbook for Sonographers Delivering the Antenatal Screening Programme in Wales

4th Edition

Version 6

2020

Summary of changes			
Date	Section	Page	Comments
Aug 2019	Front cover		Year/edition changed
Ultrasound Screening In Pregnancy			
Aug 2019	Whole document		Changes to terminology on Down's syndrome, Edwards' syndrome and Patau's syndrome
Aug 2019	Codes Poster	21	Amendments to codes
Aug 2019	Ultrasound Screening Tests	23	Ultrasound scan performed 11+2-14+1
		24	Pathway for >NT or cystic hygroma
		27	2 <sup>nd</sup> anomaly scan completion 22+6
		28	Guidance on specific ultrasound findings
Aug 2019	Health Board sonographer roles	56-60	Update on sonographer roles
Jan 2020	Images for anomaly scan	30+32	Change to nose/lips and chin
April 2020	Anomaly menu	27	Change to placenta $\geq$ 20mms
April 2020	Consent for screening	25	New guidelines for sonographers
April 2020	Anomaly scan	27	When to perform a AC measurement and HC <5 <sup>th</sup> centile abnormal
Dec 2020	Cerebral Ventricular Measurements	46	Cerebral ventricular measurements updated to 10.1mm and 15.1mm
May 2021	Three Vessel View	45	Three vessel view image and drawing removed
Sept 2021	Effect of Vaginal Bleeding on Biochemical Markers used for First Trimester Screening	25	Removed
Sept 2021	Sonographer requirements	61	E Learning resources updated
Jan 2022	Cerebral Ventricular Measurement description	46	Changed to 'long axis of the ventricle'.
Feb 2022	Technical Information	8	Ultrasound Machine Specification
July 2022	Combined screening twin/failing pregnancies	26	Link to management guidelines

# Acknowledgements

Antenatal Screening Wales wish to acknowledge the following for all their help in compiling this handbook

## Contributors:

The Fetal Anomaly Screening Programme, Public Health England

Tiny Tickers

Dr Orhan Uzun                      Fetal Cardiologist

Mrs Nerys Thomas              Obstetric Lead

Mrs Wendy Williams          Obstetric Lead

## In consultation with:

Health Board Obstetric Lead sonographers from Wales

## With thanks to:

For the preparation of the document

Rebecca Jones                      Antenatal Screening Wales

Jemma Muggeridge              Antenatal Screening Wales

# Contents

Introduction .....	6
Section 1: Technical Information .....	8
Antenatal Screening Wales Specification for Ultrasound Systems.....	8
Current Obstetric Charts Embedded in RadIS.....	9
Current Obstetric Charts and Centiles for Anomaly and Sizing .....	17
RadIS Codes.....	21
Section 2: Ultrasound Screening Tests.....	23
The Early Pregnancy Ultrasound Scan .....	23
Down’s syndrome, Edwards’ Syndrome and Patau’s Syndrome Screening .....	24
Twin Pregnancy First Trimester Screening.....	26
Quadruple testing .....	266
The Quadruple Test Is Not Offered in a Twin Pregnancy.....	266
The Anomaly Scan.....	27
Short Femur .....	29
Image Storage .....	30
Section 3: Guidance on Obtaining Correct Images .....	35
Crown Rump Length (CRL) .....	35
Nuchal Translucency (NT) .....	36
Correct NT Technique Calliper Placement .....	39
Head Circumference (HC) .....	40
Femur length.....	41
Abdominal Circumference .....	41
Four Chamber View.....	43
Left Outflow Tract (aorta) .....	43
Right Outflow Tract (pulmonary artery showing the bifurcation).....	44
Right Ventricular Outflow Tract (RVOT).....	44
Three Vessel Trachea View .....	45

Measurement of Posterior Horn of Cerebral Ventricle for Ventriculomegaly .....	46
Transverse Section of the Kidneys in the Abdomen .....	47
Section 4: Audit and Assessment Proformas .....	48
Audit of Images .....	48
Routine Measurements .....	48
Non-Routine Measurements .....	48
Section 5: Health Board Sonographer Roles Working With Antenatal Screening Wales .....	56
Ultrasound Obstetric Lead .....	56
NT Lead .....	56
The Fetal Cardiac Ultrasound Lead.....	59
Section 6: Sonographer Requirements .....	61
Appendix 1 .....	63
Appendix 2 .....	64

# Introduction

Welsh Government asked Antenatal Screening Wales (ASW) to set standards and protocols and to establish a performance management framework to assess the quality of the antenatal screening programmes. The Antenatal Screening Coordinators, Maternal and Child (MAC) Governance Leads, Ultrasound Obstetric Sonographers, Nuchal Translucency (NT) Lead Sonographers and Fetal Cardiac Ultrasound sonographers work closely with ASW to implement and maintain these standards in their Health Boards. ASW provide education and training to sonographers where required and appropriate.

ASW Policy, Standards and Protocols are available on the [Antenatal Screening Wales website](#).

The ASW Policy, Standards and Protocols state that all women resident in Wales should be offered an early pregnancy ultrasound scan (WHC 2003b; NICE 2008) and a fetal anomaly ultrasound scan (NICE 2008).

All screening tests are optional and it is important that the woman is provided with up to date information on which she is able to make a personalised informed choice on whether to have the screening tests.

The screening scans offered in pregnancy are:

➤ **Early Pregnancy Scan**

The purpose of the early pregnancy ultrasound scan is to determine viability, gestational age and to detect multiple pregnancies (fetal number and chorionicity/amnionicity). Some major fetal anomalies may be detected, but this is not the primary purpose of this scan.

➤ **Fetal Anomaly Ultrasound Scan**

The purpose of the fetal anomaly ultrasound scan is to detect significant structural fetal anomalies that are likely to have an adverse effect on the health of the mother or baby and for which an effective intervention is available and warranted at 18 weeks and 0 days to 20 weeks and 6 days of pregnancy.<sup>1</sup>

For some conditions, preventive treatment is available during the antenatal period or after delivery to improve the baby's health. For others, the condition can be identified by ultrasound scanning but no preventive treatment is available. Women can make an informed decision about whether they wish to continue the pregnancy with a baby affected by the condition or to end the pregnancy.

Sonographers must use the most up to date RadIS obstetric module reporting templates when undertaking these two scans as this ensures that the agreed all Wales definitions for the scan, charts and parameters for measurements are used.

Sonographers working within Wales requested that ASW produce a handbook in order to have all documentation pertaining to the early pregnancy and fetal anomaly scans in a concise format. In the production of this handbook, ASW has consulted with sonographers, Antenatal Screening Co-ordinators and MAC Governance Leads and relevant stakeholders in All Wales meetings.

This handbook is an easy reference guide for sonographers delivering the antenatal screening programme in Wales. The handbook is available on the ASW professional [website](#) and will be updated every 3 years in line with the [ASW Policy, Standards and Protocols](#) and in the interim as and when required. If you choose to print this document, it is your responsibility to ensure you always refer to the most up to date

---

<sup>1</sup> ASW (2019 Version 9). Policy, Standards and Protocols to Support the Provision of Antenatal Screening in Wales

version. Please be aware the electronic version on the Antenatal Screening Wales website will always be the most up to date.

Key documents will be hyperlinked throughout this handbook. To access these, click on the hyperlink and the document will open in a separate webpage. See example below:

The Antenatal Screening Wales Policy, Standards and Protocols are available on the [Antenatal Screening Wales website](#).

## Section 1: Technical Information

This section contains information on machine specification, current obstetric charts and the centile graphs embedded in RadIS and RadIS codes.

### Antenatal Screening Wales Specification for Ultrasound Systems

This [machine specification](#) has been developed by Antenatal Screening Wales in collaboration with NHS Wales Shared Services Partnership (NWSSP). [Andrew.ward2@wales.nhs.uk](mailto:Andrew.ward2@wales.nhs.uk) (Environmental Management and Engineering)

This specification is relevant for ultrasound systems used for antenatal screening scans as defined in the Antenatal Screening Wales standards and protocols. In addition, this specification may be suitable for other obstetric scans but this must be assessed locally in each Health Board.

Ultrasound systems procured for antenatal screening scans must be capable of producing images of high diagnostic quality and include, as a minimum, the following characteristics:

- Display/ screen size for sufficient clear visualisation
- Magnification facility
- Cine loop function
- Callipers that have a millimetre precision to one decimal point i.e. 0.1mm
- Adjustable signal processing facilities
- Tissue specific pre-sets for individual clinical applications
- Sector/ linear/ curvy-linear/ transvaginal probe relevant to gestational age
- Pulse, colour Doppler and tissue harmonic imaging

### Details of minimum requirements

#### Clinical requirements

Clinical tasks:

Fetal measurements and visualisation of fetal anomaly as defined within the scope of the [Antenatal Screening Wales standards and protocols](#).

#### Technical requirements

Physical and ergonomic features, the system should:

- be a room based wheeled unit
- have display/ screen size for sufficient clear visualisation ([see RCR guidelines](#))
- have a variable position monitor (height, rotation and angle)
- have a variable position central console (height, rotation and angle)
- have controllable console illumination intensity



## Current Obstetric Charts Embedded in RadIS

These charts have been calculated using the equations recommended by the British Medical Ultrasound Society (BMUS) and the Royal College of Obstetricians and Gynaecologists (RCOG) and also cited in the following papers.

- Loughna P et al (2009) [Fetal size and dating : charts recommended for clinical obstetric practice.](#) *Ultrasound*. Volume 17. Number 3
  - Chudleigh T et al (2011) [Education and Training](#); A Practical Solution to Combining Dating and Screening for Down's Syndrome. *Ultrasound*. Volume 19. Page 154 - 157
- 
- [Table 1 – Crown Rump Length Chart](#)
  - [Table 2 – Early Pregnancy Head Circumference Chart](#)
  - [Table 3 – Fetal Anomaly Head Circumference Chart](#)

Table 1: Gestational Age from Crown Rump Length

CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION	
	WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS
1	4	4	21.5	8	6	25	9	2	28.5	9	5	32	10	0
2	5	0	21.6	8	6	25.1	9	2	28.6	9	5	32.1	10	0
3	5	3	21.7	8	6	25.2	9	2	28.7	9	5	32.2	10	0
4	5	5	21.8	8	6	25.3	9	2	28.8	9	5	32.3	10	0
5	6	0	21.9	8	6	25.4	9	2	28.9	9	5	32.4	10	0
6	6	2	22	8	6	25.5	9	2	29	9	5	32.5	10	0
7	6	3	22.1	8	6	25.6	9	2	29.1	9	5	32.6	10	1
8	6	5	22.2	8	6	25.7	9	2	29.2	9	5	32.7	10	1
9	6	6	22.3	8	6	25.8	9	2	29.3	9	5	32.8	10	1
10	7	1	22.4	9	0	25.9	9	2	29.4	9	5	32.9	10	1
11	7	2	22.5	9	0	26	9	3	29.5	9	5	33	10	1
12	7	3	22.6	9	0	26.1	9	3	29.6	9	5	33.1	10	1
13	7	4	22.7	9	0	26.2	9	3	29.7	9	5	33.2	10	1
14	7	5	22.8	9	0	26.3	9	3	29.8	9	5	33.3	10	1
15	7	6	22.9	9	0	26.4	9	3	29.9	9	6	33.4	10	1
16	8	1	23	9	0	26.5	9	3	30	9	6	33.5	10	1
17	8	2	23.1	9	0	26.6	9	3	30.1	9	6	33.6	10	1
18	8	3	23.2	9	0	26.7	9	3	30.2	9	6	33.7	10	1
19	8	3	23.3	9	0	26.8	9	3	30.3	9	6	33.8	10	1
20	8	4	23.4	9	0	26.9	9	3	30.4	9	6	33.9	10	1
20.1	8	4	23.5	9	0	27	9	3	30.5	9	6	34	10	2
20.2	8	5	23.6	9	1	27.1	9	3	30.6	9	6	34.1	10	2
20.3	8	5	23.7	9	1	27.2	9	3	30.7	9	6	34.2	10	2
20.4	8	5	23.8	9	1	27.3	9	4	30.8	9	6	34.3	10	2
20.5	8	5	23.9	9	1	27.4	9	4	30.9	9	6	34.4	10	2
20.6	8	5	24	9	1	27.5	9	4	31	9	6	34.5	10	2
20.7	8	5	24.1	9	1	27.6	9	4	31.1	9	6	34.6	10	2
20.8	8	5	24.2	9	1	27.7	9	4	31.2	10	0	34.7	10	2
20.9	8	5	24.3	9	1	27.8	9	4	31.3	10	0	34.8	10	2
21	8	5	24.4	9	1	27.9	9	4	31.4	10	0	34.9	10	2
21.1	8	5	24.5	9	1	28	9	4	31.5	10	0	35	10	2
21.2	8	5	24.6	9	1	28.1	9	4	31.6	10	0	35.1	10	2
21.3	8	6	24.7	9	1	28.2	9	4	31.7	10	0	35.2	10	2
21.4	8	6	24.8	9	2	28.3	9	4	31.8	10	0	35.3	10	2
			24.9	9	2	28.4	9	4	31.9	10	0	35.4	10	3

Table 1 (continued)

CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION	
	WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS
35.5	10	3	39	10	5	42.5	11	0	46	11	2	49.5	11	4
35.6	10	3	39.1	10	5	42.6	11	0	46.1	11	2	49.6	11	4
35.7	10	3	39.2	10	5	42.7	11	0	46.2	11	2	49.7	11	5
35.8	10	3	39.3	10	5	42.8	11	0	46.3	11	3	49.8	11	5
35.9	10	3	39.4	10	5	42.9	11	0	46.4	11	3	49.9	11	5
36	10	3	39.5	10	5	43	11	0	46.5	11	3	50	11	5
36.1	10	3	39.6	10	5	43.1	11	1	46.6	11	3	50.1	11	5
36.2	10	3	39.7	10	5	43.2	11	1	46.7	11	3	50.2	11	5
36.3	10	3	39.8	10	5	43.3	11	1	46.8	11	3	50.3	11	5
36.4	10	3	39.9	10	6	43.4	11	1	46.9	11	3	50.4	11	5
36.5	10	3	40	10	6	43.5	11	1	47	11	3	50.5	11	5
36.6	10	3	40.1	10	6	43.6	11	1	47.1	11	3	50.6	11	5
36.7	10	3	40.2	10	6	43.7	11	1	47.2	11	3	50.7	11	5
36.8	10	3	40.3	10	6	43.8	11	1	47.3	11	3	50.8	11	5
36.9	10	4	40.4	10	6	43.9	11	1	47.4	11	3	50.9	11	5
37	10	4	40.5	10	6	44	11	1	47.5	11	3	51	11	5
37.1	10	4	40.6	10	6	44.1	11	1	47.6	11	3	51.1	11	5
37.2	10	4	40.7	10	6	44.2	11	1	47.7	11	3	51.2	11	5
37.3	10	4	40.8	10	6	44.3	11	1	47.8	11	3	51.3	11	5
37.4	10	4	40.9	10	6	44.4	11	1	47.9	11	3	51.4	11	6
37.5	10	4	41	10	6	44.5	11	1	48	11	4	51.5	11	6
37.6	10	4	41.1	10	6	44.6	11	1	48.1	11	4	51.6	11	6
37.7	10	4	41.2	10	6	44.7	11	2	48.2	11	4	51.7	11	6
37.8	10	4	41.3	10	6	44.8	11	2	48.3	11	4	51.8	11	6
37.9	10	4	41.4	10	6	44.9	11	2	48.4	11	4	51.9	11	6
38	10	4	41.5	11	0	45	11	2	48.5	11	4	52	11	6
38.1	10	4	41.6	11	0	45.1	11	2	48.6	11	4	52.1	11	6
38.2	10	4	41.7	11	0	45.2	11	2	48.7	11	4	52.2	11	6
38.3	10	4	41.8	11	0	45.3	11	2	48.8	11	4	52.3	11	6
38.4	10	5	41.9	11	0	45.4	11	2	48.9	11	4	52.4	11	6
38.5	10	5	42	11	0	45.5	11	2	49	11	4	52.5	11	6
38.6	10	5	42.1	11	0	45.6	11	2	49.1	11	4	52.6	11	6
38.7	10	5	42.2	11	0	45.7	11	2	49.2	11	4	52.7	11	6
38.8	10	5	42.3	11	0	45.8	11	2	49.3	11	4	52.8	11	6
38.9	10	5	42.4	11	0	45.9	11	2	49.4	11	4	52.9	11	6

