

Growing Pains

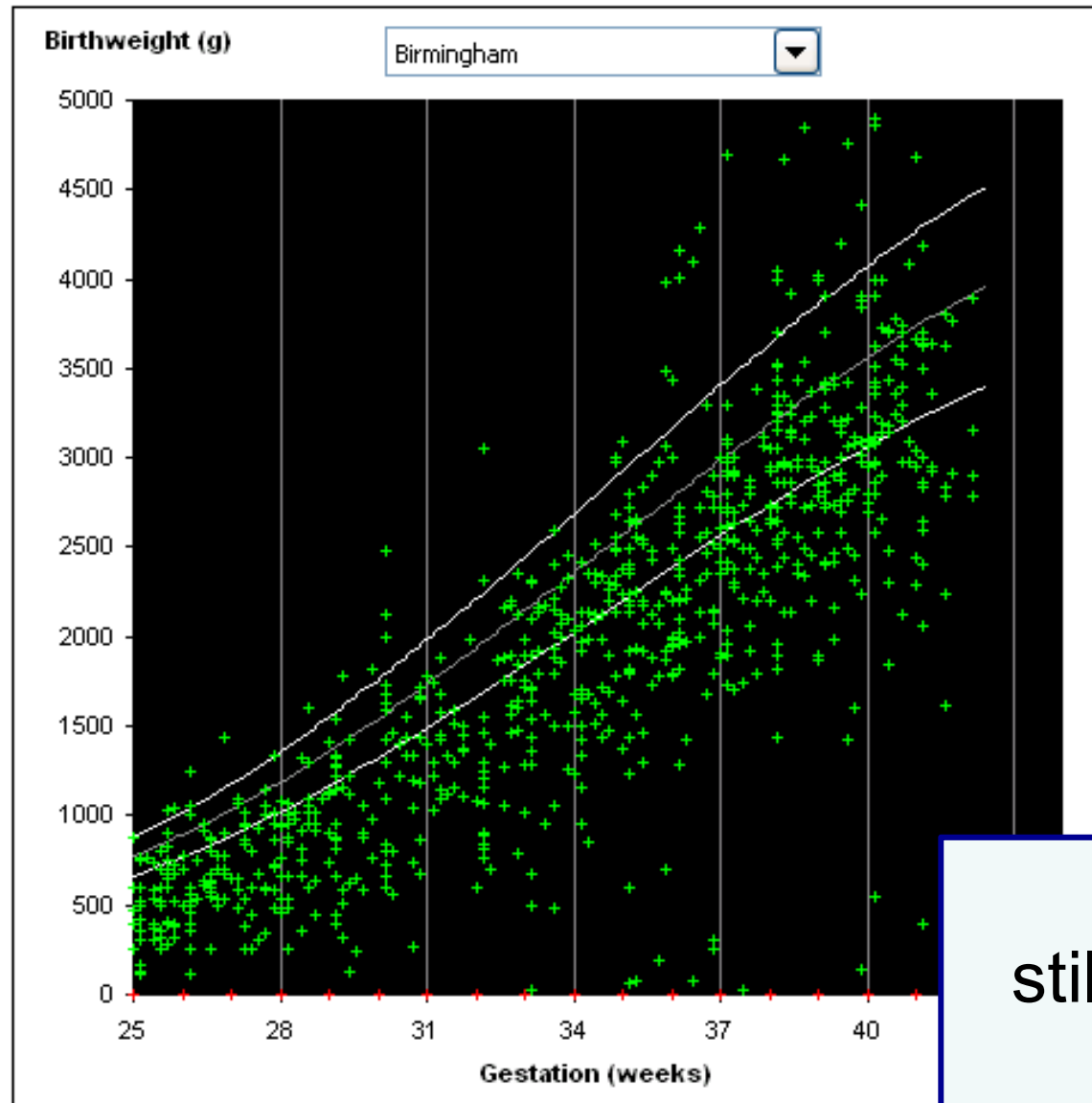
2015 Annual report

Professor Lesley McCowan



SGA Stillbirths

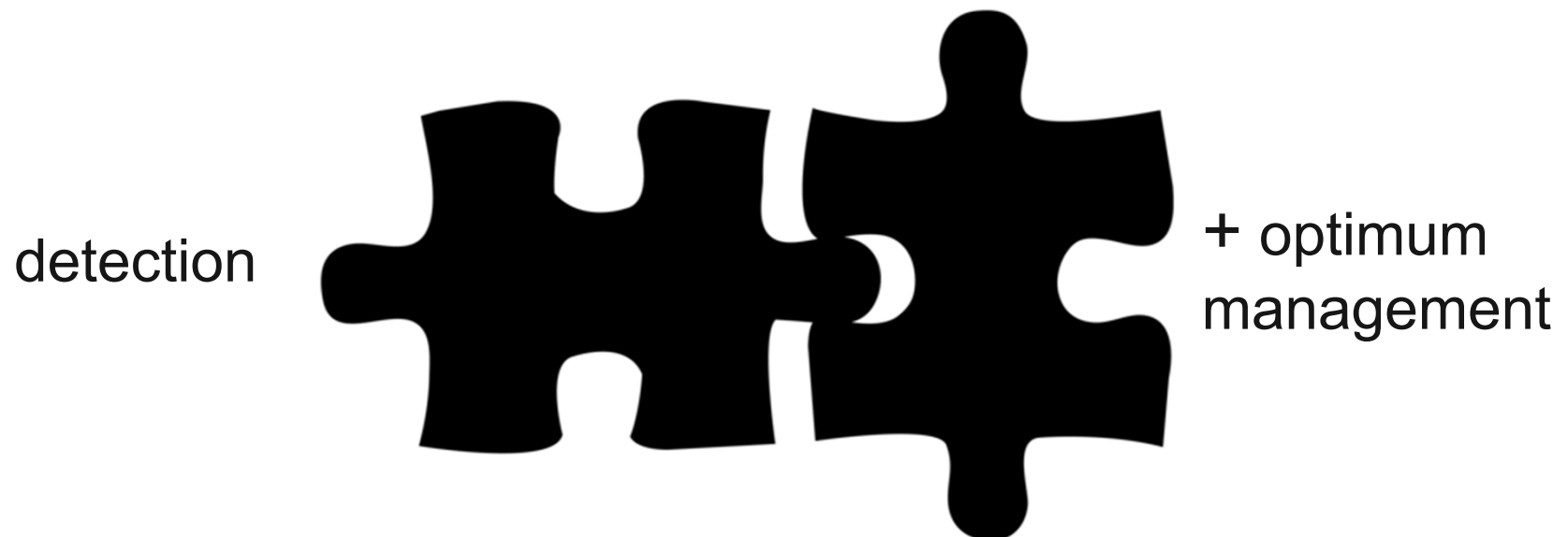
Birmingham 1995-2002



40% of
stillbirths are
SGA

Contribution of SGA to stillbirth

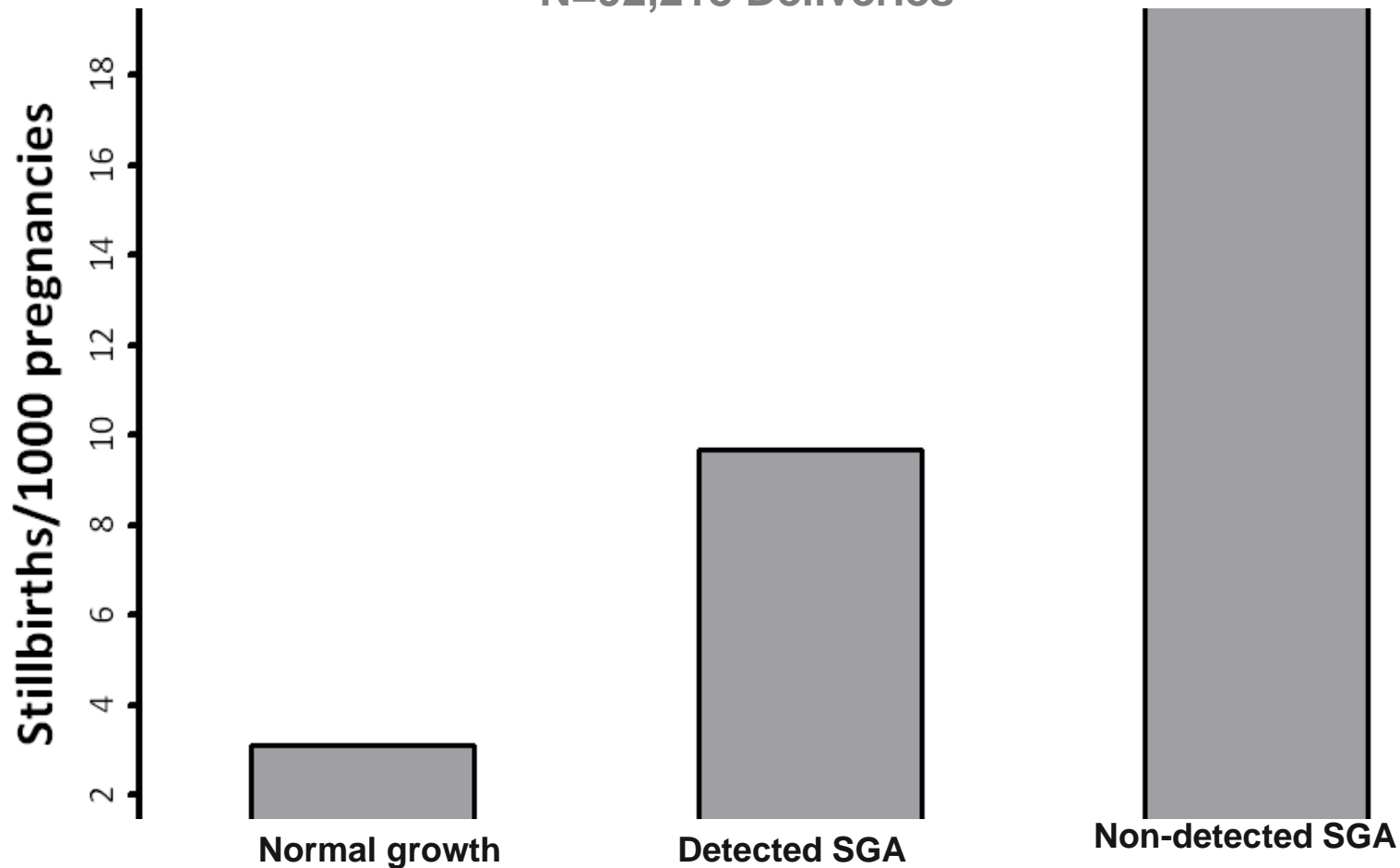
- 40% of non-anomalous singleton stillbirths in NZ are SGA (birthweight<10th customised centile)
- only ¼ of these recognised as SGA before birth
- improved detection before birth & timely delivery is associated with ↓ perinatal morbidity & mortality



Antenatal identification of SGA improves outcome

GA at delivery: 270 detected vs. 280 days undetected

N=92,218 Deliveries



Gardosi J. Maternal and fetal risk factors for stillbirth: population based study. BMJ 2013

