



**The Evolution of Health Status  
and Health Determinants in the  
Cree Region (Eeyou Istchee):**

**Eastmain I-A Powerhouse and  
Rupert Diversion Sectoral Report**

***Volume 1: Context and Findings***

**Series 4 Number 3:**

**Report on the health status of the population  
Cree Board of Health and Social Services of James Bay**



*The Evolution of Health Status and Health Determinants in  
the Cree Region (Eeyou Istchee):  
Eastmain-1-A Powerhouse and Rupert Diversion  
Sectoral Report*

**Volume 1  
Context and Findings**

Jill Torrie  
Ellen Bobet  
Natalie Kishchuk  
Andrew Webster

**Series 4 Number 3: Report on the Health Status of the Population.  
Public Health Department of the Cree Territory of James Bay  
Cree Board of Health and Social Services of James Bay**

The views expressed in this document are those of the authors and do not necessarily reflect those of the Cree Board of Health and Social Services of James Bay.

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## **FOREWORD TO THE PUBLIC HEALTH REPORT SERIES**

The Public Health Report Series includes publications of the Department of Public Health of the Cree Territory of James Bay on major activities of the Department: annual reports, immunizations and/or notifiable diseases, diabetes and reports on the health status of the population.

### **SERIES 4: REPORTS ON THE HEALTH STATUS OF THE POPULATION (PERIODIC)**

Number 1: *Health and What Affects it in the Cree Communities of Eeyou Istchee: A Compilation of Recent Statistics*. 2001. (added retrospectively).

Number 2: How Healthy are the Eeyouch in 2002: An Update. (added retrospectively)

Number 3: *The Evolution of Health Status and Health Determinants in the Cree Region (Eeyou Istchee): Eastmain 1-A Powerhouse and Rupert Diversion Sectoral Report*. 2005.

The Series 4 reports are the Department's principal publications about the health status of the regional population. The *Public Health Act (2001)* of Québec highlights surveillance as a priority because it is through surveillance that all public health priorities become identified and defined, and long-term impacts of interventions can be assessed.

## **FOREWORD TO**

### ***THE EVOLUTION OF HEALTH STATUS AND HEALTH DETERMINANTS IN THE CREE REGION***

This document was produced under contract to Hydro-Québec as background information for the development of their Eastmain-1-A Powerhouse and Rupert Diversion Project Impact Statement. The Department accepted the contract because the request from Hydro-Québec fell into its regular mandate to produce reports on the health status of the population. The contract provided extra resources to develop this summary document to bring together data from all known studies, reports, and data banks.

The completion of this final version of the Sectoral Report is greatly overdue. The substantive work for the document was in draft form one year ago. The delay in producing this final version is entirely my responsibility and not that of the other authors. Nonetheless, we are all hopeful that this comprehensive work will interest a wide readership.

This document, and future updates, can be found online at [www.creepublichealth.org](http://www.creepublichealth.org).

I would especially like to commend everyone who worked on this report for the excellent quality of their work, and especially Ellen Bobet, Natalie Kishchuk and Andrew Webster.

The three decades following 1970 were tumultuous for all the stakeholders, but from this turmoil arose impressive improvements in the populations' health and in the health services available. It is appropriate that this documentation of this history and effort is appearing now, more than a quarter century after these first aboriginal health services in Canada were established. In coming decades, the CBHSSJB will be able to take a more Cree focussed and community controlled direction. Now that the negotiations with Québec have been successfully completed, the CBHSSJB finally has the resources to fully implement Section 14 of the *James Bay and Northern Québec Agreement (1975)*, our first modern treaty.

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## Glossary

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AED	Assistant Executive Director (2 <sup>nd</sup> highest rank in the CBHSSJB)
AIP	Agreement-in-Principle
APS	Aboriginal Peoples Survey
BCG	Bacille Calmette-Guerin (tuberculosis vaccine)
BMI	Body Mass Index
CBHSSJB	Cree Board of Health & Social Services of James Bay
CHR	Community Health Representative
CLSC	<i>Centre local des services communautaires</i> (Local Community Service Centre)
CPDP	Council of Physicians, Dentists, and Pharmacists
CRA	Cree Regional Authority
Cree Region	(a.k.a. Eeyou Istchee). The CBHSSJB, or MSSSQ Region 18 (formerly 10b), has jurisdiction for the nine Cree communities on federal land while Region 10 is responsible for the Québec municipalities within Eeyou Istchee. However, in practice, the service boundaries between the two do not in all cases conform.
DGNQ	Direction générale du Nouveau-Québec
DIAND	Department of Indian Affairs and Northern Development (a.k.a. Indian Affairs, INAC)
DM1, DM2	Diabetes Mellitus Type 1, Type 2
dmf(t)	Index of Decayed, Missing and Filled Teeth
DNHW	Department of National Health and Welfare (now Health Canada)
DSC	<i>Département de santé communautaire, Hôpital général de Montréal</i> (Public Health Department of the MGH)
Eeyou Istchee	Cree language term for the Cree Region meaning “the People’s Land” (a.k.a. Iiyiyiu Aschii). Defined as all lands in the eastern James Bay watershed.
EM-1-A	Eastmain-1-A Powerhouse and Rupert River Diversion hydro project.
FAS	Foetal Alcohol Syndrome (with Foetal Alcohol Effects – FAE)
GCC(EI)	Grand Council of the Crees of Eeyou Istchee (formerly .../ of Quebec)
GDM	Gestational Diabetes Mellitus
HBC	Hudson Bay Company
ICD	International Classification of Diseases
IGT	Impaired Glucose Tolerance
IHD	Ischemic Heart Disease
ISP	Income Security Programme (for Cree Hunters and Trappers)

INSPQ	Institut national de santé publique du Québec (National Public Health Institute of Québec)
IQA	Indians of Quebec Association (Predecessor of Assembly of First Nations - Quebec and Labrador)
ISQ	<i>Institut de la Statistique</i> (More recently: <i>Institut national de la statistique du Québec</i> )
JBNQA	James Bay and Northern Quebec Agreement (1975)
LG	La Grande hydro project (the great project of the 1970s)
MADO	<i>Maladies à déclaration obligatoire</i> (MSSSQ’s mandatory disease reporting system)
MAS	<i>Ministère des Affaires Sociales</i> (predecessor of the MSSSQ)
MCH	Montreal Children’s Hospital
MED-ECHO	The MSSSQ’s data base for curative and diagnostic hospitalisation acts.
MGH	Montreal General Hospital
MSB	Medical Services Branch of Health Canada (Recently renamed First Nations and Inuit Health Branch or FNIHB)
MSSSQ	<i>Ministère de la santé et des services sociaux du Québec</i>
NIHB	Non-Insured Health Benefits
NNADAP	National Native Alcohol & Drug Awareness Programme
O&M	Operations & Maintenance (budget component for recurrent operations costs)
Paix des Braves	“Peace Among Braves”, the recent agreement between the Crees and the Quebec parties to the JBNQA, establishing a “new relationship, permitting the EM-1 project and guaranteeing Cree benefits from the project, while also settling certain economic development differences of opinion.
Public Health Department	Public Health Department of the Cree Territory of James Bay, CBHSSJB
RAMQ	<i>Régie de l’assurance-maladie du Québec</i> (Québec Health Insurance Board)
SAGMAI	<i>Secretariat des activités gouvernementales en milieu amérindien et inuit</i> (predecessor of the <i>Secretariat des affaires autochtones</i> )
SEBJ	<i>Société d’énergie de la Baie James</i>
Section 14	Section 14 of the JBNQA (establishes a Cree Region under Cree administrative control, and among other things, requires a Cree Health Board to be created to administer one of Québec’s health services administrative regions.
SMR	Standardised Mortality Ratio.
SRP	Strategic Regional Plan
STI	Sexually Transmissible Infection (a.k.a. STD - /... Disease)
TB	Tuberculosis
WHO	World Health Organisation

# Chapter 1- Introduction

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## 1.1. Background

In August 2003, Hydro-Québec asked the Public Health Department of the Cree Board of Health and Social Services of James Bay (CBHSSJB) to prepare several background documents for the Eastmain 1-A Powerhouse and Rupert Diversion (EM-1-A) Project Impact Statement. The study plan requested:

1. a description of the health status of the Cree population from around 1970;
2. a description of the status of health and social services in the Cree Region from around 1970;
3. a list of principal factors related to the changes observed in the health status in the communities during the above time period; and
4. a survey of mercury and other contaminants and health indicators in a representative sample of individuals from Mistissini, especially those who would experience some impact from the EM-1-A project.

Hydro-Québec's offer raised questions within the Public Health Department and the Cree Regional Authority. As a contractor assisting Hydro-Québec with background documents for preparing its Impact Statement, would the Department be in conflict when later it would be the Cree party responsible for commenting on the human impacts portions of the Impact Statement? Ultimately, the Department's Management Committee decided that a conflict would not occur because the role of preparing texts on health status and services is already in the Department's mandate. The contract was clear that the Department's role was to describe and report on the situation but not predict future impacts, which would remain the sole responsibility of Hydro-Québec based on the research available to it.

To decide a response to the request for an environment and health study in Mistissini, two directors of the Department met with several leaders of Mistissini who expressed interest in such a study, but for reasons quite different from those of Hydro-Québec. The Department decided that such a study would be better planned through the provisions of the *Mercury Agreement* (2001) between Hydro-Québec and the Crees rather than through a contract involving background work for Hydro-Québec's Impact Statement.

