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# North West Regional Guideline for the Detection and Management of Fetal Growth Restriction

**This guideline is for use in conjunction with the North West eFGR Integrated Care Pathway**

Version 2.2i
December 2021

## Document Control

### Ownership

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### Version control

| | |
|---|---|
| Title | **North West Regional Guideline for the Detection and Management of Fetal Growth Restriction** |
| V2.1 | Ratified September 2020 |
| | Revisions:<br>• Inclusion to risk factors for FGR (Previous FGR (<10th centile **AND** born <34 weeks); Inhibin A (2nd Trimester) >2MoM; $aFP$ (2nd Trimester) >2.2MoM<br>• Aspirin: the gestation for aspirin to 8-12 (previous version stated 8); criteria for the prescription of aspirin now includes; <10th centile **AND** born <34 weeks<br>• Inclusion of follow up relating to UAD>95th centile<br>• Change to the calculation of static growth; EFW from 32 weeks can now be used to calculate static growth. A scan interval of more than 4 weeks should not be used.<br>• Clarification of the pathway for static growth (<20g per day by EFW) provided.<br>• Clarification of timing of delivery for women ≥34 weeks based on clinical presentation<br>• Inclusion of; when a baby is born with a birthweight less than the 3rd centile, the placenta should be sent for histology<br>• 5th centile changes to 3rd centile as per text in the main body of the guideline.<br>• Clarification of the pathway for high risk women including management of differing sub-groups<br>• Reference to the 5th centile has been changed to the 3rd centile as per Saving Babies Lives care bundle version 2. This is reflected in the changes to the management lines on the Perinatal Institute customised growth chart |
| V2.2 | **Ratified May 2021** |
| | Revision to section 2.2.2 Women at risk of FGR<br>• Addition of advice for women who have an unknown pregnancy history |
| **V2.2i** | **December 2021** |

### Endorsement process

| | |
|---|---|
| Ratification | V2.2 by GMEC SCN Maternity Steering Group on 4 June 2021<br>**V2.2i circulated December 2021** |
| Application | All Staff |
| Review | Review Date: May 2023<br>Responsibility of: North West FGR Network |


### Acknowledgements

We would like to thank the members of the North West FGR Group for their enthusiasm, commitment and contribution to the development of this North West Fetal Growth Restriction Guideline. We would also like to acknowledge and thank the families who gave their time and experience to create this guideline; together we are committed to driving better outcomes for babies across our region.



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# Contents

# 1 Introduction

Up to 40% of 'unexplained' stillbirths are small for gestation age (SGA) and thought to have suffered fetal growth restriction (FGR sometimes known as IUGR) (Gardosi et al, 2005). In addition, these infants are at increased risk of perinatal hypoxia and acidaemia, operative delivery, neonatal encephalopathy and cerebral palsy (Ribbert et al. 2005, Jacobsson et al 2008).

Not all babies who are SGA (<10$^{th}$ centile birth weight) will have FGR, but the lower the centile the higher the chance that FGR will be present. The management strategies within this guideline recognise this and stratify patients according to risk. This approach aims to increase identification of high-risk pregnancies whilst at the same time reducing unnecessary investigations and iatrogenic deliveries in lower risk women.

# 2 Detail of the Guideline

## 2.1 Risk assessment for FGR and management of women at the booking appointment

Women should be screened at booking and throughout pregnancy for the identification of risk factors for SGA **(**see Appendix 3**)**. Birth weight centiles for previous babies should be calculated using an appropriate birth weight centile calculator.

These centiles must be documented in the antenatal booking proforma. Women with singleton pregnancies and no evidence of diabetes should be assigned to one of 4 groups below at their booking visit:

**Please refer to section 2.2 Antenatal Management for detail on the management of these groups**

**1 Women at low risk of SGA or FGR**

- No identifiable risk factors for SGA or FGR at booking appointment

**2 Women at moderate risk of SGA or FGR**

- Previous SGA (BW centile 3$^{rd}$ -<10$^{th}$)
- Previous stillbirth (>/=10$^{th}$ centile)
- Current cigarette smoker (any number of cigarettes, does not include women who vape)
- Drug misuse
- Women aged ≥40 at booking

**3 Women at high risk of SGA or FGR**

**History (obstetric or medical) of:**

- Maternal medical conditions (for example chronic kidney disease, hypertension, autoimmune disease (SLE, APLS), cyanotic congenital cardiac disease)
- Previous FGR (<3rd centile or <10th centile AND born <34 weeks)
- Hypertensive disease in a previous pregnancy
- Previous Stillbirth (<10th centile)

**Or current pregnancy risk factors developing <24 weeks:**

- PAPP-A < 0.415 MoM
- aFP>2.2 MoM
- Inhibin A >2.0 MoM
- Echogenic bowel
- Significant heavy bleeding in the 1st or 2nd trimester
- Evolving gestational HT or pre-eclampsia > 20 weeks

**4 Women unsuitable for assessment of fetal growth by Fundal Height measurement**

- BMI ≥ 35kg/m2
- Multiple fibroids

2.1.1 Women who stop smoking before week 15 of pregnancy reduce their risk of SGA to the same as a non-smoker (McGowan et al, 2009). In the absence of any additional risk factors these women do not require growth scans in pregnancy.

