Assessment of Fetal Growth

Unit / Trust: _____

1. BACKGROUND AND INTRODUCTION

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 also 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 FGR; however it is the growth trend that is of more value in predicting poor fetal outcome.

NHS England has made it a priority to reduce stillbirth rates. The care bundle has been developed to include 4 elements:-

- Smoking cessation – carbon monoxide (CO) testing at booking & referral to smoking cessation as appropriate
- Identification and surveillance of pregnancies with fetal growth restriction
- Raising awareness amongst pregnant women of the importance of detecting and reporting reduced fetal movements
- Effective fetal monitoring during labour

Fetal growth restriction is the biggest risk factor for stillbirth. The principle aim of screening and surveillance is to detect fetal growth restriction. Antenatal detection of fetal growth restriction significantly reduces risk; it prompts further investigation, fetal surveillance and timely delivery.
Most instances of fetal growth restriction are late onset; surveillance of all pregnancies is required throughout pregnancy, and should reflect the level of risk

- Low risk = standardised serial fundal height measurements, plotted on a customised growth chart.
- Increased risk = 3 weekly ultrasound assessments of fetal growth throughout the 3rd trimester until delivery.

The aim of this guideline template is to outline the methods used to assess fetal growth and referral pathways utilising customised antenatal growth charts. The template can be adapted to suit local Trust/Health Board needs.

2. 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
- Booking risk assessment

- When and how to measure fundal height using a standardised technique
- When to refer to ultrasound for a growth scan
- Serial growth scans for women at increased risk of fetal growth restriction

This guideline template does *not* seek to cover management of pregnancy once FGR has been diagnosed. This is covered in detail in the RCOG guideline 31 (2013)

3. OBJECTIVES

- To ensure that there is accurate fetal surveillance, through standardised fundal height measurements of low risk women and serial growth scans for increased risk women
- To ensure that serial fundal height measurements are plotted correctly on customised growth charts
- Where growth problems are suspected from fundal height measurements, referral for a growth scan and appropriate further investigations to assess fetal well-being should be undertaken as soon as possible and within at most 72 hours.
- Where a problem has been identified, referral is indicated to an obstetrician/MFM team for discussion and agreement of an appropriate management plan, to be seen as soon as possible.
- To ensure that there is identification of all infants born below the 10^{th} customised centile at birth and appropriate management initiated postnatally.

4. Abbreviations/Definitions

BMI	Body mass index
Centile lines	The lines of growth on the customised growth chart are estimated fetal weight centile lines, 10^{th}, 50^{th} and 90^{th}.
EDD	Estimated date of delivery
EFW	Estimated Fetal Weight
FH	Fundal Height
FGR	Fetal growth restriction / intrauterine growth restriction; defined by - Weight for gestation below the tenth customised centile; and/or - Slow growth or no growth on serial scan; with or without abnormal umbilical or fetal Doppler - Histopathology (post-mortem and/or placental examination)
MFM	Maternal-Fetal Medicine Specialists
OGTT	Oral Glucose Tolerance Test
Sonographer	Practitioner qualified to perform growth scans
SGA	Small for gestational age (includes constitutional and pathological causes)

5. ROLES AND RESPONSIBILITIES

- **To risk assess at booking, during pregnancy and arrange serial growth scanning if increased risk of fetal growth problems or if fundal height measurements not accurate (e.g. raised BMI):**
  - Midwives, Obstetricians, GP's

- **To generate customised growth charts:**
  - ****Add here who will be responsible locally

- **To undertake fundal height measurements and plot on customised charts:**
  - All ante natal care providers (Midwives, Obstetricians, GP's)

- **To measure fetal biometry, calculate EFW and plot on customised charts:**
  - Sonographers, MFM team

6. CLINICAL CONTENT

Customised Growth Charts

The charts are used to plot both FH measurements obtained during clinical examination and EFW following an ultrasound examination. They are customised to each individual taking into account the height, weight, ethnicity, parity of the woman. Birth weights of previous children need to be inputted to identify previous problems with growth, but this does not affect the centiles produced.

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 $10^{th,}$ $50^{th\ and}$ 90^{th} centile lines, (5^{th} and 95^{th} centiles can be printed as an option if required). 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. Mother's name, reference number, and date of birth will appear above the chart. The chart ID number appears in bold at the bottom of the chart.

The charts are very easy to produce and must be generated for women who book at any gestation (recommendation is to generate after the dating scan) The software can be accessed in ***local department**** or via contacting the Perinatal Institute's specialist midwives team at gap@perinatal.org.uk

Measuring fundal height (FH)

Who to measure

Not all pregnancies are suitable for primary surveillance by fundal height measurement, and require ultrasound biometry instead. In most instances, these pregnancies fall into the following categories:-

a. Fundal height measurement unsuitable/inaccurate e.g. large fibroids, BMI ≥ 35, multiple pregnancy.

b. Pregnancy considered increased risk requiring serial ultrasound e.g. Pre-existing diabetes.