Table 1 (continued)

CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION	
	WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS
53	11	6	56.5	12	1	60	12	3	63.5	12	5	67	13	0
53.1	11	6	56.6	12	1	60.1	12	3	63.6	12	5	67.1	13	0
53.2	12	0	56.7	12	1	60.2	12	3	63.7	12	5	67.2	13	0
53.3	12	0	56.8	12	2	60.3	12	3	63.8	12	5	67.3	13	0
53.4	12	0	56.9	12	2	60.4	12	3	63.9	12	5	67.4	13	0
53.5	12	0	57	12	2	60.5	12	4	64	12	5	67.5	13	0
53.6	12	0	57.1	12	2	60.6	12	4	64.1	12	5	67.6	13	0
53.7	12	0	57.2	12	2	60.7	12	4	64.2	12	5	67.7	13	0
53.8	12	0	57.3	12	2	60.8	12	4	64.3	12	5	67.8	13	0
53.9	12	0	57.4	12	2	60.9	12	4	64.4	12	6	67.9	13	0
54	12	0	57.5	12	2	61	12	4	64.5	12	6	68	13	0
54.1	12	0	57.6	12	2	61.1	12	4	64.6	12	6	68.1	13	0
54.2	12	0	57.7	12	2	61.2	12	4	64.7	12	6	68.2	13	0
54.3	12	0	57.8	12	2	61.3	12	4	64.8	12	6	68.3	13	0
54.4	12	0	57.9	12	2	61.4	12	4	64.9	12	6	68.4	13	1
54.5	12	0	58	12	2	61.5	12	4	65	12	6	68.5	13	1
54.6	12	0	58.1	12	2	61.6	12	4	65.1	12	6	68.6	13	1
54.7	12	0	58.2	12	2	61.7	12	4	65.2	12	6	68.7	13	1
54.8	12	0	58.3	12	2	61.8	12	4	65.3	12	6	68.8	13	1
54.9	12	0	58.4	12	2	61.9	12	4	65.4	12	6	68.9	13	1
55	12	1	58.5	12	2	62	12	4	65.5	12	6	69	13	1
55.1	12	1	58.6	12	2	62.1	12	4	65.6	12	6	69.1	13	1
55.2	12	1	58.7	12	3	62.2	12	4	65.7	12	6	69.2	13	1
55.3	12	1	58.8	12	3	62.3	12	4	65.8	12	6	69.3	13	1
55.4	12	1	58.9	12	3	62.4	12	5	65.9	12	6	69.4	13	1
55.5	12	1	59	12	3	62.5	12	5	66	12	6	69.5	13	1
55.6	12	1	59.1	12	3	62.6	12	5	66.1	12	6	69.6	13	1
55.7	12	1	59.2	12	3	62.7	12	5	66.2	12	6	69.7	13	1
55.8	12	1	59.3	12	3	62.8	12	5	66.3	12	6	69.8	13	1
55.9	12	1	59.4	12	3	62.9	12	5	66.4	13	0	69.9	13	1
56	12	1	59.5	12	3	63	12	5	66.5	13	0	70	13	1
56.1	12	1	59.6	12	3	63.1	12	5	66.6	13	0	70.1	13	1
56.2	12	1	59.7	12	3	63.2	12	5	66.7	13	0	70.2	13	1
56.3	12	1	59.8	12	3	63.3	12	5	66.8	13	0	70.3	13	1
56.4	12	1	59.9	12	3	63.4	12	5	66.9	13	0	70.4	13	2

Table 1 (continued)

CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION		CRL (MM)	GESTATION	
	WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS
70.5	13	2	74	13	3	77.5	13	5	81	14	0
70.6	13	2	74.1	13	3	77.6	13	5	81.1	14	0
70.7	13	2	74.2	13	3	77.7	13	5	81.2	14	0
70.8	13	2	74.3	13	3	77.8	13	5	81.3	14	0
70.9	13	2	74.4	13	3	77.9	13	5	81.4	14	0
71	13	2	74.5	13	4	78	13	5	81.5	14	0
71.1	13	2	74.6	13	4	78.1	13	5	81.6	14	0
71.2	13	2	74.7	13	4	78.2	13	5	81.7	14	0
71.3	13	2	74.8	13	4	78.3	13	5	81.8	14	0
71.4	13	2	74.9	13	4	78.4	13	5	81.9	14	0
71.5	13	2	75	13	4	78.5	13	5	82	14	0
71.6	13	2	75.1	13	4	78.6	13	5	82.1	14	0
71.7	13	2	75.2	13	4	78.7	13	5	82.2	14	0
71.8	13	2	75.3	13	4	78.8	13	6	82.3	14	0
71.9	13	2	75.4	13	4	78.9	13	6	82.4	14	0
72	13	2	75.5	13	4	79	13	6	82.5	14	0
72.1	13	2	75.6	13	4	79.1	13	6	82.6	14	0
72.2	13	2	75.7	13	4	79.2	13	6	82.7	14	0
72.3	13	2	75.8	13	4	79.3	13	6	82.8	14	0
72.4	13	2	75.9	13	4	79.4	13	6	82.9	14	0
72.5	13	3	76	13	4	79.5	13	6	83	14	0
72.6	13	3	76.1	13	4	79.6	13	6	83.1	14	0
72.7	13	3	76.2	13	4	79.7	13	6	83.2	14	1
72.8	13	3	76.3	13	4	79.8	13	6	83.3	14	1
72.9	13	3	76.4	13	4	79.9	13	6	83.4	14	1
73	13	3	76.5	13	4	80	13	6	83.5	14	1
73.1	13	3	76.6	13	4	80.1	13	6	83.6	14	1
73.2	13	3	76.7	13	5	80.2	13	6	83.7	14	1
73.3	13	3	76.8	13	5	80.3	13	6	83.8	14	1
73.4	13	3	76.9	13	5	80.4	13	6	83.9	14	1
73.5	13	3	77	13	5	80.5	13	6	84	14	1
73.6	13	3	77.1	13	5	80.6	13	6			
73.7	13	3	77.2	13	5	80.7	13	6			
73.8	13	3	77.3	13	5	80.8	13	6			
73.9	13	3	77.4	13	5	80.9	13	6			

Table 2: Gestational Age from Head Circumference Derived, for Early Pregnancy Dating (cited in Loughna 2009)

HC (MM)	GESTATION		HC (MM)	GESTATION		HC (MM)	GESTATION		HC (MM)	GESTATION		HC (MM)	GESTATION	
	WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS
80	12	3	115	15	3	150	18	2	185	21	1	220	24	0
81	12	4	116	15	3	151	18	2	186	21	1	221	24	1
82	12	5	117	15	4	152	18	3	187	21	2	222	24	1
83	12	5	118	15	4	153	18	3	188	21	2	223	24	2
84	12	6	119	15	5	154	18	4	189	21	3	224	24	2
85	12	6	120	15	6	155	18	5	190	21	3	225	24	3
86	13	0	121	15	6	156	18	5	191	21	4	226	24	4
87	13	0	122	16	0	157	18	6	192	21	5	227	24	4
88	13	1	123	16	0	158	18	6	193	21	5	228	24	5
89	13	2	124	16	1	159	19	0	194	21	6	229	24	5
90	13	2	125	16	1	160	19	0	195	21	6	230	24	6
91	13	3	126	16	2	161	19	1	196	22	0	231	25	0
92	13	3	127	16	3	162	19	2	197	22	0	232	25	0
93	13	4	128	16	3	163	19	2	198	22	1	233	25	1
94	13	5	129	16	4	164	19	3	199	22	2	234	25	2
95	13	5	130	16	4	165	19	3	200	22	2	235	25	2
96	13	6	131	16	5	166	19	4	201	22	3	236	25	3
97	13	6	132	16	5	167	19	4	202	22	3	237	25	4
98	14	0	133	16	6	168	19	5	203	22	4	238	25	4
99	14	0	134	17	0	169	19	6	204	22	5	239	25	5
100	14	1	135	17	0	170	19	6	205	22	5	240	25	5
101	14	2	136	17	1	171	20	0	206	22	6			
102	14	2	137	17	1	172	20	0	207	22	6			
103	14	3	138	17	2	173	20	1	208	23	0			
104	14	3	139	17	2	174	20	1	209	23	0			
105	14	4	140	17	3	175	20	2	210	23	1			
106	14	4	141	17	4	176	20	3	211	23	2			
107	14	5	142	17	4	177	20	3	212	23	2			
108	14	6	143	17	5	178	20	4	213	23	3			
109	14	6	144	17	5	179	20	4	214	23	3			
110	15	0	145	17	6	180	20	5	215	23	4			
111	15	0	146	17	6	181	20	5	216	23	5			
112	15	1	147	18	0	182	20	6	217	23	5			
113	15	2	148	18	1	183	20	6	218	23	6			
114	15	2	149	18	1	184	21	0	219	23	6			

Table 3: Gestational Age estimated from Head Circumference, for Anomaly and Sizing

HC (MM)	GESTATION		HC (MM)	GESTATION		HC (MM)	GESTATION		HC (MM)	GESTATION		HC (MM)	GESTATION	
	WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS		WEEKS	DAYS
80	12	6	115	15	3	150	18	0	185	20	6	220	23	6
81	12	6	116	15	3	151	18	1	186	20	6	221	24	0
82	13	0	117	15	4	152	18	1	187	21	0	222	24	0
83	13	0	118	15	4	153	18	2	188	21	1	223	24	1
84	13	1	119	15	5	154	18	2	189	21	1	224	24	2
85	13	1	120	15	5	155	18	3	190	21	2	225	24	2
86	13	2	121	15	6	156	18	3	191	21	2	226	24	3
87	13	2	122	15	6	157	18	4	192	21	3	227	24	4
88	13	3	123	16	0	158	18	5	193	21	4	228	24	4
89	13	3	124	16	0	159	18	5	194	21	4	229	24	5
90	13	4	125	16	1	160	18	6	195	21	5	230	24	6
91	13	4	126	16	1	161	18	6	196	21	5	231	24	6
92	13	5	127	16	2	162	19	0	197	21	6	232	25	0
93	13	5	128	16	2	163	19	0	198	22	0	233	25	0
94	13	6	129	16	3	164	19	1	199	22	0	234	25	1
95	13	6	130	16	3	165	19	1	200	22	1	235	25	2
96	14	0	131	16	4	166	19	2	201	22	1	236	25	2
97	14	0	132	16	4	167	19	3	202	22	2	237	25	3
98	14	1	133	16	5	168	19	3	203	22	3	238	25	4
99	14	1	134	16	6	169	19	4	204	22	3	239	25	4
100	14	2	135	16	6	170	19	4	205	22	4	240	25	5
101	14	2	136	17	0	171	19	5	206	22	4	241	25	6
102	14	3	137	17	0	172	19	5	207	22	5	242	26	0
103	14	3	138	17	1	173	19	6	208	22	6	243	26	0
104	14	4	139	17	1	174	20	0	209	22	6	244	26	1
105	14	4	140	17	2	175	20	0	210	23	0	245	26	2
106	14	5	141	17	2	176	20	1	211	23	0	246	26	2
107	14	5	142	17	3	177	20	1	212	23	1	247	26	3
108	14	6	143	17	3	178	20	2	213	23	2	248	26	4
109	14	6	144	17	4	179	20	2	214	23	2	249	26	4
110	15	0	145	17	4	180	20	3	215	23	3	250	26	5
111	15	0	146	17	5	181	20	4	216	23	4	251	26	6
112	15	1	147	17	6	182	20	4	217	23	4	252	26	6
113	15	1	148	17	6	183	20	5	218	23	5	253	27	0
114	15	2	149	18	0	184	20	5	219	23	5	254	27	1

Table 3 (continued)

HC	GESTATION		HC	GESTATION		HC	GESTATION	
(MM)	WEEKS	DAYS	(MM)	WEEKS	DAYS	(MM)	WEEKS	DAYS
255	27	2	290	31	1	325	36	0
256	27	2	291	31	2	326	36	2
257	27	3	292	31	2	327	36	3
258	27	4	293	31	3	328	36	4
259	27	4	294	31	4	329	36	5
260	27	5	295	31	5	330	37	0
261	27	6	296	31	6	331	37	1
262	28	0	297	32	0	332	37	2
263	28	0	298	32	1	333	37	3
264	28	1	299	32	2	334	37	5
265	28	2	300	32	3	335	37	6
266	28	3	301	32	3	336	38	1
267	28	3	302	32	4	337	38	2
268	28	4	303	32	5	338	38	4
269	28	5	304	32	6	339	38	5
270	28	6	305	33	0	340	39	0
271	28	6	306	33	1	341	39	2
272	29	0	307	33	2	342	39	3
273	29	1	308	33	3	343	39	5
274	29	2	309	33	4	344	40	0
275	29	2	310	33	5	345	40	2
276	29	3	311	33	6	346	40	4
277	29	4	312	34	0	347	40	6
278	29	5	313	34	1	348	41	1
279	29	6	314	34	2	349	41	4
280	29	6	315	34	3	350	42	0
281	30	0	316	34	4	351	42	3
282	30	1	317	34	5	352	42	6
283	30	2	318	34	6	353	43	3
284	30	3	319	35	0	354	44	0
285	30	3	320	35	2	355	44	6
286	30	4	321	35	3			
287	30	5	322	35	4			
288	30	6	323	35	5			
289	31	0	324	35	6			



### Current Obstetric Charts and Centiles for Anomaly and Sizing

These have been recommended by the British Medical Ultrasound Society (BMUS) and the Royal College of Obstetricians and Gynaecologists (RCOG) and cited in the following paper;

- Loughna P et al (2009) [Fetal size and dating : charts recommended for clinical obstetric practice.](#) *Ultrasound*. Volume 17. Number 3
- [Chart and Table A – Head Circumference Sizing](#)
- [Chart and Table B – Abdominal Circumference Sizing](#)
- [Chart and Table C – Femur Length Sizing](#)

Chart A – Head Circumference Size Chart (after Chitty et al)

