Introduction
Small fetuses are divided into:
- Normal (constitutionally) small;
- Non–placenta mediated growth restriction; for example; structural, chromosomal anomaly, inborn errors of metabolism and fetal infection
- Placenta mediated growth restriction

As a group, structurally normal SGA fetuses are at increased risk of perinatal mortality and morbidity but most adverse outcomes are concentrated in the growth restricted group. Several studies have shown that neonates defined as SGA by population based birth weight centiles, but not customised centiles are not at increased risk of perinatal morbidity or mortality. There is thus a perceived benefit in the use of customised weight centiles.

Clinical examination is a method of screening for fetal size, but is unreliable in detecting SGA fetuses. Diagnosis of a SGA fetus relies on ultrasound measurement of fetal abdominal circumference and / or estimation of fetal weight. Management of the SGA fetus is directed at timely delivery.

This new guideline introduces the use of customised Symphysio fundal height = (SFH) charts, identifiable maternal risk factors and updates the management plans once SGA is identified.

This guideline is only relevant to singleton pregnancies as multiples are already being monitored routinely.

Definitions:
SGA = infant whose estimated fetal weight is at the bottom of the population reference range. Estimated fetal weight and / or abdominal circumference is below tenth (10th) percentile for gestational age. The cause can be constitutional or pathologic.

IUGR/FGR = This is a postnatal diagnosis from observation of the child’s biometry rising through the centiles. It can be suspected antenatally if there are ultrasound features in addition to small size.

Staff must not use the terms IUGR / FGR unless antenatal assessment has clearly shown abnormalities other than fetal size.
**Screening for SGA**

Screening will now be routinely performed in all pregnancies (excluding multiple births), using customised SFH charts. The charts will be added to all patient hand held notes when they attend for their routine first trimester scan (dating or nuchal). If a patient declines a first trimester scan, or is a late booker proceeds directly to the anomaly scan, then the community midwife is responsible for informing the antenatal department, obtaining a customised SFH chart for that patient and adding it to the patient notes before 14 weeks.

Customised SFH charts are designed to detect SGA with measurements no more than 2-3 weeks apart. SFH must therefore be measured at all patient contacts in the community and hospital unless performed within 2 weeks.

The full details of the GROW SFH program are attached at Appendix 1, including the first line management by ultrasound.

All booking patients must also be screened at the booking interview to see if they fall into a high risk group for Small for Gestational Age Risk factors who then require a routine serial ultrasound scan program for size monitoring.

The RCOG states “Women who have a major risk factor (Odds Ratio [OR] >2.0) should be referred for serial ultrasound measurement of fetal size and assessment of wellbeing with umbilical artery Doppler from 26–28 weeks of pregnancy”.

**Risk factors identifiable at booking:**
- Age >40 at EDD
- Smoke > 10 cigarettes per day
- Cocaine use
- Daily vigorous exercise (e.g. gym use or running causing breathlessness)
- Previous baby <3rd centile for gestation (see table attached at appendix 3)
- Stillbirth in previous pregnancy
- Chronic hypertension on treatment
- Pre-existing Diabetes
- Renal impairment (discuss with consultant caring for patient)
- Antiphospholipid syndrome (must be confirmed by testing)

**Risk factors arising in current pregnancy:**
- Cocaine use
- Unexplained repeated antepartum haemorrhage (at least 2 inpatient stays)
- PAPPA ≤ 0.41 MoM (on Downs screening bloods)
- Fetal echogenic bowel (confirmed by Fetal Medicine scan)

Only those patients with an identified major risk factor (above) should have routine serial scans arranged. Serial scans should be booked at 26, 29, 32 and 35 weeks.

**Diagnosis**

Management of patients undergoing serial growth scans is detailed in Appendix 5.
SGA can be confirmed on ultrasound scan by fetal measurements. A scan should be requested if SGA is suspected by customised SFH. Amniotic fluid volume will be assessed by maximum pool depth (MPD) and amniotic fluid index (AFI) will only be measured if the MPD is below gestational reference range. Sonographers will automatically assess fetal Doppler where they are concerned, and routinely for those patients having serial scans for a risk factor.

