

# EXCESS FETAL GROWTH AND GLYCAEMIC CONTROL IN TYPE 1 DIABETES AND PREGNANCY

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# Type 1 Diabetes and Fetal Growth

- 4 studies found that LGA neonates demonstrate excess fetal growth on ultrasound scans as early as mid-second trimester:
- No association with maternal glycaemic control in 2 studies
  - Wong et al; Diabetes Care, 2002
  - Hammoud et al; Ultrasound Obstet Gynecol, 2013
- Association with first trimester glycaemic control
  - Mulder et al; Ultrasound Obstet Gynecol, 2010
- Association with first and second trimester glycaemic control
  - Raychaudhuri et al; Obstet Gynecol, 2000

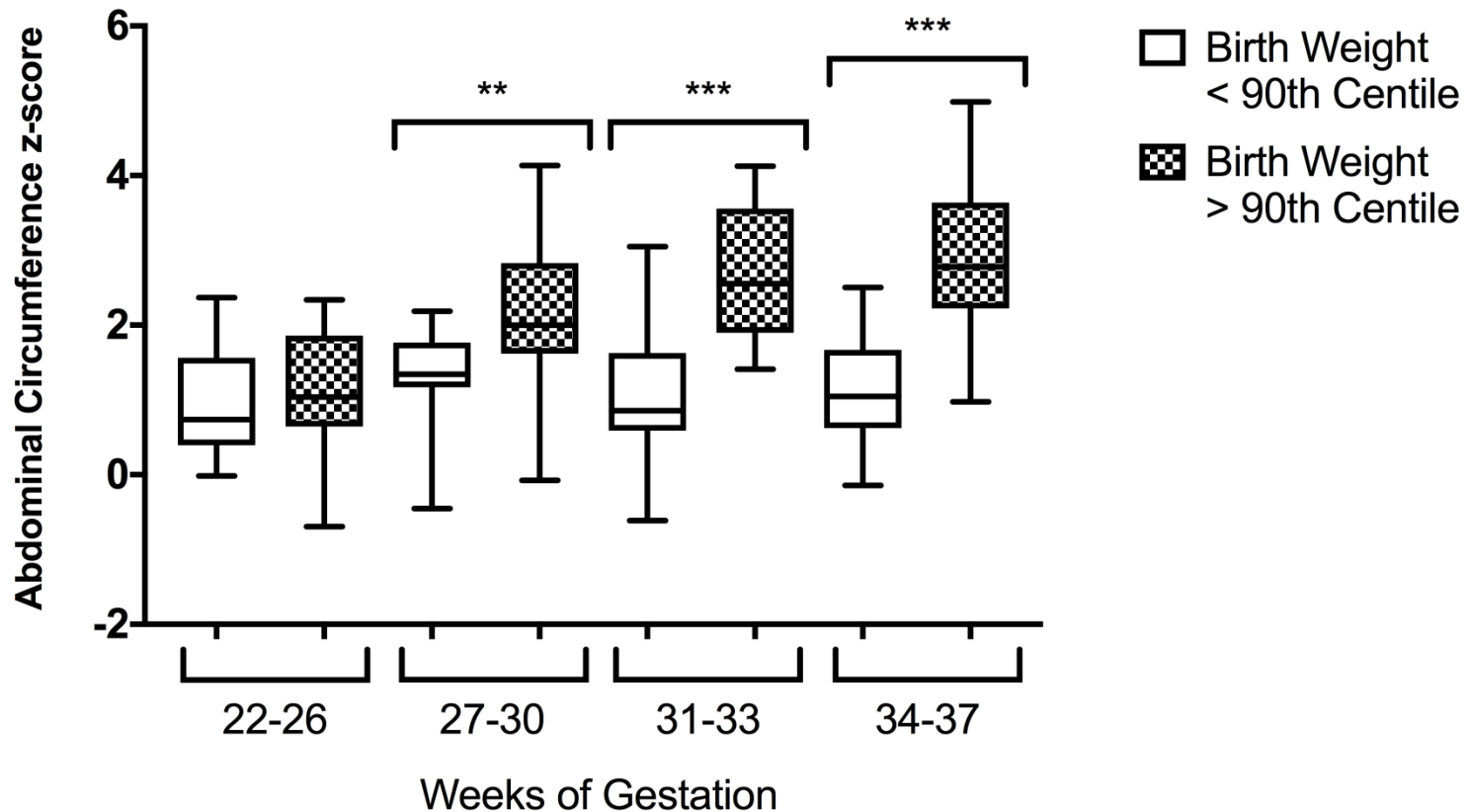
# Study Aim

- To determine the relationship between fetal abdominal circumference as a marker of fetal growth and glycaemic control throughout pregnancy in women with type 1 diabetes.
- Retrospective, cohort study at Royal North Shore Hospital, Sydney between 2012-2017.

	LGA (n = 37)	Non-LGA (n = 27)	P
<b>Maternal Age (Years)</b>	32.7 ± 5.9	32.2 ± 4.5	0.707
<b>Duration of Diabetes (Years)</b>	15.7 ± 9.4	14.4 ± 9.4	0.695
<b>Early Pregnancy BMI (kg/m<sup>2</sup>)</b>	26.2 ± 4.4	27.1 ± 6.9	0.664
<b>Parity</b>	0.6 ± 0.8	0.4 ± 0.8	0.128
<b>Mode of Delivery</b>			
- <b>Caesarean Section</b>	86.5%	70.4%	0.129
- <b>Vaginal</b>	13.5%	29.6%	

*\*Cohort excluding neonates born < 36 weeks of gestation.*

# Abdominal circumference z-scores during pregnancy for LGA and non-LGA neonates.



Comparisons made using student's independent t-test or Mann-Whitney test.

\*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

Correlation between 2<sup>nd</sup> trimester HbA1c and fetal abdominal circumference at 27-30 weeks' gestation and between 3<sup>rd</sup> trimester HbA1c and fetal abdominal circumference at 34-37 weeks' gestation.

HbA1c Time Point	Intergrowth-21 <sup>st</sup>	<i>P</i>	Hadlock	<i>P</i>
2 <sup>nd</sup> trimester	$r = 0.357$	0.022	$r = 0.365$	0.021
3 <sup>rd</sup> trimester	$r = 0.364$	0.017	$r = 0.404$	0.008

Using a HbA1c cut-off off 6% showed that second trimester HbA1c was more predictive of LGA neonates (sensitivity 74.1%, specificity 83.3%) than third trimester HbA1c (sensitivity 69.2% and specificity 61.9%).

# Conclusions

- Women with type 1 diabetes that had LGA neonates had higher HbA1c levels both prior to pregnancy and throughout pregnancy.
- Elevated HbA1c levels were associated with fetal overgrowth in the second and third trimesters.
- Second trimester HbA1c was a better discriminator between women that did or did not have LGA neonates, compared with third trimester HbA1c.

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# Perinatal Outcomes

	LGA Neonates (n = 37)	Non-LGA Neonates (n = 27)	P
Neonatal Hypoglycaemia	55.3%	59.3%	0.803
Respiratory Distress	26.3%	11.1%	0.208
Jaundice	29%	26%	0.999
Admission to NICU	34.2%	29.6%	0.791