Report from the Cree Diabetes Information System (CDIS)
2017 Update

Diabetes in Eeyou Istchee:
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CONSEIL CRI DE LA SANTÉ ET DES SERVICES SOCIAUX DE LA BAIE JAMES
CREE BOARD OF HEALTH AND SOCIAL SERVICES OF JAMES BAY

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Executive Summary

The number of Eeyouch/Eenouch with diabetes continues to increase at roughly the same rate as it has over the past decade and now includes 2,932 people (26.7% of adults over age 20) – more than one in four. However, the good news is that the number of new cases is remaining relatively stable, and over the past 15 years, the age at which people are being diagnosed has been gradually increasing. Women continue to outnumber men, the reverse of the pattern seen elsewhere.

Diabetes in young Eeyouch/Eenouch remains a big concern. Almost one person in five with diabetes is under the age of 40: this represents 560 people across the 9 communities (including 28 who are under age 20). Only by learning to live a healthy life with their diabetes will they prevent complications.

However, many of these younger people under age 20 are having difficulty managing their diabetes, with only about one third (39.4%)having their glucose at target levels. As of December 2017, they all have normal kidney function, although 60% of them are showing early kidney damage (with documented proteinuria). This age group requires special attention to help them learn to live a healthy life with diabetes, and prevent the progression of kidney damage.

Many Eeyouch/Eenouch have learned to manage their type 2 diabetes, while living for many years with the disease. In 2017, 526 had been living with their type 2 diabetes for more than 20 years. This number is encouraging, as it shows that an increasing number of people are living a balanced life while caring for their diabetes.

Most Eeyouch/Eenouch are coming to the clinics for their blood tests to learn how they are managing. Only 9.8% had not had a blood test to assess their diabetes control (A1C) in the past 2 years. However, over a third (35%) have very high blood glucose (A1C >8.5%). This tells us that we, as healthcare workers in the CBHSSJB, may need to change our approach to diabetes management to better understand patient needs.

Prediabetes is an opportunity to make behavior changes that can prevent or delay the development of diabetes. If we look at the Eeyouch/Eenouch who have been diagnosed with prediabetes for at least 10 years (656 cases in the CDIS), 45% of them (292) were still diabetes-free 10 years after their diagnosis. They have managed to prevent or delay developing diabetes, most likely by making small but consistent changes in the way they stay healthy.

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[1] To request a copy, please contact one of the authors listed on the inside cover.

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Abbreviations

A1C:	blood glucose level
ACR:	albumin/creatinine ratio
CBHSSJB:	Cree Board of Health and Social Services of James Bay
CDIS:	Cree Diabetes Information System
CHR:	community health representative
E/E:	Eeyouch/Eenouch
EI:	Eeyou Istchee
GDM:	gestational diabetes mellitus
GFR:	glomerular filtration rate
JBNQA:	James Bay and Northern Quebec Agreement
LDL:	low-density lipoprotein (bad cholesterol)
MSSS:	Ministère de la Santé et des Services sociaux
RAMQ:	Régie de l'assurance maladie du Québec

Introduction

In 1996, when the Board of Directors declared diabetes and mental health as the two priorities of the Cree Board of Health and Social Services of James Bay (CBHSSJB), the Public Health Department responded by setting up a diabetes information system which would not only report on the numbers of people involved with this new 'epidemic' but also help patients and health care workers manage the disease[2].

The Cree Diabetes Information System (CDIS) is a database used for the clinical management of people with type 1 or type 2 diabetes, prediabetes or a history of gestational diabetes mellitus (GDM). The primary goal of the CDIS is to serve as a clinical tool to improve patient management; the secondary goal is to provide aggregate data on the state of diabetes in Eeyou Istchee (EI).

From the early years, the CDIS established fairly accurate counts of the numbers of Eeyouch/Eenouch living with the disease and being diagnosed each year.

The addition of automated laboratory results (glucose, A1C, cholesterol and kidney function) uploaded into the CDIS, and new graphic displays allow

Mavis Verronneau (1949-2000)

patients to quickly see their trends to help them better understand their results. Clinical data (for example blood pressure, smoking, foot care, or ophthalmology follow-up) must be manually entered by the local teams, and is not currently up-to-date or considered accurate enough for population-level analysis.

New cases or changes in diagnosis can be entered by the local teams or faxed to the Montreal public health office to be entered into the data base. This can lead to a delay in registering new cases, and result in an underestimation of cases diagnosed in the most recent two-year period.

Deaths of patients with type 2 diabetes are updated annually by using the RAMQ Registration List and the JBNQA Beneficiary List to identify deceased patients whose deaths have not yet been registered in the CDIS. CHRs in the relevant community may be asked to verify and confirm correct patient identification. The CHRs also receive the full list of all patients from their community on the CDIS, so they can identify any deaths or discrepancies in demographic information[3].

The CBHSSJB has been reporting quite accurate prevalence and incidence data for twenty years. Over recent years, with each report, reporting on primary clinical indicators has become more detailed. Currently, our focus is to better understand how successful patients are at managing their diabetes with the help of the CBHSSJB.

The following report is part of an ongoing series of reports from the CDIS[4], pursuant to the Public Health Department's mandate to monitor the health of the population. It Includes CDIS data up to December 31, 2017. Unless otherwise stated, data are for adults over age 20. The target audience for this report is health care professionals who will use the results to plan and fine-tune diabetes-prevention and treatment programs. With them in mind, this report continues to put emphasis on clinical indicators to show progress in monitoring and controlling diabetes. For instance, there are many more "process" indicators to tell what

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[2] The late Mavis Verronneau, the first diabetes educator to work for the Cree Board of Health, had implemented priority procedures for establishing an accurate record of the numbers of cases as an essential first step in planning the strategy to address the growing 'epidemic'. She was posthumously awarded the *Lifescan Canada Chapter of the Year Award* (2017).

[3] In order to ensure the completeness of the CDIS, periodic matches between the CDIS, Omnitech database, and the CARE4 and Medipatient systems, are carried out to identify patients not yet entered or to complete some missing information.

[4] www.creehealth.org

proportion of people with diabetes are having regular follow-up, and which groups are not monitored as often as recommended.

The report is divided into two main sections — the first on epidemiological patterns, and the second on clinical indicators.

