

MATERNITY GUIDELINES

Fetal growth surveillance in singleton pregnancies

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Key Points

The essential elements of this guideline are:

- Definitions of Small for Gestational Age (SGA) and Fetal Growth Restriction (FGR)
- Risk factors for SGA/FGR
- Management of women with risk factors
- Routine fundal height assessment
- Frequency of serial ultrasound assessment
- Ultrasound identification of the SGA fetus
- Management following ultrasound assessment

1. Introduction

The purpose of this guideline is to outline the screening and growth surveillance for a singleton fetus.

Small fetuses are divided into:

- normal (constitutionally) small
- non-placenta mediated growth restriction for example, structural or chromosomal anomaly, inborn errors of metabolism and fetal infection
- placenta mediated growth restriction (pathological)

2. Background

Normal (constitutionally) SGA fetuses are at increased risk of perinatal mortality and morbidity but most adverse outcomes are concentrated in the growth restricted group.

3. Definitions

Small for Gestational Age (SGA)

SGA refers to an infant whose estimated fetal weight (EFW) and/or abdominal circumference (AC) is below the 10th centile.

Intrauterine Growth Restriction / Fetal Growth Restriction (IUGR/FGR)

Fetal growth restriction (FGR) is not synonymous with SGA. It is a manifestation of placental insufficiency, where the potential growth rate of the fetus is not achieved.

Do not use the terms IUGR / FGR unless there are:

- Abnormal Dopplers
- Asymmetrical growth restriction
- A clear change in the trend of growth

4. Risk Factors for SGA and ultrasound scan frequency

The following conditions are considered risk factors for SGA (RCOG 2014, NHS England 2016).

Risk factors **identifiable at booking**:

- Age \geq 40 at estimated date of delivery (EDD)
- Smoking > 10 cigarettes per day

- Current substance/cocaine use
- Daily vigorous exercise (gym use or running causing breathlessness)
- Previous baby $\leq 5^{\text{th}}$ centile for gestation
- Previous Stillbirth
- Chronic hypertension requiring medication
- Diabetes
- Renal impairment (discuss with consultant)
- Antiphospholipid syndrome
- Fibroids $>6\text{cm}$ or multiple
- BMI ≥ 35 (**see below**)

Risk factors arising in current pregnancy:

- Heavy or recurrent antepartum haemorrhage
- PAPP-A (pregnancy associated plasma protein A) ≤ 0.415 MoM (on first trimester screening bloods)
- Fetal echogenic bowel (confirmed by fetal medicine scan)

Raised BMI ≥ 35

The symphysis fundal height chart should be used for all women with a singleton pregnancy. Women with raised BMI >35 , if not already meeting criteria for serial scans, should have growth scans offered at **28** and **34** weeks gestation.

All other identified risk factors will have growth scans at 28, 32, 36 and 39 weeks.

A further scan may be arranged at any point by the sonographer if the trajectory of the EFW or AC is such that it could be projected to be below the 10^{th} centile in a subsequent scan.

Identification of Risk factors

At booking

The community midwife (CMW) will identify any risk factors in the booking summary.

During pregnancy

At the time of the first trimester ultrasound scan the midwife sonographer will highlight on the front of the maternity notes whether serial scans are required and the reason.

After the anomaly scan the sonographer then completes a request form for serial scans and the appointments are sent to the patient via post.

Referral for serial scans is to be made by the professional who has confirmed a risk factor that has arisen in the pregnancy.

Late bookers / Transfer into area

The community midwife must contact the antenatal ultrasound clinic and request serial scans if risk factors are identified.

5. Identification of suspected SGA in women by routine antenatal symphysis fundal height (SFH) measurement

- **Do not perform symphyseal fundal heights on women who are having serial growth scans.**
- Screening for impaired fetal growth is performed in all pregnancies by plotting the SFH measurement onto the Intergrowth 21st International SFH charts
- Symphyseal height should be performed with the patient recumbent at 45°. The bladder should be empty. The paper tape measure should have the numbers face down. Measurement should occur from the fundus to the top of the symphysis pubis. Measurement should only occur once (i.e not multiple attempts to find the 'best' measurement)
- Fundal height should be measured and plotted on the growth chart every 2-3 weeks beginning from **25-28** weeks until delivery; this allows time for growth of the fetus.
- Measure the fundal height at each antenatal contact including non-routine, for example triage review. If less than 2 weeks since the last measurement was plotted the SFH chart should still be reviewed to ensure that deviation is not evident.

