

PSBC's 2<sup>nd</sup> Biennial Conference

# Healthy Mothers & Healthy Babies

## Advances in Clinical Practice & Research Across the Continuum

March 11-12, 2016 Vancouver, B.C.

### Gestational Diabetes in South Asian and Chinese Women in BC & Alberta

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# Disclosures

- None

# Gestational Diabetes Mellitus (GDM)

- GDM is glucose intolerance first recognized during pregnancy
  - typically after 20 weeks gestation
  - generally temporary, resolves postpartum
  - established risk factor for Type 2 DM
- Increasing maternal age and obesity major factors contributing to GDM rates
- Largest global increase in diabetes is among women aged 20 - 49 years

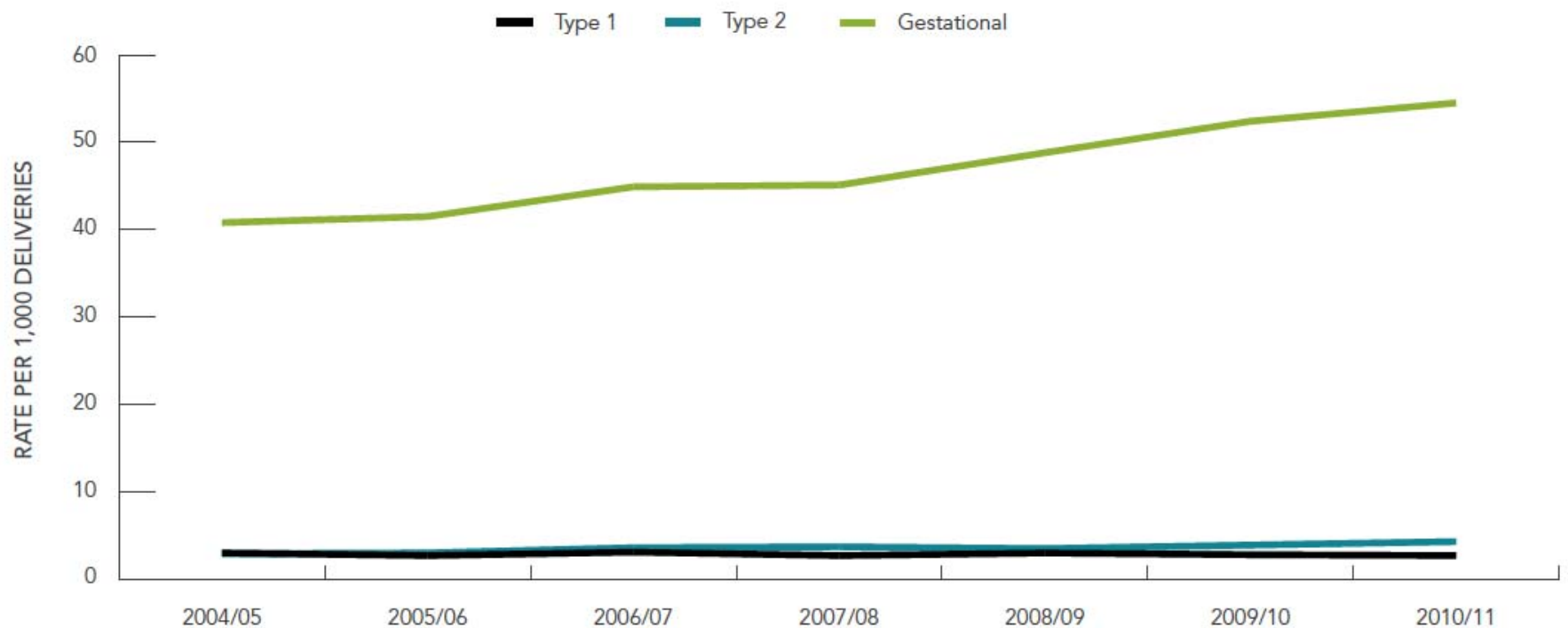
# GDM Rates in Canada



# Rates of Diabetes in pregnant women, Canada

- **GDM 54.5 per 1000 deliveries (2010/11 )**

FIGURE 1: Rates of diabetes among pregnant women in Canada, 2004/05–2010/11



SOURCE: Canadian Institute for Health Information, Discharge Abstract Database (DAD). Quebec data was not included because it does not contribute to DAD



