

# Cardiovascular Disease among Crees Living with Diabetes in Eeyou Istchee, in Northern Quebec

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## BACKGROUND

Eeyou Istchee is a territory in Northern Quebec with a total population of 15,000 of which 95% are Cree in 2008. The Eeyou population lives in nine communities located on the Eastern shore of James Bay, as well as further inland in the area of Chibougamau (Figure 1).

Crees aged ≥20 years experience a high prevalence of diabetes (21.4% in 2009<sup>1</sup>), especially in younger age groups, but little is known about their cardiovascular diseases (CVD) and health services utilization outside the region.

## OBJECTIVE

To describe the burden of CVD comorbidities, as measured from hospital records, in Cree individuals living with diabetes.

## METHODS

### Data Sources

Information on CVD was obtained by linking the Quebec hospital discharge database (MED-ÉCHO) with the Cree Diabetes Information System (CDIS) through health insurance numbers (HIN).

**Study period:** January 1<sup>st</sup>, 1996 to March 31<sup>st</sup>, 2009

### Inclusion criteria

- Successfully linked (94% of CDIS)
- Identified as type 1 or type 2 diabetes cases in the CDIS
- Aged ≥20 years
- Aboriginal (self-identified or band number provided)

### Identification of CVD

Cardiovascular diseases (IHD, AMI, stroke and HF) were identified using International Classification of Diseases (ICD) diagnosis codes as presented in Table 2. Individuals were considered to have the disease if one of these codes was recorded in any diagnosis field of a hospital discharge summary.

### Analyses

- The proportion of diabetes cases hospitalized with each CVD at any time during the study period, was determined:
  - 1) among all cases including those deceased during the period.
  - 2) among those who were prevalent in 2008-2009.
- Kaplan-Meier method was used to estimate the cumulative incidence rate of IHD, AMI, stroke and HF following a diabetes diagnosis among individuals incident during the study period. Multivariate Cox proportional regression models<sup>2</sup> were used to investigate the effect of sex and age at diagnosis (<40, 40-59, ≥60 years).
- All tests were bilateral, with a significance level of 5%.

Figure 1 Eeyou Istchee territory



Table 1 Description of the Cree individuals with diabetes in 2008-2009 (n=1773)

Characteristic	Category	%
Sex	Male	59.8
	Female	40.2
Age (years)	< 50	49.4
	50-59	22.8
	60-69	17.8
	70+	10.0
Diabetes type	Type 1	0.3
	Type 2	99.7
Diabetes duration* (years)	< 5	34.0
	5-9	27.7
	10-14	18.0
	15-19	11.1
	≥ 20	9.0

\*Duration is unknown for 2 individuals

Table 2 Proportion of Cree individuals with diabetes hospitalized with cardiovascular diseases (n=1930)\*

	Diagnosis codes		Proportion (%)
	ICD-9	ICD-10	
Ischemic heart disease (IHD)	410-414	I20-I25	14.9
Acute myocardial infarction (AMI)	410	I21-I22	4.0
Stroke	430-438	I60-I69	5.0
Heart failure (HF)	428	I50	8.0

\*Individuals deceased before 2008-2009 are included (n=157)

Table 3 Proportion of prevalent cases in 2008-2009 hospitalized with select CVD by age, sex and diabetes duration (n=1773)

Characteristic	Category	IHD (%)	AMI (%)	Stroke (%)	HF (%)
Sex	Male	14.8	4.5	3.8	5.1
	Female	9.8	1.9	3.0	4.3
Age (years)	< 60	5.4	1.4	1.3	0.9
	60-79	25.2	6.3	6.0	11.0
	80+	36.7	8.3	23.3	30.0
Diabetes duration* (years)	< 5	6.0	1.5	0.8	1.2
	5-9	8.1	2.0	1.4	2.4
	10-14	14.1	2.2	4.7	4.7
	15-19	18.4	4.6	5.1	9.2
≥ 20	31.9	10.6	13.8	18.1	
Total		11.8	2.9	3.3	4.6

\*Excluding 2 individuals whose duration of diabetes is unknown

## RESULTS

Figure 2 Cumulative incidence rate of IHD, stroke, and HF following a diabetes diagnosis by age at diagnosis (n=595)