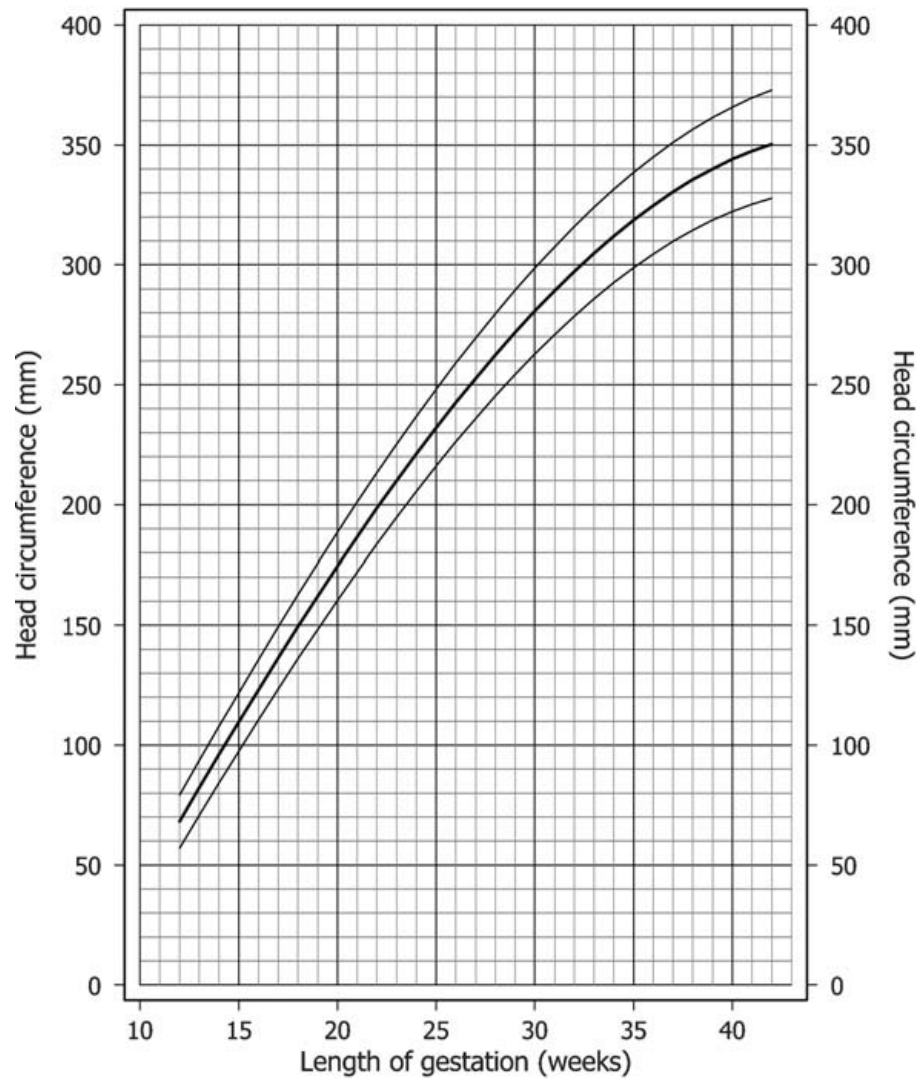


Table A- Head Circumference Size Table (after Chitty et al)

GA (weeks)	Head circumference (mm)		
	50th centile	5th centile	95th centile
12	68.1	57.1	79.2
13	82.2	70.8	93.6
14	96.0	84.2	107.8
15	109.7	97.5	121.9
16	123.1	110.6	135.7
17	136.4	123.4	149.3
18	149.3	136.0	162.7
19	162.0	148.3	175.7
20	174.5	160.4	188.6
21	186.6	172.1	201.1
22	198.5	183.6	213.3
23	210.0	194.8	225.3
24	221.2	205.6	236.9
25	232.1	216.1	248.1
26	242.6	226.2	259.0
27	252.7	235.9	269.5
28	262.5	245.3	279.6
29	271.8	254.3	289.4
30	280.7	262.8	298.7
31	289.2	270.9	307.6
32	297.3	278.6	316.0
33	304.9	285.8	324.0
34	312.0	292.6	331.5
35	318.7	298.8	338.5
36	324.8	304.6	345.0
37	330.4	309.8	351.0
38	335.5	314.5	356.5
39	340.0	318.7	361.4
40	344.0	322.3	365.8
41	347.4	325.3	369.6
42	350.3	327.7	372.8

Chart B – Abdominal Circumference Size Chart (after Chitty et al)

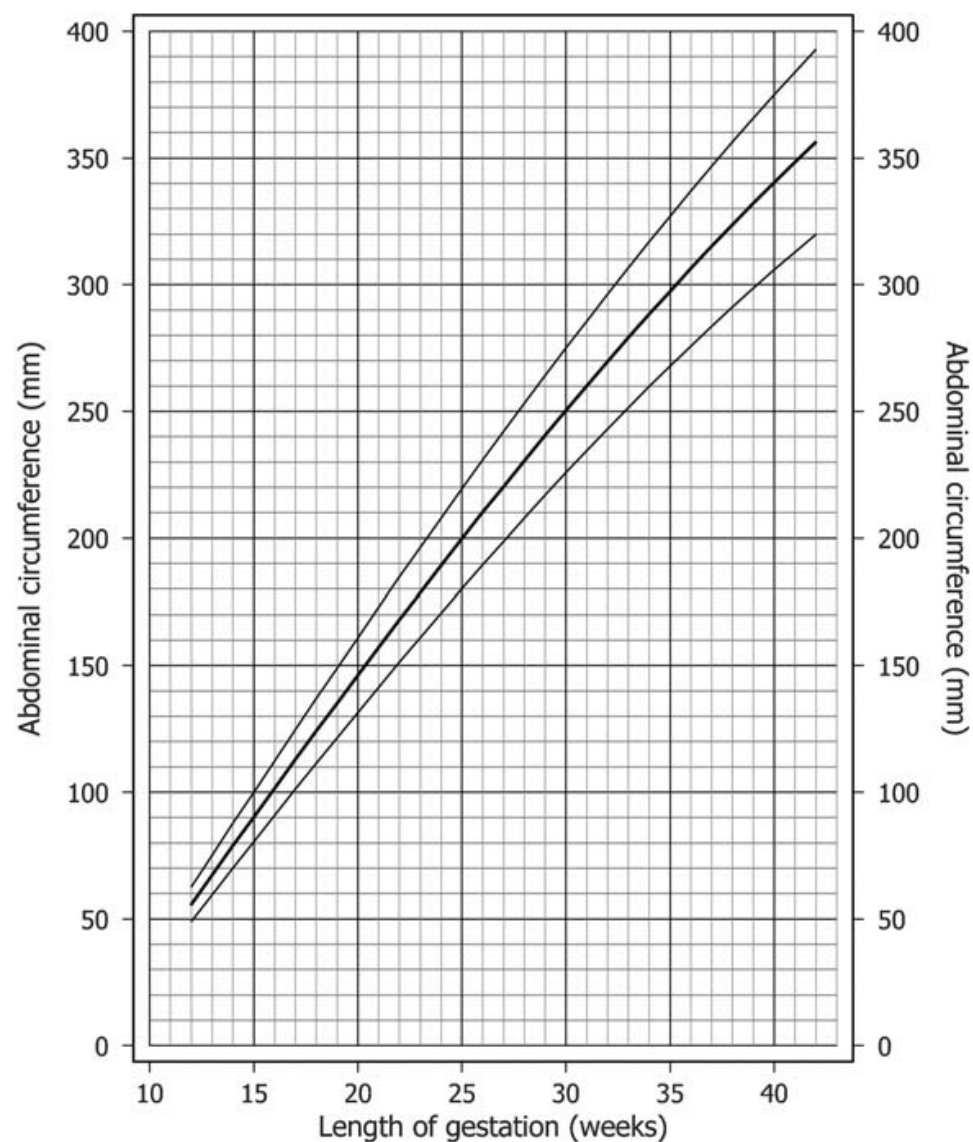


Table B- Abdominal Circumference Size Table (after Chitty et al)

GA (weeks)	Abdominal circumference (mm)		
	50th centile	5th centile	95th centile
12	55.8	49.0	62.6
13	67.4	59.6	75.2
14	78.9	70.1	87.7
15	90.3	80.5	100.1
16	101.6	90.9	112.4
17	112.9	101.1	124.7
18	124.1	111.3	136.9
19	135.2	121.5	149.0
20	146.2	131.5	161.0
21	157.1	141.4	172.9
22	168.0	151.3	184.7
23	178.7	161.0	196.4
24	189.3	170.6	208.0
25	199.8	180.1	219.5
26	210.2	189.5	230.8
27	220.4	198.8	242.1
28	230.6	207.9	253.2
29	240.5	216.9	264.2
30	250.4	225.8	275.0
31	260.1	234.5	285.7
32	269.7	243.1	296.3
33	279.1	251.5	306.7
34	288.4	259.8	317.0
35	297.5	267.9	327.0
36	306.4	275.8	337.0
37	315.1	283.6	346.7
38	323.7	291.2	356.3
39	332.1	298.6	365.7
40	340.4	305.8	374.9
41	348.4	312.9	383.9
42	356.2	319.7	392.7

Chart C – Femur Length Size Chart (after Chitty et al)

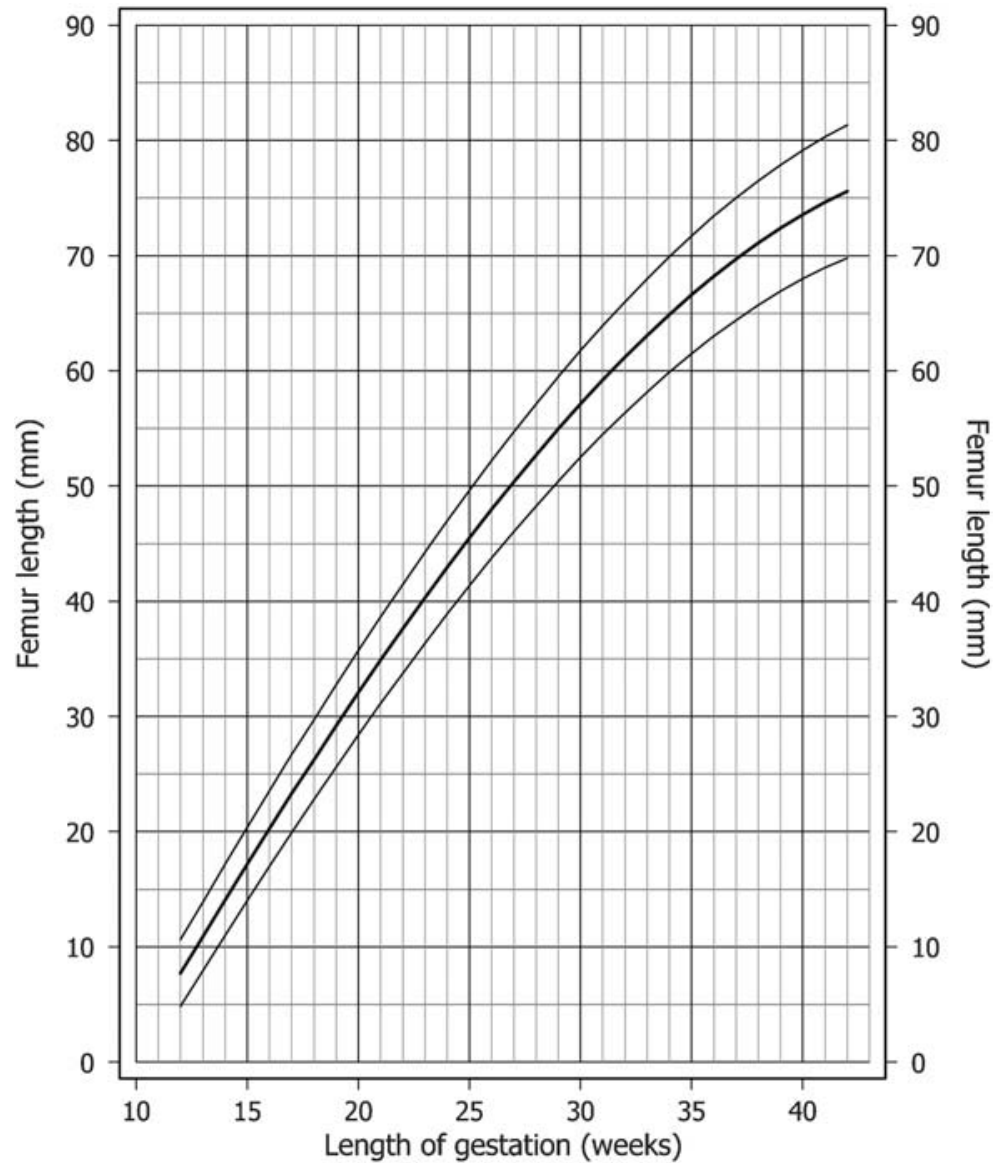


Table C- Femur Length Size Table (after Chitty et al)

GA (weeks)	Femur length (mm)		
	50th centile	5th centile	95th centile
12	7.7	4.8	10.6
13	10.9	7.9	13.9
14	14.1	11.0	17.2
15	17.2	14.0	20.4
16	20.3	17.0	23.6
17	23.3	19.9	26.7
18	26.3	22.8	29.7
19	29.2	25.6	32.8
20	32.1	28.4	35.7
21	34.9	31.1	38.6
22	37.6	33.8	41.5
23	40.3	36.4	44.3
24	42.9	38.9	47.0
25	45.5	41.4	49.6
26	48.0	43.7	52.2
27	50.4	46.0	54.7
28	52.7	48.3	57.1
29	55.0	50.4	59.5
30	57.1	52.5	61.7
31	59.2	54.5	63.9
32	61.2	56.4	66.0
33	63.1	58.2	68.0
34	64.9	59.9	69.9
35	66.6	61.5	71.7
36	68.2	63.0	73.4
37	69.7	64.4	75.0
38	71.1	65.7	76.5
39	72.4	66.9	77.9
40	73.6	68.0	79.1
41	74.6	68.9	80.3
42	75.6	69.8	81.3

## RadIS Codes

These are the codes that must be used as agreed for screening scans within Wales

EXAM DATING CODES	PHRASE CODES TO BE INSERTED BY THE SONOGRAPHER
<p><b>UODAT</b> - Dating scan not for combined. The menu builder can be added.</p> <p><b>This code is only to be used once in each pregnancy.</b></p>	<p>This code is to be used for dating the pregnancy and <u>once only</u> if scan is to be repeated code <u>must</u> be changed.</p>
<p><b>UODNU</b> - Dating scan for combined using NT. The menu builder can be added.</p> <p><b>This code is only to be used once in each pregnancy.</b></p> <p><b>UMULT</b> - This code should be added where twins are diagnosed at dating.</p>	<ul style="list-style-type: none"> <li>➤ <b>NTNOT</b> - This will generate the following text: <i>"!NTNOT. Unable to obtain an NT measurement due to ..... (refer for quad)." This phrase code must not be used for twins as Quad test not offered.</i> This text will appear on the report.</li> <li>➤ <b>NTLTE</b> - This will generate the following text: <i>"!NTLTE The woman presented too late for the combined test. Woman referred for quad test." This phrase code must not be used for twins as Quad test not offered.</i> This text will appear on the report.</li> </ul> <p>This exam code must be added to UODAT, UODNU and UO1T</p> <ul style="list-style-type: none"> <li>➤ <b>NTNOT2</b> - This will generate the following text: <i>Unable to obtain either NT measurement. (Twin pregnancy <b>do not</b> refer for quad)."</i></li> <li>➤ <b>NTNOT1</b> - This will generate the following text: <i>Only one NT measurement obtained.</i> This text will appear on the report.</li> </ul>
<p><b>UO1T</b> - This code must be used where a CRL is below 45.0mm.</p>	<ul style="list-style-type: none"> <li>➤ <b>NTERL</b> - This will generate the following text: <i>"!NTERL. CRL measurements below the criteria for the combined test rescan arranged."</i> This text will appear on the report.</li> </ul>
<p>❖ <b>WHERE A PREGNANCY PROVES TO BE NON-VIABLE:</b> The code <u>must</u> be changed from UODAT or UODNU to a locally agreed code as this information will not be required by ASW e.g. UODAVY. Using the prefix in the report as well as the sentence generated is a more robust way when searching for data.</p>	

<b>UANOM</b> - Anomaly scan.	<ul style="list-style-type: none"> <li>• <b>RTC</b>- This will generate the following text: <i>"!RTC Unable to complete anomaly scan due to ....."</i> This text will appear on the report</li> <li>• <b>GTLE</b>- This will generate the following text: <i>"!GTLE Gestation over 22weeks 6 days....."</i> This text will appear on the report</li> <li>• <b>RFM</b> - This will generate the following text: <i>"!RFM Refer to fetal medicine ....."</i> This text will appear on the report</li> <li>• <b>3VT</b>-This will generate the following text: <i>" !3VT 3Vessel trachea view seen and appears normal"</i> This text will appear on the report Continue to use this code as a reporting phrase code until Radis 2.3.203.1 is rolled out where 3VT will be included in the anomaly report builder. Local arrangements to be agreed where Radis II is not used.</li> </ul>
<b>UODA</b> - Fetal medicine referrals.	<b>Fetal medicine</b> scans are performed at two sites currently in Wales. Cardiff and Vale University Health Board and Betsi Cadwaladr University Health Board.
<b>UMFEA</b> - Anomaly scan for twins.	Appointment times for this scan can be confirmed locally and anomaly builder added.

