University Hospitals of North Midlands NHS
NHS Trust

**Achieving Sustainable Quality in Maternity Services**

# ASQUAM

# Guideline for the Screening, Investigation and Management of the Small for Gestational Age Fetus and Fetal Growth Restriction

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| **Date of Ratification:** | January 2020 |
| **Date of Next Review:** | Interim go live review May 2020<br><br>Major review - January 2023 - pending national guidance |
| **Minor amendment:** | November 2020 |
| **Ratified by:** | Maternity Forum sub group – guideline group |
| **Reviewed by:** | MAU Manager<br>Consultant Obstetrician<br>Registrar |

# VERSION CONTROL SCHEDULE

| Version | Date | Author | Comments |
|---|---|---|---|
| 1 | April 2011 | [redacted] Consultant Obstetrician<br><br>[redacted] Locum Consultant Obstetrician | |
| 2 | October 2015 | Reviewed by [redacted] Consultant Obstetrician and Gynaecologist | Updated as out of date |
| 3 | February 2018 | Reviewed by [redacted] Consultant Obstetrician and Gynaecologist | Minor change: Added Care Pathway and reference for Low PAPP-A |
| 4 | January 2020 | Re-written by, [redacted] (Registrar) [redacted] (Consultant Obstetrician and Gynaecologist) and [redacted] MAU Manager) with acknowledgments to [redacted], Consultant Obstetricians | Extensive changes listed within document |
| 5 | November 2020 | [redacted] Inpatient Matron | Care pathway updated. Women with a low PAPP-A result and normal growth scan should be induced at Term$^{+12-14}$ weeks and not 38 weeks as per previous guideline. |

# Contents Page No.

## Highlighted changes within guidance

BMI 35 or greater now qualifies for monthly serial scans from 26-28 weeks

The integration of the K2 pathways, expansion of midwifery scan review, publication of saving babies lives 2 and the need to simplify the language within the guidance to support teams in providing a safe, quality service required key changes.

Dosage of aspirin for placental protection around pre-eclampsia risk factors has been increased from 75mg/day to 150mg/day until delivery and to begin at booking appointment.

The remit of midwifery scan reviews has been clearly defined **(Section 6 page 13)**

Fetal growth restriction (FGR) has been clearly defined and differentiated from small for gestational age (SGA) **(see Frequently asked questions)**

SGA below 3rd centile should be offered birth at 37 weeks
**(birth means either induction of labour or elective caesarean section)**

SGA below 10th centile should be offered birth at 39 weeks

When women are on a high risk care pathway that includes serial monthly scanning; routine measurement of symphysis fundal height should commence from 36-38 weeks when scanning surveillance ends

Carbon monoxide (CO) monitoring should be documented at the start of the pregnancy and if 4ppm or more should receive serial growth scans under the smoking care pathway

For those mothers not on a care pathway that details serial scans / recent growth scan CO monitoring at 36 weeks of 4ppm or more, a fetal growth scan by 38 weeks is indicated

Low PAPP A pathway is retained as an appendix from the last version of guidance to promote familiarity. Serial scanning should start from 26-28 weeks.

3 types of scans have been defined to promote evidence based clinical use. **(section 1 page 6)**

A lot of significant but non-relevant information has been removed. The guidance assumes a certain level of knowledge and operational process (eg how to use the growth chart on K2 and fetal physiological principles).

The tone on guidance has been changed from 'should be delivered at' to 'birth should be advocated to parents'. This implies that parents should be presented with a discussion of the risks and benefits of intervention and this documented. The results and interpretation of any scan should be agreed with parents and documented.

A flow chart for the management of SGA & FGR have been included as appendices.

Birth for static fetal growth (defined by estimated fetal weight) at 37 weeks or more should occur within 48 hours.

Referrals to fetal medicine can be variable in timescale and need to reconcile the clinical urgency. Referrals to the fetal medicine department should be triaged with 1 working day. This includes assessment of urgency and scheduling of scan by a member of the fetal medicine team.

A FAQ (frequently asked questions) section has been added to make the document more user friendly. It is intended to address common queries and provide further detail for users.

# 1. INTRODUCTION & KEY DEFINITIONS

This guideline is applicable to women with a singleton pregnancy with no known fetal abnormalities.

The aim of this guideline is:

- To demonstrate the framework for screening and management of Small for Gestational Age (SGA) and Fetal growth restriction (FGR).
- To provide clinicians with guidance to identify risk factors, provide management plans and make consistent decisions with respect to birth.
- To help to prevent serious clinical incidence from transcription errors from Viewpoint to K2.
- To demonstrate escalation pathways for fetal medicine opinion.

Plotting of fetal growth can occur within K2 from 24 weeks. Three kinds of fetal growth scan are defined with the guideline to reduce non evidence based use:

**Serial growth scan** – Growth scan of monthly frequency commencing from 26-28 weeks. It is the screening tool within the K2 tool antenatal care pathways to define the fetal growth velocity. When risk factors remain unchanged and the scans define normal growth and liquor additional scans are not thought to be of benefit.

**Fortnightly fetal growth liquor and doppler** – To be used when a change in growth velocity occurs. There is thought to be no benefit in increasing the frequency of scans when normal Dopplers and liquor are present and there has been no change in risk factors.

**Liquor Doppler scan** – this should be requested exceptionally for the indication of altered liquor volume or abnormal dopplers.

**It should not stop caregivers from personalising care and collating all of the risk factors present for mother and baby, nor does it remove the need to consider escalation and a team approach in high risk situations.**

# 2. ASSESSMENT OF RISK FACTORS See appendix 1

There is strong evidence to suggest that FGR is the biggest risk factor for stillbirth. Antenatal detection of growth restricted babies is vital and has been shown to reduce stillbirth risk significantly because it gives the option to consider timely delivery of the baby at risk.