Women who are recognised as low risk and suitable for midwifery led care should have serial fundal height measurements undertaken as a primary screening test for fetal wellbeing. These should

commence from 26- 28 weeks gestation.

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 non-elastic 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 FH is explained below the customised growth chart to support standardised practice.

Serial fundal height measurements should be carried out 2-3 weekly from 26-28 weeks gestation until delivery.

Referral to Ultrasound

Indications for a growth scan are:

- First FH measurement below 10th centile (preferably between 26-28 weeks)
- Static growth: no increase in sequential measurements
- Slow growth: based on sequential measurements, the pattern of growth is not following the slope of the curve.
- Excessive growth: curve linking up plots crossing centiles in an upward direction

Note that a first measurement above the 90th centile is NOT an indication for a growth scan. A scan would however be indicated if there was clinical suspicion of polyhydramnios or there was excessive growth on subsequent measurements.

Requests for a growth scan should be made directly to the ****** department*** who will give an appointment as soon as possible and within ****** days***. Arrangements for follow-up by the referrer should be made assuming the scan is normal. If there are concerns regarding the scan, the Sonographer will make the urgent referral to a consultant obstetrician/MFM team. (Locally agreed time scale). See Appendix 1

Serial growth scans for those at increased risk of growth restriction

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. All women should be assessed at booking for risk factors to identify those who need increased surveillance. Women who fall into these categories will need referral to a consultant obstetrician or maternal fetal medicine specialist. The consultant-led team will arrange for serial scans at least every three weeks from 26-28 weeks until delivery (earlier gestation or higher frequency if required in individual cases). These women will ***not*** require plotting of fundal height measurements while such a serial scanning protocol is being followed.

Growth scan requests related to obstetric history:

- Previous birthweight(s) <10th customised centile
- Previous stillbirth

Growth scan requests related to maternal medical history include:

- Chronic hypertension
- Diabetes
- Renal impairment
- Antiphospholipid syndrome
- *Local variances*

Growth scan requests related to current pregnancy

- Maternal age >40 years
- Maternal smoking
- Drug misuse
- PAPP-A <0.415MoM
- Fetal echogenic bowel
- Large fibroids
- BMI > 35
- Multiple pregnancy *
- Severe pregnancy induced hypertension
- Pre-eclampsia
- Unexplained APH
- Concerns related to growth measurements, as listed above

***** *In accordance with RCOG guideline and local multiple pregnancy protocol*

NHS England – Saving Babies Lives – Care Bundle for reducing stillbirth and early neonatal death
(See appendix 2)

Referral following a growth scan (see also RCOG Green Top Guidelines)

These referrals will be made by the sonographer once the growth scan has been completed and the EFW plotted on the customised growth chart (with a circle).

If the EFW plots between the 10th and 90th centile and is following the centile curve, 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).

If the EFW does not plot within the 10th and 90th centile or is not following a centile curve, or there are concerns regarding the liquor volume or umbilical artery Doppler, then the following referrals should be made:

1. EFW above 90th centile (or significantly accelerated / increased growth velocity)

- Refer to ***** for OGTT within 1 week

***** *will refer to either the Diabetic ANC or a Consultant clinic depending on result of OGTT.*

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

- For obstetric review and repeat scan in 2 weeks

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

- For *immediate* obstetric review/MFM team.

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

Following birth

Calculate birthweight centile using postnatal GROW module.

- If <10th centile, for neonatologist review.

7. REFERENCES

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.

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.

Saving Babies Lives – Care Bundle for reducing stillbirth and early neonatal death. Recommendations from the Task and Finish Groups. Draft March 2015 *NHS England*. London. www.perinatal.org.uk/FetalGrowth/NHSE-CB-Element2.aspx

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.

