Conseil Cri de la santé et des services sociaux de la Baie James
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Cree Board of Health and Social Services of James Bay

Diabetes clinical management in Iiyiyiu Aschii (2006)

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Public Health Department

July 2008

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Foreword to the report on diabetes clinical management in Iiyiyiu Aschii (2006)

Since 1996, the Public Health Department has reported to the population on the extent to which diabetes is affecting individuals, age groups, genders and communities in the region. The Annual diabetes report provides a yearly snapshot of an evolving situation with this serious chronic disease. Recent reports from that Public Health Report Series are available on the website: www.creepublichealth.org.

Since 2002, the Public Health Department has been carrying out a quality assurance program by conducting periodic audits of medical charts of individuals with diabetes. To date, audits have covered the years 2002, 2005 and 2006. This allows us to report on how well diabetes is being managed within the nine community clinics where patients receive services. In contrast to the *Annual diabetes reports*, which provide information to the population, these diabetes audit reports are like report cards for health care workers and health care planners within the Cree Board of Health and Social Services of James Bay itself. That is why we refer to this as an internal report, because its purpose is to help us improve how we deliver quality care within the clinics.

Quality care for diabetes management in our clinics is the result of a series of supporting collaborations between many partners. Within our clinics in Chisasibi, Eastmain, Mistissini, Nemaska, Oujé-Bougoumou, Waskaganish, Waswanipi, Wemindji and Whapmagoostui, patients collaborate with and are supported by health care workers. In turn, the health care workers receive support from and work with systems developed by our regional team. And, our work is supported by our partners in diabetes management and research from some teaching hospitals of Montreal, a number of universities and from other government organizations. This includes our friends associated with the universities of Alberta, Laval, McGill, McMaster, Montreal, Ottawa and Western Ontario, and those working within the Institut national de santé publique du Québec, Health Canada and the Public Health Agency of Canada. We would like to take this opportunity to thank all of our partners from both inside and outside of Iiyiyiu Aschii for their invaluable collaboration. Through our partnerships we can make a difference.

Jill Torrie
Director of Specialized Services

Rationale and background information

Diabetes represents a serious health concern for many First Nations in Canada.[1] In the Cree region of eastern James Bay (Iiyiyiu Aschii), the crude prevalence rate of type 2 diabetes among Cree adults has increased from 4.1% in 1989[2] to 19.1% in 2007.[3] The 2007 age-adjusted rate of diabetes (Cree population aged 20 years and over) was 25.5% compared to 6.4% in the rest of Quebec in 2003-2004.[4] Furthermore, Cree are diagnosed with diabetes at a young age (average: 42 years old) and two thirds of all cases of diabetes (65%) were only diagnosed in the past 9 years.[3] This suggests an important increase in demands for clinical services in the near future. Diabetes-related complications represent a heavy burden for health care and seriously affect patients' quality of life.[5] Diabetic nephropathy is the most common diabetes-related complication in Cree patients diagnosed with diabetes (53.3%), followed by cardiovascular complications (12.6%).[6]

It has been demonstrated that intensive glycemic control and preventive clinical practices can reduce or slow the progression of diabetes-related complications.[7,8,9] The 2003 Canadian Diabetes Association clinical practice guidelines stress the importance of aggressive management of diabetes and screening for diabetes-related complications.[10] The results of the audits of medical charts, conducted in 2002 and 2005,[6] within the framework of the Continuous Quality Improvement program of the Regional Diabetes Initiative, suggested that some clinical practices in the local clinics can be improved, particularly foot care, neuropathy and retinopathy screening.

Due to the high prevalence rate of diabetes and diabetes-related complications, the regional public health surveillance and the quality assurance program of the Regional Diabetes Initiative share some common clinical indicators such as the proportion of patients with adequate metabolic control. The Cree Diabetes Information System (CDIS)[11] represents the principal data source on diabetes in the region. The CDIS was created in 1997 and has two goals: to improve diabetes clinical management and to provide ongoing public health diabetes surveillance.[3,12] However, as a clinical and surveillance tool, the CDIS has some limitations. First, all data in the CDIS is based on information reported on the paper Diabetes Flow Sheets in each patient's chart that are filled out by health care workers. It is possible that the reported new cases of diabetes and diabetes-related complications are an underestimation of the true rates. Furthermore, the CDIS is not able to provide information on all clinical practices on the Cree territory and care received outside of the region. In 2003, the research project merging the CDIS data with the Quebec NDSS data provided information on the use of services outside of the Region.[13] Although the laboratory results for coastal communities are now linked internally with the CDIS electronic patient files, we are waiting for a systems update before we will be able to make this link between the laboratory in Chibougamau Hospital and the CDIS electronic patient files from inland communities. Because of these limitations of the CDIS, it is important that we continue conducting regular medical chart audits to monitor and to evaluate the quality of clinical care over time, and to validate public health surveillance data on diabetes-related complications.