## Section 2: Ultrasound Screening Tests

This section includes an overview of the early pregnancy and the fetal anomaly scan (including image storage).

This section also includes information on;

- Down's syndrome, Edwards' syndrome and Patau's syndrome screening
  - The impact of vaginal bleeding on the quadruple test for Down's syndrome screening ,
  - Management of empty second sacs and non-viable fetus'
- Abnormalities on the fetal anomaly scan
- [Short femur](#) diagnosed on the anomaly scan
- Enlarged NT seen on the early pregnancy ultrasound scan

### The Early Pregnancy Ultrasound Scan

The early pregnancy ultrasound scan dates the pregnancy, by accurately measuring the crown rump length (CRL) or head circumference (HC) to provide the gestational age. From this measurement, an accurate estimated date of delivery (EDD) is provided.

The CRL measurement is between 45.0mm-84.0mm (11 weeks 2 days and 14 weeks 1 day). If the CRL measurement is above 84.0mm HC measurements must be used. HC measurements cannot be used if they are below 88.0mm (13 weeks 3 days). ASW follow the guidance below and therefore do not recommend the use of BPD measurements.

See ASW Policy, Standards and Protocols (2019):

NB. In the following two standards – please note, protocol numbering no in sequence (only specific protocols have been included)

### Standard US 17

The scan must be arranged and performed between 11<sup>+2</sup> weeks and 14<sup>+1</sup> weeks of pregnancy, ideally at 12 weeks (if the woman presents before that time).

Target 100%

(2) If the CRL is below 45.0mm a further scan appointment should be offered.

*It is recommended that CRL measurement should be used to determine gestational age unless it is above 84mm; after this stage, HC can be used, as it becomes slightly more precise than is BPD<sup>2</sup>.*

---

<sup>2</sup> ISUOG (2013) *ISUOG Practice Guidelines: performance of first-trimester fetal ultrasound scan*. Ultrasound Obstetrics and Gynecology. Vol 41. Page 102-113



## Standard US 21

If the pregnancy is ongoing and an abnormality is identified, the sonographer must arrange for an appropriately trained midwife or obstetrician to discuss the finding with the woman within 24 hours.

Target 100%

- (5) If a cystic hygroma is present or if the nuchal translucency is 3.5mm and above, the woman should be informed and (with her consent) referred to a health care professional with appropriate skills and knowledge for further information and management. The electronic image should be made available with the referral correspondence.
- (6) If the NT is 3.5mm and above, screening for Down's syndrome, Edwards' syndrome and Patau's syndrome should be completed if consent for the test has been given.
- (7) If the woman has a cystic hygroma or a NT of 3.5mm and above, an invasive test should be offered. If the woman declines an invasive test, a NIPT can be offered but the woman should be informed that the NIPT will only give a result for Down's syndrome, Edwards' syndrome and Patau's syndrome whereas the invasive procedure will result in an array CGH (comparative genomic hybridization) test providing more information on genetic conditions.

There are specific requirements needed to produce the CRL and HC image, provided in detail in [section 3](#).

### Down's syndrome, Edwards' Syndrome and Patau's Syndrome Screening

Ultrasound assessment of gestational age is required for Down's syndrome, Edwards' syndrome and Patau's syndrome screening tests.

*The First Trimester Combined Test is offered in singleton and twin pregnancies.*

To calculate the chance of Down's syndrome, Edwards' syndrome and Patau's syndrome in the pregnancy the laboratory requires:

- ❖ Maternal age
- ❖ Maternal smoking status
- ❖ Maternal weight
- ❖ Maternal ethnicity
- ❖ Information about fertility treatment
- ❖ Gestational age calculated from the crown rump length (CRL) measurement
- ❖ Two biochemical markers (free beta hCG and PAPP-A levels)
- ❖ The nuchal translucency measurement (NT)

The CRL must be between 45.0 - 84.0mm. If the CRL is less than 45.0mm. The woman must be recalled for a further scan at the correct gestation. If the CRL is greater than 84.0mm the second trimester quadruple (quad) test should be offered, (quad test not offered in twins). Where it is not possible to obtain the NT measurement on the same day as CRL the woman should be referred for the quad test. The CRL measurement obtained can be used for the subsequent quad test.



## Standard DEP 6

The woman's informed verbal consent is required for these tests and her decision must be recorded in the All Wales Maternity Record.

Target 100%

- (1) Before commencing the early pregnancy dating scan, the sonographer should enquire if the woman:
  - Understands the screening test she has consented to.
  - Requires further information about the screening test.
  - gives her informed verbal consent to proceed with the screening test she consented to:
    - the early pregnancy dating scan if the woman has declined screening for Down's syndrome, Edwards' syndrome and Patau's syndrome, or
    - the early pregnancy dating scan including measuring the nuchal translucency and taking a maternal blood sample if the woman consents to screening for Down's syndrome, Edwards' syndrome and Patau's syndrome
- (2) If the woman does not understand or has changed her mind about the screening test or requires further information on the screening test:
  - The sonographer should refer the woman back to the midwife in the antenatal clinic to discuss her decision and to ensure that the woman has received accurate information on which to base her decision before the early pregnancy scan is performed.
- (3) The midwife should record any further discussions and changes in decision in the All Wales Maternity Record.

For the management of Down's syndrome, Edwards' syndrome and Patau's syndrome screening when there is a failed or failing twin pregnancy please refer to the ASW guidance below.

[Management of Down's syndrome, Edwards' syndrome and Patau's syndrome screening in twin/failing pregnancies.](#)

### **Twin Pregnancy First Trimester Screening**

The combined test is offered for screening for Down's syndrome, Edwards' syndrome and Patau's syndrome in a twin pregnancy.

Follow the guidance below:

- Women known to have a twin pregnancy prior to their early pregnancy ultrasound scan should have had specific counselling for the screening in twin pregnancy and consented to that screening test prior to their scan. The sonographer should check that the woman has consented
- If a woman consents to screening for Down's syndrome, Edwards' syndrome and Patau's syndromes and she is then diagnosed as having a twin pregnancy during her early pregnancy ultrasound scan, the health board will have a pathway for arranging an appointment with the nominated health board professional for screening in twin pregnancies
- If the woman has requested screening for Down's syndrome, Edwards' syndrome and Patau's syndrome and the process for obtaining both NT measurements is unsuccessful or the CRL is greater than 84.0mm the woman must be informed that screening cannot be offered
- If only one NT measurement is obtained, combined screening can be offered but the result will be less accurate. Monochorionic twins will receive the result for the pregnancy. Dichorionic twins will receive the result for the one fetus for which both measurements were obtained.
- If either CRL is below 45.0mm a further scan appointment should be offered for when the CRL measurements would be between 45.0mm-84.0mm ( $11^{+2}$  and  $14^{+1}$  weeks ).

### **Quadruple testing**

Where the woman presents for her ultrasound scan and is more than  $14^{+1}$  weeks gestation but less than  $18^{+0}$  days she can be offered a quadruple test. The quadruple test can only be carried out in Wales when the gestation is between  $15^{+0}$  and  $18^{+0}$  weeks. The quadruple test will give a result for Down's syndrome **only** and not a result for Edwards' syndrome or Patau's syndrome.

**N.B The Quadruple Test Is Not Offered in a Twin Pregnancy**

## The Anomaly Scan

The fetal anomaly scan must be performed between 18 weeks and 0 days and 20 weeks and 6 days of pregnancy using the measurements of the early pregnancy ultrasound scan not the date of the last menstrual period (LMP). Routine measurements to be taken are the head circumference (HC) and femur length (FL). Abdominal circumference (AC) must be measured and documented in cases of any suspected or diagnosed fetal abnormality, a HC measurement <5<sup>th</sup> or FL measurement <5<sup>th</sup> centile, multiple pregnancies or if it has been requested by the referring clinician because of a woman's current or previous obstetric history.

The ASW [fetal anomaly scan menu](#) lists the structures to be assessed. All structures must be visualised for the scan to be completed.

If appropriate images cannot be obtained to allow the standard checklist to be completed the woman should be offered one further ultrasound scan. The woman should be informed that there are a number of reasons why it is sometimes not possible to complete the scan checklist.

Examples of why it may not be possible to complete the checklist are:

- ❖ Maternal habitus or body mass index
- ❖ Uterine fibroids
- ❖ Abdominal scarring
- ❖ Suboptimal fetal position
- ❖ Wrong gestation

This second examination should be performed and completed before 22 weeks and 6 days of pregnancy.

Please note: The routine anomaly scan reporting module in RadIS2 cannot be used for scans after 20 weeks and 6 days as the estimation of normal measurements may not be accurate with increased gestational age unless free text is used to clarify the above.

Where it is not possible for the sonographer to complete the standard checklist on the second scan, the woman should be informed that it was not possible to complete the checklist and the corresponding ASW leaflet given to the woman.

## Standard US 25

The following specific ultrasound findings must be referred for further assessment as per the Antenatal Screening Wales [ultrasound observations pathways](#) 2018:

- ventriculomegaly
- echogenic bowel
- renal pelvic dilatation.

Target 100%

### *Abnormalities Suspected or Identified on Anomaly Scan*

Where the fetal anomaly scan is abnormal the ASW Policy, Standards and Protocols (US 25 and US 26) should be followed. See below:

#### Standard US 25

Where a fetal anomaly is identified, the sonographer must arrange for an appropriately trained midwife or obstetrician to discuss the findings with the woman within 24 hours.

- (1) Where a problem has been identified, verbal information that there may be a problem should initially be provided by the sonographer. The sonographer must place a report within the woman's All Wales Maternity Record at the time of this appointment.
- (2) Antenatal Screening Wales has provided guidance on [short femur](#) lengths.
- (3) Verbal information should then be provided by the antenatal screening coordinator (or deputy) or obstetrician and a record of the discussion documented in the All Wales Maternity Record.
- (4) Advice on relevant serological investigation on maternal serum can be found in the [infections in pregnancy](#) document.
- (5) Where appropriate services are not available locally, women must be offered an appointment in a fetal medicine department within an appropriate timescale for the condition found.
- (6) Any suspected congenital anomaly should be reported to CARIS via the RadIS2 reporting module. It is the sonographer's responsibility to ensure that reporting to CARIS has been completed. If the RadIS2 reporting module is not available, a 'CARIS notification card' for a suspected congenital anomaly should be completed and sent to the CARIS coordinator/office.
- (7) The woman's explicit consent is not required for reporting to CARIS. Information about the purpose of CARIS and the woman's right not to have information about her used by CARIS is provided in the ASW Antenatal screening tests pack.

#### Standard US 27

Following a suspected fetal cardiac anomaly, the woman must be reviewed within three working days by a fetal cardiologist.

## Short Femur

Where femur length measurements are below the 5<sup>th</sup> centile the [short femur guidance](#) should be followed.

### **Antenatal Screening Wales Guidance for the development of local referral arrangements for short femur <5th centile**

#### **Definition:**

Short femur is described as femur length which is below the 5th centile for gestational age when measured with the shaft of the femur parallel to the transducer.

#### **Consider the following:**

If a short femur, <5th centile, is identified at the fetal anomaly scan between 18+0 to 20+6 weeks, the sonographer should consider the possibility of skeletal dysplasia and with this in mind assess the appearances of the long bones, the shape of the head and chest. If an abnormality is suspected, the woman should be referred to an obstetrician for further assessment.

If there is no obvious abnormality, the scan should be repeated four weeks following the first fetal anomaly scan as skeletal dysplasia often appears after 24 weeks gestation. If an abnormality is suspected, the woman should be referred to an obstetrician for further assessment. If the scan is normal and there are no features of skeletal dysplasia or growth restriction/ placental insufficiency then no further follow up is required.

Health Boards are requested to develop their local referral arrangements to include the above guidance.

## Image Storage

ASW have provided agreed guidance on the minimum set of ultrasound screening images to be stored on the PACS system and the length of storage time.<sup>3</sup>

### Standard US 13

A full record of the ultrasound scan findings must be made on the ultrasound reporting module and images must be stored on the Health Board electronic image storage (PACS).

Target 100%

The RadIS2 obstetric reporting module should be used to report all early pregnancy and fetal anomaly ultrasound scans

- (1) A clear and concise ultrasound report should be produced and authorised by the person performing the ultrasound examination as an integral part of the examination.
- (2) The scan report is a legal document and part of the medical record. The scan report and associated images and/or cine loops required for a record of the scan should be stored electronically. They must be stored for 25 years.
- (3) Adequate identifiers to include the date and time of the examination should be entered on all images relevant to that woman.

#### Images to be stored at the fetal anomaly scan

The Obstetric Lead sonographers agreed the following set of images as a minimum requirement for storage, and to provide a quality assessment of the examination.

- ❖ Head Circumference
- ❖ Nose/Lips and Chin
- ❖ Femur Length
- ❖ Four Chamber Heart View
- ❖ Transverse Section of Kidneys in the Abdomen
- ❖ Three Vessel Trachea View with colour
- ❖ Midline Longitudinal Section to include the Internal OS
- ❖ Sagittal Spine

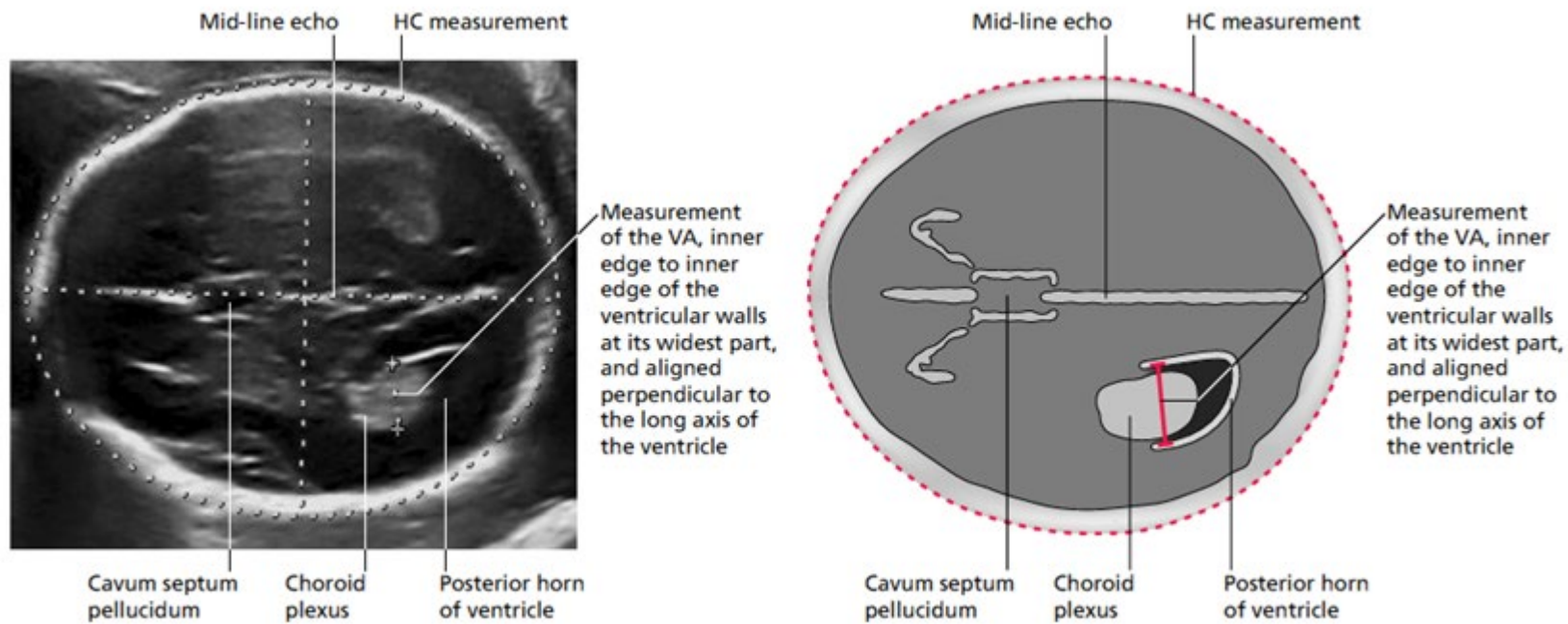
Any abnormality or other measurement included in the report should have an image to support the finding.

