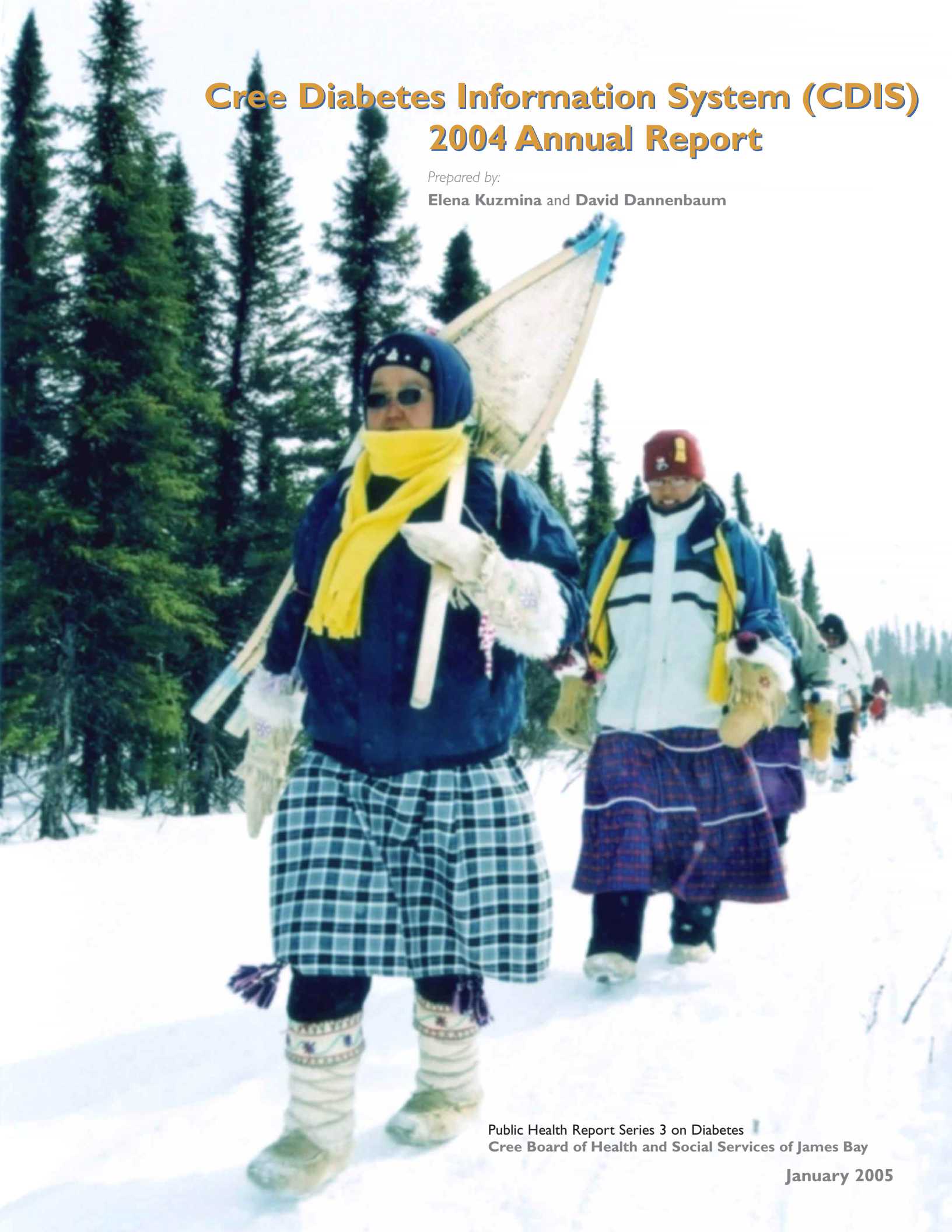


Cree Diabetes Information System (CDIS) 2004 Annual Report

Prepared by:

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The cover picture shows the participants with MIYUPIMAATISIITAAU 2002 – a 1400-km walk through the territory of Eeyou Istchee in northern Quebec from Waswanipi to Whapmagoostui to create awareness about diabetes and about the strengths that Eeyouch can call upon to stay healthy.