Data-handling and statistical procedures

- Except in the sections specifically dedicated to gestational diabetes mellitus and prediabetes, the numbers in this report refer to Eeyou/Eenou patients with valid James Bay and Northern Quebec Agreement (JBNQA) beneficiary numbers who live in Eeyou Istchee, and who had been diagnosed with type 2 diabetes before December 31, 2017.
- The data are for patients over age 20. This captures the vast majority of people in the CDIS: as of December 2017, there were only 28 Eeyouch/Eenouch aged 10-19 with type 2 diabetes in EI, compared to 2,932 over 20 years of age. The five patients diagnosed with type 1 diabetes have been excluded from the analysis.
- Population data for the Cree communities that serves as the basis for the rates of type 2 diabetes was drawn from the JBNQA Beneficiary List maintained by the Ministère de la Santé et des Services sociaux. These numbers are for July of each year: to obtain an estimate of the population as of December 31, half of the population increase over the past year was added to the current year's figures.
- Any cell in a table with fewer than 5 people has been suppressed or merged with a neighbouring cell to protect confidentiality, and these are noted with an asterisk (*).
- Although people always want to see their own community-specific numbers, the populations are too small to permit easy and/or useful comparisons; and reporting diseases linked to specific small communities has the potential to stigmatize that population. For this reason, results for individual communities have been placed in the appendix; the text focuses on all of EI and the broader Coastal-Inland comparisons.

Specific indicators

Duration is measured from the date of diagnosis, which may be later than the true date of onset.

Data presented for A1C, LDL, ACR and GFR are based on the last available result in the CDIS over the past two years. Tests carried out prior to the 2-year criteria are not included and the case is counted in the "no result available" column.

Part 1: Diabetes in Eeyou Istchee

Prevalence of diabetes in EI

Type 2 diabetes remains a challenge faced by 2,932 Eeyouch/Eenouch over age 20: more than one in four adults (26.7%) is living with this condition. (Five Eeyouch/Eenouch with type 1 diabetes and 28 under age 20 are excluded from this analysis.)

FIGURE 1:   PREVALENCE (%) OF TYPE 2 DIABETES AMONG JBNQA CREE BENEFICIARIES OVER AGE 20, EEYOU ISTCHEE, 1982 TO 2017
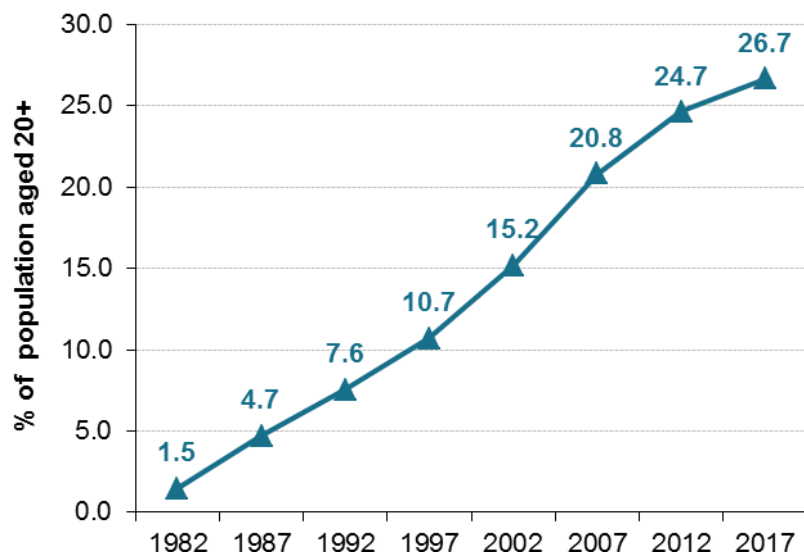
Sources: - CDIS, January 2018;
     - MSSS, JBNQA Cree beneficiary lists, December 31, 1982 to 2017 estimates.

The age and sex-adjusted prevalence of type 2 diabetes in Eeyou Istchee is 3.6 times higher compared to the rest of Quebec, where 9.5% of the adult population has been diagnosed with type 2 diabetes (March 31, 2016). When looking at sex-specific differences, the rate ratios (RRs) when compared to the rest of Quebec are 2.9 for males and 4.6 for females.

TABLE 1:   TOTAL NUMBERS, CRUDE RATES AND AGE/SEX-ADJUSTED RATES RATIOS OF TYPE 2 DIABETES AMONG JBNQA CREE BENEFICIARIES OVER AGE 20, BY SEX, EEYOU ISTCHEE (DECEMBER 31, 2017) AND THE REST OF QUEBEC (MARCH 31, 2016).

Region	Sex	Total number	Crude rate*	Rate ratio**
Eeyou Istchee	Male	1,131	21.7	2.9
	Female	5,242	30.7	4.6
	Total	2,741	26.2	3.6
Rest of Quebec	Male	337,569	10.4	
	Female	285,975	8.6	
	Total	623,544	9.5	

  *: Rates per 100 persons;

**: Rates are age and sex-adjusted using Quebec 2015 population.

New cases of type 2 diabetes

The number of new cases of type 2 diabetes each year has remained relatively stable, at approximately 2 cases per 100 adult Eeyouch/Eenouch. The incidence after 2014 cannot be accurately assessed, as it is not possible to know the numbers of new cases which remain unregistered in the CDIS.

FIGURE 2:   INCIDENCE (%) OF TYPE 2 DIABETES AMONG JBNQA CREE BENEFICIARIES OVER AGE 20, EEYOU ISTCHEE, 1998 TO 2014
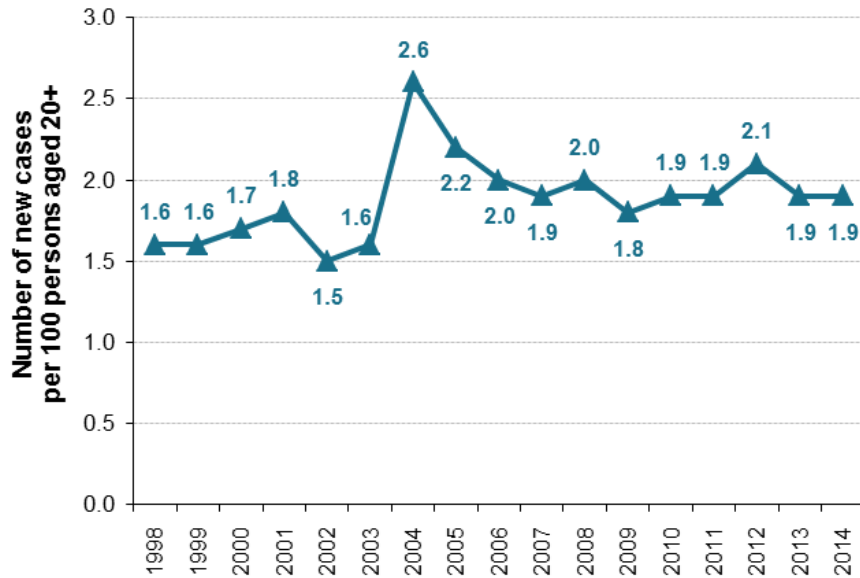
Sources: - CDIS, January 2018;
          - MSSS, JBNQA Cree beneficiary lists, December 31, 1998 to 2014 estimates.

