Cree Health Survey 2003

Canadian Community Health Survey *Cycle 2.1*

Iiyiyiu Aschii

Food habits, physical activity and body weight

June 2008

Conseil Cri de la santé et des services sociaux de la Baie James
ᓂᐲᑯᔨᐦ ᑲᔪ ᐃᒋᐃᐧ ᐊᐃᓐ ᐊᓇᑲᒋᐦᑕᐧᐃᐣ
Cree Board of Health and Social Services of James Bay

Institut national de santé publique Québec

Canadian Community Health Survey, Cycle 2.1
Iiyiyiu Aschii, 2003

Food habits, physical activity and body weight

AUTHORS

Bertrand Nolin
Unité Connaissance-surveillance, direction Recherche, formation et développement
Institut national de santé publique du Québec

Carole Blanchet
Unité Connaissance-surveillance, direction Recherche, formation et développement
Institut national de santé publique du Québec

Elena Kuzmina
Specialized Services, Public Health Department
Cree Board of Health and Social Services of James Bay

EDITING AND COORDINATION

Gilles Légaré, Marie-Anne Kimpton and Mélanie Anctil
Unité Connaissance-surveillance, direction Recherche, formation et développement
Institut national de santé publique du Québec

STATISTICAL ANALYSES

Denis Hamel
Unité Connaissance-surveillance, direction Recherche, formation et développement
Institut national de santé publique du Québec

WITH THE COLLABORATION OF

Jill Torrie, Yv Bonnier-Viger, Marcellin Gangbè, Elena Kuzmina and Pierre Lejeune
Public Health Department
Cree Board of Health and Social Services of James Bay

REVIEWER

Angélo Tremblay
Division kinésiologie, Département de médecine sociale et préventive, Université Laval

TRANSLATION

Matthieu Trudeau

LAYOUT

Line Mailloux
Unité Connaissance-surveillance, direction Recherche, formation et développement
Institut national de santé publique du Québec

PUBLICATION

Cree Board of Health and Social Services of James Bay &
Institut national de santé publique du Québec

The complete text of this document is available
on the CBHSSJB's Web site at www.creepublichealth.org
and on the INSPQ's Web site at www.inspq.qc.ca

Photo: Elmer Georgekish
Design: Katya Petrov

Document deposited on Santécom (http://www.santecom.qc.ca)
Legal deposit – 2nd trimester 2008
Bibliothèque et Archives nationales du Québec
Library and Archives Canada
ISBN: 978-2-550-52900-2 (PDF)

TABLE OF CONTENTS

FOREWORD **2**

METHODOLOGY OF THE CANADIAN COMMUNITY HEALTH SURVEY (CCHS), CYCLE 2.1, IIYIYIU ASCHII, 2003 ..... **2**

INTRODUCTION **3**

1. FOOD HABITS **3**

Methodological aspects 4
Results 4
Fruit and vegetable consumption *4*
Dietary choices *5*
Food insecurity *5*
Discussion 7

2. PHYSICAL ACTIVITY **8**

Methodological aspects 8
Results 9
Leisure time physical activity *9*
Links with other factors *10*
Transportation physical activity *10*
Work (main occupation) physical activity *11*
Discussion 12

3. BODY WEIGHT **13**

Methodological aspects 13
Results 13
Current situation *13*
Weight perception *14*
Evolution from 1991 to 2003 ..... *14*
Links with other factors *14*
Discussion 15
Impact on service planning *16*

KEY ISSUES **16**

FOOD HABITS *16*
PHYSICAL ACTIVITY *16*
BODY WEIGHT *17*

REFERENCES **17**

APPENDIX **21**

FOREWORD

This publication presents the findings of a health survey carried out in 2003 among households of Iiyiyiu Aschii[1]. A similar survey had been undertaken in the region by Santé Québec in 1991 (Santé Québec, 1994). Ten years later, the Public Health Department of the Cree Board of Health and Social Services of James Bay (CBHSSJB) urgently required a new picture of its population's state of health. The purpose of the 2003 survey was to gather up-to-date information on the region's main health problems and related factors in order to improve the planning, administration, and evaluation of various social and health programs.

According to the 2001 Public Health Act (*Loi sur la santé publique*), Quebec's public health departments must periodically assess the health of their respective populations. Since 2000-2001, the province's socio-sanitary regions – with the exception of Iiyiyiu Aschii and Nunavik – have participated in the Canadian Community Health Survey (CCHS) conducted by Statistics Canada.

In 2003 the Public Health Department of Iiyiyiu Aschii decided to take part in this vast project, which was already under way across Canada, and initiated a CCHS-type survey on its own territory (Statistics Canada, 2003). Because the CBHSSJB Public Health Department is connected to the network of Quebec's Department of Health and Social Services (*Ministère de la santé et des services sociaux*, MSSS), it was able to enlist the expert assistance of the *Institut national de santé publique du Québec* (INSPQ) in coordinating the analysis of the results. Professionals drawn from Quebec's health care community and the Public Health Department of Iiyiyiu Aschii, as well as academic experts in the field, were given the task of drafting the publications. The analyses include results on various aspects of health affecting residents of Iiyiyiu Aschii and they also provide comparisons with 1991 data from the region and 2003 data from the rest of Quebec (Santé Québec, 1994; Statistics Canada, 2003). These analyses are relevant for everyone concerned with the health of Iiyiyiu Aschii residents (professionals, administrators, planners, and researchers).

Ten publications were produced as part of this survey:

- *Demographic and social characteristics of the population living in Iiyiyiu Aschii*
- *Food habits, physical activity and body weight*
- *Cigarette consumption*
- *Lifestyles related to alcohol consumption, drugs and gambling*
- *Preventive practices and changes for improving health*
- *Health status, life expectancy and limitation of activities*
- *Injuries and transportation safety*
- *Mental health*
- *Use and perceptions of health services*
- *Survey methods*

A final publication, *Survey highlights*, offers a rapid overall view of the health study's results.

Many people contributed to this study at every stage in its progress. Particularly deserving of mention are the roles played by Jill Elaine Torrie, Director of Specialized Services, and Yv Bonnier-Viger, Director of Public Health of the Cree Board, throughout the planning phase and during operations on the field. Above all, we wish to thank the Cree population for its remarkable level of collaboration.

METHODOLOGY OF THE CANADIAN COMMUNITY HEALTH SURVEY (CCHS), CYCLE 2.1, IIYIYIU ASCHII, 2003

The survey was conducted during the summer of 2003 using a representative sample of residents aged 12 and older from the nine communities in Iiyiyiu Aschii: Chisasibi, Eastmain, Mistissini, Nemaska, Oujé-Bougoumou, Waskaganish, Waswanipi, Wemindji, and Whapmagoostui.

The original 1,000-person sample was randomly selected from residents of private households in the region. The final sample thus included both Aboriginal and non-Aboriginal residents. Most interviews (85%) were conducted in person during the summer of 2003 using computer-assisted interview software. Individuals who were absent during the first data collection period were interviewed by telephone at the end of autumn 2003.

There was a high participation rate. Of the 646 households selected, 581 agreed to participate in the survey (90%). Within these households, 920 of the 1,074 eligible individuals (86%) agreed to answer the questionnaire, for a combined response rate of 78%. The survey results were then adjusted based on the number of people aged 12 and older from Iiyiyiu Aschii living in private households, excluding residents of institutions such as seniors' homes. This survey does not include

[1] Please note that the socio-sanitary region for the James Bay Cree Territory is referred to by its Cree name, Iiyiyiu Aschii, throughout this text.

children under the age of 12. All data presented in this document have been weighted to allow inferences to be made for the population as a whole.

However, it must be noted that the data are from a sample and are therefore subject to a sampling error, which must be taken into account. A coefficient of variation (CV) was used to quantify how precise the estimates were, and Statistics Canada's cut-off points were used to describe the precision of these estimates. An asterisk (*) next to an estimate indicates high sampling variability (CV between 16.6% and 33.3%). Estimates with unacceptable precision rates (CV > 33.3%) or based on fewer than ten respondents have been suppressed and replaced by the letter "U."

Statistical analyses of comparisons among the sexes, age groups and sub-regions were conducted at a threshold of $\alpha = 0.05$. Comparisons with the rest of Quebec were standardized to take into account the differences in age structure between the population of Iiyiyiu Aschii and that of the rest of Quebec, and were conducted at a threshold of $\alpha = 0.01$ (Statistics Canada, 2003).

When the questions asked were similar, the results were compared to those of a 1991 survey carried out in the region (Santé Québec, 1994). In light of differences in the samples between the two surveys, these comparisons are only made among Cree aged 15 and older and have been standardized to compensate for changes in the population's age structure. Only unadjusted rates are presented in the text in order to avoid possible confusion with the standardized rates.

More details on data processing are given in the above-mentioned *Survey methods* report.

INTRODUCTION

This publication deals with three major health determinants: food habits, physical activity and body weight. It describes the prevalent status of each of these determinants in 2003 and, unless otherwise specified, the reported findings apply to all residents 12 and over living in the Iiyiyiu Aschii region. A comparison has been made between some of these results and those of the 1991 Santé Québec Health Survey of the James Bay Cree (Santé Québec, 1994). It also describes the interaction between the three determinants and their potential link to other factors; this has led to the identification of some target groups. Finally, the findings and their implications are analyzed and some recommendations or lines of thought for possible action are provided.

1. FOOD HABITS

It is now widely admitted that a healthy diet helps maintain and improve overall health and reduces the risks of illness. Canada's Food Guide to Healthy Eating recommends eating a wide variety of foods, favouring low fat foods, grain products, fruits and vegetables. According to Ingrid Keller, from the World Health Organization, increased consumption of fruits and vegetables has become a major health issue worldwide (Keller, 2005). Canada has seen the consumption of fruits and vegetables increase by 65% and 37%, respectively, from 1966 to 2003 (Statistics Canada, 2005a). Fruits and vegetables are an important source of nutrients such as vitamin A, beta-carotene, vitamin C, folic acid, magnesium and dietary fibres. These nutrients are a prerequisite for healthy living. Eating fruits and vegetables may also help reduce the risk of suffering from chronic illness such as cardiovascular disease, diabetes, obesity and cancer. Canada's Food Guide recommends a daily intake of five to ten fruit and vegetable servings.

Dietary choices and food consumption may be influenced by various factors, including food preferences and nutritional knowledge as well as attitudes and beliefs about eating (Devine, 2005; Raine, 2005; Willows, 2005). Dietary choices may also be influenced by age, gender, health status, educational level, physical activity level, or family, social and economic factors (Payette & Shatenstein, 2005). Additionally, factors such as health status, family, place of residence and social environment may alter dietary choices as people get older (Drewnowski & Shultz, 2001; Raine, 2005).