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FOREWORD TO THE PUBLIC HEALTH REPORT SERIES

The Public Health Report Series includes reports prepared by the Department of Public Health of the Cree Territory of James Bay on major activities of the Department. At the present time, the series includes the following:

- *Series 1: annual reports of the Public Health Department (from 2002)*
- *Series 2: reports on immunisations and/or notifiable diseases (periodic)*
- *Series 3: annual diabetes update (from 1996) and annual diabetes report (from 2004)*
- *Series 4: report on the health status of the population (periodic)*

In the coming years as the Department evolves and grows, reports on other major activities - such as health promotion, environmental health, dental health, or the work of committees - will likely be added to this series.

FOREWORD TO THE ANNUAL DIABETES REPORT

This new annual diabetes report series is dedicated to the late Mavis Verronneau, a nurse and diabetes educator, who was the driving force behind the development of the CBHSSJB's diabetes information system. The region is now beginning to see the results of her vision.

Since 1997, the Cree Board of Health and Social Services of James Bay has produced the Annual Diabetes Update, a four-page report to the population about trends in diabetes on the territory. In this 8th year of the Annual Diabetes Update, we are also introducing this new series of annual reports that provide a more technical overview of the current situation of diabetes. It will be of interest to health care workers and health researchers.

The information for both the four-page Annual Diabetes Update and this more technical Annual Diabetes Report is compiled from the Cree Diabetes Information System. The system began in 1996 as the "Diabetes Registry". The Diabetes Registry was started following requests by the Chiefs and leaders of Eeyou Istchee to provide more information about this new and growing medical problem. In 2004, the system was revamped as an improved clinical management tool with new web-based software, organised under a new administrative structure and renamed the Cree Diabetes Information System, or CDIS for short.

Whatever it has been called, this system has been an important tool for planning services for people with diabetes in the region. It has helped to focus attention on this growing and priority medical issue by providing data about the situation. Since 1996, the CDIS has:

- *Generated reports that have helped the population and the CBHSSJB to understand what is happening with the new "epidemic" of diabetes;*
- *Produced standardised procedures in the clinics for delivering recommended care to people with diabetes;*
- *Provided the evidence about the situation that convinced the Ministry of Health and Social Services to finance, first, a special Working Group on Diabetes and, then, special, permanent financing for diabetes services in the region;*
- *Been continuously developed and improved while always reflecting changes in the state-of-the-art of diabetes care in Canada;*
- *Been linked with administrative data of the Quebec health care system to understand the extent of complications suffered by people with diabetes and their pattern of using health care services outside the region (see the report by Gilles Légaré at www.inspq.qc.ca);*
- *Had periodic and timely audits as part of the continuing evaluation of the performance of the system;*
- *Provided a database that has been analysed to show how diabetes is being managed in the clinics.*

In 2005, our challenges will be to make the CDIS more responsive to the daily needs of health care workers in the clinics, to carry out a partial audit, to establish a permanent linking system to administrative data of the Quebec health care system, and to continually promote healthy living in Eeyou Istchee.

Jill Torrie

Director of Specialized Services

Public Health Department of the Cree Territory of James Bay



General

This annual report provides information on the prevalence of diabetes, the prevalence of diabetes-related complications, and the state of the clinical management of diabetes (control of glycemic levels, lipids, blood pressure and weight) in Eeyou Istchee. The report is based on the data from the Cree Diabetes Information System (CDIS). The data were entered from the Diabetes Flow Sheets, which were updated by medical students between June and July 2004. The CDIS contains information on 1,775 patients diagnosed with Type 1 or Type 2 diabetes mellitus, impaired fasting glucose and/or impaired glucose tolerance, and a history of gestational diabetes. 1,746 of them are living in Eeyou Istchee and 29 are living in non-Eeyou communities. Only Eeyou patients living in Eeyou Istchee who were diagnosed with diabetes before July 1st, 2004 were included in this report.