# Variability in GDM rates across Canada

**TABLE 2:** Rates of GDM, by province and territory, Canada, 2004/05–2010/11

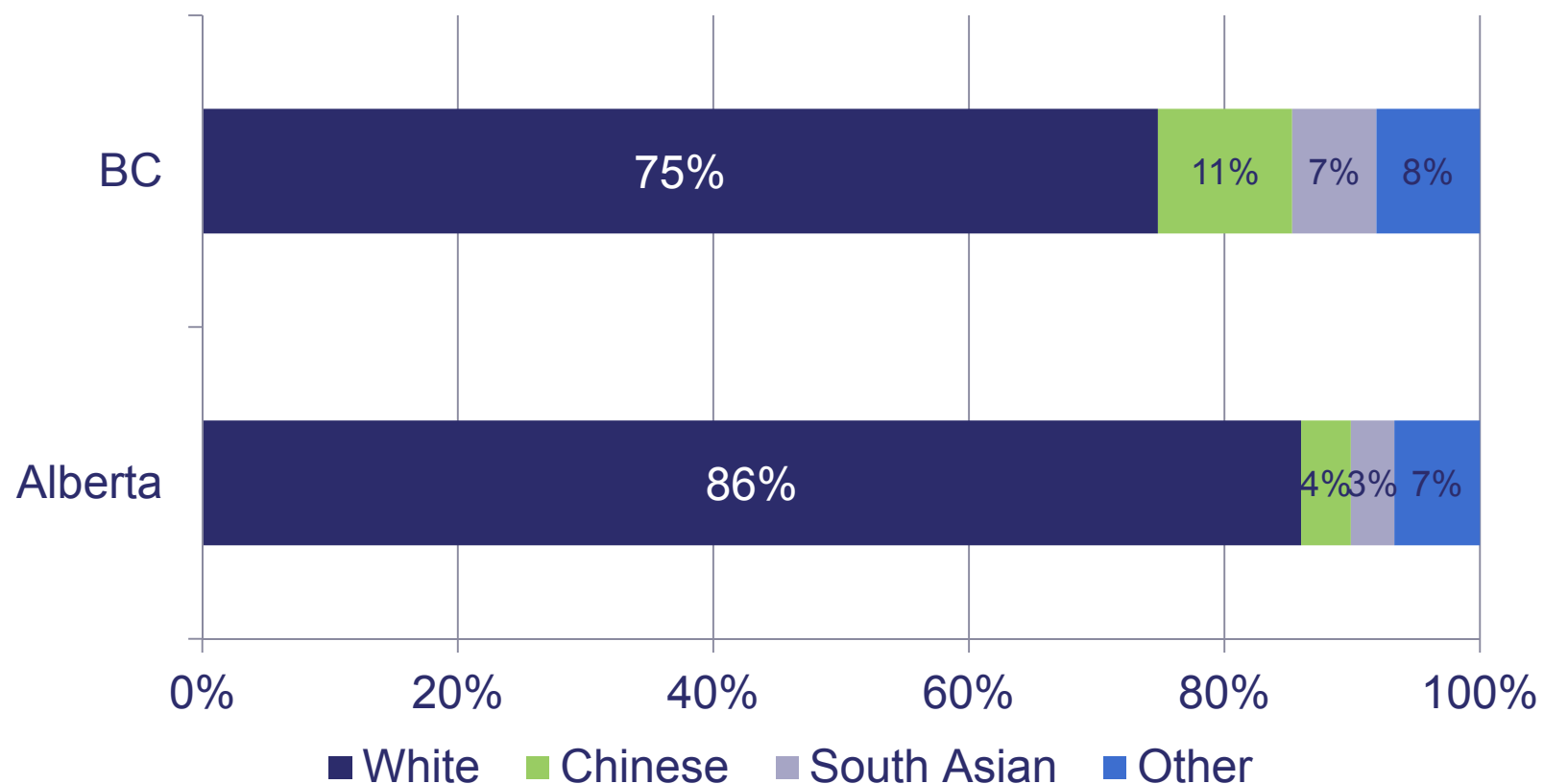
PROVINCE/TERRITORY	RATE PER 1,000 DELIVERIES	95% CI
Newfoundland and Labrador	36.0	33.9–38.1
Prince Edward Island	20.6	17.9–23.7
Nova Scotia	36.6	35.0–38.1
New Brunswick	33.3	31.8–35.0
Ontario	44.0	43.6–44.4
Manitoba	40.9	39.7–42.1
Saskatchewan	37.7	36.5–39.0
Alberta	44.3	43.6–45.1
British Columbia	73.7	72.7–74.7
Yukon	44.5	36.5–53.7
Northwest Territories	21.5	17.8–25.7
Nunavut	11.7	8.0–16.7
Canada	47.1	46.8–47.5

**SOURCE:** Canadian Institute for Health Information, Discharge Abstract Database (DAD). Quebec data was not included because it does not contribute to DAD

# Objective

- In two Canadian provinces:
  - Examine the contribution of ethnicity to GDM prevalence
  - Examine the contribution of ethnicity to obstetrical and neonatal outcomes among women with GDM

# Ethnic Distribution of Female Population, Census of Canada 2006





# Methods

- Retrospective cohort study
- Data from Alberta Perinatal Health Program and BC Perinatal Data Registry
- Study population
  - Resident women aged 15-44 years in Alberta and BC
  - Singleton deliveries between April 1, 2004 to March 31, 2010 in Alberta and BC (2004/05 to 2009/10)
  - Unit of analysis is delivery i.e. women with >1 singleton delivery during the study time period are included more than once
- Exclusion:
  - Late pregnancy terminations

# Defining Ethnicity

- Used two previously validated algorithms based on surname
  - Quan and colleagues: sensitivity 78%, specificity 100%, PPV 91% for *Chinese* ethnicity
  - Nam Pehchan: sensitivity 90-94%, specificity 99% and PPV for *South Asian* ethnicity 63-96%
- All other categorized as Other (predominantly Caucasian origin)

# Definition of GDM

- ICD-10-CA codes for GDM (O24.4, O24.8) in delivery episode
- Clinician documented GDM based on clinical history in antenatal record
- Canadian Diabetes Association Guidance: 2003 & 2008: universal GDM 50g OGS at 24 -28 weeks of gestation
  - if 1h  $\geq 10.3$  mmol/L, diagnose GDM;
  - if 1h 7.8-  $< 10.3$  mmol/L, diagnose if at least two values exceeding:

	AB- 75g 2h OGTT (mmol/L)	BC- 100g 3h OGTT (mmol/L)
Fasting	5.3	5.3
1 hour PG	10.6	10.0
2 hour PG	8.9	8.6
3 hour PG	<i>n/a</i>	7.8

# Baseline Characteristics – All deliveries

	<b>Alberta</b> 249,796 newborns 190,224 mothers			<b>BC</b> 248,217 newborns 193,381 mothers		
	Other	South Asian	Chinese	Other	South Asian	Chinese
Births n (%)	218,730 (87.6)	23,262 (9.3)	7,804 (3.1)	201,790 (81.3)	24,703 (10.0)	21,724 (8.8)
Mean maternal age (SD)	<b>29.1 (5.5)</b>	<b>29.3 (5.0)</b>	<b>32.7 (4.7)</b>	<b>30.1 (5.7)</b>	<b>29.9 (4.6)</b>	<b>33.0 (4.8)</b>
Urban resident, %	<b>81.9</b>	<b>95.9</b>	<b>98.4</b>	<b>86.3</b>	<b>98.1</b>	<b>98.4</b>
Mean Gestational age, (SD)	<b>38.8 (2.2)</b>	<b>38.7 (2.2)</b>	<b>38.7 (1.9)</b>	<b>38.7 (2.1)</b>	<b>38.6 (2.1)</b>	<b>38.6 (1.9)</b>

# Baseline Characteristics – All deliveries

	<b>Alberta</b> 249,796 newborns 190,224 mothers			<b>BC</b> 248,217 newborns 193,381 mothers		
	Other	South Asian	Chinese	Other	South Asian	Chinese
Pre-pregnancy weight $\geq 91$ kg*, %	9.6	4.9	1.5	5.8	1.8	0.8
Nulliparas, %	43.3	42.0	47.9	46.4	45.2	47.7
Smoking, %	19.5	6.2	2.3	12.2	1.3	1.5
GDM, %	4.2	8.4	11.0	5.7	13.9	13.5

\*20% missing pre-pregnancy weight in BC  
**significant differences** at  $p < 0.05$  level among ethnic groups within province