If having serial growth scans do not use symphyseal fundal height measurements.

- The Intergrowth 21st International SFH charts are to be added to the patients maternity notes at booking or when they attend for their routine first trimester scan by the midwife sonographer.
- The CMW is responsible for obtaining a Intergrowth 21st International SFH chart when it is not present in the woman's notes. Depending on the gestation all previous growth measurements should be plotted in case referral for a growth scan is needed.

6. Referral criteria when SGA is suspected on the Intergrowth 21st International SFH chart

Referral is made to the GROWTH Scan clinic for assessment of fetal growth by contacting the antenatal clinic. The GROWTH clinic is led by midwife sonographers.

The criteria for growth ultrasound scan:

- The first time the fundal height measurement plots below the 10th centile on the customised chart.
- No growth over 2 consecutive measurements no less than 2 weeks between measurements (static or flat curve).
- Slow growth. The plotted measurements fall below the expected growth trajectory based on previous measurements. This pattern is likely to emerge over 3 or 4 measurements. There is no evidence-based definition of slow growth however the essential feature is if you are concerned, referral is recommended (see example in appendix 1).
- Excessive Growth. The SFH is above the 95th centile and there is clinical suspicion of polyhydramnios.

NOTE: The above criteria is relevant to all gestations and referral pathway remains the same.

Large for gestational age fetus

Measuring above the 95th centile with no evidence of polyhydramnios.

- A first measurement of SFH above the 95th centile is not an indication for a growth scan.
- Referral should be made to exclude gestational diabetes (GDM).
- A growth scan will only be organised if GDM has developed.
- Screening for gestational diabetes will only be offered if not performed in the previous 4 weeks.

SFH measurement is already above the 95th centile and there is a significant increase in growth when plotted on the SFH chart.

- Refer for growth scan

Plotting SFH measurements that remain above the 95th or below the 10th centile.

If despite a normal scan and no evidence of GDM subsequent SFH measurements continues to plot above and parallel to the 95th centile, or below and parallel to the 10th centile, referral for another scan is not indicated.

7. Ultrasound standards

When using two measurements of AC or EFW to estimate growth velocity, they should be at least 2 weeks apart to minimise false-positive rates for diagnosing FGR. The form of measurement should comply to that used to develop the biometry chart used (in this case Intergrowth 21).

The ultrasound scan must include:

- Biparietal diameter (BPD) and Occipitofrontal diameter OFD. The head circumference is also measured via the ellipse function.
- Abdominal circumference is measured via the ellipse method.
- Femur length (FL) (horizontal femur).
- AFI should be measured.
- Placental localisation is noted at time of scan. A transvaginal scan is often indicated for precision. Where the placenta has previously been noted to be low lying or covering the internal os (confirmed by a TV scan) it should be written in the report.
- Umbilical Artery (UA) Doppler will be assessed with standard protocol and a Pulsatility Index (PI) measured.

The appropriate measurement centiles and centile charts on viewpoint must be printed on the ultrasound report.

Sonographers will automatically assess fetal Doppler when they are concerned, and routinely for those patients having serial scans for a risk factor.

Request for USS more frequently than 2 weeks apart must be agreed by a Consultant obstetrician.

Normal ultrasound measurements

Normal size, Doppler and liquor are:
AC ≥ 10 th centile EFW ≥ 10 th centile UA PI Doppler < 95 th centile AFI > 5 th centile and < 25cm

Pathway for normal scan findings

- Women attending for serial growth scans do not need routine antenatal clinic appointments unless there are other indications.
- Women with identified risk factors will have serial scans which continue even if normal growth identified.
- Women who have been referred for scan following an antenatal SFH measurement will be discharged back to community care if the scan is normal
- If the scan is abnormal (tailing growth / less than 5th or tenth centile EFW / AC, abnormal liquor or Dopplers), then further assessment should be arranged

8. Abnormal ultrasound measurements

Pathway following abnormal measurements

The SGA/abnormal Doppler ultrasound clinic is provided by the fetal medicine team.