NZ pregnant women vary in size & ethnicity



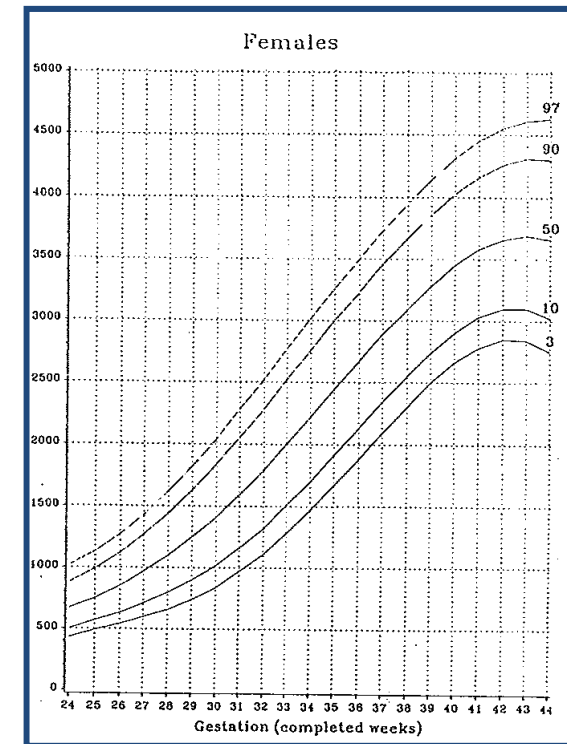
Ethnicity and Birthweight

Ethnicity & mean birthweight : NZ 2012

European	48%	3.46kg
Pacific	11%	3.53kg
Asian	14%	3.24kg
Māori	27%	3.36kg

Risk of SGA by population centiles

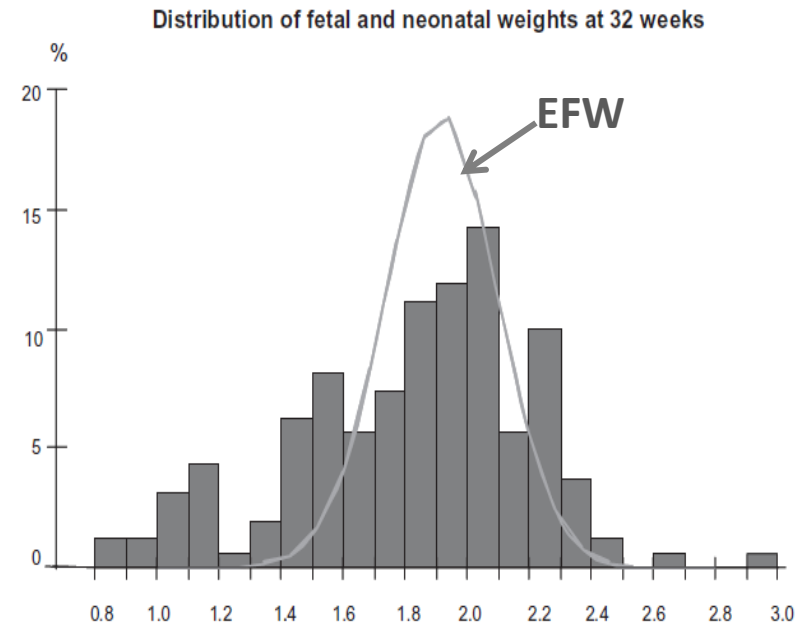
- Asian (Indian) RR 4.4 (2.9 - 6.6)
- Pacific Island RR 0.7 (0.55 - 0.95)



Thompson J Paediatr Child Health 2001

How to define SGA?

- Pre-term birth is pathological - babies are more likely to be growth restricted
- Birthweight curve shifted to left vs ultrasound EFW curve



Customised birthweight centiles

- Adjust for maternal physiological factors that influence fetal growth:
 - early pregnancy weight
 - height
 - ethnicity
 - parity
 - gestation
 - infant sex
- Use an ultrasound standard (Hadlock)
- Creates an optimum growth potential for an individual baby after exclusion of pathology



Original Article

A customised birthweight centile calculator developed for a New Zealand population

Lesley McCOWAN,¹ Alistair W. STEWART,² Andre FRANCIS³ and Jason GARDOSI³

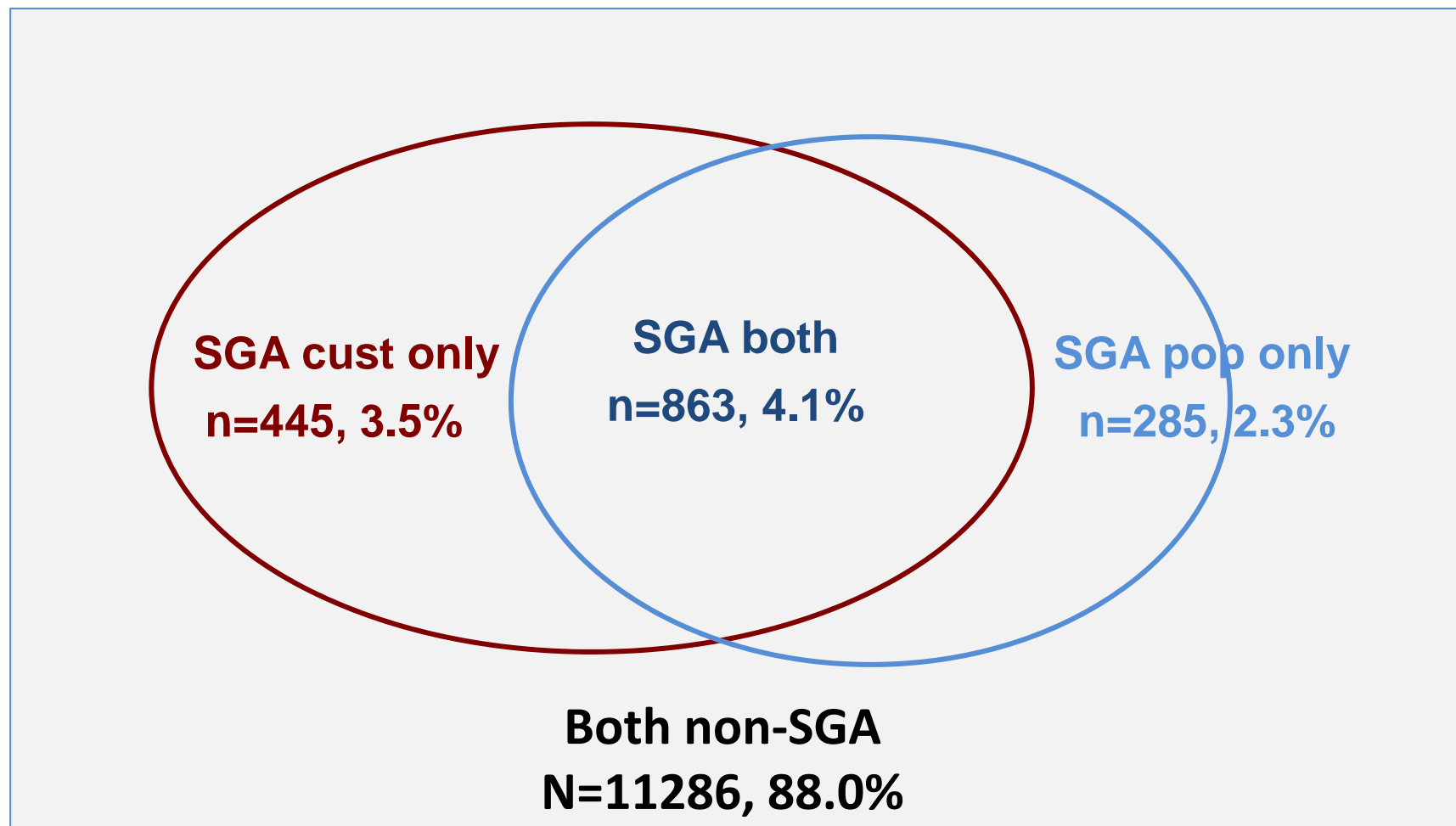
¹*Department of Obstetrics and Gynaecology, National Women's Hospital,* ²*School of Population Health, University of Auckland, New Zealand* and ³*West Midlands Perinatal Institute, Birmingham, United Kingdom*

Coefficients originally developed for 6 ethnic groups

- NZ European
- Maori
- Samoan
- Tongan
- Chinese
- Indian

Population SGA and Customised NWH SGA 2005

N=12,879



Population vs Customised centiles: National Women's Database 1993-2000

	Both non-SGA n=11,286, 88.0%	SGA pop only n=285, 2.3%	SGA cust only n=445, 3.5%	Both SGA n=863, 4.1%
	Not Cust	SGA	Cust SGA	
European	37%	25%	29%	37.0%
Height cm	163	155	167	162
Weight kg	73.2	53.9	82.7	67.1
BMI	27.5	22.3	29.7	25.6
Gestation wks	39.1	39.3	38.5	38.6
Birthweight g	3507	2785	2826	2516
PND RR,95% CI	1	0	5.2 (2.6, 10)	10 (6.7, 15)

McCowan, Harding
& Stewart

BJOG: an International Journal of Obstetrics and Gynaecology
August 2005, Vol. 112, pp. 1026–1033