2.1.2 In women who meet the following criteria:

- **Previous baby with a birthweight centile less than the 3rd centile**
- **Previous baby with a birthweight centile <10th AND delivered less than 34 weeks.**
- **Previous history of pre-eclampsia**

Consider prescribing aspirin***** 150mg once a day (at night) from 8-12 weeks of pregnancy until 36 weeks (Rolnik et al, 2017). Low molecular weight heparin (LMWH) should not be routinely prescribed in the absence of other risk factors, please refer to the *Thromboprophylaxis in Pregnancy and the Puerperium Guideline / name of local guideline*.

*****In relation to FGR specifically, only certain criteria for the use of aspirin are mentioned. Please refer to local risk assessment for use of aspirin for other conditions.

## 2.2 Antenatal management

Following assessment of FGR risk, women should be managed according to Appendix 2. Further details of this management are provided below.

### 2.2.1 Women who are at low risk of SGA or FGR

Fundal height (FH) should be measured and plotted on a customised growth chart at every scheduled antenatal appointment from 26-28 weeks of pregnancy. Only practitioners who have successfully completed annual fundal height competency assessment should undertake assessment of fetal growth by fundal measurement.

Where the FH is less than the 10th centile at the first plot or there is slowing or static velocity on the fetal growth chart and fetal movements are normal, the woman must be seen, within 72 hours, for ultrasound scan of fetal growth, LV and umbilical artery Doppler (UAD) (See Appendix 1). Where movements are reduced the woman must be seen in: *insert name of local service here,* on the same day where they should have a computerised CTG performed and ultrasound scan of fetal growth, LV and umbilical artery Doppler (UAD) arranged for the next working day (See Appendix 1).

### 2.2.2 Women at moderate risk of FGR

Women at moderate risk of FGR should have a one off fundal height measurement to assess fetal growth at 28 weeks of pregnancy. If this measurement plots above the 10th centile on a growth chart no further action is required until the commencement of ultrasound assessment of fetal growth at 32 weeks' gestation. If the fundal height measurement plots below the 10th centile an ultrasound assessment of fetal growth is required within 72 hours.

Ultrasound assessment of fetal growth, umbilical artery Doppler assessment and LV should start from 32 weeks gestation and be repeated every 3-4 weeks (but not exceeding 4 weeks) until delivery. The scan should be reviewed by an appropriately trained person (sonographer / Midwife / Midwife Ultrasound Practitioner / Clinician). The continuation of fundal height measurements is not required once the woman is on a scan pathway. See Appendix 1 & Appendix 2 for the management of abnormal findings.

**Women who have an unknown pregnancy history with regard to gestation at delivery and/or birthweight with no other risk factors should be placed on the moderate risk pathway (serial scans from 32 weeks). These women will often have given birth outside of the UK and may also come from deprived groups. If a woman has had a previous baby of unknown outcome followed by a subsequent birth in the UK then the SBL risk assessment in future pregnancies should be based on the (accurate) outcome of that pregnancy alone. This may mean that she returns to a low risk, non-scan pathway for subsequent pregnancies.**

### 2.2.3 Women at high risk of FGR

Women at high risk of FGR should have Uterine Artery Doppler (UtAD), Umbilical Artery Doppler (UAD) and assessment of fetal growth by ultrasound at 20-24 weeks gestation (the optimum gestation is 22 – 24 weeks).

Women will be assigned a "positive" screen if they have the following: EFW <10$^{th}$ centile, mean uterine artery PI>95$^{th}$ centile for gestation (use Gomez chart; Appendix 4) or uterine artery notching. If only one uterine is obtained, then the PI from this will be used. If neither is obtained, then this should be considered a positive finding (i.e. high risk).

Follow up will be arranged 2-6 weekly depending on the findings:

- Normal uterine artery doppler & EFW <10$^{th}$ centile requires serial ultrasound scans from 26 weeks until delivery
- Abnormal uterine artery doppler (as described above) & EFW ≥10$^{th}$ centile requires serial ultrasound scans from 28 weeks every 3 weeks until delivery
- Abnormal uterine artery doppler and AC or EFW<10$^{th}$ centile for discussion with fetal medicine unit

Some units may wish to assess placental biometry in conjunction with uterine artery dopplers in recognition that small placental size (<10cm diameter) is associated with FGR (Kingdom, 2018) and may constitute a positive screen finding. This is not an obligatory procedure.

Women with none of these features (negative screen) should be seen for ultrasound assessment of fetal growth at 32 weeks gestation (all risks except low PAPP-A, raised inhibin, raised $aFP$) and from 35 weeks gestation (low PAPP-A, raised inhibin, raised aFP). Ultrasound scans should continue every 3 weeks until delivery. Where appropriate fundal height measurements should be conducted until the commencement of serial ultrasound scans.

