Reference Number: UHBOBS167 **Version Number: 4b**	**Date of Next Review:** 22/12/2024 **Previous Trust/LHB Reference Number: N/A**

Fetal Growth Assessment (GAP Protocol and GROW Charts)

Introduction and Aim

Fetal growth restriction is associated with stillbirth, neonatal death and perinatal morbidity. Confidential Enquiries have demonstrated that most stillbirths due to Fetal growth restriction are associated with suboptimal care and are potentially avoidable. A recent epidemiological analysis based on the comprehensive West Midlands database has underlined the impact that Fetal growth restriction has on stillbirth rates, and the significant reduction, which can be achieved through antenatal detection of pregnancies at risk. Customised assessment of birthweight and fetal growth has been recommended by the RCOG since 2002 and is re-emphasised in the 2013 revision of the Green Top Guidelines. Most studies use a one off measurement to predict IUGR however it is the growth trend that is of more value in predicting poor fetal outcome.

The aim of this guideline is to outline the methods used to assess fetal growth and referral pathways utilising customised antenatal growth charts.

Objectives

- To ensure that there is accurate fetal surveillance through standardised fundal height measurements of low risk women and serial growth scans for high risk women.
- To ensure that serial fundal height measurements are plotted correctly on customised growth charts.
- To ensure that patterns of fundal height measurements suggestive of growth problems are recognised and referral for a growth scan is made, to be undertaken as soon as possible and within at most 72 hours.
- To ensure that problems of fetal growth on ultrasound are identified and referral made to an obstetric team for discussion and agreement of an appropriate management plan as soon as possible.
- To ensure that there is identification of all infants born below the 10th customised centile at birth and appropriate management initiated postnatally.

Scope

This guideline is relevant to all healthcare professionals involved in the care of pregnant women including Midwives, General Practitioners, Obstetricians and Sonographers.

This guideline addresses:-

- Use and production of a customised growth chart
- Risk assessment
- When and how to measure fundal height using a standardised technique
- When to refer for ultrasound assessment of fetal growth
- Serial growth scans for women at high risk of fetal growth restriction

This guideline does *not* seek to cover management of pregnancy once IUGR has been diagnosed. This is covered in detail in the Small for Gestational Age Guideline

Equality Health Impact Assessment	*An Equality Health Impact Assessment (EHIA) has not been completed.*
Documents to read alongside this Procedure	*Antenatal Care Guideline*
Approved by	*Maternity Professional Forum*

Accountable Executive or Clinical Board Director	*Ruth Walker, Executive Nurse Director*
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Disclaimer

If the review date of this document has passed please ensure that the version you are using is the most up to date either by contacting the document author or the Governance Directorate.

Summary of reviews/amendments

Version Number	Date of Review Approved	Date Published	Summary of Amendments
1	April 2015	April 2015	New Document
2	Nov 2017	Nov 2017	Amended to incorporate new practice
3	Jul 2018	Nov 2018	Amended to incorporate new scanning frequency
4	Sept 2019	06/09/2019	Updated to reflect current practice.
4a	Sept 2020		Updated Risk Factors
4b	Dec 2021	Jan 2022	Updated Risk Factors

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2 Abbreviations/Definitions

BMI	Body mass index
Centile lines	The lines of growth on the customised growth chart are estimated fetal weight centile lines: 5th, 10th, 50th, 90th and 95th.
EDD	Estimated date of delivery
EFW	Estimated Fetal Weight
SFH	Symphysis Fundal Height
FGR / IUGR	Fetal growth restriction / intrauterine growth restriction defined by: Weight for gestation below the tenth customised centile and/or slow growth on serial scan and/or abnormal Doppler and/or histopathology (post-mortem and/or placental examination)
GTT	Glucose Tolerance Test
Sonographer	Practitioner qualified to perform growth scans
SGA	Small for gestational age (includes constitutional and pathological causes)

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3 Roles and Responsibilities

To risk assess during pregnancy and arrange serial growth scans if high risk of fetal growth problems or if fundal height measurements not accurate (e.g. raised BMI):

- Midwives and Obstetricians

To generate customised growth charts:

- Antenatal clinic staff (generated following pregnancy scan once EDD is confirmed)
- All staff at any stage of pregnancy if a woman is found not to have a chart, including after birth in order to generate a birthweight centile.

To undertake fundal height measurements and plot on customised charts:

- Midwives and Obstetricians

To measure fetal biometry, calculate EFW and plot on customised charts:

- Sonographers to perform growth scans
- Midwifery sonographers to perform growth scans and plot on customised charts
- Midwives supporting growth scan clinics to plot on customised charts when scan performed by sonographers

To make appropriate referrals to obstetric clinic or return to midwifery led care following growth ultrasound.

- Midwives supporting the sonographers' clinics
- Midwifery sonographers

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4 Customised Growth Charts

The charts are used to plot both Fundal Height measurements obtained during clinical examination and Estimated Fetal Weight following an ultrasound examination. They are customised to each individual taking into account the height, weight, ethnicity and parity of the woman. Birthweights of previous children need to be entered to identify previous babies with growth restriction, but this does not affect the centiles produced.

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4.1 Chart production

Each woman will have a customised growth chart printed following her dating scan and secured in her hand held pregnancy notes. The EDD entered into the software will be the one calculated by the dating ultrasound scan. The chart will show the 5th, 10th, 50th, 90th and 95th centile lines. There is a box in the top left hand corner where her height, weight, ethnicity and parity are shown. A customised centile will be calculated for all previous children; if they were small for gestational age (SGA) or large for gestational age (LGA) this will also be highlighted. The woman's name, reference number, chart ID and date of birth will appear above the chart.

The charts are very easy to produce and can be generated at any time during pregnancy. The software can be accessed via the UHB clinical portal Obstetrics and Gynaecology welcome page. The login details are:

Username: **unihospwales**
Password: **whistles152**

See Appendix 3 for details of how to generate a chart.

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4.2 Risk Assessment

Some women will be at increased risk of developing fetal growth restriction because of risk factors in the current pregnancy, past medical history or past obstetric history. Others will be unsuitable for surveillance by fundal height measurement due to factors such as large fibroids or high maternal BMI.

All women should be assessed for risk factors to identify those who need serial ultrasound. This should be done with the use of the risk assessment stickers following the dating scan. Women who trigger one major or three minor risk factors will require an obstetric referral and appointment at 28 weeks.

Serial ultrasound assessment of fetal growth will be arranged from 28 weeks until delivery, with the usual pattern being 28, 32, 36 and 39 weeks (earlier gestation or higher frequency if required in individual cases as decided by an obstetrician).

In women who are referred for serial scans because of a previous baby <10th centile, AND that baby was >3kg AND that woman has no other risk factors for serial scans (including BMI under 35 so that SFH can be assessed), then scans will be offered at 36 and 39 weeks instead of from 28 weeks. These women WILL have SFH measurements from 28 weeks until delivery and referral if indicated.

Serial scans should be commenced during pregnancy in the case of complications that could affect fetal growth, see appendix 2.

All women having serial ultrasound will *not* require plotting of fundal height measurements while such a serial scanning protocol is being followed.

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4.3 Serial scans for otherwise low risk women

Women who are otherwise suitable for Midwifery Led Care but trigger a risk factor for serial ultrasound (e.g. a previous baby below the 10th centile) should be referred to a consultant antenatal clinic with the reason for referral clearly documented. These women will attend the antenatal clinic for their ultrasound as scheduled, if the results of the ultrasound are normal they may be plotted on the GROW chart by a midwife and the woman will not need to be reviewed by an obstetrician.

Women who are otherwise low risk will be suitable to plan birth on the MLU if all ultrasound results are normal up to and including 37 weeks, they will still attend the antenatal clinic for their final ultrasound at 39 weeks if they have not given birth yet.

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5 Measuring fundal height

Women who do not require serial ultrasound should have serial fundal height measurements undertaken as a primary screening test for fetal growth. These should be taken 2-3 weekly and commence from 28 weeks gestation, the usual pattern being 28, 31, 34, 36, 38, 40 and 42 weeks. All women having FH measurement should be seen with this frequency, regardless of their parity. No FH measurement should be done before 26 weeks.

Measurements must be taken and acted upon whether the woman is attending her community midwife or the antenatal clinic for her appointment.

To ensure accurate measurements are taken midwives should use standard paper tape measures. Each woman should be given a tape measure at booking to be stored in her hand held records and used for each measurement.