In Autumn 2003, in anticipation of the contract, the Public Health Department assembled its research team for the first three items and the contract was signed in December 2003.

## 1.2. The Sectoral Report in Context

As the proponent of the EM-1-A project, Hydro-Québec is responsible under statutes for arranging for background research to support an Impact Statement covering all aspects of the project including the potential impacts on the health determinants and health status of the population. The present Sectoral Report is one of many reports from various sectors commissioned by Hydro-Québec.

In the summer of 2003 - as understood by the Public Health Department - Hydro-Québec faced three limitations on contracting out the work in this area. First, there was no recent, comprehensive health survey data for the region. This meant that although there were many disparate and discrete research reports on various health-related topics, there was no available public source of data of the kind required

for preparing a longitudinal report on changing health status. The most recent comprehensive data was the Santé Québec Cree Health Survey from 1991<sup>a</sup>.

Second, what data did exist tended to be in the form of published studies, unpublished studies and internal reports, regional data received from various Ministries, internal data sets, and so forth. These were often difficult or impossible to access by a party other than the Public Health Department. Third, although Hydro-Québec had begun studies long before the summer of 2003 to develop background documents for understanding possible social and economic impacts, no study in the area of health and social services had been undertaken. This left little time to plan and complete a comprehensive health study starting in the summer of 2003. From the point of view of the Public Health Department, this was the context at the time that Hydro-Québec approached the Public Health Department with a request to undertake the Sectoral Report project.

The CBHSSJB's Public Health Department came into existence through legislation in 2001. It is the successor to the Public Health Module for the Cree Region of James Bay which had began in 1978 as part of Montreal General Hospital's Community Health Department. The new Cree Public Health Department had its own need for comprehensive overviews of the health status of the Crees and of the evolution of health determinants in the region: to plan the implementation of the new regional Public Health Plan and Programme; and as background material for the CBHSSJB negotiations which were then underway between the Crees and the *Ministère de la santé et des services sociaux du Québec (MSSSQ)*.

### **1.3. Mandate from Hydro-Québec**

The intention was to use existing materials in an attempt to create a comparison with the 1991 Santé Québec Cree Health Survey. The Hydro-Québec contract stipulated that the analysis was to be limited to six Cree communities: Mistissini, Chisasibi, Wemindji, Eastmain, Nemaska and Waskaganish. Hydro-Québec believed these communities were the ones likely to experience significant impacts from the EM-1-A project. The Public Health Department was further mandated to use this analysis to prepare short summary sections in French and English, which Hydro-Québec could use, at its discretion, in its Impact Statement. The Sectoral Report as a whole was to be printed in English under the name of the CBHSSJB as a public document.

The study officially began in December 2003. Given the time constraints, Hydro-Québec asked the Public Health Department to prepare the sections for the Impact Statement as soon as the Sectoral Report reached substantial draft form. The research team responsible for this Sectoral Report feels confident that its contributions for the Impact Statement – as they were delivered to Hydro-Québec - reflect the final analysis found in this Sectoral Report.

Early in 2004, the research team had suggested to Hydro-Québec that, since the six communities comprised most of the Cree population, the analysis could just as well be done for all nine communities. This made sense in light of three considerations. First, the population of the six chosen communities amounted to most of the region's population. Statistically, analysis of the six communities was no different from analysis of all nine. Second, the existing data sets covered various communities, and it was not always possible to isolate the data for community level analyses. Third, based on a study of past impacts and a consideration of new factors, the team had good reason to believe that EM-1-A would have positive and negative human impacts on all of the nine communities.

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<sup>aa</sup> In the autumn of 2003, the CBHSSJB and Statistics Canada carried out the field work for a comprehensive health survey based on the Canadian Community Health Survey done in the rest of Québec. However, the results from that survey are not expected before the autumn of 2005.

As this suggestion was unacceptable to Hydro-Québec, the team prepared analyses for the six target communities, as well as for the region as a whole, comparing these data to that from other jurisdictions whenever possible. Following the completion of the statistical analysis, in March 2004, Hydro-Québec required a significant, and last-minute, revision to the mandate. At Hydro-Québec's request, the community-specific portion of the analysis was to be limited to only four communities: Eastmain, Mistissini, Nemaska, and Waskaganish. The Public Health Department had to re-engage team members whose work had been completed, re-analyse all of the data, rework all the tables and illustrations, and revise the text. This mandate change, so late in the project, made it impossible to complete the report according to the original timeline.

#### **1.4. The Project Team**

The team was composed of four principal authors - Jill Torrie, Ellen Bobet, Natalie Kishchuk and Andrew Webster - who worked with contributions from an adjunct team - Pierre Lejeune, Olivier Receveur, Deborah Schoen, Manon Girard. Their work was ably supported by Frances Couchees and Rachel J. Martin. For specific analyses, the project benefited from expert advice from the teams of Danielle St.-Laurent and Robert Choinière at the *Institut national de santé publique du Québec* (INSPQ). The biographical descriptions of the team members can be found in Appendix A

The work for the project was divided into three large areas: literature review, health status analysis and health services history. Natalie Kishchuk carried out the literature review on the impacts of development on small communities, and for this Sectoral Report only, analysed how impacts in the literature might be expected to manifest in the Cree Region. Ellen Bobet brought together the large section on the evolution of health status and health determinants from roughly 1970 to the present day. This involved critical analysis of existing research and new analysis of recent data. Andrew Webster analysed the evolution of health services in the region, bearing in mind changes in the socio-economic, political, administrative, and regulatory environments over time. These three contributors developed the respective, substantive content of the three principal areas of the report. They frequently liaised among one another so that their contributions developed in a parallel, informed, and complementary manner.

Ellen Bobet afterwards re-read and edited all the sections to give them a 'common tone'. Andrew Webster carried out the initial reorganisation of this lengthy material into its present form in these two volumes with appendices. By undertaking the thankless task of simplifying all of the endnotes, editing out many redundancies, and cross-referencing, he reduced the work to a manageable length. Jill Torrie was responsible for the overall project plan, management and for the co-ordination of the project team. She was involved with planning and editing, although she contributed some sections of the text. She finalised the reorganisation of the materials into chapters and carried out the final editing of both volumes

#### **1.5. Organisation of the Report**

The report is organised into two volumes. The two volumes and their individual chapters can be read in a number of different ways. Overall, Volume 1 can be used as a complete document because it contains the complete analysis, including summaries, of all the chapters in Volume 2. By contrast, Volume 2 contains the detailed reports on health status, health determinants and the history of health services upon which the summaries in Volume 1 are based.

As a result of this organisation, certain chapters are based on the same content, although the size of the chapter or the type of analysis will be different. The congruence of chapters is as follows:

Chapter 3 Literature Review	with	Chapter 8 Expected Impacts from the Literature
Chapter 4 Highlights	with	Chapters 5, 6, 11 and 12
Chapter 5 Health Determinants	with	Chapter 11 long report on health determinants
Chapter 6 Health Status	with	Chapter 12 long report on health status
Chapter 7 Health Services	with	Chapter 9 and 13 long report on health services

Chapters 3 and 8 are based on a review of existing non-Cree literature, using the community of Nemaska as an example of the kind of community discussed in the literature. By contrast, Chapters 11 and 12 (with their summaries in 4, 5, 6), are the results of analyses of the data and existing studies that could be located on the Cree of Québec. Chapter 13 and its summaries in Chapters 7 and 9 are drawn from other types of documentary materials to develop a historical overview of the emergence and growth of health services in the Cree Region. Finally, the reader should be aware that Chapter 8 on impacts that might be expected from the literature, and Chapter 9 which analyses health services against ten benchmarks of health service adequacy, project a future assessment on these two areas of the materials.

### 1.5.1. Organisation of Volume 1

Volume 1 is organised into nine chapters.

For the reader seeking a quick overview of Cree health status and the evolution of health determinants, Chapter 4 provides the reader the highlights of key findings. The other chapters are more conventional in presentation.

Chapter 2 on methodology explains how the project’s analytical framework rests on three characteristics: it is based on a population health-health determinants approach; it is evidence-based; and it is longitudinal. This framework applies to all sections of the report. The methodology discussion then sets out the reliability and sources of the data which form the backbone of the sections on health determinants and health status (Chapters 4, 5, 6, 11, 13).

Chapter 3 opens with the detailed methodological discussion of the literature review. In the *Background* section the combined EM-1-A Powerhouse and Rupert Diversion hydro project proposed by Hydro-Québec is described. This discussion includes the Cree community of Nemaska in order to better situate the literature review within the type of proposed project. The detailed literature review then follows.

Chapters 5, 6 and 7 present the summary reports which were sent to Hydro-Québec as background materials for their Impact Statement. Chapter 5 is the summary report on the evolution of the state of health determinants in the Cree Region. Chapter 6 is the summary report on the evolution of health status of the Crees while Chapter 7 summarises the evolution of health services in the region.

Chapter 8 asks - based on a reading of the international, empirical, post-development literature – what impacts one might expect the EM-1-A project to have on the Cree communities. This section on expected impacts and implications drawn from the literature was not included in the substantive drafts provided to Hydro-Québec in March 2004. It appears in the final version of the Sectoral Report because it is of interest to the CBHSSJB.