Although the CDIS tracks people with all types of diabetes-related conditions, this report refers only to patients with Type 1 and Type 2 diabetes, except where otherwise indicated.

Part I. Epidemiologic data

1.1 CRUDE PREVALENCE

In July 2004, 1,232 Eeyouch were living with diagnosed diabetes in Eeyou Istchee (Table 1). This represents a crude prevalence rate of 13.7% in the Eeyou population aged 15 years and over, and 15.8% in the Eeyou population aged 20 years and over.

Table 1. Crude prevalence rate of diabetes (Type 1 and Type 2) in Eeyou Istchee, 2004

Type of diabetes	Number of patients	Crude prevalence* in the Eeyou population aged 15+	Crude prevalence** in the Eeyou population aged 20+
Type 1	7		
Type 2	1,225		
Total	1,232	13.7%	15.8%

Note: Crude rate per 100 persons (not age-adjusted)

* Based on July 2004 Cree beneficiaries list (total population of 8,980 Eeyouch aged 15 and over).

** Based on July 2004 Cree beneficiaries list (total population of 7,734 Eeyouch aged 20 and over).

1.2 AGE-ADJUSTED PREVALENCE

Table 2 presents the comparative data on the age-adjusted prevalence of diabetes in the Eeyou and Quebec populations. In July 2004, the age-adjusted prevalence rate of diabetes in the Eeyou population, aged 20 and older, was 20.6%. This rate is 4.2 times higher than the Quebec age-adjusted (Quebec population, 1996) diabetes prevalence rate of 4.9%¹. Furthermore, we can observe a slight increase in the age-adjusted prevalence of diabetes in the Eeyou population from 19.9% in 2002² to 20.6% in 2004.

Table 2. Age-adjusted prevalence of diabetes in the Eeyou and Quebec populations, 2004

Age-adjusted* prevalence of diabetes in the Eeyou population (July 2004)		Age-adjusted* prevalence of diabetes in the Quebec population ³ (1999-2000)
Aged 15+	Aged 20+	Aged 20+
18.9%	20.6%	4.9%

* Rate is age-adjusted to the 1996 Quebec population.

¹ Émond V. 2002. *Prévalence du diabète au Québec et dans ses régions : premières estimations d'après les fichiers administratifs*. Québec, Institut national de santé publique du Québec.

² Légaré G. 2004. *Project of Diabetes Surveillance Among the Cree of Eeyou Istchee*. Québec and Chisasibi, Institut national de santé publique du Québec and Cree Board of Health and Social Services of James Bay : 84 p.