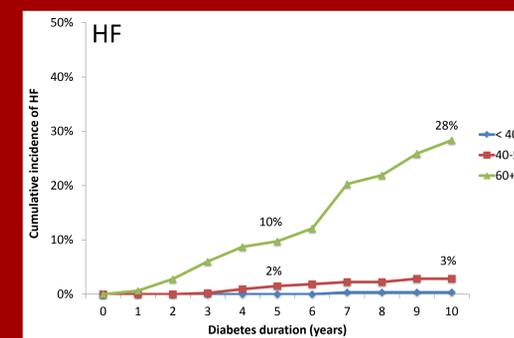
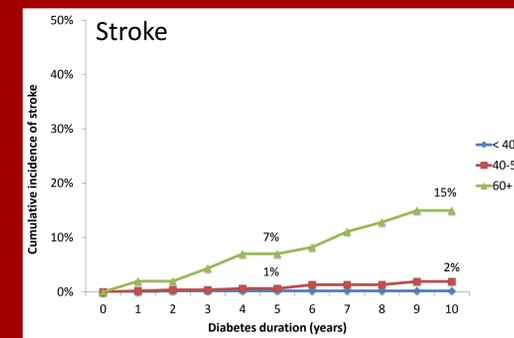
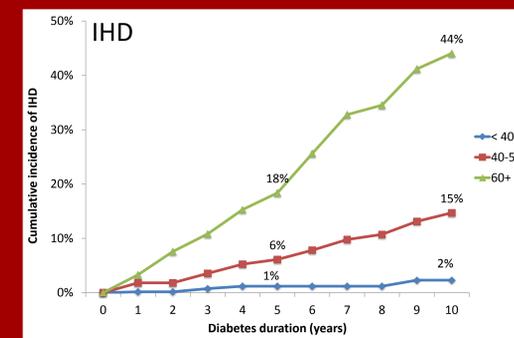


Table 4 Proportions of individuals with diabetes hospitalized with HF, Cree vs Quebec, 2008-2009

Age (years)	Cree	Quebec*	p-value**
40-59	1.4%	2.6%	0.025
60-79	11.0%	8.5%	0.033
80+	30.0%	19.8%	0.049

\*Source: Quebec Integrated Chronic Disease Surveillance System (QICDSS)  
\*\*p-value from Chi-square test

- In 2009, the average age at diabetes diagnosis was around 20 years younger in the Cree population than in the overall province of Quebec (data not shown).
- Nearly half of the Crees living with diabetes in 2008-2009 were < 50 years old and over 60% were diagnosed in the last 10 years (Table 1).
- Over the 13-year study period (n=1930), 15% have been hospitalized with IHD (including AMI), 5% with stroke, and 8% with HF (Table 2).
- Among cases that were prevalent in 2008-2009, presence of HF increased with age, from 0.9% in those aged <60 years to 30.0% in cases ≥80 years (Table 3).
- Ten years following a diabetes diagnosis, the rate of individuals hospitalized with IHD was 15% in the Crees diagnosed with diabetes at 40-59 years of age, compared with 44% in those diagnosed at ≥60 years (Figure 2).
- Cox regression showed a higher risk in males for IHD (RR=1.9, p=0.003) and stroke (RR=2.5, p=0.0499) (data not shown).
- Compared to Quebecers with diabetes in 2008-2009, Crees were significantly less likely to have been hospitalized with HF in the younger age group but more likely in groups over 60 years old (Table 4).

## CONCLUSION

- Diabetes is a relatively new health problem for the Crees, with over 60% of cases diagnosed in the past 10 years.
- Even if CDIS collects information on CVD comorbidities, MED-ÉCHO identified 88% more cases with IHD and 45% more cases with stroke. Therefore, hospitalization database linkage is fundamental for assessing the burden of CVD among Crees living with diabetes.
- The rate of stroke observed in Crees living with diabetes seems slightly lower than that observed in diabetes cases from other First Nations communities across Canada.<sup>3</sup>
- Crees with diabetes in northern Quebec experience an important cardiovascular burden, even at young ages. The extent of this is a wake-up call for a systematic, comprehensive approach targeting health promotion, prevention and chronic disease management in this northern region.

### References

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