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5.1 How to measure

The fundal height measurement should be performed with the mother in a semi- recumbent position, with an empty bladder and the uterus relaxed and non-contracting. It is recommended that the clinician uses both hands to perform an abdominal palpation, identifies the highest point of the uterine fundus then leaves one hand on the fundus. A paper tape measure, starting at zero, is placed on the uterine fundus – at the highest point (which may or may not be in the midline). The tape measure should then be drawn down to the top of the symphysis pubis (in the midline) and the number read in whole centimetres. To reduce the possibility of bias, the tape measure should be used with the cm side hidden, and the measurement should be taken once only. The result should be recorded in centimetres on the customised growth chart and the value plotted using a cross. The method for measuring SFH is explained below the customised growth chart to support standardised practice.

Indications for a growth scan are:

- First SFH measurement below 10th centile
- Static growth: no increase in sequential measurements
- Slow growth: curve linking up plots increasing slower than the curve of the chart
- Excessive growth: curve linking up plots increasing quicker than the curve of the chart

Note that a first measurement above the 95th centile is NOT an indication for a growth scan. An ultrasound would however be indicated if there was clinical suspicion of polyhydramnios or there was excessive growth on subsequent measurements.

See appendix 9.5 for flowchart for referrals following FH measurement.

See appendix 9.6 for flowchart for SFH measurements above the 95th centile.

Requests for a growth scan should be made directly to the antenatal clinic (via the email referral system,

appendix 9.7) who will give an appointment, ideally within 72 hours. Growth scan appointments will be available as set sessions within midwife sonographers' clinics.

Arrangements for follow up by the referrer should be made at the time of the referral. The SFH should be measured again 2-3 weeks after the measurement that prompted the referral. If this measurement does not show growth in line with the curve of the chart (using the most recent measurement as the new baseline) then another referral for USS should be made to assess the rate of growth between two EFW measurements.

Women do not need to be seen in an obstetric antenatal clinic prior to their scan.

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6 Referral following a growth scan (see appendix 9.1)

Once the growth scan has been completed the EFW will be plotted on the customised growth chart (with a circle) by the midwifery sonographer or midwife supporting the clinic.

If the EFW plots between the 10th and 95th centile and is following the centile curve of any previous EFW, and the liquor volume is normal, the woman will be asked to attend her next antenatal appointment as planned (this should already have been confirmed with the woman by the referring carer for 2-3 weeks after the measurement which prompted the referral).

If the EFW does not plot within the 10th and 95th centile or is not following a centile curve of any previous EFW, or there are concerns regarding the liquor volume or umbilical artery Doppler, then the following referrals should be made:

1. **EFW above 95th centile (or significantly increased growth velocity)**

Refer to antenatal clinic for GTT within 1 week.
Refer to either the Diabetic ANC or Birth Choices Clinic depending on outcome of GTT (see appendix 6).

2. **EFW below 10th centile or reduced growth velocity, normal liquor volume, normal umbilical artery Doppler**

Refer for obstetric review and repeat scan in 2 weeks. Please refer to the SGA guideline.

3. **EFW below 10th centile or reduced growth velocity with oligohydramnios and/or abnormal umbilical artery Doppler and/or abnormal middle cerebral artery Doppler:**

Refer immediately to OAU for senior obstetric review (ST6 or above) and follow the SGA guideline.

4. **EFW below 5th centile**

Refer immediately to OAU of clinic for senior obstetric review (ST6 or above) and follow SGA guideline.

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6.1 Management in labour

Early admission should be recommended in women in spontaneous labour with a fetus where growth problems have been identified, in order to instigate continuous fetal heart rate monitoring.

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7 Following birth

The birthweight centile must be calculated using the centile calculator software. This is accessed via the clinical portal in the same way as producing a chart, see Appendix 4 for details of how to generate a birthweight centile. Please be mindful that the question 'Early pregnancy assessment' refers to the risk of fetal growth restriction specifically and not low/high risk care. Please refer to GAP criteria to identify this risk.

If no chart is available, generate one using the woman's booking demographics. This chart number can then be used to generate a birthweight centile.

Enter the centile into the maternity information system when completing the birth details.

If the birthweight is below the 2nd centile the baby should be cared for under the Hypoglycaemia Guideline. If the baby is <10th centile and appears clinically wasted, it should be reviewed by a neonatologist.

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8 REFERENCES

8.1 Birthweight

Clausson B et al. Perinatal outcome in SGA births defined by customised versus population based birthweight standards. *BJOG* 2001;108:830-4

de Jong CLD et al. (1998). Application of a customised birthweight standard in the assessment of perinatal outcome in a high risk population. *BJOG* 105:531-35

Gardosi J, Clausson B, Francis A. The value of customised centiles in assessing perinatal mortality risk associated with parity and maternal size. *BJOG* 2009;116:1356-63.

McCowan L, Harding JE, Stewart AW. Customised birthweight centiles predict SGA pregnancies with perinatal morbidity. *BJOG* 2005;112:1026-1033.

8.2 Fetal Growth

de Jong CLD et al. Fetal weight gain in a serially scanned high-risk population. *Ultrasound Obstet Gynecol* 1998; 11:39-43.

Gardosi J et al. Maternal and fetal risk factors for stillbirth : population based study. BMJ 2013;346:f108.

Mongelli M, Gardosi J. Longitudinal study of fetal growth in subgroups of a low risk population. *Ultrasound Obstet Gynecol* 1995; 6: 340-344,

Mongelli M, Gardosi J. Reduction of false-positive diagnosis of fetal growth restriction by application of customized fetal growth standards. *Obstet Gynecol* 1996;88:844-848.

8.3 Fundal height

Gardosi J, Francis A. Controlled trial of fundal height measurement plotted on customised antenatal growth charts. *BJOG* 1998 106(4):309-17.

Roex A, Nikpoor P, van Eerd E, Hodyl N, Dekker G. Serial plotting on customised fundal height charts results in a doubling of the antenatal detection of small for gestational age fetuses in nulliparous women.

Wright J, Morse K, Francis A. *MIDIRS Midwifery Digest*, 2006; vol 16, no 3, pp 341-345.

8.4 Reviews / Best Practice

Figueras F. Gardosi J. Intrauterine growth restriction: new concepts in antenatal surveillance, diagnosis, and management. *AJOG* 2010; 204:4;288-300.

Gardosi J Intrauterine growth restriction: new standards for assessing adverse outcome. *Best Practice & Research Clinical Obstet Gynaecol* 2009;23;741–749

Morse K., Williams M. and Gardosi J. Fetal growth screening by fundal height measurement. *Best Practice & Research Clin Obstet Gynaecol* 2009;23;6:809-819

8.5 Guidelines

National Institute for Clinical Excellence. Antenatal care: routine care for the healthy pregnant woman. NICE Clinical Guideline 62. NICE, London.

Royal College of Obstetricians and Gynaecologists. The investigation and management of the small-for-gestational age fetus. RCOG Green Top Guideline No 31, 2013. RCOG, London.