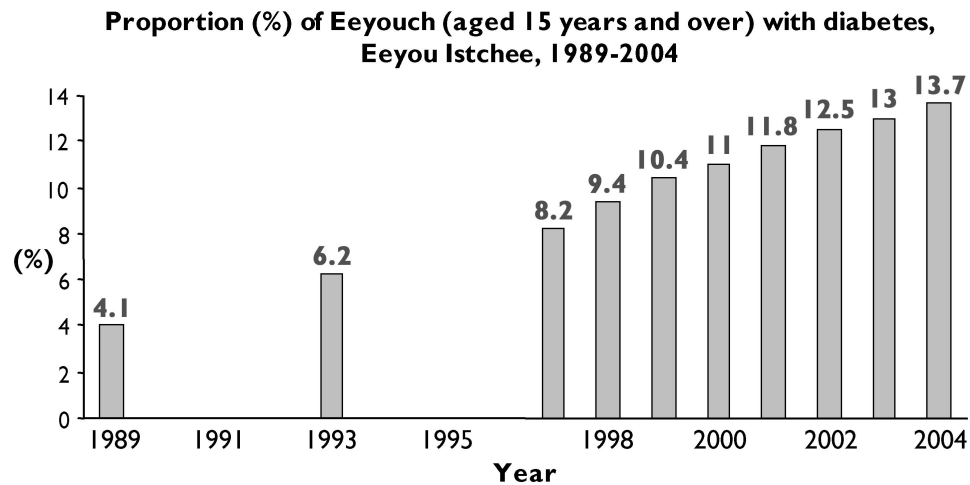
³ Émond, *Ibid.*



1.3 PREVALENCE OF DIABETES OVER TIME

Figure 1 demonstrates that the total number of individuals (aged 15 years and over) diagnosed with diabetes increased over three fold (330%) between 1989 and 2004, with the crude prevalence rate rising from 4.1% to 13.7%.

Figure 1. Crude prevalence of diabetes in Eeyou Istchee, 1983-2004



Sources: 1989 data from Brassard P, Robinson E, Dumont C. 1993. *Descriptive Epidemiology of non-insulin-dependent diabetes mellitus in the James Bay Cree Population of Quebec, Canada*. *Arct Med Res*; 52:47 – 54. 1993 data from Verronneau M, Robinson E. 1993. *Prevalence of diabetes in James Bay Cree Communities*. Internal report, Cree Board of Health and Social Services of James Bay. Remaining data from the CDIS.

1.4 PREDICTIONS FOR THE FUTURE PREVALENCE OF DIABETES

As Figure 1 shows, the crude prevalence of diabetes has been increasing by about 0.5% per year. If this pattern were to continue, for individuals aged 15 and over we would expect a future crude prevalence rate of diabetes of 20% in 2015 and 25% in 2025.

1.5 PREVALENCE OF DIABETES BY COMMUNITY

Table 3 and Figure 2 show that the crude prevalence of diabetes for people aged 15 years and older in different Eeyou communities ranges from 8% to 20.1%. The inland communities of Waswanipi and Oujé-Bougoumou reported the highest prevalence rate of diabetes at 20.1% and 19.4%, respectively. The coastal community of Whapmagoostui has the lowest documented prevalence rate of diabetes. In general, Table 3 suggests that coastal communities have a lower prevalence of diabetes (11.5%) than inland communities (17%).

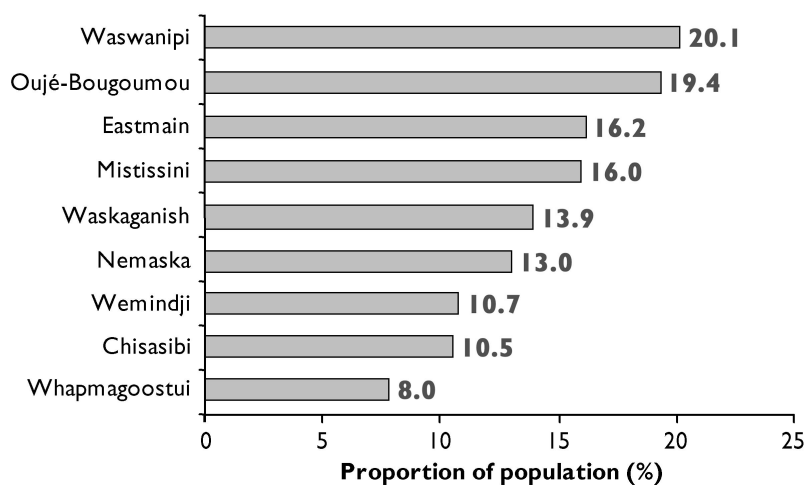
Table 3. Prevalence* of diabetes by community, Eeyou Istchee, 2004

Eeyou community	Number of people with diabetes aged 15+	Population aged 15+ (n)	Crude prevalence (%)
Waswanipi	176	876	20.1
Oujé-Bougoumou	74	381	19.4
Mistissini	310	1,942	16.0
Nemaska	54	416	13.0
Total inland	614	3615	17.0
Eastmain	65	402	16.2
Waskaganish	168	1208	13.9
Wemindji	90	840	10.7
Chisasibi	256	2439	10.5
Whapmagoostui	38	476	8.0
Total coastal	617	5365	11.5