# Baseline Characteristics – GDM-involved deliveries

	Alberta 12,036 deliveries			BC 17,912 deliveries		
	Other	South Asian	Chinese	Other	South Asian	Chinese
Births n (%)	9,215 (76.6)	1,965 (16.3)	856 (7.1)	11,553 (64.5)	3,436 (19.2)	2,923 (16.3)
Maternal age, mean (SD)	31.9 (5.3)	31.9 (4.8)	34.8 (4.3)	32.8 (5.2)	31.7 (4.6)	34.7 (4.3)
Urban resident, %	84.4	98.4	99.2	92.5	99.4	99.5
Mean gestational age, (SD)	38.2 (1.9)	38.1 (1.9)	38.4 (1.6)	38.3 (1.9)	38.4 (2.0)	38.4 (1.8)

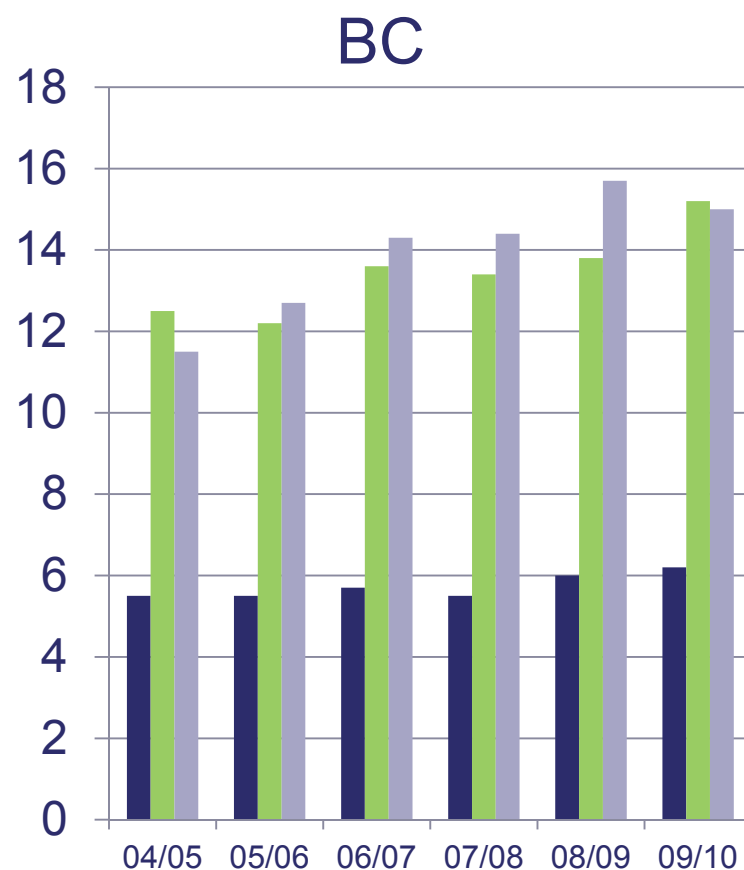
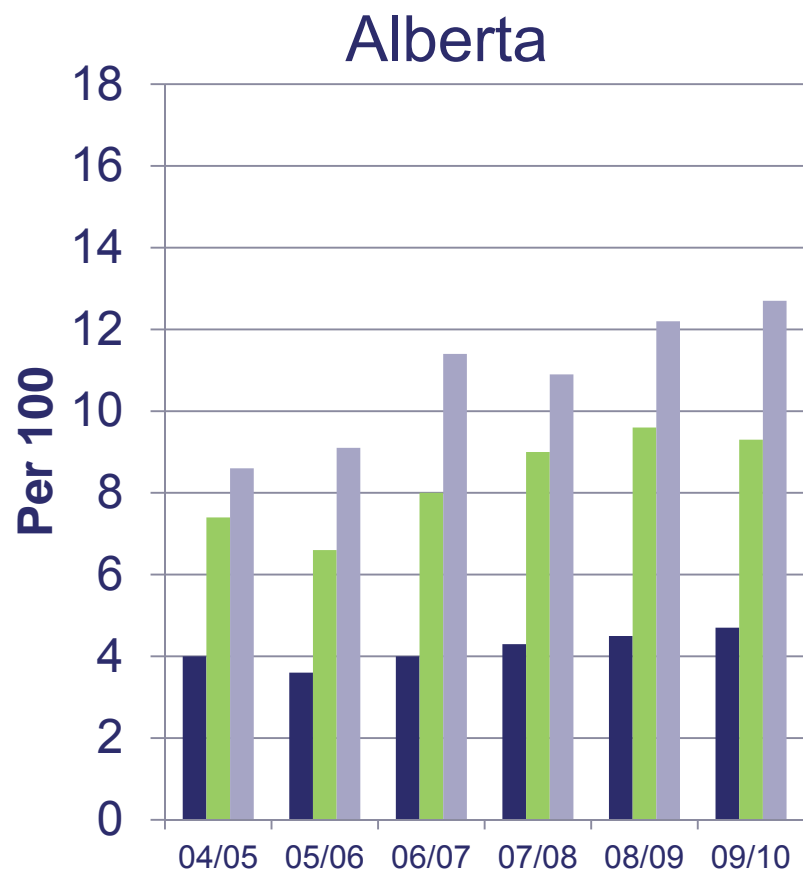
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# Baseline Characteristics – GDM-involved deliveries

	Alberta 12,036 deliveries			BC 17,912 deliveries		
	Other	South Asian	Chinese	Other	South Asian	Chinese
Pre-pregnancy weight $\geq 91$ kg*, %	22.9	8.9	2.3	13.7	3.9	1.2
Nulliparas, %	38.1	33.9	42.8	42.0	38.7	45.1
Smoking, %	18.9	3.0	1.8	9.9	0.8	1.0

\*20% missing pre-pregnancy weight in BC  
**significant differences** at  $p < 0.05$  level among ethnic groups within province

