

Cree Diabetes Information System (CDIS) 2007 Annual Report

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The cover picture shows participants in **Miyupimaatisiitaa 2002** – a 1400-km walk through the territory of Iiyiyu Aschii in northern Quebec from Waswanipi to Whapmagoostui to create awareness about diabetes and about the strengths that Iiyiyuch can call upon to stay healthy.

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In 2007-8, we continued to improve the CDIS as an electronic patient file system. First, we linked the CDIS to laboratory data systems in Chisasibi and Chibougamau hospitals so that doctors and nurses could have up-to-date access to patients' laboratory results within the system. Second, we continued to improve the user-friendliness of the CDIS for health care workers so it now provides them with an easily accessible, visual, and comprehensive record of all patient tests. Now patients and health care workers can sit together and view and discuss the history of the patients' test results and management profiles.

In 2008-9, we will continue to implement the use of the CDIS in the clinics. Given the high staff turnover, we need to invent on-line training programmes so that all new employees will be able to understand our standards of practice for diabetes care and our approach to diabetes management. At the same time, we will begin to incorporate other chronic diseases into the system, starting with the management of high blood pressure.

Jill Torrie

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I. Number of people diagnosed with diabetes

This report is based on data from the Cree Diabetes Information System (CDIS). Only Cree patients living in Iiyiyiu Aschii who were diagnosed with type 1 or type 2 diabetes before July 1, 2007 are included in this report. The diabetes prevalence was calculated using the mid-year (July 2007) Cree population based on the James Bay & Northern Québec Agreement beneficiary list we obtain through the Ministry of Health and Social Services of Québec.

As Table 1 demonstrates, a total of 1,583 Cree people are living with diabetes in Iiyiyiu Aschii (July 1, 2007). Two of these individuals may have type 1 diabetes. Differentiating between type 1 and type 2 diabetes can be difficult; therefore, for the purposes of this report, all cases are considered as type 2. One in four (25.8%) individuals living with diabetes is under 40 years old and almost half of all Cree patients with diabetes (46.5%) were diagnosed before the age of 40.

Table 1. Number of people diagnosed with diabetes by region, gender and age group, Cree population, Iiyiyiu Aschii, July 1, 2007

Age group	Iiyiyiu Aschii			Coastal			Inland		
	F	M	T	F	M	T	F	M	T
10 to 19	*	*	7	*	*	*	*	-	*
20 to 29	59	29	88	28	15	43	31	14	45
30 to 39	176	138	314	84	68	152	92	70	162
40 to 49	219	130	349	115	57	172	104	73	177
50 to 59	213	143	356	123	71	194	90	72	162
60 to 69	179	119	298	98	69	167	81	50	131
70 & older	108	63	171	52	29	81	56	34	90

Source: CDIS, July 1, 2007

* According to the guidelines for reporting small numbers, only the total number of people with diabetes in Iiyiyiu Aschii is presented for the 10-19 years age group.

Age calculated as of July 1, 2007.

Table 2. Number of people diagnosed with diabetes by community, Cree population, Iiyiyiu Aschii, July 1, 2007.

Community	Number of people with diabetes
Chisasibi	365
Eastmain	78
Mistissini	381
Nemaska	68
Oujé-Bougoumou	93
Waskaganish	191
Waswanipi	228
Wemindji	133
Whapmagoostui	46
Iiyiyiu Aschii	1,583

Source: CDIS, July 1, 2007



II. Diabetes prevalence

The overall crude diabetes prevalence is 19.1% in the population 20 years old and older (Table 3). In order to compare these numbers with the rest of Québec, we have to consider the fact that the age distribution of the Cree population as a whole is different from the Québec population. In particular, the Cree population is much younger than the general Québec population. To take this difference into account, we adjusted the diabetes prevalence in the Cree population according to the 2001 age distribution of Québec's population (our reference population) using the direct standardization method. According to the results, the age-standardized diabetes prevalence is 25.5% in the Cree population 20 years old and older. This number is much higher compared to the prevalence of 6.4% in other Québec residents (age-adjusted to the 2001 Québec population, 20 years old and older)¹. It is important to mention that the most recent data on diabetes prevalence in the rest of Québec is only available for 2003-2004.