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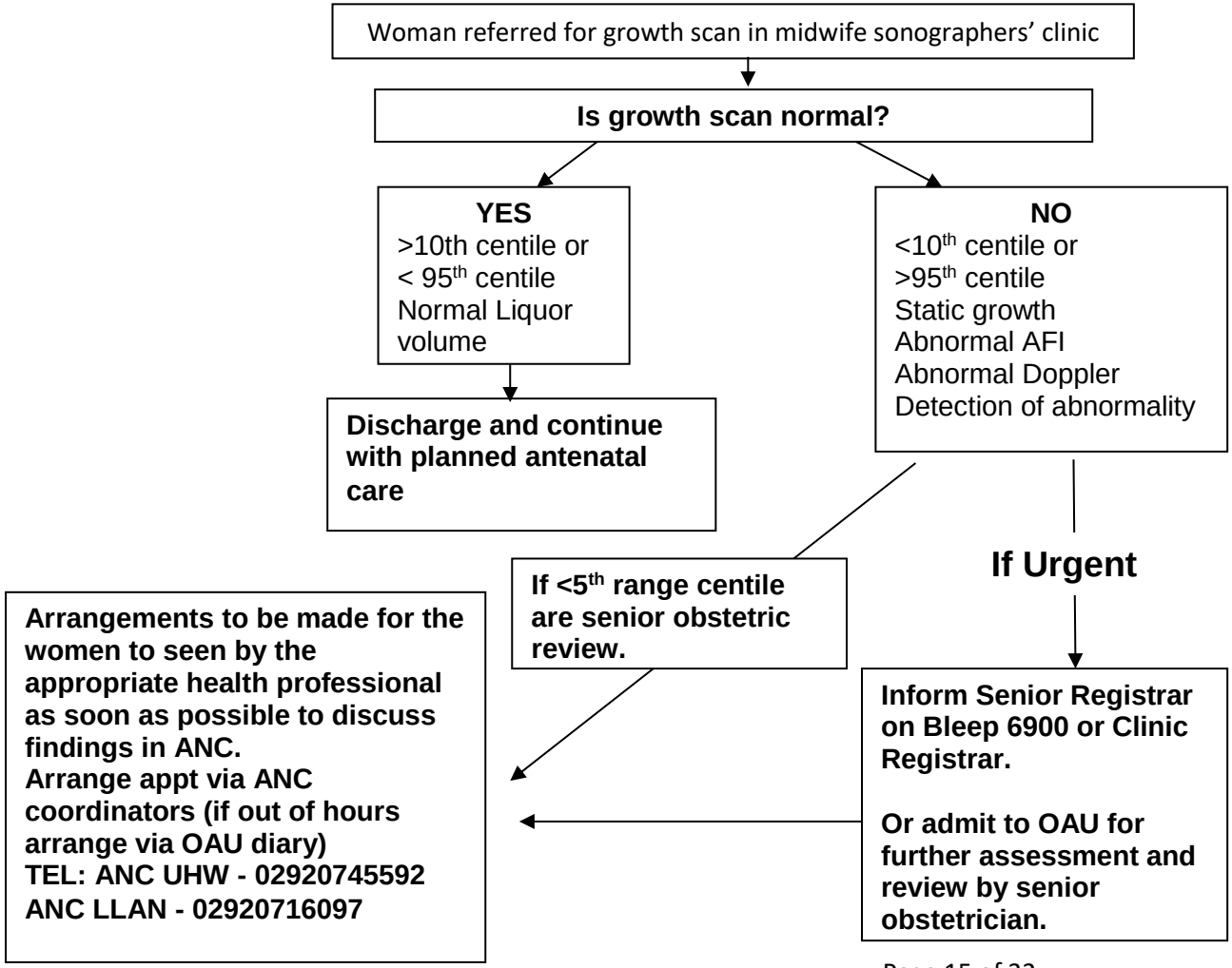
9 Appendices

9.1 Pathway for Growth Scan Referrals for Midwife Sonographers



9.2 Risk assessment for serial growth scans

Risk factors - requiring serial growth scans if 1 factor is present

- Maternal age >40 at conception
- Smoker (any amount)
- Previous SGA baby (see page 3 re: previous baby <10th centile but >3kg)
- Previous stillbirth
- Substance misuse
- Diabetic
- Renal impairment
- Maternal medical autoimmune disease (SLE/ APLS/ Cyanotic heart disease)
- Chronic hypertension
- Heavy bleeding in pregnancy
- Uterine fibroid >6cm
- BMI ≥35
- Fetal Echogenic bowel
- Maternal use of Beta Blockers (e.g. Propanolol, Labetalol)
- Fetal two vessel cord
- PAPP-A <0.415 MoM

Serial scans should be commenced during pregnancy in the case of:

- Unexplained significant APH
- Gestational diabetes
- Significant pregnancy induced hypertension (requiring treatment)
- Pre-eclampsia

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9.2.1 Risk Assessment Sticker

Risk assessment for (any 1 = serial USS)		
Smoker	Maternal age ≥40 at conception	Renal Impairment
Previous baby <10th centile	Previous stillbirth	BMI ≥35
Substance Misuse	Diabetes	Chronic Hypertension
Uterine fibroid >6cm	Taking Beta blockers	Fetal two vessel cord
Fetal Echogenic Bowel	Heavy bleeding in pregnancy	PAPP-A <0.415 MoM
Maternal medical autoimmune disease (SLE/APLS/Cyanotic heart disease)		

Growth Assessment: **Fundal Height / Serial USS** (please circle)
Fundal Heights should be 2 – 4 weekly from 28 weeks.
Serial USS should be at 28, 32, 36 and 39 weeks.
If previous baby **<10th centile but >3kg** and NO other risk factors, for USS **at 36 and 39 weeks AND SFH** from 28 weeks as above.

Completed by: Date:

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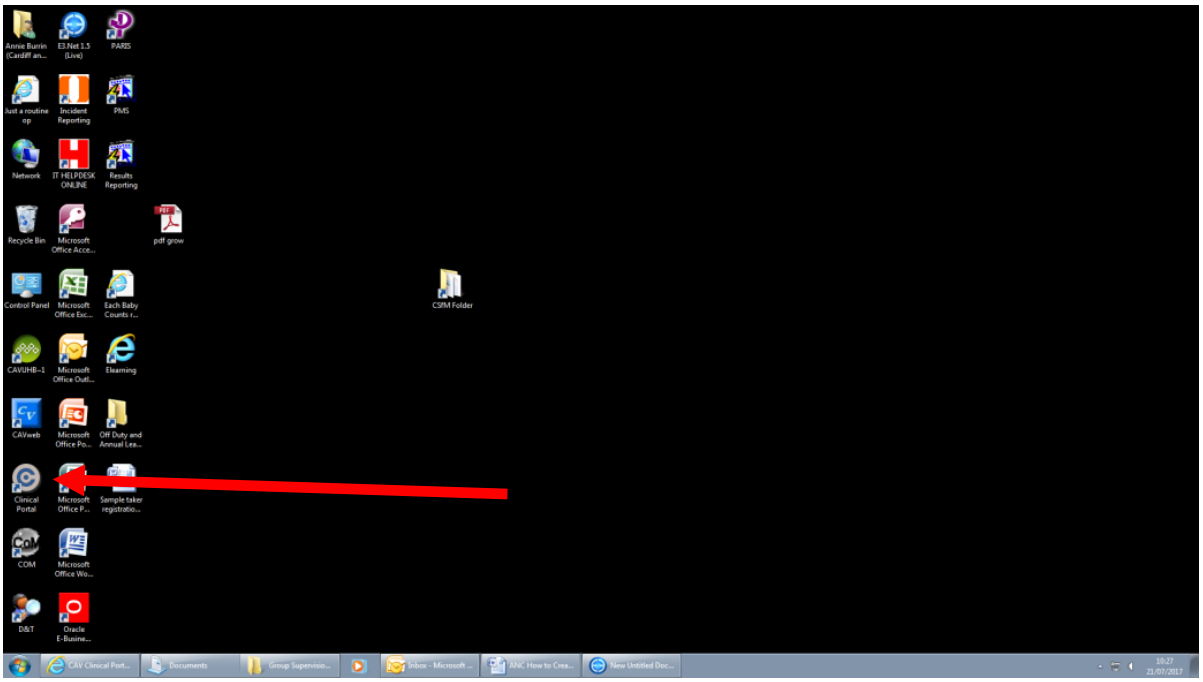
9.3 How to generate a GROW chart

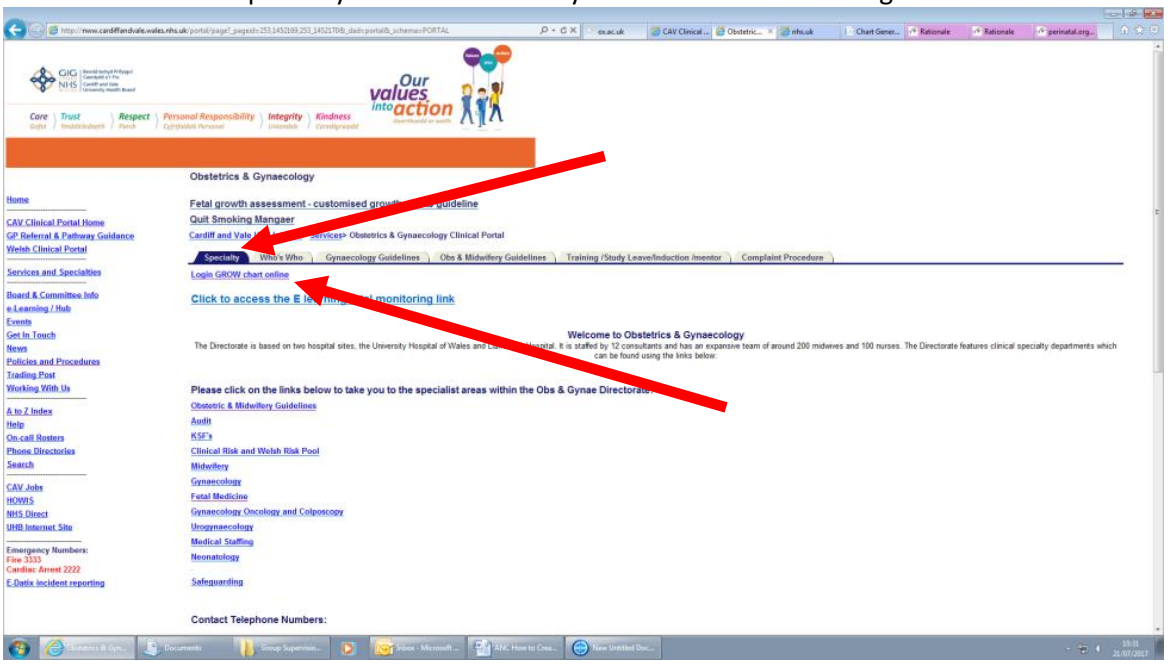
Open Clinical Portal by double clicking on the icon:



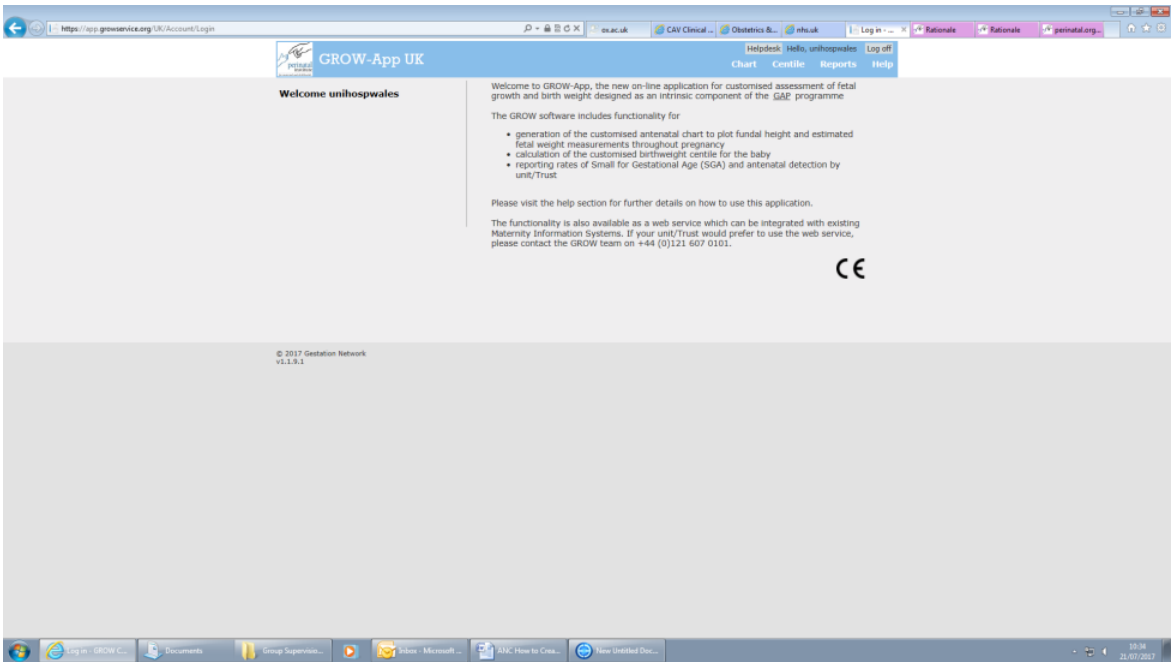
Click on A to Z index:

Click on O – then Obstetrics & Gynaecology

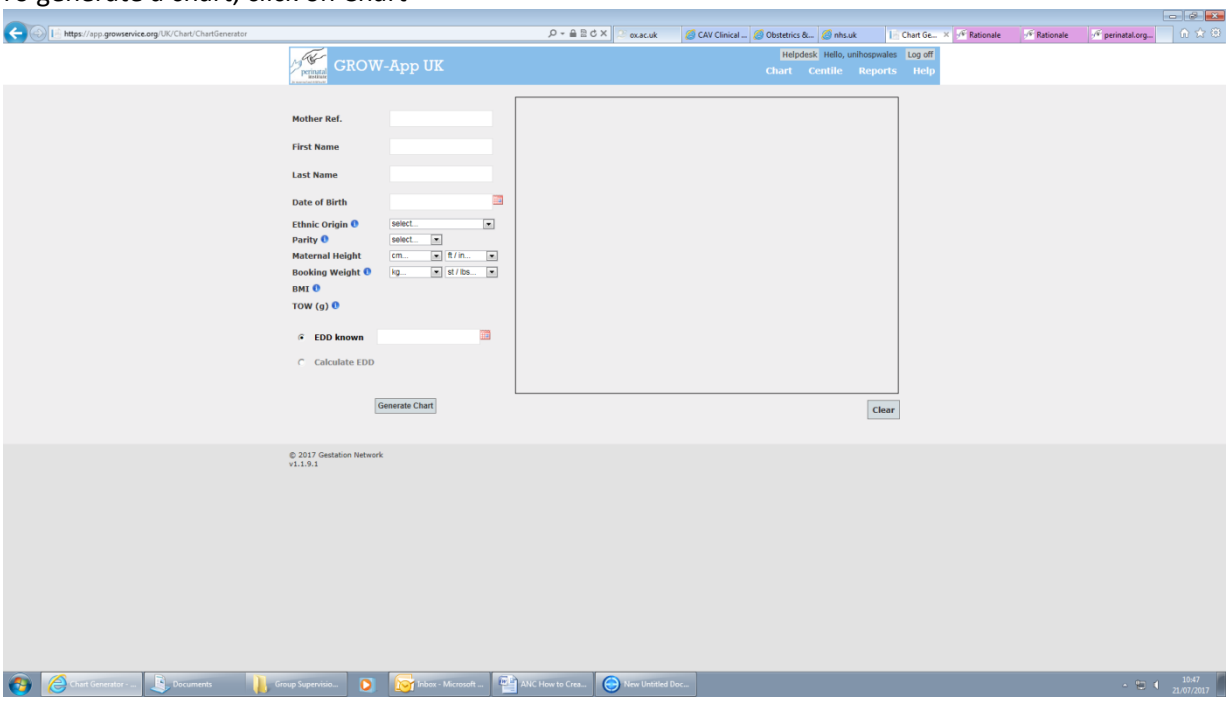
Make sure that the Speciality Tab is clicked and you will see the link for Login GROW chart online:



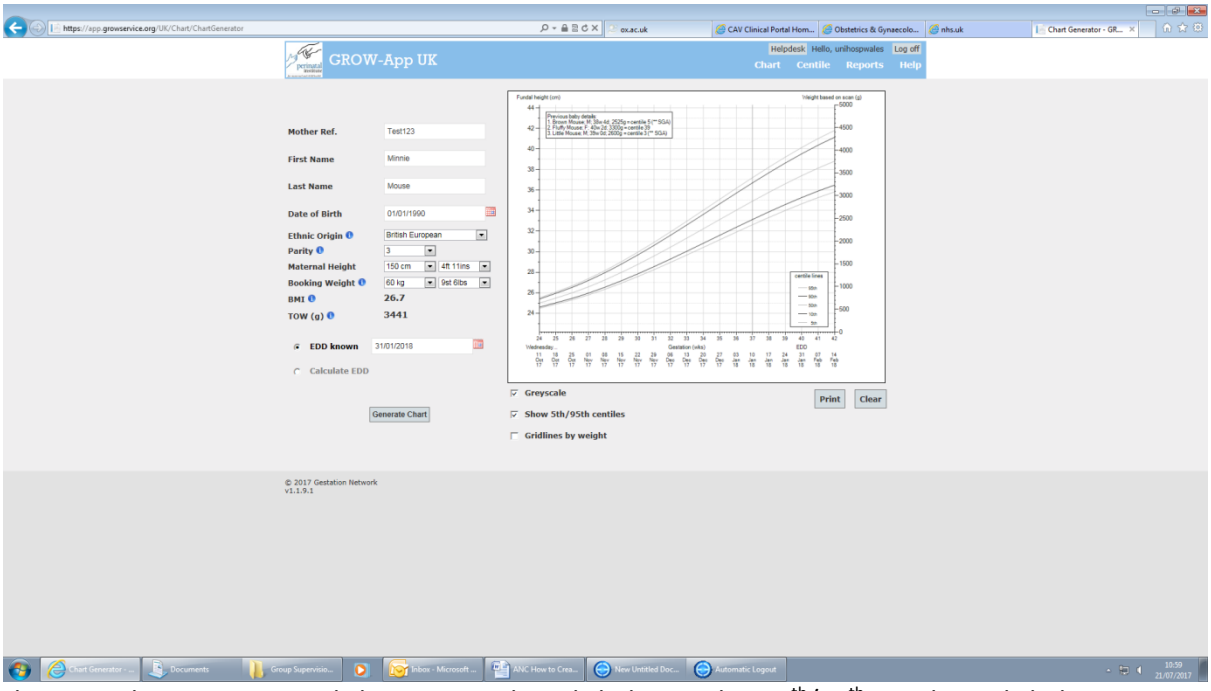
Click to follow link then log in:
User Name: unihospwales
Password: whistles152



