Customised Antenatal Growth Charts

Adapted with permission Perinatal Institute
Aims of Training

- Promote best practice
- Understand risk assessment at booking
- Increase knowledge of customised growth charts
- Standardise fundal height measurement
- Expand awareness of referral criteria
Parameters of normal growth

- What is the average size baby at term?
- What is the local definition of SGA?
- What is the local definition of LGA?
Birth weight

2500g = SGA?

4500g = LGA?
Antenatal Detection

Using population standards to assess fetal growth in the 3rd trimester will miss most cases of SGA. Population standards group all women together and predict they will all have the same size baby at term.
Fetal growth restriction

*associations*

- Stillbirth
- Neonatal deaths
- SIDS
- Perinatal morbidity
- Cerebral palsy
- Effects in later life
‘Unexplained’ Stillbirths in West Midlands, 2001
n=231; <10th percentile: 140 = 62 %
Stillbirths – Wigglesworth classification: consistently about two-thirds are ‘Unexplained’
MBRRACE-UK
Perinatal Mortality Surveillance Report

UK Perinatal Deaths for Births from
January to December 2015

Summary Report

June 2017
Improving our understanding – why babies die

Previous reports have highlighted the number of stillbirths which are unexplained. This has fallen from 49% in 2014 to 42% in 2015. Almost one third of these unexplained stillbirths were identified as potentially having poor growth highlighting the importance of close monitoring of fetal growth during pregnancy.
Fetal growth surveillance

Methods

- **Manual palpation**
  - Landmarks

- **Fundal height measurements**
  - Tape measure
  - Interpretation
  - Documentation

- **Ultrasound**
  - Biometry
  - Estimated fetal weight
  - Liquor volume
  - Doppler

Population based fundal height chart
Risk assessment at booking

Major and Minor risk factors for SGA identified:

- Using RCOG 1 major or 3 minor risk factors = increased risk
- Increased risk = serial scans
- Many trusts find the algorithm too complex and cannot implement RCOG guidance
**APPENDIX II: Screening for Small-for-Gestational-Age (SGA) Fetus**

### Booking assessment (first trimester)

**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 ≥ 11 cigarettes per day
- Paternal SGA
- Cocaine
- Daily vigorous exercise
- Previous SGA baby
- Previous stillbirth
- Maternal SGA
- Chronic hypertension
- Diabetes with macrovascular disease
- Renal impairment
- Antiphospholipid syndrome
- Heavy bleeding similar to menses
- PAPP-A < 0.4 MoM

Women unsuitable for monitoring of growth by SFH measurement e.g. Large fibroids, BMI ≥ 25

- Reassess at 20 weeks
  - PAPP-A < 0.4 MOM (major)
  - Fetal echogenic bowel (major)

- Uterine artery Doppler at 20–24 weeks
  - 3 or more

- Reassessment of fetal size and umbilical artery Doppler in third trimester
  - Normal

- Reassess during third trimester
  - Institute serial assessment of fetal size and umbilical artery Doppler if develops
  - Severe pregnancy induced hypertension
  - Pre-eclampsia
  - Unexplained APH abruption

**Consider aspirin at <16 weeks if risk factors for pre-eclampsia**

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.
Points from RCOG guidelines

- Women with an SGA fetus between 24-35 weeks – should receive a single dose of corticosteroids if delivery is being considered
- CTG should not be used as the only form of surveillance in SGA fetuses in 3rd trimester
- Early admission should be recommended in women in spontaneous labour with an SGA fetus in order to instigate continuous fetal heart monitoring

- Element 1- Reducing smoking in pregnancy
- Element 2- Risk assessment and surveillance for fetal growth restriction
- Element 3- Raising awareness of fetal movement
- Element 4- Fetal monitoring during labour
Algorithm and Risk Assessment Tool: Screening and Surveillance of fetal growth in singleton pregnancies

Low Risk
- No known risk factors

Increased Risk: one or more of the following:
- Maternal Risk Factors
  - Maternal age > 40 years
  - Ongoing smoker (at booking)
  - Drug misuse
- Previous Pregnancy History
  - Previous SGA baby (<10th 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