Table 3. Crude and age-standardized diabetes prevalence, Cree population, 20 years old and older, liyiyiu Aschii (July 1, 2007) and the rest of Québec (2003-2004)

	M	F	Total
Crude prevalence (Cree)	15.3%	22.9%	19.1%
Age-adjusted prevalence (Cree)	20.3%	30.4%	25.5%
Age-adjusted prevalence Québec ¹	7.4%	5.6%	6.4%

Source: CDIS, July 1, 2007

MSSSQ, JBA beneficiary list, July 1, 2007

MSSSQ, Québec population estimates based on Statistics Canada 2001 Census.

III. Gender distribution of diabetes prevalence

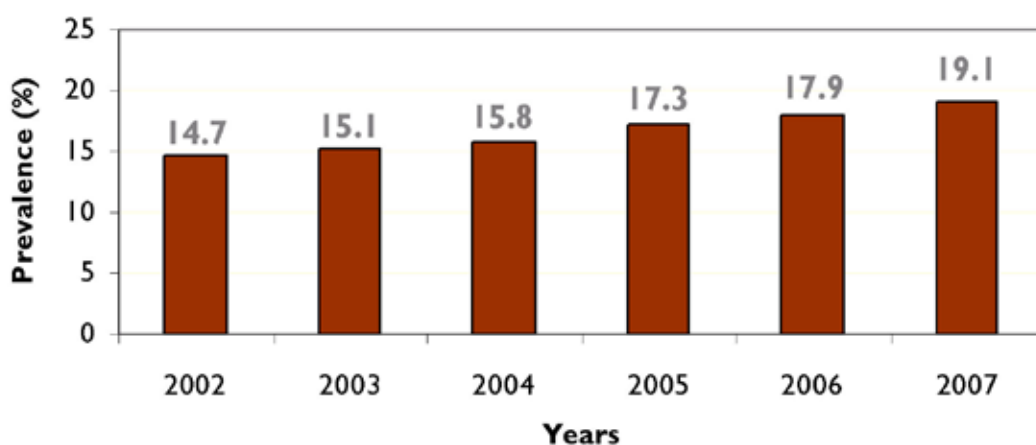
A gender comparison shows that diabetes continues to affect more Cree women 20 years old and older than Cree men (22.9% vs. 15.3%, respectively). The difference is statistically significant and corresponds to a rate ratio of 1.5, reflecting the fact that women have a diabetes prevalence rate 50% higher than that for men. This situation is similar to many other aboriginal populations, but not to the general Canadian population². For example, in the rest of Québec, men have a higher diabetes prevalence rate than women (female-male ratio of 0.8)¹. Although the exact cause of this difference is not known, it could be due to higher obesity prevalence in Cree women³, excessive weight gain by young Cree mothers during pregnancy⁴ and a high rate of gestational diabetes^{5,6}. It may also reflect a more aggressive screening for diabetes in women, particularly during pregnancy.



V. Diabetes prevalence over time

The proportion of Cree adults (20 years old and older) living with a diagnosis of diabetes has significantly increased, from 14.7% in 2002, to 19.1% in 2007 (Figure 2). Over this six-year period, the average increase of diabetes prevalence was 1.1% per year. This observed increase in diabetes prevalence over the years may reflect a combination of several factors: an increase in new diabetes cases diagnosed each year, better screening for diabetes, decreased mortality of patients with diabetes, and an improved registration process (better use of the registration forms) to include patients with diabetes on the CDIS.