**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.” Ultrasound reception will decline scans more frequently than three weekly unless agreed by Miss Montague or Mr Welch.

Scans arising from the customised SFH or risk factor screening program should be booked by the community midwife based on the above prior factors or by the consultant caring for the patient where the patient is already in their clinic (see appendix 1).

The scan must include Biparietal diameter (BPD), occipitofrontal diameter (OFD) Head circumference (HC) is then calculated by Viewpoint), Anterioiposterior(AP) and transverse abdominal diameter (TAD) Abdominal circumference (AC) is then calculated by Viewpoint) and femur length (FL). Amniotic fluid will be assessed by deepest pool and if the deepest pool is <25mm then a full AFI will be measured.

Umbilical Artery (UA) Doppler will be assessed with standard protocol and a Pulsatility index (PI) measured.

**Care Pathway**

Any patient whose scan results show:
AC < 10th centile for gestation
EFW < 10th centile for gestation
UA PI > 95th centile

- Patients with AC< 10th centile or EFW< 10th centile with normal UA PI Should be referred into the Small Baby Clinic for further assessment within 2 weeks.

- If at any scan, AC or EFW are <10th centile with UA Doppler >95th but EDF is present, refer to small baby clinic, via the fetal medicine midwives for review within 48 working hours.

- If continually absent or reverse UA flow the patient should be reviewed either by one of the fetal medicine consultants/ senior midwife sonographer the same day, or in their absence by the week on service consultant. A CTG should be commenced on day unit whilst waiting for that review.
Local management of Small Baby Clinic patients is detailed in Appendix 6

RCOG recommendations:

- In the 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 venous Doppler is normal, delivery is 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 (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. Surveillance in the SGA baby clinic 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 Midwife sonographer can arrange for the date of the induction of labour. The procedure will be commenced following review and agreement by the senior obstetrician on the day of admission.

- Mode of delivery will be agreed by the consultant caring for the patient or if not available the week on service consultant. The use of Antenatal steroids is only required as per SOP.

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 Hospital Trust Policy. This is in keeping with standards set by professional colleges, i.e. NMC and RCOG.

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

Delivery of the SGA fetus

Spontaneous onset of Labour

Early admission should be recommended for those women in spontaneous labour with a fetus where scans have identified a fetus below the 10th centile for AC/EFW. In those women where AC/EFW is above 5th but less than 10th centile with no other factors an admission CTG is recommended. If CTG is normal then either intermittent auscultation or CTG is acceptable as the woman wishes.
Induction of labour

Women who are being induced for proven SGA below 10th centile and/or abnormal dopplers should be induced on central delivery suite. A CTG should be undertaken 1-3 hours post vaginal prostaglandin pessary insertion and repeated 4 hourly until labour commences. Continuous electronic fetal monitoring should be used in labour for foetuses below the 5th centile for AC/EFW or if there have been any other abnormalities of antenatal assessment. If the fetus is thought to be constitutionally small then careful intermittent monitoring is an acceptable first approach.

In the situation where CDS are unable to accept the patient at time of admission a review of the ultrasound report finding must be undertaken by a senior clinician. Where dopplers are within normal limits, and there are no other clinical issues, then the induction can be commenced on WDS or Argyll. These patients will be then moved to CDS as appropriate.

If dopplers are abnormal and/or liquor reduced then induction must be on CDS. In the event that CDS is unable to progress with the induction within 4-6 hours of planned admission time the CCT Doctor on labour ward will review the patient and clearly document a management plan in patients notes.

Abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AC</td>
<td>Abdominal circumference</td>
</tr>
<tr>
<td>AEDF</td>
<td>Absent end diastolic flow</td>
</tr>
<tr>
<td>AFI</td>
<td>Amniotic fluid index</td>
</tr>
<tr>
<td>BPD</td>
<td>Biparietal diameter</td>
</tr>
<tr>
<td>CPR</td>
<td>Cerebro pulmonary ratio</td>
</tr>
<tr>
<td>DV</td>
<td>Ductus venosus</td>
</tr>
<tr>
<td>EDD</td>
<td>Estimated due date</td>
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<tr>
<td>EFW</td>
<td>Estimated fetal weight</td>
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<tr>
<td>FGR</td>
<td>Fetal growth restriction</td>
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<tr>
<td>HC</td>
<td>Head circumference</td>
</tr>
<tr>
<td>IUGR</td>
<td>Intrauterine growth restriction</td>
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<tr>
<td>MCA</td>
<td>Middle cerebral artery</td>
</tr>
<tr>
<td>MPD</td>
<td>Maximum pool depth</td>
</tr>
<tr>
<td>OFD</td>
<td>Occipito frontal diameter</td>
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<tr>
<td>PI</td>
<td>Pulsatility index</td>
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<tr>
<td>PAPP A</td>
<td>Pregnancy associated plasma protein A</td>
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<tr>
<td>RCOG</td>
<td>Royal College of Obstetricians and Gynaecologists</td>
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<tr>
<td>REDF</td>
<td>Reversed end diastolic flow</td>
</tr>
<tr>
<td>SGA</td>
<td>Small for gestational age</td>
</tr>
<tr>
<td>SFH</td>
<td>Symphysiodental height</td>
</tr>
<tr>
<td>UA</td>
<td>Umbilical artery</td>
</tr>
</tbody>
</table>
Appendix 1: The GROW Programme

Aims and objectives

- To ensure that every woman has a customised growth chart generated at her dating scan appointment
- To ensure that there is accurate fetal surveillance, through standardised fundal height measurements of low risk women and serial growth scans for high 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 5 working days.

Process

- The charts are used to plot both SFH measurements obtained during clinical examination and EFW following an ultrasound examination. Each woman will have a customised growth chart printed following her dating/screening scan and secured in her hand held pregnancy notes.
- They are customised to each individual taking into account the height, weight, ethnicity, parity of the woman. Accurate date of birth and birth weights of previous children need to be inputted to identify previous problems with growth, but this does not affect the fundal height centiles produced.
- The EDD entered into the software will be the one calculated by the dating ultrasound scan.
- The chart will automatically show the 10th 50th and 90th centile lines. The 5th and 95th centiles must be also chosen so that they also appear on the customised growth chart.
- There is a box in the top left hand corner where her height, weight, ethnicity and parity are shown. Mother’s name, reference number, chart ID and date of birth will appear above the chart.

Please note: The chart ID number is the identification that is used by the Perinatal Institute(PI) to provide audit, not the patients name /DOB or hospital number. Therefore please ensure that this is recorded in the patients notes so that if it is lost and another chart has to be generated then the PI has to be contacted to cancel the misplaced form.

The charts are very easy to produce and can be generated at any time during pregnancy. The software can be accessed in the antenatal clinic and the midwife sonologists can assist in this matter.

Measuring fundal height (SFH)

Who to measure:

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 as described previously. These should be undertaken at each routine antenatal appointment after 24 weeks gestation. As part of routine antenatal care do not measure more frequently than once a fortnight.
NOTE- 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, multiple pregnancy.
   b. Pregnancy considered high risk requiring serial ultrasound e.g. Pre-existing diabetes. However charts will be generated for all singleton pregnancies.

The individual symphysis height charts can be used for women with BMI between 15-40 however it is advisable that for those **ladies with a BMI > 35 , not already having serial scans, have a one-off growth scan at 34 weeks.**

**How to measure**

*See appendix 2*

Serial fundal height measurements must be undertaken and recorded on the individual fundal height chart at each antenatal appointment from 24 weeks gestation until delivery.

**ESSENTIAL TO REMEMBER:**

As part of **routine antenatal care** do not measure more frequently than once a fortnight

**Referral Pathway for Ultrasound**

Low risk women having serial fundal height measurements
Indications for a growth scan are:

- First SFH measurement below 10th centile
- Static growth: no increase in sequential measurements over at least three Measurements or crosses the 10th centile. These measurements are done 2 weeks apart or after one four week period when not seeing patient fortnightly.
- Slow growth: curve linking up plots crosses centile lines in a downward direction again these measurements are done 2 weeks apart or after one four week period when not seeing patient fortnightly.
- Excessive growth: Where SFH is above the 95th centile AND there is clinical suspicion of polyhydramnios (clinical signs of polyhydramnios include very tense abdomen; unable to palpate fetal parts and can be linked with excessive breathlessness unless standing or sat upright).