Variations according to age and sex

In the under 40 age group, 560 Eeyouch/Eenouch are living with type 2 diabetes (19% of all cases of type 2 diabetes), including 28 youths aged 10 to 19 years. This is of great concern as this group will live with type 2 diabetes for all of their adult years and, to live a healthy life *with* type 2 diabetes, they must adapt their lifestyle and use medications properly.

Type 2 diabetes remains more common among females (58.6% of all cases). The opposite is seen in the rest of Quebec, where 54% of all people with type 2 diabetes are male.

TABLE 2: NUMBER OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY CURRENT AGE GROUP, SEX AND SUB-REGION, EEYOU ISTCHEE, DECEMBER 31, 2017

Age group (years)	Coastal			Inland			Eeyou Istchee		
	F	M	T	F	M	T	F	M	T
10 to 19[1]	*	*	13	*	*	15	20	8	28
20 to 29	33	15	48	49	32	81	82	47	129
30 to 39	113	67	180	143	80	223	256	147	403
40 to 49	232	160	392	203	155	358	435	315	750
50 to 59	205	151	356	177	148	325	382	299	681
60 to 69	167	127	294	132	109	241	299	236	535
70+	126	92	218	134	82	216	260	174	434
Total 20+	876	612	1,488	838	606	1,444	1,714	1,218	2,932
Average age	53.4	54.7	53.9	52.3	52.5	52.4	52.9	53.6	53.2

Notes: * Cells with numbers lower than 5 are masked for confidentiality purposes.
   [1] The 28 youths under age 20 are not included in the 20+ total of 2,932.
Source: CDIS, January 2018.

TABLE 3: PREVALENCE (%) OF TYPE 2 DIABETES AMONG JBNQA CREE BENEFICIARIES OVER AGE 20, BY AGE GROUP AND SEX, EEYOU ISTCHEE, DECEMBER 31, 2017

Age group (years)	F	M	T	F	M	T	F	M	T
20 to 29	3.7	1.7	2.7	7.5	5.4	6.5	5.3	3.2	4.3
30 to 39	17.7	10.1	13.8	28.3	15.1	21.5	22.4	12.3	17.2
40 to 49	33.6	23.7	28.7	40.8	33.0	37.0	36.6	27.5	32.1
50 to 59	43.5	31.0	37.1	53.4	45.9	49.7	47.6	36.9	42.2
60 to 69	67.1	43.6	54.4	71.4	55.9	63.4	68.9	48.6	58.2
70+	56.8	36.4	45.9	114.0	48.0	74.9	76.6	41.1	56.9
Total 20+	27.6	18.9	23.2	36.6	26.6	31.6	31.4	22.1	26.7

Sources: - CDIS, January 2018;
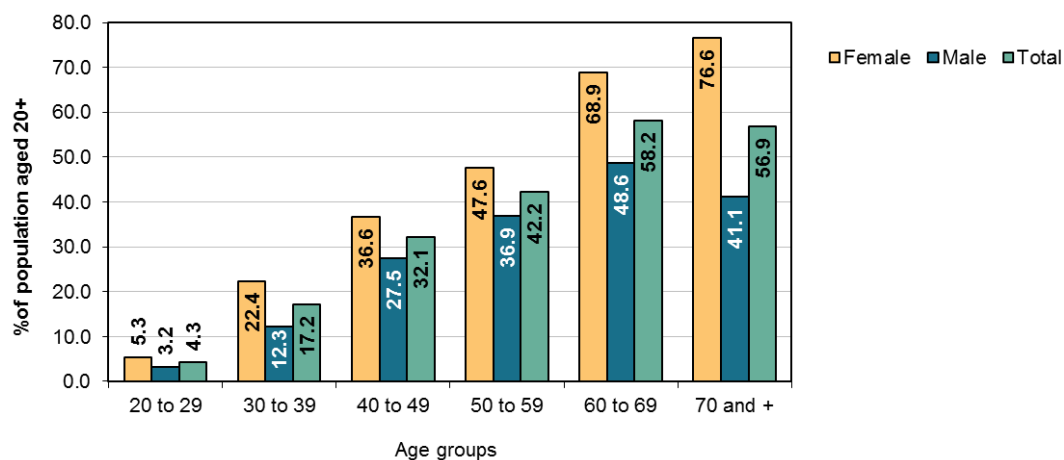   - MSSS, JBNQA Cree beneficiary lists, December 31, 2017 estimate.

FIGURE 3: PREVALENCE (%) OF TYPE 2 DIABETES AMONG JBNQA CREE BENEFICIARIES OVER AGE 20, BY AGE GROUP AND SEX, EEYOU ISTCHEE, DECEMBER 31, 2017

Sources: - CDIS, January 2018;
    - MSSS, JBNQA Cree beneficiary lists, December 31, 2017 estimate.

Age at diagnosis of type 2 diabetes

The average age at which Eeyouch/Eenouch are diagnosed with type 2 diabetes has been gradually increasing. On average, those diagnosed in the most recent period were 4 years older compared to 15 years ago.

FIGURE 4: **AVERAGE AGE AT TIME OF DIAGNOSIS FOR JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, EEYOU ISTCHEE, 1988-1992 TO 2013-2017**
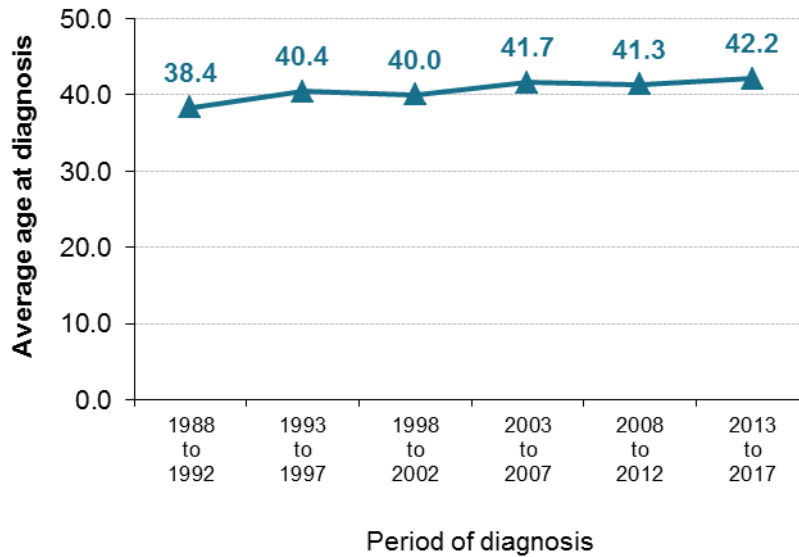
Source: CDIS, January 2018.