* Rate per 100 people aged 15+

Figure 2. Prevalence of diabetes by community, Eeyou Istchee, 2004

Proportion of Eeyouch (aged 15 years and over) with diabetes, in each community*, Eeyou Istchee, 2004



* Based on the July 2004 Cree beneficiaries list

1.6 IMPAIRED FASTING GLUCOSE AND/OR IMPAIRED GLUCOSE TOLERANCE

In the Eeyou population aged 15 years and over, the documented prevalence of Impaired Fasting Glucose (IFG) and/or Impaired Glucose Tolerance (IGT) was 2.6% (Table 4). In other populations, studies have found that the number of people with IGT is double the number diagnosed with Type 2 diabetes. If this pattern is true for the population of Eeyou Istchee, then our rates for IGT/IFG grossly underestimate the true prevalence of these conditions. This could be the result of cases remaining undiagnosed because of limited use of the 75-g oral glucose tolerance test, and of diagnosed cases not being registered in the CDIS by the clinics. IGT and IFG are important pre-diabetes clinical conditions and should be treated and followed according to the Canadian Diabetes Association guidelines⁴.

⁴ Canadian Diabetes Association. *Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada* (<http://www.diabetes.ca/cpg2003>).

Table 4. Total number of patients with a diagnosis of IGT or IFG living in Eeyou communities, Eeyou Istchee, 2004

Type of diabetes	Number of patients	Prevalence (%) age 15+
Impaired Glucose Tolerance/ Impaired Fasting Glucose	231	2.6

1.7 PREVALENCE OF DIABETES BY SEX

Table 5 shows that diabetes is more common among Eeyou women (62.1%) than among Eeyou men (37.9%). This situation is different from Quebec as a whole, where there is almost no difference between the proportions of women and men diagnosed with diabetes⁵.

Table 5. Number (%) of patients diagnosed with diabetes, by sex, Eeyou Istchee, 2004

Sex	Number	Percent
Male	467	37.9
Female	765	62.1
Total	1,232	100

1.8 PREVALENCE OF DIABETES BY SEX AND AGE GROUP

Table 6 and Figure 3 demonstrate that, for both sexes, the prevalence of diabetes increases with age, ranging from 0.3% to 42%, with a slight decrease in the oldest age group. The highest prevalence rate of 42% (36.8% among males and 46.6% among females) is in the 60-69 age group. In this group almost half of all women have diabetes. A worrying trend is that Eeyou younger than age 40 now account for 26.8% of all people with diabetes.