Abnormal scan / SGA	Pathway
AC and / or EFW <5 th centile with normal Dopplers	Refer to clinic for further assessment in 1 weeks .
AC and / or EFW <10 th centile with normal umbilical artery (UAPI) Doppler (<95 th centile)	Refer to clinic for further assessment in 2 weeks .
AC or EFW are <10 th centile and abnormal umbilical artery PI Doppler (>95 th centile) BUT end diastolic flow (EDF) is present.	Refer to clinic for review within 2 working days .
Absent or reversed umbilical artery Doppler flow	The woman should be reviewed by one of the fetal medicine consultants /senior midwife sonographer the same day . In their absence by the week on service consultant. A CTG should be commenced whilst waiting for review.
Doppler >95 th centile without Reversed/AEDF	Refer to clinic for review 2 working days .

AFI <5 th with normal growth and Dopplers. Ask about clinical history of Spontaneous Rupture of Membranes (SROM).	Referral to Fetal Medicine Team not required. <39 weeks and no history of ruptured membranes refer for repeat USS and ANC review in 1 week . <39 weeks and a history of ruptured membranes refer for review by on call obstetric registrar or above, refer for CTG ≥ 39 weeks refer for obstetric review by on call registrar or above, refer for CTG
AFI >30cm and with deepest pool >8cm	Refer to FMC for assessment Refer as below for GDM screening
AFI 25-30cm and with deepest pool > 8cm	Refer for GTT / CBG testing if not had within last 4 weeks. Rescan 4 weeks to ensure AFI <30cm

The sonographer who performs the ultrasound assessment is to ensure that they have made an appointment for review before the patient leaves the department.

If an appointment cannot be made when the patient is present they should be informed that the Fetal Medicine team will contact them the next working day.

AFI > 25cm - Polyhydramnios

- The current definition of polyhydramnios is an AFI of >25cm with at least one pool >8cm and is only applicable to singleton pregnancies.
- Fetal medicine review is required for an AFI greater than 30cm, as the risk of unidentified anomalies increases at this point.
- GTT or capillary blood glucose monitoring to be arranged unless already performed within the last four weeks.
- AFI >25cm, <30cm, Rescan in four weeks to determine AFI and fetal growth. If <30cm or now within normal limits, no need for further scans.

9. Management following diagnosis of SGA

Pregnancies identified with SGA <32 weeks will be under the care of the fetal medicine team, and they will use appropriate Doppler surveillance to determine timing of delivery.

- In the very preterm SGA fetus with umbilical artery Absent/Reversed End Diastolic velocities (AREDV) detected prior to **32 weeks of gestation**, delivery is recommended when Ductus Venosus (DV) Doppler becomes abnormal or Umbilical Vein (UV) pulsations appear, provided the fetus is considered viable and after completion of steroids.

- In pregnancies diagnosed with IUGR / FGR after 32 weeks, CPR(cerebroplacental ratio) (MCA PI/UA PI) is the indicator of choice for delivery in the presence of normal umbilical artery Dopplers.
- The CPR will be calculated in all patients to guide delivery (**normal value >1.06**).
- In the SGA fetus >32 weeks of gestation with an **abnormal** umbilical artery Doppler, the fetal medicine team will determine timing of delivery.
- > 32 weeks: If the CPR is abnormal, OR UA Doppler shows reversed end diastolic flow, delivery should be planned within the next 24-48 hours
- In the SGA fetus >32 weeks of gestation with **normal** umbilical artery Doppler and normal cerebral placental perfusion ratio delivery should be routinely offered 39 weeks of gestation.

