

MATERNITY GUIDELINES

Fetal growth surveillance in singleton pregnancies

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

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1.0 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)

2.0 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.

3.0 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 postnatal diagnosis from observation of the child's biometry rising through the centiles in the "My personal child health record" red book. FGR can be suspected in the antenatal period if there are ultrasound features such as abnormal Doppler studies, or reduced liquor volume in addition to small size.

Do not use the terms IUGR / FGR unless a fetal medicine assessment has clearly shown abnormalities other than fetal size.

4.0 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 ≥ 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 >6cm or multiple
- BMI \geq 35 (**see below**)

Risk factors **arising in current pregnancy:**

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

Raised BMI \geq 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 27, 31, 34 and 37 weeks.

A further scan may be arranged at 39 weeks by the sonographer if the trajectory of the EFW or AC is such that it could be projected to be below the 10th 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.

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

- Clinical assessment of fetal growth is an important part of the antenatal assessment.
Screening is performed in all pregnancies by plotting the SFH measurement onto the Intergrowth 21st International SFH charts. A standardised method of measurement allows appropriate clinical decisions to be made and is therefore considered best practice. Fundal height measurement using a paper tape measure is optimal for clinical use as it is inexpensive, non-invasive, easy to perform and acceptable to the woman. Continuity of care provider further improves the accuracy of fetal growth surveillance. When this is not achievable, a standardised method of SFH measuring helps to reduce the degree of measurement error.
- Fundal height should be measured and plotted on the growth chart every 2-3 weeks from **25-28** weeks; this allows time for growth of the fetus.
- It is good practice to 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.
- 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 community midwife 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.

6.0 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.

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. However, a referral should be made to exclude gestational diabetes (GDM). A growth scan will only be organised if GDM has developed. A glucose tolerance test (GTT) will be offered for gestations <36 weeks. Capillary blood glucose monitoring will be offered for \geq 36 weeks gestation. 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.

Where polyhydramnios is suspected, a referral for growth scan can be made. Where there is no clinical suspicion of polyhydramnios then a GTT / capillary blood glucose monitoring is to be arranged if not undertaken in the previous 4 week period.

Plotting FH 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.

7.0 Ultrasound standards

When using two measurements of AC or EFW to estimate growth velocity, they should be at least 3 weeks apart to minimise false-positive rates for diagnosing FGR.

The ultrasound scan must include:

- Biparietal diameter (BPD) and Occipitofrontal diameter OFD. Head circumference (HC) is then calculated by Viewpoint,
- Anteroposterior (AP) and transverse abdominal diameter. Abdominal circumference (AC) is then calculated by Viewpoint.
- Femur length (FL).
- Amniotic fluid volume will be assessed by deepest pool depth (MPD) and if the deepest pool is <25mm then a full amniotic fluid index (AFI) will 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 Doppler gate must be adjusted to ensure that the whole vessel width is sampled, not just on machine pre-set width.

The 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 3 weeks apart must be agreed by a Consultant obstetrician.

Normal ultrasound measurements

Normal growth, Doppler and liquor are:
AC \geq 10 th centile EFW \geq 10 th centile UA PI Doppler < 95 th centile Liquor > 5 th centile and < 95 th centile

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.

Where the plotted trajectory of AC, EFW or UA Doppler PI measurements suggest that review of the management plan may be required after another scan, and if no plans are in place for an early delivery, a final scan may be booked by the sonographer at 38/39 weeks.

This may occur when the AC or EFW trajectory is such that it is projected that the measurements may then be less than 10th centile or the UA PI more than 95th centile.

8.0 Abnormal ultrasound measurements

Diagnosis of SGA (abnormal findings) are made when measurements are: -
AC <10 th centile EFW <10 th centile UA PI Doppler > 95 th centile AFI < 5 th centile

Pathway following abnormal measurements

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

Abnormal scan / SGA	Pathway
AC <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.
AFI <5 th and the AC/EFW <10 th and Doppler >95 th centile without R/AEDF	Refer to clinic for review 2 working days .
AFI <5 th with no clinical history of Spontaneous Rupture of Membranes (SROM) and the growth and Doppler are normal	Referral to Fetal Medicine Team not required. <37 weeks refer for repeat USS and ANC review in 1 week . ≥ 37 weeks and above refer for obstetric review by on call registrar or above.