The purpose of this study was to assess diabetes clinical management in the nine communities of Iiyiyiu Aschii within the framework of the continuous quality improvement program of the Regional Diabetes Initiative. The 2003 CDA clinical practice guidelines were used as the gold standard for diabetes care.[10] Carried out between June and October of 2007 in the nine local health clinics, the audit involved a review of 685 medical charts of Cree patients with type 1 or type 2

diabetes. The 2006 calendar year was used as the reference year. Patients were identified through the Cree Diabetes Information System (CDIS). In communities with less than 100 patients with diabetes, the audit involved a census review of all charts. In the five larger communities (> 100 patients with diabetes), a random sample of charts was selected. The sample size varied according to patient population (N) in each community: the larger the size of the patient population, the lower its percentage represented by the sample.

We determined that this sample/census approach was the best method to allow inter-community comparisons. The audit used the CIRCLE study (**C**anadian f**IR**st nation diabetes **CL**inical management **E**pidemiological study) data collection tool (software), and was thus considered as part of the pilot phase of the CIRCLE study.

Summary of findings

Patient demographics

The patient demographics from the audited charts (Table 1) are similar to previous reports we have produced from the CDIS. In particular, the majority (60.6%) of patients are female, one quarter (26.8%) are less than age 40, and two thirds (66.2%) have had diabetes less than 10 years. Most patients (83.0%) with diabetes are obese or morbidly obese.

Table 1 Patient demographics and characteristics (n = 685)

Male gender	39.4% (270/685)
Age at audit [mean (± SD)]	50.8 (± 15.1)
10-19 years	0.7% (5/685)
20-39 years	26.1% (179/685)
40-59 years	44.4% (304/685)
60-75 years	22.8% (156/685)
> 75 years	6.0% (41/685)
Age at diagnosis [mean (± SD)]	42.0 (± 13.8)
< 40 years	46.8% (320/684)
40-49 years	24.7% (169/684)
50-59 years	17.3% (118/684)
60+ years	11.3% (77/684)
Duration of diabetes (years) [mean (± SD)]	9.1 (± 6.2)
< 5 years	29.1% (199/684)
5-10 years	37.1% (254/684)
> 10 years	33.8% (231/684)
BMI* [mean (± SD)]	35.7 (± 7.4)
Normal (< 25)	3.8% (16/419)
Overweight (25-29.9)	13.1% (55/419)
Obese (30-34.9)	32.9% (138/419)
Morbidly obese (> 35)	50.1% (210/419)
Ever smoked	29.7% (162/546)

* BMI could not be calculated for 266 patients with missing height and/or weight in their chart.

Screening practices in Iiyiyiu Aschii

Most patients had adequate screening for glycemic control and diabetic complications during 2006 (Table 2). The exceptions are the assessment and documentation of foot exams (31%) and vaccinations (flu vaccination: 32.8%, pneumococcal vaccine: 56.2%). Screening practices vary slightly in each of the nine communities.

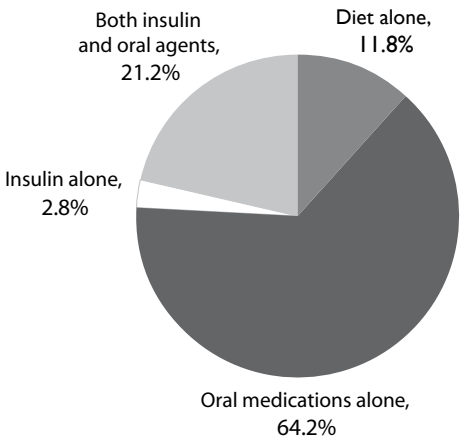
Table 2 Number (%) of patients meeting CDA guidelines for diabetes management