Population vs Customised centiles: suspected SGA pregnancies n=374

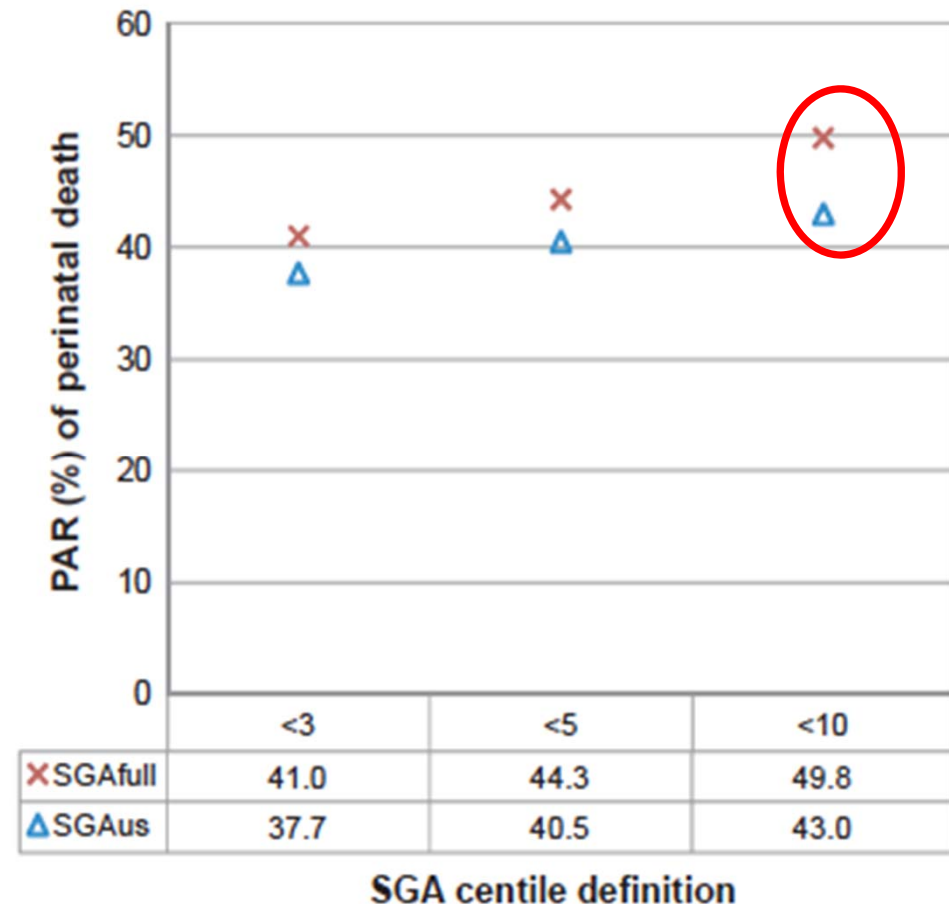
	Both non-SGA n=44, 12%	SGA pop only n=32, 9%	Both SGA n=271, 72%	SGA cust only n=27, 7%
	Not cust	SGA	Cust	SGA
Abnormal Umb Doppler	18%	9%	44%	44%
Abnormal Ut Doppler	20%	13%	47%	62%
Pre-labour LSCS fetal distress	1	1.4 (0.1, 21)	6.8 (1, 48)	8.1 (1.0, 66)
Gestation wks	38.0	38.6	36.5	34.7
Birthweight g	2905	2676	2048	2024

Updated NZ calculator 2012



- Coefficients updated -10 new ethnicities added
- RR & PAR of perinatal death assessed by ultrasound (Hadlock) EFW alone & full customisation
- 7% ↑ identification with full customisation
- RR Hadlock 2.1(1.4-3.3)
- RR full cust 5.6 (3.6-8.7)

Anderson et al BJOG May 2012,



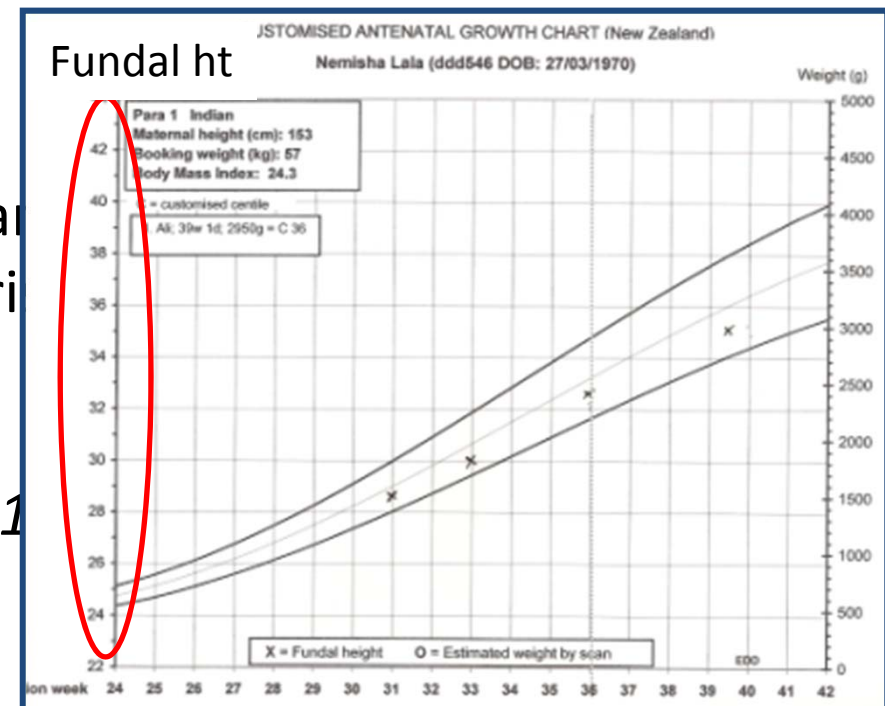
Customised antenatal growth charts-GROW

Fundal height

Customised fundal height measurement

- Impetus- poor reliability of standard fundal height nomograms to detect SGA
- Examined the influence of maternal characteristics on fundal height
- Weight a major influence
- Developed regression coefficients and a nomogram for fundal height adjusted to characteristics of individual woman