<sup>3</sup> ASW (2019 Version 9). Policy, Standards and Protocols to Support the Provision of Antenatal Screening in Wales. Standard US12

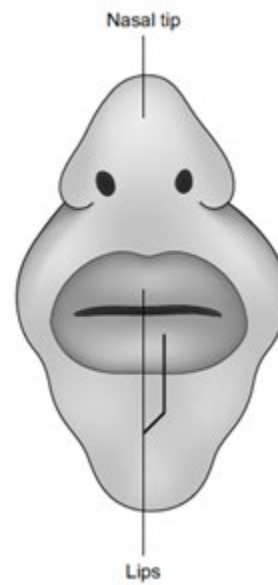
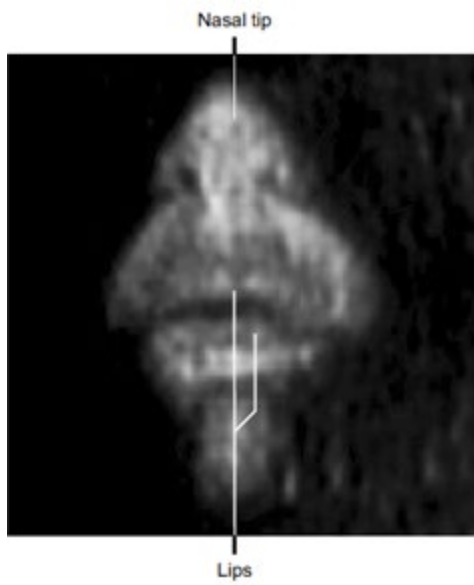
### Examples of Images for Storage

The following images were supplied by the Fetal Anomaly Screening Programme (FASP) with thanks

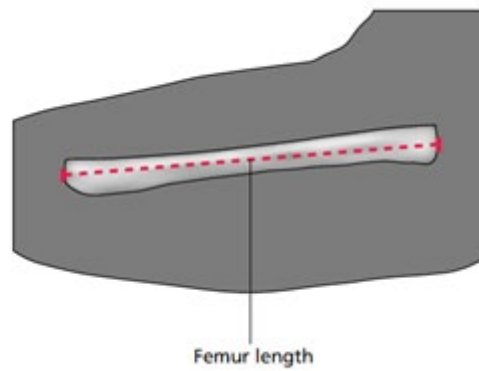
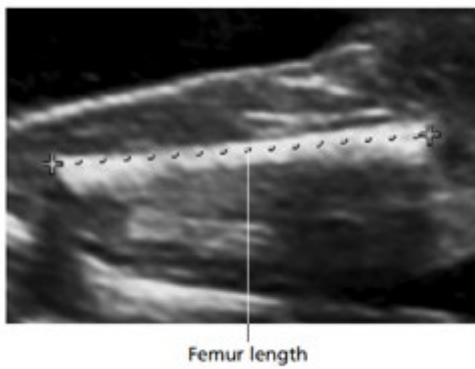
### Head Circumference



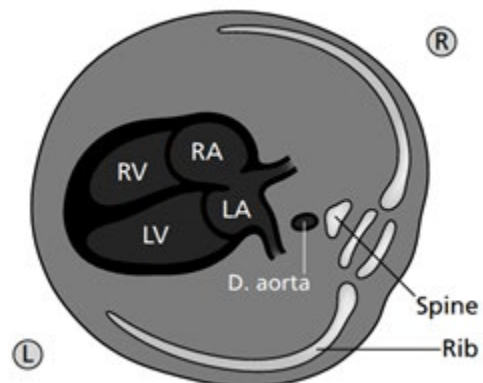
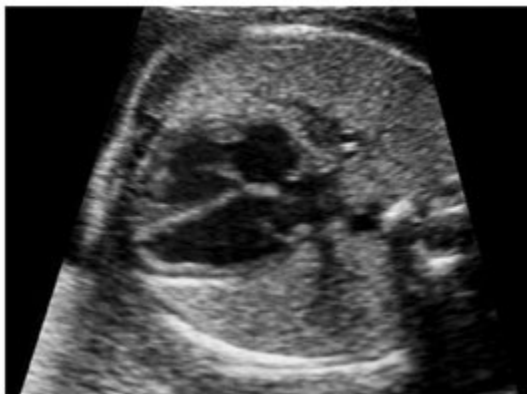
### *Nose/Lips and Chin*



### *Femur Length*

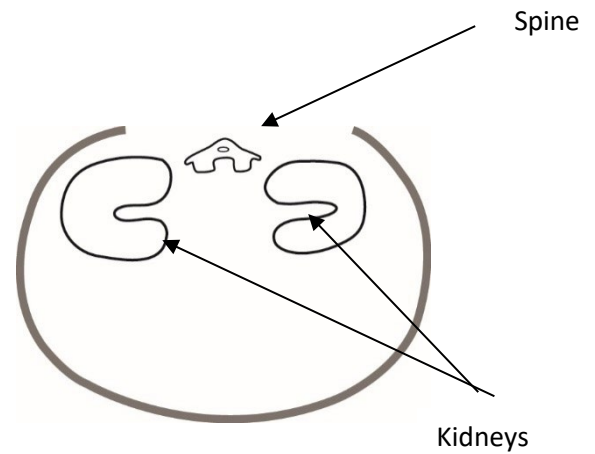


### *Four Chamber Heart View*

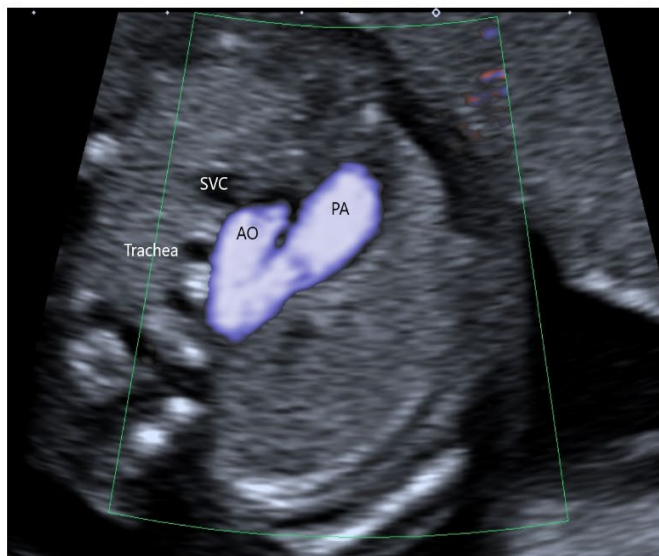




*Transverse Section of Kidneys in the Abdomen (image produced by UHW)*



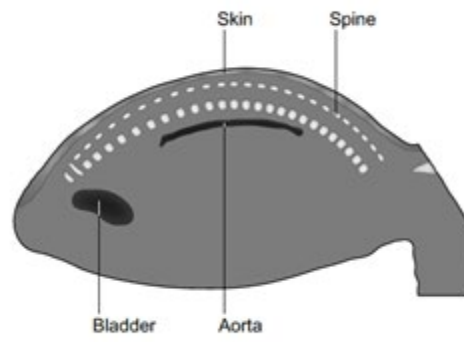
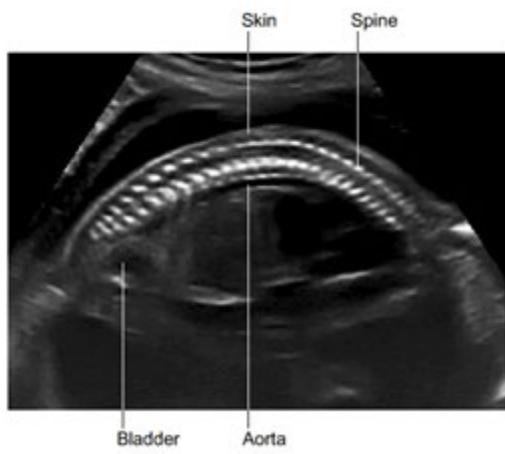
*Three Vessel Trachea View (image produced by UHW)*



*Midline Longitudinal Section to include the Internal OS (image produced by UHW)*



### *Sagittal Spine*



## Section 3: Guidance on Obtaining Correct Images

This section gives guidance on how to obtain the images and measurements required for early pregnancy and fetal anomaly scans to the required standard.

### Crown Rump Length (CRL)

The important elements for an accurate measurement are:

- ❖ Image magnification 60-90%
- ❖ Crown and rump clearly defined
- ❖ Sagittal section
- ❖ Neutral position
- ❖ Correct calliper placement
- ❖ Linear measurement

An image must be stored for assessment including audit using proforma 1. This proforma was adapted from PHE FASP with thanks. The PHE FASP rolled out the CaReFuL campaign across England to improve accuracy of CRL measurements and their campaign poster can be found below.

#### *Importance of Accuracy*

Wrongly measuring the CRL may mean the wrong chance result for combined or quadruple screening is issued to the pregnant woman.

For example - Under-measuring the CRL by 5mm causes 1 in 20 pregnancies with Down's syndrome to be incorrectly given a lower chance result.

Under-measuring the CRL reduces the chance result thereby reducing the screen positive rate of the test.

Over-measuring the CRL by 5mm doubles the screen positive rate this is likely to increase the number of women who will be offered further testing.

#### **An example of a CRL image that meets all NHS FASP criteria<sup>1</sup>**



- image magnification ✓
- sagittal section ✓
- neutral position ✓
- 'best of three' linear measurements ✓
- crown and rump clearly defined ✓
- correct calliper placement ✓

## Nuchal Translucency (NT)

Nuchal translucency is the ultrasound appearance of a collection of fluid under the skin behind the neck of the fetus in the first trimester of pregnancy.

The important elements for an accurate measurement are:

- ❖ Magnification 60-90%
- ❖ Rotation/ Sagittal section
- ❖ Neutral position/ flexion
- ❖ Caliper placement

An image must be stored for assessment including audit using proforma 2.

### *Importance of Accuracy*

Over or under-measurement of the NT has the same effect on the overall chance assessment as an over or under-measurement of CRL.

If we consider a 30 year old woman with an age related chance of 1-895 (lower chance). The effects of NT measurement are illustrated in the table below.

Maternal Age	CRL mm	NT mm	Chance
30	60	2mm	2530
30	60	2.2mm	1280
30	60	2.4mm	580
30	60	2.6mm	265
30	60	2.8mm	133
30	60	2.9mm	101
30	60	3.0mm	80

Guidance on how to measure the NT accurately using the image guidance tool and the Clear campaign poster is outlined on the proceeding pages.

*Both posters used below with permission from FASP Public Health England*

# Image guidance tool: for nuchal translucency and crown rump length measurements

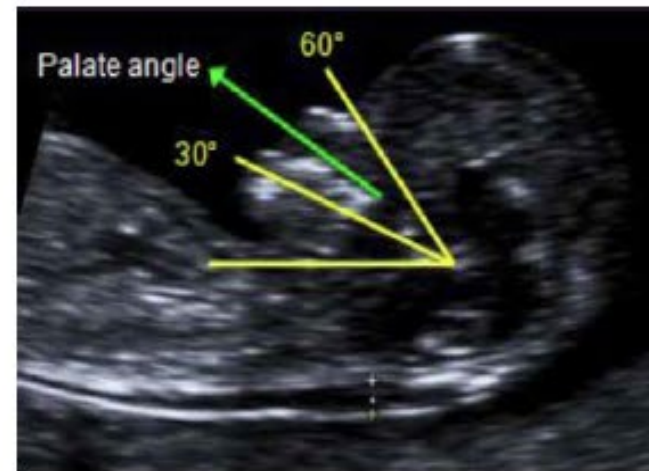


## NT: Calliper placement

Callipers must be placed on the lines that define the widest part of the NT thickness.

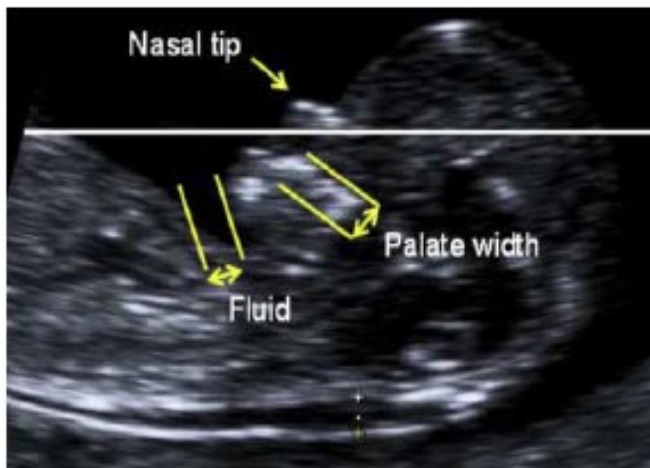
The widest part of the NT may be located anywhere between the occiput and the level of the fetal heart.

In the experience of local reviewers the NT image is often technically correct, with incorrect calliper placement being the most common error.



## NT & CRL: Flexion

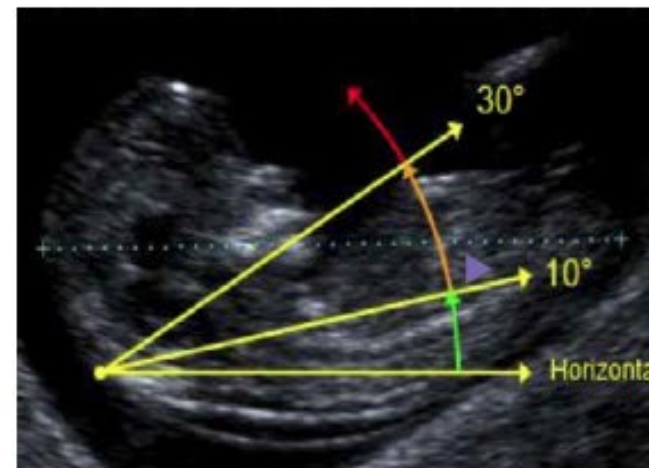
Fetal palate angle should be between 30° - 60° relative to the horizontal.



## NT & CRL: Flexion

Nasal tip must be level with or above the anterior abdominal wall relative to the horizontal.

A pocket of fluid, at least equivalent in size to the width of the palate, should be visible between the fetal chin and chest.



## CRL: Angle to the horizontal

The measured CRL axis should be at 90° to the beam. Measuring the CRL at angles >30° to the horizontal is likely to lead to under-measurement errors.

## Angle to the horizontal:

- 0 to 10° = good
- >10° to ≤30° = acceptable
- >30° = poor







# The Nuchal Translucency (NT) **CLEAR** campaign (2012)



Screening Programmes

Fetal Anomaly



## Key message

Be **CLEAR** on how to optimise the NT image: Under or overestimating the NT measurement can result in misleading risk information.