Table 6. Prevalence of diabetes by sex and age* group, Eeyou Istchee, 2004

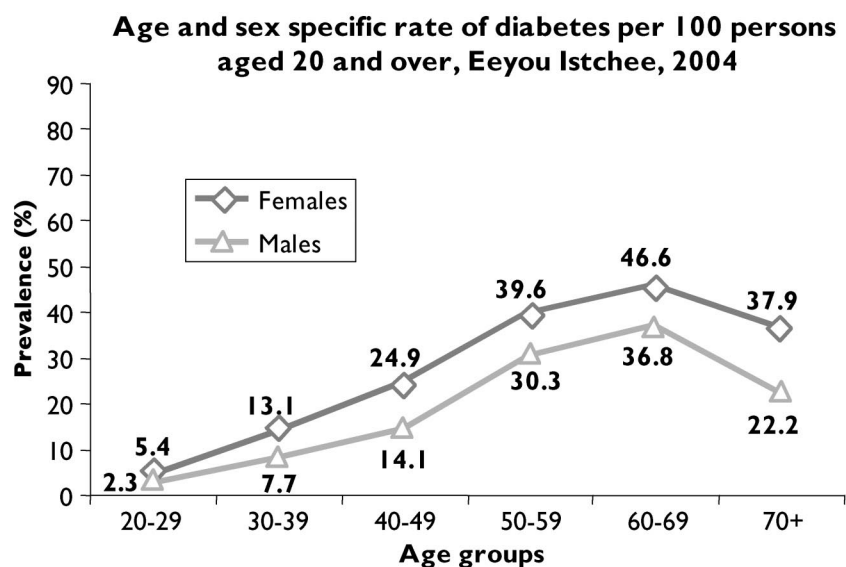
Age (yrs)	10-19		20-29		30-39		40-49		50-59		60-69		≥ 70	
Number with diabetes	8		91		231		272		290		220		120	
Sex distribution (patients with diabetes)	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	3	5	27	64	88	143	96	176	122	168	89	131	42	78
Eeyou population**	2,779		2,373		2,229		1,387		827		523		395	
Sex distribution (Eeyou population)	1,436	1,343	1,177	1,196	1,137	1,092	680	707	403	424	242	281	189	206
Prevalence of diabetes by age group (%)	0.3		3.8		10.4		19.6		35.1		42.1		30.3	
Prevalence of diabetes by sex (%)	0.2	0.4	2.3	5.4	7.7	13.1	14.1	24.9	30.3	39.6	36.8	46.6	22.2	37.9
% of total diabetic pts. (n = 1,232)	0.6		7.4		18.8		22.1		23.5		17.9		9.7	

*Age is calculated as of July 1st, 2004.

**Based on July 2004 Cree beneficiaries list.

⁵ Émond, *Ibid.*

Figure 3. Prevalence of diabetes, by age and sex, Eeyou Istchee, 2004



1.9 AGE AT WHICH DIABETES WAS DIAGNOSED

The average age at which diabetes was diagnosed was 42 years. Almost half (46 %) of patients were diagnosed with diabetes before the age of 40. These findings are significant. We know that the longer someone lives with diabetes, the higher the risk for long-term complications to the kidneys, eyes, nerves, heart and blood vessels.

1.10 DURATION SINCE DIAGNOSIS OF DIABETES

Table 7 presents the percentage of patients stratified in 5-year age groups by the number of years which they have lived with diabetes. Of all Eeyouch with diabetes, 39% have been diagnosed in the past 5 years. These numbers suggest that we can expect a significant rise in the rate of diabetes-related complications in the coming years, as there will be an increasing number of people living longer with the disease.

Table 7. Duration since diagnosis of diabetes (n = 1,230), Eeyou Istchee, 2004

Duration of diabetes (yrs)	Percent of patients
Less than 5 years	39.0
5-9 years	28.4
10-14 years	16.9
15-19 years	10.7
More than 20 years	5.0



Part 2. Clinical management

2.1 GLYCEMIC CONTROL

In 2004, 53.2% of the patients with diabetes kept their blood sugars at optimal or target levels (Table 8). This is a significant overall improvement, compared to 32% in 2002 and 29% in 2001. Nevertheless, 554 patients (46.8%) still have inadequate glycemic control.

Table 8. Glycemic control based on the last available glycated hemoglobin values (A1c) in the CDIS, Eeyou Istchee, 2004

A1c (%)	Number of patients	Percent of patients
Optimal (normal) (≤ 6.0)	268	22.6
Target (≤ 7.0)	362	30.6
Inadequate (≥ 7.1)	554	46.8
Total	1,184	100.0
Missing information	48 (3.9%)	
Total	1,232	