Duration of type 2 diabetes

Many Eeyouch/Eenouch have learned to manage their type 2 diabetes, and are living many years with the disease. In 2017, 526 have been diagnosed for over 20 years. This number is encouraging, as it shows that increasing numbers of people are succeeding in learning to live a balanced life while taking care of their type 2 diabetes.

TABLE 4: **DURATION* OF DIABETES IN JBNQA CREE BENEFICIARIES OVER AGE 20, EEYOU ISTCHEE, 2004, 2009, 2014 AND 2017**

Duration	2004		2009		2014		2017	
	n	%	n	%	n	%	n	%
0 to 4 years	578	42.3	662	33.9	671	26.5	577	19.7
5 to 9 years	390	28.5	568	29.1	659	26.0	687	23.5
10 to 14 years	200	14.6	368	18.8	549	21.7	676	23.1
15 to 19 years	125	9.1	185	9.5	345	13.6	456	15.6
20 years and +	75	5.5	170	8.7	311	12.3	526	18.0
Total	1,368	100.0	1,953	100.0	2,535	100.0	2,922	100.0
Average duration	7.8 years		9.2 years		10.9 years		12.1 years	

Note *: Duration from date of diagnosis, not date of onset which is unknown.

Source: CDIS, January 2018.

Prediabetes and Gestational Diabetes Mellitus

Eeyouch/Eenouch who have been told they have prediabetes or who have had gestational diabetes mellitus in a previous pregnancy are at increased risk of developing type 2 diabetes in the future. As not all those with prediabetes or a history of gestational diabetes mellitus are registered in the CDIS, the true total number with each condition is highly underestimated in this report. Nonetheless, for those who are registered in the CDIS, reporting on the rates of progression to type 2 diabetes, will allow those who have or have had these conditions to better understand their future risks and their ability to prevent or delay diagnosis of diabetes.

Prediabetes

Prediabetes is when a person's blood glucose is not normal, but not at a high enough level to cause the complications seen with type 2 diabetes. Their pancreas is fighting hard by producing higher levels of insulin in order to keep the blood sugar at a healthy level. At some point, if nothing is done to reverse the trend, the pancreas will be unable to keep up with the body's insulin requirements, and the blood glucose will move up into the type 2 diabetes range.

In 2017, 1,084[5] Eeyouch/Eenouch were registered in the CDIS with a diagnosis of prediabetes:

- By the end of 2017, 44% (472) of them developed type 2 diabetes, on average within 4.9 years of their initial diagnosis of prediabetes.
- Conversely, the other 56% (612) had not developed type 2 diabetes as of Dec 31, 2017. Of these, most (79%, 484) had been diagnosed with prediabetes for more than five years.
- If we look at the 656 (of 1,084) Eeyouch/Eenouch who had been diagnosed with prediabetes for **more than 10 years**, 45% of them (292) still had not developed type 2 diabetes 10 years after their diagnosis of prediabetes. On the one hand, this is good news — it tells us that 45% of people with prediabetes for more than 10 years manage to prevent or delay type 2 diabetes. On the other hand, it also suggests that 55% (364) of Eeyouch/Eenouch with prediabetes go on to type 2 diabetes within 10 years.
- To sum up: it seems that some people diagnosed with prediabetes go on to develop type 2 diabetes eventually, although 45% make important (and often just small yet consistent) lifestyle changes and remain diabetes-free 10 years or more after diagnosis.

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[5] 115 women (11% of total Eeyouch/Eenouch with prediabetes) were also diagnosed with GDM at a different date.

TABLE 5: PROGRESSION FROM PREDIABETES TO TYPE 2 DIABETES IN EEYOUCH/EENOUCH INCLUDED IN THE CDIS, AS OF DECEMBER 31, 2017

Number of persons diagnosed with prediabetes	**1,084** (100%)
Number of those who had progressed to type 2 diabetes as of Dec. 2017	**472** (44%)
Number of those who had **not** progressed to type 2 diabetes as of Dec. 2017	**612** (56%)
No progression to type 2 diabetes, but less than 5 years since the person's initial diagnosis of prediabetes	**128** (21% of all 612 with prediabetes who had not progressed to type 2 diabetes)
No progression to type 2 diabetes, even though more than 5 years since the person's initial diagnosis of prediabetes	**484** (79% of all 612 with prediabetes who had not progressed to type 2 diabetes)
No progression to type 2 diabetes, but less than 10 years since the person's initial diagnosis of prediabetes	**292** (48% of all 612 with prediabetes who had not progressed to type 2 diabetes)
No progression to type 2 diabetes, even though 10 years or more have elapsed since the person's initial diagnosis of prediabetes	**320** (52% of all 612 with prediabetes who had not progressed to type 2 diabetes)

TABLE 6: DURATION* OF PREDIABETES PRIOR TO THE ONSET OF DIABETES, JBNQA CREE BENEFICIARIES OVER AGE 20, EEYOU ISTCHEE, DECEMBER 31, 2017

Duration (years)	n	%
Less than 2	116	24.6
2 to 4	174	36.9
5 to 9	132	28.0
10 +	50	10.6
Total	472	100.0
Average time to onset	4.9 years	

Note *: Data cover the period from inception of the CDIS (1996) up to December 31 2017.

Source: CDIS, January 2018

Gestational Diabetes Mellitus

There are currently 824[6] Eeyouch/Eenouch who are registered in the CDIS with a history of gestational diabetes mellitus during a previous pregnancy.

- 29% (236) of those women eventually progressed to diabetes; the average time prior to onset of diabetes was 7.9 years[7].
- Of the 252 women who had had a history of gestational diabetes mellitus occurring more than 10 years ago, 58% (147) were still type 2 diabetes-free in December 2017.