The organisational context of ultrasound screening for fetal growth restriction is based on the definitions used within the Saving Babies Lives 2 document, the high risk antenatal care pathways generated by K2 and the clinical review of scans both by medical teams and the midwifery scan review team.

50-70% of the Small-for-Gestation Age (SGA) fetuses are constitutionally small but healthy. Approximately 10-15% of SGA fetuses are classified to be 'true' FGR cases, and another 10-15% is associated with chromosomal/structural anomalies, or chronic intrauterine infection. Classically these have been defined with a consistent growth velocity below the 10$^{th}$ centile.

FGR fetuses are at greater risk of stillbirth, birth hypoxia, neonatal complications, and impaired neurodevelopment.

SGA fetuses are at increased risk of developing FGR.

## 2.1 History

All women should be assessed at booking for risk factors associated with a SGA fetus/neonate to identify those who require increased surveillance.

Please check the IUGR risk assessment tab in consultation section on K2.

The risk factors for FGR have been based on the referenced RCOG guideline and appendix 3 however minor amendments have been made to update them as listed below:

(Refer to ASQUAM Guidelines for Booking Appointments and Antenatal risk Assessment).

**Low Risk**
No risk factors identified

**Minor Risk Factors**
Maternal age ≥35 years
IVF singleton pregnancy
Nulliparity
BMI <20
BMI 25-34.9
Smoker 1-10 cigarettes per day
Low fruit intake pre pregnancy
Previous pre-eclampsia
Pregnancy interval <6 months

Pregnancy interval >60 months

**Major Risk Factors**
Maternal age >40 years
Smoker >10 cigarettes
Cocaine
Daily vigorous exercise
Previous SGA baby (growth less than 10th centile)
Previous fetal growth restriction (FGR) * see below
Previous stillbirth
Chronic hypertension
Diabetes with vascular disease
A low PAPP-A <0.4 MoM
Renal Impairment
Antiphospholipid Syndrome
Heavy bleeding similar to menses
CO of 4ppm or greater
BMI >35 or weight 100kg
Fetal echogenic bowel

In addition:

Assess for history of placental dysfunction and consider aspirin 150mg at night from booking as appropriate (see 3.1).

* **Definition of FGR in a previous pregnancy as a risk factor:** defined as any of the following:

• early onset placental dysfunction necessitating delivery <34 weeks
• birthweight <10th centile (ideally this should be allied to placental dysfunction however the notes may not be available because the transition to Athena).

# 3. PREVENTATIVE INTERVENTIONS FOR HIGH RISK PATIENTS

## 3.1 Aspirin

(The administration of aspirin is based on the underlying risk of pre-eclampsia rather than fetal growth restriction. Please see Appendix 10.)

Offer low-dose aspirin (150mg OD from booking until delivery) to women at high risk of pre-eclampsia. To be taken in the evening for maximum effect.

## 3.2 Smoking Cessation

Women who smoke should be offered referral for smoking cessation advice.

### 3.3 Carbon Monoxide Monitoring

Carbon Monoxide (CO) Monitoring is offered to all patients at booking and 36 weeks. A score of 4ppm or more at booking is an indication for the K2 care pathway for smoking to be applied that includes monthly serial scans from 26-28 weeks. When a reading of 4ppm or more at 36 weeks is found a fetal growth scan by 38 weeks should be carried out (if serials scans are not already in place or a fetal growth scan has been done in the last 2 weeks).

## 4. SCREENING FOR SMALL FOR GESTATIONAL AGE & FETAL GROWTH RESTRICTION

Although SGA and FGR have similar methods of screening and management plans, they are distinct clinical entities as described in the FAQ of Appendix 6.

Screening includes the following elements:

- Accurate determination of the gestational age.
- Abdominal palpatation to determine symphysis fundal height (SFH)
- Customised fetal growth chart on K2 from 25 weeks gestation for Primigravida and 28 weeks gestation for Multigravida.
- Serial fetal growth scans commencing from 26+0-28 weeks within the context of the K2 antenatal care bundles.
- Assessment of fetal well-being when an SGA fetus or FGR fetus is diagnosed (explained below)

### 4.1 Determination of Gestational Age

Dating ultrasound in the first trimester provides the most accurate method. At UHNM the EDD (estimated due date) is based on the CRL (crown rump length) at the 11-13 weeks scan, or HC (head circumference) if late booker (14+ weeks).

### 4.2 Symphysis Fundal Height Measurement (SFH) See Appendix 2

The ability of SFH measurements to detect SGA is limited. Physical examination of the abdomen by inspection and palpation detects as few as 30% of SGA fetuses. Therefore should not be used as the sole method of detecting SGA.

Community midwives should undertake serial SFH measurements from 25 weeks for Primigravida and 28 weeks for Multigravida women. This measurement should be documented on K2.

**SFH should not be plotted on the growth chart at less than 2 weekly intervals or if an USS has been plotted within the previous 2 weeks.**

**For high risk women who are receiving serial ultrasound growth scans as part of a high risk care bundle, serial measurements of SFH are not required until 36-38 weeks when scan surveillance end.**

Women in whom the measurement of SFH is inaccurate (BMI >35, large fibroids and polyhydramnios) should be referred for monthly ultrasonographic serial assessment of fetal growth from 26-28 weeks.

**Measuring SFH**

The SFH should be performed from 25 weeks in Primigravida and 28 weeks gestation in Multigravida. This should be performed at each antenatal visit unless previously measured or had USS performed within the last 14 days.