If there is a possible history of spontaneous rupture of membranes (SROM) then a review by the on-call obstetric team is required.

A CTG should be commenced whilst waiting for review.

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 >95th centile - Polyhydramnios

- The current definition of polyhydramnios is an AFI of >25cm with at least one pool >8cm and is only applicable to singleton pregnancies.
- Unless there is an identified structural abnormality (e.g. double bubble) referral to fetal medicine is **not** required.
- GTT or capillary blood glucose monitoring to be arranged unless already performed within the last 4 weeks.

9.0 Management following diagnosis of SGA

All referrals should have a suspected diagnosis of SGA, with or without abnormal UA Doppler, made on ultrasound.

At less than 32 weeks gestation:

- 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.
- When the Ductus venous Doppler is normal, delivery is then recommended by 32 weeks of gestation and should be considered between 30–32 weeks of gestation.
- If Middle cerebral Artery (MCA) Doppler is abnormal, delivery should be recommended no later than 37 weeks of gestation.
- The CPR (cerebroplacental ratio) (MCA PI/UA PI) will be calculated in all patients to guide delivery (**normal value >1.08**).
- In the SGA fetus detected after 32 weeks of gestation with an **abnormal** umbilical artery Doppler, delivery no later than 37 weeks of gestation is recommended. Review by the Fetal Ultrasound Surveillance Team will continue until delivery.
- In the SGA fetus detected after 32 weeks of gestation with **normal** umbilical artery Doppler, a senior obstetrician should be involved in determining the timing and mode of birth of these pregnancies. Delivery should be offered at 37 weeks of gestation.

The local management decisions of patients following fetal medicine review are made by the fetal medicine consultants and are made in line with RCOG recommendations:

- Where AC/EFW measurements are $<10^{\text{th}}$ centile but all other assessments are normal then patients will be reviewed every 2 weeks and delivery offered and timed at 37 weeks.
- If any Doppler changes are identified then delivery will be individualised depending on the findings as soon as appropriate depending on degree of compromise after 32 weeks. Abnormal CPR with normal individual components to be individually managed
- Doppler assessments of UA, MCA (with angle correction), Ductus Venosus and when appropriate tricuspid valve will be performed. The CPR (MCA PI/UA PI) will be calculated and documented in all appropriate cases.

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)

10.0 Decision for delivery

- When a scan is undertaken by a midwife sonographer/sonographer **after** 35 weeks where AC or EFW are $<10^{\text{th}}$ centile with normal AFI and UA Doppler, then delivery should be arranged as soon as practical after 37 weeks and onward referral for fetal medicine review is **not** required.
- The midwife sonographer can arrange the induction of labour. A senior obstetrician will review the scan report and prescribe Propess if indicated.
- Women who require delivery by LSCS require senior obstetric review.
- 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.
- Where the last Doppler/Ultrasound scan has been undertaken more than 12 days before the planned date of delivery or commencing IOL, a further appointment for

UA Doppler only should be arranged for the day of delivery or the days immediately before.

- If the Dopplers are then abnormal, a consultant review of the management plan including mode of delivery is required.

11.0 Steroids

- Antenatal steroids should be considered when a vaginal birth is planned before 37 weeks and a caesarean is planned before 39 weeks when time allows.

12.0 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.

13.0 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.