### 2.2.4 Women unsuitable for assessment of fetal growth by fundal height measurement

Women in whom FH measurement is not possible due to either high BMI (≥35), multiple fibroids or large fibroids should undergo ultrasound assessment of fetal growth from 32 weeks' gestation 3-4 weekly until delivery. Fundal height measurements are not appropriate for this group of women.

### 2.2.5 Management of women when SGA/FGR is detected

If the woman is less than 28 weeks' gestation and the estimated fetal weight when plotted on the customised growth chart is less than the 3$^{rd}$ centile, discussion should take place with the Consultant on call within 24 hours regarding a plan of care, and the woman should also be referred to *insert name of local service here* (see Appendix 2).

Women diagnosed with SGA or FGR (<3rd centile) should be managed in accordance with Appendix 2 and if <32 weeks the NW eFGR integrated care pathway should be commenced (go to: https://www.england.nhs.uk/north-west/gmec-clinical-networks/our-networks/maternity/resources/) (Appendix 6).

At every antenatal visit / attendance all women must be asked about the pattern of fetal movements and advised to report any decrease or cessation of fetal movements and immediately contact: *insert name of local service here*
In the presence of absent/reversed end diastolic flow in Umbilical Artery Doppler (UAD) at less than 32 weeks a Fetal Medicine assessment should be sought within 24 hours. This assessment should include a repeat umbilical artery Doppler assessment, ductus venosus Doppler assessment and a review of fetal growth.

If UAD PI is >95th centile in both vessels (see Appendix 5: Acharya et al, 2005) repeat Doppler twice per week until UAD returns to <95th centile or until delivery is indicated.

Antenatal steroids should not be administered before this assessment has occurred. If assessment is not available within 24 hours, then a computerised CTG should be performed. If computerised CTG criteria are met, then delivery can be postponed until a fetal medicine opinion is obtained at the next possible opportunity. If computerised CTG criteria are not met, then a review of which component this is dependent on should take place by a senior obstetrician. If the component is STV then refer to NW eFGR integrated care pathway (go to: https://www.england.nhs.uk/north-west/gmec-clinical-networks/our-networks/maternity/resources/) (Appendix 6). If the cCTG does not meet the criteria on another component then the decision regarding whether to proceed to delivery or repeat the cCTG is the responsibility of the obstetrician caring for the patient.

In the presence of absent/reversed end diastolic flow in UAD >/=32 weeks delivery should occur as soon as is safely possible following the administration of steroids.

Antenatal corticosteroids - All women with FGR and planned for delivery at less than 35+6 weeks must receive a single course of antenatal corticosteroids. Two doses of betamethasone/dexamethasone 12mg given intramuscularly, or two doses of dexamethasone 12mg intramuscularly, should be given 12-24 hours apart. These are medications are licensed for use in pregnancy but are commonly used within practice. See also GMEC Preterm Birth Guideline.

Inpatient monitoring - Inpatient monitoring should be reserved for women with FGR at less than 32 weeks with absent/reversed end diastolic flow in whom delivery is anticipated.

## 2.3 **Delivery planning**

If delivery when EFW<1.8kg or <35 weeks is planned due to FGR then the availability of neonatal care should be identified prior to induction or caesarean delivery. If no facilities are available, arrangements can be made for transfer, but only if there is a normal computerised CTG and / or a normal Ductus venosus a-wave (if <32 weeks) prior to this occurring. Where this is not the case women must be delivered locally with ex-utero neonatal transfer as needed. The NW eFGR Integrated care pathway should be followed (go to: https://www.england.nhs.uk/north-west/gmec-clinical-networks/our-networks/maternity/resources/) (Appendix 6).

For women <34 weeks' gestation, delivery should usually be by planned caesarean section 24 hours after antenatal steroids. At least 4 hours prior to caesarean section a magnesium sulphate loading dose and infusion should be offered to all women between 24+0 and 29+6 weeks of pregnancy and considered for women between 30+0 and 33+6 weeks of pregnancy. This has been shown to reduce the incidence of cerebral palsy in high risk pre-term infants (RCOG, 2011). The NW eFGR integrated care pathway should be followed (go to: https://www.england.nhs.uk/north-west/gmec-clinical-networks/our-networks/maternity/resources/) (Appendix 6).

2.3.1 For women >34 weeks', timing of delivery depends on the estimated fetal weight centile, growth velocity and the **whole clinical picture.**

Infants with likely FGR (<3rd centile EFW) should be delivered 37-38 weeks. Infants with SGA at moderate risk of FGR (3rd -<10th centile) should be delivered 39-40 weeks.

Delivery from 36 weeks should occur in the absence of adequate growth defined by <20g growth from scans no more than 3 weeks apart and in the presence of other concerning features (reduced fetal movements, any umbilical or middle cerebral Doppler abnormality, cCTG that do not meet criteria, maternal hypertensive disease, abnormal PlGF/sFlt1 ratio or reduced liquor volume). If there are no concerning features, then attempts should be made to prolong pregnancy until 37+0 weeks gestation with additional cCTG monitoring in place if there are either medical or maternal concerns. Calculating growth of <20g should not be used unless EFW is available from scans performed >/=32 weeks.