Table 9. Glycemic control by community, Eeyou Istchee, 2004

Community	A1c (%)	Number	Percent
Nemaska	Optimal (≤ 6.0)	16	30.2
	Target (≤ 7.0)	25	47.2
	Inadequate (≥ 7.1)	12	22.6
	Total	53	100.0
	Missing	1	
Wemindji	Optimal (≤ 6.0)	30	34.0
	Target (≤ 7.0)	29	33.0
	Inadequate (≥ 7.1)	29	33.0
	Total	88	100.0
	Missing	2	
Whapmagoostui	Optimal (≤ 6.0)	11	33.3
	Target (≤ 7.0)	11	33.3
	Inadequate (≥ 7.1)	11	33.3
	Total	33	100.0
	Missing	5	
Waskaganish	Optimal (≤ 6.0)	36	21.6
	Target (≤ 7.0)	62	37.1
	Inadequate (≥ 7.1)	69	41.3
	Total	167	100.0
	Missing	1	
Chisasibi	Optimal (≤ 6.0)	67	27.2
	Target (≤ 7.0)	73	29.7
	Inadequate (≥ 7.1)	106	43.1
	Total	246	100.0
	Missing	10	
Eastmain	Optimal (≤ 6.0)	10	15.4
	Target (≤ 7.0)	23	35.4
	Inadequate (≥ 7.1)	32	49.2
	Total	65	100.0
	Missing		
Oujé-Bougoumou	Optimal (≤ 6.0)	11	15.7
	Target (≤ 7.0)	24	34.3
	Inadequate (≥ 7.1)	35	50.0
	Total	70	100.0
	Missing	4	



Mistissini	Optimal (≤ 6.0)	54	18.6
	Target (≤ 7.0)	74	25.5
	Inadequate (≥ 7.1)	162	55.9
	Total	290	100.0
	Missing	20	
Waswanipi	Optimal (≤ 6.0)	33	19.2
	Target (≤ 7.0)	41	23.8
	Inadequate (≥ 7.1)	98	57.0
	Total	172	100.0
	Missing	5	

2.2 MANAGEMENT OF DYSLIPIDEMIA AND HYPERTENSION

Patients with diabetes are at a very high risk for cardiovascular disease. Therefore, the reduction of coronary risk factors through optimal lipid and blood pressure control should be one of the goals in the prevention of diabetes complications. The Canadian Diabetes Association guidelines⁶ recommend a LDL (bad cholesterol) level of less than 2.5 mmol/L and a blood pressure of less than or equal to 130/80 mm Hg. As Table 10 shows, in 2004, 40.2% of the patients achieved target levels of LDL-cholesterol < 2.5 mmol/L compared to 30.7% in 2002⁷. Furthermore, Table 11 suggests that the proportion of patients who achieved the target level for blood pressure (< 130 mm Hg systolic and 80 mm Hg diastolic) increased from 35.5% in 2002⁸ to 49% in 2004.

Table 10. Number and percent of the patients who achieved the target value for lipid control (LDL-cholesterol), Eeyou Istchee, 2004

LDL-Cholesterol (mmol/L)	Number	Percent
< 2.5	450	40.2
≥ 2.5	669	59.8
Total	1,119	100.0
Missing	113	
TOTAL	1,232	

Table 11. Number and percent of patients who achieved the target value for blood pressure control, Eeyou Istchee, 2004

Blood pressure (mm Hg)	Number	Percent
$\leq 130/80$	548	49.0
$> 130/80^*$	571	51.0
Total	1,119	100.0
Missing	113 (9.2%)	
TOTAL	1,232	

*Either systolic > 130 or diastolic > 80.

⁶ Canadian Diabetes Association. *Ibid.*

⁷ Kuzmina E. 2004. *Evaluation of the Diabetes Registry based on the audit of Flow sheets for type 1 and 2 diabetes mellitus.* Internal report. Chisasibi, Cree Board of Health and Social Services of James Bay.

⁸ Kuzmina. *Ibid.*

2.3 DIABETES-RELATED COMPLICATIONS

Our information about the rate of diabetes-related complications comes from the information reported on the Diabetes Flow Sheets of the CDIS. As we know that some complications are omitted from the Flow Sheets⁹, the following is likely an underestimation of the true rate of diabetes-related complications.