To generate a chart, click on Chart

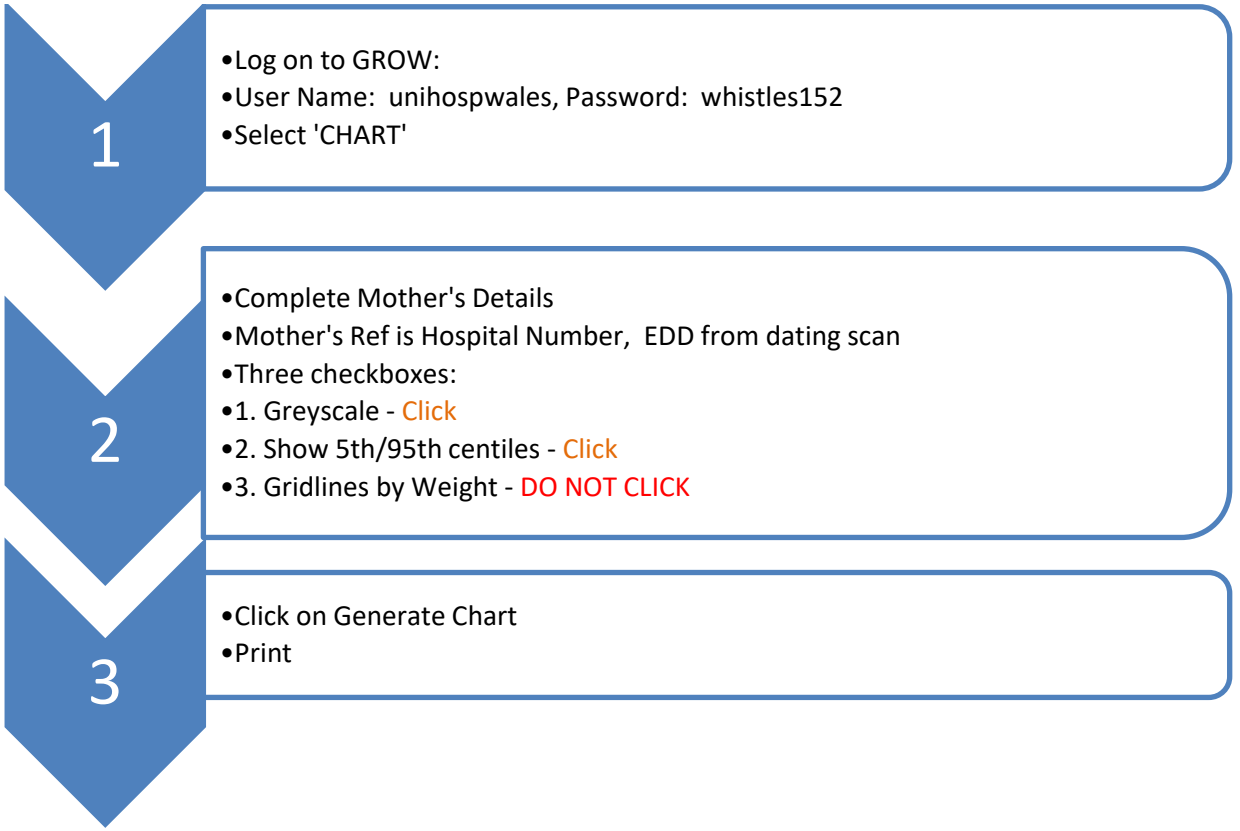


Fill in all boxes. In the box marked Mothers Ref, enter her hospital number. Parity means how many babies more than 24 weeks the woman has carried, regardless of outcome. E.g. if she has been pregnant five times, had two live births at 40 weeks, one 12 week miscarriage and one 26 week stillbirth her Parity would be 3. You may see midwives or doctors writing 2+1 for this but when entering the GROW chart data, her parity would be 3. EDD must be entered from the dating scan date, unless it is an IVF pregnancy in which case you must use the EDD provided by the IVF clinic. Fill in the other details and click on 'Generate Chart'



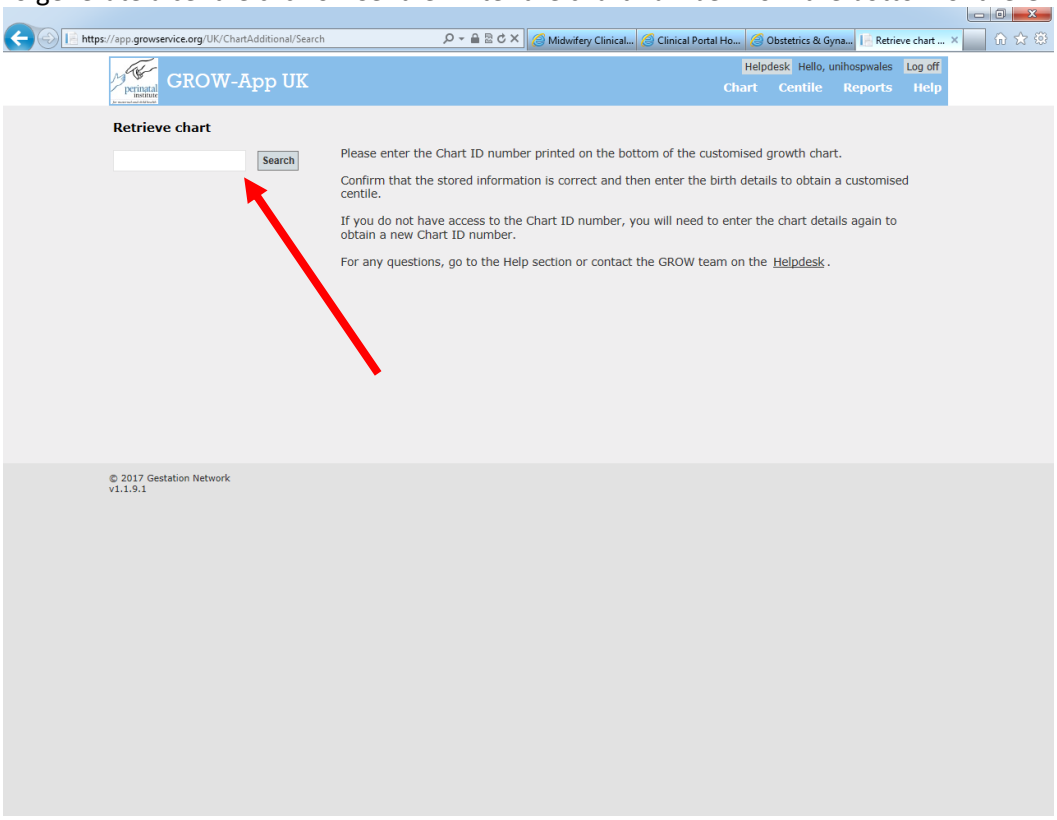
There are three options to click: 1. Greyscale – click this, 2. Show 5th/95th centiles – click this, 3. Gridlines by weight – **DO NOT CLICK THIS.** **Then click on print to produce your chart**