Explain the procedure to the mother and gain verbal consent.

Wash hands.

Have a non-elastic tape measure to hand.

The fundal height measurement should be performed with the woman in a semi-recumbent position, with an empty bladder and non-contracting relaxed uterus.

Expose enough of the abdomen to allow a thorough examination.

The clinician should use both hands to perform an abdominal palpation and after identifying the highest point of the uterine fundus, leaves one hand on the fundus.

A non-elastic tape measure, starting at zero, should be used, placed on the highest part of uterine fundus (which might not be midline) and drawn down to the top of the symphysis pubis (midline) and the number read in whole centimetres (CM).The tape measure should stay in contact with the skin.

To avoid bias the tape measure should be used with the cm side hidden.

The result should be plotted on K2.

The customised SFH chart generated by K2 is adjusted for physiological variables such as maternal height, weight, parity. Use of such charts was found to result in improvement in sensitivity (29% and 48% using non-customised and customised charts, respectively), resulting in increased antenatal detection of SGA babies with a reduction in unnecessary hospital investigations for fetal growth.

**SFH Indications for a Growth Scan and management**:

First SFH measurement below the 10th centile at 25 or 28 weeks gestation.

Static growth: no increase in sequential measurements.

Slow growth: curve not following slope on any curve on the chart.

If the EFW is >10th centile and normal LV and Doppler the woman should return to serial SFH measurements and routine antenatal care.

If the SFH continues to measure along the same curvature there is no need to repeat the USS.

If there is a further fall in the SFH measurement a repeat fetal USS should be requested.

If the EFW falls below the 10th centile refer to Consultant care in ANC within the week.

### 4.3 Serial Growth Scans From 26-28 Weeks Within the K2 Care Bundles on Athena

Explanation of the findings of the growth scan and documentation of this should be carried out during every consultation.

Dedicated K2 Care bundles exist for the **major FGR risk factors** described in Appendix 1

In addition serial growth scans should be performed in women who have **3 or more minor risk factors**. Serial growth scans should be performed every 4 weeks. If these factors are entered correctly then K2 should delineate a risk of fetal growth restriction pathway. This should prompt referral into the high risk clinic.

The use of monthly serial scans from 26-28 weeks up to 38 weeks in this fashion makes the outcomes of uterine artery Dopplers redundant (See appendix 3). Serial growth scans are logistically easier to implement and define placental function and fetal growth over a longer timescale. Any referrals should be discussed with fetal medicine team.

It needs to also be recognised that those fetuses who are within the normal range or large for dates may demonstrate fetal growth restriction in late pregnancy, after 35 weeks.

Umbilical artery doppler flow is discussed with in the FAQ (appendix 6).

## 5. MANAGEMENT OF SMALL FOR GESTATION AGE (SGA) AND FETAL GROWTH RESTRICTION (FGR). See Appendix 3 and 4

### 5.1 Management of SGA

If fetal growth is identified below the 10th centile with a normal LV and Doppler then a repeat USS for Growth, LV and Doppler should be requested to coincide with a consultant ANC appointment 14 days after the previous scan. (With these findings Liquor Volume & Doppler scan should not be required between these two scans).

Any growth charted at less than 3rd centile should be considered to be at relatively high risk of difficulties and this requires escalation of care and collation of additional risk factors and managed as fetal growth restriction (see next section). For growth <3rd centile on the first scan at 26 weeks referral to fetal medicine should be considered (see Appendix 5 & 6).

If the second scan identifies linear growth with a normal LV and Doppler then a repeat scan should be carried out every 3 weeks and birth advocated at:

37 weeks (below 3rd centile)

39 weeks (3rd-9th centile)

Weekly LV and Doppler is not indicated in these constitutionally small fetuses. Umbilical artery Doppler itself is of limited value after 36 weeks gestation.

There is recognised inter and intra-observer variation when measuring fetal growth. This needs to be recognised when the subsequent EFW appears to normalise by moving over the 10th centile. In such cases a growth scan within 4 weeks should be considered.

## 5.2 Management of FGR with Normal Doppler and Liquor

Sub-optimal fetal growth is defined as an increase in **EFW <280 grams over 14 days (20 gram per day) from 34 weeks**. Prior to this gestation the definition is still valid but should be considered in tandem with any maternal or fetal risk factors present. **As a rough guide at less than 34 weeks a change of 15 centiles over any interval should prompt medical review**.

Management should be based around serial fortnightly growth scan. Interim liquor doppler scans should not be requested as a matter of routine.

Birth should be offered from 37 weeks ideally and before $37^{+6}$. Earlier delivery should be justified and include documentation of agreement from parents within the antenatal appointment documentation on K2.

Static growth of estimated fetal weight should be considered either an indication to advocate birth with 48 hours (if 37 weeks or greater).

When delivery is not appropriate, static growth at 36 weeks or less should be discussed within the fetal medicine team because of the requirement for middle cerebral artery dopplers to be used within management. (See appendix 4 and 5).

## 5.3 Management of FGR with Abnormal Doppler and Liquor

The clinical relevance of different kinds of abnormal Doppler are discussed in appendix 3 and 4.

An abnormal doppler or liquor volume should raise suspicion of FGR, even on a first scan. It should prompt urgent medical review (usually referral to the concurrent antenatal clinic as a 'walk in consultation' or to the Maternity Assessment Unit) and evaluation of whether gestation is sufficient for birth.

Absent or reversed umbilical doppler flow is an indication for discussion with the Fetal Medicine team and middle cerebral artery dopplers / ductus venosus doppler. If Fetal Medicine assessment is not immediately available then assessment on the Maternity Assessment Unit by the on-call team should be carried out and Fetal Medicine review planned within 2 working days. When birth is not an option twice weekly LV and doppler in fetuses should be carried out with options to increase the frequency (see appendix 4).

