

# Congenital Anomalies in the Canadian North 2001-2012: Emerging East West Differences

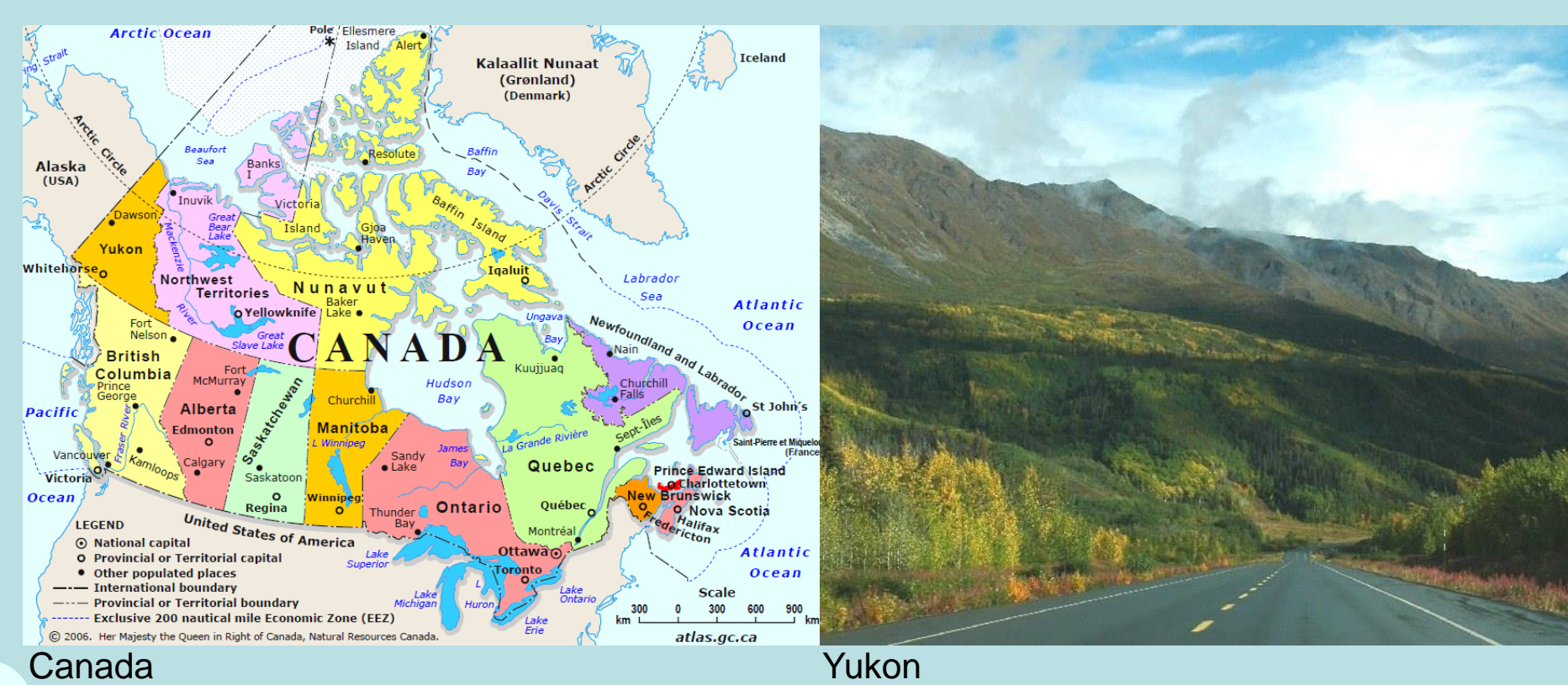
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## 1 Introduction

- Congenital anomalies (CA) are an important cause of childhood mortality and morbidity in all parts of the world.
- Genetic, infectious and environmental factors all influence rates.
- 142,000 people inhabit the Northern regions of Canada which include Yukon, Northwest Territories (NWT), Nunavut and Labrador.
- Primary care is usually delivered through local health centres but tertiary care is accessed through southern centres increasing the impact of CAs on families and the cost of health care.

It has been shown that socioeconomic status<sup>1,2,3</sup>, access to prenatal care<sup>4</sup> and supplementation with a multivitamin containing folic acid<sup>5</sup> can each influence the rate of birth defects in a population.