**On the grow program, SFH continues to be measuring below 10th centile.**

- Continue to see in community and plot the SFH on the growth chart.
- Ensure that the next scan appointment has been made.
- The scan measurement takes president and will inform the decision making for the induction of labour date.

**Measuring Above 95th centile**
Note that a first measurement of SFH above the 95th centile is NOT an indication for a growth scan. If the SFH is above the 95th centile then a GTT is recommended if not undertaken in previous 4 weeks. Growth scan would only be done if GTT is abnormal.

Additionally if the fetal growth in subsequent SFH measurements continues to grow along or parallel to the 95th centile with no clinical suspicion of polyhydramnios then referral for a scan is still not indicated.

If already above the 95th centile and there is a significant jump in growth on the SFH chart in the case that clinical polyhydramnios is suspected referral to scan can be made. Where no clinical suspicion of Polyhydramnios then GTT to be arranged if greater than 4 weeks since any previous investigation.

When there is an indication for a growth scan assessment the midwife will refer directly to the GROW ultrasonography team. Ring antenatal admin team on 01752 439794 to make appointment. (Use GROW referral form – see appendix 2).

Patients will be appointed to the next available appointment.

Arrangements for follow up should be made by the referrer prior to the scan. Most referrals will have a normal result from scan and if the scan is normal the sonographer will refer back to MLC.

If there are concerns about the scan the midwife sonographer /sonographer will discuss/refer on to the Small Baby clinic team as appropriate.
Appendix 2
Fetal Growth - Fundal Height Measurements

Minimum amount of time between SFH measurements for routine antenatal care is 2 weeks (i.e. no more frequently)

- Explain the procedure to the mother and gain verbal consent
- Wash hands
- Have a non-elastic tape measure to hand
- Ensure that the mother is comfortable in semi-recumbent position, with an empty bladder. (A sofa is often not supportive enough for this procedure to be accurate)

1. Mother semi-recumbent, with bladder empty. Ensure the abdomen is soft (not contracting)

2. Perform two handed abdominal palpation to enable accurate identification of the uterine fundus.

3. To locate the fundus a hand is moved down the abdomen below the xiphisternum, gently curving your fingers into the abdomen until the curved upper border of the fundus is felt. Then leave one hand on the fundus.
3. Use the tape measure with the centimetres hidden on the underside to reduce bias

Secure tape with hand at top of fundus with one hand.

4. Measure from the top of the fundus to the top of symphysis pubis. The tape measure should stay in contact with the skin.
5. Measure along longitudinal axis of the uterus, without correcting to the abdominal midline (i.e. where fundus may appear to “lean to one side”, do not correct to measure down middle of abdomen, measure from top of fundus)

   Measure only once.

6. The result should be recorded in centimetres on the customised growth chart and the value plotted using a cross (X) The method for measuring SFH is clearly explained below the customised growth chart to support standardised practice.
## Appendix 3

**ANTENATAL ULTRASOUND REFERRAL FORM for GROW**

<table>
<thead>
<tr>
<th>Date of referral:</th>
<th>Hospital No (if known):</th>
<th>DOB:</th>
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<tbody>
<tr>
<td></td>
<td>NHS No:</td>
<td></td>
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<table>
<thead>
<tr>
<th>Woman’s Name:</th>
<th>Referring GP:</th>
<th>Home Tel:</th>
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<tbody>
<tr>
<td>Address:</td>
<td>Name &amp; Address</td>
<td>Mobile Tel:</td>
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</table>

<table>
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<tr>
<th>Referred by:</th>
<th>Contact number of referring person:</th>
<th>Team:</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Language Spoken:</th>
<th>Interpreter Required:</th>
<th>Language and dialect:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes / No</td>
<td></td>
</tr>
</tbody>
</table>