TABLE 7: PROGRESSION FROM GDM TO DIABETES IN WOMEN WITH A HISTORY OF GDM, AS OF DECEMBER 31, 2017

Number of women registered with a history of GDM	**824** (100%)
Number who had progressed to diabetes as of Dec 2017	**236** (29%)
Number who had **not** progressed to type 2 diabetes as of Dec 2017	**588** (71%)
No progression to type 2 diabetes, but less than 10 years since the woman's initial diagnosis of GDM	**441** (75% of 588 women with GDM who had not progressed to type 2 diabetes)
No progression to type 2 diabetes, even though 10 years or more have elapsed since the woman's diagnosis of GDM	**147** (25% of 588 women with GDM who had not progressed to type 2 diabetes)

TABLE 8: TIME TO ONSET OF TYPE 2 DIABETES AMONG WOMEN PREVIOUSLY DIAGNOSED WITH GDM, JBNQA CREE BENEFICIARIES OVER AGE 20, EEYOU ISTCHEE, DECEMBER 31, 2017

Time to onset (years)	n	%
Less than 2	33	14.0
2 to 4	55	23.3
5 to 9	76	32.2
10 +	72	30.5
Total	236	100.0
Average time to onset	7.9 years	

Note *: Data cover the period from inception of the CDIS (1996) up to December 31 2017.

Source: CDIS, January 2018

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[6] 115 women (14% of total patients with GDM) were also diagnosed with Prediabetes at another date.
[7] Based on the first date of diagnosis of GDM, if more than one (multiple pregnancies).

Part 2: Clinical management of diabetes

Blood glucose (A1C)

A1C (or HbA1c or glycated hemoglobin) measures glucose control over the past 2-3 months and is a good measure of overall diabetes control. The following tables look at the most recent results available from the CDIS during the past two years (2016 and 2017).

FIGURE 5: PROPORTION (%) OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY LEVEL OF THEIR LAST A1C RESULT, SUB-REGION, SEX, AGE GROUP AND DURATION OF DIABETES, EEYOU ISTCHEE, JANUARY 1, 2016 TO DECEMBER 31, 2017

Category	Group	Target < 7.0	High 7.0 - 8.5	Very high > 8.5
Sub-region	Coastal	39.7	32.5	27.8
	Inland	28.7	28.6	42.7
	Eeyou Istchee	34.5	30.7	34.9
Sex	Female	34.7	29.5	35.8
	Male	34.2	32.3	33.5
Age group	20 to 29 years	31.9	23.3	44.8
	30 to 49 years	30.0	28.6	41.4
	50 years and +	37.8	32.7	29.5
Duration	0 to 4 years	53.5	26.2	20.3
	5 to 9 years	39.1	25.6	35.3
	10 to 14 years	29.5	31.7	38.8
	15 to 19 years	21.7	36.3	42.0
	20 years and +	20.4	37.7	41.8

Source: CDIS, January 2018

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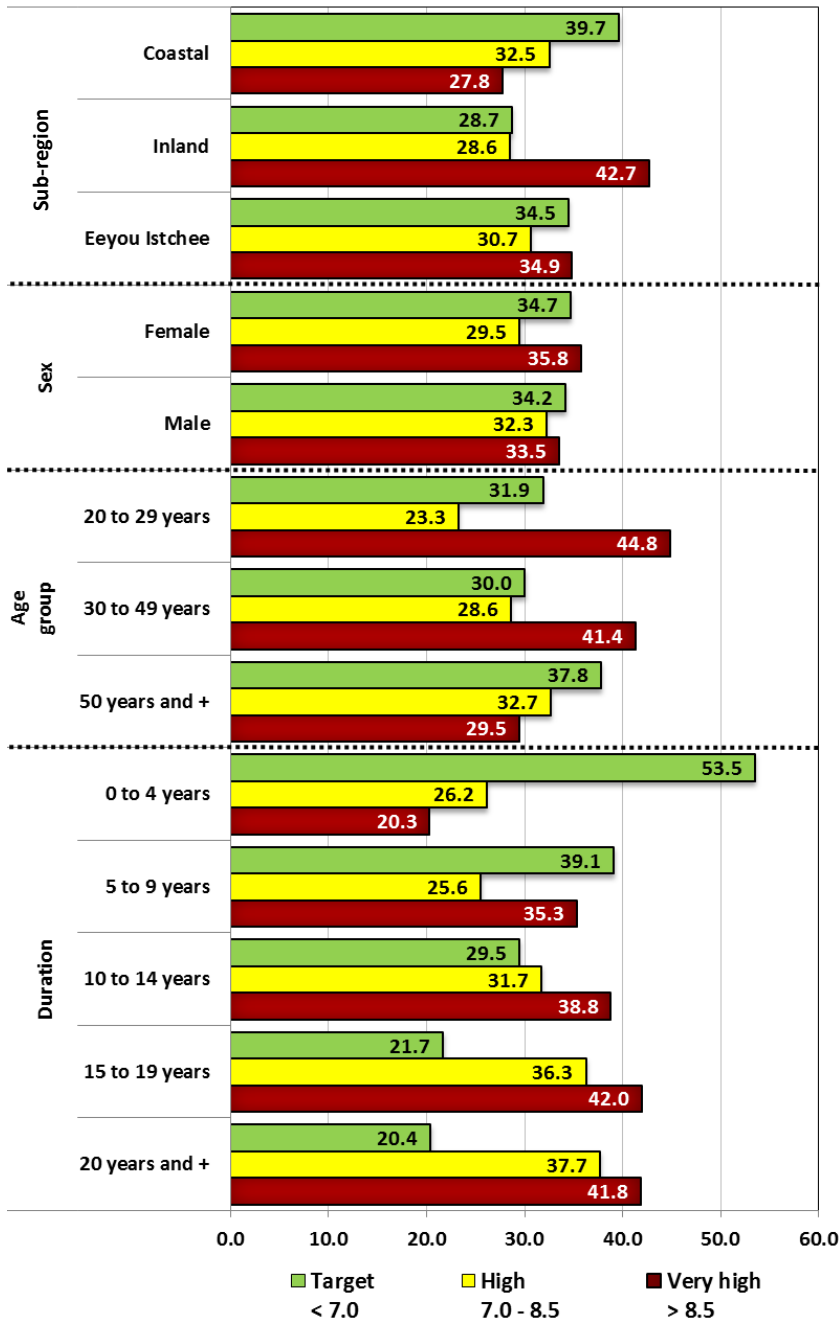
Frequency of testing:

Most people with type 2 diabetes should have their A1C tested every 3-12 months. Of the 2,925[8] Eeyouch/ Eenouch with type 2 diabetes living in Eeyou Istchee, 286 (9.8%) people with type 2 diabetes had not had an A1C done in the 2016 or 2017 calendar years. During the 2017 calendar year, 534 (18%) did not have an A1C done. These people may have been lost to clinical follow-up or moved out of the territory. Analysis of age groups and sex did not show a significant difference between younger or older, male or female Eeyouch/Eenouch with type 2 diabetes. Of the 2,391 who had had an A1C blood test in the 2017 calendar year, 1,337 had 1 or 2 blood tests, 891 had 3 or 4 blood tests, and 144 had between 5 and 8 blood tests.