Chapter 9 is a synopsis of highlights from the penultimate section in Volume 2, Chapter 13 on the *Evolution of Health Services*. It compares the current health services in the Cree Region against the comparative benchmarks developed by the Canadian Health Services Research Foundation. The intent is to give a brief picture of the adequacy of the regional services. This is an important question because some of the health (and social) impacts of EM-1-A will be avoided or mitigated by services already in

place when the impacts are felt. Moreover, it may prove necessary to reconfigure or augment these services in light of impacts observed in the future.

Volume 1 has three appendices. Appendix A contains brief biographies of the project team. Appendix B is a chronological table of major events in the evolution of health services in the region. Appendix C is a table summarising the evolution of health facilities in the region.

### **1.5.2. Organisation of Volume 2**

Volume 2 contains an introductory chapter and the three large ‘reports’ upon which the analysis in Volume 1 is based. Chapter 11 analyses the evolution of the status of health determinants; Chapter 12 analyses Cree health status according to traditional indicators; and Chapter 13 looks at the historical and administrative evolution of health services.

Volume 2 contains two appendices: Appendix D – Drinking Water and Waste Water Facilities in the Cree Region; and Appendix E - Historical Tables of Mortality and Hospitalisation Data.

## Chapter 2 - Methodology

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### 2.1. General

Our main objective has been to provide a portrait of evolving health status in the Cree Region, as well as an assessment of the evolving status of health determinants underlying this changing health status. The focus has been on the Cree Region as a whole and, to the extent permitted by the data, the four communities<sup>a</sup> considered by Hydro-Québec most likely affected by the EM-1-A project.

The intent has been to examine the evolution in health status over as long a period as possible and using a variety of sources. Because the Cree communities have undergone rapid social change in the past several decades, any impacts of the present hydroelectric development will have to be assessed against the backdrop of prior and ongoing changes in the territory.

### 2.2. Analytical Framework

Our purpose has been to assess the current conditions among the affected Cree communities to serve as a baseline from which the expected impacts of the EM-1-A-Rupert development project can be drawn in the future. Our approach has three main characteristics. It is:

- grounded in the population health approach / health determinants framework;
- longitudinal; and
- evidence-based.

The **population health approach / health determinants framework** is an internationally recognised framework which now forms the basis for much of the World Health Organisation's (WHO) approach to health impact assessment<sup>b</sup>. It emerged from a growing recognition among researchers and policy-makers that the health and well-being of a population are to a very large extent determined by social and environmental conditions, rather than just by health services:

*A population health approach recognises that any analysis of the health of the population must extend beyond an assessment of traditional health status indicators like death, disease and disability. A population health approach establishes indicators related to mental and social well-being, quality of life, life satisfaction, income, employment and working conditions, education and other factors known to influence health<sup>c</sup>.*

The actual framework was developed in seminal papers by the Federal/Territorial/Provincial Advisory Committee on Population Health.<sup>d</sup> It allows for the consolidation of research on key determinants of health - and well-being - at the level of entire populations.

The concept of health determinants clearly resonates with the over-arching Cree concept of *miyupimaatisiun*, an expression of basic social values in Cree life that encompasses notions of: caring for

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<sup>a</sup> Eastmain, Mistissini, Nemaska, and Waskaganish.

<sup>b</sup> <http://www.who.int/hia/evidence/doh/en/index.html>

<sup>c</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>

<sup>d</sup> Canada (1999a).

and nourishing one's family; enjoying life and participating actively in the extended family and community; being responsible for keeping oneself safe and in good health; and remaining strong physically, emotionally, and mentally in order to make a good living for the family.

Cree society is founded on what have elsewhere been termed "principles of social capital"<sup>a</sup>: living in a resilient community with understood norms and relationships based on trust, and where people co-ordinate their work co-operatively for the common good. For the individuals involved, this implies intrinsic self-esteem, a feeling of control over the environment, and resiliency in the face of adversity. As with many indigenous peoples, the Cree concept of health refers to the health of the land, the health of the community, as well as to spiritual health.<sup>b</sup>

The following table summarises the key determinants of population health.

### **Determinants of Population Health<sup>c</sup>**

<b>Income and social status</b>	Health status improves at each step up the income and social hierarchy. The healthiest populations are those which are prosperous and have an equitable distribution of wealth.
<b>Employment &amp; working conditions</b>	Unemployment, under-employment, stressful or unsafe work are associated with poorer health.
<b>Education</b>	Health status improves with level of education. Closely related to income, education contributes to health and prosperity by equipping people for problem solving and providing a sense of mastery over life circumstances. It also increases opportunities for job and income security.
<b>Social environment &amp; social support</b>	Support from families, friends and communities is associated with better health. The caring and respect that occur in social relationships, and the resulting sense of satisfaction and well-being, seem to act as a buffer against health problems. The health effect of social relationships may be as important as established risk factors such as smoking, physical activity, obesity and high blood pressure. The importance of social support also extends to the broader community. Civic vitality, social stability, recognition of diversity, and cohesive communities provide a supportive society that reduces or avoids many potential risks to health.
<b>Personal health practices &amp; coping skills</b>	There is a growing recognition that personal life 'choices' are greatly influenced by socio-economic environments. Effective coping skills enable people to be self-reliant, solve problems and make face life's challenges in positive ways, without recourse to risky behaviours.
<b>Physical environment</b>	At certain levels of exposure, contaminants in air, water, food and soil can cause a variety of adverse health effects. Factors in the built environment can significantly influence physical and psychological well-being.
<b>Health services</b>	Health services, particularly those designed to maintain and promote health and to prevent disease contribute to population health.
<b>Gender and culture</b>	Some persons or groups may face additional health risks due to a socio-economic environment that contributes to marginalisation, stigmatisation, loss or devaluation of language and culture and lack of access to culturally appropriate health care and services.

<sup>a</sup> Canada (2003b).

<sup>b</sup> Colomeda and Wenzel (2000).

<sup>c</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>

Our examination of the current conditions within the Cree communities systematically examines the existing evidence concerning health status indicators and health determinants in order to establish a baseline description for future assessments of the impacts of the EM-1-A project.

In the general literature on health determinants, health services are often considered to have a weaker influence on health status than other health determinants, such as social and physical environment, education for example.<sup>a</sup> However, in the Cree Region, the present-day health services have had quite a different impact than they might have had under other circumstances because they developed in their present form as a direct result of the first James Bay Hydro project. They are the subject of a detailed examination in Volume 2 of this report because they were identified specifically in the mandate from Hydro-Québec, and because a history of services in the region is needed during this time of great organisational change within the CBHSSJB.

The second characteristic of the approach is that it is **longitudinal**. This implies examining trends in each of the above health determinants over as long an historical period as possible, in some cases as far back as 30 years. This longitudinal approach is necessary because the Cree communities of northern Québec have been undergoing fairly rapid social change over the last several decades. This change is largely as a result of ongoing ‘development’ in its broadest sense: increasing southern interest in the economic, social, and political potential of northern Québec. This new interest has brought increased contact between northern and southern peoples and institutions. Any impacts of the EM-1-A project will have to be measured against the backdrop of existing change. This will be challenging, as the project may, for any given health determinant: 1) exacerbate already negative trends; 2) accelerate already positive trends; 3) reverse or slow already negative trends; 4) reverse or slow already positive trends; or 5) have no impact.

Furthermore, several types of impact may be found in different segments of the population. Studies have shown that development projects tend to affect community members unequally, with the most vulnerable at risk of becoming even more disenfranchised.<sup>b</sup>

The final characteristic of our approach is that it is **evidence-based**. This implies a focus on the strongest available empirical findings. Caution is required in estimating potential social and economic impacts of development projects because, although post-impact studies are rarely done (Baxter et al., 2001), when they are, they often show that predicted impacts as described in environmental impact statements were inaccurately predicted, with both over- and under-estimations of both positive and negative impacts being found.<sup>c</sup>

Moreover, as it has been noted in previous reviews<sup>d</sup>, the literature is replete with conflicting evidence and poorly designed studies. Our approach has been to critically examine and triangulate data from a very wide range of sources, including administrative records, census and surveys, previous research projects, archival records, and from former service providers, compensating for a paucity of comprehensive information for the earlier periods by juxtaposing disparate and partial information sources.

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<sup>a</sup> Makino (2003).

<sup>b</sup> Palinkas (1993).

<sup>c</sup> e.g., Berkes (1988); Osler (1990); BC Hydro (1981) c.f. Knight et al. (1993); Stewart and Bone (1986); Égré and Sénécal (2003).

<sup>d</sup> e.g., MacDonald and Giesbrecht (1983).

### 2.3. Continuity and Reliability of the Available Data

Several limitations concerning data affect our examination of health status and health determinants. First, few data were available prior to 1982, because computerised records of health services did not yet exist and the territory's public health service was still in the process of formation. Comparisons with the situation prior to the James Bay and Northern Quebec Agreement (JBNQA) can be made only on a general level. This is because the early data often exist in bodies of documentary evidence, rather than the continuous, standardised numerical reporting that we are accustomed to today. The paucity of data for the early years (pre-1985) necessitates a greater reliance upon relatively few statistical reports, and upon fragmentary statistics captured in documents such as the field reports of administrators.

Second, definitions of some health indicators inevitably changed over the course of three decades. In particular, there were variations from source to source in the statistical procedures applied (e.g., crude mortality rates vs. standardised mortality ratios; direct vs. indirect method of age-standardisation). These procedural changes can raise questions about whether a time series – particularly one presented in a previous report - actually captures a sequence of sufficiently similar items of data.

