Outline

• Dr Deralie Flower
  – Risk factors in early pregnancy
  – Smoking in pregnancy

• Dr Ngaire Anderson
  – Pre-pregnancy BMI and gestational weight gain
  – Customised fetal growth charts

• Q&A
CUSTOMISED FETAL GROWTH CHARTS
Customised Fetal Growth Charts

- Why is fetal size important?
- What are customised fetal growth charts?
- Why are they useful?
- How do I use them?
Why is fetal size important?
Why is fetal size important?

- Consequences of small for gestational age (SGA)

**Perinatal Period**
- Preterm birth
- Asphyxia
- Stillbirth
- Hypoglycaemia
- Polycythæmia
- Neonatal Death

**Childhood**
- CP
- Lower IQ
- Short stature
- ↑ BP

**Adulthood**
- Hypertension
- Heart disease
- Diabetes
- CVA

**Mother**
- ↑ Ischaemic Heart Disease

Customised Fetal Growth Charts
Stillbirths
Birmingham 1995-2002

40% - 50% of stillbirths are SGA
As a GP, why do I need to know about fetal size?

- Risk factors for SGA / poor pregnancy outcome are often present at booking
- These risk factors can be modifiable with early intervention
- Women identified as at increased risk can be monitored more closely throughout pregnancy
- If SGA is identified antenatally, risk of adverse perinatal outcomes are reduced four-fold

Identification of SGA

• Only 20-40% SGA babies detected before birth!!
• Improved detection before birth & timely delivery decreases perinatal morbidity & mortality
• How can we increase antenatal detection of SGA?

Customised Fetal Growth Charts
SGA and Fetal growth restriction

- IUGR = failure to reach growth potential
- SGA = birthweight <10th population centile

- Some growth restricted babies may be missed (20-30%)
- Some ‘constitutionally small’ babies that are not growth restricted will be included (20-30%)
SGA and IUGR

Customised Fetal Growth Charts
IUGR not SGA
Customised Fetal Growth Charts

**SGA**
Birth weight below 10th percentile

**IUGR**
Fetus unable to achieve its growth potential
Fetal growth potential

• Optimal weight
• Associated with:
  – Gestation
  – Maternal Ethnicity
  – Maternal height and weight
  – Parity
  – Fetal sex
  – Smoking
  – Diabetes
  – Hypertensive disease
Ethnicity and birthweight in NZ

Proportion of births & mean birthweight: NZ 2004

- European 58% 3.46kg=7lb10oz
- Pacific 9% 3.56kg=7lb14oz
- Asian 8% 3.24kg=7lb2oz
- Maori 18% 3.36kg=7lb7oz

Risk of SGA by population birth-weight centiles

- Asian (Indian) RR 4.4 (95% CI 2.9 - 6.6)
- Pacific Island RR 0.7 (95% CI 0.55 - 0.95)

Thompson J Paediatr Child Health 2001
Customised Fetal Growth Charts

Same ethnicity - different sizes

Small European
wt 50kg, ht 155cm
baby centile = 39
not c SGA

3200 g
40 wks
25th Population centile

Big European
wt 100kg, ht 178cm
baby centile = 5
c SGA
So... how do we know customised centiles are better than population centiles at identifying at-risk infants?
Customised Birthweight Centiles

Customised SGA associated with:

• Abnormal umbilical and uterine artery Doppler studies
• Preeclampsia
• Preterm birth & neonatal unit admission
• Stillbirth and neonatal death
• Used by: PMMRC / NWH

Customised SGA better identifies TRUE fetal growth restriction

McCowan et al BJOG 2005
**GROW**  
(Gestation Related Optimum Weight)

- Developed by J Gardosi et al.  
  [free download from www.gestation.net](http://www.gestation.net)

- Produces ‘normal’ curves for an individualised optimal fetal weight  
  (and fundal height assessment)

- NZ calculator developed from NZ births

- Potentially **doubles** the antenatal detection of SGA

*Gardosi and Francis BJOG 1999, 106:309-17*
Customised Fetal Growth Charts
1. Mother semi-recumbent with an empty bladder
2. Palpate to determine the fundus
3. Secure tape with hand at top of fundus
4. Measure along longitudinal axis of the uterus in whole cms

SFH should be performed at 2-4 weekly intervals after 24-28 weeks
Small Indian woman
BMI-24
Previous baby AGA
36w SFH 33cm
Normal increase in SFH

Growth scan not required

Customised Fetal Growth Charts
Large European BMI-29
Previous SGA
35w SFH 33cm
Suboptimal increase in SFH

Needs growth scan

Stillbirth, 39 wks
2780g, 2nd centile

Needs scan now
Case Report

- 35 year old, G3P2
- previous babies >4kg born by LSCS
- booked 16 wks
- BMI 48
- Normal GTT
- 3 growth scans:
Customised Fetal Growth Charts

Ultrasound growth chart

Measurements within normal limits
Para 2 Samoan
Maternal height (cm): 170
Booking weight (kg): 148
Body Mass Index: 48.4 High

C = customised centile

1. female; 40w 0d; 4100g = C 83
2. boy; 40w 0d; 4400g = C 88

Stillbirth: 39 weeks 2810g C 2nd centile
In summary:

- Free download: [www.gestation.net](http://www.gestation.net)
- Gives an easy summary of important risk factors at booking
  - Identifies those who would benefit from early obstetric review/intervention
- Serial SFH / fetal weight plotting gives a reliable indication of fetal growth compared to optimum
  - Identifies at-risk fetuses

Recommended for all women at booking
Q&A

Everything you wanted to know but were too busy to ask...