Adjusting these controls appropriately will improve your NT image.



Consider reducing Power



Lower Gain



Enlarge image

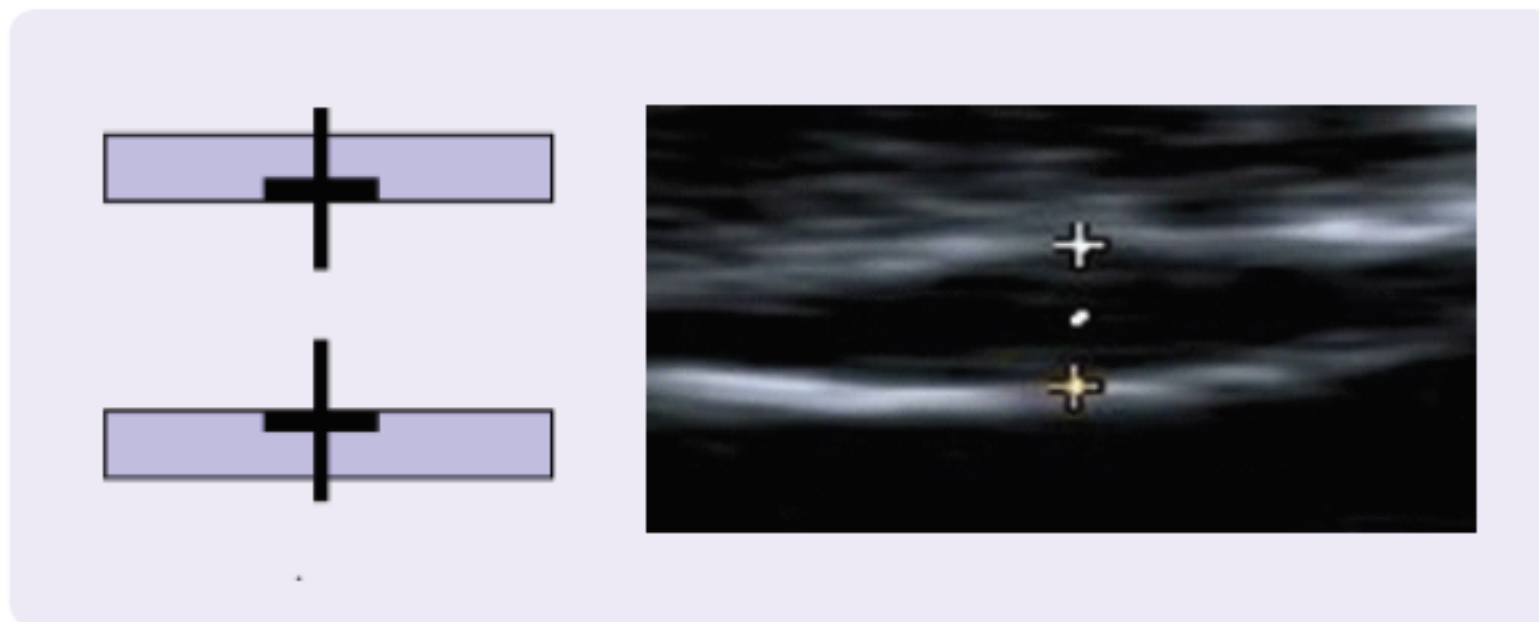


Adjust Focus



Reduce dynamic range

## Correct NT Technique Calliper Placement <sup>4</sup>



For NT measurements, the crossbar of the calliper should be such that it is hardly visible as it merges with the white line of the skin border, not in the nuchal fluid. The callipers should be placed with the inner border of the horizontal line of the callipers placed on the line that defines the NT thickness, illustrated in Diagram 2. The callipers must also be placed in the widest part of the NT.

<sup>4</sup> With permission to use from FASP (2012), *Measuring the NT and CRL as part of combined screening for Trisomy 21 in England*, Manual for ultrasound practitioners. Page. 29

## Head Circumference (HC)

### *HC Measurement for the Early Pregnancy Ultrasound Scan (up to 18 weeks)*

The definition of the measurement of HC at this gestation is:

*The midline third ventricle, interhemispheric fissure and choroid plexuses should be visible.  
Towards 13 weeks, the Thalamus and the third ventricle provide good landmarks<sup>5</sup>*

The important elements for an accurate measurement are:

- ❖ Image magnification
- ❖ Shape and clarity of head
- ❖ Identifiable land marks
- ❖ Ellipse measurements
- ❖ Horizontal mid-line echo



An image must be stored for assessment including audit using [proforma 3](#).

### *Importance of Accuracy*

The angle of incidence of the ultrasound beam should be as close as possible to 90° to the horizontal mid line echo for a more accurate measurement.

Using the ellipse method by placing the initial callipers on either side of the horizontal line and then initiating the ellipse calculation will give greater accuracy.

### *HC for Anomaly Scan*

The definition of the measurement of HC at this gestation is that the centrally positioned continuous midline echo is broken at one third of its length by the cavum septum pellucidum. The anterior walls of the lateral ventricles should be centrally placed around the midline echo. The choroid plexus should be visible within the posterior horn of the ventricle in the distal hemisphere.

The important elements for an accurate measurement are:

- ❖ Image magnification should be 60-90%
- ❖ The head should be the shape of a rugby ball oval, with clearly defined skull margins.
- ❖ The midline echo should lie as close as possible to the horizontal plane

An image must be stored for assessment including audit using [Proforma 3](#).



---

<sup>5</sup> ISUOG (2013) *ISUOG Practice Guidelines: performance of first-trimester fetal ultrasound scan*. Ultrasound Obstetrics and Gynecology. Vol 41. Page 102-113



### *Importance of Accuracy*

The angle of incidence of the ultrasound beam should be as close as possible to 90° to the horizontal mid line echo for a more accurate measurement.

Using the ellipse method by placing the initial callipers on either side of the horizontal line and then initiating the ellipse calculation will give greater accuracy

### *Femur length*

The important elements for an accurate measurement are:

- ❖ Image magnification 60-90%
- ❖ Horizontal
- ❖ Identifiable land marks
- ❖ Calliper placement

An image must be stored for assessment including audit using [proforma 5](#)



### *Importance of Accuracy*

The femur should be imaged lying as close as possible to the horizontal plane, so that the angle of incidence of the ultrasound beam is as close as possible to 90°. Care should be taken to include the whole length of the bone and that no part is obscured by shadowing from adjacent structures. Femur length is the measurement between the distal and proximal ossification centres of the femoral diaphysis. If a technically good image is obtained a single measurement is acceptable.

### *Abdominal Circumference*

This measurement is to be undertaken on abnormal or non-routine anomaly scans.

The important elements for an accurate measurement are that all of the following are incorporated in the image:

- ❖ Fetal stomach
- ❖ Spine
- ❖ Umbilical vein
- ❖ Ribs
- ❖ Portal sinus
- ❖ Aorta
- ❖ The image should be magnified to 60-90%

An image must be stored for assessment including audit (only when measured in non-routine scans) using [proforma 4](#).



### *Importance of Accuracy*

The abdominal circumference measurement should not be taken on an oblique section and the callipers should be on the skin surface (skin surface should be visible as in the image above).

### *Cardiac Views*

Images and sections provided by Prof Orhan Uzun.

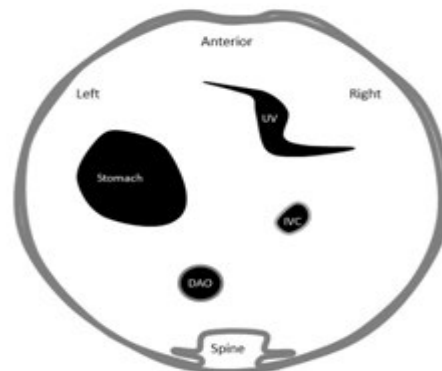
There are five cardiac views these will be described in the following sections. The three vessel view is not a mandatory view.

[Proforma 8](#) is to be used for a full cardiac assessment review where required.

### *Situs*

The important elements for an accurate image are that all of the following are incorporated in the image:

- ❖ The stomach
- ❖ Descending aorta
- ❖ Inferior vena cava
- ❖ Umbilical vein.



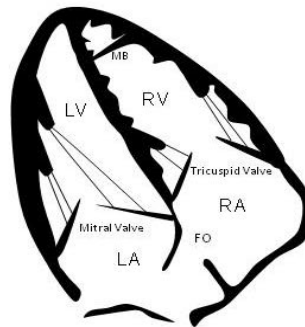
An image must be visualised during the examination.

## Four Chamber View

The important elements for an accurate image are:

- ❖ Equal sized right-left atria and ventricles
- ❖ Two separate patent inlet valves
- ❖ The apex of the heart pointing to the left

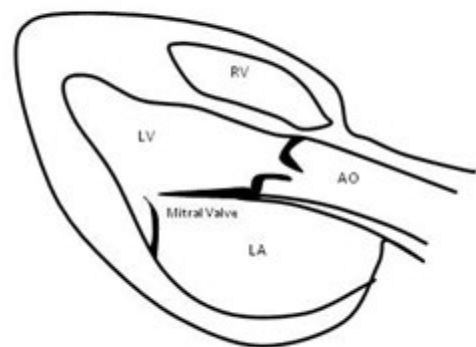
An image must be stored for assessment including audit using [proforma 7](#).



## Left Outflow Tract (aorta)

The important elements for an accurate image are:

- ❖ The aorta must arise from the left ventricle
- ❖ Pass to the right of the fetus
- ❖ Crossing the right ventricular outflow tract.

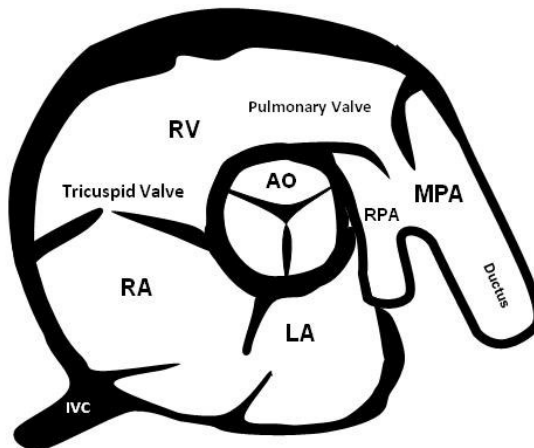


An image must be visualised during the examination.

Right Outflow Tract (pulmonary artery showing the bifurcation) One of the views below must be visualised

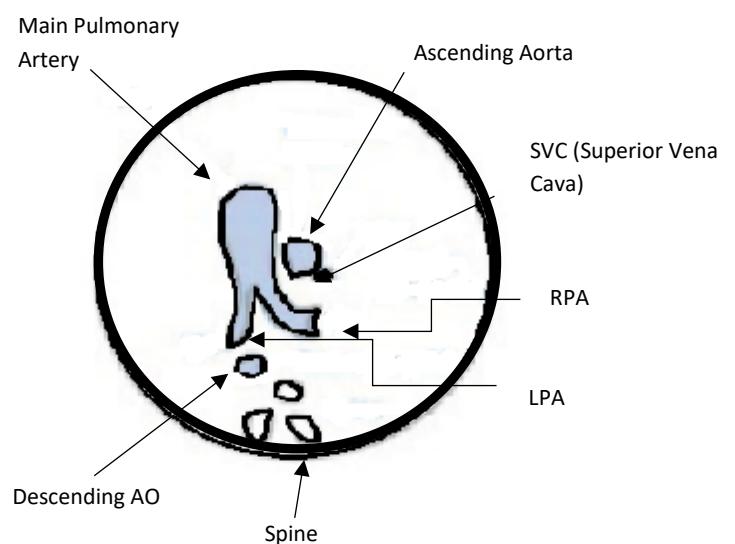
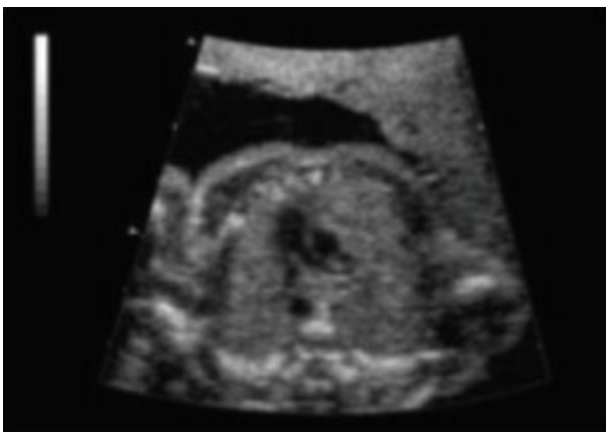
The important elements for an accurate image are:

- ❖ The pulmonary artery arises from the right ventricle
- ❖ Passes posteriorly
- ❖ Divides into three vessels; the right and left pulmonary arteries and the ductus arteriosus.



An image must be visualised during the examination with option to store.

Right Ventricular Outflow Tract (RVOT)<sup>6</sup>



<sup>6</sup> Tiny Tickers (2015), *Fetal Heart Screening in 5 Transverse Views*.

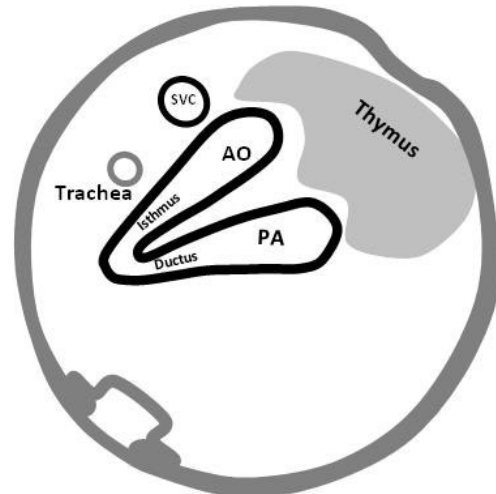
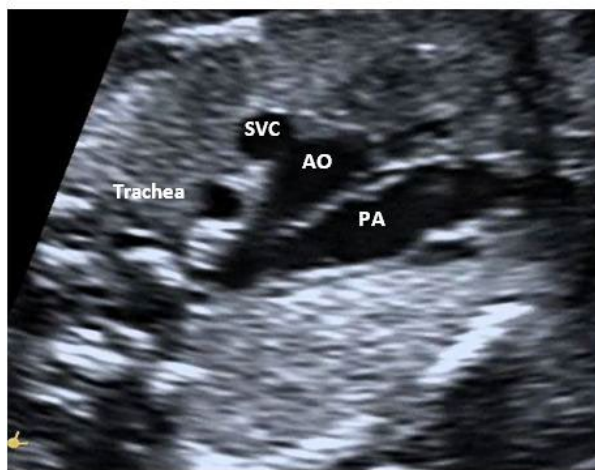
*A copy of the Tiny Tickers poster has been included as appendix 2 with permission from Tiny Tickers.*

An image must be visualised during the examination.

### Three Vessel Trachea View

The important elements for an accurate image are:

- ❖ The long axis of the main pulmonary artery communicates with the ductus arteriosus and the long axis of the aortic arch forming a V shape
- ❖ The trachea situated to the right of the aortic arch and posterior to the superior vena cava.

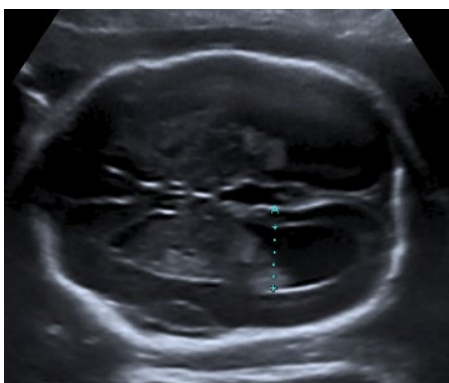


An image must be stored (to include colour) for assessment including audit using [proforma 6](#).