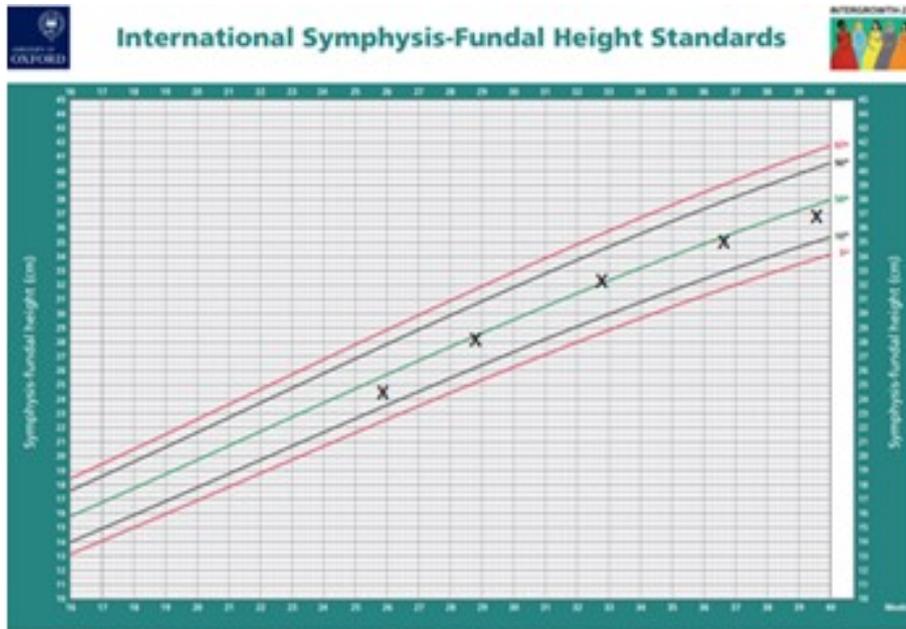
- When the Doppler is abnormal and/or liquor reduced (<5th centile) the induction must be on CDS. In the event that CDS is unable to start the induction a CTG should be performed and the situation reviewed by the obstetric registrar.
- Monitoring of the fetal heart during induction of labour should be 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.

14.0 Record keeping

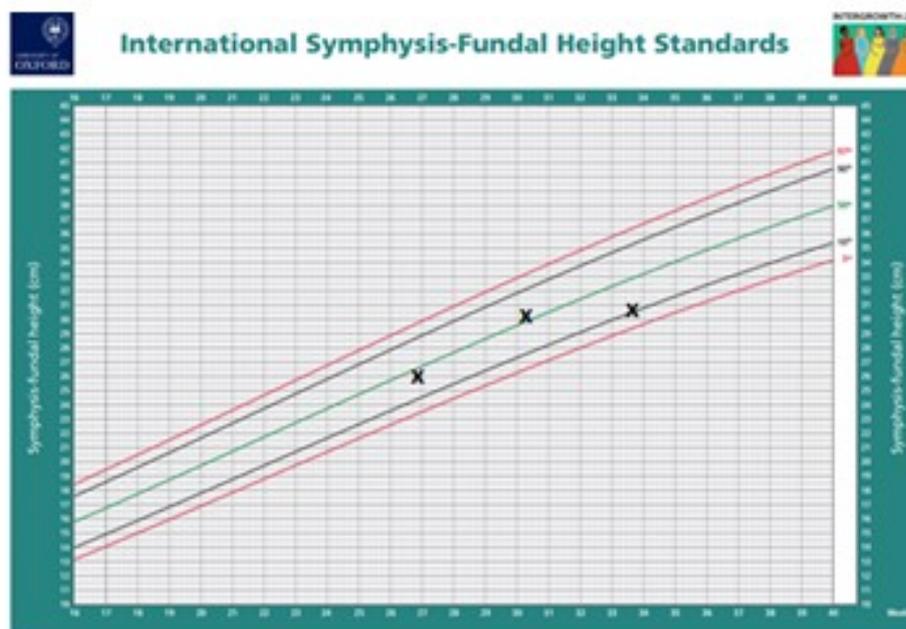
It is expected that every episode of care be recorded clearly, in chronological order, and as contemporaneously as possible by all healthcare professionals as per Trust Policy. All entries must have the date and time together with signature and printed name.