Third, questions have arisen about the completeness of some of the data. For example, in the early years the mortality records of the *Ministère des Affaires sociales du Québec* (MAS) and its successor the *Ministère de la santé et des services sociaux du Québec* (MSSSQ) were based on death certificates which appear to under-state the true number of deaths and, alternative sources were found to be incomplete.

Denominators are a recurring issue, and the 'target' population has varied somewhat from report to report. For instance, some studies included all residents of the territory (Cree, Inuit, and non-Aboriginal), while others focused specifically on the Cree residents. Similarly, some researchers applied various types of corrections to the population figures, while others simply used the numbers shown in the JBNQA Beneficiaries List<sup>a</sup> or used sources based on the Census. As a result of all of these factors, it is often only possible to draw broad conclusions from the existing material. Some observed differences over time may be due to non-comparability of sources rather than due to true changes, despite efforts to use the most comparable information and to triangulate information from different sources.

### 2.4. Data Sources - General

The data on health status and health determinants were systematically inventoried from administrative and statistical sources including the following:

- Published and unpublished reports, and working papers, prepared by the CBHSSJB since its inception.
- Programme and administrative files from the CBHSSJB over time.
- Published reports from government sources such as the Medical Services Branch of Health Canada<sup>b</sup>, the *Institut national de santé publique du Québec* (INSPQ), and MSSSQ.
- Academic studies of the Cree Region such as: articles published in scientific journals, theses, and studies of specific topics or diseases.
- Data from MSSSQ databanks (for more recent years only, since electronic databases did not exist during the early part of the period), including: mortality data; hospitalisation data (MED-ECHO files); notifiable disease data; and tumour registry data.

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<sup>a</sup> The official list of Cree persons entitled to benefits under the provisions of the James Bay and Northern Quebec Agreement. This list is maintained by the MSSSQ.

<sup>b</sup> The Department of National Health and Welfare from 1945 until the 1980s.

- Data collected by the CBHSSJB for purposes of programme management and for mandatory reporting to other agencies.
- Survey data from the report of the Santé-Québec survey and from Statistics Canada's 1991 and 2001 Aboriginal Peoples Surveys. In addition to the published sources, a series of custom tabulations was ordered from Statistics Canada for data from the 2001 Aboriginal Peoples Survey.
- Census data for the years 1986, 1991, 1996, and 2001.
- Archival reports and records, largely with respect to the evolution of health services.
- General literature in the area of Aboriginal health and health services.

Because of its geography and history, the Cree Region has fewer comprehensive, longitudinal data than would usually be available in a 'mainstream' context. To compensate for this, our strategy has been to juxtapose information from a variety of different sources, some of them necessarily being partial. The approach involved, firstly, determining the comparability of data from the various sources in terms of definitions and methodologies. Secondly, comparable data were located in their appropriate historical period to permit analysis of trends over time. Where possible, data from multiple sources covering the same issue in the same period were triangulated to arrive at an overall portrait for the health issue in question.

Some of the data inventoried were only available for the Cree Region as a whole (Region 18 of the MSSSQ), while others were available for individual communities. In some instances, community-level data were used to group the communities into inland and coastal areas for comparison, as in the 1991 Santé Québec Health Survey. In a few cases it was also possible to extract data for the subset of four communities anticipated by Hydro-Québec to be most affected by the EM-1-A project: Eastmain, Mistissini, Nemaska and Waskaganish. Where practicable, data for the Cree population were compared to data for other Registered Indian communities in Canada, for the Québec population, for Nunavik (Region 19), and sometimes for Region 10 into which Region 18 appears as nine discrete jurisdictional islands.

## 2.5. Data Sources - Specific

Some previous research has read too much from the statistical data available for the region. In other instances, studies would have been stronger had they brought additional data sets into their analysis. For these reasons we have been careful to consider the quality and continuity of all data sources, including ones such as the Census which are sometimes assumed to be more representative or accurate than actually may be the case. Furthermore, as a rule we have considered multiple sources and cross-checked them for veracity and representativeness.

It is useful now to review the utility main sources of mortality data that we have used, either as a data source *per se*, or to provide valuable lessons about the utility of data. The mortality records, already referred to, provide the longest time series. These data, along with several key surveys, form the backbone of much of the information on trends in health status. For this reason, the text below describes the coverage and limitations of the major reports on mortality, and the key surveys that we used, in greater detail.

### **Bernèche Report, 1975-77**

Bernèche obtained data on deaths (1976) and hospitalisations (1975-77) from the *Ministère des Affaires sociales* (MAS, predecessor of the MSSSQ) for all residents of what was at the time Region 10b (a sub-region of Region 10 which corresponded to the eight Cree communities). These data on deaths included

some non-Aboriginal residents of the area, plus some 600 Inuit living at Poste-de-la-Baleine (now Whapmagoostui and Kuujuaaraapik) and 50 Inuit at Fort George (Chisasibi).

There being no way to distinguish a person's ethnicity in the MAS data, Bernèche coped with the problem by adding the Inuit populations of Fort George and Whapmagoostui to her denominator. She was unable to find an equivalent way of compensating for the inclusion of some non-Aboriginal people in the figures. She observed that including non-Aboriginal people in the numerator, but not the denominator, could potentially inflate the rates. However, she suggested that this inflation would likely be offset by a series of other factors that would artificially lower the rates.

First, because the Cree Beneficiaries List was only established in July 1977, she had to use the larger 1977 population as the base year for rates, although her data were for 1976 (deaths) and 1975-77 (hospitalisations). Second, the Beneficiaries List included an estimated 10% of people who in fact were no longer resident in the area, but were still on the list because they had been absent less than ten years. Third, late reporting of deaths to the MAS would also tend to artificially lower the rates.

### **Robinson Report, 1975-82**

There are few methodological details for this report. According to Saint-Pierre, it included only Cree residents, but counted people throughout the entire territory – on the lands defined as Category 1, 2, and 3 in the JBNQA (i.e., the existing Cree communities, plus Crees living in towns such as Chibougamau and Chapais, whereas many of the other mortality reports counted only residents of the Cree communities as such). However, Robinson's study also cited some of Bernèche's figures, which were only for the Cree communities.

### **“Plasanouq” Survey (Foggin Report), 1983-84**

The Plasanouq (*Planification santé Nouveau-Québec*) survey took place in the summers of 1983 and 1984. It involved 1,760 Cree people chosen from all the existing Cree communities. The survey consisted of:

- A questionnaire administered to one person in each selected house by a Cree interviewer.
- A clinic visit for a physical exam by a doctor, including measurements, an ear exam, dental inspection, blood pressure measurement, and blood and hair samples.
- A detailed questionnaire on respiratory health, administered during the clinic visits.
- Tests of lung capacity.

The survey team used maps to select a random sample of 35 households in each community. They then interviewed one person in each household, who was usually the mother. This person responded to questions about health status, clinic visits, and perceptions of service on behalf of all household members. Every member of the household was invited to take part in the clinic visits, and a large percentage (81%) did so. In addition, while in the house, the survey team took a sample of whatever water the residents were actually drinking (which was not always the water from the tap).

Although the **“Plasanouq” Survey** is one of the few available major sources of information for the early 1980s, it appears to have had some methodological flaws and has therefore been de-emphasised wherever there are alternate sources of information. There are inherent problems with any proxy-response method, and the technique of producing individual-level data by choosing one respondent per household no matter what its size leaves something to be desired. This is especially important because at the time there was systematic variation in household size, since some communities had recently been relocated and hence had newer, larger housing.

Further, the researchers seem to have aggregated the results without any kind of weighting to compensate for the very different sizes of the communities. The result is that most of the territory-level data included in the report are erroneous. However, some of the numbers for individual communities are accurate, and the information on water quality at the time remains useful. As well, in some instances enough of the original data were provided to allow for a re-weighting of the numbers, so that it was possible to recreate accurate estimates for the Cree Region as a whole.

### **Courteau Report, 1982-86**

This study focused on the populations under the responsibility of the CBHSSJB; namely, persons people living on lands defined as Category 1a and Category 1b. Thus, this study concerned persons in the existing Cree communities and their immediate surrounds. It excluded the several hundred Crees living in towns like Chibougamau, Val d'Or and Chapais.

Mortality Figures: At the time, MSSSQ death certificates for the area were judged very inadequate because they produced life expectancy figures considerably above the provincial average. Therefore Courteau merged three sources of mortality data to obtain complete figures:

- Death certificates for Region 10b (the existing 8 communities) as listed in the MSSSQ system, but deleting deaths that occurred in the 'other' Mistissini in the Lac St-Jean area, and eliminating the Inuit deaths from the figures for Great Whale.
- A computerised list of deaths maintained by the Northern Quebec module of Montreal's *Département de santé communautaire*. This list, based on monthly reports from the Cree clinics and hospital, had recently been updated and cleaned up by Lavallée.
- Deaths reported to the Cree Beneficiaries List, maintained by the MSSSQ. (This source included five deaths not listed elsewhere - presumably people who died outside the territory).

Courteau noted that there were problems in tracing people due to factors such as migration, name change as a result of marriage, and so forth. The date of birth of the elderly was frequently unknown, and death records occasionally confused the date of death *per se* with the date of the *declaration* of death.