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

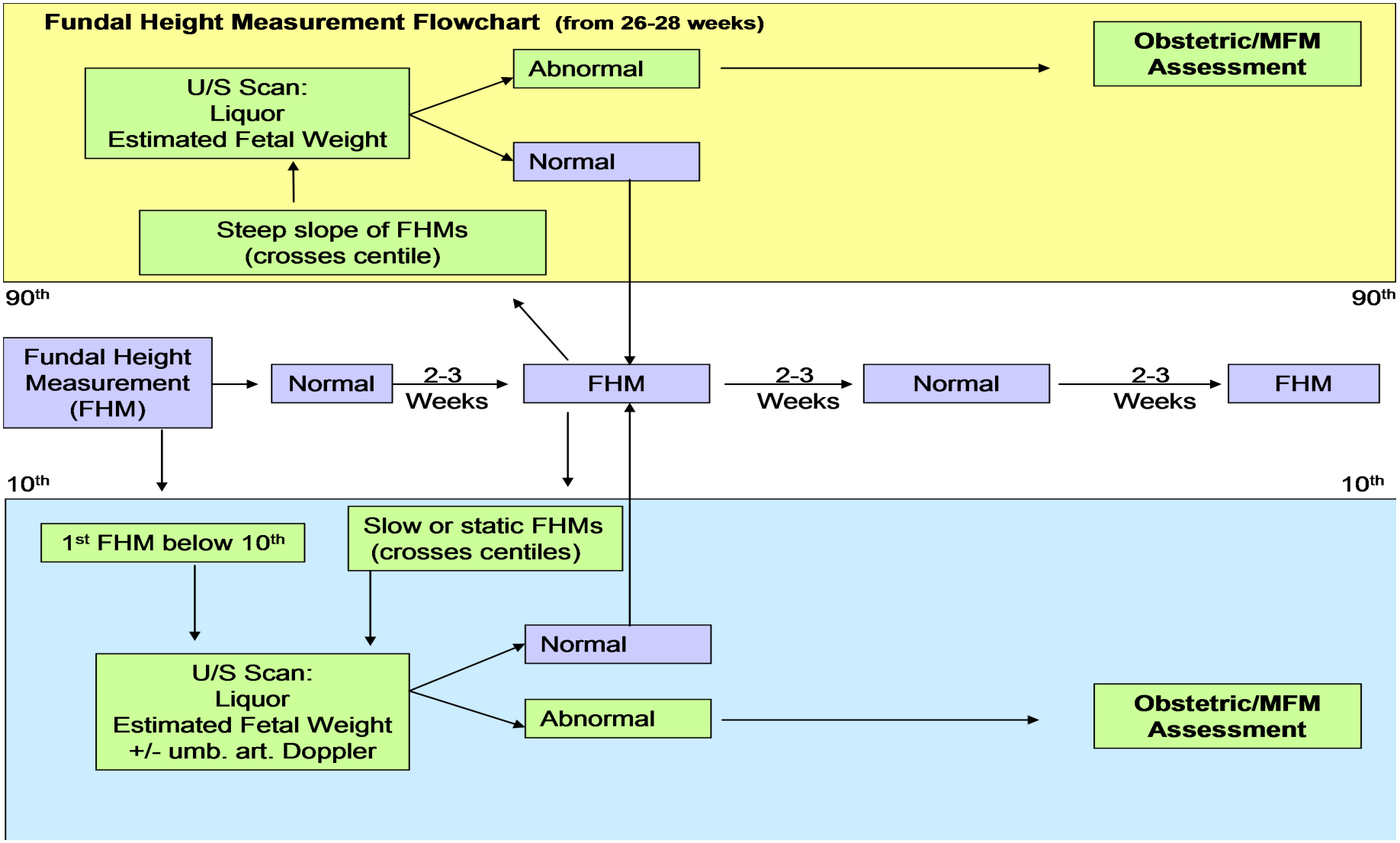
Guidelines

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.

National Institute for Health and Clinical Excellence. Multiple pregnancy. The management of twin and triplet pregnancies in the antenatal period. NICE Clinical guideline (CG129). *NICE* 2011. London.

Appendix 1 Ref: Morse - Best Practice



Appendix 2

Algorithm and Risk Assessment Tool: Screening and Surveillance of fetal growth in singleton pregnancies

Low Risk
☐ No known risk factors

No risk factors

Low Risk Care
Serial assessment (2-3 weekly) of fundal height from 26-28 weeks until delivery
FH measurements plotted on customised chart

Increased Risk: one or more of the following:

Maternal Risk Factors
☐ Maternal age >40 years
☐ Smoker (any)
☐ Drug misuse

Previous Pregnancy History
☐ Previous SGA baby (<10th cust. centile)
☐ Previous stillbirth

Maternal Medical History
☐ Chronic hypertension
☐ Diabetes
☐ Renal impairment
☐ Antiphospholipid syndrome

Unsuitable for monitoring by fundal height- e.g.
☐ Large fibroids
☐ BMI >35

Current Pregnancy Complications
Early Pregnancy
☐ PAPP-A <0.415 MoM
☐ Fetal echogenic bowel
Late Pregnancy
☐ Severe pregnancy induced hypertension or pre-eclampsia (=PIH and proteinuria)
☐ Unexplained antepartum haemorrhage

One or more risk factors

Suspected abnormal growth:
FH <10th centile or not following curve ('crossing centile lines')

Direct referral for assessment (<72 hours) for estimated fetal weight (EFW), liquor volume and umbilical artery Doppler

Normal

Abnormal growth:
- cust EFW <10th centile and/or
- Serial measurements not following curve and/or
- abnormal umbilical artery pulsatility index

Refer to RCOG guidance on management of the SGA fetus

High Risk Care
Serial assessment (3 weekly) of fetal weight and umbilical Doppler from 26-28 weeks until delivery; EFWs plotted on customised chart