A1C targets:

The ideal A1C target for people with type 2 diabetes should be individualized. For the young, a target of less than 7.0% is recommended, yet for older people or for those who have lived with type 2 diabetes for many years, it is reasonable and safer to aim for an A1C of less than 8.5%. There was no significant sex difference in the percentage of Eeyouch/Eenouch reaching their target.

The **average A1C** result was 8.1%. This has not changed over the past 10 yrs.
(2013-2014 average = 8.1, 2008-2009 average = 8.2)

Change in A1C over time:

Measuring *change in A1C over time* is more intricate, because patients have different numbers of A1C tests, and might have taken them at any point over the two-year period. To measure change, we first restricted the analysis to patients who had had at least two A1C tests in the past two years. Each patient's test results were then divided into "first half" and "second half" (if they had an uneven number of tests, the middle one was discarded), and an average calculated for each half. Change was then measured by comparing the person's first-half average to his or her second-half one.

Analysis of the change in A1C over time showed roughly the same number of Eeyouch/Eenouch improved from a high to a normal result as those who changed from a normal to a high result. Analysis of change per age group or per community did not show any clinically significant differences.

TABLE 9:   NUMBER AND PROPORTION (%) OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY CHANGE IN A1C RESULTS, EEYOU ISTCHEE, JANUARY 1, 2016 TO DECEMBER 31, 2017

A1C change from first period	n	%
Remained <7.0	638	26.5
From ≥7.0 to <7.0	205	8.5
From <7.0 to ≥7.0	257	10.7
Remained ≥7.0	1,308	54.3
Total	2,408	100.0

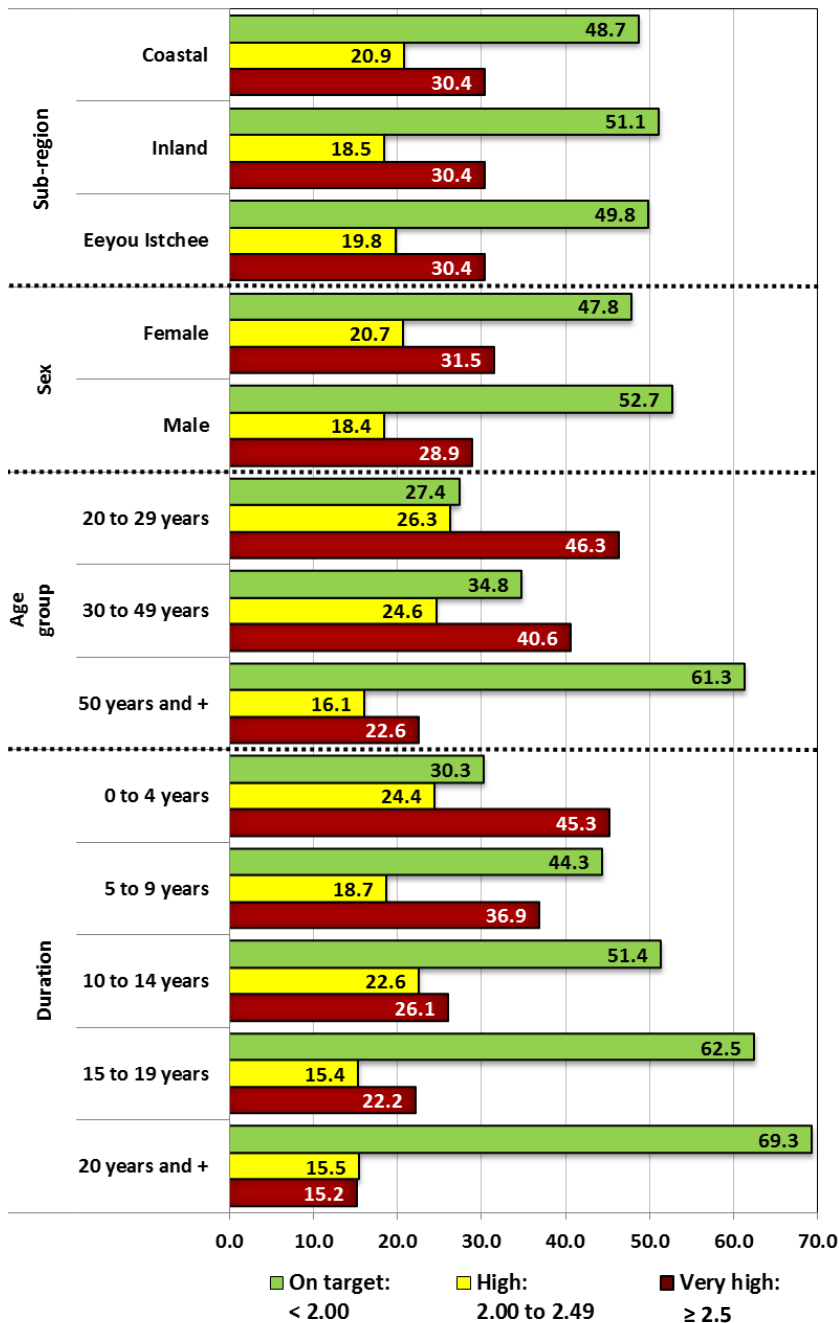Source: CDIS, January 2018

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[8] Seven persons were not retained in this section because some of their information is missing.

Cholesterol (LDL)

The risk of both heart disease and kidney damage can be reduced with healthy cholesterol levels. Overall, 83% of Eeyouch/Eenouch with type 2 diabetes had had their cholesterol checked in 2016 or 2017. The target LDL is less than 2.0 mmol/L. Half (49.8%) of those tested had their cholesterol (LDL) at target levels and the average LDL of all patients is close to target at 2.1 mmol/L. It is reassuring that close to two thirds (61.3%) of Eeyouch/ Eeyouch over age 50 and 69.3% who have lived with type 2 diabetes for over 20 years have their LDL on target.