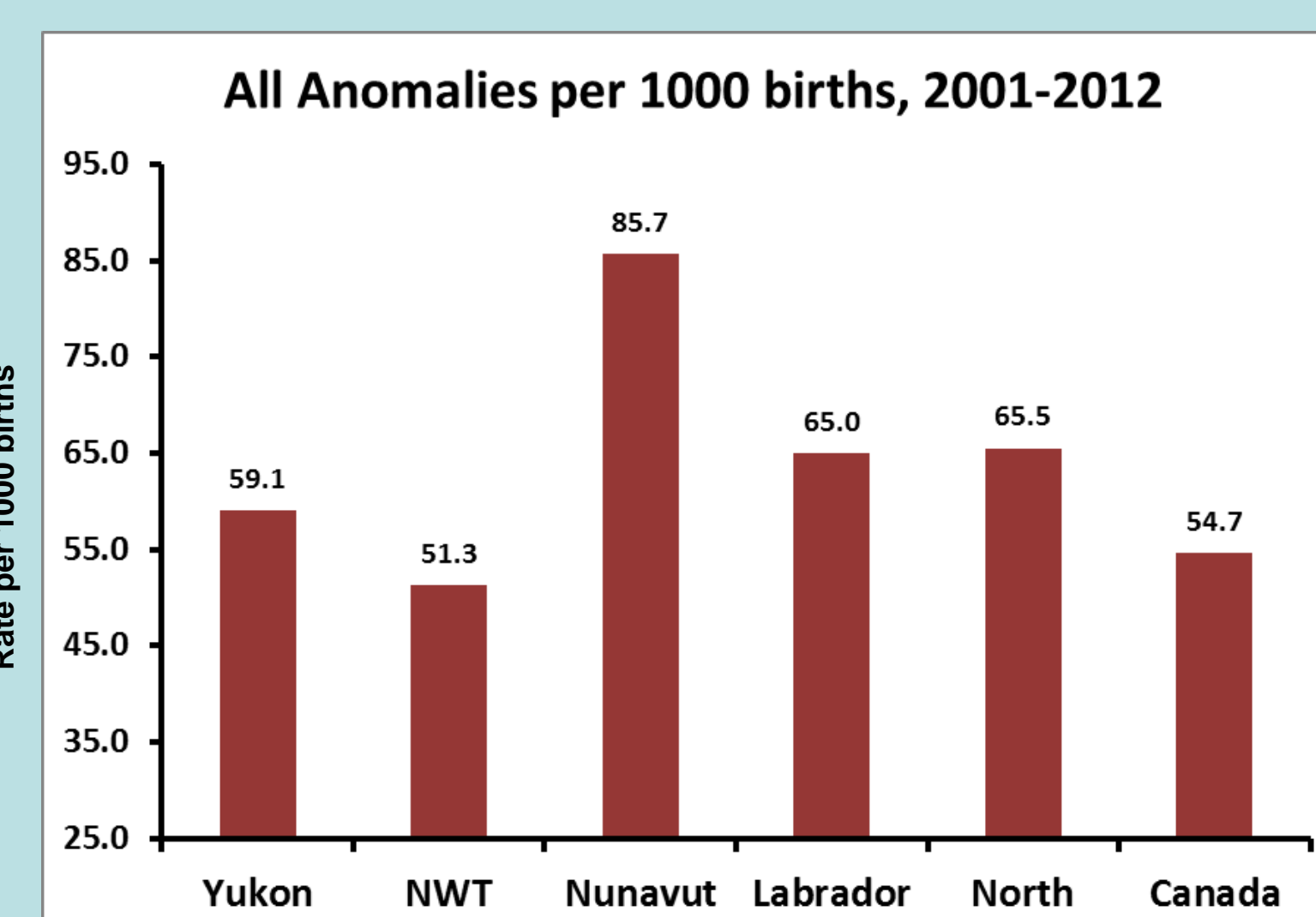