CDA guidelines	All nine communities*
HbA1c measured **at least once** in 2006 *(Note: the CDA recommends A1c every 3 months)*	86.1% (584/678)
Blood pressure checked **at least once** in 2006 *(Note: the CDA recommends at each DM visit)*	87.3% (592/678)
Lipid profile done **at least once** in 2006 *(Note: the CDA recommends lipid profile every 1-3 yrs for patients with well controlled diabetes)*	77.2% (517/670)
Nephropathy assessment: Spot urine Alb/Creat ratio *or* 24h urine protein **at least once** in 2006	65.4% (448/685)
Ophthalmology exam during 2006 calendar year *(Note: the CDA recommends an ophthalmology exam every 1-2 yrs for patients with well-controlled diabetes)*	40.3% (272/675)
Foot exam (documented in 2006)	31.0% (210/678)
Pneumococcal vaccine (ever)	56.2% (358/637)
Influenza vaccine (2006)	32.8% (211/644)

* When the denominator is less than the total sample size (n = 685), this indicates that information from some audited files was rejected because it was not clear in the database if the test had been done or not.

Treatment of diabetes

Figure 1 Treatment of diabetes in IA (2006)



64.2% of patients were treated with OHG agents alone,

21.2% were treated with both insulin and oral agents,

11.8% were treated with diet alone

2.8% were treated with insulin alone.

51.8% were treated with a statin,

60.6% were treated with an ACEi or ARB

69.8% were on Aspirin*.

* 2008 CDA CPG[14] no longer recommend ASA prescription for primary prevention of CVD in all patients with DM2.

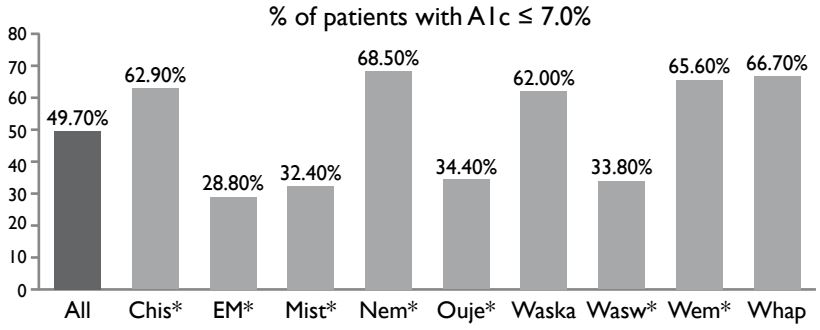
The **ABC**s of clinical practice in Iiyiyiu Aschii

Glycemic control (**A**1c) *(excludes the 104 patients who did not have an A1c test done in 2006)*

Average A1c was **7.67%**

49.7% had an A1c ≤ 7.0%, 15.0% had an A1c < 6.0%, 25.8% had an A1c > 8.5%

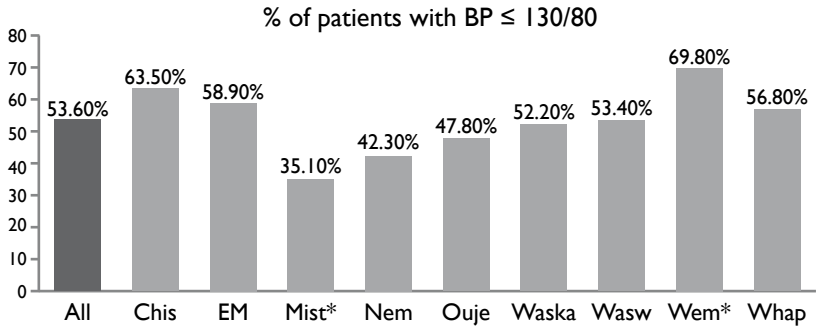
33.2% had a fasting glucose < 7.0 mmol/L



* The difference between the community and the rest of the region is statistically significant (p < 0.01)

Blood pressure control *(excludes 86 patients without documented BP in 2006)*

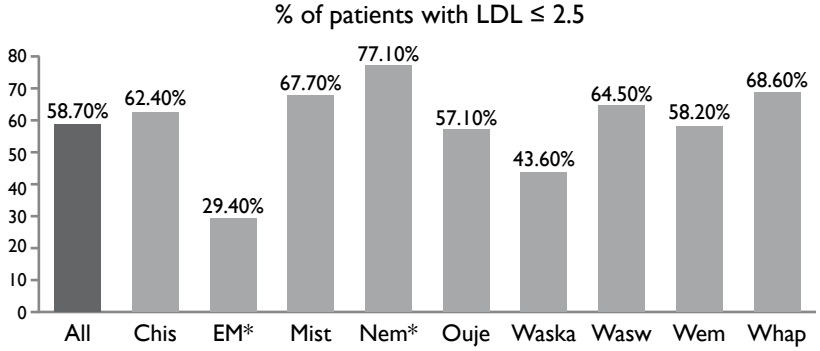
53.6% have reached target BP ≤ 130/80



* The difference between the community and the rest of the region is statistically significant (p < 0.01)