Low Risk Care
- Serial assessment (2-3 weekly) of symphysis fundal height (SFH) from 26-28 weeks until delivery
- SFH measurements plotted on chart
- Suspected abnormal growth (SFH < 10th centile or serial measurements which demonstrate slow or static growth)
- Direct referral for assessment (as soon as practically possible and should be within 72 hours) for estimated fetal weight (EFW), liquor volume and umbilical artery Doppler
- Abnormal growth or abnormal umbilical artery pulsatility index
- Refer to RCOG guidance on management of the SGA fetus

High Risk Care
- Serial assessment of fetal weight and umbilical Doppler from 26-28 weeks until delivery. EFWs plotted on chart

One or more risk factors
No risk factors
Normal
Risk assessment at booking

‘low risk’

‘increased risk’
Women are unique
GROW

Gestation Related Optimal Weight

www.perinatal.org.uk
Customised growth chart

- Generate once EDD by scan established

Adjusted for
- Height
- Weight
- Ethnic origin
- Parity

And not for
- Paternal
- Fetal
Using a multiple regression model, the term (280) day birthweight for a non-smoking British European primip of average weight (64kg) and average height (163cms) is calculated as 3453.4

When you input individual maternal characteristics the software then “adds on” or “subtracts from” the average we calculate the TERM OPTIMAL WEIGHT
Standardised Fundal Height Measurement
Fundal Height Measurement

- Primary screening tool
- Acceptable to women
- Easy to perform
- Non-invasive
- Inexpensive
Standardising Practice

• Intra observer variation
• Inter observer variation
• Bladder volume
• Tape measure
• Frequency of assessment
Semi recumbent-empty bladder
Fundal height

Identify the fundus
Identify top of the symphysis pubis
Semi recumbent-empty bladder

Measure the longitudinal axis, with an non-elastic tape measure and numbers hidden.
6. Plot measurement on customised growth chart and refer for USS if required
Considerations

- Descent of the head
- Malpresentation
- Multiple Pregnancies
- Already having serial scans – how frequent is serial?
- Obesity
Is this normal growth?
Referral recommendation
USS with EFW above 10th centile
USS with EFW above 10\textsuperscript{th} centile
USS with EFW below 10th centile
Referral recommendation
Referral recommendation
Is this normal growth?
Referral recommendation

Graph showing fundal height (cm) and weight based on scan (g) over gestation (wks) and EDD. Three data points are marked with an 'X'. The graph includes centile lines for 90th, 50th, and 10th centriles.
Fetal growth screening implementation strategy

- Standardised fundal height measurement
- Serial plotting on customised charts
- Clear referral protocols
- Revolving door policy
Growth Assessment Protocol (GAP)

- Face-to-face training
- E learning
- Completion of baseline audit
- Competency assessments
- Template fetal growth protocol
- Monitoring detection rates
- Audit of non-detected cases of FGR
- GAP leads (midwife, obstetrician, sonographer)
- PI support
E-learning

Module 1 – Theory
Module 2 - Practice

- Can be accessed from anywhere with an internet connection
- Will take approximately 1 hour to complete
- User can update themselves as required (every 12 months recommended)
- Email address required for every user
  Account will be set up and login details emailed to them
- Key leads will have a training log of all users who have completed online training
Log in details will be emailed to users with details of how to access the system.
Courses

Perinatal Institute e-Learning

Theory

- Definitions
- FGR and pregnancy outcome
- Risk assessment
- Screening and surveillance
- Detection rates and effect of training

GAP Theory

Not available unless:
- The activity Definitions is marked complete
- The activity FGR and pregnancy outcome is marked complete
- The activity Risk assessment is marked complete
- The activity Screening and surveillance is marked complete
- The activity Detection rates and effect of training is marked complete
- The activity Training and Protocols is marked complete

Practice
Test at the end of each module

Assists learner to retain information

Can take test as many times as required

Can print own certificate
Competency Assessment

- Knowledge of:
  - Definitions of FGR
  - Research evidence
  - Risk assessment at booking
  - Customised growth chart and referral criteria
  - Standardised fundal height
  - Customised centile at birth and ongoing management

- Demonstration of:
  - Production of a GROW chart
  - Standardised fundal height
  - Plotting measurements on a chart
Welcome to GROW web-app, the new online application for customised assessment of fetal growth and birth weight designed as an intrinsic component of the GAP programme.

The GROW software includes functionality for:

- generation of the customised antenatal chart to plot fundal height and estimated fetal weight measurements throughout pregnancy
- calculation of the customised birthweight centile for the baby
- reporting rates of fetal growth restriction and antenatal detection by unit/Trust

Please visit the help section for further details on how to use this application.