Denominator: Courteau used the Beneficiaries List as his denominator, excluding people living outside the territory and in towns like Chibougamau. However, he did not adjust the figures to compensate for late reporting of births to the Beneficiaries List. Therefore, according to Saint-Pierre, his denominator for the age group 1-4 was artificially low. (This would not have affected his infant mortality figures, which were based on live births, and it would have had only a negligible impact on the rates for the territory as a whole).

### **Saint-Pierre Report, 1987-92**

Saint-Pierre seems to have carried out an exhaustive exercise to come up with the most complete figures possible. Her target population was Region 18, that is, people served by the Cree Health Board living on category 1 and category 2 lands. This included about 300 non-Aboriginal people and 50 Inuit.

Mortality Figures: Saint-Pierre matched three sources: the vital statistics produced by the MSSSQ (extracted using the municipal code); the Beneficiaries List numbers (which give identifying information but not cause of death); and the monthly reports from each clinic to the Public Health Module for the Cree Region at the Montreal General Hospital. No single source was complete. The Beneficiaries List had 86% of the deaths, the Public Health list 84%, and the MSSSQ vital statistics 78%.

Denominator: Saint-Pierre listed substantial evidence that the 1991 Census had under-counted the territory's population:

- Census figures showed the population of Mistissini decreasing by 19% since 1986, and Chisasibi down 3% (an unlikely scenario in a region with little migration and a high birth rate).
- In Mistissini and Waswanipi, at least a quarter of the questions had not been completed, suggesting broader problems with administration of the Census in these communities.
- Between 1981 and 1986 the rate of increase was estimated at 14%, while between 1986 and 1991 it was only 1.7%.
- The 1991 Santé Québec survey used the housing lists in each community as its sampling frame, and came up with a higher population figure.
- The number on the Cree Beneficiaries List was also higher than the Census figures.

Saint-Pierre accordingly decided not to use the Census information, and instead adjusted the Beneficiaries List to use as her denominator. The Beneficiaries List also had some problems. Specifically, the rules under which the system operated stipulated that for a table requested in, say, 1995 but containing data up to 1990, any births that had happened before 1990 but were reported late were not counted into the table. On the other hand, any deaths that happened before 1990 but were reported late *were* certainly counted into the table.

The net result was that the Beneficiaries List correctly estimated deaths but it under-stated births. Saint-Pierre requested a special tabulation to eliminate this problem. She also added the Inuit in Chisasibi, and corrected the figures for Whapmagoostui to include only Crees (thus, exclude Inuit there). Finally, she added in an appropriate denominator for the non-Aboriginal population of the territory.

### **Aboriginal Peoples Survey, 1991 (APS 1991)**

In 1991 Statistics Canada carried out a survey of Aboriginal people across the country. The survey covered health and a variety of other topics such as employment, income, language, and housing. As part of this survey, Statistics Canada produced data for each of the Cree communities in James Bay based on a random sample of residents. This provides useful information not only on health, but also on factors related to health such as housing. It is interesting and useful that the Santé Québec survey also took place in the Cree communities in 1991. This asked about some of the same topics. This overlap permits some degree of checking one survey's findings against the other.

The APS as administered in the Cree Region had two known limitations. First, it used the 1991 Census as a sampling frame. The 1991 Census suffered from problems of under-counting (as explained above) and it is estimated to have missed as much as 30% of the population.<sup>a</sup> This is likely to have affected the sample. Second, on a more mundane level, the survey results are in printed-paper form for each individual community. It is of course possible to produce a picture for the territory as a whole by adding the community figures together, but to do so probably introduces a small amount of error, because each community's figures have been subject to Statistics Canada's random-rounding process.<sup>b</sup>

### **Santé-Quebec Survey, 1991**

The Santé-Québec survey was carried out in each of the eight existing Cree communities in 1991. This detailed health survey was a collaborative effort between the MSSSQ and the CBHSSJB. Besides a questionnaire, it included measured biophysical indicators such as height, weight, blood pressure, and blood chemistry (e.g., lipid levels). The survey used corrected band lists from the nine communities as its sampling frame and targeted people over the age of fifteen. The final sample for the questionnaire portion consisted of 1,161 individuals in 354 participating households.

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<sup>a</sup> Schnarch (2001), p. 5.

<sup>b</sup> A procedure whereby results are rounded up or down to the nearest five in order to protect the confidentiality of individual respondents.

The known limitations of the Santé-Québec survey relate primarily to issues of language and cross-cultural understanding. Survey managers were not certain that all interviewers translated questions into Cree in the same way. In addition, analysts grappled with the fact that some concepts of health that are common in Quebec do not exist in the Cree world (and vice-versa). Although there were doubts about how well some of the scales (e.g., alcohol scale) performed across cultures, the survey remains a valuable source of information.

#### **Schnarch Report, 1993-97**

The Schnarch report is a large compilation of existing data from various sources. After 1998, the MSSSQ recognised that the 1991 Census had under-counted the population of the Cree Region. The MSSSQ therefore issued corrected figures. Schnarch (et al.) applied this corrected denominator to existing mortality figures published by the MSSSQ to produce more accurate rates.

#### **INSPQ, Le portrait de santé, 1994-98**

The mortality data published by the INSPQ includes all residents of Region 18 (i.e., the entire service population of the CBHSSJB). Consequently, it includes some non-Aboriginals as well as 50-100 Inuit residing in Chisasibi. Inuit living in Whapmagoostui / Kuujuarapik are excluded. As denominator, the INSPQ uses the population projections prepared by the *Institut de la statistique du Québec*, which sometimes differ considerably from other sources.

#### **CBHSSJB Mortality Figures for 1995 and Later**

In most cases, the CBHSSJB uses the mortality data produced by the MSSSQ (i.e., numbers covering all residents of the Region 18, Cree and non-Cree). A few reports - notably a special report on injuries that was prepared in 2002 - use the mortality databank maintained by the CBHSSJB itself, which relates only to Cree residents of the area. The CBHSSJB uses the Beneficiaries List as the denominator for its rates.

#### **Aboriginal Peoples Survey, 2001 (APS 2001)**

Like the 1991 version, this survey covered a variety of topics and interviewed people in each of the Cree communities. Unlike the 1991 version, however, the sample in 2001 was designed primarily to produce data at the level of the territory rather than the level of individual communities. The target population included any resident who self-identified as an Aboriginal person. The sampling frame was drawn from the simultaneous (2001) Census. This produced population figures which are fairly similar to those on the JBNQA Beneficiaries List. All told, the 2001 APS obtained data from 328 children and 578 adults.

In sum, the various studies and data sources all grapple with denominator issues, and the historical reports have tended to cover slightly different populations and geographic areas.

<b>A Comparison of the Populations Covered by the Different Mortality Studies</b>				
<b>Study</b>	<b>Years covered</b>	<b>Population covered</b>	<b>Geographic area covered</b>	<b>Denominator used</b>
Bernèche	1975-77	Crees + Inuit in Whapmagoostui and Chisasibi + non-Aboriginal residents	The 8 [at the time] Cree communities	Beneficiaries List for 1977 + Inuit
Robinson	1975-82	Crees only	Category 1, 2, and 3 lands (including Chapais, Val d'Or etc)	Beneficiaries List?
Foggin (Plasanouq)	1983-84	Crees only	Cree communities	Respondents, (weighted to popn on Beneficiaries List)
Courteau	1982-86	Crees only	Category 1 and 2 lands	Beneficiaries List
Saint-Pierre	1987-92	Crees + Inuit of Chisasibi + non-Aboriginal residents	Category 1 and 2 lands	Beneficiaries List adjusted + Inuit + non-Aboriginal
APS 1991	1991	Residents who identify as Aboriginal	The 9 Cree communities	Survey respondents (weighted to 1991 Census popn)
Santé-Québec	1991	Crees age 15+	The 9 Cree communities	Survey respondents, (weighted to population figure from unstated source)
Schnarch	1993-97	Crees + Inuit of Chisasibi + non-Aboriginal residents	Category 1 and 2 lands	INSQ population projections, as corrected in 1998
INSPQ Portrait de santé	1994-98	Crees + Inuit of Chisasibi + non-Aboriginal residents	Category 1 and 2 lands	INSQ population projections based on Census
APS 2001	2001	Residents who identify as Aboriginal	The 9 Cree communities	Survey respondents (weighted to 2001 Census popn)
CBHSSJB internal tables	1995+	Crees + Inuit of Chisasibi + non-Aboriginal residents	Category 1 and 2 lands	Beneficiaries List

## 2.6. Specific Sources of Population Data

This section discusses how the regional population is counted. Up to 1998, the MSSSQ used erroneous population figures for the region. This was corrected retrospectively in 1998. However, from 1999

onwards, the population figure proposed by the MSSSQ was a projection based on an erroneous rate of growth for the region. This problem was only recently addressed on the basis of the 2001 Census<sup>a</sup>.

### **2.6.1. The Influence of Maps in Describing the Cree Population**

Throughout Quebec the government-established boundaries of administrative regions vary from ministry to ministry. While the Government of Québec has health and social services as well as educational services delivered through regional councils in Regions 17 and 18, these regions are incorporated within the geographically enormous Administrative Region 10 for many other areas of government services.

The *Institut de la Statistique du Québec* (ISQ) produces regular population reports on the administrative regions of Quebec. As the populations and geography of MSSSQ Regions 17 and 18 are but minority populations and areas within the vast Administrative Region 10, statistical descriptions for MSSSQ Regions 17 and 18 are not part of the ISQ's routine public reporting. The ISQ does not produce material specific to either the Cree or Inuit regions apart from selected population projections. This has obvious political and practical implications for that area of Quebec. In particular, the CBHSSJB cannot draw upon, for its own planning purposes, some useful geographic groupings of data. Indeed, much of the regular, regional statistical background information that other health regions in Quebec utilise for planning purposes are not at all, or else only minimally, available to planners in Regions 17 and 18.