Normal ultrasound

If AC/EFW is $\geq 10^{\text{th}}$ centile and all other measurements are normal, patients will be referred back to their CMW or GROW clinic as appropriate (Re-referral by sonographers for future review can be made where appropriate).

10. Decision for delivery

- When a scan is undertaken by a midwife sonographer/sonographer **after** 36 weeks where AC or EFW are $< 10^{\text{th}}$ centile with normal AFI and UA Doppler, then a rescan should occur after two weeks and delivery planned for 39 weeks, with the aim to deliver by 39+6 weeks gestation.
- If the AC / EFW is less than the fifth centile at or after 36 weeks, with normal AFI and umbilical artery Doppler are normal, induction should occur from 37 weeks, with aim to delivery by 37+6 weeks gestation.
- The midwife sonographer can arrange the induction of labour at either 37 or 39 weeks. A senior obstetrician will review the scan report and prescribe Propess if indicated.
- Women who require delivery by LSCS require senior obstetric review.

If induction / delivery is timed for >14 days following ultrasound assessment, a rescan for liquor and Dopplers should be arranged and performed at 14 days.

- In the absence of a midwife sonographer the woman should be referred to triage for a senior obstetrician to review the scan report and organise the induction.
- If the Doppler is abnormal then a consultant review of the management plan, including timing and mode of delivery is required.

11. Steroids

- Antenatal steroids should be considered when a vaginal birth is planned before 34 weeks and a caesarean is planned before 34 weeks, if time allows.

12. Neonatology

- Neonatology to be informed of any delivery <37 weeks.
- A neonatal consultation should be requested in any cases that are likely to require admission to NICU following delivery such as prematurity, absent/reversed EDF.

13. Labour and Delivery of the SGA fetus

Spontaneous onset of Labour

- Early admission should be recommended to women in spontaneous labour where scans have identified a fetus with EFW or AC below the 10th centile or an abnormal Doppler.

In all cases of SGA continual fetal heart rate monitoring is recommended from the onset of regular uterine contractions and during labour.

Induction of labour

- Compared to appropriate for gestational age fetuses, term and near-term SGA fetuses are at increased risk of FHR decelerations in labour, emergency caesarean section for suspected fetal compromise and metabolic acidaemia at delivery. This reflects a lower pre-labour pO₂ and pH.
- Women who are being induced for proven SGA below the 10th centile should be individually assessed to decide the appropriate place for induction.

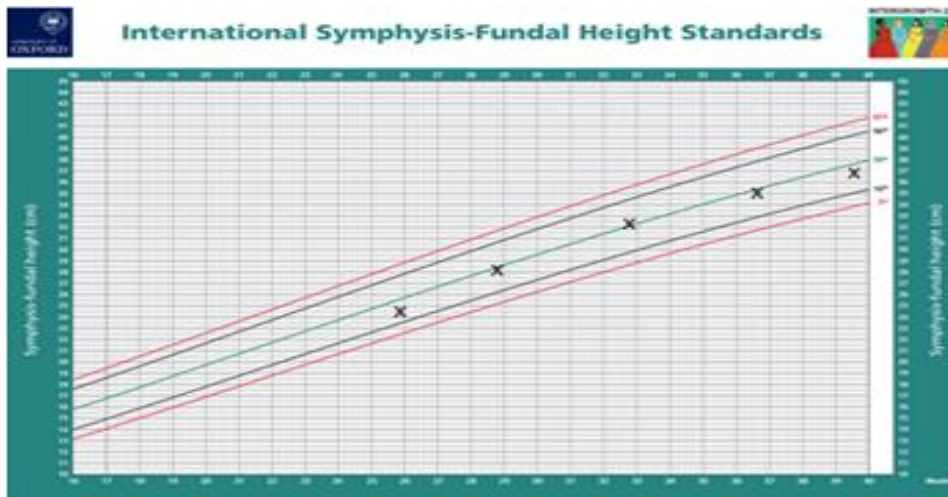
- When Doppler and liquor volume are normal, and there are no other clinical issues, the induction can be commenced on DAU or Argyll. All women will be moved to CDS when in labour, or if there are any concerns regarding fetal wellbeing. The midwife caring for the patient must ensure that there is clear communication and escalation to senior obstetricians and the CDS coordinators where concerns are raised.
- When the Doppler is abnormal and/or liquor reduced (<5th centile) the induction must be on CDS. In the event that CDS is unable to start the induction a CTG should be performed and the situation reviewed by the obstetric registrar.
- Monitoring of the fetal heart during induction of labour should be undertaken as per the induction of labour guideline.
- Continuous fetal heart monitoring should be commenced with the onset of contractions/SROM with transfer to CDS as appropriate.