# Crude GDM prevalence by ethnicity and province, 2004/05 to 2009/10

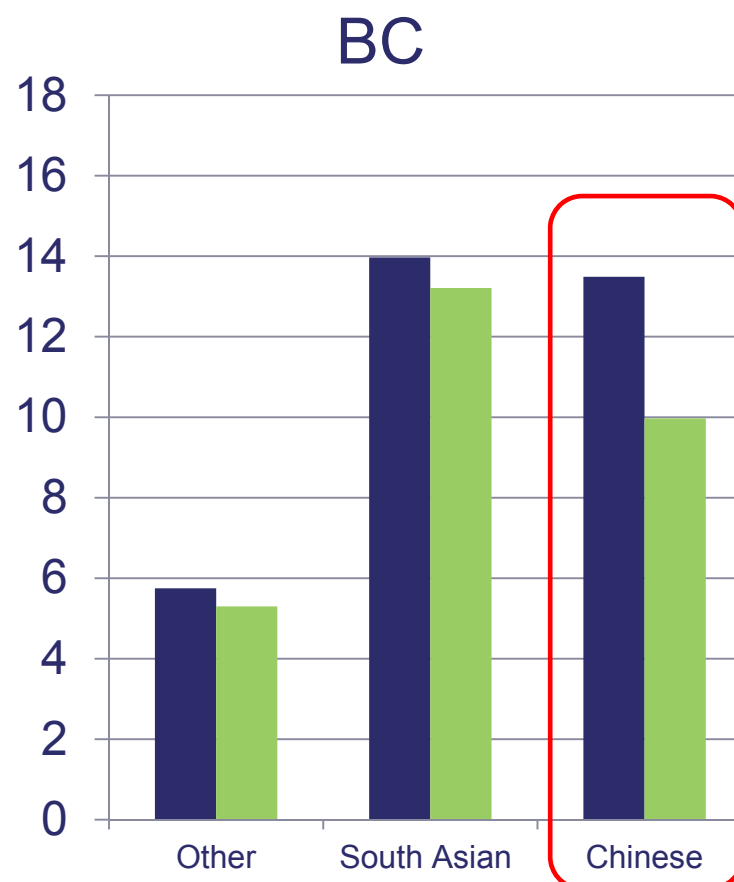
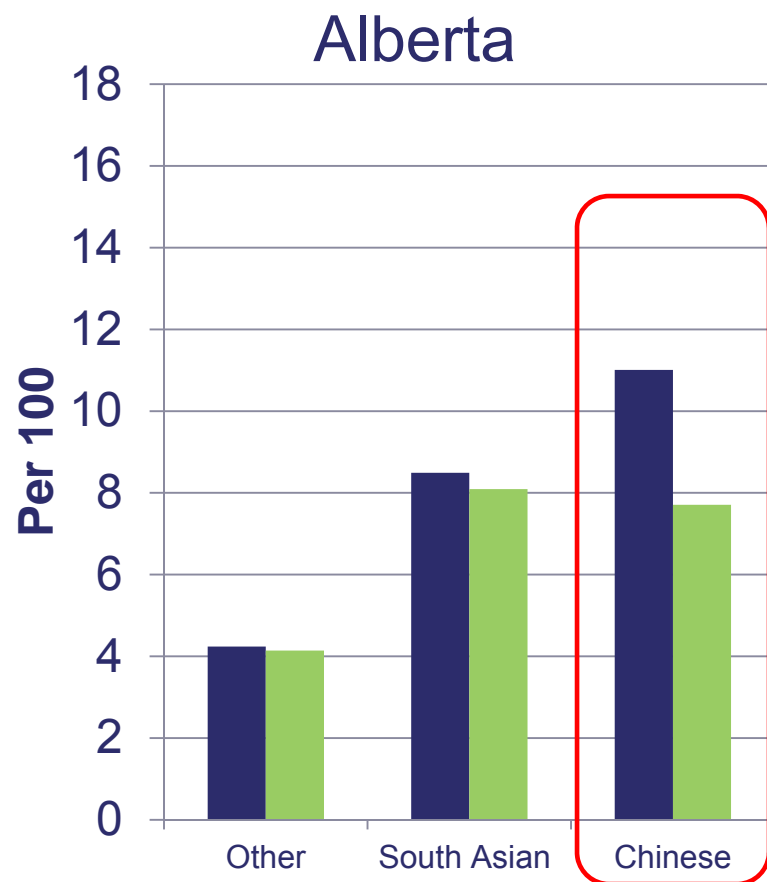


■ Other ■ South Asian ■ Chinese





# Crude and Age-adjusted prevalence of GDM by ethnicity and province, 2004/05 to 2009/10



■ Crude ■ Age-adjusted

# Ethnicity and Odds of GDM

	Alberta		BC	
	% GDM	Adjusted OR (95% CI)	% GDM	Adjusted OR (95% CI)
<b>Other</b>	4.2	Ref.	5.8	Ref.
<b>South Asian</b>	8.5	2.26 (2.13, 2.39)	14.0	2.13 (2.03, 2.23)
<b>Chinese</b>	11.0	2.27 (2.09, 2.47)	13.5	2.93 (2.80, 3.06)

Multivariable logistic model adjusted for maternal age, urban residency, pre-pregnancy weight ( $\leq 45\text{kg}$ ,  $46\text{kg}-90\text{kg}$ ,  $\geq 91\text{kg}$ ), height ( $<152\text{cm}$ ), smoking during pregnancy, multiple deliveries to same woman.



# Maternal and Neonatal Outcomes by GDM

## 2004/05 to 2009/10

	Alberta						BC					
	Other		South Asian		Chinese		Other		South Asian		Chinese	
	GDM	No GDM	GDM	No GDM	GDM	No GDM	GDM	No GDM	GDM	No GDM	GDM	No GDM
Induction %	36.6	22.9	33.7	22.0	29.6	20.1	42.6	16.8	20.7	17.1	18.3	13.4
Cesarean %	38.2	25.3	37.3	26.6	34.0	26.5	24.4	28.4	38.5	30.5	34.3	28.3
LGA %	19.8	10.4	10.4	6.0	6.0	5.0	22.1	14.5	11.5	7.0	10.1	7.4
SGA %	6.9	8.2	10.9	13.9	10.7	11.5	4.9	5.8	8.8	11.2	8.1	8.6

# Maternal and Neonatal Outcomes

## GDM-involved deliveries, 2004/05 to 2009/10

	Alberta			BC		
	Other	South Asian	Chinese	Other	South Asian	Chinese
		OR (95% CI)	OR (95% CI)		OR (95% CI)	OR (95% CI)
Induction	Ref.	0.96 (0.86, 1.07)	<b>0.76</b> <b>(0.64, 0.89)</b>	Ref.	<b>0.72</b> <b>(0.65, 0.80)</b>	<b>0.89</b> <b>(0.81, 0.99)</b>
Cesarean	Ref.	1.01 (0.90, 1.12)	<b>0.76</b> <b>(0.65, 0.89)</b>	Ref.	<b>0.68</b> <b>(0.62, 0.74)</b>	0.93 (0.85, 1.01)
LGA	Ref.	<b>0.54</b> <b>(0.46, 0.63)</b>	<b>0.37</b> <b>(0.28, 0.50)</b>	Ref.	<b>0.49</b> <b>(0.43, 0.56)</b>	<b>0.48</b> <b>(0.42, 0.54)</b>
SGA	Ref.	<b>1.70</b> <b>(1.43, 2.02)</b>	<b>1.35</b> <b>(1.05, 1.72)</b>	Ref.	<b>1.60</b> <b>(1.35, 1.89)</b>	<b>2.07</b> <b>(1.77, 2.41)</b>

Multivariable logistic model adjusted for maternal age, urban residency, pre-pregnancy weight ( $\leq 45\text{kg}$ ,  $46\text{kg}$ - $90\text{kg}$ ,  $\geq 91\text{kg}$ ), height ( $< 152\text{cm}$ ), smoking during pregnancy, multiple deliveries to same woman.