Another point to consider is the southern boundary of the MSSSQ's Administrative Region 10. Based on the 49th parallel, this line on the map is north of the height of land which the JBNQA defines as the Cree Region. A result of this is that a part of the 'traditional' Cree population living in the southern hunting territories of Waskaganish, Waswanipi and Mistissini are not counted as part of the Cree population of Region 18 unless they also maintain a residence within a Cree community.

### **2.6.2. Sources for Population Counts**

The Cree cohort of the regional population is by far the dominant in terms of size, while also the most challenging to accurately count. The counts that are available are found in administrative records or else in sets of periodic survey data.

Administrative Records: The list of Cree beneficiaries of the JBNQA is periodically updated and released by the MSSSQ. These data are available by community of residence or by community of affiliation. Also, the Department of Indian Affairs and Northern Development (DIAND, also called INAC) maintains the Indian Registry. This counts only registered Indians living on, near or off own reserve or on another reserve. As Oujé-Bougoumou does not have reserve status (it is not on federal land) its residents are considered off-reserve members of other communities.

Periodic Survey Data: The results of the Census, released by Statistics Canada every five years, are available for total population as well as for Aboriginal population. Additionally, the ISQ produces population projections based on reworked total Census data.

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<sup>a</sup> Considering the importance of the subject and its implications, this section has been updated to include the 2005 information on population. However, note that all of the substantive work in this report, which uses population data, was completed by the spring of 2004. Except for this short methodological discussion, all the population data in the report were current at the end of 2003.

Population Categories Used by the Principal Sources				
Source	JBNQA Cree Beneficiaries	All Residents	All Aboriginal Residents	Status Indians on Reserve
MSSSQ Beneficiaries List				
Indian Registry				
Canadian Census				
ISQ Projections				

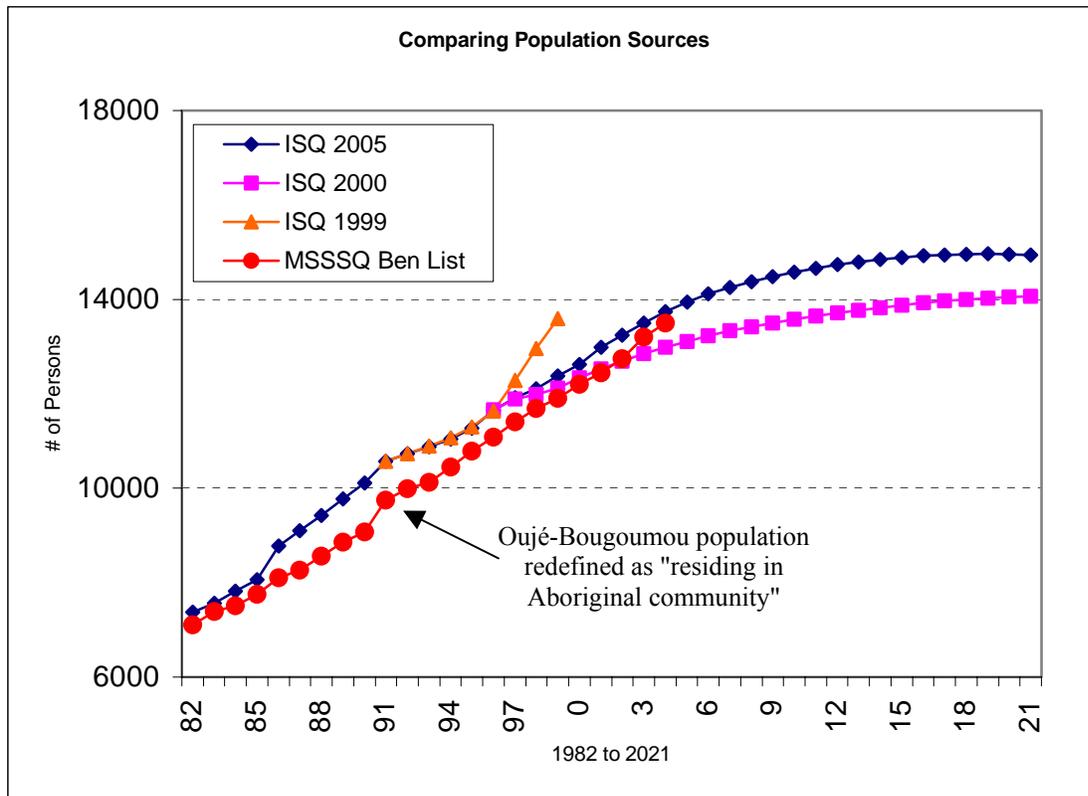
These categories of the population overlap. The Statistics Canada category ‘Aboriginal’ includes all individuals who self-identify as North American Indian, Inuit or Métis and/or have reported band membership and/or have affirmed that they were registered Indians. In the Cree Region, this includes Cree, Inuit, Métis as well as non-Cree Status Indians.

Source	Uses of Principal Sources of Population Counts for the Region
MSSSQ Beneficiaries List	Used on a daily basis within the CBHSSJB, the Public Health Department and by other organisations within the region.
Indian Registry	Apparently not used (possibly used by federal departments for funding calculations).
Canadian Census	Used within the Public Health Department for comparative purposes.
ISQ Projections	Used within the Public Health Department for comparative purposes.

**2.6.3. The Current and Projected Cree Population**

The Problem of Under-Counting: There is good reason to believe that the Cree population was significantly under-counted from the early 1990s until 2003-2004. The 1991 Census may have under-counted the population by about 30%, a problem not unrelated to under-counting in the 1986 Census. Therefore, subsequent population projections based on the 1991 Census and used by the MSSSQ significantly under-estimated the population. Until 1998, all MSSSQ analyses of the state of health of the population, or of costing per capita for health services in Region 18, were using the wrong denominator with various outcomes. This means that comparative rates reporting aspects of the state of health of the population would have been exaggerated, as would the per-capita costs of providing services. In February 1998, the MSSSQ finally published a corrected population projection produced by the ISQ and based on the 1991 Census. In 1999, projections were produced from the same Census. These tried to estimate population up to that year but there was an important overestimation of population growth rate. Then, in 2000, the ISQ produced revised projections based, this time, on the 1996 Census. While both presented an increase in population, the growth predicted in the 1999 projection was slowed down too much in the version of 2000, leading to an under-estimation of the population once again. In February 2005, a new population projection was published by the ISQ, this time based on the 2001 Census. While the numbers seem to agree up until 2002 with the MSSSQ’s JBNQA Beneficiaries List (considering a 95% Aboriginal population in the ISQ list), they subsequently show a decline in population growth which

is not matched by a decline in the Beneficiaries List for 2003 and 2004 which is based on actual, not projected, Cree beneficiaries resident in the Cree communities.

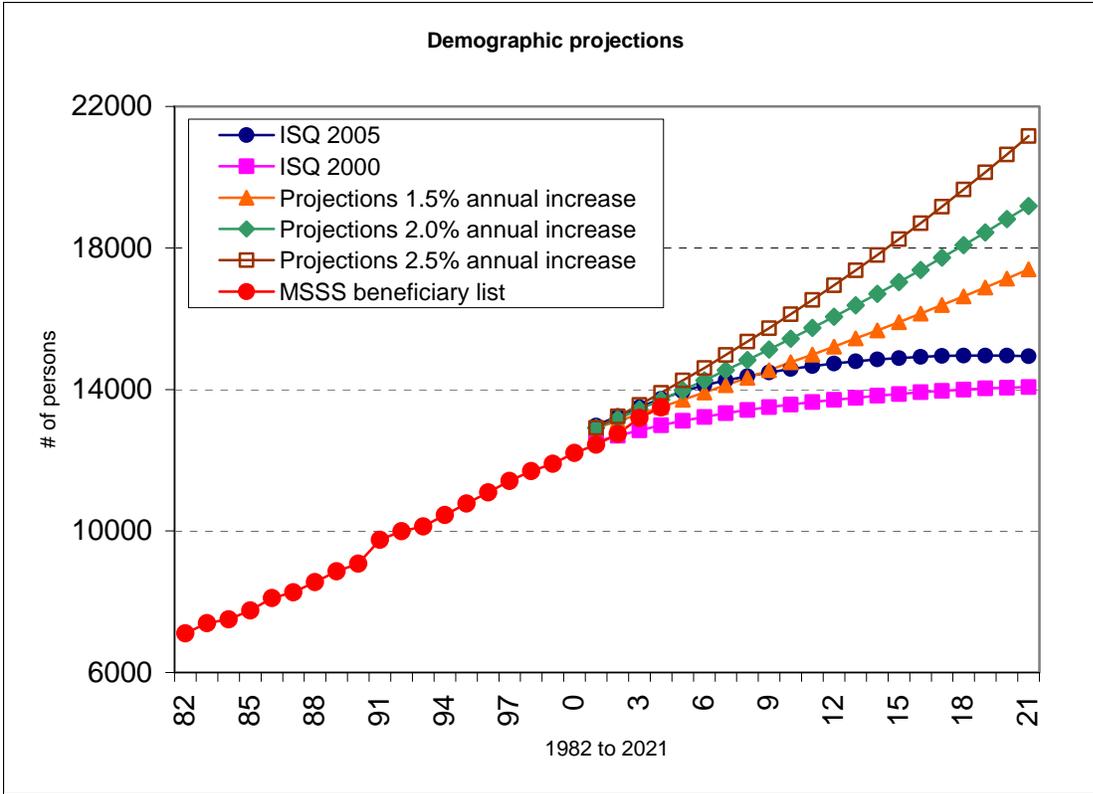


An implication of this difference is that the Government of Quebec’s population projections once again under-estimate the present and future service population of the CBHSSJB. By our estimates, their total population figure for the region in 2005 is likely missing between 500 to 600 people. This difference is expected to increase rapidly in future years. In addition, these figures neither include the roughly 100 Inuit residing in Chisasibi (who are counted as Inuit beneficiaries living outside of Region 17) nor the in-region labour force immigration that is expected in coming years as a result of the new agreements with Quebec.