Food availability, cost and access are other material factors of a healthy diet (Raine, 2005). In Canada, access

to adequate nutrition and food insecurity are increasingly becoming a source of concern. Indeed, food insecurity is now deemed a serious Canadian public health and social issue (Health Canada, 2002). Food insecurity has an impact on the health and well-being of affected people as well as on society as a whole. Various levels of food insecurity have been noted, ranging from anxiety to hunger. Studies conducted to this day among Canadians prone to food insecurity have identified insufficient income as the prevalent obstacle to a healthy diet (Power, 2005). According to Canadian data, the chance of experiencing food insecurity or food deficiencies is inversely proportional to income. The lack of money limits people from buying an adequate amount of nutritional foods. Furthermore, the availability of healthy foods is often limited in more isolated aboriginal communities.

METHODOLOGICAL ASPECTS

The Canadian Community Health Survey (CCHS 2.1) (Statistics Canada, 2003), conducted among residents of Iiyiyiu Aschii 12 and over, has provided an update of the fruit and vegetable consumption, a record of factors that may influence dietary choices and an estimation of the scope of food insecurity within the region. Survey participants had to answer questions on the frequency of their fruit and vegetable consumption. More precisely, the questions were asked on the consumption frequency of fruits, fruits juices, salad, potatoes, carrots or other vegetables. The survey also included three question units aimed at identifying various factors that could influence the dietary choices of Iiyiyiu Aschii residents. The first question unit dealt with the concerns of respondents about body weight, heart diseases, cancer and osteoporosis. The second unit aimed to identify factors influencing the selection of some foods, such as low-fat, fibre or calcium content. The third unit was intended to identify factors that could lead respondents to avoid some foods, such as fat content and fat type, sodium content, cholesterol level or calories. Finally, three additional questions were asked to assess some concepts linked with food insecurity, i.e. concern that there would not be enough food to eat, diet monotony and food restriction. A rating of positive answers (often and sometimes) to any of these three questions was then compiled. This rating indicates the prevalence (%) of food insecurity among residents of Iiyiyiu Aschii.

RESULTS

Fruit and vegetable consumption

According to survey findings, residents 12 and over eat fruits and vegetables on average 3.6 times per day (Table 1), compared to 5.3 times in the rest of Quebec. The consumption frequency of fruits and vegetables does not vary with gender but tends to decrease with age, reaching only 3.0 times per day for people 50 and over, compared to an average of 5.5 for that age group in the rest of Quebec. People of high educational level[2] tend to consume more fruits and vegetables (4.1 times per day) than those of lower educational level (3.5 times per day on average) (Table 1).

Table 1
Daily consumption frequency of fruit and vegetable by gender, age and educational level, population aged 12 and over, Iiyiyiu Aschii, 2003

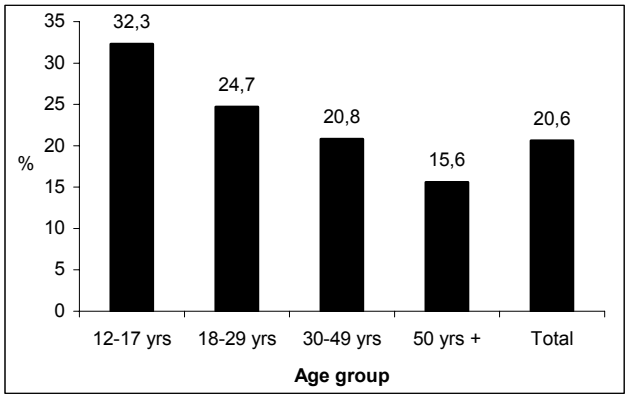
Gender, age and education	Times per day (average)
Total	3.6
Gender	
Men	3.5
Women	3.8
Age group	
12-17 years	3.9
18-29 years	4.0
30-49 years	3.7
50 years and over	3.0
Education	
Lower level	3.5
Middle level	3.5
Higher level	4.1

Source: CCHS 2.1 - Iiyiyiu Aschii, 2003.

Data collected also indicate a relatively low proportion (21%) of residents 12 and over who eat fruits and vegetables at least 5 times a day (Figure 1), compared to 51% for the rest of Quebec. Furthermore, only 16% of residents 50 and over eat fruits and vegetables at least 5 times a day, compared to 32% of youngsters 12 to 17 years of age; fruit juice is the main factor behind this consumption. Indeed, 72% of youngsters 12 to 17 have reported consuming fruit juice at least once a day compared to only 34% of people 50 and over. Overall, fruit juice and subsequently fruits are the major source of fruit and vegetable intake among residents. Then come salad, potatoes, carrots and other vegetables, at a basic consumption rate of once to twice a week (Table A1, Appendix).

[2] Education level is defined according to number of years of schooling. The "lower" educational level means less than 7 years (less than a secondary grade 1). The "middle" educational level means 7 to 11 years (completed some or all of secondary high school). The "higher" educational level means 12 years or more (at least some college or other postsecondary education).

Figure 1
Percentage of residents eating fruits and vegetables at least 5 times a day, by age (%), population aged 12 and over, Iiyiyiu Aschii, 2003



Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

Nearly 86% of coastal residents[3] do not eat fruits and vegetables a minimum of 5 times a day compared to a ratio of 67% among residents of inland areas. A greater number of inland residents eat fruits and vegetables more than 5 times a day (data not shown).

Dietary choices

The survey indicates that 60% of people 18 and over select or avoid specific foods because of health concerns (Table 2). More women than men do so and these concerns increase with age. Additionally, 62% of men 18 to 29 do not select food on the basis of health concerns. Nearly half of the residents, however, do select their food or avoid some foods on the basis of weight concerns. For example, 55% of women of all age groups are concerned with losing weight, including 65% of women 30 and over, compared to only 50% of men of that same age group. Additionally, more women than men, especially those 50 and over, tend to selector avoid specific foods because of concerns related to heart diseases, cancer and osteoporosis. More people of higher educational level tend to base their choice or avoidance of specific foods on health concerns, particularly in regards to weight loss, heart diseases and osteoporosis (data not shown). The place of residence was not associated with dietary choices made as a result of health issues (data not shown).

On the other hand, the nutritive value of foods does have an influence on dietary choices made by residents. Indeed, some 60% of adults reported selecting foods based on nutritive value (Table 2). People who did so were primarily concerned with low-fat foods, followed by fibre or calcium content. This pattern is more frequent among women than men and increases with age. Furthermore, 65% of adults reported avoiding some foods as a result of their undesirable content. This behaviour increases with age and is more frequent among women. Thus, more than half of residents 30 and over avoid some foods based on a high-fat, cholesterol, sodium or caloric content or on the type of fat.

Table 2
Contributing factors of food choices by gender (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Contributing factors	Total	Men	Women
		%	
1. Select or avoid foods based on health concerns	59.6	51.2	68.8
2. Select foods based on nutritional value	60.2	51.3	69.9
3. Avoid foods based on undesirable content	64.6	58.2	71.6

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

Generally speaking, more residents living in inland communities than in coastal areas select or avoid specific foods because of their nutritional content. Dietary choices made by residents of Iiyiyiu Aschii also vary according to educational level, as more people of higher educational level select their food for nutritional value or avoid specific foods because of their undesirable content (data not shown).

Food insecurity

It would seem that slightly more than a quarter (27%) of the adult population of Iiyiyiu Aschii experienced food insecurity in the year preceding the survey (Table 3), compared to nearly 15% of other Quebec residents during that period. Nearly 24% of adults have been concerned by a potential lack of food in the preceding year as a result of money shortages. Furthermore, 23% of people had to limit their food intake due to a lack of money, and 21% of people did not eat quality foods or were unable to vary their diet as a result of money shortages. Food insecurity does not vary according to gender or age, although the prevalence seems to decrease among older people.

[3] The region of Iiyiyiu Aschii has been divided in two sub-regions for comparison. The coastal region includes the villages of Chisasibi, Wemindji, Eastmain, Waskaganish and Whapmagoostui while the inland region includes Nemiscau, Mistissini, Oujé-Bougoumou and Waswanipi.

Table 3
Food insecurity by gender (%), population aged 18 and over, Iiyiyiu Aschii, 2003

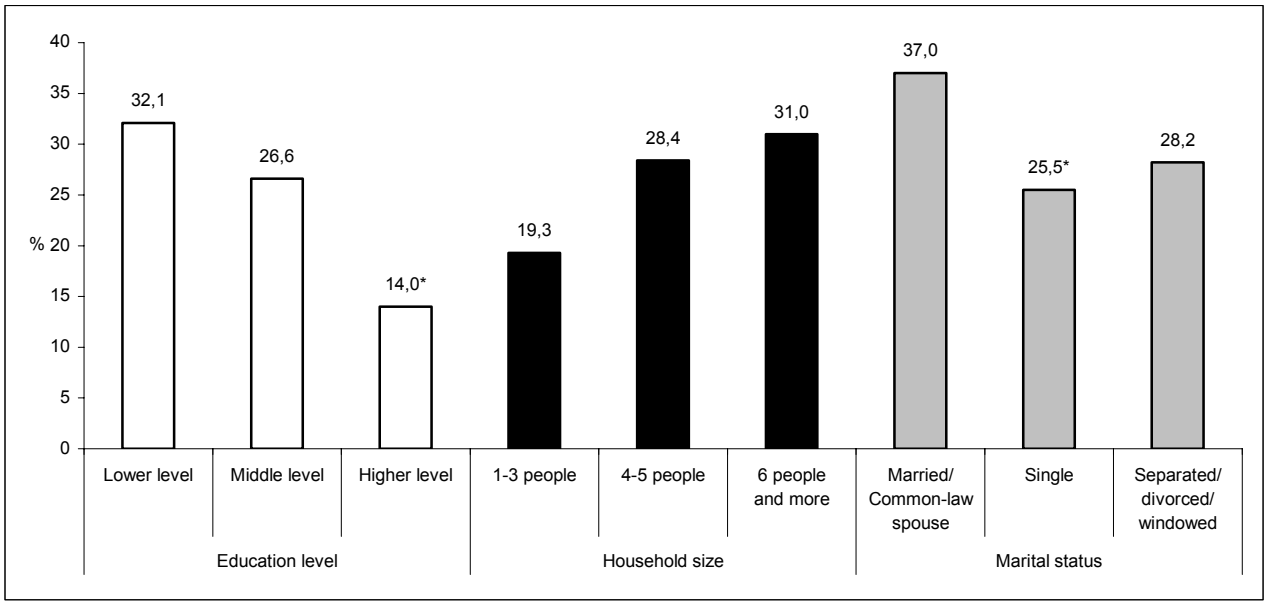
Food insecurity issues	Total	Men	Women
		%	
Fear of the lack of food			
Often	5.4*	3.9*	6.9*
Sometimes	18.5	17.1	20.1
Never	76.1	79.0	73.0
Monotonous diet			
Often	4.6*	3.2*	6.0*
Sometimes	16.0	14.1	18.0
Never	79.5	82.7	76.0
Food restriction			
Often	4.6*	3.6*	5.7*
Sometimes	18.0	14.7	21.4
Never	77.4	81.7	72.8
Food insecurity	*26.6*	*23.4*	*29.9*

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

The prevalence of food insecurity, under any of its three aspects, remains essentially the same among coastal residents (25%) as among inland residents (29%). Food insecurity is however less frequent among residents of higher educational level (14%*), that is to say those who have completed postsecondary studies, than among residents of lower educational level (32%) (Figure 2). Food insecurity is more prevalent in households of six people or more (31%) than in households of three people or less (19%). Food insecurity does not appear to be linked to marital status (Figure 2) or type of household (data not shown).

