



Better Outcomes Registry & Network  
Registre et Réseau des Bons Résultats dès la naissance

# Assessing maternal and infant health outcomes among women with gestational or pre-existing diabetes

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# Study team

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# Outline

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- Background
- Methods
- Results
- Discussion

# Background

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- The rate of maternal diabetes is an important health indicator, as diabetes in pregnancy is associated with an increased risk of adverse perinatal outcomes.
- There are a number of studies investigating the health effects of maternal diabetes, however, most studies rely on patient recruitment and few can examine the effects of diabetes on maternal and infant outcomes in such a large population.
- There is very little literature specifically focused on individual determinants and outcomes of pre-existing or gestational diabetes at the provincial level.

# Objective

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- Objective: to determine the difference in health outcomes among mothers with pre-existing diabetes and gestational diabetes compared to non-diabetic mothers in Ontario.

# Methods

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- Data source: BORN data
  - Retrospective cohort study 2012/13 to 2013/14
- Sample size: 281, 480
  - GDM: 14,152 T1: 838 T2: 1,481
- Analysis is limited to singleton births
- Statistical significance of comparisons of proportions was assessed using chi-squared tests and/or t-tests ( $p < 0.05$ ).
- Multiple logistic regression was used to calculate odds ratios to assess association between pregnancy outcomes among women with pre-existing and gestational diabetes compared to women with no diabetes.

# Table 1: study characteristics

	No diabetes	GDM	Type 1	Type 2
Maternal age (mean $\pm$ SD)	30.0 (5.4)	32.7 (5.0)	30.4 (5.3)	33.3 (5.4)
Education (%)				
Lowest quintile	19.8%	19.0%	20.5%	25.6%
Highest quintile	17.0%	16.4%	15.7%	11.5%
Income (%)				
Lowest quintile	23.8%	29.2%	24.7%	33.3%
Highest quintile	19.6%	16.4%	18.0%	12.4%
Smoking (%)	8.1%	5.7%	8.3%	11.2%
BMI (mean $\pm$ SD)	25.3 (6.4)	28.4 (7.4)	27.1 (6.5)	32.2 (8.4)
Parity (% primiparous)	43.5%	38.3%	46.1%	32.8%
Prenatal visit <20 weeks (%)	82.8%	77.3%	80.5%	76.2%

P<0.01 for all comparisons

# Table 2: maternal outcomes

	No diabetes (%)	GDM (%)	Type 1 (%)	Type 2 (%)
Hypertension (%)	3.5%	7.8%	12.0%	12.0%
Delivery type (%)				
Vaginal (assisted or spontaneous)	74.3%	62.4%	42.0%	46.2%
C-section (with or without labour)	25.7%	37.6%	58.0%	53.8%
Delivery complications				
Shoulder dystocia	1.1%	1.2%	3.0%	1.7%
Stillbirth/infant death	<1%	<1%	<1%	1.4%

P<0.01 for all comparisons



# Table 3: neonatal outcomes

	No diabetes	GDM	Type 1	Type 2
Birth weight (gm) (mean $\pm$ SD)	3382.3 (580.1)	3334.7 (783.2)	3510.4 (774.7)	3364.9 (783.2)
Hyperbilirubinemia	14.4%	12.2%	13.5%	10.6%
Hypoglycemia	4.6%	13.6%	23.4%	17.5%
SGA (%)	12.1%	11.3%	4.2%	8.9%
LGA (%)	7.9%	12.8%	41.9%	26.5%
Preterm (%)	6.0%	9.4%	28.8%	19.8%
5 minute Apgar (<7)	2.1%	2.0%	6.6%	6.3%
NICU admission	11.9%	18.3%	36.6%	47.5%
Congenital anomaly (suspected or confirmed)	2.7%	3.4%	5.7%	5.1%

P<0.01 for all comparisons

# Table 4: main findings

	<b>GDM AOR (95% CI)</b>	<b>Type 1 AOR (95% CI)</b>	<b>Type 2 AOR (95% CI)</b>
Obese	2.7 (2.5-2.8)	1.1 (0.8-1.3)	6.3 (5.3-7.4)
C-Section delivery:			
Planned	1.6 (1.6-1.7)	3.4 (2.8-4.2)	2.4 (2.1-2.8)
Unplanned	1.3 (1.2-1.4)	2.6 (2.1-3.2)	1.7 (1.5-2.1)
Preterm birth	1.5 (1.4-1.6)	4.6 (3.8-5.5)	2.7 (2.3-3.2)
LGA	1.4 (1.3-1.5)	6.9 (5.9-8.2)	2.7 (2.4-3.2)
NICU admission	1.5 (1.4-1.6)	4.8 (4.1-5.7)	3.3 (2.9-3.8)
Congenital anomalies	1.2 (1.1-1.3)	1.5 (1.4-2.2)	1.7 (1.3-2.2)
Stillbirth	*	*	2.4 (1.2-4.9)

Reference group: women with no diabetes. Controlled for all significant socio-demographic, maternal and neonatal outcomes.

# Discussion

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- Very different profiles of women with diabetes
- Type 2: women have lower SES (education and income), are more likely to be obese and more likely to smoke compared to non-diabetic women.
- GDM follows a similar profile of women with type 2 diabetes.

# Discussion

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- Pre-existing diabetes have more serious maternal and neonatal outcomes
  - Case ascertainment issues/coding
  - Screening in pregnancy may reveal T2 diabetic
- GDM and type 2 have one common modifiable risk factor: weight
  - Type 2 diabetes onset linked to lifestyle
  - Implications for interventions and prevention
- Expectation that rates of T2 and GDM will continue to increase



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