

# PROVISION OF OBSTETRICAL CARE IN FIRST NATIONS MOTHERS IN BRITISH COLUMBIA, CANADA

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## Motivation

- There are large gaps in perinatal outcomes between Canadian First Peoples and other Canadians:
  - Higher rate of term stillbirth
  - Higher rate of neonatal death
- Disparities in perinatal death may be related to decreased provision, uptake, and quality of perinatal care in First Nations women

## Objectives

- To compare indicators of obstetrical care quality between registered First Nations and all other women giving birth in British Columbia (BC)
- To examine differences in the use of obstetrical interventions during labour between these mothers

## Study Population

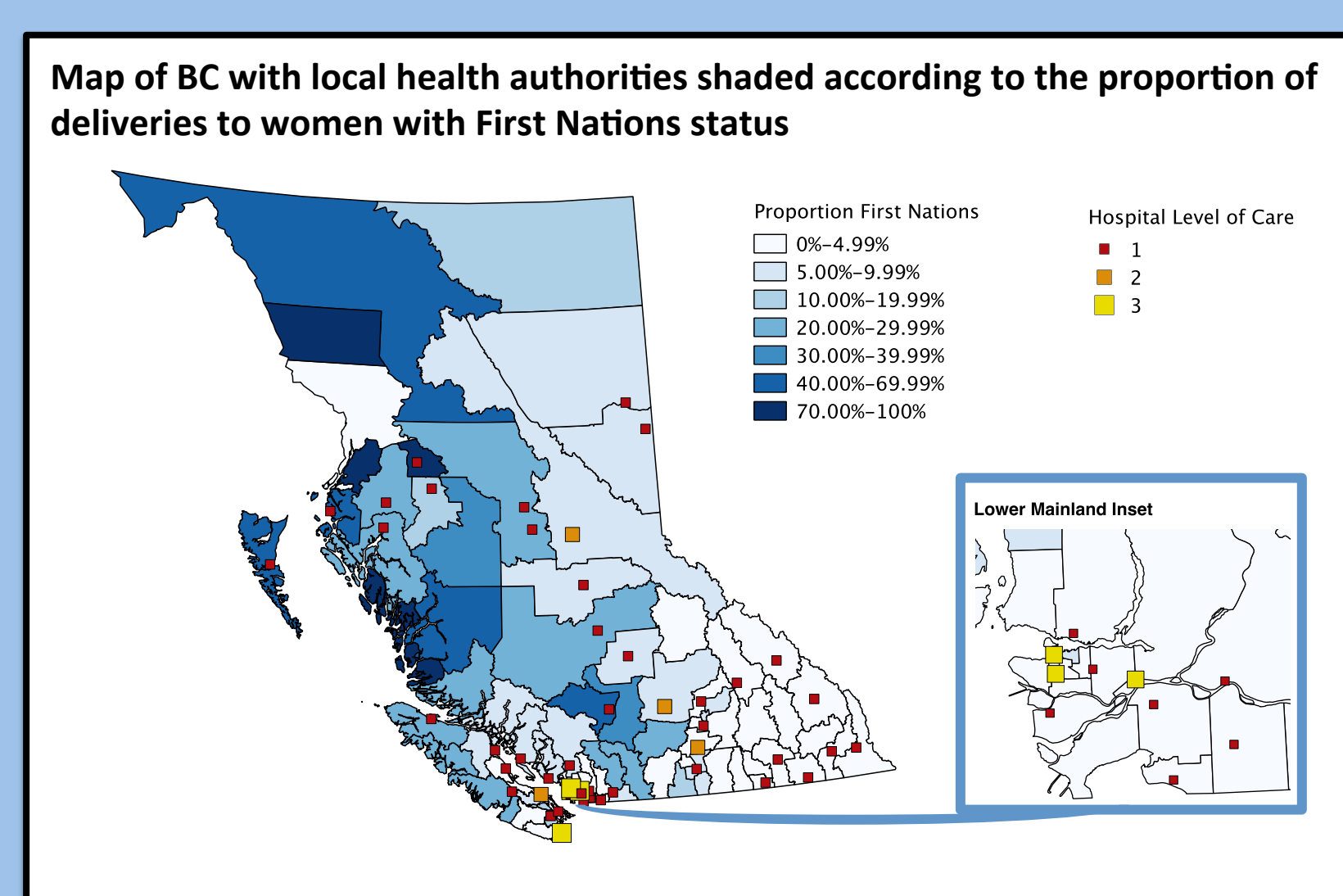
- All deliveries of singletons to nulliparous women in BC between April 1, 1999 and March 31, 2011
- Data linkage between: BC Perinatal Data Registry, First Nations Status File, Discharge Abstract Database, and a geodatabase encoding distances