Figure 2
Food insecurity according to selected socio-demographic characteristics (%), population aged 18 and over, Iiyiyiu Aschii, 2003



* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

DISCUSSION

The survey's findings suggest that Iiyiyiu Aschii residents do not eat fruits and vegetables often enough, in spite of numerous information campaigns. Daily consumption of fruits and vegetables is a major health issue for residents since increased consumption could help reduce some prevalent regional health problems such as obesity, diabetes and cardiovascular diseases.

The impact of some socio-economic factors on fruit and vegetable consumption was also assessed through this survey. Findings indicate that the consumption rate decreases with age among both women and men. Older people are less inclined to eat fruit and vegetables on a daily basis, probably as a result of their traditional dietary habits, which initially excluded such foods. Personal taste and family preferences also affect the consumption of fruits and vegetables (Blanchet et al., 2002; Devine, Farrell & Hartman, 2005). Additionally, food consumption varies with the seasons as some foods become more or less available, particularly fruits and vegetables. Access to fruits and vegetables in northern or more isolated communities is hampered by many obstacles, such as high costs incurred by transport, poor product quality, lack of variety and scarcity (Lawn & Langner, 1994; Willows, 2005). These factors have a tremendous impact on fruit and vegetable consumption and are, to a great extent, responsible for the noted variance compared to the more southern Quebec population, which benefits from a better supply (Lawn & Langner, 1994).

The survey's findings also indicate that more young residents 12 to 17 eat fruits and vegetables at least five times a day. As mentioned earlier, fruit juices are responsible for this higher consumption. The reported consumption of fruit juices by 72% of local young people is similar to that of other young persons in Quebec of the same age group who took part in the 2003 CCHS survey. However, findings of the Quebec children and adolescent health and social survey (*Enquête sociale et de santé auprès des enfants et des adolescents québécois*, ESSEA), published in 2004 by the Institut de la statistique du Québec, indicate that only 35% of young people of that age group drank fruit juices every day (Bertrand, 2004). It is very likely that young people taking part in the 2003 CCHS overestimated their consumption of fruit juices (100% fruit juice) by also reporting fruit drinks and beverages that are extremely popular with youngsters. The 2003 CCHS and the 2004 ESSEA relied on different data collecting methods, ESSEA data having been collected solely by nutritionists who were very much aware during interviews of the high consumption rate of such drinks among young people of that age group.

The present survey also shows that a rather high percentage of adults living in the region reported selecting or avoiding specific foods because of health concerns or nutritional value. Furthermore, as noted among other populations, food choices tended to be based primarily on health concerns as residents got older (Payette & Shatenstein, 2005). According to Fernyhough et al. (1999), age is a positive predictive factor of nutrition quality, especially among women (Fernyhough et al., 1999). Incidentally, the survey indicates that a great many people are concerned with losing weight, but reasons to do so were not documented. This phenomenon is widespread among western populations. But as Willows stated in a recent article, people may resort to unhealthy eating behaviours when weight concerns or dissatisfaction with body image occur (Willows, 2005). Insight could be gained by assessing the food behaviours, perceptions and attitudes of Iiyiyiu Aschii residents.

The survey also established a link between dietary choices and educational level. People who are more knowledgeable about nutrition and health generally tend to have better eating habits. Food availability and cost throughout Iiyiyiu Aschii territory may also influence food choices made by residents, access to food being more difficult for economically distressed persons (Raine, 2005; Willows, 2005).

Finally, crucial information on the nutritional value of foods or their impact on health has been disseminated by the health sector and the media, as well as through school and prenatal nutrition programs. It would appear that this information has reached the population of Iiyiyiu Aschii, as more than half of people 12 and over select or avoid some foods for reasons of health or nutritional value. However, it must be noted that the present survey, since it does not allow drawing a parallel between factors that influence food choices and the population's health status, also does not allow the targeting of high-risk groups.

In general, one out of four local adults (27%) has experienced one form or another of food insecurity – fear of a lack of food, diet monotony or food restriction – over the year preceding the survey, compared to 15% among other Quebec residents. Data may underestimate the prevalence of food insecurity among residents as assessment of this issue was based on only three questions. Yet the survey's findings indicate a very high prevalence of food insecurity among the population of Iiyiyiu Aschii. The 1998-1999 National Population Health Survey (NPHS) stated a 27% prevalence rate of food insecurity among Aboriginal people living off reserve (Che & Chen, 2003; Statistics Canada, 2005b): 24% of respondents had an inadequate diet as a result of a lack of food or of sufficient money to purchase diverse and

quality foods. A recent study conducted by McIntyre showed an overrepresentation of Aboriginal people among Canadian households suffering from hunger (McIntyre, Connor & Warren, 2000; Willows, 2005).

Some population groups living in Iiyiyiu Aschii seem more affected by food insecurity than others, including one out of three members of large households (six persons or over). Furthermore, adults of lower educational level seem more likely to experience food insecurity. If income is the main factor behind food insecurity, isolated aboriginal communities also face limited or irregular access to healthy foods at a reasonable cost (Power, 2005; Willows, 2005). It has long been established that the cost of living is higher in northern Canada. A food basket can easily cost twice as much up north as a similar basket purchased in Montreal (Lawn, 1994; Santé Québec, 1998). Food insecurity has a negative impact on the health of those affected (Dubois et al., 2000; Dubois & Girard, 2001). It should therefore be included as a health determinant in the framework of health initiatives, in order to provide the population of Iiyiyiu Aschii easy access to a healthy food supply.

2. PHYSICAL ACTIVITY

An integral part of everyday life for a majority of people in early 20th century, physical activity had considerably declined by the beginning of the 21st as a result of the mechanization and automation of most tasks. Aboriginal populations were not spared, and physical activity associated with everyday activities, traditional or otherwise, declined considerably among these populations, especially during the second half of the 20th century (Shephard, 1994).

To maintain a sufficient level of physical activity throughout one's life is essential for good health. This concept, analyzed more systematically from the 20th century onward (U.S. Department of Health and Human Services (USDHHS), 1996; Bouchard, Shephard & Stephens, 1994) addresses many specific health problems such as cardiovascular diseases, diabetes, some types of cancer and excess weight. The preventive aspect (upstream application) of physical activity should also be noted, although it can in many cases be applied downstream (treatment).

From this point of view, assessing the physical activity level of a population becomes paramount. Ideally, this assessment should target all five categories of physical activity potentially encountered during the day (Table A2, Appendix) for an entire year. However, data collected during the 2003 CCHS does not allow such an analysis. The survey does provide a good assessment of leisure-time physical activity from May to September 2003, however, and to a lesser extent of physical activity linked to transportation (walking and cycling) over that same period. The survey also provides an overall assessment of physical activity related to work or one's main occupation. Potential links to other health determinants are also analyzed, as are the place of residence and links between the various categories of physical activity. Finally, recommendations are made regarding possible actions within that sector.

METHODOLOGICAL ASPECTS

All findings are based on interviews conducted in August and September[4] 2003 and the information review covers the three-month period preceding the actual interview (Statistics Canada, 2005c). A list of leisure time physical activities was provided and the respondent had to specify (yes or no) if he or she practiced any of them. In addition to the items on this list, the respondent could add a maximum of three others not included in it. The respondent had to specify for each activity practiced its frequency and approximate duration. The data collected are compared with recommendations issued by competent authorities (Pate et al., 1995; USDHHS, 1996; Comité scientifique de Kino-Québec, 1999; Kesaniemi et al., 2001; Cavill, Biddle & Sallis, 2001; Strong et al., 2005) and also make it possible to classify individuals according to different levels of physical activity (Nolin, 2006).

The information collected on physical activity associated with transportation (walking and cycling) is more limited and applies to a regular week. The respondent had to choose one of six approximate durations that were then distributed in four time ranges: none, less than 1 hour, from 1 hour to less than 6 hours, and 6 hours or more. Collected data is insufficient to confirm that recommendations pertaining to physical activity have been met as time ranges are too wide (i.e. 1 to 6 hours) and no information is available in regards to weekly frequency.

In regards to physical activity at work (or connected with a person's main occupation), the respondent had to choose one of four statements that most closely reflected main occupation physical requirements. The collected information is once again insufficient to confirm whether recommendations pertaining to physical activity have been met, as it relates only to the level of physical activity requirements ("intensity"), and no information is available on the frequency (days per week) and daily

[4] A few respondents (64/920: 7%) filled the questionnaire by telephone in October, November and December 2003.

duration. Furthermore, the two intermediate statements had to be grouped given the potential significant overlaps as to the amount of physical activity.

RESULTS

Leisure time physical activity

Table 4 shows that from May to September 2003, 1 out of 3 adults (33%) was physically active[5] during his or her free time. In contrast, more than 1 out of 4 adults (27%) remained sedentary while roughly 4 out of 10 respondents were situated somewhere between these two extremes (17% moderately active and 23% somewhat active). Overall, 2 out of 3 adults (67%) did not meet the recommended physical activity level (active) that might offer them substantial health benefits.

There are more active men than women (41% vs. 23%) and, conversely, fewer sedentary men than women (24% vs. 31%). The proportion of active and sedentary men is similar to that found elsewhere in Quebec[6] for the May-September period. As for women, they are less active (23% vs. 42%) and therefore more sedentary (31% vs. 21%) than their Quebec counterparts.