FLOWCHART

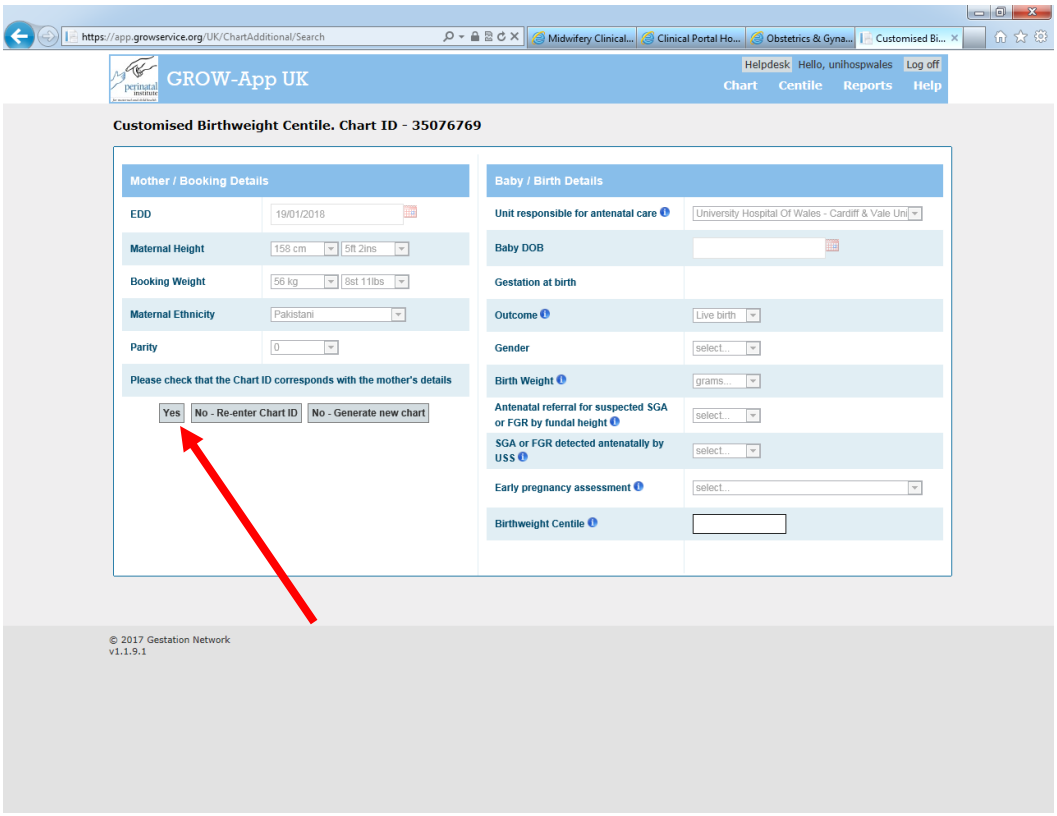

1
•Log on to GROW:
•User Name: unihospwales, Password: whistles152
•Select 'CHART'
2
•Complete Mother's Details
•Mother's Ref is Hospital Number, EDD from dating scan
•Three checkboxes:
•1. Greyscale - Click
•2. Show 5th/95th centiles - Click
•3. Gridlines by Weight - DO NOT CLICK
3
•Click on Generate Chart
•Print

9.4 How to Generate a Birthweight Centile

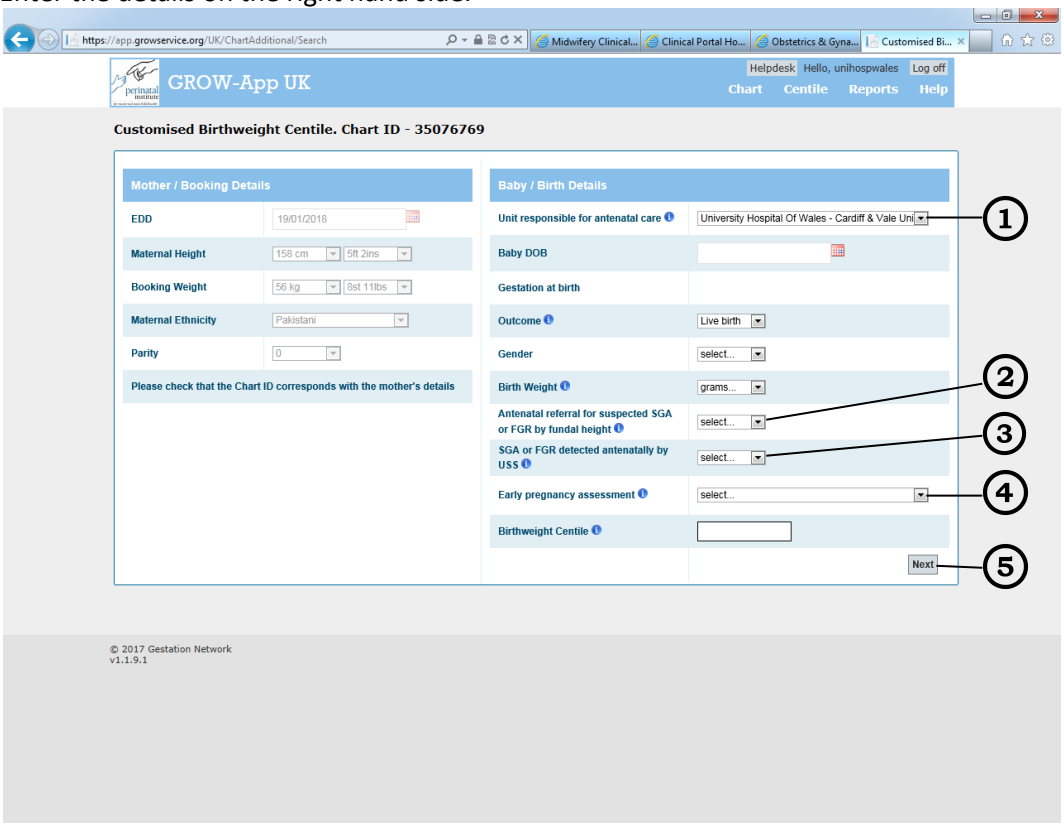
To generate a centile click on Centile. Enter the chart number from the bottom of the GROW chart and click Search.



Check the woman's details and confirm they are correct by clicking **YES** on the bottom left



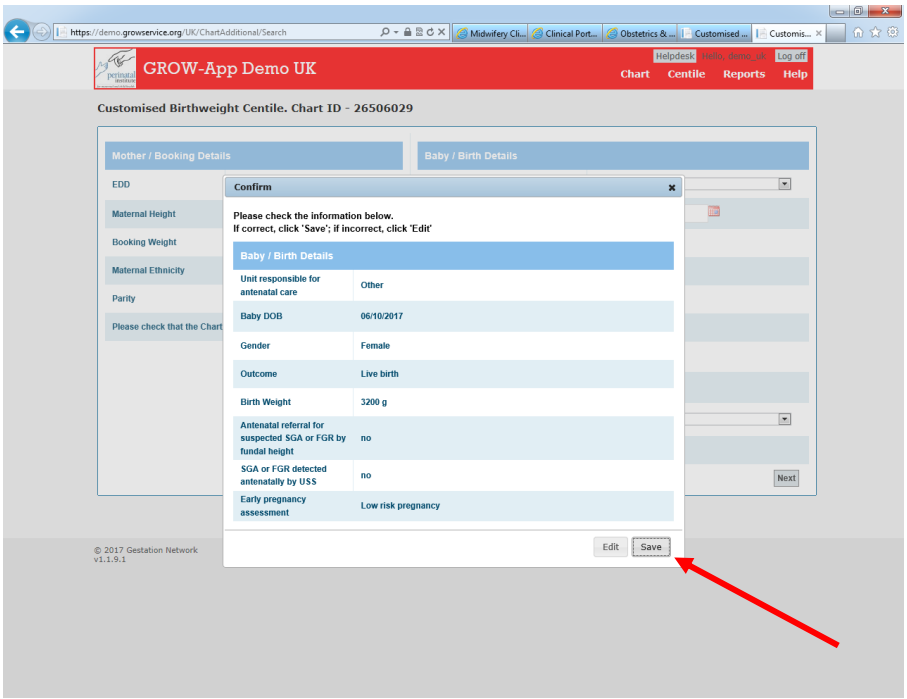
Enter the details on the right hand side.