Reason for referral: see guideline

- ☐ First SFH <10th centile
- ☐ Static/No change in SFH over 3 measurements or crosses the 10th centile. These measurements are done 2 weeks apart or after one four week period when not seeing patient fortnightly.
- ☐ sequential plots crossed 10th centile
- ☐ Slow/sequential plots curving downwards over at least three measurements 2 weeks part or after one four week period when not seeing patient fortnightly.
- ☐ clinical suspicion of polyhydramnios (fetal parts not palpable and tense)

Any other concern should be discussed with Liza Rose / Mr Welch before referral

Any additional information

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Patients will be appointed to the next available appointment. This will be within 5 working days

Arrangements for follow up should be made by the referrer prior to the scan. Most referrals will have a normal result from scan and if the scan is normal the sonographer will refer back to MLC.

If there are concerns about the scan the midwife sonographer/sonographer will discuss / refer on to the Small Baby clinic team as appropriate.

Please return this completed referral to: Antenatal Clinic (ANC), Plymouth Hospital NHS Trust via Email. OR patient can bring form with them to appointment. T. For enquiries, please contact the Midwife sonographer via 01752439794 or antenatal clinic on 01752 432170
## Birth weight centiles for guidance on previous baby centiles

<table>
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<th>3rd centile (gms)</th>
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<td>42</td>
<td>2907</td>
</tr>
<tr>
<td>43</td>
<td>2982</td>
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</tbody>
</table>
Appendix 5.

Management of patients having serial scans by sonographer or in the GROW clinic

- Patients allocated to serial scans because of a risk factor or Customised SFH

  - Do not require ANC visits coinciding.

  - If all scans show size ≥10th centile, the sonographer should clearly document and refer back to patient’s normal lead care.

  - If no plans are in place for early delivery a final scan may be booked at 38 weeks where there is concern that there is a trend in AC, EFW or UAPI which may result in review of the management of the last scan i.e. AC, EFW may be under 10th centile or the UA PI may exceed 95th centile.

  - If at any scan after 35 weeks, AC or EFW are <10th centile with normal AFI and UA Doppler, then delivery should be arranged as soon as practical after 37 weeks. This should be arranged via the week on Service team on Triage. If there are more than 12 days between the last scan and delivery then an appointment for a UA Doppler only should be given for the day of delivery or the day before.

  - If at any scan before 35 weeks, AC or EFW are <10th centile with normal AFI and UA Doppler, Sonographers who do the scans are responsible for onward referral to small baby clinic, via the fetal medicine midwives for review in two weeks.

  - If at any scan, AC or EFW are <10th centile with UA Doppler >95th but EDF is present, refer to small baby clinic, via the fetal medicine midwives for review within 48 working hours

  - If continually absent or reverse UA flow the patient should be reviewed either by one of the fetal medicine consultants the same day, or in their absence by the week on service consultant. A CTG should be commenced on day unit whilst waiting for that review.
Appendix 6.

Management of patients in Small Baby Clinic

- All fetuses should already have had a diagnosis of SGA with or without abnormal UA Doppler
  - If AC/EFW is <10\textsuperscript{th} centile but all other assessments are normal then patients will be reviewed every 2 weeks and delivery timed as soon as practical after 37 weeks.
  - If AC/EFW is ≥10\textsuperscript{th} centile and all other measurements are normal, patients will be referred back to their CMW or GROW clinic as appropriate

- 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.

- 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.
  - Neonatology to be informed of any induction <37 weeks prior to induction

- With absent/reversed EDF <32 weeks, seek neonatal consult with patient prior to delivery.
The Small for Gestational Age SGA Fetus

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 of this update and then every two years

Responsible person:
Midwife/SHO

Cross references
Antenatal Guideline 31 - Maternity Hand Held Notes, Hospital Records and Record Keeping
Antenatal 44 Guideline development within the maternity services
Intrapartum 12 Induction of labour

References
RCOG Green Top Guideline #31 Investigation and management of the small for gestational age fetus RCOG Feb 2013

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


Author
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Work Address
Maternity Unit, Derriford Hospital, Plymouth, Devon, PL6 8DH

Version 7

Changes SGA rather than IUGR

Date Ratified December 2016 Valid Until Date December 2019