Of the 1,232 Eeyouch with diabetes in 2004:

- 615 (49.9%) have some amount of kidney damage (nephropathy):
 - 394 (32%) • early kidney damage (“leaky” kidneys)
 - 180 (14.6%) • moderate kidney damage
 - 26 (2.1%) • kidney failure (pre-dialysis)
 - 15 (1.2%) • on dialysis
- 144 (11.7%) have some eye damage (retinopathy):
 - 114 (9.3%) • mild retina damage
 - 29 (2.4%) • required laser therapy (advanced retinopathy)
 - 1 (0.1%) • documented to be blind
- 108 (8.8%) have some nerve damage (neuropathy):
 - 89 (7.2%) • mild nerve damage
 - 14 (1.1%) • diabetic ulcers in legs or feet
 - 5 (0.4%) • amputations
- 136 (11%) have damage to blood vessels:
 - 72 (5.8%) • heart disease
 - 38 (3.1%) • stroke
 - 16 (1.3%) • poor blood flow to the feet
 - 10 (0.8%) • documented to have sexual problems (impotence)

Table 12. Number of patients with diabetes-related complications (n = 1,232), Eeyou Istchee, 2004

Nephropathy				Retinopathy			Neuropathy			Cardio-vascular disease			Sexual dysfunction
Micro albuminuria	Macro albuminuria	Renal failure	Dialysis	Mild retinopathy	Laser	Blind	Mild neuropathy	Ulcer	Amput	CAD	CVD	PVD	Impotence
394	180	26	15	114	29	1	89	14	5	72	38	16	10

Table 13 presents the number and the proportion of patients with diabetes with one or more diabetes-related complications. More than 50% of the people diagnosed with diabetes already have one or more complications, and as pointed out above, our information on complications is likely an underestimation.

Table 13. Number and percent of patients with one or more diabetes-related complications, Eeyou Istchee, 2004

Number of complications	Number of people	Percent
0	550	44.6
1	445	36.2
2	158	12.8
3	63	5.1
4	13	1.1
5 and more	3	0.2
Total	1,232	100

⁹ Kuzmina. *Ibid.*

2.4 WEIGHT CONTROL

Table 14 shows that 32.9% of patients are obese and 48.6% are morbidly obese. Unfortunately, this information only reports on 636, or just over half (51.7%) of the patients on the CDIS for whom both the height and weight data, required to calculate BMI, were available. As weight control is an integral part of diabetes clinical management, this high rate of obesity among patients with diabetes indicates the need to further address this issue.

Table 14. Body mass index (BMI), Eeyou Istchee, 2004

BMI*	Number	Percent
Normal weight (18.5 – 24.9)	18	2.8
Overweight (25.0-29.9)	100	15.7
Obesity (30-34.9)	209	32.9
Morbid obesity (≥ 35)	309	48.6
Total	636	100
Missing data	596	
TOTAL	1,232	

*World Health Organization classification (2000).

2.5 DEATHS OF PATIENTS WITH DIABETES

The CDIS documented the deaths of 92 patients with diabetes between January 1996 and July 2004. Of these 92 deaths, 30 were due to cardiovascular (heart) causes, 11 to kidney disease, 13 to infections, 35 were not related to diabetes (mostly cancer, accidents, etc.) and 3 are unknown. Most importantly, this tells us that the deaths of 32.6% of patients with diabetes were related to cardiovascular causes.

CONCLUSION

Diabetes remains one of the most serious medical issues in Eeyou Istchee. Tight control of glycemia, blood pressure and cardiovascular risk factors are important targets for the management of diabetes and the prevention of complications. In 2004, with the help of the clinics and communities, many patients with diabetes took excellent care of their illness by learning about diabetes and how to control their blood sugar:

- 53% of patients achieved target level for glycemic control (A1c blood test).
- 40% achieved target level for blood lipids (LDL cholesterol).
- 49% have a healthy blood pressure.
- 72% of patients were screened for nephropathy (not reported here).

These improvements in diabetes care are encouraging because it is through the good management of diabetes that the long-term complications from the disease are prevented or delayed.