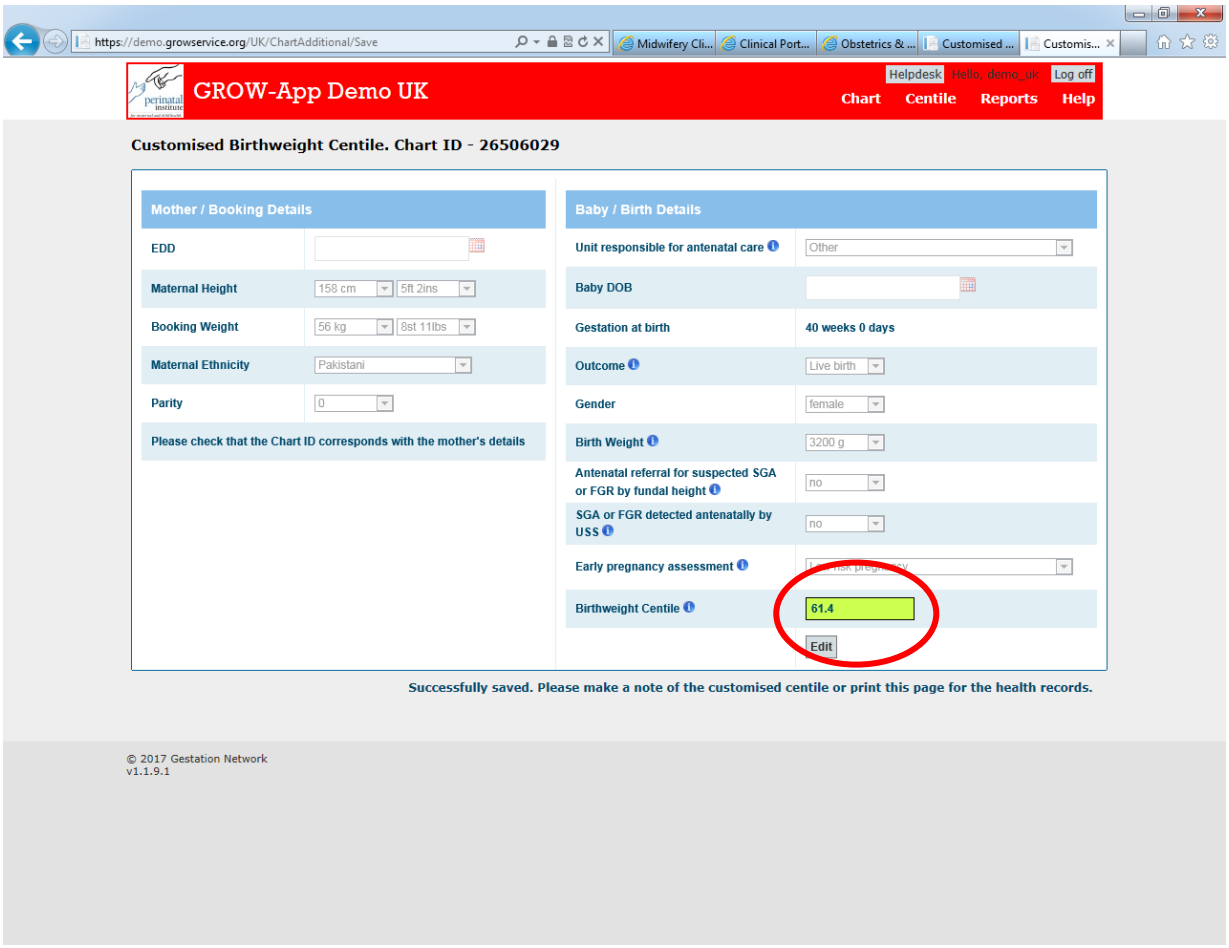
1. If a woman has had her antenatal care in another health board select the correct unit.
2. If a woman has been referred for USS following an SFH measurement select **YES**.
3. Select **YES** if USS showed baby was <10th centile, slow growth or abnormal dopplers.

4. The risk assessment question refers to the risk of fetal growth restriction specifically. Please refer to GAP criteria to idenitfy the risk.
5. Click **NEXT**.

Check the details are correct and click **SAVE**:



The birthweight centile will now be displayed:



The background colour will be red if <10th or >90th centile.

This number should be entered into the maternity information system (including the decimal place).

9.5 Fundal height measurement and referrals for Ultrasound

Risk Assessment for serial USS is completed at your dating scan as part of your screening appointment (or later if missed) using the **risk assessment sticker**.

Serial USS should be every 3-4 weeks from 28/40 – **usual pattern 28, 32, 36 and 39 weeks.**

Fundal Height (SFH) should be measured 2-3 weekly from 28/40 – **usual pattern 28, 31, 34 ,36, 38, 40 and 42 weeks** for all women regardless of parity.

NO SFH measurements are required for women having serial USS.

Measure Fundal Height **2-3 weekly from 28 weeks**

↓

Referral for USS should be made when:

1. **First SFH measurement <10th centile**
2. **Slow growth**: curve linking up plots increasing slower than the curve of the chart
3. **Static growth**: no increase in sequential measurements
4. Clinical suspicion of polyhydramnios
5. See separate flow chart for measurements above the 95th centile, **these DO NOT always need referral for USS**

↓

Contact ANC at UHW via the **email referral** system. ANC will contact the woman with her USS appointment.

USS for reasons 1 – 3 should be as soon as possible, **ideally within 72hrs.**

↓

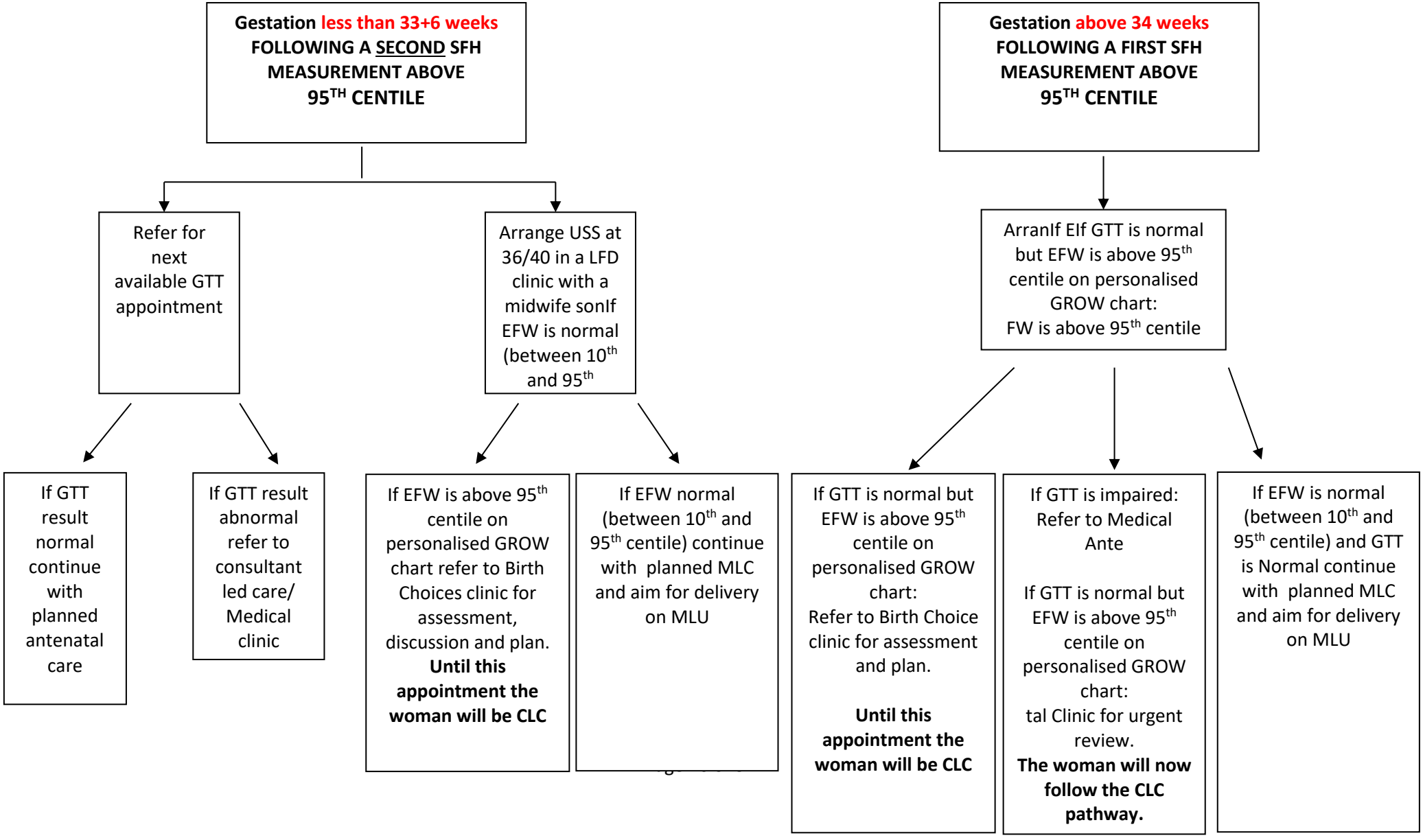
Arrange follow up **at the time of making the referral**. SFH should be **measured again 2-3** weeks after the measurement which prompted the referral. Use the previous measurement as the **new baseline** and use the same referral criteria above.

↓

Remember!

No growth USS can be done before 28 weeks or less than 2 weeks since the last growth measurements. No decisions on growth velocity should be made with a less than 3 week interval.