The use of computerised CTG should be considered on case by case basis by consultant rather than a routine application. It adds value as dopplers demonstrate increasing abnormality with absent end diastolic flow and decreased liquor. CTG interpretation should be based on reduced short-term variability on Dawes Redmond CTG or recurrent unprovoked decelerations (abnormal CTG). STV <4 should be considered an indication to advocate birth.

Interpretation of amniotic fluid volume should be based on the single deepest vertical pocket (SDVP). SDVP <2cm is considered oligohydramnios.

Biophysical profile (BPP) is no longer used for surveillance in preterm SGA fetuses. It remains non-specific and unable to delineate changes in risk to fetus.

# 6. MIDWIFERY SCAN REVIEW

Midwifery scan reviews are intended to provide a convenient safe service for parents who require an interim growth scan rather than a full antenatal clinic assessment. Their primary remit is review of serial scans within the K2 high risk care bundles, assessment of scans from SFH measurement and assessment of serial scans of SGA fetuses. Consistent fetal growth restriction / growth below the $10^{th}$ centile requires escalation to the medical team. As an essential member of the MDT around parents they may be needed to make decisions in respect to these scans and should be able to obtain support from the antenatal clinic team, the Fetal Medicine team and on-call medical team.

Patients should not become estranged from their named consultant team due to recurrent attendance for midwifery scan review. Where management decision are anticipated there should be an effort to either refer back to antenatal clinic for the next scan.

Whilst the scan review is a useful adjuvant to care it does not replace the need to personalise it and collate the risk factors of the pregnancy as a whole.

Interim liquor doppler scans should not be requested by the team unless supported by medical review.

# 7. TIMING AND MODE OF DELIVERY

**SGA with a normal Doppler**

Growth <3rd centile: If other feto-maternal surveillance findings are normal then birth should be offered from 37 weeks gestation and before $37^{+6}$. Growth 3rd-9th centile: If other feto-maternal surveillance findings are normal then birth should be offered from 39 weeks gestation and before $39^{+6}$.

**Fetal growth restriction with normal Doppler**

Birth should be offered for decreased growth velocity with normal dopplers at 37 weeks.

Where there is static growth, this should be within 48 hours of diagnosis. When less than 37 weeks an individualised plan of care for monitoring and birth should be made by the consultant team.

**Fetal growth restriction with abnormal Doppler**

When there is absent or reversed end diastolic flow in the umbilical artery delivery should be considered by 32 weeks because of the increased risk of placental abruption after this gestation.

When PI or RI are raised but EDF is present birth should be offered by 37 weeks.

# 8. ANTICIPATED PRETERM BIRTH

Offer a course of steroids if delivery between $24^{+0}$ and $33^{+6}$ weeks gestation is expected and thereafter considered up to 36 weeks. Maximum effect is achieved by administration of the complete dosage 48 hours prior to delivery.

Offer Magnesium Sulphate for neurological-protection below or equal to $32^{+6}$ weeks. (see ASQUAM Suspected pre-term labour 24-$36^{+6}$ weeks guideline.)

The Obstetric Consultant to liaise with the Neonatal Unit if planning to deliver a fetus <34 weeks gestation or the EFW is <1800grams.

Arrange Neonatal consultation if the gestation is less than 34 weeks or if the EFW is <1800grams.

Organise a tour of the Neonatal Intensive Care unit when appropriate for the parents.

## 9. EDUCATION AND TRAINING

Education and training of both the guideline and SFH competency should be part of mandatory training. A frequently asked questions document has been added to the guidance to assist this and both common questions that arise during care. (Appendix 6). The Low PAPP A care pathway is also included in Appendix 7 as this remains a relatively new care pathway.

## 10. MONITORING AND AUDIT

(Correlated against SBL2 benchmarking)

The need to monitor/audit the standards set out below will be considered alongside other Directorate requirements and prioritised accordingly. The Directorate Clinical Audit programme is drafted by the Directorate Clinical auditor, in liaison with clinical staff, and approved by the Directorate.

There are three components to audit which require combination to establish a quality assurance framework. These will be finalised with the Saving Babies Lives project midwife.

1. SGA/FGR detection rates and percentage of babies born <3rd centile >$37^{+6}$ weeks' gestation.
2. On-going case-note audit of <3rd centile babies not detected antenatally, to identify areas for future improvement (at least 20 cases per year, or all cases if less than 20 occur).
3. Monitoring of babies born >$39^{+6}$ and <10th centile to provide an indication of detection rates and management of SGA babies.

| Element to be monitored | Lead | Tool | Frequency | Reporting arrangements | Acting on recommendations and lead(s) | Change in practice and lessons to be shared |
|---|---|---|---|---|---|---|
| Guideline content | Guideline Co-ordinator | Guideline Review | Every three years | Labour Ward Forum Subgroup: Guideline Meeting | Required changes to practice will be identified and actioned with the release of the updated guideline. | Required changes to practice will be identified and actioned with the release of the updated guideline. |
| Clinical standards within guideline | Directorate Clinical Auditor | Clinical Audit | As required in relation to other Directorate priorities | Directorate Business, Performance and Clinical Governance Meeting | Required actions will be identified and completed in a specified timeframe as per the audit action plan. | Required changes to practice will be identified and actioned within a specific timeframe as per the audit action plan and, in addition, lessons will be shared with relevant stakeholders as per audit action plan. |

## 11. SUPPORTING REFERENCES


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## Appendix 1 – Screening elements for Fetal growth restriction used within Athena