Figure 2. Crude diabetes prevalence, Cree population 20 years old and over, Iiyiyiu Aschii, 2002-2007



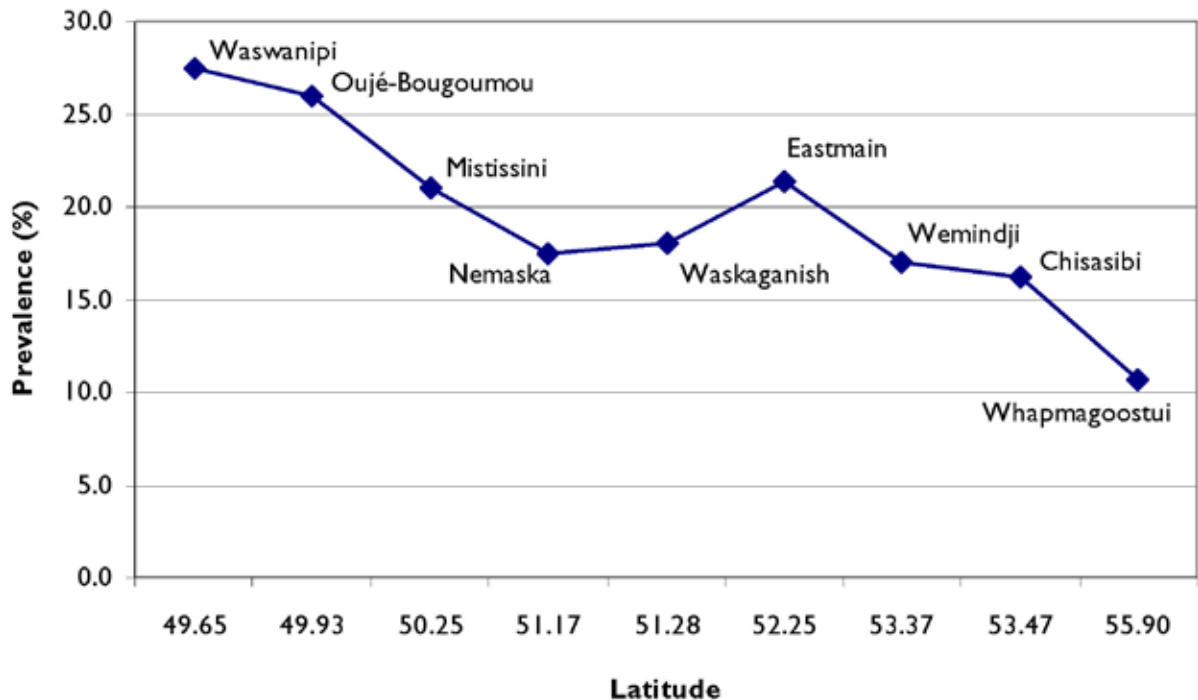
Source: CDIS, July 1, 2007

Note: The prevalence for the period 2002-2006 is based on the data from the previous annual diabetes reports. It is not uncommon to have cases reported to the CDIS that date back several years (i.e., diagnosed in 2004, but reported in 2007). These can underestimate the real increase over the years.