The functionality is also available as a web service which can be integrated with existing Maternity Information Systems. If your unit/Trust would prefer to use the web service, please contact the GROW team on 0121 607 0101.
Confirm mother's details are correct. If so select “yes”.

If mothers details are incorrect, re enter chart ID number. If details remain incorrect, generate a new chart, and use the new chart ID number.
All maternity units in the United Kingdom are listed with the additional option for 'no antenatal care' or 'other' for care received outside of UK/ private.
## Obtaining a birthweight centile

**Customised Birthweight Centile, Chart ID - 52754625**

### Mother / Booking Details
- **EDD**: 31/05/2016
- **Maternal Height**: 163 cm
- **Booking Weight**: 64 kg
- **Maternal Ethnicity**: British European
- **Parity**: 0

### Baby / Birth Details
- **Unit responsible for antenatal care**: Other
- **Baby DOB**: 31/05/2016
- **Gestation at birth**: 40 weeks 0 days
- **Outcome**: Live birth
- **Gender**: female
- **Birth Weight**: 2975 g
- **Antenatal referral for suspected SGA or FGR by fundal height**: select
- **SGA or FGR detected antenatally by USS**: select
- **Early pregnancy assessment**: select
- **Birthweight Centile**: select

[Complete birth details](#)
Input baby birth details

Confirm if SGA / FGR was suspected (from a fundal height) or detected by scan antenatally

Antenatal suspicion of SGA or FGR leading to referral for further investigation is usually on the basis of a fundal height measurement below the 10th centile line, or sequential measurements suggesting no or slow growth.

Antenatal detection / diagnosis of SGA indicates an ultrasound estimated fetal weight (EFW) below the 10th centile, or sequential measurements with slow or no growth, and/or one or more abnormal Dopplers.
Input baby birth details

Identify early pregnancy assessment for low or increased risk for fetal growth restriction.

RCOG Guideline and NHS Care Bundle Algorithm recommend serial fundal height measurements for low risk women, and serial ultrasound scans for women at increased risk of SGA or fetal growth restriction. The information requested here will improve the interpretation of referral rates.

To review the NHS England Saving Babies Lives care bundle algorithm .......click here
New edit function for centile page outcome, gender, birth weight

**Customised Birthweight Centile. Chart ID - 52754625**

<table>
<thead>
<tr>
<th>Mother / Booking Details</th>
<th>Baby / Birth Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDD</td>
<td>Unit responsible for antenatal care</td>
</tr>
<tr>
<td>Maternal Height 163 cm 5ft 4ins</td>
<td>Other</td>
</tr>
<tr>
<td>Booking Weight 64 kg 10st 11lbs</td>
<td>Baby DOB</td>
</tr>
<tr>
<td>Maternal Ethnicity British European</td>
<td>Gestation at birth 40 weeks 0 days</td>
</tr>
<tr>
<td>Parity 0</td>
<td>Outcome Live birth</td>
</tr>
<tr>
<td>Please check that the Chart ID corresponds with the mother’s details</td>
<td>Gender female</td>
</tr>
</tbody>
</table>

Birthweight centile is identified. <10th centile or >90th centile = red box
Alterations can be made to:-
Outcome
Gender
Birth weight

Ed
Edit function:
Trust reports;

- Show local report on GROW application web page:
- app.growservice.org/uk
Benefits of Data collection

- Baseline FGR and antenatal detection rates
- Quarterly FGR reports
- Benchmarking against other units (anonymously)
- National picture

- Can identify missed cases to audit
- Can monitor performance and improvement
- Commissioning support – Ultrasound resources
- PI - Evaluation of GAP
Audit missed cases - Aim

- For each case:
  - To identify why the FGR was missed if possible
  - To identify if there are any training issues

- Overall
  - To identify themes/system failures
  - To focus service provision
  - To provide evidence for commissioning support/services
GAP-SCORE

- We provide an electronic audit tool to audit to missed cases in an standardised manner

- GAP-SCORE = Standardised Case Outcome Review and Evaluation.
GAP-SCORE

- Based on risk at booking/throughout pregnancy and serial scanning (RCOG guideline, 2014 & NHS England Saving Babies Lives Care Bundle, 2016)
- Use of customised growth chart
- Plotting and referring
- Growth scans
- Provides taxonomies and action plans