**Booking Assessment**
First Trimester

**Minor Risk Factors**

Maternal Age ≥35
IVF Singleton Pregnancy
Nullparity
BMI <20
BMI 25-34.9
Smoker 1-10 cigarettes per day
Low Fruit intake pre-pregnancy
Previous Pre-eclampsia
Pregnancy interval <6 months
Pregnancy interval >60 months

**3 or More**

**Major Risk Factors**

Maternal Age > 40
Paternal SGA
Maternal SGA
Previous SGA
Previous FGR
Cocaine
Smoker >10 cigarettes per day
Daily vigorous exercise
Previous Stillbirth
Chronic Hypertension
Diabetes with vascular disease
Renal Impairment
Antiphospholipid Antibody Syndrome
Heavy bleeding similar to menses
PAPP-A <0.4MoM
CO of 4ppm or greater
BMI >35 or weight 100kg
Fetal echogenic bowel

**One Risk Factor**

Consider Aspirin 150mg OD from booking until delivery for women at risk of Pre-Eclampsia

Women unsuitable for monitoring of growth by SFH measurements e.g. large fibroids, BMI >35

Serial assessments of fetal size and umbilical artery Doppler from 26-28 weeks

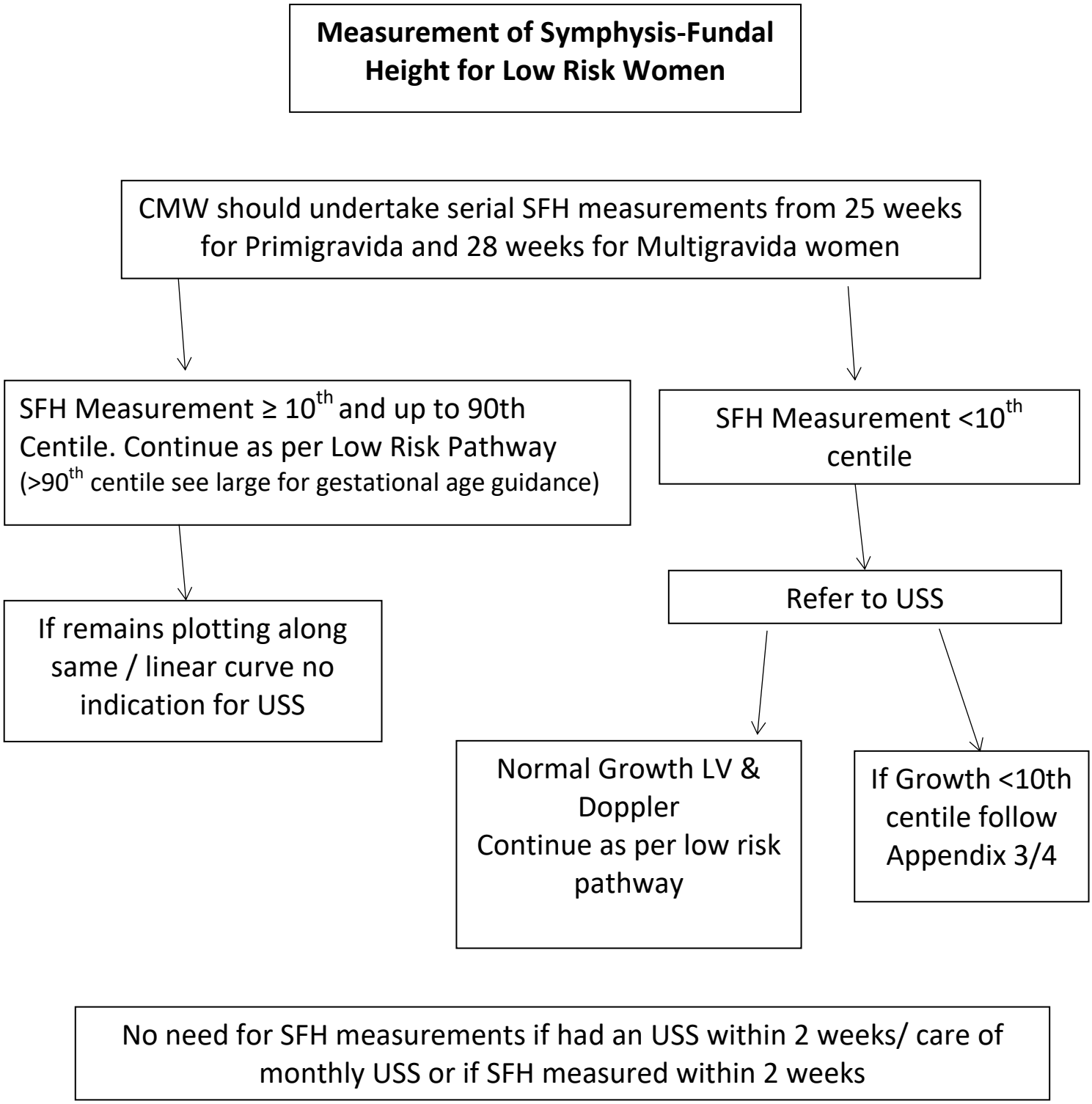
**Reassess During Third Trimester**

Begin serial assessment of fetal size and umbilical artery Doppler if any of the following develop:

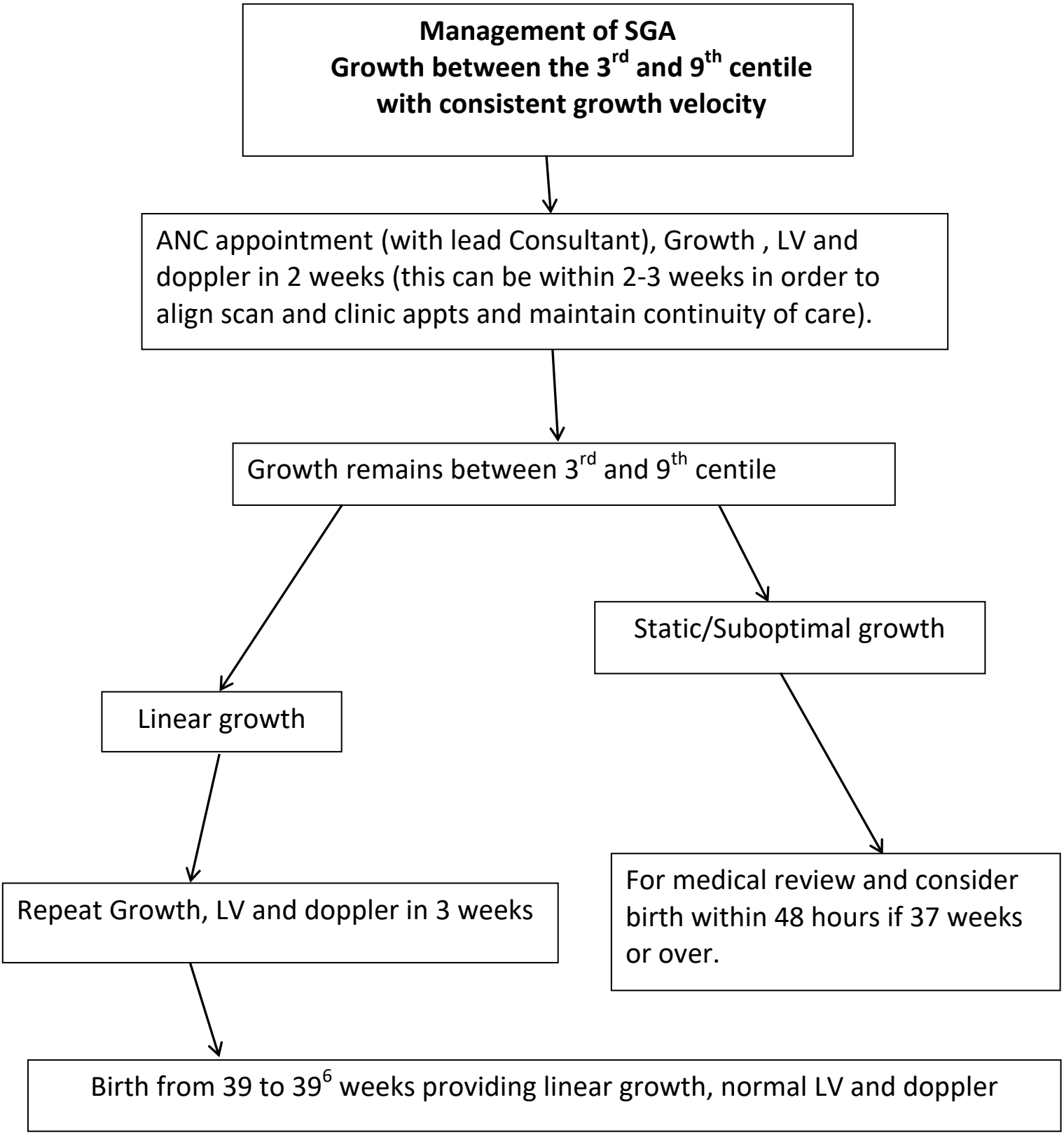
- Severe Pregnancy Induced Hypertension
- Pre-Eclampsia
- Unexplained APH
- Abruption

Risk assessment must always be individualised (taking into account previous medical and obstetric history and current pregnancy history). Disease progression or institution of medical therapies may increase an individual's risk.