Table 4
Level of leisure time physical activity from May to September[a] by age group and gender (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Gender and age group	Active	Moderately active	Somewhat active	Sedentary
	%			
Total	**32.7**	**17.1**	**22.9**	**27.3**
Men	**41.4**	**15.4**	**19.7**	**23.6**
18-29 years	58.9	9.7*	18.1*	13.4*
30-49 years	29.3	19.1	20.1	31.5
50 years and over	42.5	15.4*	20.7*	21.4*
Women	**23.3**	**19.0**	**26.3**	**31.4**
18-29 years	25.5	15.0*	32.6	26.8
30-49 years	23.1	22.8	24.0	30.1
50 years and over	21.1*	15.9*	23.1*	39.9

[a] Percentages reflect a three-month practice average, from May to September.

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1 - Iiyiyiu Aschii, 2003.

[5] For some examples of activities for each level of leisure time physical activity see Table A3 in Appendix.

[6] Rest of Quebec: All of Quebec except for regions 17 (Nunavik) and 18 (Iiyiyiu Aschii).

Variances according to the age of adults (Table 4) indicate a significant decrease of the proportion of active men between the 18-29 and 30-49 age groups (59% vs. 29%). From the statistical point of view, there is no further discrepancy between the 30-49 and 50 and over age groups. Where women are concerned, there is no variance between active women of the various age groups, the proportion of active women being less than that of men, except for the 30 to 49 age group. The percentage of sedentary men follows an inverse pattern to that of active men whereas for women, they tend to get more sedentary as they get older.

Data pertaining to the 12 to 17 age group (Table 5) indicates that roughly 1 out of every 2 youngsters (48%) meets the required level of physical activity (very active) for that age group, from May to September 2003. In contrast, nearly 1 out of 3 youngsters (33% moderately, somewhat or not active) practiced *less than half* of the physical activity level recommend for young people. Just as with adults, boys are more active than girls (59% very active vs. 37%) and a smaller proportion of them do not meet half the level of physical activity recommended for their age group (24% moderately, somewhat or not active vs. 41%). There is no noticeable difference for the May to September period, in regards to both girls and boys, with other Quebec youngsters (data not shown).

Table 5
Level of leisure time physical activity from May to September[a] by gender (%), population aged 12 to 17 years, Iiyiyiu Aschii, 2003

Total	Total	Boys	Girls
	%		
Very active[b]	47.9	59.3	37.0
Active[c]	19.2*	16.4*	21.8*
Moderately, somewhat or not active	32.9	24.2*	41.3

[a] Percentages reflect a three-month practice average, from May to September.

[b] The weekly recommended level of activity (very active) for the 5 to 17 age group is twice that of the18 and over age group.

[c] The youngster meets the recommended level of physical activity for the 18 and over age group (active), or at least half (50%) the level recommended for the 5 to 17 age group.

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

The analysis of findings based on the place of residence (data not shown) indicates overall a smaller proportion of active adults living in coastal areas (27% vs. 41%). This variance is noted with women (17% vs. 33%) and although a similar trend is noted with men, the variance is

not significant from a statistical point of view. But the place of residence has no impact on the proportion of sedentary people. No significant gap is noted between youngsters of coastal and inland areas. The proportion of girls who meet the recommended level of physical activity (very active) appears to be higher in inland areas but bears no statistical significance.

Links with other factors

It appears that leisure time physical activity of adults is linked to some health determinants and other categories of daily physical activity (Table 6). As can be observed, the proportion of sedentary adults is higher among individuals of lesser educational level than among those of higher educational level (31% vs. 17%*). Furthermore, even while there is no evidence of a direct link with smoking, adults who smoke less (1 to 9 cigarettes/day) are also less sedentary than those who smoke more (10 to 19 cigarettes/day) (20%* vs. 32%). In regard to youngsters (12 to 17, data not shown), it is interesting to note that a greater proportion (56% vs. 31%) of young people who have never smoked meet the recommended level of physical activity (very active) compared with those who smoke regularly. Finally, there is a link with the daily consumption rate of fruits and vegetables. As expected, this link is of a positive nature for active people (43% vs. 30%) and negative for sedentary people (13%* vs. 31%).
Practicing leisure time physical activities is also linked to other categories of physical activity (Table 6). There is a lesser proportion of physically active people (27% vs. 40%) among those who do not use walking, or rarely (less than 1 hr/week), as a mode of transportation compared to those who walk on a regular basis (6 hr/week and more). Conversely, there is a greater proportion of sedentary people (39% vs. 20%). The association is similar to that established with work or main occupation physical activity. The proportion of active people diminishes (22% vs. 48%) when physical requirements are lower (Level 1). Conversely, there is a greater proportion of sedentary people (40% vs. 20%*).

Table 6
Level of leisure time physical activity according to three health determinants and two categories of physical activity (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Determinant and category	Active	Moderately or somewhat active	Sedentary
	%		
Education			
Lower level	30.0	38.9	31.1
Middle level	35.9	33.2	30.9
Higher level	37.6	46.1	16.5*
Smokers (No. cigarettes)			
1 to 9 / day	38.6	41.3	20.0*
10 to 19 / day	37.4	31.1	31.5
20 and more / day	35.6*	U	37.0*
Fruits and vegetables			
5 times and more / day	43.0	44.5	12.5*
4 times or less / day	30.3	38.6	31.1
Transportation (walking)			
Less than 1 hr / wk.	26.7	34.4	38.9
1 hr to 5:59 hr / wk.	33.0	48.2	18.9*
6 hr and more / wk.	40.4	39.8	19.9
Work or main occupation[a]			
Level 1	21.9	38.6	39.6
Level 2	33.8	41.5	24.7
Level 3	48.4	31.8*	19.8*

[a] Levels 1 to 3: lower to higher physical requirements.

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

U Unpublished data (CV > 33.3% or fewer than 10 respondents).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

Transportation physical activity

Walking or cycling as a mode of transportation can help one attain a significant level of physical activity. But intent is not enough and some conditions must be present to allow or facilitate such activities (reasonable distance to cover, type of infrastructure in the area concerned, climatic conditions, etc.).

Table 7 shows that slightly fewer than 8 out of 10 adults (77%) report using walking as a mode of transportation from May to September 2003, that proportion reaching roughly 9 out of 10 (90%) among teens 12 to 17. The proportions are respectively 66% and 71% in the rest of Quebec. Furthermore, roughly one third of adults (31%)

and teens (33%) report practicing such activities 6 hours and more per week, proportions once again higher than for the rest of Quebec (adults: 12%; teens: 12%). Overall, there is no significant variation between genders, be it among teens or adults.

Table 7
Walking or cycling as a mode of transportation, May to September[a], by age group (%), Iiyiyiu Aschii, 2003

Activity / Age	Weekly duration			
	None	Less than 1 hr	1 hr to 5:59	6 hr and more
	%			
Walking				
18 years and over	22.8	17.9	28.7	30.5
12-17 years	10.2*	14.7*	41.7	33.4
Cycling				
18 years and over	89.5	5.3	3.0*	2.3*
12-17 years	65.8	13.2*	12.5*	8.5*

[a] Percentages reflect a three-month practice average, from May to September.

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

As in the rest of Quebec, cycling for utilitarian purposes is far less common than walking. Results (Table 7) indicate that cycling was the mode of transportation used by approximately one out of ten adults (11%) from May to September 2003, that proportion reaching roughly one out of three (34%) among teens 12 to 17. These proportions were respectively 9% and 46% in the rest of Quebec, indicating a much wider use amongst teens.

Whatever the duration of the activity (less than 1 hour, 1 hour up to 6 hours, 6 hours and over), the use of bicycles diminishes between the 12 to 17 and the 18 and over age groups. Overall, a greater proportion of adult men use bicycles (15% vs. 6%). For teens (12 to 17), a similar proportion of boys and girls reported having used such a mode of transportation. Finally, there is no variance between coastal and inland practice of such activities (walking and cycling) as a mode of transportation.

There is a link between walking as a mode of transportation and the level of work (main occupation) physical requirements. As can be observed (Table A4, Appendix), a greater proportion (55% vs. 35%) of people of the lowest level (Level 1) of physical requirements do not or rarely use these modes of transportation (less than 1 hr/week) compared to people of the highest level (Level 3). Conversely, these modes of transportation are used 6 hours and more per week by a smaller proportion of people (13%* vs. 40%*). If relatively few adults use their bicycles for transport, a similar pattern to that of walking can be observed in the less than 1 hour category (Level 1: 99% vs. Level 2: 94%) (data not shown). As for other durations, users are too few for any conclusion to be drawn.

Work (main occupation) physical activity

As mentioned earlier in this section, the available data for this type of activity are insufficient to determine whether or not physical activity recommendations have been met. The survey only provides an overview of physical requirements associated with this aspect of daily living. As can be noted (Table 8), slightly more than 2 out of 10 adults (22%) have reported occupational activities of very low physical requirements (Level 1) for the May to September 2003 period, with no gender variance. By contrast, roughly one out of ten adults (10%) reports a physically demanding occupation (Level 3), with a significantly higher proportion of men (16% vs. 4%*). Finally, roughly 2 out of 3 adults (68%) report occupations associated with various degrees of physical requirements (Level 2), spread over the entire continuum (from low to higher).

Table 8
Work or main occupation physical requirements, from May to September 2003[a], by gender (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Gender	Physical requirements[b]		
	Level 1	Level 2	Level 3
		%	
Total	**21.8**	**68.0**	**10.2**
Men	19.3	64.6	16.1
Women	24.4	71.9	3.8*

[a] Percentages reflect a three-month practice average, from May to September.

[b] Levels 1 to 3: lower to higher physical requirements.

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

In comparison with the rest of Quebec, there is a smaller proportion of men at the lower level (Level 1) of physical requirements (19% vs. 26%). There is no difference where women are concerned. Finally, there is no difference between coastal and inland areas whatever the level of physical requirements.

DISCUSSION

The results provided shed new light on the level of physical activity of the Iiyiyiu Aschii population. However, given the limitations of the period covered (May to September) and available data on the three assessed categories of physical activity (leisure, transportation and work or main occupation), it must be noted that these results give only a partial view.