Cholesterol control *(excludes 153 patients without documented LDL in 2006)*

31.0% have LDL-**C** ≤ 2.0 mmol/L 58.7 % have LDL-**C** ≤ 2.5 mmol/L



* The difference between the community and the rest of the region is statistically significant (p < 0.01)

Percent with all three **ABC**s at target

7.8% (36/462) (based on LDL target < 2.0 mmol/L)

17.1% (79/462) (based on LDL target < 2.5 mmol/L)

Subgroup analysis of target glycemic control as a function of increasing duration of diabetes shows that patients with diabetes > 10 years have much worse glycemic control (33.0% at target A1c) versus newly diagnosed diabetes (Table 3). There was no significant difference between age groups in the percentage of patients reaching target A1c (Table 4).

Table 3 Relationships between duration of diabetes and target A1c, Iiyiyiu Aschii, 2006

	< 5 years (n = 199)	5-10 years (n = 254)	>10 years (n = 231)	p value
Target HbA1c (< 7.0%)	70.8% (119/168)	49.1% (103/210)	33.0% (67/203)	< .001

Table 4 Relationships between age and target A1c, Iiyiyiu Aschii, 2006

	< 30 years old	30-50 years old	> 50 years old	p value
Target HbA1c (< 7.0%)	46.9% (15/32)	44.5% (109/245)	54.3% (165/304)	.070

Frequency of health care visits related to diabetes

Table 5 Frequency of clinic visits in IA, 2006

	Iiyiyiu Aschii
MD	
Mean number of visits in 2006 (± SD)	3.94 (± 3.60)
No MD visits in 2006	9.4% (63/671)
5 or more MD visits in 2006	30.7% (206/671)
RN	
Mean (± SD)	8.70 (± 12.50)
No RN visits in 2006	7.2% (48/668)
5 or more RN visits in 2006	62.0% (414/668)
Nutritionist*	
One or more visits in 2006	17.5% (88/504)
CHR**	
One or more visits in 2006	5.7% (23/402)

The data for frequency of visits needs to be interpreted with caution.

Verification of the audit database showed some errors in the definition of what constituted a "diabetes visit". (For example, some visits that were not related to diabetes were included as a diabetes visit.)

Nonetheless, we have chosen to show the data, as it does give a general idea of the involvement of health care professionals in diabetes care in each community.

* Three communities are excluded from the calculations because they did not have a nutritionist in 2006.

**Four communities are excluded from the calculations because either they did not have a CHR or the CHR was not allowed to document patient encounters in the chart.

Diabetes-related complications in Iiyiyiu Aschii

Nephropathy is the most common diabetes complication. Almost half (44.1%) of the patients have some stage of diabetic nephropathy.

Table 6 Diabetes-related complications in Iiyiyiu Aschii, 2006

Complications	Definition	%
Any nephropathy	Any stage of nephropathy in chart	44.1%
Renal failure	Medical diagnosis of renal failure in chart	3.8%
Dialysis	Peritoneal or hemodialysis	0.6%
Any retinopathy	Any stage of retinopathy documented in chart	11.1%
Laser treatment	Documented retinal laser treatment in chart	1.2%
Blindness	Documented blindness in chart	0.3%
Neuropathy	Any stage of neuropathy documented in chart	6.0%
Cardiovascular disease (CVD)	Coronary artery disease, peripheral vascular disease, cerebrovascular disease	13.0%

Both increased duration of diabetes (Table 7), and poor A1c control (Table 8) were associated with increased rates of diabetic complications. While the rate of diabetic complications also increased with age (Table 9), surprisingly there were high rates of complications in the youngest age group (i.e. 4.9% CVD with age < 30) (Table 9). Lastly, improved blood pressure control was significantly associated with decreased rates of diabetic nephropathy, although this was not significant for the other diabetic complications (Table 10).