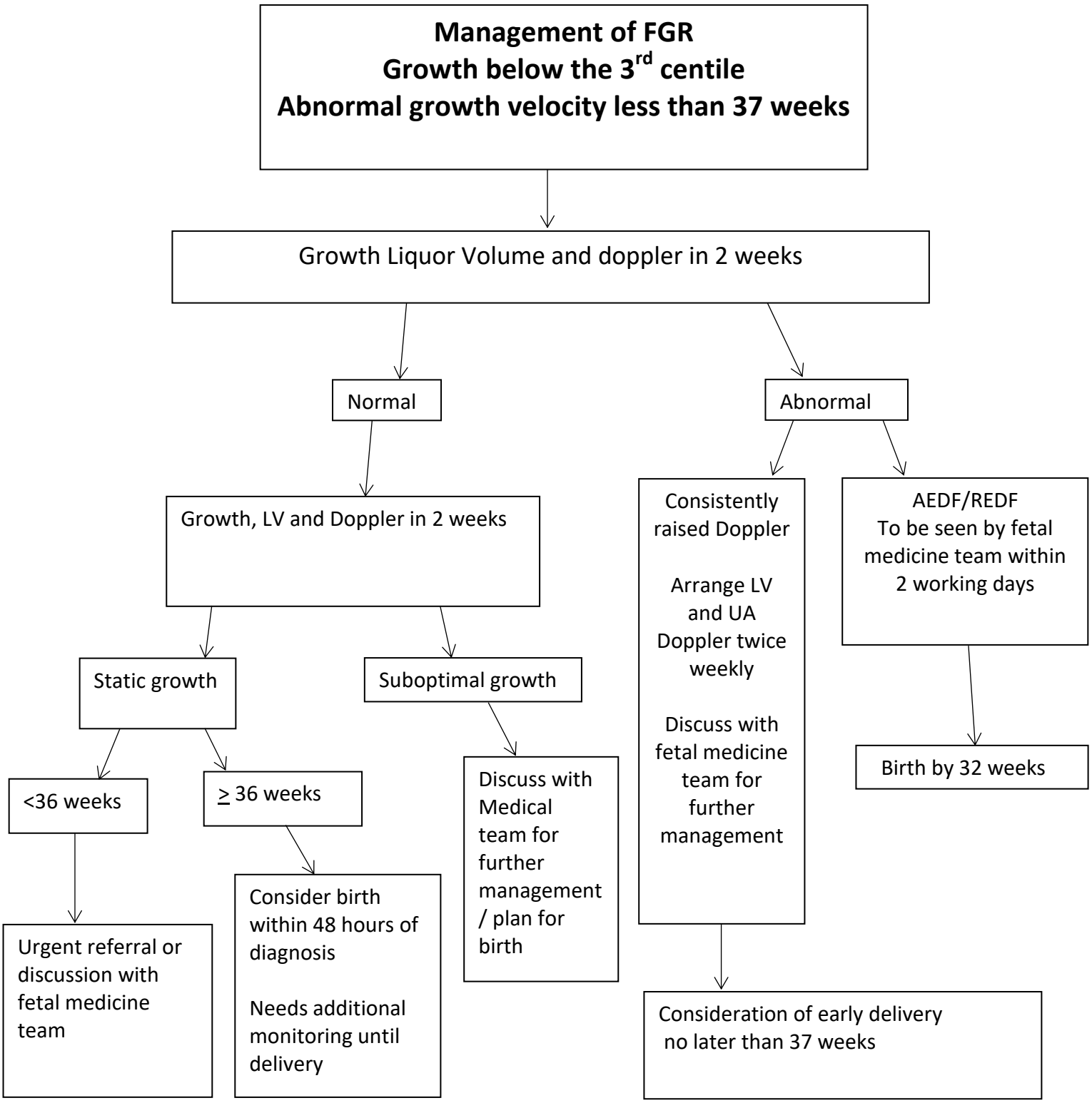
**Appendix 2 – Measurement of Symphysis-Funal Height for Low Risk Women**



**Appendix 3 - Management of SGA Growth between the 3rd and 9th centile with consistent growth velocity**



**Appendix 4 – Management of FGR Growth below the 3rd centile Abnormal growth velocity less than 37 weeks**




Growth <3rd centile should be considered as fetal growth restriction even if there is consistent growth because of high risk for adverse events

## Appendix 5- Indications for referral to Fetal Medicine at UHNM

- Suspected anomaly
- Normal variants: nuchal fold>6mm, ventriculomegaly >10mm, echogenic bowel (density=bone), renal pelvis dilatation (AP>7mm), small measurements (<5$^{th}$ centile)
- Previous anomaly
- Previous genetic abnormality (for diagnostic procedure)
- Monochorionic twins
- Higher order multiples
- Antibody with significant titres/levels
- Fetal echocardiography (usually 22 weeks):
    - Maternal/paternal/sibling with congenital cardiac abnormality (not murmurs, patent ductus arteriosus or aquired cardiac problems eg. Mitral regurgitation)
    - Increased NT of 3.5mm or more.
- Parvovirus seroconversion
- Invasive procedure
- Echogenic bowel
- Polyhydramnios if increased Amniotic fluid index (AFI) >12cms
- Raised Doppler >95$^{th}$ centile
- Absent end diastolic flow<34 weeks gestation
- AEDF on serial growth scan to be discussed with a Fetal medicine Consultant
- Growth <3$^{rd}$ centile on first serial growth scan (26-28 weeks)

## Appendix 6 – Referral Form Fetal Medicine at UHNM

| | |
|---|---|
| Patient details (Sticker) | MBC booked : Y/N<br>Consultant booked: Y/N<br>Name of consultant: |
| Contact telephone number (patient) | |
| Indication for scan (see criteria list) and details | |
| Down's screening Yes/No | Result: |
| EDD | Current Gestation |
| Maternal blood group | |
| Current medication | |
| Allergies<br>(if Yes provide details) | Y/N |
| Previous obstetric history:<br>Date/Gestation/Mode of delivery/Birth weight/<br>Outcome – live birth, stillbirth, neonatal death | |
| Significant medical history | |
| Child protection issues? | Y/N |
| Language/Interpreter needs | |
| Additional information | |
| Date of referral | Date & time appointment |
| Name of referrer : Designation:<br><br>Signature : | |

## Appendix 7 – Frequently asked questions.

### How does the customised growth chart in K2 compare to other customised growth charts?

Saving babies lives 2 states: customised fetal growth charts should be used to improve the sensitivity of screening for fetal growth restriction. There is no evidence to suggest the superiority of one format of customised chart over another in terms of reducing the risk of stillbirth. K2 therefore should be considered equivalent to other sources of customised charts.

### Should CO testing influence the frequency of growth scans?

Raised CO testing should be considered the equivalent of smoking. As such it represents a credible risk factor to fetal wellbeing and prompt serial assessment of fetal growth.

### What do raised umbilical artery dopplers mean?

Umbilical artery dopplers assess the resistance to placental flow. It represents a basic assessment of placental function. This provides information regarding the stability of the fetal circulation, risk of abruption and stillbirth.

Raised doppler means resistance higher than 95$^{th}$ centile of normality. Intermittent absent diastolic flow demonstrates abnormally high resistance and requires assessment within the fetal medicine department.

Reversed end diastolic flow should prompt consideration of urgent delivery or fetal medicine assessment.