In regard to leisure time physical activity, for which there are quite detailed data, it would appear that the level of physical activity of adult males is similar to that of those of the rest of Quebec for the period covered. But the level of physical activity of local women is much lower than that of their Quebec counterparts. Results for teens 12 to 17 (boys and girls) are comparable to those for the rest of Quebec. Substantial efforts should thus be made to promote leisure time physical activity *yearlong,* as this category presents the greatest potential for increased physical activity. Furthermore, particular attention should be given to coastal communities where such physical activity is less popular, especially among young and adult women.

As will be observed in the next section (body weight), such initiatives become paramount when dealing with the local problem of obesity. Additionally, as no increased level of leisure time or transportation physical activity compensates for the lack of daily physical activities (Table 6, and Table A4 in Appendix), vigorous efforts must be made to promote leisure time physical activity, since this practice is relatively new within the local population.

Transportation physical activity (walking and cycling) seems to be more widespread in Iiyiyiu Aschii than in the rest of Quebec. This however can only be confirmed for walking and only from *May to September*. Bicycle use among adults is similar to that of the rest of Quebec. Cycling is however less widespread among teenagers living in Iiyiyiu Aschii.

One's travelling habits can be modified; however, the potential for improvement is not as high as that of leisure time physical activity. Infrastructure types (i.e.: pedestrian and cycling routes), distances to be covered, security and climatic conditions are some of the major constraints that can have a tremendous impact on whether or not these modes of transportation are used. However, for those who cannot (or will not) practice such leisure time physical activities, this category remains a valid option to acquire a more physically active lifestyle. If the potential for improvement is more limited than in larger cities, health promotion programs must consider this option by adapting it to the local conditions of each and every local environment.

Finally, the survey provides some generic data on the physical requirements of one's work or main occupation. As noted, mechanization and automation of daily activities (traditional or otherwise) has not spared the local population. For the vast majority of residents of Iiyiyiu Aschii, physical requirements associated with these activities have become essentially similar to those in the rest of Quebec, even though as lightly smaller proportion of men report having an occupation with little or no physical requirements. Indeed, the task determines the nature of the physical activity as well as its daily extent. Thus, if some measures can be “considered”, they are mostly applicable on a case-by-case basis and can hardly be integrated into a health promotion program. Furthermore, economic considerations associated with the efficiency of the task ahead greatly limit the action potential in this regard. This only reinforces, as previously noted, the importance of taking vigorous action in regard to the two other categories of physical activity, active leisure and transportation.

3. BODY WEIGHT

The relationship between obesity and some health problems has been clearly established. Several studies have identified a link between obesity and type 2 diabetes, hypertension, dyslipidemia, cardiovascular diseases, gallbladder diseases, sleep apnea and some types of cancer (Jung, 1997). Obese children and teenagers are not only more susceptible to developing health problems (Lobstein, Baur & Uauy, 2004) but are also at higher risk of suffering from obesity in their adult years (Must & Strauss, 1999).

Being overweight is now a worldwide health issue (World Health Organization, 2000). In Canada, in recent decades, obesity has gained significant ground among adults (Katzmarzyk, 2002) as well as children and teenagers (Willms, Tremblay & Katzmarzyk, 2003). There is a greater proportion of overweight people among the First Nations than in other Canadian populations (Hanley et al., 2000). The Cree population is no exception. Many surveys have indicated since the early 1980's an alarming rate of obesity among all age groups of this population (Lavallée, 1990; Santé Québec, 1994; Bernard et al., 1995).

This section will show that the problem is far from resolved. We will analyze its evolution between 1991 and 2003 and study its potential link to other factors such as education, diet, physical activity and food insecurity. We will also learn how people relate to their body weight. In conclusion, some approaches to this situation will be suggested.

METHODOLOGICAL ASPECTS

Participants (pregnant women excluded) had to declare their weight and their height in face-to-face interviews. The body mass index (BMI) was used to determine the potential health risk associated with bodyweight. The BMI is measured by dividing the weight (in kilograms) by the squared height (in meters).

For adults, BMI categories were established according to the system recommended by the World Health Organization (Health Canada, 2003) (Table A5, Appendix). For teenagers 12 to 17, the BMI was rated according to the Cole et al. system (2000), using BMI threshold values to establish overweight and obesity among children and teenagers. These age and gender specific values are mathematically equivalent to threshold values for adult overweight and obesity (BMI of 25 kg/m^2 and 30 kg/m^2, respectively). In the text, the word "overweight" is used to identify the intermediate class between normal weight and obesity. The term "excess weight" refers to the combined percentage of overweight and obese individuals.

As a health risk indicator, the BMI must be used with caution for growing youth, naturally slim adults, those with a very muscular build and persons 65 and over (Health Canada, 2003). Furthermore, according to the literature, self-reported weight and height used to calculate the BMI usually underestimate the real excess weight of both adults and children (Roberts, 1995; Strauss, 1999). This trend of underestimating excess weight among the Cree population, particularly among women, was observed in the 1991 Santé Quebec Health Survey of the James Bay Cree (Santé Québec, 1994). It must also be noted that some studies have questioned the threshold values used in the current BMI rating for non-Caucasian populations (Lear et al., 2003). Finally, the Cole et al. (2000) body weight classification system used in this survey for teenagers 12 to 17 is not universally recognized. The validity of this new system, especially during puberty, has been discussed in some studies (Kinra, Nelder & Lewendon, 2000).

RESULTS

Current situation

According to the results of the 2003 survey, more than half (51%) of the Iiyiyiu Aschii population aged 18 and over suffers from obesity (BMI ≥ 30) and approximately one third (33%) from overweight (BMI from 25 to 29.9) (Table 9). The prevalence of obesity is not the same among adult men and women. Women are more prone than men to be obese (57% vs. 47%) and more of them fall under obesity Class III (12% vs. 3%).

Table 9
Body weight categories by gender (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Body weight categories[a]	Total	Men	Women
		%	
Underweight	U	U	U
Normal	15.5	16.2	14.7
Overweight	32.8	36.7	27.7
Obesity (Class I to III)	51.2	46.6	57.2
Class I obesity	31.1	31.3	30.8
Class II obesity	13.2	12.2	14.6
Class III obesity	6.9	3.1	11.8

[a] See Appendix (Table A5), BMI values for each weight category.

U Unpublished data (CV > 33.3% or fewer than 10 respondents).

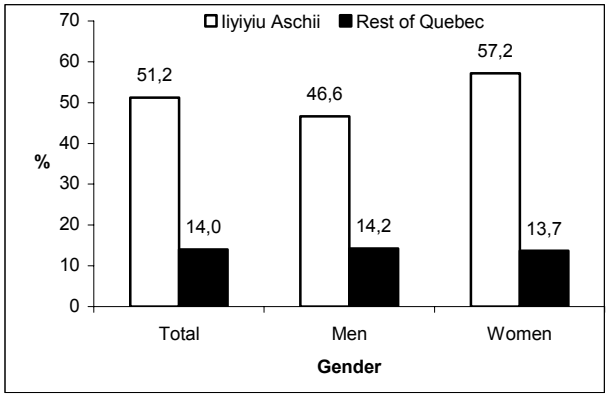
Source: CCHS 2.1- Iiyiyiu Aschii, 2003.

Overall, there is no difference between age groups as to the prevalence of obesity. There is however a greater proportion of obese women than of men in the 18 to 29 age group (Figure A1, Appendix). Nearly half (48%) of teenagers 12 to 17 (data not shown) reported an excess of weight (28% overweight and 20% obese). There is no difference between coastal and inland villages, in any age group, as to the proportion of people who are overweight or obese (data not shown).

Compared to the rest of Quebec, there is a much greater proportion of obese people in Iiyiyiu Aschii, both among adult men (47% vs. 14%) and women (57% vs. 14%) (Figure 3). There are more obese women than men in the Iiyiyiu Aschii region (57% vs. 47%) whereas in the rest of Quebec, the ratio is similar for both genders (14% and 14%).

Obesity is also more prevalent among local teenagers 12 to 17 than among other Quebec teenagers (20%* vs. 4%) (Table A6, Appendix). On the other hand, in both cases, no difference was observed between genders. Furthermore, there is a greater proportion of overweight young people from Iiyiyiu Aschii than is found among other Quebec residents of the same age group (28% vs. 15%), both genders compounded.

Figure 3
Prevalence of obesity by gender (%), population aged 18 and over, Iiyiyiu Aschii and the rest of Quebec, 2003



Source: CCHS 2.1 – Iiyiyiu Aschii and the rest of Quebec, 2003.

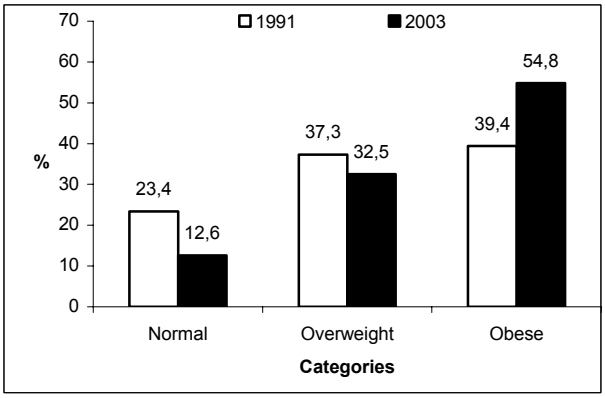
Weight perception

One of the questions included in the 2003 CCHS dealt with weight perception: *"Do you consider yourself overweight, underweight or just about right?"* Based on survey findings, more than half (58%) of residents aged 18 and over consider themselves overweight. Proportionally, there are more women than men who perceive themselves as overweight (71% vs. 47%). Nearly one third (28%) of local teenagers 12 to 17 believe that they are overweight.

Evolution from 1991 to 2003

According to the Santé Québec health survey, conducted among the Cree population of Iiyiyiu Aschii, in 1991, nearly four out of ten adults (39%) were obese. That proportion was approximately 55% in 2003 (Figure 4). The increase is especially notable for young adults 18 to 24, among whom the obesity rate rose from almost three out of ten (28%) in 1991 to over four out of ten (45%) in 2003 (Table A7, Appendix).

Figure 4
Evolution of body weight categories (%), Cree population only, aged 18 and over, Iiyiyiu Aschii, 1991 and 2003



Sources: CCHS 2.1 – Iiyiyiu Aschii, 2003 and Santé Québec survey – Iiyiyiu Aschii, 1991.

The situation for the 15 to 19 age group is even more alarming. The obesity rate has more than doubled within that age group since 1991, increasing from 14% to 33% (Figure A2, Appendix). However, in comparing the findings of these two surveys, one must take into account the different methods used to collect data: self-administered questionnaires for the 1991 Santé Québec health survey versus face-to-face interviews in 2003. Furthermore, the partial non-response rate of the 1991 survey (35%) was higher than that for the 2003 CCHS (9.4%). Therefore, noted differences could to some extent be attributed to these factors.

