



A CUSTOMISED BIRTHWEIGHT CENTILE CALCULATOR DEVELOPED FOR A NEW ZEALAND POPULATION

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BACKGROUND

- SGA is usually defined as <10th% using sex adjusted population charts.
- A number of these SGA babies are "constitutionally small" and not growth restricted.
- Customised centiles adjust for maternal variables: height, booking weight, ethnicity and parity as well as infant sex and gestation.
- Customised birthweight <10th% better identifies SGA babies with perinatal morbidity and mortality.
- Customised centiles have not previously been developed for a New Zealand population.



A baby of Maori and Indian ethnicity was on average 67g and 150g lighter respectively than a baby born to a European woman of the same height and weight.

A Samoan, Tongan and Chinese baby was 84g, 124g and 101g heavier than a baby born to a European woman of the same height and weight.

Table 3: Regression coefficients (grams) for variables from the Gardosi¹ model based on the National Women's Hospital data.

	Coefficient (g)	SE	P value
The coefficients listed are based on an expected birthweight of 3530g for a nulliparous European women of height 165cm and booking weight 70kg delivering at 40 weeks gestation.			
Gestation (from 280 days)			
Linear term	19.5	1.3	<0.0001
Quadratic term	-0.28	0.09	0.003
Cubic term	0.0006	0.005	0.9
Sex			
Female	-57.7	6.1	<0.0001
Male	57.7	6.1	<0.0001
Maternal Height (from 165cm)			
Height	9.6	1.1	<0.0001
Booking Weight (from 70kg)			
Linear term	7.1	0.6	<0.0001
Quadratic term	-0.103	0.022	<0.0001
Cubic term	0.0007	0.0003	0.02
Ethnic Group			
European	0		
Maori	-67	23	0.004
Samoan	84	23	0.0002
Tongan	124	27	<0.0001
Chinese	101	20	<0.0001
Indian	-150	31	<0.0001
Other	13	19	0.5
Parity			
Parity 1	102	15	<0.0001
Parity 2	102	19	<0.0001
Parity 3	123	25	<0.0001
Parity 4+	175	28	<0.0001



AIMS

- To develop customised centiles applicable to a New Zealand population
- To determine if customised birthweight varies between European and Maori and European and the main Pacific Island ethnic groups resident in New Zealand (Samoan and Tongan).

METHODS

Study population (n=4707)

- Women from the National Women's Hospital database from 1993-2000 with the following data: ethnicity, parity, height, booking weight and scan at <24 weeks.
- Exclusions - multiple pregnancies, preterm births, stillborn babies and babies with congenital abnormalities.



Statistical methods

- Multiple regression analysis using the model of Gardosi (1995) generated coefficients for New Zealand women.
- Coefficients entered into "Gestation Network centile calculator" www.gestation.net/birthweight_centiles/birthweight_centiles.htm.
- More diabetic women met inclusion criteria so population proportion used in model.

RESULTS

Table 1: Ethnicity and mean birthweight in the study group and those eligible but excluded because of missing data.

Ethnicity	Included in study (n=4707)	Birthweight	Not included (missing data) (n=54,357)	Birthweight
European	1688 (36%)	3457 (494)	29,663 (55%)	3520 (486)
Maori	419 (9%)	3448 (472)	5078 (9%)	3414 (509)
Samoan	506 (11%)	3668 (510)	4772 (9%)	3642 (504)
Tongan	326 (7%)	3739 (503)	3148 (6%)	3782 (519)
Chinese	751 (16%)	3410 (455)	3827 (7%)	3351 (428)
Indian	214 (5%)	3173 (479)	1981 (4%)	3132 (452)
Other	803 (17%)	3433 (499)	5888 (11%)	3446 (484)

Data are mean (SD) and number (%) as appropriate.
Birthweights are weights in grams.

Table 2: Demographic characteristics of the study population (n=4707 women)

Ethnicity	Age (yrs)	Nulliparous	Booking Weight (kg)	Height (cm)	Body Mass Index kg/m ²
European	31.2 (5.9)	41%	69.2 (14.6)	164.9 (6.7)	25.5 (5.2)
Maori	26.9 (6.3)	30%	78.4 (19)	164.7 (6.2)	28.9 (6.6)
Samoan	28.9 (5.8)	26%	86.6 (18.8)	164.2 (5.6)	32.1 (6.9)
Tongan	29.8 (5.8)	22%	88.4 (17.9)	165.5 (5.5)	32.3 (6.1)
Chinese	32.3 (4.7)	41%	55.9 (9.0)	159.3 (5.3)	22.0 (3.3)
Indian	28.3 (5.4)	30%	61.2 (13.3)	158.4 (6.0)	24.3 (4.6)
Other	29.7 (6.1)	38%	69.9 (19.6)	160.8 (6.6)	26.8 (6.6)

Data are mean (SD) or % as appropriate.

REFERENCE

Gardosi J, Mongelli M, Wilcox M, Chang A. An adjustable fetal weight standard. *Ultrasound Obstet Gynecol* 1995; 6:168-74.

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CONCLUSIONS

- There are significant differences in mean birthweights between New Zealand's main ethnic groups
- The expected birthweight of a European baby from a mother of average build, 3530g, was very similar to that in Nottingham, UK, 3478g.
- These coefficients can be applied clinically by downloading the software program from www.gestation.net/birthweight_centiles/birthweight_centiles.htm.
- As customised centiles appear to improve prediction of perinatal morbidity, data on height and booking weight should be collected in all pregnancies.