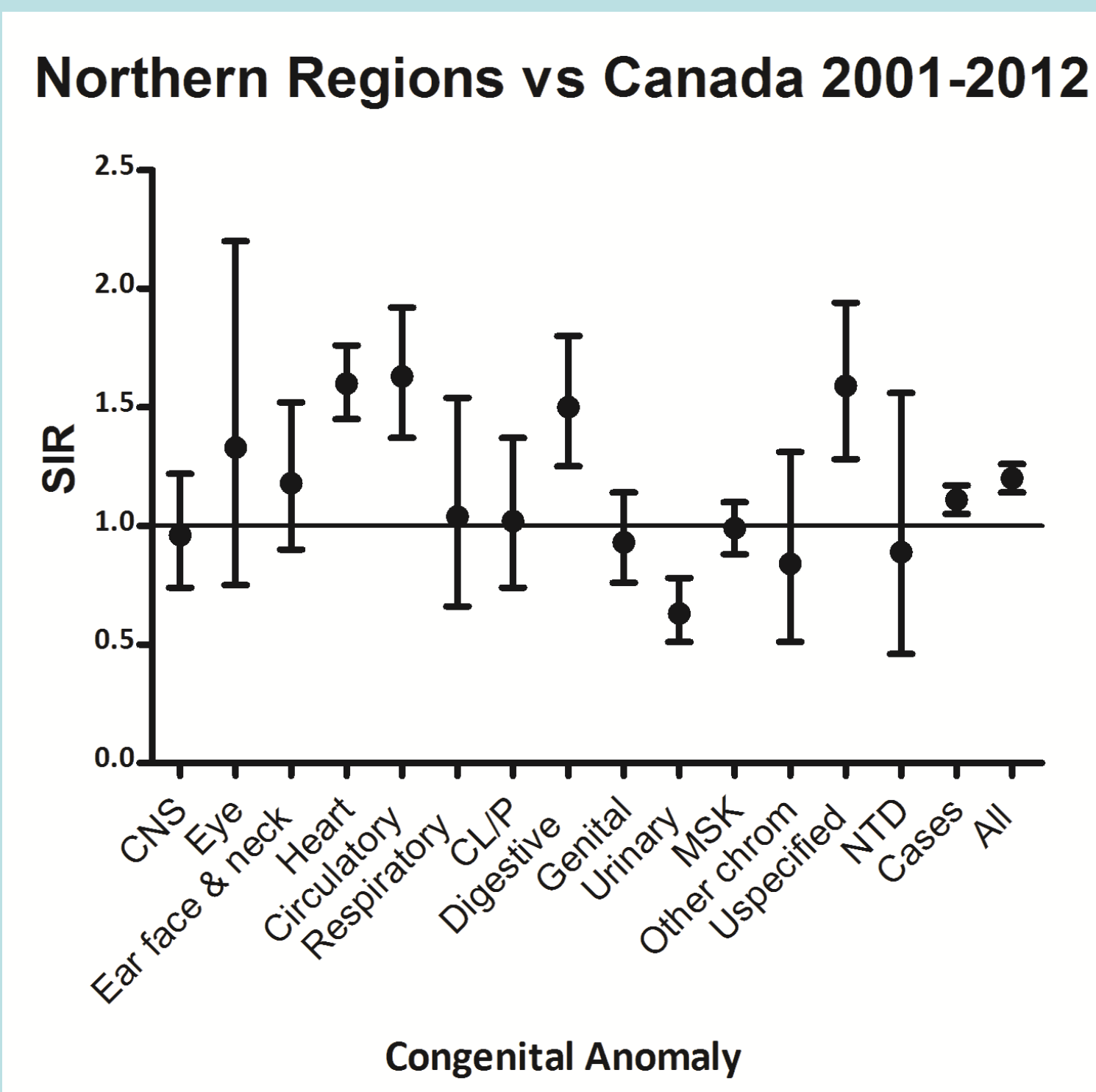