### What is the value of the Liquor Volume / Doppler scan

Even with a decreased growth velocity the positive predictive value liquor volume & dopplers in defining the risk of stillbirth is limited. Where previous scans have defined consistently normal liquor and dopplers there is no clinical value in requesting scans more frequently than 2 weekly (fortnightly). This would include attendance with decreased fetal movements where computerised CTG demonstrated normal short term variation.

The use of liquor volume / doppler scans should be restricted to very specific indications. It should be seen as the means to provide additional surveillance to prolong a preterm pregnancy where there are concerns related to liquor volume and umbilical artery dopplers.

## What is the difference between SGA and FGR?

Small for gestation age differs from fetal growth restriction. SGA represent those fetuses that grow at a normal rate but are below the 10$^{th}$ centile and are above the 3$^{rd}$ centile. They are at risk of fetal growth restriction but the need for intervention should be based on changes to the fetal growth scan. When a consistent velocity and normal liquor volume and dopplers exist birth should be advocated to parents at 39 weeks.

Fetal growth restriction represents growth below 3$^{rd}$ centile, a decreased growth velocity or static. It is statistically linked with abnormal placental function and an increased risk of stillbirth. It should be seen as an indication to advocate birth if 37 weeks or more. For pregnancies less than 37 weeks increasing the frequency of fetal growth scans, advocating birth or requesting fetal medicine assessment will all be options that the team need to decide on. This needs to be tempered against the fact that stillbirth remains an unpredictable event and the level of risk in continuance of the pregnancy should be carefully considered.

## Why not induce everyone at 37/40?

Units that implemented the original saving babies lives care bundle were able to reduce the risk of stillbirth by 20% in late pregnancy. However increased levels of intervention have been defined as increasing maternal risk from emergency caesarean section and an increased risk of neonatal unit admission.

Furthermore fetal development demonstrates significant improvement between 37 -40 weeks. The risk adjusted rate of special education needs is 1 in 60 when born at 37 weeks, 1 in 120 at 38 weeks and continues to decrease until 42 weeks.

## What changes in centiles are important?

Increase in EFW <280g over 14 days (20g per day) from 34 weeks / a change of 15 centiles between scans / growth that drops below 10$^{th}$ centile.

## Appendix 8–LOW PAPP-A Pathway (refer to K2)

| **Gestation** (weeks) | **Purpose of Visit** | **Location/ Clinician** | **Appointment** Date & Time |
|---|---|---|---|
| **6-10** | Booking history<br>Booking bloods | CMW | |
| **11-13** | Dating scan (if combined Nuchal Translucency test requested and low Papp-A less than 0.41 MoM for high risk with serial monthly growth scans from 26-28 weeks.<br><br>Refer Consultant for plan of care | Scan/ Consultant | |
| **16-18** | Antenatal examination<br>Offer Quadruple Test | CMW | |
| **18-20** | Anomaly scan | Scan | |
| **25 First pregnancy only** | Antenatal assessment<br>Mat B1 | | |
| **26-28 weeks** | Start serial fetal growth ultrasound | ANC | |
| **28** | Antenatal assessment<br>Repeat bloods<br>Mat B1 (multips) | | |
| | Anti D if required | ANC | |
| | GTT if required | | |
| **31 First pregnancy only** | Antenatal assessment | | |
| **32** | Fetal growth ultrasound | ANC | |
| **34** | Antenatal assessment<br>Birth plan | | |
| **36** | Antenatal assessment | | |
| | Fetal growth ultrasound scan | ANC | |
| **38** | Antenatal assessment | | |
| **40 First pregnancy** | Antenatal assessment<br>Offer membrane sweep | | |
| **41** | Antenatal assessment<br>Offer membrane sweep<br>Book IOL $T^{+12\text{-}14}$ | | |

## Appendix 9–Synonyms

**Low Birth Weight (LBW)** refers to an infant with a birth weight < 2500g

**AC** Abdominal circumference

**AFI** Amniotic fluid index

**AGA** Appropriate for gestational age

**AREDV** Absent or Reversed End–Diastolic Velocity

**BMI** Body mass index

**BPP** Biophysical profile

**CI** Confidence interval

**CM** Centimetres

**CS** Caesarean Section

**CTG** Cardiotocography

**DV** Ductus Venosus

**EDV** End-diastolic velocities

**EFW** Estimated fetal weight

**FGR** Fetal growth restriction

**FHR** Fetal heart rate

**GAP** Growth Assessment Protocol

**GROW** Gestational Related Optimal Weight

**IOL** Induction of labour

**LBW** Low birth weight

**MCA** Middle cerebral artery

**MoM** Multiples of the median

**MGSO4** Magnesium Sulphate

**UAD** Umbilical Artery Doppler

**PAPP–A** Pregnancy associated plasma protein–A

**PI** Pulsatility Index

**RCT** Randomised controlled trial

**RR** Relative risk

**SDVP** Single deepest vertical pocket

**SFH** Symphysis fundal height

## Appendix 10–Risk Assessment for Pre-Eclampsia (indication for Aspirin)

Advise pregnant women at high risk of pre-eclampsia to take 150 mg of aspirin daily from booking until the birth of the baby. Women at **high risk** are those with any of the following:

- hypertensive disease during a previous pregnancy
- chronic kidney disease
- autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
- type 1 or type 2 diabetes
- chronic hypertension

Advise pregnant women with **more than 1 moderate risk** factor for pre-eclampsia to take 150 mg of aspirin daily from booking until the birth of the baby.

Factors indicating **moderate risk** are:

- first pregnancy
- age 40 years or older
- pregnancy interval of more than 10 years
- body mass index (BMI) of 35 kg/$m^2$ or more at first visit
- family history of pre-eclampsia in a first degree relative
- multi-fetal pregnancy