Links with other factors

Our findings indicate a lower prevalence of obesity (44% vs. 54%) among adults having attained a higher educational level than among those with a lower educational level. Conversely, there is a greater proportion of individuals of normal weight among adults of higher educational level (22% vs. 13%).

Adults who report selecting or avoiding some foods because of weight concerns are more likely to be obese (55% vs. 47%) than those giving a negative answer to that question. However, dietary choices based on food content do not vary according to weight categories. Although the variance is not statistically significant, there seems to be a greater proportion of adults of normal weight among those who consume at least five portions of fruits and vegetables per day. Excess weight in the 12 to 17 age group does not vary according to eating habits (data not shown).

Three questions pertaining to the fear of the lack of food, diet monotony and food restriction were asked in order to assess the proportion of adults suffering from food insecurity. Results indicate a greater proportion (92% vs. 82%) of people carrying excess weight (overweight or obese) among adults who have experienced food insecurity (or at least one of its three components) than among those who have not. Results may however have been affected by the high partial non-response rate (14%) among adults with this problem.

Residents 18 and over who are sedentary in their free time are more likely to be obese (61% vs. 39%) than those who are physically active (Table A8, Appendix). Conversely, there is a greater proportion of adults of normal weight among active than among sedentary individuals (24% vs. 9%). For adults, weight does not vary according to the time spent walking (as a means of travel) but there is a greater proportion of normal weight or underweight people among teenagers 12 to 17 who do not walk as much for travelling (71% reporting less than 1 hour vs. 49% reporting 6 hours or more), which is contrary to what may be expected. Overestimation of the weekly walking time and the lack of data for the October to April period may to some extent explain these results.

Obesity is more prevalent (71% vs. 25%) among adult residents who feel that they are overweight than among those who see themselves as too thin or fairly normal. Things are quite different in the "overweight" range where there is a greater proportion (44% vs. 26%) of people who deem themselves too thin or fairly normal than people who perceive themselves as overweight. There is no difference between men and women in weight perception based on the categories of BMI.

DISCUSSION

According to survey findings, around half (51%) of adults 18 and over and approximately 20% of teenagers 12 to 17 living in Iiyiyiu Aschii are obese. The combined prevalence of overweight and obesity is even more dramatic, since a great majority of adults (84%) and around half of teenagers (48%) are affected by this problem. Furthermore, more than 20% of adults fall under Class II obesity (BMI 35 to 39.9) and Class III obesity (BMI ≥ 40), and are therefore at very high or extremely high risk of developing health problems.

Overall, more than 8 out of 10 adults (84%) carry excess weight (overweight or obese) yet only 6 out of 10 (58%) consider themselves affected. Nearly 3 out of 10 (28%) teenagers (12 to 17) share that view although approximately 5 out of 10 (48%) are actually overweight. More women than men (71% vs. 47%) consider themselves overweight.

Few studies have investigated the link between weight perception and actual weight among the Cree people. A study conducted in 1992 by Bernard et al. (1995) noted an association between body weight perception and actual obesity among Cree children and teenagers aged 9 to 19. In this study, most of the obese participants deemed themselves "slightly obese" whereas the majority of non obese participants qualified themselves as "fairly normal".

The analysis of weight perception according to BMI rating among residents aged 18 and over indicates a fairly adequate weight perception in the "obese" category. In particularly, the proportion of people who deem themselves overweight is greater than that of people who consider themselves too thin or fairly normal. There is however a greater proportion of overweight people (BMI: 25 to 29.9) who deem themselves "too thin or fairly normal" than actually overweight. This finding should be further investigated, as a false perception of the actual weight among population sub-groups could have serious implications for education and health promotion programs.

That same study (Bernard et al., 1995) shows that girls have a more accurate perception of actual obesity than boys do. An American study also noted that women had a more accurate perception of being overweight (reported weight, BMI 25.0 - 29.9 kg/m$_2$) than men (Paeratakul et al., 2002). There is however no observed difference between women and men in the 2003 survey.

In the scientific literature there are reports of weight perception varying according to ethnic origin (Adams, Quinn & Prince, 2005). A recent study conducted by Vallianatos et al. (2006), showed that weight perception and the perceived health risk of being overweight within the Cree population might differ from official recommendations. For example, Cree women's perception of the appropriate weight during pregnancy exceeds medical standards. But Cree women were very

aware of the importance of losing weight after giving birth. More in-depth studies are thus necessary to understand the cultural popular perception of excess weight, particularly in the overweight category (BMI: 25 to 29.9).

A number of studies report that a high rate of obesity may be associated with a low socio-economic status, including low educational level (Martinez et al., 1999). Our survey comes to similar conclusions in regard to education. Some studies report a positive link between food insecurity and obesity, especially among women (Townsend et al., 2001). Other studies have not established this link (Vosoris & Tarasuk, 2003). However, the reported findings could be influenced by the tools used to assess food insecurity, obesity threshold values and cultural factors (Kaiser et al., 2004). According to Drewnowski and Specter (2004), the link between socio-economic factors and obesity could be explained by the lower cost of high fat and sugar foods.

Our survey indicates a greater proportion (92% vs. 82%) of people carrying excess weight (overweight and obese) among adults who experienced food insecurity in the year preceding the survey than among those who have not. However, the limited number of questions used to define food insecurity and the high partial non-response rate (14%) among people experiencing this problem, especially among women (19%), must be taken into account when interpreting these findings.

Dietary habits and the level of physical activity also play a major role in being overweight (Astrup, 2001; Comité scientifique de Kino-Québec, 2006). Analysis of the link between excess weight and the daily recommended intake of fruits and vegetables leads to expected results among adults but not among teenagers. In regard to leisure physical activity, less active adults are overweight. As for walking as a means of travel, no association could be established for adults, while for teenagers the observed link is contrary to what would be expected, at least among youth of normal weight. This finding should clearly be studied in greater detail.

Impact on service planning

Findings of the 2003 Cree CCHS illustrate the extent of overweight and obesity among both adult and teenager residents of Iiyiyiu Aschii. This survey confirms the importance of implementing health promotion and chronic disease prevention programs that take into account, among other factors, the body weight perception of Iiyiyiu Aschii residents.

Obesity is a risk factor for many health problems, such as type 2 diabetes, gestational diabetes and cardiovascular diseases. Given the very high rate of diabetes among the local population compared to what is found in the rest of Quebec and Canada, the obesity should be a priority for regional authorities. Furthermore, the rapid increase of excess weight among teenagers deserves special attention. In regard to public health, there is an urgent need for school-based education and intervention programs.

Obesity is a multifaceted health problem that requires an integrated approach targeting a number of factors, such as dietary habits and physical activity as well as socio-economic factors, food insecurity and nutrition policies. More studies must be conducted to better understand individual, cultural and environmental factors that may contribute to the problem.

KEY ISSUES

FOOD HABITS

- There is a relatively low proportion (21%) of residents 12 and over who eat fruits and vegetables at least 5 times a day, compared to 51% for the rest of Quebec. Furthermore, the consumption of fruits and vegetables decreases with age, among both men and women.
- A rather high percentage of adults (18 and over) reported selecting or avoiding specific foods based on health concerns or nutritional value.
- Furthermore, as noted among other populations, dietary choices tend to be based primarily on health concerns as Iiyiyiu Aschii residents get older.
- A great many people were concerned with losing weight.
- Slightly more than a quarter of the Iiyiyiu Aschii adult population experienced some form of food insecurity in the year preceding the survey.
- Some population groups living in Iiyiyiu Aschii seem more affected by food insecurity, including members of large households (6 persons or more) and adults of lower educational level.

PHYSICAL ACTIVITY

- Slightly more than 3 out of 10 adults (33%) were active during leisure time from May to September 2003. Conversely, slightly fewer than 3 out of 10 (27%) were sedentary during that period.

- There is a greater proportion (41% vs. 23%) of men than of women who are physically active during leisure time. Accordingly, there is a smaller proportion of sedentary men (24% vs. 31%).
- The proportion of women who are physically active during leisure time is the same for all age groups. Younger men (18 to 29) are more active than older men.
- Nearly 1 out of every 2 (48%) youngsters (12 to 17) meets the required level of physical activity (very active) for that age group from May to September 2003. In contrast, nearly 1 out of 3 youngsters (33%) attained less than half of this level of physical activity.
- Just as with adults, more boys than girls (59% vs. 37%) meet the recommended level of physical activity. Conversely, a greater proportion of girls do not meet half of the recommended level of physical activity (41% vs. 24%*).
- Nearly 8 out of 10 adults (77%) and 9 out of 10 (90%) teenagers reported using walking as a mode of transportation from May to September 2003. Respective percentages for cycling were 11% and 34%.
- Work or main occupation physical requirements in Iiyiyiu Aschii have become essentially similar with those of the rest of Quebec and Canada, but remain slightly more demanding for men.
- Individuals who are less active at work (or in the course of their main occupation) and/or during transportation tend to be less active in their free time. Here as elsewhere, "*sedentariness seems to attract sedentariness*".

BODY WEIGHT

- More than half (51%) of adults are obese (BMI ≥ 30) while 1 out of 3 (33%) adults is overweight (BMI: 25 to 29.9). Respective percentages are 20% and 28% among teenagers 12 to 17.
- Overall, more adult women than men (57% vs. 47%) suffer from obesity. The proportion of obese teenagers 12 to 17 does not vary according to gender.
- The proportion of obese adults (BMI ≥ 30) within the Cree population has increased from around 39% to around 55% between 1991 and 2003. The increase is more pronounced in the 15 to 24 age group
- In general, perception of excess weight (BMI: 25 and over) tends to be lower than the data obtained for the population as a whole. This tendency to underestimate is especially pronounced within the overweight class (BMI: 25 to 29.9). As a whole, women tend to have a more accurate perception of excess weight.
- Adults of higher educational level and those who are physically active during leisure time tend to have less serious issues with weight. Conversely, adults who reported selecting or avoiding some foods because of weight concerns and adults who experienced food insecurity tend to have more weight problems.

REFERENCES

Adams A.K., Quinn R.A., & Prince R.J. (2005). Low recognition of childhood overweight and disease risk among Native-American caregivers. *Obes Res*, 13(1), 146-52.

Astrup, A. (2001). Healthy lifestyles in Europe : prevention of obesity and type II diabetes by diet and physical activity. *Public Health Nutrition*, 4(2B): 499-515.