Mongelli & Gardosi O&G 1999, 94: 591



Customised antenatal growth charts-GROW

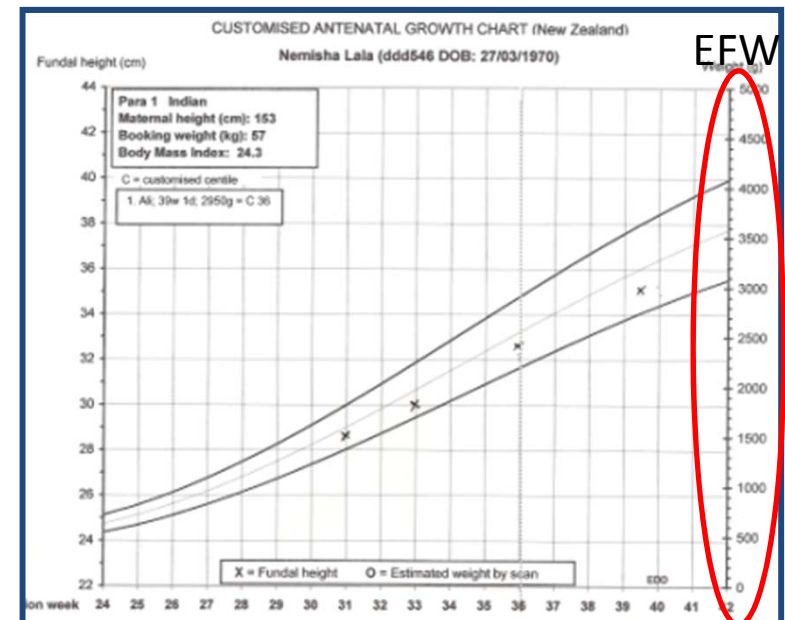
2 components

Gestation Related Optimum Weight- GROW

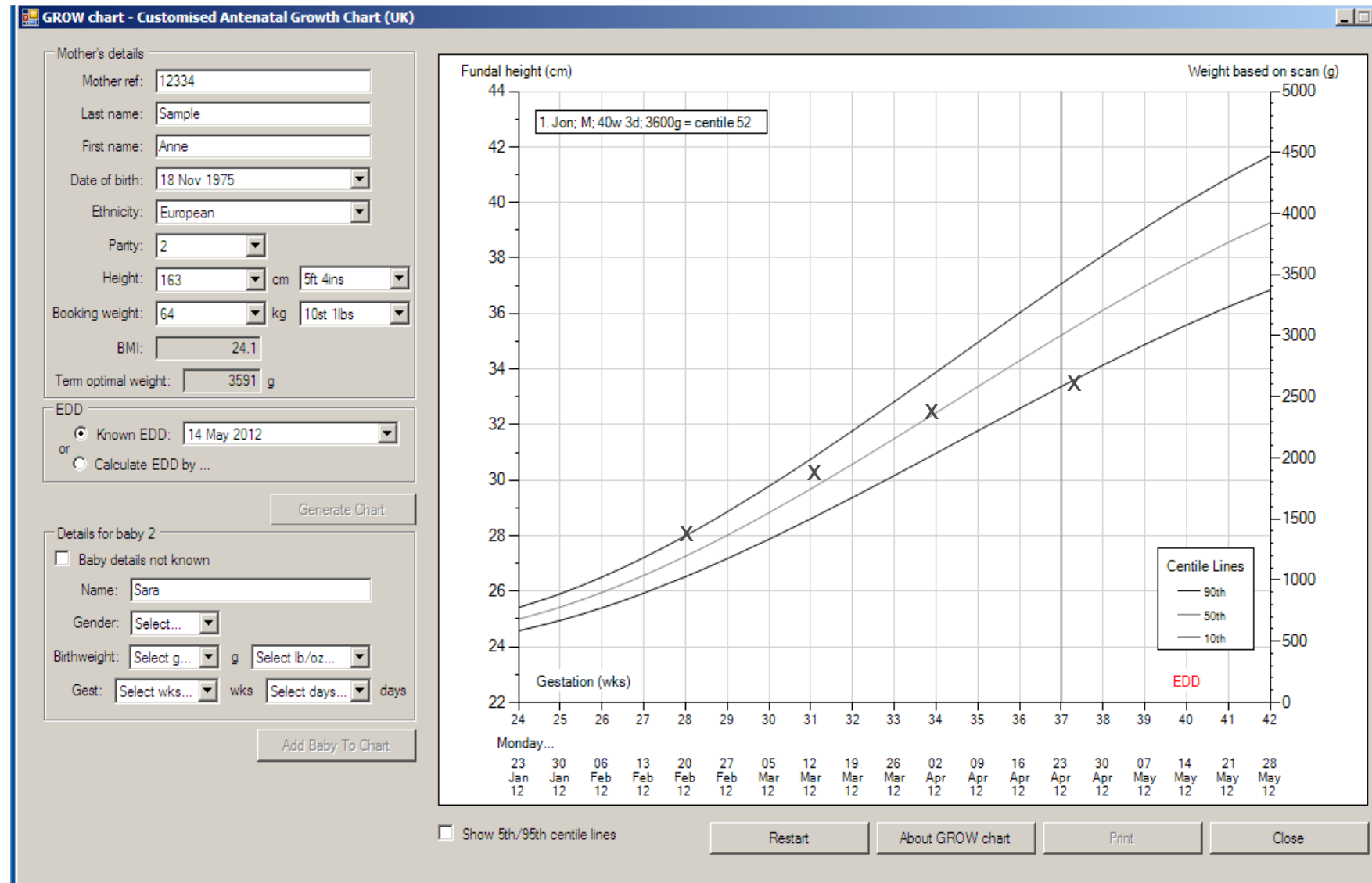
- GROW produces computer generated EFW curves for optimal fetal weight , adjusted to characteristics of individual pregnancy
 - weight, height, parity, ethnicity
- EFW uses Hadlock proportionality curve.
- Used to plot EFW from growth scans

Gardosi et al Lancet 1992 : 339;283,

10 ethnicities in NZ GROW program



Reducing Fundal Height –needs scan



Controlled study GROW vs Routine Care



	Study group n=667	Control n=605	OR(95%CI) P value
Weight(kg)	66.2	65.5	
SGA detected	48%	29%	2.2 (1.1-4.4)
>2 growth scans	16%	20%	0.8 (0.6-1)
Antenatal admissions	0.23	0.39	<0.0001

Green-top Guideline No. 31
2nd Edition | February 2013

**The Investigation and Management of
the Small-for-Gestational-Age Fetus**

Gardosi and Francis BJOG 1999, 106:309-17

GROW recommended by 2014
RCOG & Irish SGA guidelines

Australian SGA detection data: Adelaide 2009

	SGA detected n (%)	SGA missed n (%)	P value
Control SCOPE study	31/125 (25%)	94 (75%)	
GROW routine use	44/103 (43%)	43 (57%)	p=0.005

Increased detection of SGA after introduction of GROW
as unit policy to plot fundal height measurements!