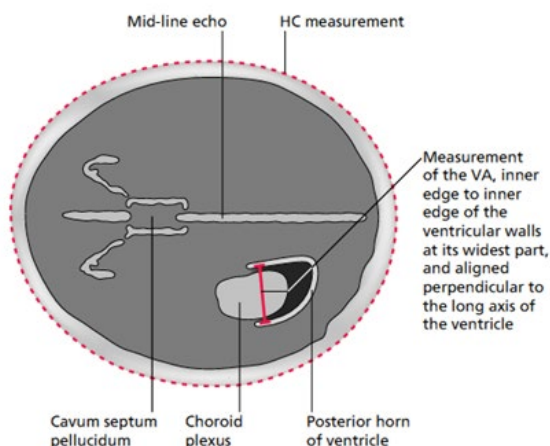
## Measurement of Posterior Horn of Cerebral Ventricle for Ventriculomegaly



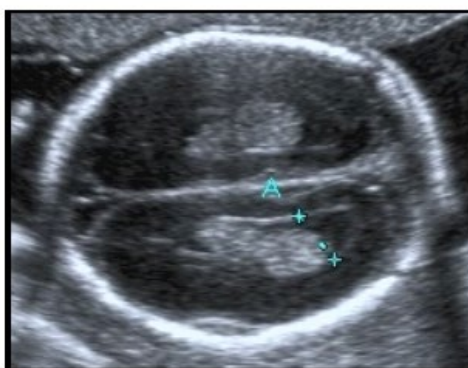
Normal/ correct at 20 weeks



Abnormal/ correct at 20 weeks



Schematic normal at 20 weeks



Incorrect section and calliper placement

An image should be stored where a measurement is greater than or equal to 10.1mm for assessment using audit [proforma 9](#).

The important elements for an accurate image are:

- ❖ The midline of the fetal brain to the midline of the image
- ❖ Callipers are placed to inner margins of the echogenic ventricular wall, 90° to the long axis of the ventricle.

### Notes

A measurement of the cerebral ventricles at the atrium of 15.1mm and above is classified as hydrocephalus



## Transverse Section of the Kidneys in the Abdomen if abnormality suspected

The important elements for an accurate section and measurement are that all the following are incorporated in the image:

- ❖ Spine
- ❖ Ribs
- ❖ Aorta
- ❖ The image should be magnified to 60-90%
- ❖ Both kidneys adjacent to the spine at the level of the renal pelvis (may have to be taken separately)
- ❖ Where there is dilatation the RPD should be measured in the AP plane

An image must be stored for assessment including audit using [proforma 10](#).



### Importance of Accuracy

The abdominal circumference should not be oblique; ideally both kidneys will be captured in the same image showing both kidneys and renal pelvis diameters. The diameter should be measured in AP i.e. from the spine to the anterior abdominal wall of the renal pelvis.

## Section 4: Audit and Assessment Proformas

This section contains information on image assessment and provides proformas to be used for audit.

### Audit of Images

The following images will be used for audit of the fetal anomaly screening scan in Wales. ASW audits will take place annually and will consist of 2 images out of the 5 below.

- ❖ Head Circumference
- ❖ Femur Length
- ❖ Four Chamber Heart View
- ❖ Transverse Section of Kidneys in the Abdomen
- ❖ Three Vessel Trachea View

Additional audits of images on the fetal anomaly menu checklist may be performed by ASW by requesting current images (proformas supplied)

### Routine Measurements

The following proformas are to be used for the routine image assessment and audit.

- ❖ [Proforma 1 - CRL audit proforma \(Proforma adapted and produced with consent from FASP\)](#)
- ❖ [Proforma 2 - NT \(Proforma adapted and produced with consent from FASP\)](#)
- ❖ [Proforma 3 - Proforma for audit and assessment of HC](#)
- ❖ [Proforma 4 - Proforma for abdominal circumference measurement](#)
- ❖ [Proforma 5 - Proforma for measurement of femur length](#)
- ❖ [Proforma 6 - Proforma for three vessel trachea view](#)
- ❖ [Proforma 7 - Proforma for four chamber view](#)

### Non-Routine Measurements

The following proformas are to be used for non-routine image assessment and audit

- ❖ [Proforma 8 - Proforma for cardiac assessment](#)
- ❖ [Proforma 9 - Proforma for posterior horn of the cerebral ventricle](#)
- ❖ [Proforma 10 - Proforma for abdominal circumference measurement taken at the renal pelvis diameter level](#)



Proforma 1 - CRL Audit proforma (Proforma adapted and produced with consent from FASP)

Criteria		Tick if achieved	
Image magnification	60-98% of screen		
End points of crown rump	1. clearly defined crown		
	2. clearly defined rump		
	3. pocket of fluid at the crown	One tick required	
	4. pocket of fluid at the rump		
Horizontal	Angle to the horizontal $\leq 30^\circ$		
The mid-line sagittal section/ rotation	<i>The following features should be seen; The mid sagittal view of the head</i>		
	1. the echogenic tip of the nose	Two ticks required	
	2. the rectangular shape of the palate		
	3. the translucent diencephalon		
	<i>The head should be in line with the full length of body displaying:</i>		
	4. full length of the body	One tick required	
Flexion	5. full length of the spine, displayed as lines of echoes		
	1. a pocket of fluid, at least equivalent in size to the width of the palate should be visible between the fetal chin and the chest		
	2. the palate angle should be $30^\circ$ to $60^\circ$ relative to the horizontal		
	3. the nasal tip should be level or above the anterior abdominal wall		
Linea CRL measurement (calliper placement)	4. the fetal cervical spine should not be extended		
	1. Correct calliper placement crown		
	2. Correct calliper placement rump		
	3. Longest measurement of the fetus		

Proforma 2 – NT (Proforma adapted and produced with consent from FASP)

Criteria		Tick if achieved		Tick if achieved		Tick if achieved		Tick if achieved	
Image magnification	A) 60-98% of screen								
	B) Facial profile anteriorly								
	C) The skin edge posteriorly								
	D) The upper aspect of the heart inferiorly								
	<b>N.B. Some will be visa versa if fetus prone</b>								
The mid-line sagittal section/ rotation	A) The mid-sagittal view of the face displaying at least two of the following:								
	1) <i>the echogenic tip of the nose</i>	Two ticks required		Two ticks required		Two ticks required		Two ticks required	
	2) <i>the rectangular shape of the palate</i>								
	3) <i>the translucent diencephalon</i>								
	B) Head in line with the body and displaying the fetal skin line from the neck to the upper aspect of the heart								
<b>N.B. Ideally the frontal processes of the maxilla should not be visible</b>									
Flexion and neutral position	A) a pocket of fluid, at least equivalent in size to the width of the palate, should be visible between the fetal chin and chest								
	B) the fetal palate angle should be 30° - 60° relative to the horizontal								
	C) the nasal tip should be level or above the anterior chest wall, relative to the horizontal								
Calliper placement	A) Widest part of NT								
	B) Callipers on the upper skin line								
	C) Callipers on the lower skin line								
	<b>N.B. The crossbar of the calliper should be such that it is hardly visible as it merges with the thin white line of the border of the skin lines. Callipers must be placed ON the line that defines the widest part of the NT thickness</b>								
All boxes must be ticked (as indicated) for an 'All criteria met' image. Use image supplied for visual clarification.									

*Proforma 3 -Proforma for Measurement and Audit of HC*

Criteria	Specific Criteria	Image assessment if using ellipse	Image assessment if not using ellipse
Image magnification	60-90% of screen		
Shape and clarity of head	1. Shape of head – rugby ball		
	2. Clearly defined skull margins		
Horizontal	3. Mid-line echo lying as close as possible to horizontal plane		
Identifiable land marks	4. Centrally positioned, continuous, midline echo broken at one third of its length by the cavum septum pellucidum		
	5. Anterior walls of the lateral ventricles centrally placed around the midline		
	6. The choroid plexus should be visible within the posterior horn of the ventricle in the distal hemisphere		
Calliper placement		Image assessment if not using ellipse	
	7. Position of outer to outer (OFD) upper calliper		
	8. Position of outer to outer (OFD) lower calliper		
	9. Position of outer to outer (BPD) upper calliper		
	10. Position of outer to outer (BPD) lower calliper		
		Image assessment if using ellipse	
	11. Using ellipse facility position of callipers surrounding the skull around the outer perimeter		
Please fill in the appropriate boxes depending on whether or not an ellipse measurement is used. All boxes must be ticked for an acceptable image.			

*Proforma 4 - Proforma for Abdominal Circumference Measurement*

Criteria	Specific criteria	Image assessment
Image magnification	1. 60-90%	
Shape and clarity of abdomen	2. Shape of abdomen– spherical	
	3. Clearly defined margins	
Transverse section	4. Spherical section not oblique	
Identifiable land marks	5. Transverse section of spine posteriorly	
	6. Stomach	
	7. Aorta just anterior to spine	
	8. Portal sinus	
	9. Short length of umbilical vein anteriorly	
	10. Ribs bilaterally	
Calliper placement	11. The callipers should be on the outer skin edge outlining the section using the ellipse method	
All boxes must be ticked for an acceptable image		

*Proforma 5 -Proforma for Measurement and Audit of Femur Length*

Criteria	Specific criteria	Image assessment
<b>Image magnification</b>	1. 60-90%	
<b>Horizontal</b>	2. Horizontal and central within the image	
<b>Identifiable land marks</b>	3. Femur central with clear skin margins whole length visualised	
	4. The distal and proximal ossification centres of the femoral diaphysis clearly seen	
<b>Calliper placement</b> Position of calliper at the ends of the femoral diaphysis	5. Position of calliper at the distal end of the femur	
	6. Position of calliper at the proximal end of the femur	
<b>All boxes must be ticked for an acceptable image</b>		

*Proforma 6 - Proforma for Three Vessel Trachea View*

Criteria	Specific criteria	Image assessment
<b>Image magnification</b>	1. 60-90%	
<b>Identifiable land marks</b>	2. Superior vena cava with trachea posterior	
	3. Main pulmonary artery	
	4. Ductus arteriosus	
	5. Aortic arch with trachea to the right	
	6. Trachea	
	7. Spine	
<b>Colour doppler</b>	8. Visualisation of communication of arteries	
<b>All boxes must be ticked for an acceptable image</b>		

*Proforma 7 - Proforma for Four Chamber View*

Criteria	Specific criteria	Image assessment
<b>Image magnification</b>	1. 60-90%	
<b>Identifiable land marks</b>	2. Apex of the heart pointing to the left	
	3. Right ventricle closest to the anterior chest wall	
	4. Spine posterior	
	5. Equal sized right and left Atria	
	6. Equal sized right and left ventricles	
<b>All boxes must be ticked for an acceptable image</b>		

The following proformas are to be used for the non- routine image assessment and audit.

*Proforma 8 - Proforma for Cardiac Assessment*

Criteria	Specific Requirements	Image Assessment
Image magnification	60-90%	
<b>IDENTIFIABLE LANDMARKS</b> Situs of the heart	The stomach, descending aorta are seen on the left side of fetal spine with the IVC situated anterior and to the right of the aorta. Umbilical vein anteriorly.	
4 chamber view	Equal sized right-left atria and ventricles with two separate patent inlet valves. Note the off-setting of inlet valves with right sided tricuspid valve being closer to apex. The apex of the heart pointing to the left.	
Right Ventricular outflow tract	Arising from the anterior right ventricle and passing posteriorly and dividing into three vessels; the right and left pulmonary arteries and the ductus arteriosus. (only 2 vessels can be demonstrated in a single plane)	
Left Ventricular outflow tract	Arising from the posterior left ventricle and passing to the right of the fetus and crossing the right ventricular outflow tract	
3 Vessel View (OPTIONAL)	Pulmonary artery, transverse aortic arch and SVC are all aligned from the left to right in order and on the same straight line: pulmonary artery and the aorta are of similar size, the SVC being the smallest vessel.	
3 Vessel Trachea view	The long axis of the main pulmonary artery communicating with the ductus arteriosus and with the long axis of the aortic arch and forming a V shape; with the trachea situated to the right of the aortic arch and posterior to the SVC	
Please fill in the appropriate column. All shaded boxes must be ticked for an acceptable cardiac assessment Please fill in the appropriate box below		
Weeks of gestation	18+0 weeks-20+6 weeks	
	20+6 weeks-23+0 weeks	
	Late gestation >23 weeks	

*Proforma 9 - Audit Proforma for the Measurement of the Posterior Horn of the Ventricle*

Criteria	Specific criteria	Image assessment if using ellipse	Image assessment if not using ellipse
<b>Image magnification</b>	1. 60-90%		
<b>Shape and clarity of head</b>	2. Shape of head – rugby ball		
	3. Clearly defined skull margins		
<b>Horizontal</b>	4. Mid-line echo lying as close as possible to horizontal plane		
<b>Identifiable land marks</b>	5. Centrally positioned, continuous midline echo broken at one third of its length by the cavum septum pellucidum		
	6. Anterior walls of the lateral ventricles centrally placed around the midline		
	7. The choroid plexus should be visible within the posterior horn of the ventricle in the distal hemisphere		
<b>Calliper placement</b>	8. Angle of callipers at the ventricle		
	9. Position of callipers in the ventricle inner to inner wall		
		Image assessment if not using ellipse	
	10. Position of outer to outer (OFD) upper calliper		
	11. Position of outer to outer (OFD) lower calliper		
	12. Position of BPD outer to outer (BPD) upper calliper		
	13. Position of BPD outer to outer (BPD) lower calliper		
		Image assessment if using ellipse	
	14. Using ellipse facility position of callipers surrounding the skull around the outer perimeter		
Please fill in the appropriate column depending on whether an ellipse measurement is used. All un-shaded boxes must be ticked for an acceptable image.			

*Proforma 10 - Proforma for Abdominal Circumference Measurement taken at the Renal Pelvis  
Diameter Level*

Calipers only placed where a dilatation has been suspected .Abdominal section will not always be with the spine and kidneys lying anteriorly in the image.

Criteria	Specific Criteria	Image Assessment
Image magnification	60-90%	
Shape and clarity of abdomen	1. Shape of abdomen – spherical	
	2. Clearly defined margins	
Transverse section	3. Section must not be oblique	
Identifiable landmarks	4. Transverse section of spine	
	5. Aorta just anterior to the spine	
	6. Kidneys adjacent to spine bilaterally	
Calliper placement	7. Angle of callipers to the renal pelvis should be 90°	
	8. Position of callipers on the inner walls of the renal pelvis	
All boxes must be ticked for an accurate image number. 7/8 only where dilatation is suspected		

## Section 5: Health Board Sonographer Roles Working With Antenatal Screening Wales

### Ultrasound Obstetric Lead

The Health Boards should identify a named Ultrasound Obstetric Lead for antenatal screening who manages the ultrasound antenatal screening programme.

The named Ultrasound Obstetric Lead will have responsibility for:

- (1) Acting as liaison between the Health Board and ASW.
- (2) Implementation of the ASW policy, standards, protocols and pathways in relation to the early pregnancy ultrasound scan, the anomaly scan and some aspects of the Down's syndrome, Edwards' syndrome and Patau's syndrome screening programme.
- (3) Performance management of the antenatal ultrasound screening programmes and dealing with high level programme risk issues.
- (4) Working alongside the NT Lead and Fetal Cardiac Lead to implement strategies for any required service changes.
- (5) Lead the Health Board, working alongside the NT lead and Fetal Cardiac Lead, to ensure that all ASW audits, as part of the performance management framework, are completed and forwarded to ASW in a timely manner.
- (6) Lead in the coordination of the supply of information for women to sonographers providing care.
- (7) Lead on the development of educational activities and education resources for health professionals.
- (8) To work in partnership with the MAC Governance Lead to ensure action plans for the performance indicators, audit results and Down's syndrome Quality Assurance Support Service (DQASS) results are developed where required and acted upon in a timely manner.