14. Record keeping

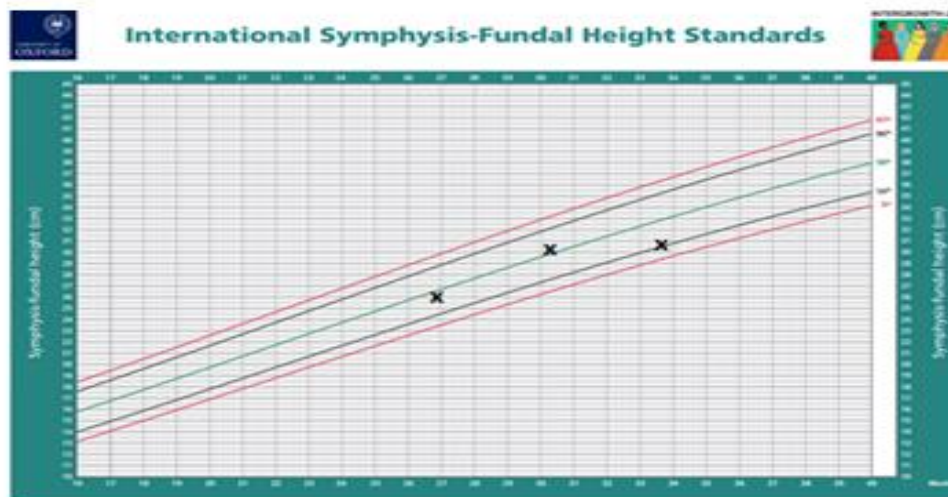
It is expected that every episode of care be recorded clearly, in chronological order, and as contemporaneously as possible by all healthcare professionals as per Trust Policy.

All entries must have the date and time together with signature and printed name.

Appendix 1
 Growth examples



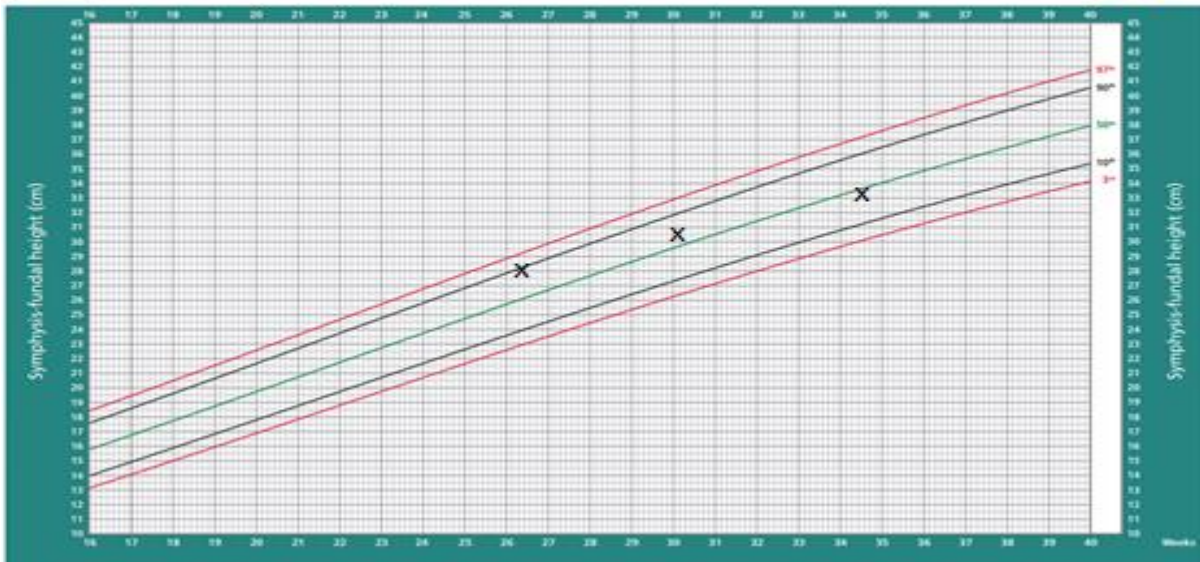
Normal Growth Normal variability means that the slope will alter from one measurement to another, but the overall slope should not be static.