While there was no significant difference between sub-regions or sexes related to the numbers achieving target LDL, the target level was achieved by more Eeyouch/Eenouch who were older and those having had diabetes for a longer time.

FIGURE 6: PROPORTION (%) OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY LEVEL OF THEIR LAST LDL RESULT, SUB-REGION, SEX, AGE GROUP AND DURATION OF DIABETES, EEYOU ISTCHEE, JANUARY 1, 2016 TO DECEMBER 31, 2017

Source: CDIS, January 2018

On target: < 2.00
High: 2.00 to 2.49
Very high: ≥ 2.5

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Kidney function (ACR)

Kidney damage is assessed by two types of tests which allow us to divide kidney damage into several stages. Initially, urine Albumin/Creatinine Ratios (ACRs) are tested to measure protein leaking into the urine; later blood tests are used for the Glomerular Filtration Rate (GFR) which measures the ability of the kidneys to filter the blood. Healthy living and healthy cholesterol, blood pressure and glucose levels can prevent or delay the progression of kidney damage.

FIGURE 7: PROPORTION (%) OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY LEVEL OF THEIR LAST ACR RESULT, SUB-REGION, SEX, AGE GROUP AND DURATION OF DIABETES, EEYOU ISTCHEE, JANUARY 1, 2016 TO DECEMBER 31, 2017
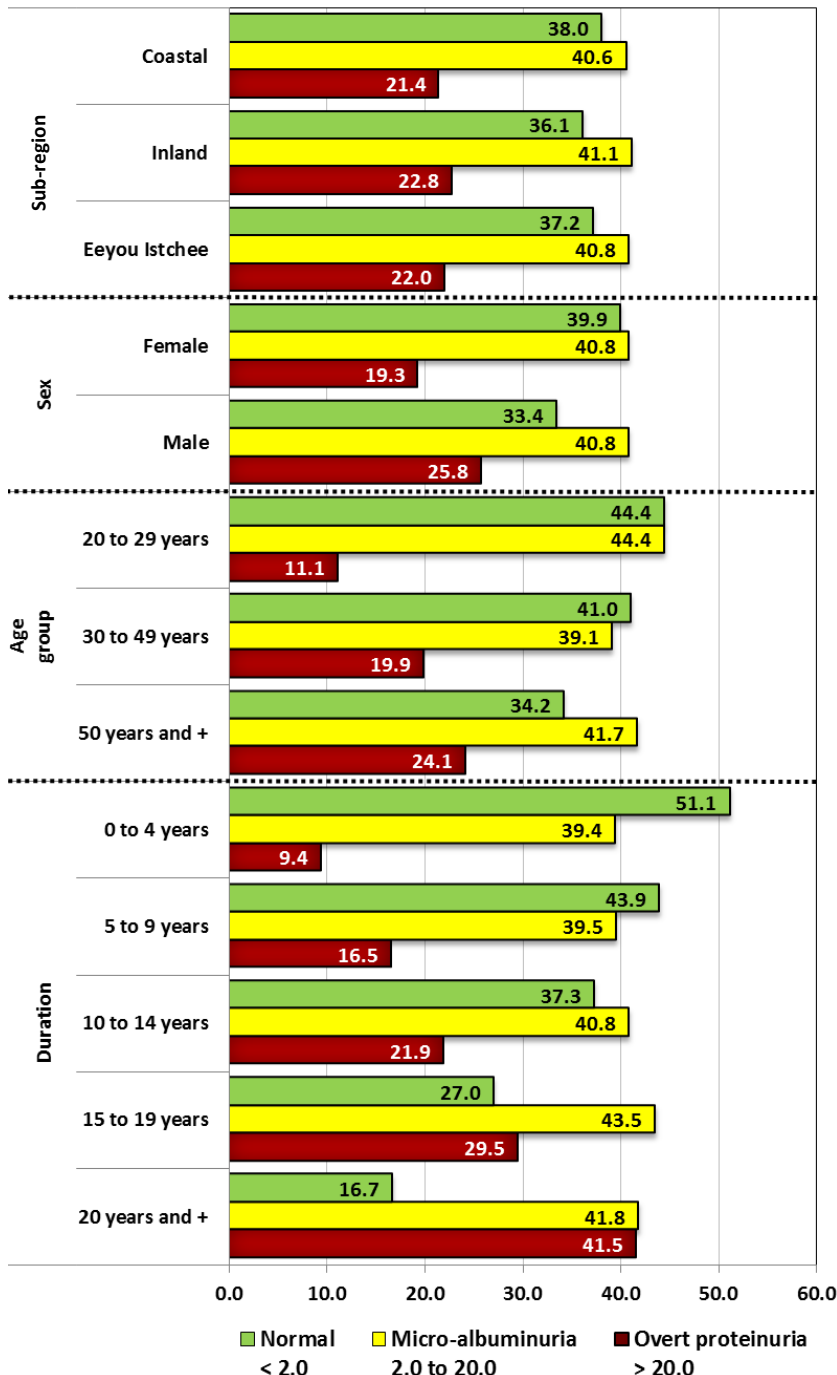

Kidney damage is first noticed when the kidneys leak protein into the urine (microalbuminuria). This stage can often be reversed. If it is not, with time, the kidneys will leak more protein (overt proteinuria) although they will continue to work well to filter the blood of toxins. As the damage advances, the kidneys will start to have difficulty filtering the blood and we will begin to see a drop in the GFR.

Approximately 15% of people with type 2 diabetes in coastal communities did not have their urine tested in either 2016 or 2017. (Unfortunately, a computer error in uploading the Chibougamau laboratory data has resulted in some missing Inland ACR data).