Infants with abnormal dopplers or MDVP <2cm should be reviewed by a consultant obstetrician and delivery planned (see Appendix 2).).

## 2.4 **Postnatal management**

2.4.1 An individual birth weight centile must be calculated for every baby (live born/ stillborn / multiples) at birth, this must be documented on the neonatal record and in the child's personal health record (red book).

2.4.2 If a baby is born with a birthweight less than 3rd centile, consideration should be given to histopathological examination of the placenta . All low-risk woman who deliver a baby with a birth weight less than the 3rd centile and less than 32+6 weeks must be offered a follow up postnatal appointment.

At this time any potentially identifiable risk factor for FGR in future pregnancies will be discussed. Scientific data supporting a causal association between either methylenetetrahydrofolate reductase (MTHFR) polymorphisms or other common inherited thrombophilias and adverse pregnancy outcomes, such as recurrent pregnancy loss, severe preeclampsia and FGR, are lacking. Specific testing for antiphospholipid antibodies, when clinically indicated, should be limited to lupus anticoagulant, anticardiolipin antibodies and beta 2 glycoprotein antibodies.

See also the guideline for *Hypoglycaemia prevention and Thermoregulation following Birth* for neonatal care planning.

## 2.5 **Communication and Documentation**

All women with learning disabilities, visual or hearing impairments or those whose first language is not English must be offered assistance with interpretation where applicable, and where appropriate a telephone interpreter must be used. It is paramount that clear channels of communication are maintained at all times between all staff, the women and their families. Once any decisions have been made/agreed, comprehensive and clear details must be given to the woman thereby confirming the wishes of the women and their families. The contents of any leaflet issued must be explained in full at the time it is issued. All communication difficulties (including learning difficulties) and language barriers must be addressed as outlined in the previous paragraph at the time the leaflet is issued.

Ensure the provision and discussion of information of the risks and benefits with women during the antenatal, intrapartum and postnatal periods.

Staff should aim to foster a culturally sensitive care approach in accordance with the religious and cultural beliefs of the parents and families in our care.

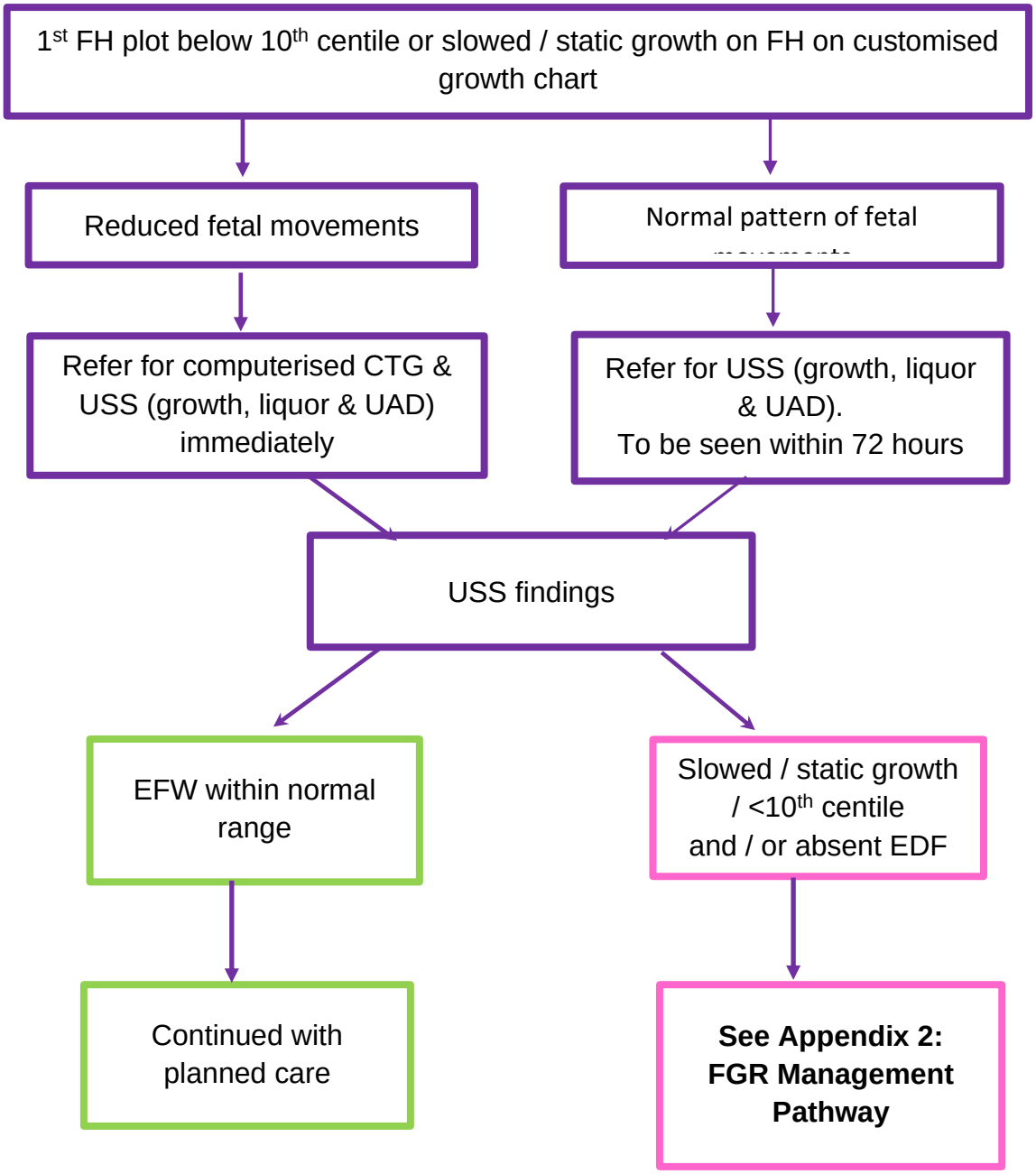
# 3 Equality, Diversity and Human Rights Impact Assessment