## Statistical Methods

- Logistic Regression analysis before and after adjustment for distance to hospital for all outcomes
- Additional adjustment for maternal age, pre-pregnancy BMI, hypertension and diabetes (pre-existing and gestational) in models of obstetrical interventions
- Computation of the average risk difference (Rate of uptake in First Nations – Rate of uptake in other BC women)
- Multiple imputation techniques to account for missing data in BMI and distance variables

## RESULTS

- 220,350 singleton deliveries to nulliparous women, of whom 9,152 (4%) were registered First Nations individuals
- First Nations mothers were:
  - more likely to live in the more rural parts of BC (see Figure)



- younger and had a higher pre-pregnancy BMI after accounting for age
- More likely to deliver pre-term, and less likely to deliver post-term
- Had similar rates of gestational diabetes, after accounting for age, and slightly high age-specific rates of gestational hypertension

Characteristics of mothers giving birth in BC by First Nations Status, 1999-2011

Measure	First Nations Status		Other	
	Measure	% missing	Measure	% missing
Number of women*	9,152		206,841	
Maternal age [IQR], years	21 [18.7, 25.0]	0.0	29.1 [25.1, 32.9]	0.0
Pre-pregnancy BMI [IQR], kg/m <sup>2</sup>	23.7 [21.2, 27.7]	46.0	22.4 [20.4, 25.4]	25.4
Pre-term (<37 weeks), n (%)	987 (11)	-	15,718 (8)	-
Post-dates (>=41 weeks), n (%)	933 (10)	-	35,484 (17)	-
Diabetes in pregnancy, n (%)	303 (3.3)	0.0	13,880 (6.7)	0.0
Hypertension in pregnancy, n (%)	820 (9.0)	0.5	17,468 (8.4)	1.3
Living 0-50 km from nearest hospital	5,134 (66)	14.6	149,747 (92)	21.0
Living 200+ km from nearest hospital	716 (9.2)	-	2,295 (1.4)	-

\*2% of women had unknown First Nations status

Proportion of women receiving standard of care services before and after adjustment for distance to hospital

Indicator of Obstetrical Quality	General Population n/N (%)	First Nations n/N (%)	Crude model Risk Difference (95% CI)	+ adjustment for distance* Risk Difference (95%CI)
1.a) Group B Streptococcus (GBS) screening at or after term	107,588/191,123 (56.3)	4,357/8,165 (53.4)	-2.9 (-4.0, -1.8)	-1.7 (-2.9, -0.6)
1.b) Use of antibiotics in those GBS positive	22,535/25,156 (89.6)	934/1,049 (89.0)	-0.5 (-2.5, 1.4)	-0.6 (-2.5, 1.4)
2. At least four antenatal visits in women with births in the 39 <sup>th</sup> week	47,470/48,419 (98.0)	1,990/2,120 (93.9)	-4.2 (-5.2, -3.1)	-3.6 (-4.6, -2.6)
3. Performance of an early ultrasound	148,817/206,841 (71.9)	5,361/9,152 (58.6)	-13.4 (-14.4, -12.3)	-10.2 (-11.3, -9.3)
4.a) Medical induction in pre-labour (>1 hour) rupture of membranes at term	17,182/46,592 (36.9)	506/1,564 (32.4)	-4.5 (-6.9, -2.2)	-3.7 (-6.1, -1.3)
4.b) Medical induction in prolonged (>12 hours) pre-labour rupture of membranes at term	9,137/18,206 (50.2)	277/635 (43.6)	-6.6 (-10.5, -2.6)	-4.9 (-8.9, -0.9)
4.c) Medical induction in prolonged (>24 hours) pre-labour rupture of membranes at term	4,917/7,336 (67.0)	162/278 (58.3)	-8.8 (-14.6, -2.9)	-5.9 (-11.8, 0.1)
5.a) Medical induction in women reaching post-dates	17,681/35,779 (49.4)	373/971 (38.4)	-11.0 (-14.1, -7.9)	-10.6 (-13.8, -7.5)
6. Timing of planned cesarean delivery for breech presentation	1929/4,631 (41.7)	40/90 (44.4)	2.8 (-7.6, 13.2)	1.04 (0.68, 1.60)