Note - 20% of GROW study population had BMI 30-40
- excluded BMI >40 who had serial scans

Similar detection to original Gardosi study

Roex A , Aust NZ J Obstet Gynecol Jan 2012

Auckland data on detection of SGA

- SCOPE study (2004-7) only 29% SGA detected before birth
 - Predominantly by self employed midwives
 - Detection by palpation or non personalised SFH measures (pre-GROW)
- National Women's audits of SGA detection 2010
 - DHB antenatal clinic 60% SGA detected with GROW, 10% without
- 2014
 - 54% detection of SGA by DHB midwife and 33% by LMC

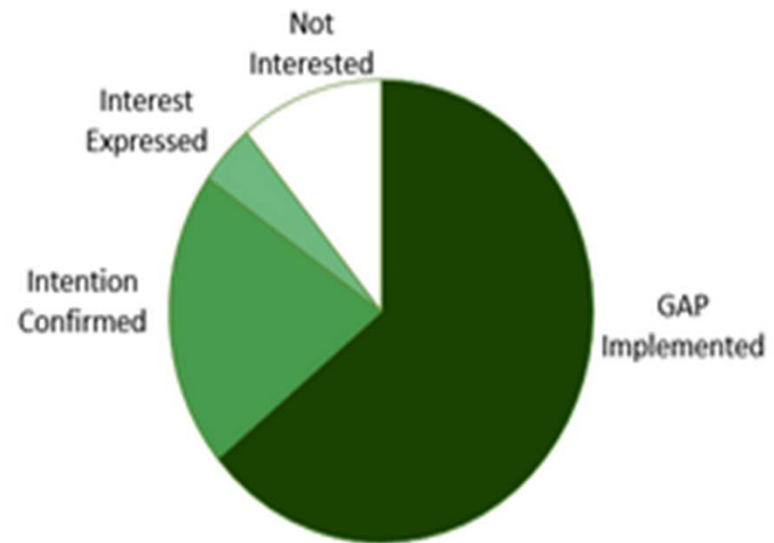
	Community Midwife N=52	Independent Midwife N=98
Grow Chart use	94.23%	65.30%
Antenatal diagnosis of SGA	53.84%	32.65%

- Need information about outcomes and resource utilisation

Growth Assessment Protocol (GAP) education workshops in UK from 2008



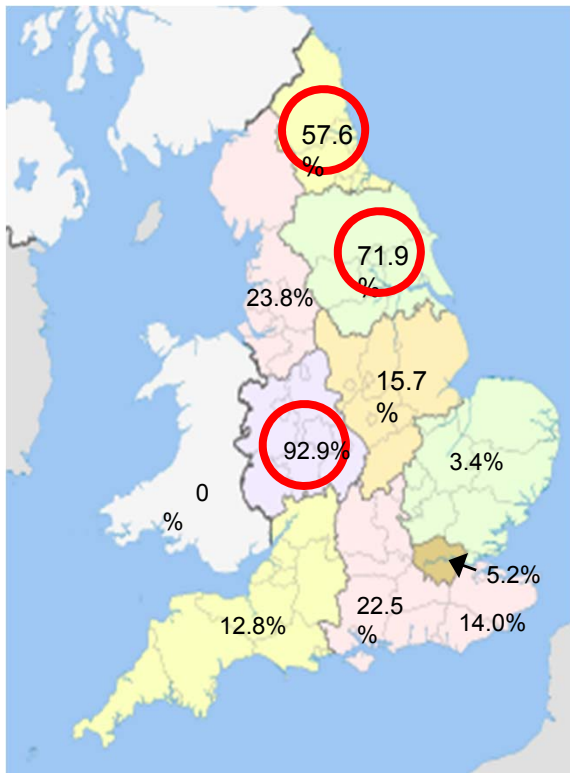
- Risk assessment for SGA
- Standardised fundal height measurement
- Plotting on customised charts
- Protocols and referral pathways
- Serial scans for high risk
- Timely delivery for SGA



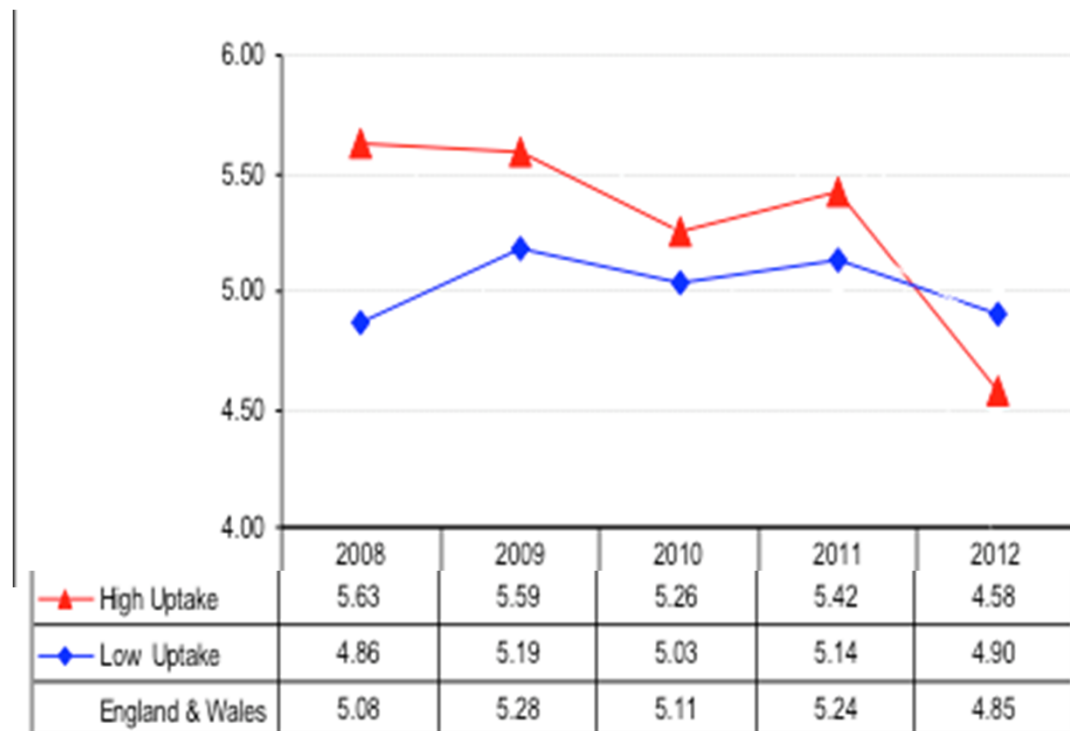
GAP Implemented in $\approx 80\%$ of NHS trusts

<http://www.perinatal.org.uk/FetalGrowth/GAP/GAP.aspx>

BMJ Open Association between reduced stillbirth rates in England and regional uptake of accreditation training in customised fetal growth assessment Gardosi et al 2013