# Conclusion

- Maternal age is a major contributor to ethnic differences in GDM prevalence, and more pronounced in Chinese women
- Similar or lower odds of induction and cesarean delivery among ethnic women with GDM (except cesarean delivery for Chinese women in BC)
- Babies born to ethnic women with GDM have increased odds of being considered SGA
- Future exploration of ethnic differences are needed to tailor strategies to reduce/prevent GDM



# Limitations

- Misclassification:
  - Diagnosis of GDM
  - Ethnicity determined by surname-based algorithms
  - LGA/SGA definition is a Canadian standard
- Selection bias
  - Universal screening?
- Uncaptured confounders
  - No adjustment for GDM treatments

# Acknowledgements

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- Roseanne O Yeung, MD, MPH<sup>1</sup>
- Jeffrey A Johnson, PhD<sup>2</sup>
- Lois E Donovan, MD<sup>3</sup>



<sup>1</sup>Division of Epidemiology, University of Alberta

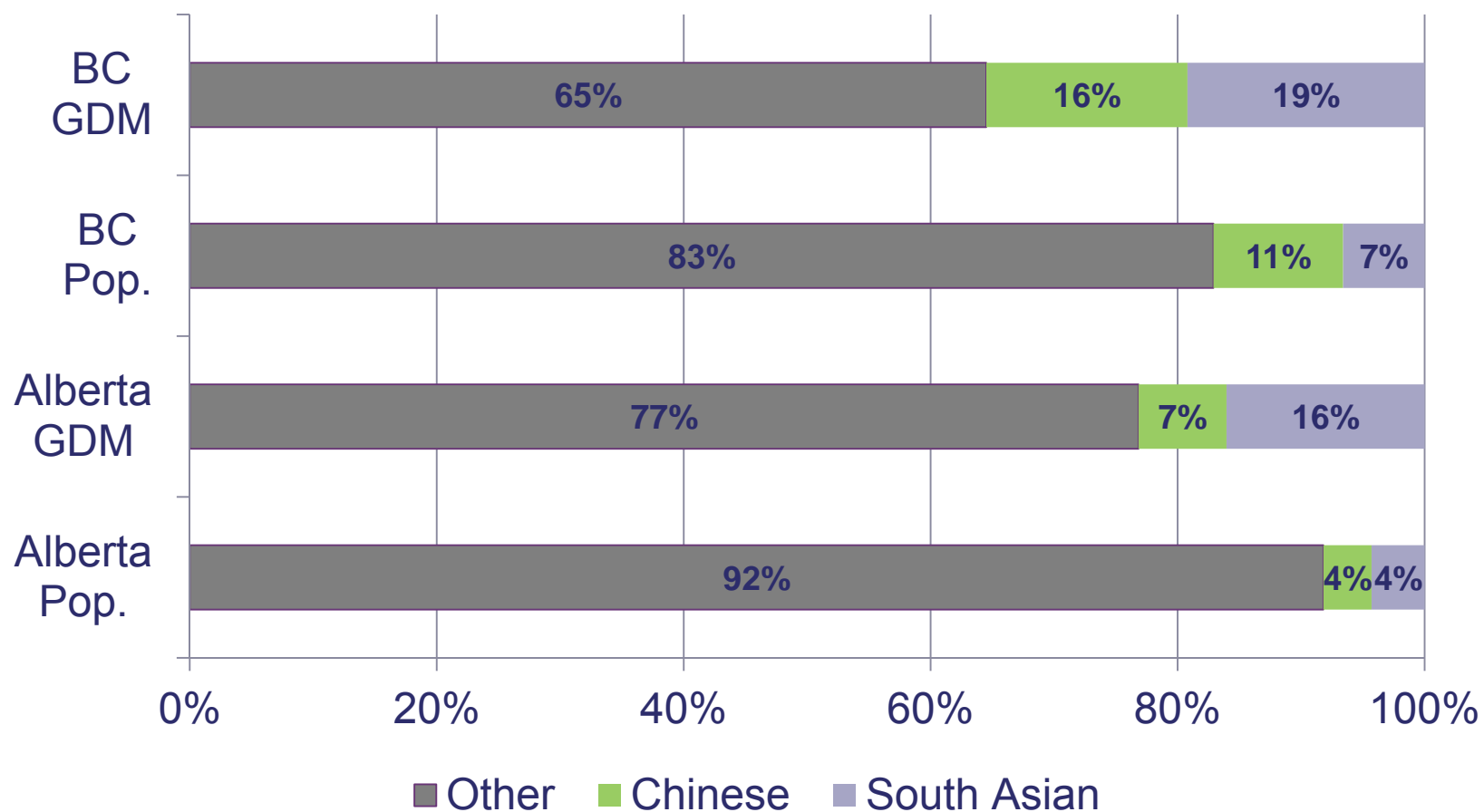
<sup>2</sup>School of Public Health, University of Alberta