- First Nations mothers were:
  - less likely to be induced for post-dates (i.e., 10.6 less inductions per 100 women reaching post-dates)
  - less likely to be induced after pre-labour rupture of membranes
  - less likely to have four antenatal visits
  - less likely to have an ultrasound performed before 20 weeks gestational age

Crude and adjusted model results for the proportion of women receiving obstetrical interventions during labour and delivery

Obstetrical Intervention	General Population n (%) <sup>§</sup>	First Nations n (%) <sup>§</sup>	Crude model Risk Difference (95% CI)	+ adjustment for maternal characteristics* Risk Difference (95%CI)	+ adjustment for distance Risk Difference (95%CI)
1.a) Pain management using entonox	97,920 (47.3)	4,265 (46.6)	-0.7 (-1.8, 0.3)	-0.2 (-1.4, 1.0)	2.1 (0.9, 3.4)
1.b) Pain management using epidural	90,819 (43.9)	3,217 (35.2)	-8.8 (-9.8, -7.8)	-5.2 (-6.3, -4.0)	-2.8 (-4.1, -1.6)
2. Labour induction <sup>†</sup>	55,686 (26.9)	1,791 (19.6)	-7.4 (-8.2, -6.5)	-5.9 (-7.3, -4.5)	-5.9 (-7.4, -4.5)
3.a) Labour augmentation by artificial rupture of membranes	60,635 (29.3)	3,301 (36.1)	6.8 (5.8, 7.8)	2.9 (1.9, 4.0)	3.2 (2.0, 4.3)
4.a) Instrumental vaginal delivery using forceps	15,699 (7.6)	297 (3.2)	-4.3 (-4.7, -4.0)	-2.7 (-3.3, -2.2)	-2.2 (-2.9, -1.5)
4.b) Instrumental vaginal delivery using vacuum	24,471 (11.8)	851 (9.3)	-2.5 (-3.1, -1.9)	-1.4 (-2.1, -0.6)	-1.6 (-2.4, -0.9)
5.a) Cesarean delivery (any indication)	64,067 (31)	2,145 (23.4)	-7.5 (-8.4, -6.6)	-1.3 (-2.3, -0.2)	-1.8 (-3.0, -0.7)
5.b) Cesarean delivery for dystocia	22,406 (10.8)	819 (8.9)	-1.9 (-2.5, -1.3)	-0.2 (-0.9, 0.6)	-0.4 (-1.2, 0.3)
5.c) Cesarean delivery for fetal distress	13,428 (6.5)	409 (4.5)	-2.0 (-2.5, -1.6)	-1.0 (-1.5, -0.4)	-0.7 (-1.4, -0.1)

\*maternal characteristics include: maternal age, pre-pregnancy BMI, hypertension (pre-existing or gestational), or diabetes (pre-existing or gestational). Missing values for BMI imputed using predictive mean matching.  
<sup>§</sup> Denominators for these percentages equal 206,841 for the general population and 9,152 for First Nations women  
<sup>†</sup> This model includes a statistical interaction term between age and First Nations status

- First Nations women were less likely to undergo most of the investigated obstetrical interventions, even after adjustment for maternal characteristics and distance to hospital
- After adjustment, they were more likely have pain managed using entonox, and more likely to have their labour augmented through artificial rupture of membranes. There was no difference in the use of oxytocin for labour augmentation after adjustment for all factors

## DISCUSSION

- More intervention is not always better, and there are indications that interventions are being used too often in developed countries.
- However, the systematic reduced usage of interventions during labour in First Nations women, when coupled with the known increased risk of perinatal mortality, is of concern

### Strengths

- Large population-based study with unique linkage to First Nations Status File
- Geodatabase allowed us to compare women living within the same distance-to-hospital

### Limitations

- The mechanism leading to lower levels of care cannot be determined by this study. Women may not seek treatment, accept recommended treatment. On the other hand, they may be offered differential care, or there may be other barriers to access
- Our data cannot identify First Nations women without status

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