Appendix 1

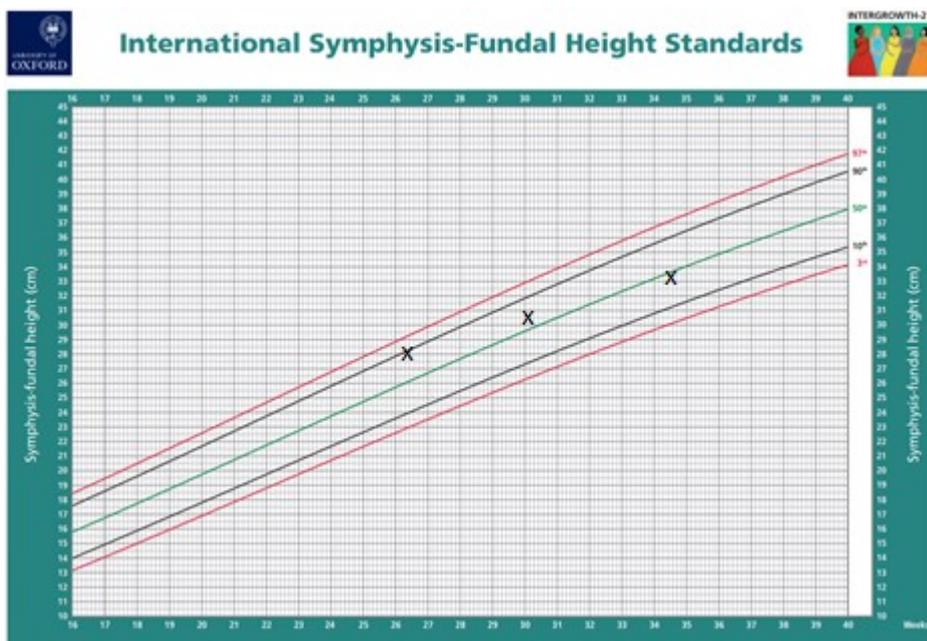
Growth examples



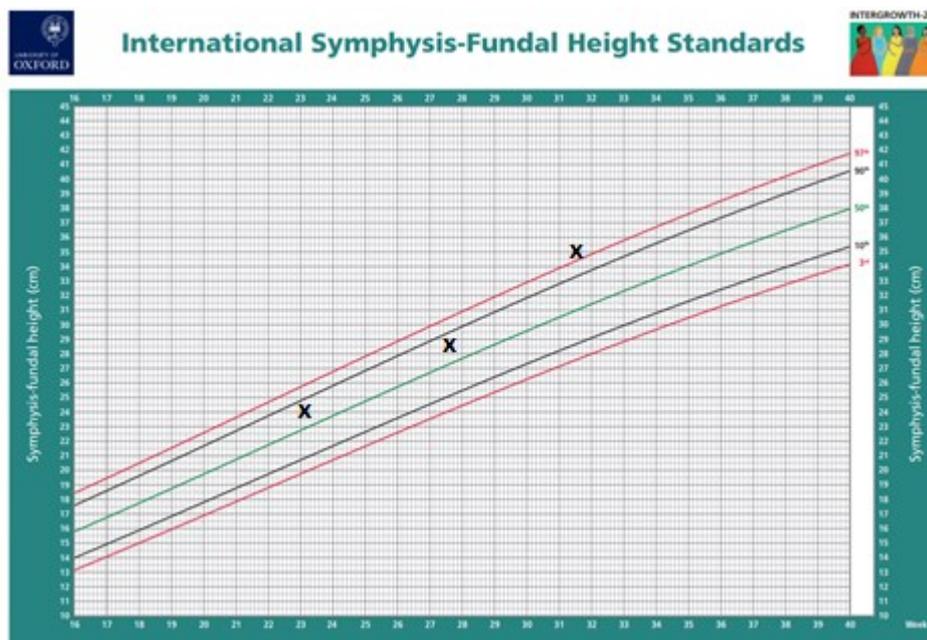
Normal Growth Normal variability means that the slope will alter from one measurement to another, but the overall slope should not be static.