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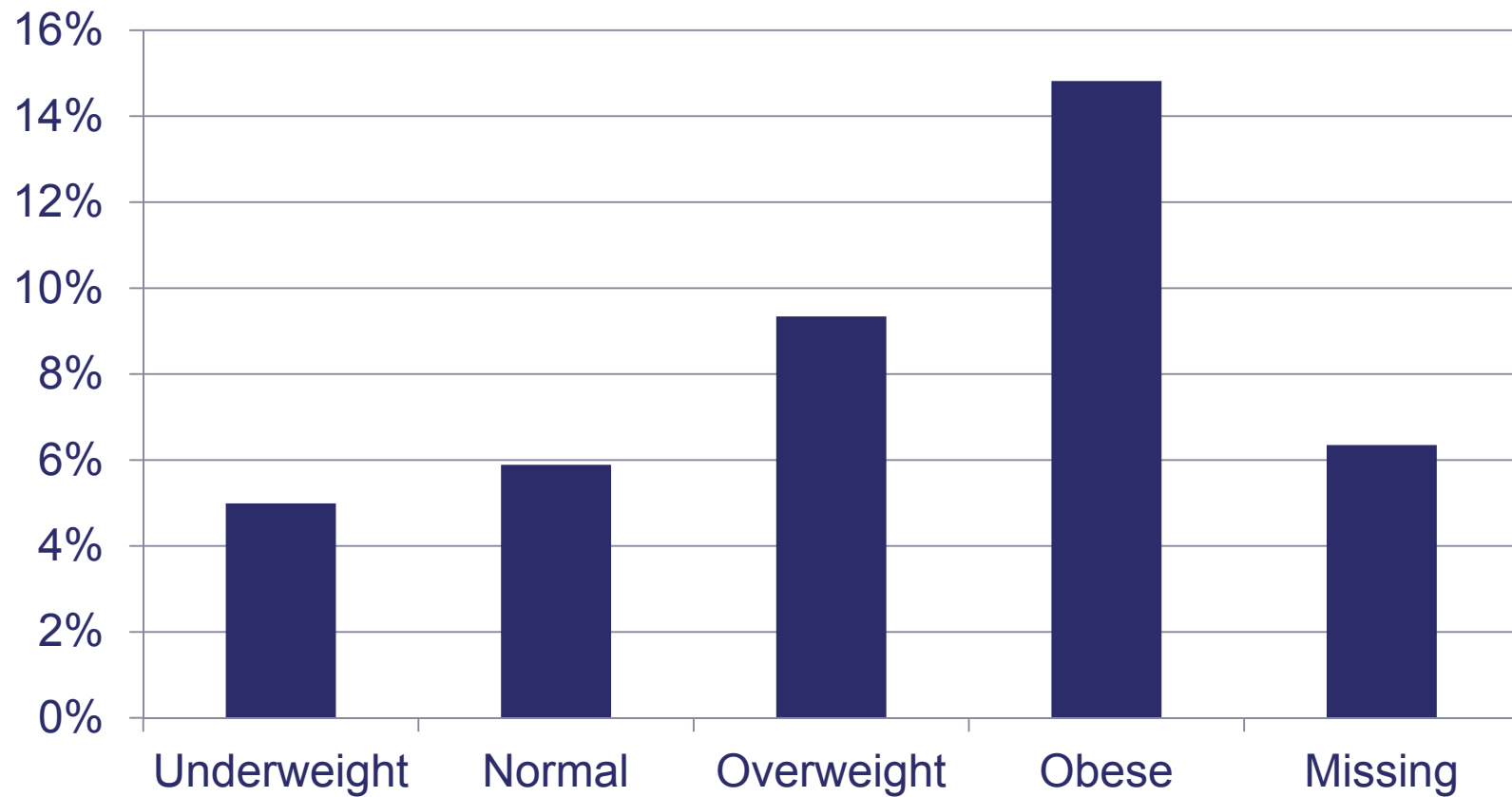
# Questions?



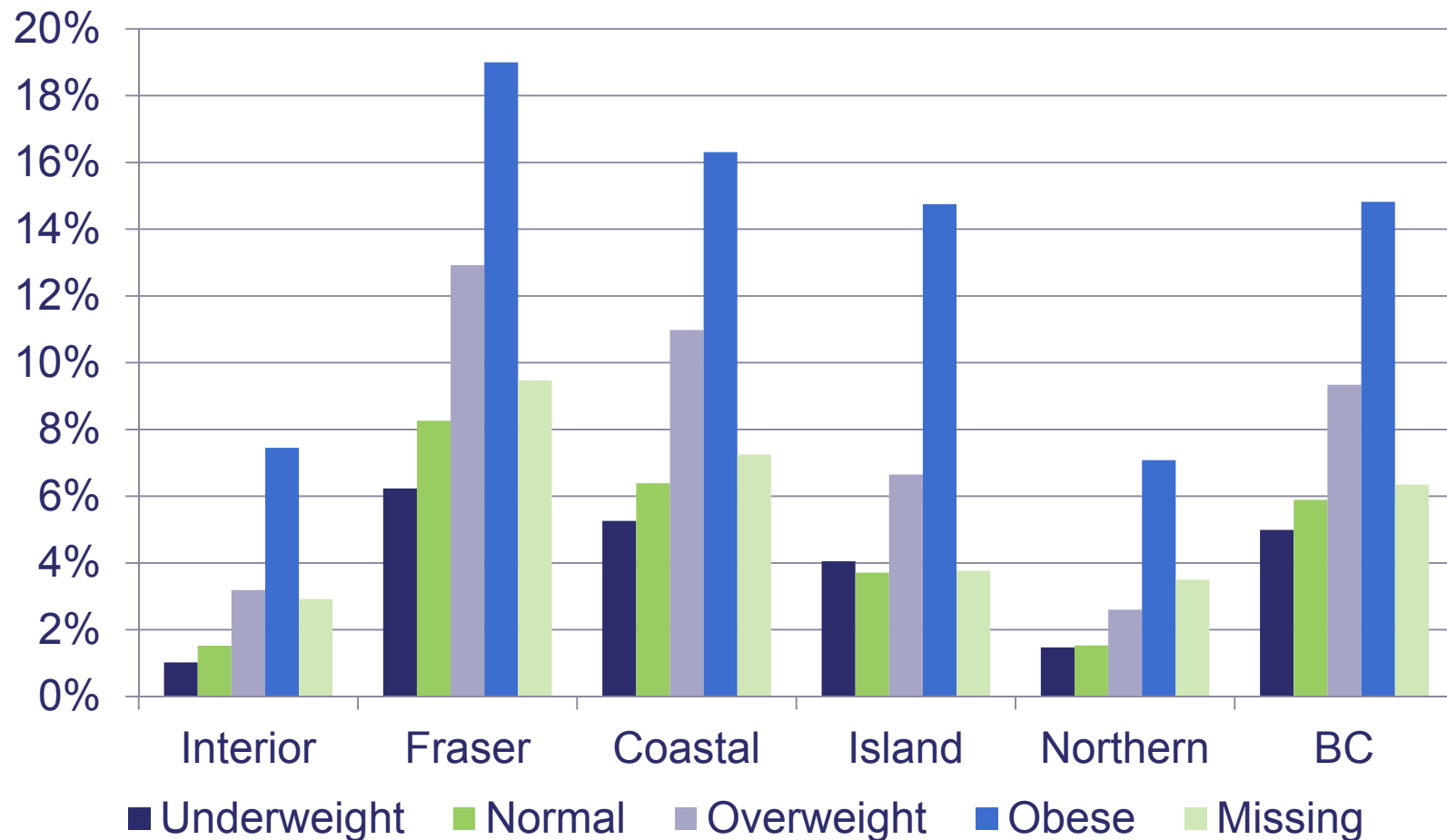
# Ethnic Distribution of Female Population and GDM cases