VI. Diabetes prevalence by region and community

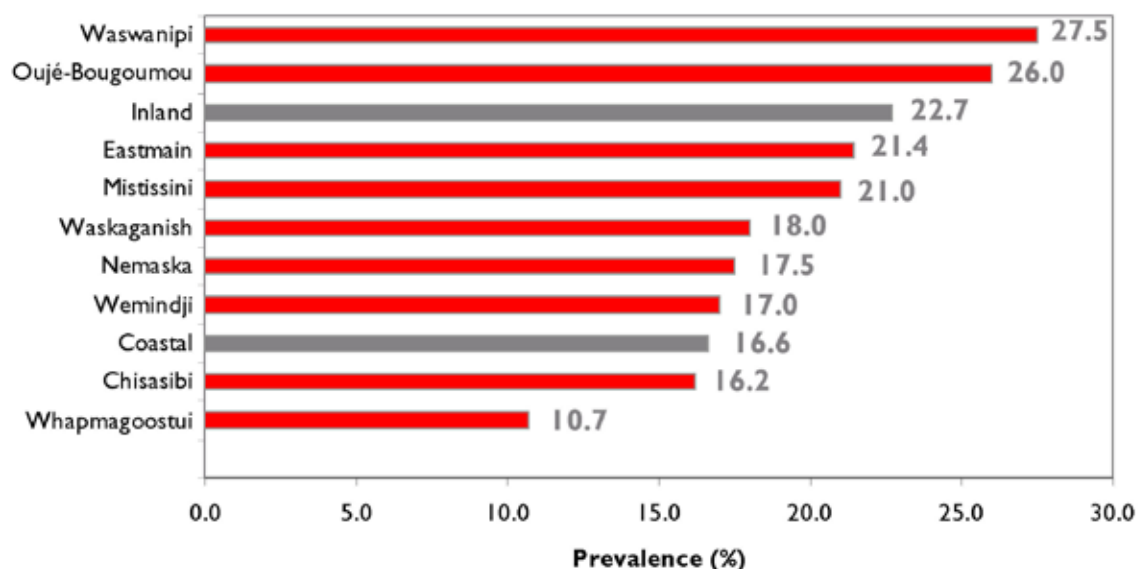
The James Bay Cree territory is composed of nine communities. Four of them (Waswanipi, Oujé-Bougoumou, Mistissini and Nemaska) are located inland. The other five Cree communities (Waskaganish, Eastmain, Wemindji, Chisasibi and Whapmagoostui) are located on the coast of James Bay. A geographic difference and a north-south gradient in the diabetes prevalence in the Cree population were first reported by Brassard et al. in 1993⁷. Since 1998, the CDIS data have consistently confirmed the same pattern, which is still evident as Figure 3 shows. The diabetes prevalence varies greatly between the communities as Figure 4 demonstrates. The highest diabetes prevalence is reported in Waswanipi (27.5%) and Oujé-Bougoumou (26.0%), and the lowest in Whapmagoostui (10.7%). Overall, the Coastal communities have significantly lower diabetes prevalence compared to the Inland communities (16.6% vs. 22.7%, respectively). This confirms the findings of many other studies that have reported lower diabetes prevalence among the aboriginal populations in more isolated regions compared to the less isolated regions⁸. Although these findings require further investigation, a greater proximity to urban areas and increased access to fast-food facilities may play a role in the observed differences..

Figure 3. Diabetes prevalence by latitude and community, Cree population 20 years old and older, Iiyiyiu Aschii, July 1, 2007



Source: CDIS, July 1, 2007

Figure 4. Diabetes prevalence by region and community, Cree population 20 years old and older, liyiyiu Aschii, July 1, 2007



Source: CDIS, July 1, 2007

VII. Age at diagnosis and duration of diabetes

The age at diagnosis and the duration of diabetes were calculated as of July 1, 2007. The average age at diagnosis for diabetes was 42 years compared to 48 years in 1989⁹. Almost half of Cree patients with diabetes (46.5%) were diagnosed before the age of 40. This observation is consistent with others who have reported a younger average age at diagnosis of diabetes in aboriginal populations compared to the general Canadian population². One third (33%) of all patients were diagnosed less than 5 years ago and two thirds (65%) have been diagnosed in the past 9 years (Table 4). The average duration a patient has been living with diabetes is 9 years.

Table 4. Duration of diabetes, Cree population, 20 years old and older, liyiyiu Aschii, July 1, 2007

Duration of diabetes (years)	Number of patients	Percentage of all patients with diabetes
0-4	533	33.7
5-9	496	31.3
10-14	251	15.9
15-19	173	10.9
20 or more	130	8.2
Total	1,583	100.0

Source: CDIS, July 1, 2007

VIII. Diabetes cumulative incidence

I. INTRODUCTION

The incidence of a disease is defined as the number of new cases per 1,000 population that occur during a given period of time in a population at risk for developing the disease¹⁰. The central element in the definition of the incidence is the number of *new cases* per given period. The incidence has been calculated for 3 three-year periods (1998-2000; 2001-2003; 2004-2006) to control for high variability on a year-to-year basis. During each of these periods, all of the individuals aged 20+ in the population were considered at risk if they had not already been diagnosed with diabetes. To compare the incidence during the three time periods, we directly adjusted it for age and sex, using the 1998-2000 population as the standard population. When genders were compared, the cumulative incidence was adjusted for age. When we compared Coastal and Inland communities, the Iiyiyiu Aschii population for the 1998-2000 period was used as the reference. The reference population for the denominator is based on the Cree beneficiaries list for years 1998 to 2000. The statistical significance of differences in incidence was tested by computing the related p-value. A p-value of less than .05 indicates a statistically significant difference.