### NT Lead

The role of the NT lead is to quality assure the ultrasound element of the combined Down's syndrome, Edwards' syndrome and Patau's syndrome screening programme within their Health Board in line with ASW Policy, Standards and Protocols.

The named NT Lead will have responsibility for:

- (1) Acting as liaison between the Health Board and ASW.
- (2) The quality assurance of the ultrasound element of the combined Down's syndrome, Edwards' syndrome and Patau's syndrome screening programme within their Health Board in line with ASW standards and protocol.



The NT Lead will be expected to:

- ❖ Assess three randomly selected paired images per sonographer to ensure compliance with the required standards and feed back to sonographer.
- ❖ Comply with ASW required standards by submitting three of their randomly selected paired images to the ASW Obstetric Ultrasound Coordinator (OUC) bi-annually.
- ❖ Regularly monitor NT diagnostic plots for each sonographer to ensure compliance with Down's syndrome Quality Assurance Support Service (DQASS) requirements.
- ❖ Liaise with (OUC) regarding the bi-annual DQASS plots received.
- ❖ Communicate with sonographers, Antenatal Screening Coordinators, MAC Governance Leads, Radiology Service Managers and ASW Obstetric Ultrasound Coordinator with regards to standards achieved and monitoring the programme.
- ❖ Oversee and keep a record of initial training, ongoing e-learning and ensure that the sonographer's files are maintained.
- ❖ Produce and implement action plans following the DQASS report where necessary.
- ❖ Provide practical training and support in relation to image production.
- ❖ Liaise with the ultrasound applications specialist to ensure optimum image settings/parameters.

#### *Requirements of the NT Lead*

- ❖ Assess three randomly selected paired images per sonographer to ensure compliance with the required standards and feed back to sonographer.
- ❖ Regular monitoring of sonographer NT diagnostic plots to ensure compliance with Down's syndrome Quality Assurance Support Service (DQASS) requirements. The plot can be found on the [ASW website](#)
- ❖ Liaise with ASW Obstetric Ultrasound Coordinator regarding the bi-annual DQASS plots received
- ❖ Communicate with sonographers, Antenatal Screening Coordinators, Maternal and Child (MAC) Governance Leads, Radiology Service Managers and ASW Obstetric Ultrasound Coordinator with regards to standards achieved and monitoring the programme.
- ❖ Keep a record of initial training, ongoing e-learning and ensure that the sonographer's files are maintained.
- ❖ Produce, implement and follow up action plans following the DQASS report where necessary.
- ❖ Provide practical training and support in relation to image production.

#### *Departmental image Review and Diagnostic Plot Assessment*

- ❖ Where a sonographer is green flagged three pairs of images every 6 months should be assessed.
- ❖ Where a sonographer is amber flagged <0.2 three pairs of images every 3 months should be assessed.

- ❖ Where a sonographer has a bias of  $>0.2$  three pairs of images should be assessed every month to provide continuous assessment, help, support and guidance to the sonographer concerned.
- ❖ Where a sonographer is white flagged (less than 25 paired measurements on a 6 monthly DQASS report), the sonographer will need to attain the minimum requirement of 50 paired measurements over 2 cycles (ie current cycle and by the end of the subsequent cycle). NT lead to write up an action plan assuring ASW that the sonographer will attain the minimum requirements to be agreed prior to the sonographer being reinstated on the DQASS register. A red flag will be issued if the sonographer does not achieve this.
- ❖ Where a sonographer is returning to work after extended leave ( $>$ six months with no acceptable DQASS plot in the previous 2 cycles) they should be continuously assessed by the NT lead until they are satisfied that the sonographer is ready to return to the DQASS register. ASW will reinstate the sonographer code with the Laboratory and DQASS.
- ❖ Student sonographers will have monthly image assessment and NT plot audit throughout their training, until they become DQASS registered.
- ❖ Where a sonographer is red flagged they will require an action plan for improvement to include monthly monitoring of images and DQASS plot until the NT Lead and ASW Obstetric Ultrasound Coordinator are confident with the image assessment and NT plot. They would then require 3 monthly image assessment and NT plot audit.
- ❖ NT Lead to liaise with ASW Obstetric Ultrasound Coordinator if there are any concerns

#### *DQASS Plots Review and Understanding*

- ❖ On receipt of the biannual DQASS report, the NT Lead should assess the plot and review it with each sonographer making comparisons with the previous cycle
- ❖ The review should include:
  - Assessing the bias from the FMF reference curve
  - The distribution of the individual paired measurements (displayed as dots on the plot) which illustrates the trend and spread and must be taken into account to ensure that the bias closely follows the reference curve. If the bias is below 0.1mm but the spread or trend do not closely follow the curve the flag status will be downgraded to amber
- ❖ The image review alongside the plot review may help identify any machine issues and/or sonographer accuracy
- ❖ NT Lead to liaise with ASW Obstetric Ultrasound Coordinator if required for advice regarding DQASS plots.

#### *Education and Training*

NT lead has the responsibility to:

- ❖ Monitor all sonographers completion of online e-learning resources:
  - [ASW Down's syndrome, Edwards' syndrome and Patau's syndrome e-learning package](#)
  - [ASW First trimester screening resource for sonographers](#)

- ❖ Provide training where problems or practical training needs are identified and if necessary liaise with ASW Obstetric Ultrasound Coordinator to provide some hands on training on site.
- ❖ Ensure that new joiners and students are supported with their practical training/ assessment and have completed the necessary on line training resources.

#### Training for Sonographers without DQASS Registration

- ❖ Prior to DQASS registration the NT Lead:
- ❖ Must ensure that the sonographer has completed the two e-learning resources within the last twelve months
- ❖ Must provide an initial practical hands on training session (1-5 scans) and further hands on support where required
- ❖ Monitor the initial diagnostic plot and offer support if required
- ❖ Assess the diagnostic plot with at least 25 paired measurements plotted
- ❖ Audit 10 sets of paired images
- ❖ Email individual sonographers self-assessment diagnostic plot to ASW for submission to DQASS when standard required has been reached.

#### Governance

The NT Lead is responsible for:

- ❖ Distributing the DQASS 6 monthly report to the Health Board Obstetric Lead Sonographer and the Radiology Service Manager. The health board Maternal and Child (MAC) Governance Lead will also receive a copy which is forwarded to the relevant directorate managers.
- ❖ Action plans as required should be produced and forwarded to ASW where issues have been identified and also forwarded following review.
- ❖ ASW to be informed of sonographers taking extended leave or changing place of employment. This will explain when there may be white flags so that ASW can inform the other relevant services.

#### The Fetal Cardiac Ultrasound Lead

The Health Boards should identify a named Fetal Cardiac Ultrasound Lead for antenatal screening who leads the fetal cardiac aspect of the antenatal screening programme.

The named Fetal Cardiac Ultrasound Lead will have responsibility for:

- (1) Acting as liaison between the Health Board and ASW.
- (2) Attending the annual ASW Cardiac Leads meeting.
- (3) Attendance at the annual Welsh Fetal Cardiovascular Network meeting and cascade any new information to colleagues.
- (4) Carrying out audit for ASW and feedback results to the Health Board.

- (5) Providing education, training and support in fetal cardiology for their colleagues.
- (6) Training student sonographers in the cardiac views and any new sonographers to the Health Board until they reach the competency required.
- (7) Attendance at fetal medicine cardiac clinics once/twice a year to further their knowledge.

## Section 6: Sonographer Requirements

### *All Sonographers Taking Part in Obstetric Screening Scans*

- ❖ Only an appropriately trained sonographer or sonographer who is in training under the supervision of a sonographer should perform ultrasound scans. All sonographers performing scans in Wales have to be HCPC or NMC registered.
- ❖ Any sonographer undertaking screening scans has to take part in departmental audit using the ASW audit proformas.

### *All Sonographers Taking Part in Combined Screening*

Sonographers need to fulfil the requirements below:

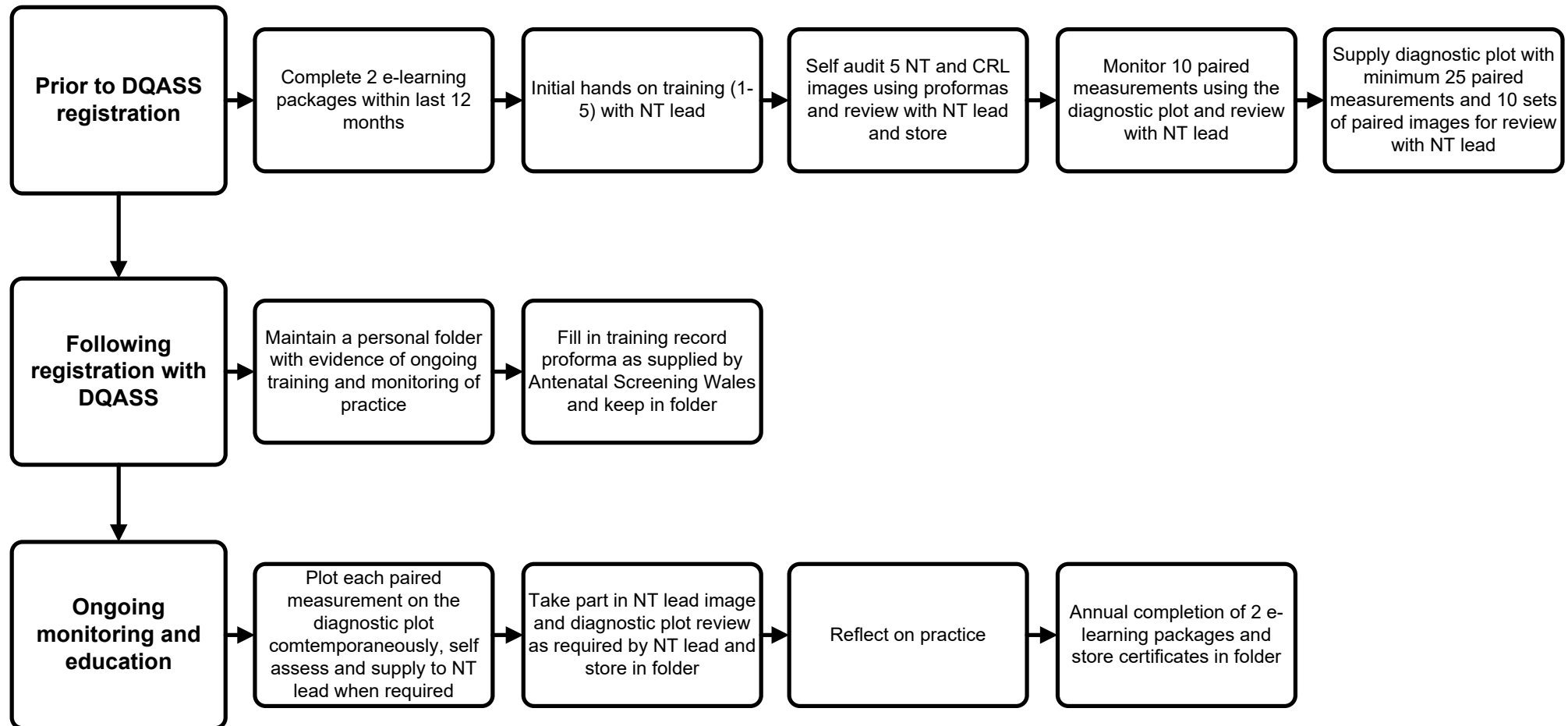
- ❖ Complete the two e-learning resources below annually and file certificates in their personal folder
  - [ASW Down's syndrome, Edwards' syndrome and Patau's syndrome e-learning package](#)
  - [ASW First trimester screening resource for sonographers](#)
  - [ASW Antenatal Screening 18+0 to 20+6 week Fetal anomaly ultrasound scan](#)
  - [ASW Antenatal Screening Wales Fetal Cardiac e-learning Module](#)
- ❖ Review personal 6 monthly DQASS report with NT Lead and store in an accessible format
- ❖ Continuously monitor each set of paired measurements using the diagnostic plot and supply to NT Lead when required. Ensure they obtain the minimum number of scans (25) per cycle. The plot can be found on the [ASW website](#)
- ❖ Take part in NT Lead image and diagnostic plot review as required by flag status.
- ❖ Reflect on practice.
- ❖ Must maintain a personal folder containing evidence of training and monitoring of their practice as above and supply to the NT Lead where required in their place of work
- ❖ Fill in the [proforma \(appendix 1\)](#) and keep at the front of the personal folder.

### *Sonographers New to Combined Screening*

Prior to DQASS registration the sonographer:

- ❖ Must have completed the two e-learning resources within the last twelve months
- ❖ Must have initial practical hands on training (1-5 scans) with NT Lead
- ❖ Self-audit 5 paired CRL and NT images using the Antenatal Screening Wales CRL and NT image audit proformas and review with NT Lead. File in personal folder
- ❖ Monitor 10 paired measurements at a time using the self-assessment diagnostic plot. Adjust practice if necessary with support from the NT Lead sonographer
- ❖ Must supply the diagnostic plot with at least 25 paired measurements plotted and 10 sets of paired images for review with NT Lead
- ❖ Must be supplied with their DQASS registration number prior to autonomous practice of combined screening.
- ❖ Must maintain a personal folder containing evidence of training and monitoring of their practice as above.
- ❖ Fill in the [proforma \(appendix 1\)](#) and keep at the front of the personal folder.

**All HCPC/ NMC and Health Board Registered Sonographers**



## Appendix 1

### Training Record for Sonographers Performing NT Measurements in Wales

**Name of Sonographer:**

**Sonographer DQASS ID number:**

**Name of NT Lead sonographer:**

**Name of Health Board:**

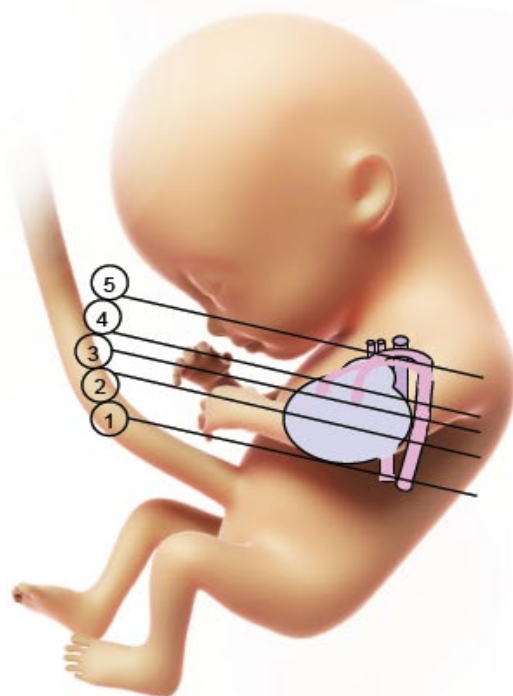
**Hospital/Site:**

## Appendix 2



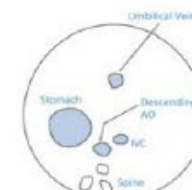
# Fetal Heart Screening in 5 Transverse Views

A systematic  
examination of the  
heart, including  
orientation,  
connections and  
relationships

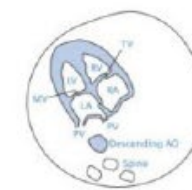


[www.tinytickers.org](http://www.tinytickers.org)

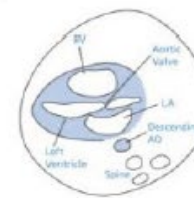
1  
Situs



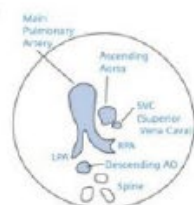
2  
4-Ch



3  
Ao  
(LVOT)



4  
PA  
(RVOT)



5  
3 vessel  
& trachea  
(3vt)