The EqIA score fell into low priority; no significant issues in relation to equality, diversity, gender, colour, race or religion are identified as raising a concern.

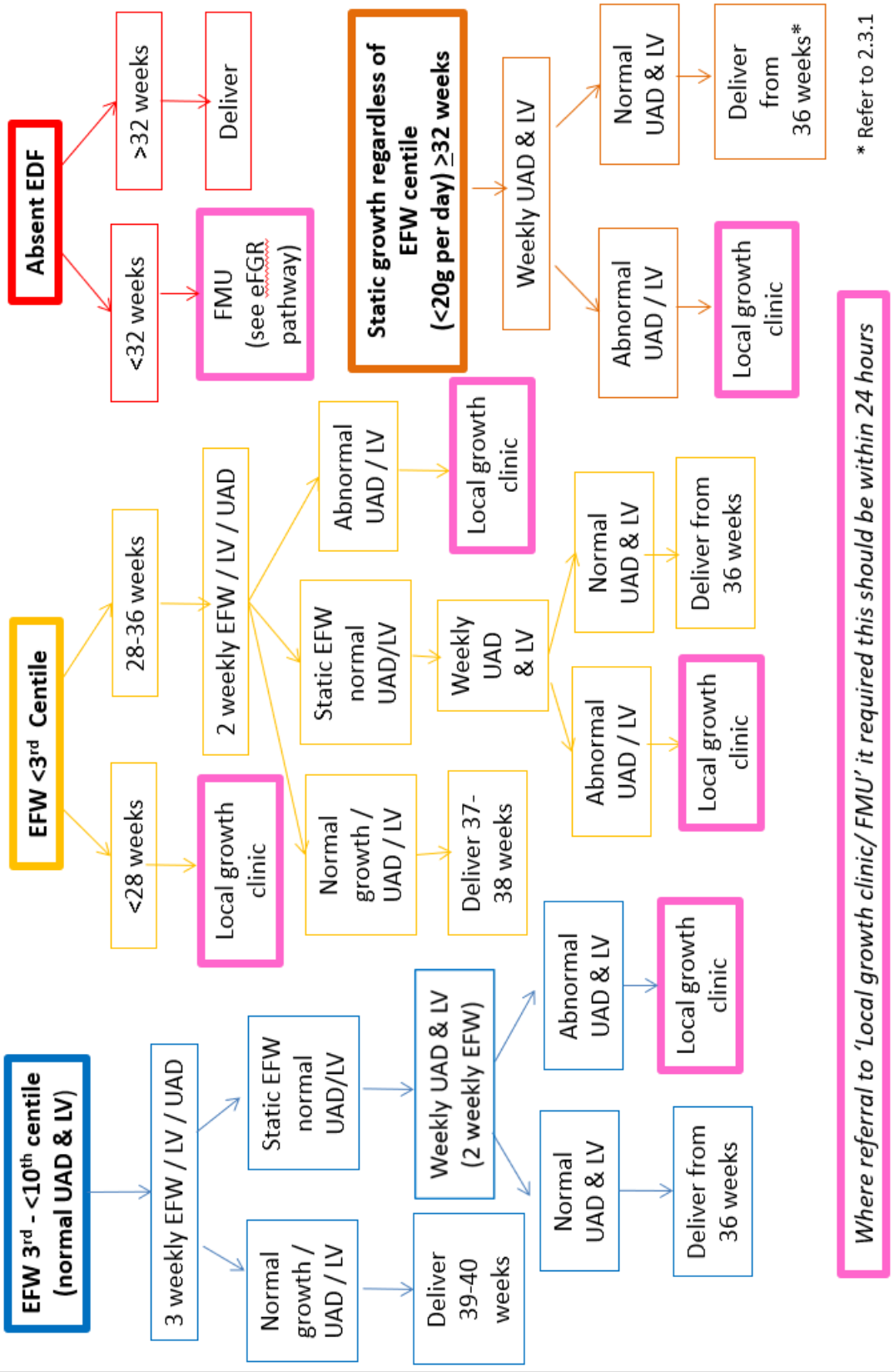
# 4 Consultation, Approval and Ratification Process

This guideline has been approved and ratified in accordance with the agreed process. Refer to Guideline for the Introduction or *Re-approval of a Clinical Guideline for Obstetric Practice.*