# GDM rate within BMI categories, 2004/05 to 2009/10

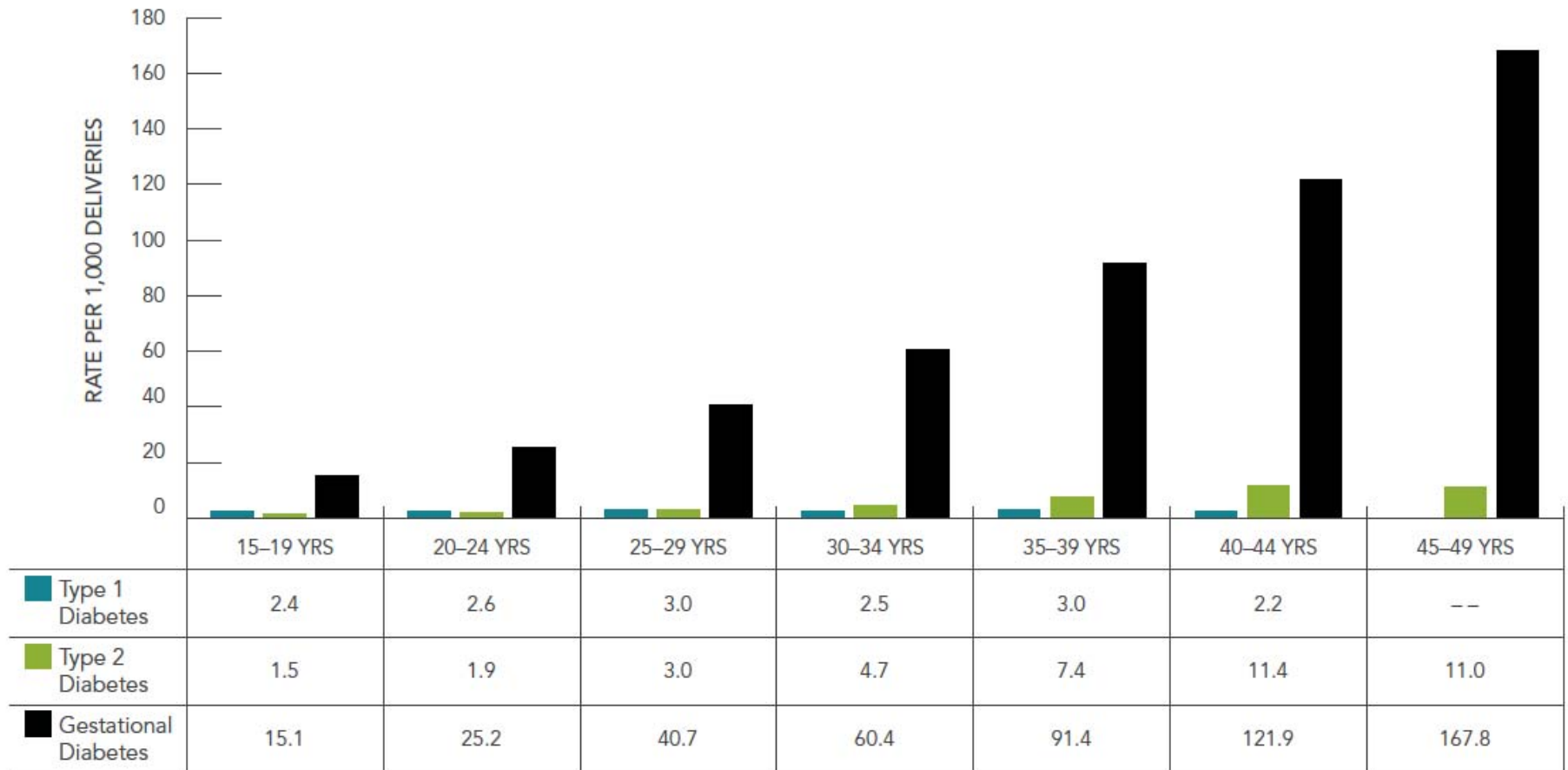


# GDM rate within BMI categories by HA 2004/05 to 2009/10



# GDM rates by age, Canada

FIGURE 2: Rates of maternal diabetes by age group in Canada, 2010/11



SOURCE: Canadian Institute for Health Information, Discharge Abstract Database (DAD). Quebec data was not included because it does not contribute to DAD