Table 7 Relationships between complications and duration of diabetes

	Duration of diabetes			p value
	< 5 years (n = 199)	5-10 years (n = 254)	>10 years (n = 231)	
Kidney complications	14.6%	42.9%	71.0%	< .001
Eye complications	2.0%	4.3%	26.4%	< .001
Neuropathy	1.5%	3.2%	13.0%	< .001
Cardiovascular disease	4.0%	12.6%	21.2%	< .001

Table 8 Relationships between complications and glycemic control target HbA1c

	HbA1c ≤ 7.0	HbA1c > 7.0	p value
Kidney complications	33.2%	56.5%	< .001
Eye complications	3.8%	18.8%	< .001
Neuropathy	3.1%	9.6%	.001
Cardiovascular disease	12.8%	13.4%	.843

Table 9 Relationships between complications and age groups, Iiyiyiu Aschii, 2006

	Age groups			p value
	< 30 years old	**30-50 years old**	**> 50 years old**	
Nephropathy	24.4%	38.1%	51.9%	< .001
Retinopathy	2.4%	9.8%	49.2%	.067
Neuropathy	12.4%	2.6%	9.5%	< .001
Cardiovascular disease	4.9%	3.3%	22.9%	< .001

Table 10 Relationships between complications and target BP, Iiyiyiu Aschii, 2006

	BP ≤ 130/80	**BP > 130/80**	**p value**
Kidney complications	38.1%	53.1%	< .001
Eye complications	9.8%	13.1%	.200
Neuropathy	7.6%	4.4%	.106
Cardiovascular disease	11.3%	16.7%	.057

Conclusions and recommendations

This internal report was done to help the clinics and management have a better understanding of the state of diabetes care in the clinics. Overall, our results suggest that many patients are receiving adequate secondary screening for diabetes-related complications with the exception of foot exams and vaccinations. The differences between the communities are shown in order to help each clinic team understand where they need to improve care for patients with diabetes in their community.

Subgroup analyses of diabetes management in Iiyiyiu Aschii showed that although 49.7% of patients had a target A1c ≤ 7.0%, this percentage decreased with the increased duration of diabetes (70.8% of patients with diabetes < 5 years had a target A1c ≤ 7.0% versus 33% of patients with diabetes > 10 years duration). This is an important issue that needs to be addressed, as diabetes is still a relatively new problem in Iiyiyiu Aschii with 66% of patients diagnosed in the past 10 years.

On the average, more than half of the patients have reached the target of one or more of the ABCs. Although only 31.0% of patients reached the target LDL of 2.0 mmol/L, 58.7% of patients did reach the older recommended target of LDL < 2.5 mmol/L. Yet, only 17.1% reached the target in all three of the ABCs (using an LDL target of 2.5 mmol/L). Efforts need to focus on improving the number of patients reaching all three of these important parameters of diabetes control. Rates of cardiovascular disease increase sharply with the duration of diabetes (4% with diabetes < 5 years vs. 21.2% with diabetes >10 years) and this highlights the importance of proper control of all ABCs to prevent cardiovascular disease. Patients receiving intensive multifactorial therapy have been shown to have a significantly lower risk of cardiovascular disease (hazard ratio, 0.47; 95 percent confidence interval, 0.24 to 0.73).[15]

In comparison with Sandy Lake Ojibwe-Cree, Ontario,[16] as well as diabetes management in Family Practice offices across Canada (the DICE study),[17] our results show that the management of diabetes in Iiyiyiu Aschii is equal to or better for many parameters. However, those two studies were done several years prior to our audit and it is possible that diabetes management in these communities has also improved over time as new recommendations for diabetes care become better known and implemented by primary care providers.

Vaccination against infectious diseases is an important component of diabetes management. This study highlights the fact that this practice could be improved in each of the nine communities. Although documentation of foot examination was low (31%), the audit procedure to identify all cases of documented foot exams may have underestimated the true proportion.

In conclusion, the health care team in Iiyiyiu Aschii should be proud of its achievements with regard to diabetes care in 2006, particularly in the context of limited resources and a very high turnover of personnel. Although approximately half of the patients have reached management targets for A1c, BP or LDL, many patients could benefit from more intensive diabetes management. As patients are living longer with diabetes, it will be increasingly important to improve all aspects of diabetes care to prevent or delay diabetes-related complications.

If you have any questions regarding this report, or if you would like a copy of a local community report, please contact:

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