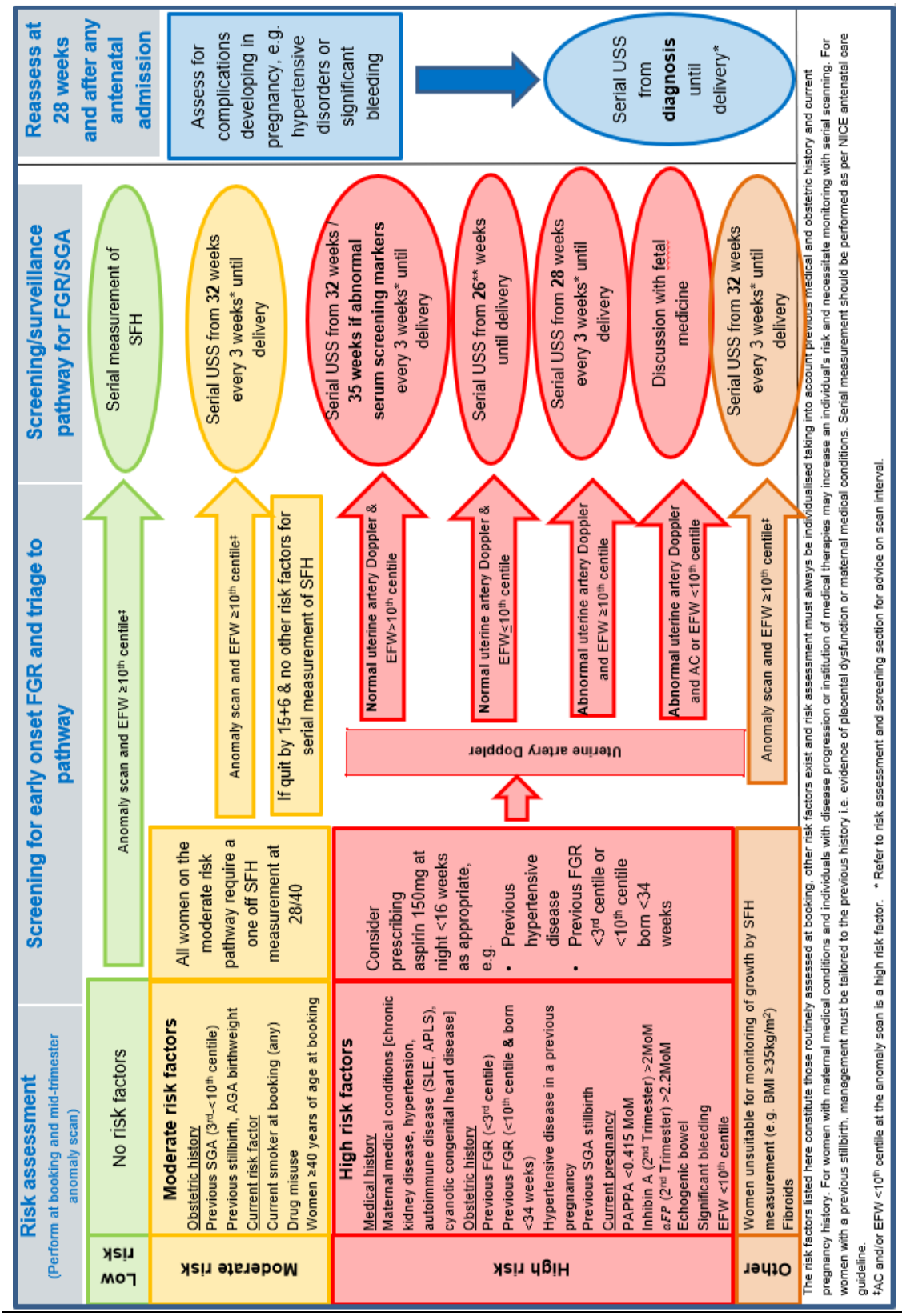
# Appendix 1 - Abnormal Fundal Height (FH) Measurement pathway