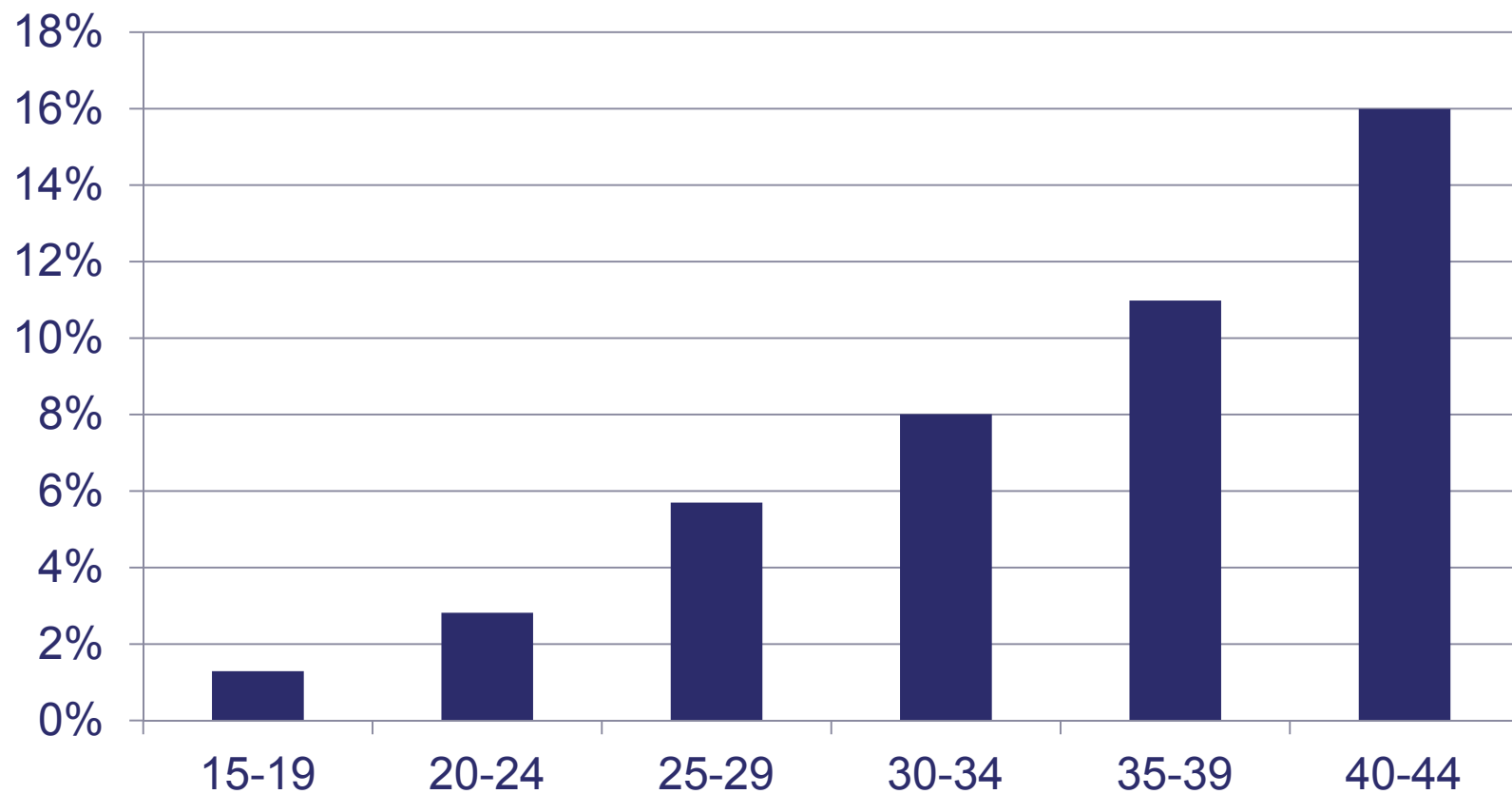
-- Rates have been suppressed <5



**Perinatal Services BC**  
An agency of the Provincial Health Services Authority

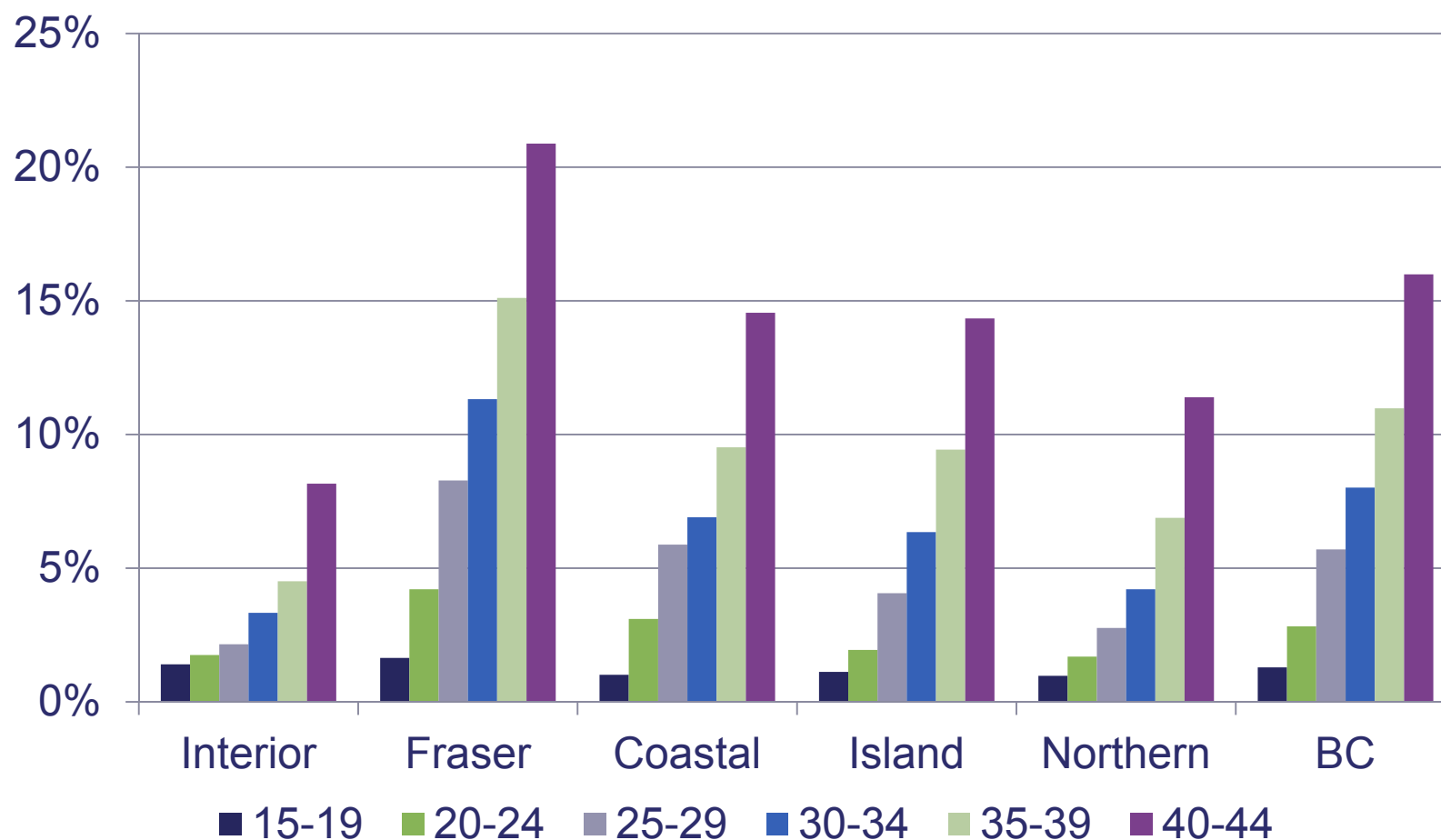
Source: PHAC Report Maternal Diabetes in Canada

# GDM rate within age groups, 2004/05 to 2009/10



# GDM rate within age categories by HA

## 2004/05 to 2009/10



## GDM rate within ethnic groups by HA 2004/05 to 2009/10