Static Growth No growth over two consecutive measurements. These measurements should be no less than two weeks apart.



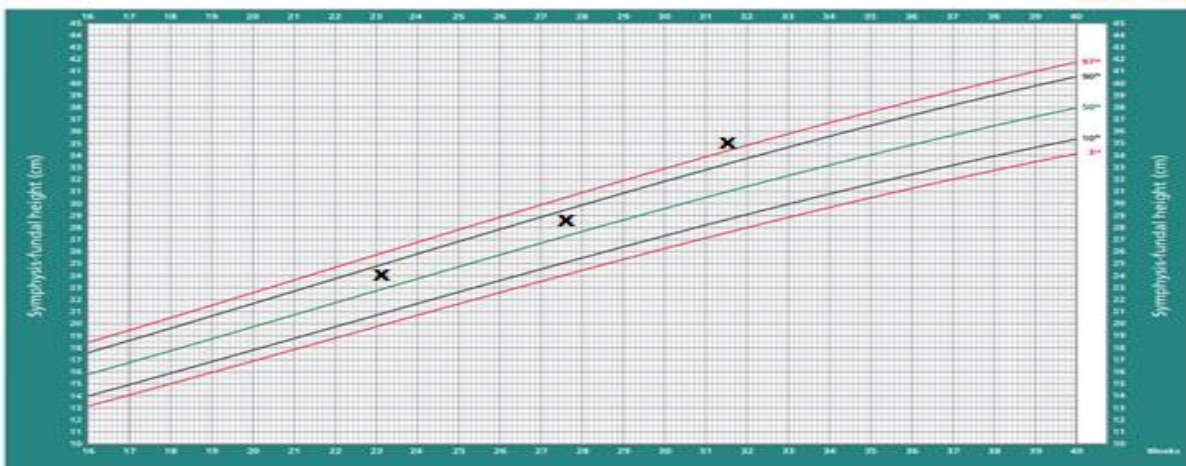
International Symphysis-Fundal Height Standards



Slow Growth The plotted measurements fall below the expected growth trajectory based on previous measurements. This pattern is likely to emerge over 3 or 4 measurements. There is no evidence-based definition of slow growth however the essential feature is if you are concerned, **referral is recommended.**