There was no significant difference between sub-regions related to the numbers achieving normal ACR.
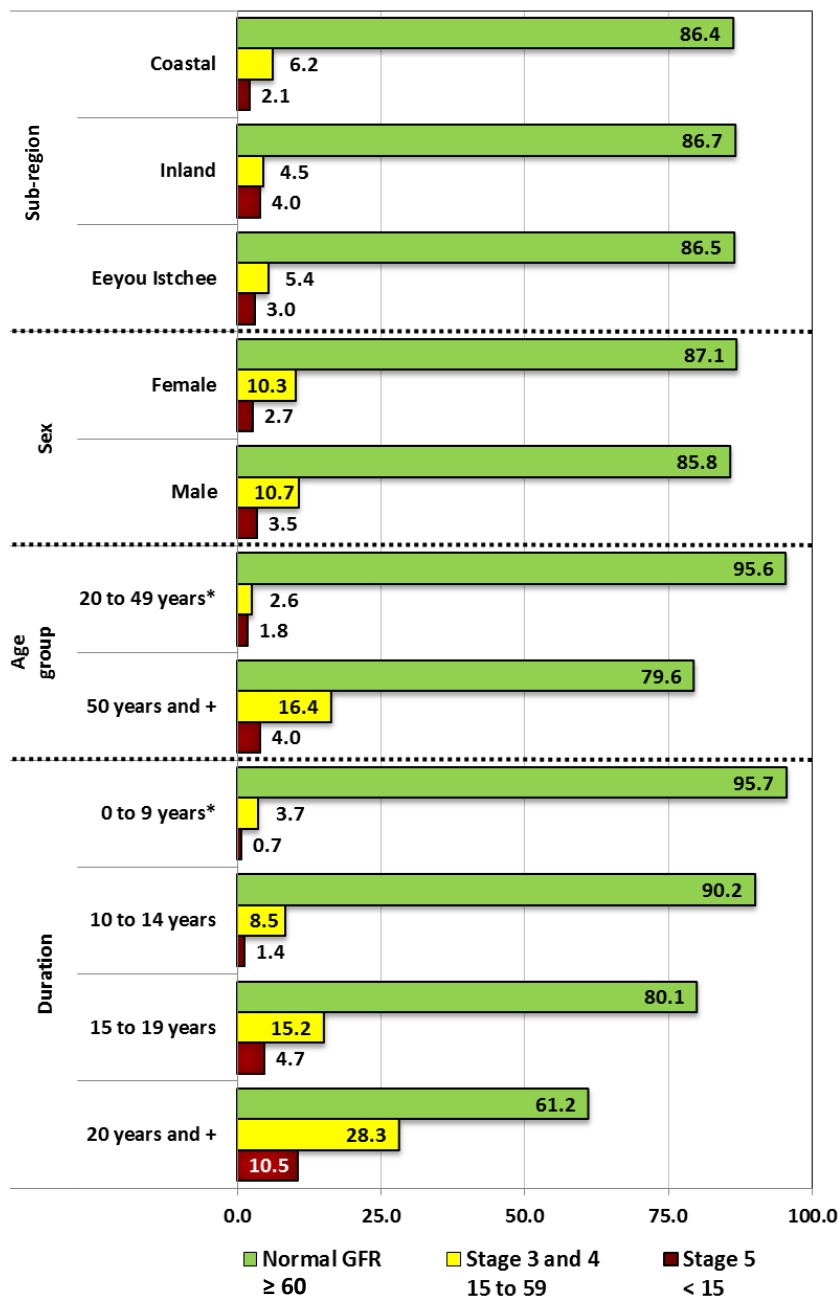
Source: CDIS, January 2018

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Kidney function (GFR)

The Glomerular Filtration Rate (GFR) measures the ability of the kidneys to filter the blood. In the past two years, 10% of Eeyouch/Eenouch have not had a blood test to check their kidney function. Of those who have been tested, 86.5% have normal kidney filtering function.

There was no significant difference between sub-regions or sexes related to the numbers maintaining a normal GFR. Two thirds (61.2%) of people living with type 2 diabetes for more than 20 years, and 80.1% of them living with type 2 diabetes for 15-19 years had normal kidney function based on their blood tests, even though they may have early kidney damage noted on their urine protein test. Almost all (97.4%) of those aged 20-29 and of those aged 30-39 (95.4%) had normal kidney function based on their blood tests.

FIGURE 8: **PROPORTION (%) OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY LEVEL OF THEIR LAST GFR RESULT, SUB-REGION, SEX, AGE GROUP AND DURATION OF DIABETES, EEYOU ISTCHEE, JANUARY 1, 2016 TO DECEMBER 31, 2017**

Note *: Some age groups and durations containing numbers lower than 5 were merged for confidentiality purposes.

Source: CDIS, January 2018

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Prognosis and screening recommendations for chronic kidney disease (CKD) vary based on both the degree of CKD as defined by the Glomerular Filtration Rate (GFR) staging **and** the Albumin/Creatinine Ratio (ACR). The following table presents the number of Eeyouch/Eenouch according to both CKD staging and albuminuria level. This will allow the CBHSSJB to better understand the current health care needs as well as anticipated needs around diabetic nephropathy in the coming years.

Note that the KDIGO[9] and Hypertension Canada recommendations use a normal albuminuria cut-off of 3.0 mg/mmol and define overt proteinuria as >30 mg/mmol. This is different from the Diabetes Canada (Canadian Diabetes Association) definitions of normal urine (ACR <2.0) and overt proteinuria (ACR >20 mg/mmol) used in the *Kidney function (ACR)* section of this document. These cut-offs are presented in the table below as they are more consistent with the research literature and well-established prognostic thresholds.

TABLE 10: NUMBER AND PROPORTION (%) OF JBNQA CREE BENEFICIARIES OVER AGE 20 WITH TYPE 2 DIABETES, BY LAST ACR AND GFR RESULTS OVER THE PERIOD, EEYOU ISTCHEE, JANUARY 1, 2016 TO DECEMBER 31, 2017

n	ACR <3.0	ACR 3.0 to 30.0	ACR >30.0	Total with ACR + GFR results
GFR 1 & 2 (≥60)	1,015	705	264	1,984
GFR 3a (45 to 59)	30	53	47	130
GFR 3b (30 to 44)	12	13	36	61
GFR 4 (15 to 29)	44*			44
GFR 5 (<15)	14*			14
Total with ACR and GFR results	1,059	779	395	2,233

% of total	ACR < 3.0	ACR 3.0 to 30.0	ACR > 30.0	Total with ACR + GFR results
GFR 1 & 2 (≥60)	45.5	31.6	11.8	88.8
GFR 3a (45 to 59)	1.3	2.4	2.1	5.8
GFR 3b (30 to 44)	0.5	0.6	1.6	2.7
GFR 4 (15 to 29)	2.0*			2.0
GFR 5 (<15)	0.6*			0.6
Total with ACR and GFR results	47.4	34.9	17.7	100.0

Note *: Some cells with a number lower than 5 were merged with an adjacent cell for confidentiality purposes.

Source: CDIS, January 2018

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[9] Kidney Disease: Improving Global Outcomes