Bertrand, L. (2004). Consommations alimentaires. In *Enquête sociale et de santé auprès des enfants et des adolescents Québécois*, Volet Nutrition. Québec: Institut de la statistique du Québec.

Bernard, L., Lavallee, C., Gray-Donald, K., & Delisle, H. (1995). Overweight in Cree schoolchildren and adolescents associated with diet, low physical activity, and high television viewing. *J Am Diet Assoc*, 95(7), 800-2.

Blanchet, C., Dewailly, E., Chaumette, P., Nobmann, E. D., Bjerregaard, P., Pars, T., Lawn, J., Furgal, C., & Proulx, J. F. (2002). Diet Profile of Circumpolar Inuit. In G. Duhaime (Ed.), *Sustainable Food Security in the Arctic* (Vol. 1, pp. 242). Quebec: Canadian Circumpolar Institute Press.

Bouchard, C., R.J. Shephard and T. Stephens (eds.). (1994,), *Physical Activity, Fitness and Health : International Proceeding and Consensus Statement,* Champaign, Human Kinetics, 1 055 p.

Cavill, N., S. Biddle, JAMES. F. Sallis (2001), Health Enhancing Physical Activity for Young People : Statement of the United Kingdom Expert Consensus Conference, *Pediatric Exercise Science,* 13, 12-25.

Che, J., & Chen, J. (2003). Food insecurity in Canadian households. *Health Report*, 12, 11-22.

Cole, T.J., Bellizzi, M.C., Flegal, K.M., & Dietz, W.H. (2000). Establishing a standard definition for childhood overweight and obesity worldwide: international survey. *BMJ*, 320(7244), 1240-1253.

Comité scientifique de Kino-Québec (1999), *Quantité d'activité physique requise pour en retirer des bénéfices pour la santé (Avis du comité).* Québec : Secrétariat au loisir et au sport et ministère de la Santé et des Services sociaux, gouvernement du Québec, 27 p. [On-line]. http://www.kino-quebec.qc.ca/comité scientifique.

Comité scientifique de Kino-Québec (2006). *L'activité physique et le poids corporel : Avis du comité.* Québec : ministère de l'Éducation, du Loisir et du Sport et ministère de la Santé et des Services sociaux, gouvernement du Québec, 44 p. [On-line]. http://www.kino-quebec.qc.ca/comité scientifique.

Devine, C. M. (2005). A life course perspective: understanding food choices in time, social location, and history. *J Nutr Educ Behav*, 37(3), 121-128.

Devine, C. M., Farrell, T. J., & Hartman, R. (2005). Sisters in health: experiential program emphasizing social interaction increases fruit and vegetable intake among low-income adults. *J Nutr Educ Behav*, 37(5), 265-270.

Drewnowski, A., & Shultz, J. M. (2001). Impact of aging on eating behaviors, food choices, nutrition, and health status. *J Nutr Health Aging*, 5(2), 75-79.

Drewnowski, A., & Specter, S.E. (2004). Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr,* 79(1), 6-16.

Dubois, L., Beauchesne-R, É., Girard, M., Bédard, B., Bertrand, L., & Hamelin, A. M. (2000). *Alimentation: Perceptions, pratiques et insécurité alimentaire*. Québec : Institut de la statistique du Québec.

Dubois, L., & Girard, M. (2001). Social position and nutrition: a gradient relationship in Canada and the USA. *Eur J Clin Nutr,* 55(5), 366-373.

Fernyhough, L. K., Horwath, C. C., Campbell, A. J., Robertson, M. C., & Busby, W. J. (1999). Changes in dietary intake during a 6-year follow-up of an older population. *Eur J Clin Nutr*, 53(3), 216-225.

Hanley, A.J.G., Harris, S.B., Gittelsohn, J., Wolever, T. M.S., Saksvig, B., & Zinman, B. (2000). Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *Am J Clin Nutr*, 71(3), 693-700.

Institut de la statistique du Québec (éd.) (2001). *Enquête sociale et de santé 1998* (2e édition). Québec : Institut de la statistique du Québec.

Jung, R.T . (1997). Obesity as a disease. *British Medical Bulletin*, 53 (2), 307-321.

Kaiser, L.L., Townsend, M.S., Melgar-Quinonez, H.R., Fujii, M.L., & Crawford, P.B. (2004). Choice of instrument influences relations between food insecurity and obesity in Latino women. *Am J Clin Nutr,* 80, 1372-1378.

Katzmarzyk, P.T. (2002). The Canadian obesity epidemic, 1985-1998. *CMAJ,* 66(8), 1039-1040.

Keller, I. (2005). La consommation de fruits et de légumes dans le monde. Paper presented at the *Symposium international sur les effets santé des fruits et légumes*. Québec : Université Laval.

Kesaniemi, Y.A., E. Danforth Jr., M.D. Jensen, P.G. Kopelman, P. Lefebvre and B.A. Reeder (2001), Dose-responses issues concerning physical activity and health : an evidence-based symposium, *Med. Sci. Sports Exerc.,* 33, (6, suppl.), S351-S358.

Kinra, S., Nelder, R.P. & Lewendon, G.J.(2000). Deprivation and childhood obesity: a cross-sectional study of 20 973 children in Plymouth, UK. *J Epidemiol Community Health*, 54, 456-60.

Lavallée, C. (1990). *Lifestyles and physical activity among the James Bay Cree. Department of community health.* Montreal General Hospital: 51.

Lawn, J., & Langner N. (1994). *Air stage subsidy monitoring program, final report. (Volume 2: Food consumption).* Ottawa: Department of Indian Affairs and Northern Development.

Lear, S.A., Toma, M., Birmingham, C.L., & Frohlich, J.J. (2003). Modification of the relationship between simple anthropometric indices and risk factors by ethnic background. *Metabolism*, 52(10), 1295-301.

Lobstein, T., Baur, L., & Uauy, R. (2004) Obesity in children and young people: a crisis in public health. *Obes Rev,* 5 (suppl1), 4-85.

Martinez, J.A., Kearney, J.M., Kafatos, A., Paquet, S., & Martinez-Gonzalez, M.A. (1999). Variables independently associated with self-reported obesity in the European Union. *Public Health Nutr*, 2(1A), 125-133.

McIntyre, L., Connor, S. K., & R. Warren, J. (2000). Child hunger in Canada: Results of the 1994 National Longitudinal Survey of Children and Youth. *CMAJ*, 163, 961-965.

Must, A., & Strauss, R.S. (1999). Risks and consequences of childhood and adolescents obesity. *Int J Obes*, 23 (supp.2), 2-11.

Nolin, B. (2006). *Activité physique de loisir : codification et critères d'analyse, 2004; système québécois de surveillance des déterminants de la santé*. Québec : Institut national de santé publique du Québec, 10 p. [On-line]. http://www.inspq.qc.ca/publications.

Nolin, B. et D. Hamel (2005). Les Québécois bougent plus mais pas encore assez. In M. Venne et A. Robitaille (dir.), *l'Annuaire du Québec 2006*. Montréal : Fides. [On-line]. http://www.inspq.qc.ca/publications.

Nolin, B., G. Godin et D. Prud'homme (2000). Activité physique (chapitre 7). In C. Daveluy, L. Pica, N. Audet, R. Courtemanche, F. Lapointe et al. *Enquête sociale et de santé 1998*. Québec : Institut de la statistique du Québec.

Organisation mondiale de la santé/World Health Organization (2000). Obesity: Preventing and managing the global epidemic. *Report of a WHO consultation on obesity. Technical Report Series no.894.* Geneva.

Paeratakul, S., White, M.A., Williamson, D.A., Ryan, D.H., & Bray, G.A. (2002). Sex, race/ethnicity, socio-economic status, and BMI in relation to self-perception of overweight. *Obes Res*, 10(5), 345-350.

Pate, R, R., M. Pratt, M. S. N. Blair, W. L. Haskell, C. A. Macera et al. (1995). Physical Activity and Public health: a Recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA,* 273, 402-407.

Payette, H., & Shatenstein, B. (2005). Les déterminants de la saine alimentation chez les personnes âgées vivant dans la collectivité. *Revue Canadienne de Santé Publique*, 96(Supplément 3), S30-S34.

Power, E. M. (2005). Les déterminants de la saine alimentation chez les Canadiens à faible revenu. *Revue canadienne de santé publique*, 96(3), S42-S48.

Raine, K. D. (2005). Les déterminants de la saine alimentation au Canada: aperçu et synthèse. *Revue canadienne de santé publique*, 96(3), S8-S15.

Roberts, R.J. (1995). Can self-reported data accurately describe the prevalence of overweight? *Public health*, 109(4), 257-284.

Health Canada (2002). *Discussion Paper on Household and Individual Food Insecurity – Part 3: Measuring Food Insecurity*. Office of Nutrition Policy and Promotion, Government of Canada. [On-line]. http://www.hc-sc.gc.ca/fn-an/nutrition/pol/food_sec_entire-sec_aliments_entier_e.html (retrieved 2002).

Health Canada (2003). *Canadian Guidelines for Body Weight Classification in Adults*. [On-line]. http://www.hc-sc.gc.ca/fn-an/nutrition/weights-poids/guide-ld-adult/weight_book_tc-livres_des_poids_tm_e.html.

Santé Québec. Daveluy, C.; Bertrand, L. (eds.) (1998). *A Dietary Profile of the Cree : Report of the Santé Québec Health Survey of the James Bay Cree 1991 : Food and Nutrient Intake*. Montreal: Ministère de la Santé et des Services sociaux, Government of Quebec.

Santé Québec. Daveluy, C., Lavallé, C., Clarkson, M., & Robinson, E. (dir.) (1994). *A Health Profile of the Cree, Report of the Santé Québec Health Survey of the James Bay Cree 1991*. Montreal : Ministère de la Santé et des Services sociaux, Government of Quebec.

Shephard, R. J. (1994). *Aerobic Fitness and Health*. Champaing, Il, Human Kinetics, pp. 132-136.

Statistics Canada. (2003). *Canadian Community Health Survey (CCHS), Cycle 2.1*. Ottawa: Health Statistics Division, Government of Canada. [On-line]. http://www.statcan.ca/english/concepts/health/cycle2_1/index.htm

Statistique Canada. (2005a). *La consommation de fruits et légumes frais, de 1966 à 2003* (Catalogue no 21-020-XIF). Ottawa: Gouvernement du Canada.