# Appendix 2 - FGR Management Pathway



# Appendix 3 - Risk assessment, surveillance pathway and management of FGR



# Appendix 4 - Reference ranges for uterine artery mean pulsatility index at 11 – 41 weeks of gestation

Table 2 Reference intervals for mean uterine artery pulsatility index

| *GA (weeks)* | *5th centile* | *50th centile* | *95th centile* |
|---|---|---|---|
| 11 | 1.18 | 1.79 | 2.70 |
| 12 | 1.11 | 1.68 | 2.53 |
| 13 | 1.05 | 1.58 | 2.38 |
| 14 | 0.99 | 1.49 | 2.24 |
| 15 | 0.94 | 1.41 | 2.11 |
| 16 | 0.89 | 1.33 | 1.99 |
| 17 | 0.85 | 1.27 | 1.88 |
| 18 | 0.81 | 1.20 | 1.79 |
| 19 | 0.78 | 1.15 | 1.70 |
| 20 | 0.74 | 1.10 | 1.61 |
| 21 | 0.71 | 1.05 | 1.54 |
| 22 | 0.69 | 1.00 | 1.47 |
| 23 | 0.66 | 0.96 | 1.41 |
| 24 | 0.64 | 0.93 | 1.35 |
| 25 | 0.62 | 0.89 | 1.30 |
| 26 | 0.60 | 0.86 | 1.25 |
| 27 | 0.58 | 0.84 | 1.21 |
| 28 | 0.56 | 0.81 | 1.17 |
| 29 | 0.55 | 0.79 | 1.13 |
| 30 | 0.54 | 0.77 | 1.10 |
| 31 | 0.52 | 0.75 | 1.06 |
| 32 | 0.51 | 0.73 | 1.04 |
| 33 | 0.50 | 0.71 | 1.01 |
| 34 | 0.50 | 0.70 | 0.99 |
| 35 | 0.49 | 0.69 | 0.97 |
| 36 | 0.48 | 0.68 | 0.95 |
| 37 | 0.48 | 0.67 | 0.94 |
| 38 | 0.47 | 0.66 | 0.92 |
| 39 | 0.47 | 0.65 | 0.91 |
| 40 | 0.47 | 0.65 | 0.90 |
| 41 | 0.47 | 0.65 | 0.89 |

Transvaginal and transabdominal ultrasound examinations were performed on pregnancies at 11–14 weeks and 15–41 weeks, respectively. GA, gestational age.

Gómez, O (2008). Reference ranges for uterine artery mean pulsatility index at 11 – 41 weeks of gestation. *Ultrasound Obstet Gynaecol,* 32: 128 – 132. DOI:10.1002/uog.5315. Published online 6th May 2008.

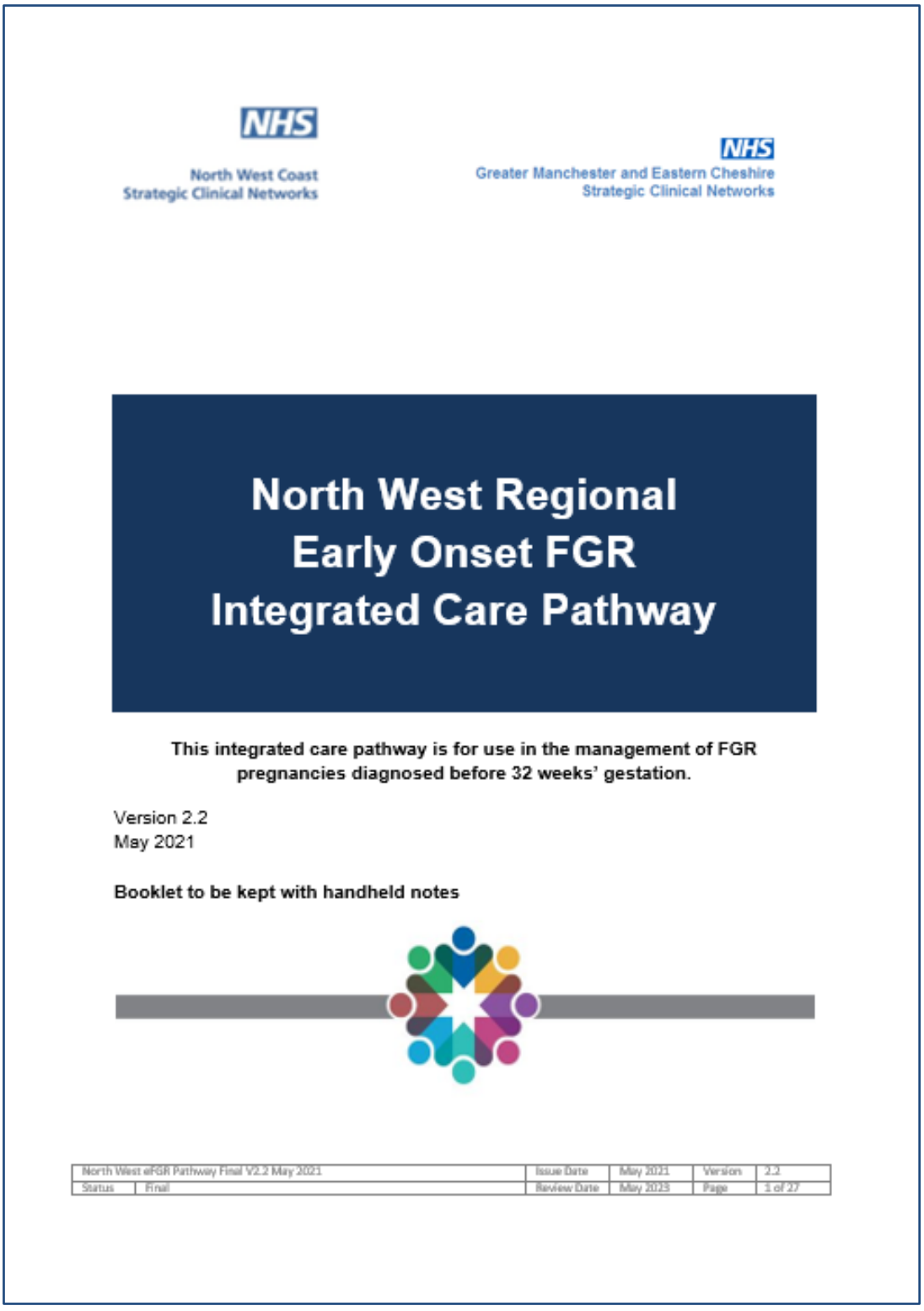
# Appendix 5 - Reference range for serial measurements of umbilical artery Doppler indices in the second half of pregnancy