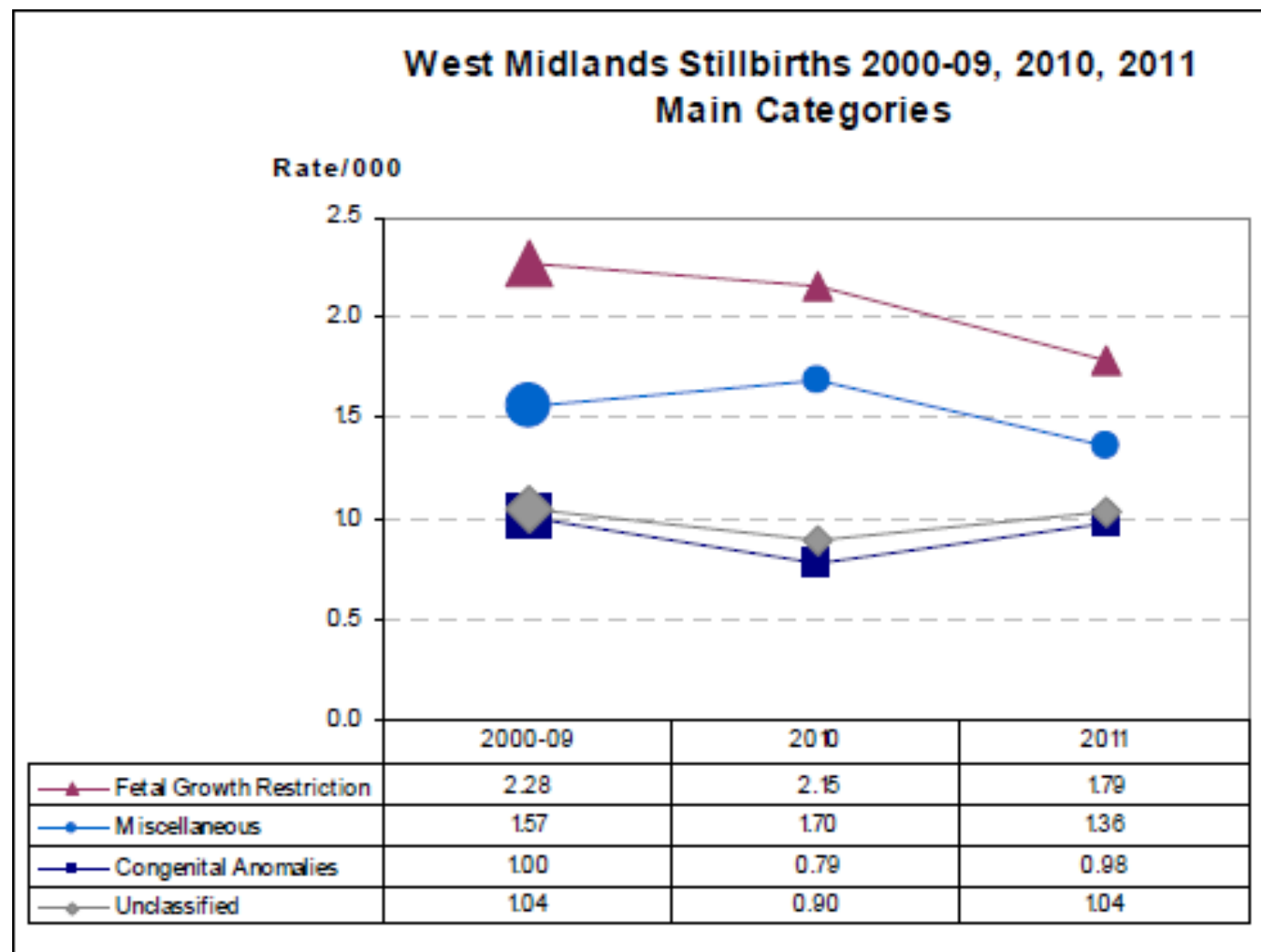


Stillbirth rates - ONS, 2008-2012



- 2012 rates were lower in the three 'high uptake' regions
- no drop in stillbirth rate in rest of England and Wales

Perinatal Mortality with FGR West-midlands



Stillbirths in West Midlands 2011 report- significant reduction in FGR stillbirths but not other categories

Use of GROW in NZ

- Introduced in some settings from 2007 onwards
- Recommended by first PMMRC annual report in 2007

Request Lead Maternity Carers to measure height and weight at the first antenatal visit and to use a customised growth chart to record fundal height to improve the recognition of infants who are small for gestational age.

- No national education implemented at this time
- This was pre NZMFM SGA guideline & pre-development of GAP
- Now in a position to implement GAP & NZMFM SGA guideline along with audit to determine whether SGA detection is increased and outcome improved



GROW education- where are we at?

- Education of GROW users may be linked to improved outcomes
- Perinatal Institute has decided that GROW licences won't be available in future without GAP training
- NZ able to implement GROW & training as now have NZ MFM SGA guideline
- Educational programs developed that are fit for purpose for NZ users

Final notes from a meeting held 12 May 2014 at RANZCOG office, 23 Waring Taylor Street, Wellington at 1pm

“Systems for identifying and addressing the needs of growth restricted babies”

19 June 2015

Attention: Clinical Directors

No. 1 The Terrace
PO Box 5013
Wellington 6145
New Zealand
T +64 4 496 2000

Dear Colleague

GROW system of detecting Intrauterine Growth Restriction/Small for Gestational Age

Through discussions with the stakeholders, the Ministry has developed the view that the GROW system that produces a customised growth chart is the agreed tool for use in New Zealand and is already in use in a number of DHBs. As the DHB Clinical Directors have decided a customised growth chart is necessary for an obstetric referral for suspected IUGR/SGA, the tool needs to be available to referring clinicians.

It is each DHB's responsibility to ensure the GROW tool is available and to pay any licence fees required. They also need to ensure that all the clinicians who will be using the tool have the necessary education to use it correctly as this is an essential component of the GROW system's efficacy – that clinicians are taking the measurements in the same way.