**Corrected Cree Population Projections**

Within the context of this contract with Hydro-Québec, the Public Health Department asked the INSPQ to provide the most accurate and current projections for regional population growth. Based on the MSSSQ’s Beneficiaries List, the INSPQ suggested<sup>a</sup> that the Public Health Department project either a 2.0% or, more conservatively, a 1.5% Cree population growth rate:

<sup>a</sup> Hamel (2003).



## Chapter 3- Literature Review: Health and Social Impacts of Large Development Projects on Small Remote Communities

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### 3.1. Introduction

The literature review in this Chapter summarises the existing research literature on the health and social impacts of large development projects on small remote communities. A subsequent section<sup>a</sup> found in Chapter 8, which was not prepared for Hydro-Québec (Hydro-Québec) but for the CBHSSJB, projects how the impacts identified in the literature might be expected to manifest in the Cree Region as a result of the Eastmain-1-A Powerhouse and Rupert Diversion hydro (EM-1-A) project. For purposes of illustration, the literature review refers to the case of the community of Nemaska because it was the first community to experience impacts from the road construction works preliminary to the EM-1-A project. Nemaska shares, with other Aboriginal northern communities discussed in the literature, many common features in terms of population, economy, geography and so on. Any impacts suggested by the literature may have local and/or more general application: the case of Nemaska is a local example for the Cree Region as a whole.

The literature review was undertaken as an examination of the so-called “social impacts assessment” literature, although information on assessment of social *and* medical impacts was equally sought and considered. The literature about human impacts tends to focus on certain so-called “social impacts”, which can be good or bad for individuals and society. Medical health as an impact receives less prominent treatment. Yet when “social impacts” studies examine negative “social” effects (e.g., abuse, fighting, addictions, injuries, and family dysfunction), they are directly or indirectly implying medical health consequences which implicate personnel, equipment, policies, and funding.

Ultimately, modern society expects the system of health and social services to address any medical and social pathologies associated with the “down side” of developments. When the services exist, human impacts often manifest as variations in medical and social services caseloads. In the Cree context, the medical and social services operate under one roof so to speak: the Cree Board of Health and Social Services of James Bay.

Chapter 3 is organised as follows:

A **Methodology** section explains the methodological approach to the literature review, and also how these results are related to the present Cree context.

A **Background** section describes the combined Eastmain-1-A Powerhouse and Rupert Diversion hydro project, the regulatory and legislative landscape, and the circumstances of the community of Nemaska.

A **Results** section summarises the literature review.

At the outset, three aspects of the approach taken in this literature review should be made clear. First, the review should not be confused with the “social impact statement” which the project’s promoters are required to make under environmental assessment legislation. Environmental assessments are required to include effects on “health and social conditions, physical and cultural heritage, current use of lands and

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<sup>a</sup> Findings (c) - Expected Impacts and Implications for Intervention: Lessons from the Literature Review.

resources for traditional purposes by Aboriginal persons” - i.e., the broad domains of impacts on people and peoples - but they are estimates of *potential* impacts, not empirical measurement of *actual* impacts<sup>a</sup>. This review focuses on empirical studies of actual impacts, giving greatest weight to studies with the most solid empirical base.

Second, this literature review makes no deliberate assumptions about the direction of impacts on communities. Within the parameters of the health determinants model, it was assumed that large development projects could have both negative and positive human impacts,<sup>1</sup> and the literature was searched accordingly.

Third, while one of the aims of the review is to identify intervention strategies that have helped communities adapt to the changes brought by large development projects, the term “mitigation of impacts” has been avoided because it is charged with legalistic connotations related to compensation and remediation.<sup>b</sup>

### 3.2. Methodology

Like other parts of the overall research project, the literature is consistent with the population health determinants framework approach. The literature review thus examines the available evidence about the impacts of large development projects on each of the recognised health determinants.

Nemaska has several important characteristics which - both individually and in combination -have implications for the impacts of large-scale development projects. These include: its northern and moderately remote location; its predominantly Aboriginal population; its status as a parcel of federal land locally administered by an Indian band, its history of relocation and subsequent fragility; and its involvement in a boomtown-type development. The literature review aimed to identify impacts that applied to communities with any combination of these characteristics.

The review also took into consideration the fact that development projects can be understood along multiple dimensions.<sup>2</sup> Over periods of several years, large projects go through phases of planning, development, construction, commissioning, and maintenance. Each of these may be associated with activities having different types of impacts. They may also involve different geographical and physical aspects, leading to different arrangements for access and transport to the construction site, worker accommodation, and work organisation. All of these may have implications for communities and social

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<sup>a</sup>Recognised as a longstanding problem (e.g. Baxter et al., 2001), the lack of post-project monitoring and follow-up to measure actual and cumulative impacts has recently been addressed in changes to the federal Canadian ([http://www.ceaa.gc.ca/013/b1031030\\_e.htm](http://www.ceaa.gc.ca/013/b1031030_e.htm)) and American (Inter-organizational Committee, 2003) legislation. From a Hydro-Québec perspective in the Québec context, Trussart et al.(2002) recommended that “the hydro power industry put more resources into ensuring that existing and future environmental and social mitigation measures are adequately monitored and assessed, and that the results of post-project studies are systematically fed back into the project planning and environmental impacts assessment process”, p. 1258.

<sup>b</sup> Some critics of Canada’s environmental assessment legislation argue for moving toward sustainability assessment, where impacts on complex systems would be examined more holistically, and where a more stringent test for project approval would require demonstrating enhancement to sustainability rather than mere mitigation of serious adverse effects (Gibson 2000, 2002). This approach would be more compatible with that taken in this review. Interestingly, Trussart et al. (2002) conducted a study of the mitigation measures most commonly used throughout the world and their effectiveness, using systematic literature review of 147 research reports and a survey of major hydro powers. In the context of hydro development projects, four types of mitigation strategies are used: 1) impact avoidance measures; 2) mitigation measures; 3) compensation measures; and 4) environmental measures. Many of the measures that might be associated with a sustainability approach would fall under the first category.

organisation. Large-scale projects are also subject to “dragging effects,” whereby activities of other parties are stimulated or accelerated because of spin-off effects related to the development.<sup>3</sup>

Studies have found that “support activities” (e.g., construction and operation of roads, river crossings, airstrips, barges, wharves, gravel pits, and work camps) are more damaging and less controllable than the development project itself,<sup>4</sup> yet their impacts generally fall outside the requirements for impact assessment.<sup>5</sup> Finally, although most large-scale projects are now considered to be “multi-stakeholder,” the organisational and political structures, and relationships, of and between the stakeholders may vary. The review thus examined all types of large-scale development projects. The range included not simply hydro-electric projects but also those connected with mining, oil and gas developments, and some types of natural disasters which have had long-term, major environmental implications for local communities.

The methodology used to locate sources for the review was as follows:

- Internet searches using Psycinfo, Ingenta and Medline using various combinations of words and phrases related to resource (hydro-electric, mine, oil and gas) development and human (community, psychosocial, health, organisational) impacts.
- On-line searches of the libraries of the DIAND and Environment Canada using Yukia, the Yukon Government information system.
- Visits to the DIAND and Environment Canada libraries to physically locate documents identified on-line.
- Searches of Hydro-Québec’s documentation centre catalogue, both on-line and on-site.
- Use of a very helpful annotated bibliography by Knight et al. (1993) obtained through the Centre for Human Settlements at the University of British Columbia.

Journal articles were either obtained through commercial document retrieval services or reviewed on-site at one of the above libraries. Some documents were ordered from the Centre for Human Settlements at the University of British Columbia.

Three comments on the state of the literature are in order.