| | Percentile | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Gestation (wk) | 2.5th | 5th | 10th | 25th | 50th | 75th | 90th | 95th | 97.5th |
| 19 | 0.97 | 1.02 | 1.08 | 1.18 | 1.30 | 1.44 | 1.57 | 1.66 | 1.74 |
| 20 | 0.94 | 0.99 | 1.04 | 1.14 | 1.27 | 1.40 | 1.54 | 1.62 | 1.70 |
| 21 | 0.90 | 0.95 | 1.00 | 1.10 | 1.22 | 1.36 | 1.49 | 1.58 | 1.65 |
| 22 | 0.87 | 0.92 | 0.97 | 1.07 | 1.19 | 1.32 | 1.46 | 1.54 | 1.62 |
| 23 | 0.84 | 0.89 | 0.94 | 1.04 | 1.15 | 1.29 | 1.42 | 1.50 | 1.58 |
| 24 | 0.81 | 0.86 | 0.91 | 1.00 | 1.12 | 1.25 | 1.38 | 1.47 | 1.55 |
| 25 | 0.78 | 0.83 | 0.88 | 0.97 | 1.09 | 1.22 | 1.35 | 1.44 | 1.51 |
| 26 | 0.76 | 0.80 | 0.85 | 0.94 | 1.06 | 1.19 | 1.32 | 1.41 | 1.48 |
| 27 | 0.73 | 0.77 | 0.82 | 0.92 | 1.03 | 1.16 | 1.29 | 1.38 | 1.45 |
| 28 | 0.71 | 0.75 | 0.80 | 0.89 | 1.00 | 1.13 | 1.26 | 1.35 | 1.43 |
| 29 | 0.68 | 0.72 | 0.77 | 0.86 | 0.98 | 1.10 | 1.23 | 1.32 | 1.40 |
| 30 | 0.66 | 0.70 | 0.75 | 0.84 | 0.95 | 1.08 | 1.21 | 1.29 | 1.37 |
| 31 | 0.64 | 0.68 | 0.73 | 0.82 | 0.93 | 1.05 | 1.18 | 1.27 | 1.35 |
| 32 | 0.62 | 0.66 | 0.70 | 0.79 | 0.90 | 1.03 | 1.16 | 1.25 | 1.32 |
| 33 | 0.60 | 0.64 | 0.68 | 0.77 | 0.88 | 1.01 | 1.14 | 1.22 | 1.30 |
| 34 | 0.58 | 0.62 | 0.66 | 0.75 | 0.86 | 0.99 | 1.12 | 1.20 | 1.28 |
| 35 | 0.56 | 0.60 | 0.64 | 0.73 | 0.84 | 0.97 | 1.09 | 1.18 | 1.26 |
| 36 | 0.54 | 0.58 | 0.63 | 0.71 | 0.82 | 0.95 | 1.07 | 1.16 | 1.24 |
| 37 | 0.53 | 0.56 | 0.61 | 0.69 | 0.80 | 0.93 | 1.05 | 1.14 | 1.22 |
| 38 | 0.51 | 0.55 | 0.59 | 0.68 | 0.78 | 0.91 | 1.04 | 1.12 | 1.20 |
| 39 | 0.49 | 0.53 | 0.57 | 0.66 | 0.76 | 0.89 | 1.02 | 1.10 | 1.18 |
| 40 | 0.48 | 0.51 | 0.56 | 0.64 | 0.75 | 0.87 | 1.00 | 1.09 | 1.17 |
| 41 | 0.47 | 0.50 | 0.54 | 0.63 | 0.73 | 0.85 | 0.98 | 1.07 | 1.15 |

Acharya, G et al (2005). Reference ranges for serial measurements of umbilical artery Doppler indices in the second half of pregnancy. *Am J Obstet Gynecol, Mar; 192(3): 937-44*

# Appendix 6 - NW Early Onset FGR Integrated Care Pathway

https://www.england.nhs.uk/north-west/wp-content/uploads/sites/48/2021/06/North-West-eFGR-Pathway-Final-V2.2-May-2021.pdf



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**North West Regional Early Onset FGR Integrated Care Pathway**

**This integrated care pathway is for use in the management of FGR pregnancies diagnosed before 32 weeks' gestation.**

Version 2.2
May 2021

**Booklet to be kept with handheld notes**

| | | | | | |
|---|---|---|---|---|---|
| North West eFGR Pathway Final V2.2 May 2021 | | Issue Date | May 2021 | Version | 2.2 |
| Status | Final | Review Date | May 2023 | Page | 1 of 27 |

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