Statistics Canada. (2005b). National Population Health Survey *(NPHS)*. Government of Canada. [On-line]. http://www.statcan.ca/english/concepts/nphs/index.htm

Statistics Canada. (2005c). *Canadian Community Health Survey (CCHS), Questionnaire for Cycle 2.1*, January 2003 to November 2003. Statistics Canada, pp. 72-74.

Strauss, R.S. (1999). Comparison of measured and self-reported weight and height in a cross-sectional sample of young adolescents. *Int J Obes*, 23, 904-908.

Strong, W.B., R.M. Malina et al. (2005), Evidence based physical activity for school-age youth. *Journal of Pediatrics*, 146, 732-737.

Townsend, M.S, Peerson, J., Love, B., Achterberg, C., & Murphy, S.P. (2001). Food insecurity is positively related to overweight in women. *J Nut* ,131(6), 1738- 45.

Vallianatos, H., Brennand, E.A., Raine, K., Stephen, Q., Petawabano, B., Dannenbaum, D., & Willows, N.D. (2006). Beliefs and practices of First Nation women about weight gain during pregnancy and lactation: implications for women's health. *Canadian Journal of Nursing Research*, 38 (1), 102-119.

Vozoris, NT, & Tarasuk, V.S. (2003). Household food insufficiency is associated with poorer health. *J Nutr,* 133, 120-6.

Willms, J.D., Tremblay, M.S, & Katzmarzyk, P.T. (2003). Geographic and demographic variation in the prevalence of overweight Canadian children. *Obes Res*, 11, 668-673.

Willows, N. D. (2005). Les déterminants de la saine alimentation chez les peuples autochtones du Canada: état actuel des connaissances et lacunes au niveau de la recherche. *Revue canadienne de santé publiqu*e, 96 (Supplément 3), S36-S41.

U.S. Department of Health and Human Services (USDHHS, 1996). *Physical Activity and Health : A Report of the Surgeon General*. Atlanta, GA : U.S.D.H.H.S., Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 278 p.

APPENDIX

Table A1
Consumption frequency of fruit juices, fruits and some vegetables, population aged 12 and over, Iiyiyiu Aschii, 2003

Fruits - Vegetables / Consumption rate	Not once a day	1-2 times per week	3-6 times per week	More than once a day
Fruit juice	10.1	22.4	15.1	52.4
Fruits	4.8*	25.2	22.4	47.6
Salad	28.5	48.4	14.9	8.2
Potatoes	6.5	57.2	27.5	8.8
Carrots	19.7	56.5	16.7	7.1
Other vegetables	9.4	40.3	25.5	24.8

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1 – Iiyiyiu Aschii, 2003.

Table A2
Categories of all possible daily physical activity[a]

CATEGORY	EXAMPLES
Domestic physical activity[b]	Showering or bathing, dressing children, vacuuming, doing odd jobs, shovelling, grocery shopping, etc.
Work physical activity[b] (main occupation)	Filing, serving tables, carrying packages, digging, etc.
Transportation physical activity[c]	Walking to work, biking to activity school, rollerblading to a friend's house, etc.
Leisure time physical activity[c]	Walking, biking, playing hockey, fitness training, dancing, etc.
Other physical activity[b]	Volunteering and other activities done in a context different from those of the first four categories

[a] Any bodily movement caused by the skeletal muscles that expends more energy than resting metabolism (USDHHS, 1996: p. 20).

[b] A number of activities in these three categories are physically similar or identical. The main difference is that some are remunerated and some not, as well as the location and/or context in which they are conducted.

[c] Physical activities conducted *during free time* (sports, fitness training, outdoor pastimes, etc.).

Adapted from: Nolin, Godin & Prud'homme (2000: p. 171).

Table A3
Three examples for each level of leisure time physical activity

Level	Activity (intensity[a])	Duration[b] (min /day)	Frequency[c] (days /wk)
Very active[d]	Walking (brisk pace)	60	7
	Walking (moderate pace)	80	7
	Jogging (moderate speed)	35	5
Active[e]	Walking (brisk pace)	30	7
	Walking (moderate pace)	40	7
	Jogging (moderate speed)	30	3
Moderately active	Walking (brisk pace)	30	4
	Walking (moderate pace)	40	4
	Jogging (moderate speed)	30	2
Somewhat active	Walking (brisk pace)	30	2
	Walking (moderate pace)	40	2
	Jogging (moderate speed)	30	1
Sedentary	All	All	Less than 1

[a] **Intensity:** No specified speed (km/h) since effort depends on individual capacities, according to age, fitness level and health status.

[b] **Duration:** Approximate duration. The duration can also be divided in shorter segments (10 minutes minimum), if so preferred. [Example: brisk walk (3 times/day, 10 minutes each, instead of one 30-minute period a day)].

[c] **Frequency (minimum):** Very active (5 days/wk), active (3 days/wk), moderately active (2 days/wk), somewhat active (1 day/wk).

[d] **Very active:** Recommended level for the 5 to 17 age group.

[e] **Active:** Recommended level for the 18 and over age group.

Note: There are many other sport, outdoor, fitness or dance activities that one can practice to attain the recommended level of physical activity.

Adapted from: Nolin & Hamel, 2005.

Table A4
Walking as a means of transportation according to work or main occupation physical requirements level (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Work or main occupation[a]	Walking (transportation): Weekly duration		
	Less than 1 hr	1 hr to 5:59	6 hr and more
	%		
Level 1	55.2	31.6	13.2*
Level 2	37.1	28.5	34.5
Level 3	35.0*	25.1*	39.8*

[a] Levels 1 to 3: lower to higher physical requirements.

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003

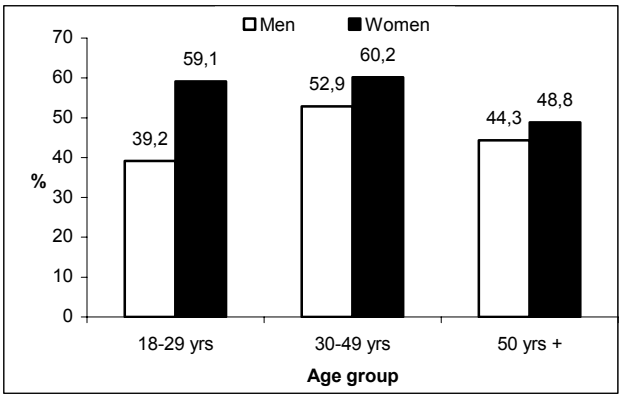
Table A5
Body Mass Index (BMI) ratings for adults aged 18 and over [a]

Classification (Weight categories)	BMI (kg/m^2)	Risk of developing health problems
Underweight	< 18.5	Increased
Normal weight	18.5 – 24.9	Least
Overweight	25.0 – 29.9	Increased
Obesity Class I	30.0 to 34.9	High
Obesity Class II	35.0 to 39.9	Very high
Obesity Class III	≥ 40	Extremely high

[a] Values apply to both men and women. The Cole et al. classification system (2000) was used for the 12 to 17 age group. This system is based on only 3 ratings that are mathematically equivalent to: normal weight or under weight (< 25), overweight (25 to 29.9), and obese (≥ 30) for the 18 and over age group.

Source: Health Canada (2003).

Figure A1
Prevalence of obesity by age and gender (%), population aged 18 and over, Iiyiyiu Aschii, 2003



Source: CCHS 2.1- Iiyiyiu Aschii, 2003

Table A6
Body weight categories by gender (%), population aged 12 to 17 years, Iiyiyiu Aschii and rest of Quebec, 2003

	Normal weight or underweight	Overweight	Obese
	%		
Iiyiyiu Aschii			
All	52.6	27.6	19.9*
Boys	58.9	21.0*	20.1*
Girls	44.8	35.7*	19.5*
Rest of Quebec			
All	81.2	14.7	4.2
Boys	78.0	7.1	4.9
Girls	84.7	11.9	3.4

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).

Source: CCHS 2.1-Iiyiyiu Aschii and rest of Quebec, 2003

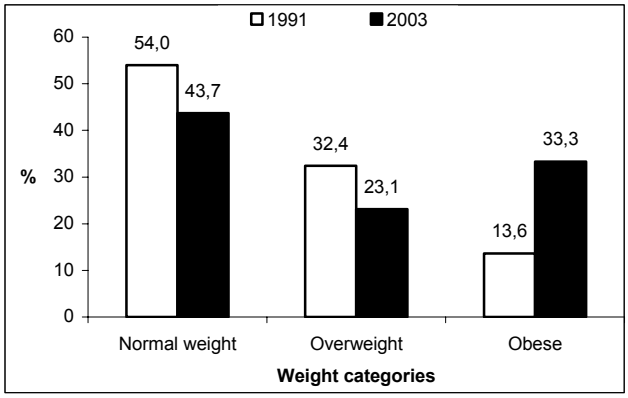
Table A7
Evolution of body weight categories by age (%), Cree population only, aged 18 years and over, Iiyiyiu Aschii, 1991 and 2003

Age group	Normal weight or underweight		Overweight		Obese	
	1991	2003	1991	2003	1991	2003
	%					
Total	**23.4**	**12.6**	**37.3**	**32.5**	**39.4**	**54.8**
Age group						
18-24 years	34.5	27.1*	37.9	27.9	27.6	45.0
25-44 years	20.4	11.8*	37.4	29.2	42.2	59.0
45-64 years	12.2*	U	33.0	39.3	54.8	55.7
65 years +	U	U	47.7*	41.0*	U	47.5

* Imprecise estimate. Interpret data with caution (CVbetween 16.6% and 33.3%).
U Unpublished data (CV > 33.3% or fewer than 10 respondents).

Sources: CCHS 2.1 – Iiyiyiu Aschii, 2003 and Santé Québec survey – Iiyiyiu Aschii, 1991.

Figure A2
Evolution of body weight categories (%), Cree population only, aged 15 to 19 years, Iiyiyiu Aschii, 1991 and 2003



Source: CCHS 2.1- Iiyiyiu Aschii, 2003 and Santé Québec survey – Iiyiyiu Aschii, 1991.

Table A8
Body weight categories according to the level of leisure time physical activity (%), population aged 18 and over, Iiyiyiu Aschii, 2003

Level	Body weight categories			
	Underweight	Normal	Overweight	Obese
	%			
Active	U	23.9	37.2	38.8
Moderately, somewhat active	U	12.4	31.1	55.8
Sedentary	U	8.6*	30.0	60.7

* Imprecise estimate. Interpret data with caution (CV between 16.6% and 33.3%).
U Unpublished data (CV > 33.3% or fewer than 10 respondents).

Source: CCHS 2.1- Iiyiyiu Aschii, 2003.