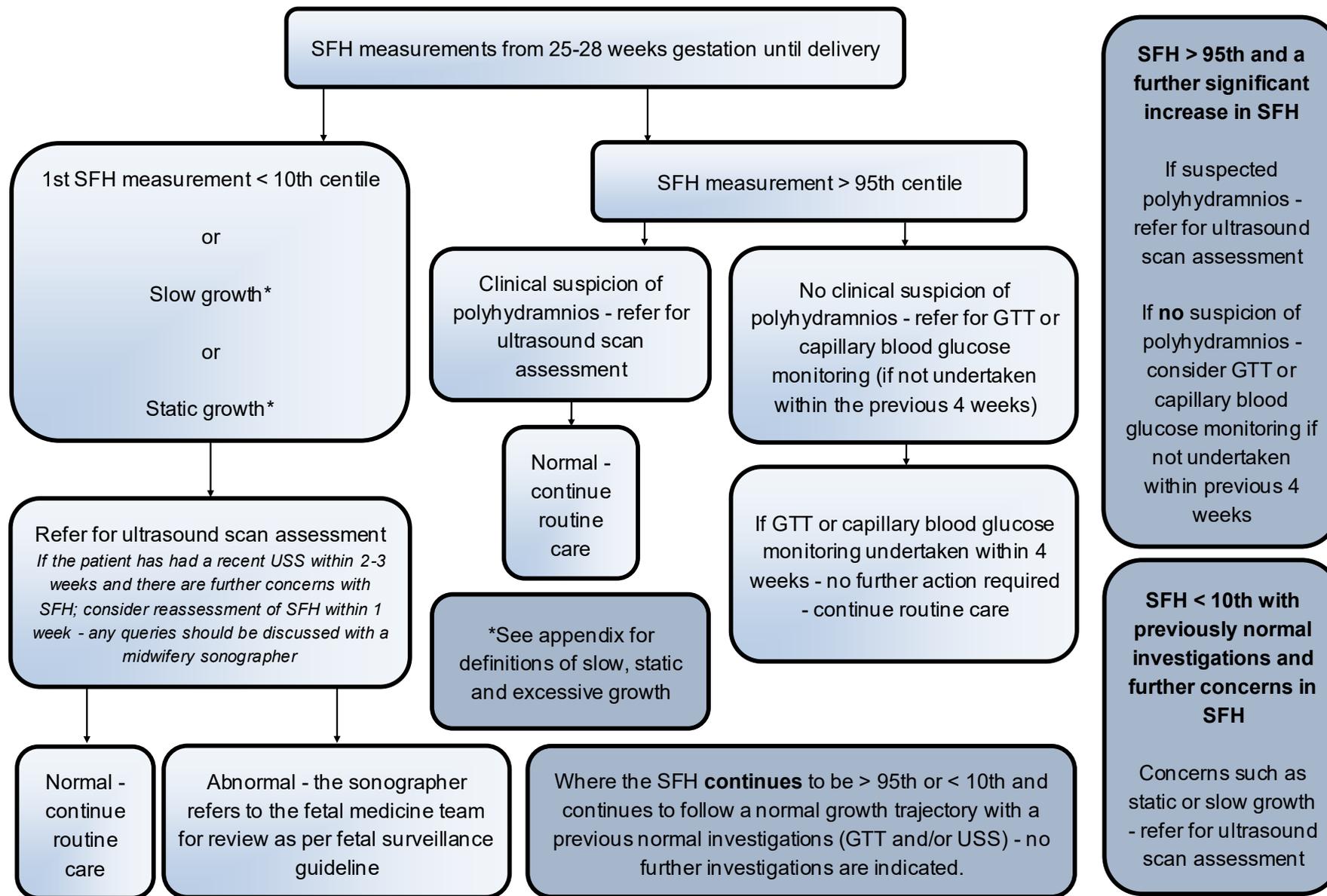
Static Growth No growth over two consecutive measurements. These measurements should be no less than two weeks apart.



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.**



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.



Monitoring and Audit

Auditable standards:

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

Reports to:

Clinical Effectiveness Committee – 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>

References

The Investigation and management of the Small for Gestational Age Fetus. Green-top Guideline No31. (RCOG February 2013. Minor revisions January 2014).

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

Figueras F, Gratacos E. Update on the Diagnosis and Classification of Fetal Growth Restriction and Proposal of a Stage-Based management Protocol. Fetal Diagn Ther 2014; 36:86-98

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