9.6 Referral process for SFH measurements plotting above the 95th centile (LARGE FOR DATES) on GROW charts FOR LOW RISK WOMEN



9.7 Community Midwife Referral for Growth Ultrasound – Standard Operating Procedure

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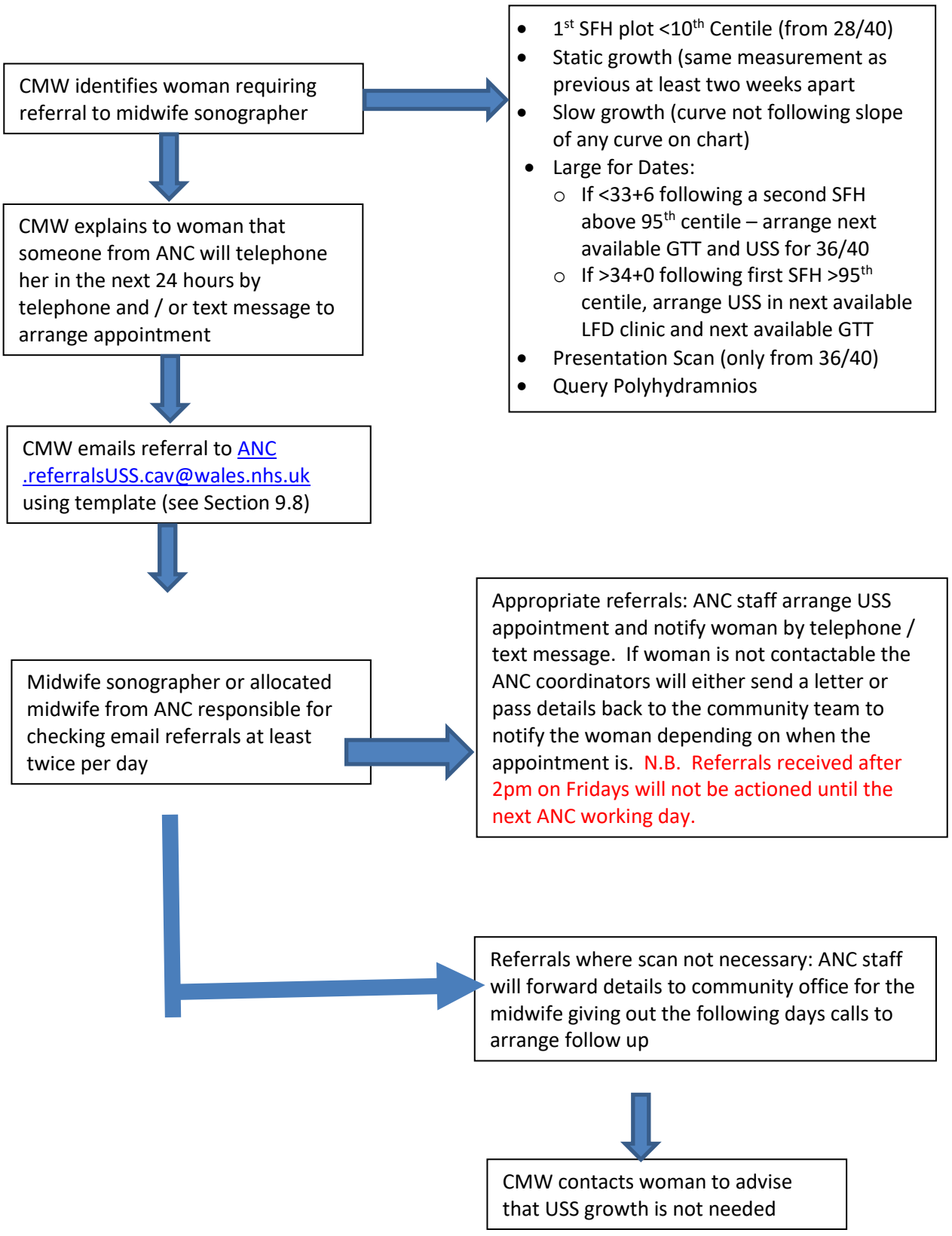

CMW identifies woman requiring referral to midwife sonographer
1st SFH plot <10th Centile (from 28/40)
Static growth (same measurement as previous at least two weeks apart
Slow growth (curve not following slope of any curve on chart)
Large for Dates:
If <33+6 following a second SFH above 95th centile – arrange next available GTT and USS for 36/40
If >34+0 following first SFH >95th centile, arrange USS in next available LFD clinic and next available GTT
Presentation Scan (only from 36/40)
Query Polyhydramnios
CMW explains to woman that someone from ANC will telephone her in the next 24 hours by telephone and / or text message to arrange appointment
CMW emails referral to ANC .referralsUSS.cav@wales.nhs.uk using template (see Section 9.8)
Midwife sonographer or allocated midwife from ANC responsible for checking email referrals at least twice per day
Appropriate referrals: ANC staff arrange USS appointment and notify woman by telephone / text message. If woman is not contactable the ANC coordinators will either send a letter or pass details back to the community team to notify the woman depending on when the appointment is. N.B. Referrals received after 2pm on Fridays will not be actioned until the next ANC working day.
Referrals where scan not necessary: ANC staff will forward details to community office for the midwife giving out the following days calls to arrange follow up
CMW contacts woman to advise that USS growth is not needed

9.8 Email Template for Community Midwife Referrals for Growth Ultrasound Scan.

This must be emailed to ANC.referralsUSS.cav@wales.nhs.uk. This email address will be monitored at least twice per day by ANC staff.
If USS is not indicated the midwife giving out calls on the next days will request a midwife from your team contact the woman, if in doubt, refer to GAP guideline.
These women will be the responsibility of community midwifery to follow up.
Please explain to the woman that someone from ANC will contact her within the next working day to arrange an appointment. Ensure telephone contact details are correct

Name	
Hospital Number	
CLC/MLC	
Relevant Clinical Details	
Telephone Number	
EDD	
Gestation Today	

Indication for USS
• 1st SFH <10th centile (from 28/40)
• Static Growth (same measurement as previous, two weeks apart)
• Slow growth (curve not following slope of any curve on chart)
• Large for Dates:
  ○ If <33+6 following a second SFH above 95th centile – arrange next available GTT and USS for 36/40
  ○ If >34+0 following first SFH >95th centile, arrange USS in next available LFD clinic and next available GTT
• Presentation Scan (only from 36 weeks)
• Query Polyhydramnios	

Date of Last USS • USS growth can only be repeated after 14 days	
Date of Next CMW appointment	
Date of next ANC appointment	
Referring Midwife	
Referring Team	
Contact for next working day in absence of Referring Midwife	
Date and Time woman contacted by Clinic Coordinator informing her of appointment – or what action taken if woman not contacted:	

9.9 UA PI SBAR

UMBILICAL ARTERY PULSATILITY INDEX (UA PI)

SITUATION

Umbilical artery resistance index (RI) and pulsatility index (PI) are both well-known indices to describe arterial flow velocity waveforms. They are highly correlated. The current measurement used in Cardiff and Vale is RI. The proposal is to ALSO USE PI from 22nd July 2018.

BACKGROUND

Umbilical artery Doppler is used routinely for fetal surveillance within the departments of Obstetrics, Radiology and Fetal Medicine within the University Hospitals of Wales and LLandough.
It is performed routinely in women having growths scans and for assessment of fetal well-being.

Indications: -

- *Suspected or known small for gestational age (SGA) fetus*
- *The abdominal circumference on the population chart is < 5th percentile*
- *Discrepancy (> 30% difference between head and AC with lower AC percentile*
- *The estimated fetal weight on the GROW chart is < 10th centile*
- *The estimated fetal weight on the GROW chart is dropping centiles by > 30%*
- *Maternal hypertensive disorders*
- *Decreased fetal movements*

ASSESSMENT

The benefits of using Pulsatility Index (PI) over Resistance Index (RI) are as follows: -

1) Safety – for new doctors and locum doctors, likely to be used to working in PI, there is potential to not recognise a raised RI, as the range is lower than PI. This has serious implications.
2) It is considered more up to date measurement, circulated to all O&G trainees in Wales in 2018.
3) It is recommended by International Society of Ultrasound in Obstetrics and Gynecology (ISUOG)
4) It has a linear correlation with vascular resistance.
5) It provides consistency with care in the fetal medicine clinic where PI is more routinely used.
6) It allows calculation of the Cerebroplacental ratio in those pregnancies where information about head sparing may be useful to time delivery.

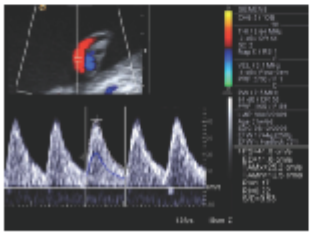
RECOMENDATION

Both measurements to be reported from Monday 22nd July
New colour RI and PI Charts will be placed in the antenatal clinic rooms, In UHL and UHW scan rooms, day assessment unit and the obstetric Assessment unit. The charts are from Viewpoint.

It is anticipated that manual plotting of the PI on the chart will be required.

- 95th percentile is abnormal

If PI is in the normal range, only sample one of the umbilical arteries.
If the PI is abnormal, sample both umbilical arteries and report the lower value
Please report PI in presence of absent or reversed EDF so trend is observed.



*'Bhide A, et al., ISUOG Practice Guide- lines: use of Doppler ultrasonography in obstetrics. Ultra- sound Obstet Gynecol 2013; **41**: 233 – 239*

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