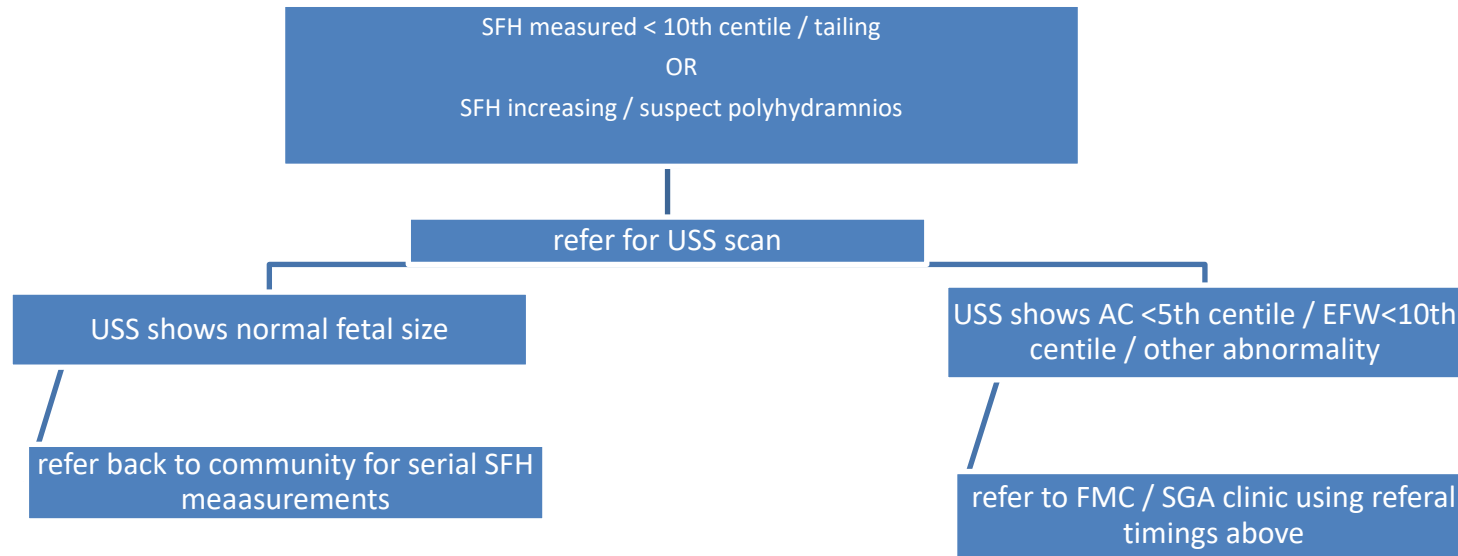


International Symphysis-Fundal Height Standards



Excessive Growth The SFH is above the 95% centile and there is clinical suspicion of polyhydramnios refer for USS. If no clinical signs of polyhydramnios, referral for screening to exclude GDM should be made if not undertaken in previous 4 week period.

Appendix 2: Process for referral to if abnormalities in growth suspected



Monitoring and Audit

Auditable standards:

Please refer to audit tool, location: 'Maternity on cl2-file11', Guidelines

Reports to:

Maternity Assurance Group – responsible for action plan and implementation of recommendations from audit

Frequency of audit:

At the end of the first year and then every two years

Responsible person:

Midwife/SHO

Cross references

Identification of suspected SGA in women with-out pre-existing identifiable risk factors by routine antenatal symphysis fundal height (SFH) measurement

The fetal monitoring of fetal well-being during labour.

<http://staffnet.plymouth.nhs.uk/Portals/1/Documents/Trust%20Documents/Maternity/Intrapartum/The%20monitoring%20of%20fetal%20well-being%20during%20labour.pdf>

Maternity Hand Held Notes, Hospital Records and Record Keeping

<http://staffnet.plymouth.nhs.uk/Portals/1/Documents/Clinical%20Guidelines/Maternity/Maternity%20hand%20held%20notes%20and%20hospital%20records.pdf>

Induction of labour (IOL).

<http://staffnet.plymouth.nhs.uk/Portals/1/Documents/Trust%20Documents/Maternity/Intrapartum/Induction%20of%20labour.pdf>

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Saving Babies' Lives. A care bundle for reducing stillbirth. (NHS England March 2016)

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Joshua I. Rosenbloom, Adam K. Lewkowitz, Kristina E. Sondgeroth, Jessica L. Hudson, George A. Macones, Alison G. Cahill, Methodius G. Tuuli & Su-Hsin Chang (2018) Antenatal corticosteroid administration in late-preterm gestations: a cost-effectiveness analysis, The Journal of Maternal-Fetal & Neonatal Medicine, DOI: 10.1080/14767058.2018.1540582

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Version	11		
Changes	<p>SGA definition IUGR / FGR definitionAdministration of steroidsChange of scan timings and intervals for routine scans for risk factors Change of induction for SGA and FGR as per SBL2 SGA definition compliance with RCOG - Estimated fetal weight and / or abdominal circumference is below tenth (10th) percentile for gestational age Update to Intergrowth 21st International SFH charts. Update to intergrowth scan technique</p>		
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