2. RESULTS

Incidence over time and by gender

Although the absolute number of new cases has increased by 21% between the first and last three-year period (Table 5), the cumulative incidence for the whole region has not changed significantly (Table 6). The incidence in the younger age groups increased, with stable or decreasing incidence of diabetes in the older age groups. However, this trend is significant only for the 20 to 29-year-old population. In 1998-2000, men represented 36% of new cases. This proportion rose to 45% in 2001-2003, and to 46% in 2003-2006 (Figure 5).



Table 5. Total number of new cases of diabetes per three-year period, by sex and age group, liyiyiu Aschii, 1998-2006*

Periods	Age groups	Coastal			Inland			liyiyiu Aschii		
		M	F	T	M	F	T	M	F	T
1998-2000	20-29									15
	30-39	7	18	25	13	24	37	20	42	62
	40-49	12	31	43	10	20	30	22	51	73
	50-59	15	22	37	11	17	28	26	39	65
	60-69	13	17	30	5	10	15	18	27	45
	70+	5	6	11	7	10	17	12	16	28
	Total**	52	94	146	46	81	127	98	175	288
2001-2003	20-29			9			8	6	11	17
	30-39	22	29	51	14	20	34	36	49	85
	40-49	18	26	44	10	25	35	28	51	79
	50-59	18	18	36	12	10	22	30	28	58
	60-69	15	17	32	11	7	18	26	24	50
	70+			10			5	10	5	15
	Total**	73	90	182	47	62	122	136	168	304
2004-2006	20-29	9	16	25	7	15	22	16	31	47
	30-39	22	20	42	25	27	52	47	47	94
	40-49	14	29	43	26	22	48	40	51	91
	50-59	22	20	42	13	10	23	35	30	65
	60-69	13	11	24	5	8	13	18	19	37
	70+			9			6	6	9	15
	Total**	80	96	185	76	82	164	162	187	349

Source: CDIS, July 1, 2007

* When the number of a cell is less than 5, it is not reported and the related cells are also masked