## 2 Methods

- CAs reported from discharge abstracts from 2001-2012 for stillbirths and live births for the first 30 days of life were compiled into CA categories for each region through the Canadian Congenital Anomalies Surveillance System.
- Totals and categories were compared per region to those of the rest of Canada using Standardised Incidence Ratios (SIR) and 95% confidence intervals (CI). SIRs were used to control for differing age distribution in each region.
- Population and demographic data from Statistics Canada<sup>6,7</sup> and the Canadian Maternity Experiences Survey<sup>8</sup> were used and compared to the trends observed in CAs incidence ratios.

## 3 Results

- Between 2001 and 2012 there were 26,780 births in the Northern regions and 3,306,783 in the South.
- Total anomalies in Canada, Yukon, NWT, Nunavut and Labrador per 1000 births respectively are: 54.6, 59.1, 51.3, 85.7, and 65.0.
- The rate of total CAs is elevated in the North vs South (SIR 1.2; 95% CI 1.1-1.3).
- Nunavut and Labrador had a statistically significant higher total rate than the rest of Canada (SIR 1.6; 95% CI 1.5-1.7; SIR 1.2; 95% CI 1.1-1.4)
- **This higher rate was due to increased congenital heart and other circulatory anomalies in Nunavut and Labrador.**
- Total rates of CAs in Yukon and NWT were the same or lower when compared to the rest of Canada, partly due to significantly decreased rates of urinary tract anomalies.



Anomaly	Yukon		NWT		Nunavut		Labrador		All Northern regions	
	sir	95% CI	sir	95% CI	sir	95% CI	sir	95% CI	IR	95% CI
Congenital heart defects	1.3	0.9-1.6	1.0	0.8-1.3	2.6	2.2-3.0	1.8	1.4-2.1	1.6	1.4-1.8
Circulatory system anomalies	1.1	0.6-1.8	1.2	0.8-1.7	2.6	2.0-3.4	1.8	1.2-2.5	1.6	1.4-1.9
Cleft lip and/or palate	0.7	0.2-1.6	1.2	0.6-1.9	1.9	1.2-2.8	--	--	1.0	0.7-1.4
Digestive system anomalies	1.1	0.6-1.9	1.5	1.1-2.1	2.1	1.5-2.8	1.4	0.9-2.1	1.5	1.2-1.8
Urinary system anomalies	0.5	0.3-0.9	0.4	0.2-0.6	0.8	0.6-1.1	0.6	0.4-0.9	0.6	0.5-0.8
All congenital anomalies	1.1	1.0-1.2	1.0	0.9-1.1	1.6	1.5-1.7	1.2	1.1-1.3	1.2	1.1-1.3
Rate per 1000 births	59.1		51.3		85.7		65.0		65.5	

## 4 Conclusion

- In this study of the birth prevalence of CAs in the Canadian North over a 12 year span, regional differences emerge.
- The two more western territories, Yukon and NWT, have over-all rates of CA the same or lower than the rest of Canada, whereas the two eastern regions, Nunavut and Labrador, demonstrate increased rates.
- Congenital heart defects and other circulatory anomalies in the eastern regions as well as digestive system anomalies across the North drive the over-all increase in rates of North vs South.
- This increase holds despite the decrease across most northern regions of urinary system anomalies.

Several demographic factors support the theory that socioeconomic status, access to prenatal care and periconceptional vitamin supplementation might interact to create an increase in overall CAs in the North with the greatest impact seen on heart defects in the Northeastern regions.



## 5 Background

	Yukon	NWT	Nunavut	Canada
Land Mass (million square km)	0.5	1.1	1.8	8.9
Population (2011)	35,402	43,501	34,196	34,752,128
Aboriginal population (2006)	25%	50%	86%	4%
Inuit population (2006)	1%	10%	85%	0.2%
Population <20 yrs (2011)	23%	29%	41%	22%
Births (2011)	431	690	837	377,636
Out of territory births (2007-11)	5%	7%	43%	-
Preterm birth (<37wks gest, 2011)	7%	8%	15%	8%
Birth rate (LB/1000 pop, 2011)	12	16	25	11
Births to mothers 15-19yrs (2011)	4%	8%	20%	4%
Infant mortality (/1000 LB, 2007-11)	5	8	17	5
Prepregnancy folic acid suppl.	68%	47%	14%	58%
1st trim folic acid suppl.	98%	82%	53%	90%
Median total family income (2011)	\$91,090	\$105,560	\$65,280	\$72,240

Data sources: Statistics Canada CANSIM Tables: 051-0001 Population, 102-4501 Births by residence, 102-4512 Births by gestation, 102-4505 Fertility rates, 102-4505 Births by age of mother, 102-0507 Infant mortality rates, 111-0009 Median income, 2006 Census, Canadian Maternity Experiences Survey (folic acid).

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