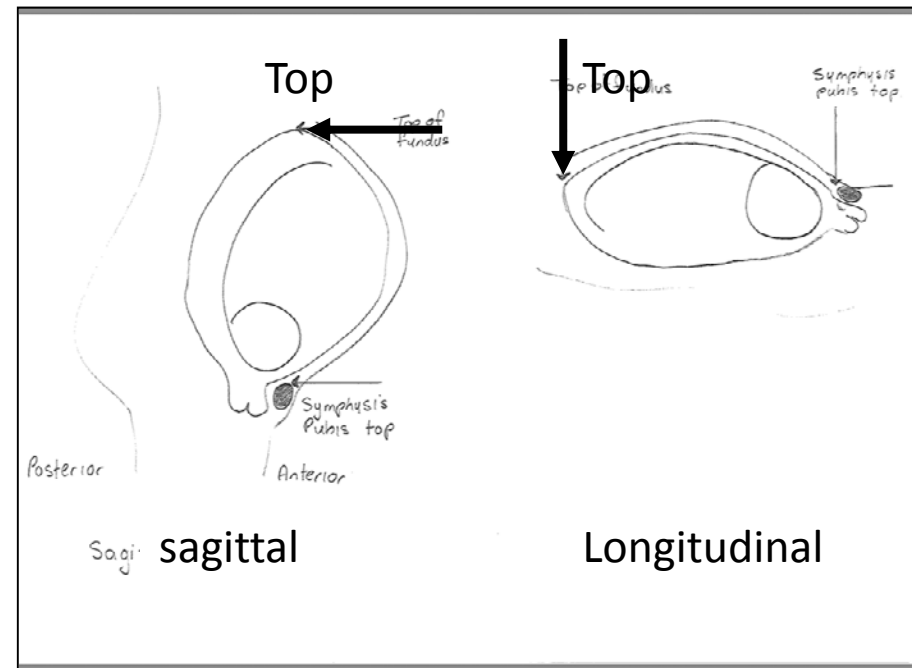
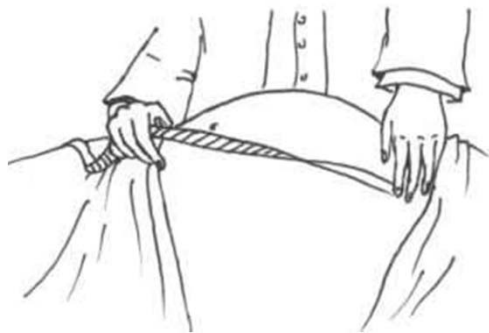
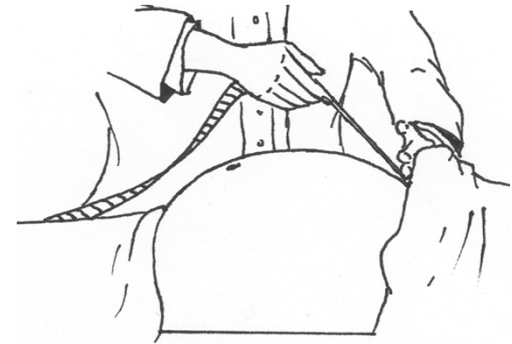
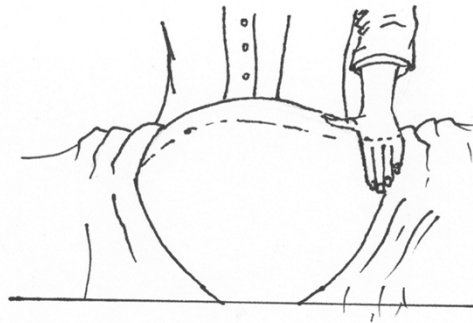
CDs obstetrics and midwifery gone back to MoH requesting a national licence for GROW

GAP Training in 14/20 NZDHBs in 2014

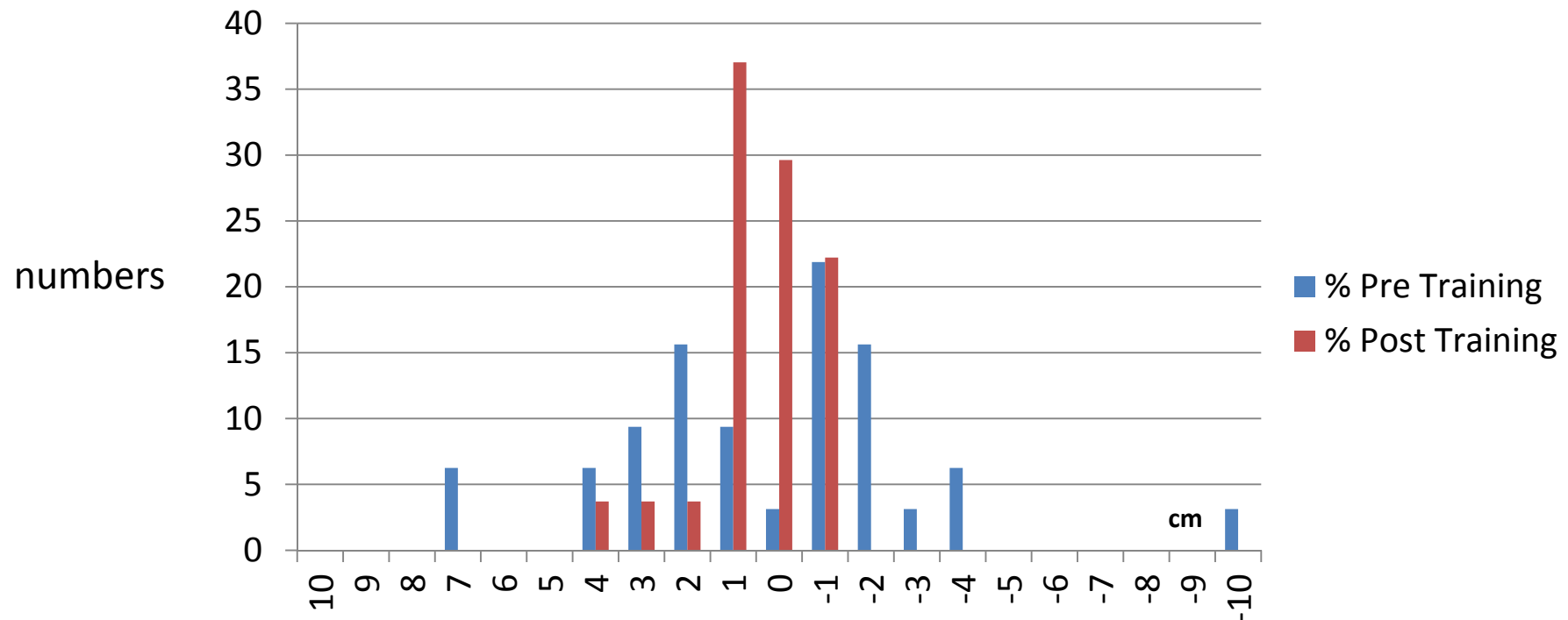


- Variation in fundal height measurement usual pre & post training
- Over-measurement of SFH more common than under
- Could reduce detection of SGA & over recognition of suspected LGA

Standardised measurement of fundal height



Marked variation in fundal height measurements pre & post training



Spread pre training = -10 to +7 cm (n=32)

Spread post training = -1 to +4cm (n=27)

The Future –RCTs of GAP & audit

TWO CLUSTER RCTS IN DESIGN PHASE:

FRENCH RCT :HPAG (Hauteur utérine et Petit poids pour l'Age Gestationnel)

The DESIGN Trial

DEtection of Small for GestationNal age fetus (SGA) – a cluster randomised controlled trial to evaluate the effect of the Growth assessment protocol (GAP) programme

In NZ- audit of detection of SGA , perinatal morbidity and cost effectiveness of GAP planned as DHScience in CMH pre and post implementation of GAP program.

Summary

- SGA by customised centiles is associated with increased perinatal morbidity and mortality
- Standardised measurement of fundal height plotted on a customised growth chart may increase detection of SGA babies
- Increased detection along with careful management and timely delivery is required to reduce perinatal mortality associated with SGA infants