** Totals may not match the sum of the columns since some cells are masked

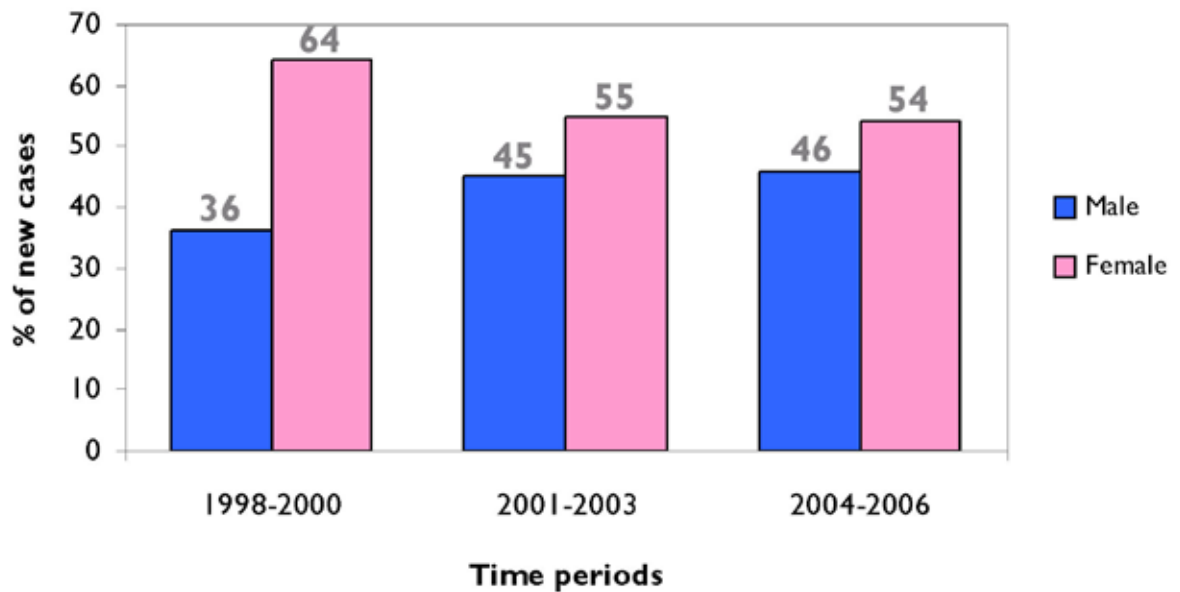


Table 6. Cumulative incidence (per 1,000 population) over time, by gender and age group, Iiyiyiu Aschii, 1998-2006

	1998-2000	2001-2003	2004-2006
	I ₁ (95% CI)	I ₂ (95% CI)	I ₃ (95% CI)
All	16.0 (14.2-17.9)	15.5 (13.7-17.3)	16.9 (15.0-18.7)
M	10.9 (8.8-13.0)	13.5 (11.1-15.8)	15.0 (12.5-17.5)
F	21.4 (18.4-24.4)	17.6 (14.8-20.3)	18.8 (16.0-21.7)
20-29	2.1 (1.0-3.2)	2.4 (1.3-3.6)	6.7 (4.8-8.6)
30-39	12.3 (9.3-15.4)	15.2 (11.8-18.6)	15.2 (11.8-18.6)
40-49	27.7 (21.4-34.0)	25.7 (19.7-31.8)	25.0 (19.0-30.9)
50-59	43.2 (33.0-53.5)	35.9 (26.5-45.3)	38.0 (28.3-47.6)
60-69	50.3 (35.9-64.6)	53.7 (38.9-68.4)	43.4 (30.0-56.7)
70+	33.2 (21.1-45.3)	17.8 (8.9-26.8)	20.7 (11.1-30.4)

Source: CDIS, July 1, 2007

Figure 5. Gender distribution of new cases of diabetes over time, Cree population, 20 years old and older, Iiyiyiu Aschii, 1998-2006



Source: CDIS, July 1, 2007

Conclusion

The overall crude diabetes prevalence in the Cree population 20 years old and older has increased from 14.7% in 2002, to 19.1% in 2007. In 2007, one in every five Cree adults over 20 was living with diabetes. The diabetes prevalence continues to be almost twice as high in women as in men. This observation deserves special attention, because women who have type 2 diabetes prior to and during their pregnancy are at a much higher risk of maternal and neonatal complications and their children are at a higher risk of obesity and diabetes later in life^{6,11}. As well, the age at diagnosis of diabetes has been getting younger and almost half of the Crees living with diabetes were diagnosed before they had reached 40 years. Furthermore, the fact that two thirds (65%) of all cases of diabetes were only diagnosed in the past 9 years, suggests that there will be a steadily increasing demand on clinical services and human resources in the near future.

Our data suggest a slight increase in the absolute number of new cases of diabetes diagnosed over the past 9 years, though the cumulative incidence (new cases/1,000 population) of diabetes remained relatively stable. Subgroup analysis did show a significant increase in the incidence in both young adults aged 20-29 years old and in all men in Iiyiyu Aschii over the 6-year period. It is not surprising, if we consider the fact that the prevalence of obesity, one of the main risk factors for type 2 diabetes related to lifestyle, has dramatically increased in the Cree population over the past ten years². However, it is important to keep in mind that the true incidence of diabetes could be underestimated because of the current process for registering new diabetes cases into the CDIS.

Our report demonstrates that diabetes still remains one of the main public health problems in the Cree territory. This stresses the importance, not only of diabetes primary prevention programs targeting obesity and physical inactivity, but also the implementation of preventive clinical practices to decrease the number of new diabetes cases each year, and to prevent or delay diabetes-related complications in people already diagnosed with the disease. Note that this report discusses only the epidemiological aspect of diabetes in Iiyiyu Aschii. In the following 6 months, the results of the audit project (medical chart review) on the clinical management of diabetes in the nine Cree communities will be available. The upcoming report will help to identify areas requiring improvement in the clinical management of diabetes and the health care services in Iiyiyu Aschii.



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