First, some critics of northern development have noted that there is little incentive for proponent stakeholders to carry out good-quality follow-up studies of mega-projects. This may be because downstream areas affected by the project are out of their jurisdiction, and/or because such studies are expensive and complex and require good long-term databases with pre-project baselines which rarely exist. However, when such studies have been done, they show that the impacts predicted in environmental impact statements have generally been inaccurate, with consistent over-estimation of investment returns, and consistent under-estimation of archaeological loss, economic loss, project costs, and environmental damage.<sup>6</sup>

For example, a review by Berkes<sup>7</sup> of impact studies of the James Bay project showed that predicted impacts in five of six case studies were inaccurate. A post-project overview study of the Grand Rapids hydro-electric development concluded that the environmental, economic and social impacts were all less than predicted.<sup>8</sup> A study by BC Hydro of the actual impacts of the Revelstoke hydro-electric projects showed that impacts on social and community services were less than predicted, largely due to inaccurate forecasting of worker mobility patterns.<sup>9</sup> Post-project monitoring of the Norman Wells oilfield and pipeline development showed that benefits to northern residents and social costs were both lower than predicted.<sup>10</sup> In other cases, shifting economic and political contexts significantly altered the implementation of mitigation measures, leading to much greater negative impacts than expected.<sup>11</sup> In still other cases there were errors, omissions, and political machinations which led to over-estimation of

benefits, under-estimation of negative impacts, and subsequent inadequacy of mitigation resources (often among people who have little legal or political recourse to publish alternative viewpoints).<sup>12</sup>

A second comment on the state of the literature (as noted in previous reviews<sup>13</sup>) is that it is replete with conflicting evidence. One can identify sources with opposing interpretations of the same situation in the case of every major Canadian development. It is difficult to know how to reconcile these conflicting results, especially as they often seem to fall in line with the authors' stakes or affiliations.<sup>a</sup> For example, studies conducted on behalf of Manitoba Hydro and the Manitoba government<sup>14</sup> downplay the impacts of hydro-electric development on the people of northern Manitoba, while other authors find the impacts to have been major and devastating.<sup>15</sup> In Québec, authors associated with Hydro-Québec applaud the success of mitigating measures in "speeding up development of the Cree, Inuit, and Naskapi societies,"<sup>16</sup> while other authors conclude that James Bay development has caused irreversible cultural, economic and spiritual dispossession.<sup>17</sup>

In the NWT, a congratulatory description by a former federal government official of the negotiations leading to agreements to proceed with the Ekati diamond mine<sup>18</sup> does not match an alternative account of the same process by one of the Aboriginal negotiators.<sup>19</sup> It would not be appropriate to merely dismiss conflicting reports (although it would be helpful if authors could state and assume their biases, as do Colomeda & Wenzel, for example). This is because all probably contain some elements of truth at least from the authors' perspectives. We accept these differences as one of the features of the literature: in the review which follows, conflicting findings on impacts are noted.

Third, it must be noted that the methodological quality of most of these studies leaves much to be desired. The most comprehensive and rigorous studies triangulate findings from a combination of primary and secondary sources. These are generally in-person key informant interviews and administrative data. However, many studies rely on only one data source. To assess impact, studies must be able to detect changes associated with development projects over a backdrop of the ongoing changes taking place in northern and Aboriginal communities. This allows one to understand how the development project may accelerate, hinder, or synergise pre-existing trends both positive and negative. A few of the existing studies measure impacts longitudinally, comparing changes over time, but most use a one-shot cross-sectional design. Almost none of the studies use a comparative design, examining concurrent changes in similar communities. To the extent that findings from studies with different types of weaknesses converge, we can be more confident about the validity of the conclusions. However, the many conflicting findings in this literature limit our ability to make unequivocal statements about human impacts.

### **3.3. Background**

#### **3.3.1. Background: The Eastmain-1-A Powerhouse and Rupert Diversion Project**

To begin with, the Eastmain-1-A Powerhouse Project and the Rupert Diversion Project are actually two separate, related projects within a larger hydro-electric development. It has become commonplace to consider the two as one project, often simply called "EM-1-A" with or without "Rupert" in the title. However, in this literature review we must occasionally distinguish between the Eastmain-1-A Powerhouse project and the Rupert Diversion project.

The combined Eastmain-1-A Powerhouse and the Rupert Diversion initiative has three major construction components (see [www.hydroquebec.com](http://www.hydroquebec.com)). These are: the Rupert River diversion; the Eastmain Powerhouse; and the Sarcelle structures.

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<sup>a</sup> See Levesque (1989) for an example of findings separated according to the authors of the studies.

## **Component 1: Rupert River Diversion**

The first component of the project is the Rupert Diversion, that is, the redirection of some of the waters from the Rupert River watershed into the Eastmain watershed. Specifically, the diversion involves a portion of the flow of the Rupert River from a point 314 km upstream of where it empties into Rupert Bay. This will be diverted into the existing Eastmain 1 reservoir. This diversion of flow will require the construction of:

- four dams;
- a spillway on the Rupert River;
- about 50 dikes;
- two diversion bays with a total area of about 400 square kilometres (including 165 km<sup>2</sup> already under water and 230 km<sup>2</sup> of land);
- a control structure between the two diversion bays;
- a network of canals or tunnels totalling approximately 12,000 metres in length; and
- structures to restore some of the diverted flow to the lower reaches of the Rupert.

It will also require relocation of some existing power lines, and construction of:

- three temporary work camps;
- permanent access roads from the Albel substation and from an existing secondary road;
- a temporary transmission line from Albel substation to the construction site; and
- a permanent transmission line to the spillway on the Rupert River and a control structure.

The issues which gave rise to this literature review are linked to the construction of a work camp at Némiscau, about 20 km to the east of the community of Nemaska (see below). Construction of the camp began in 2003 and it currently houses about 200 Hydro-Québec workers. Some of these are Cree, mainly from the community of Mistissini, while others are southern non-Aboriginals.

## **Component 2: Eastmain Powerhouse**

The second component of the project is the construction of an additional generating station (Eastmain 1-A) near the Eastmain 1 powerhouse already under construction. A work camp will also be constructed at Eastmain, with road access from the Némiscau airport.

## **Component 3: The Sarcelle Structures**

This involves the construction of structures at the Sarcelle site, at the outlet of the Opinaca reservoir north of the Eastmain generating station, with their exact nature to be determined by the Crees.

### **3.3.2. Background: Legislative and Regulatory Environment**

As all of the land affected by the overall Eastmain-1-A and Rupert Diversion project is in the territory covered by the JBNQA, the project is subject to both provincial and federal impact assessment and review processes under the JBNQA and the Canadian Environmental Assessment Act. In August 2003, the two levels of government signed a draft agreement for the co-ordination of the impact assessments.

In February 2003, the Grand Council of the Crees, the Cree Regional Authority, the Cree Nation of Eastmain, the Cree Nation of Mistissini, the Cree Nation of Nemaska, the Cree Nation of Waskaganish,

Hydro-Québec and the *Société d'énergie de la Baie James* (SEBJ) signed a preliminary agreement. This Agreement established the parties affected by the development and set out their future roles. The SEBJ, the arm of Hydro-Québec, is expected to produce the impact statements in 2004. If the project is approved at that point, large-scale construction will begin in 2005 and continue over the next eight to ten years, with the Eastmain station becoming operational in 2010.

In parallel with the Eastmain development's impact assessment processes, in April 2004 Hydro-Québec/SÉBJ, the Grand Council of the Crees, the Cree Regional Authority and the nine James Bay Cree Nations signed a major agreement.<sup>20</sup> Its purpose was to facilitate participation of the Crees in hydroelectric development, to settle longstanding legal disputes arising from the JBNQA, and to introduce a new funding mechanism to address the impacts of the La Grande complex.

### **3.3.3. Background: The Cree Community of Nemaska**

Nemaska is home to about 600 people. It is situated about 170 km inland from the southern end of James Bay. While a northern community, it is only moderately remote - it has road access to both northern and southern communities via the Route de la Baie James. The original community of Nemaska was abandoned in the early 1970s due to the closure of its Hudson Bay Post, and also due to concerns about the Rupert-Broadback-Nottaway Development Project. Nemaska's residents subsequently dispersed, mainly to the vicinities of Mistissini and Rupert House (now Waskaganish).<sup>21</sup> The re-establishment of Nemaska re-united this dispersed population in a newly constructed, and more modern, community.

The Nemaska relocation was undertaken as part of the general compensation measures identified in the JBNQA.<sup>22</sup> In this respect, the entire physical community of Nemaska is an impact of the James Bay hydro project. However, this major community change should also be viewed in the context of broader changes affecting all Cree communities over the last three generations. Strong acculturation pressures led to the settlement in organised communities, residential schooling, and so on, with well-documented negative consequences for the health and well-being of people and their communities.<sup>23</sup>

At the time of the relocation of the Nemaska Band, clear differences were seen between younger and older members of the labour force, with two-thirds of adults under 30 being involved in the wage economy (and thus expected to benefit directly from employment in development projects), and older adults involved in subsistence hunting.<sup>24</sup> The early 1990s were a particularly difficult period for the Crees. Increased youth suicide rate and numerous other problems caused great concern. As a result, the residents took measures to improve services and the community fabric, with the reported result that over the last 10 years there have been relatively low levels of social discord or other problems such as alcohol, violence, or family breakdown.

As the early phases of the Rupert Diversion project began, with the construction of the Némiscau work camp, health workers and social service workers in Nemaska noticed the appearance of new and more frequent social problems beginning in the spring 2003 and escalating thereafter. Accounts transmitted to the headquarters of the CBHSSJB describe problems among hydro workers and problems among community residents.

Within the work camp itself there have been reports of excessive drinking and eating among workers. Further, since Nemaska is the community closest to the work camp, Cree and non-Cree workers from the camp frequently visit especially on weekends. These visits have been associated with incidents of excessive drinking, loudness, fighting, and general rowdiness including driving around town in the workers' large trucks late at night. More cases of fighting-related injuries are being treated at the local

health clinic. Additionally, more patients than usual are reported to require evacuation each week for emergency treatment of wounds related to drinking and fighting.

Problems have also been reported among community residents. The proximity of the work camp has increased the ease by which alcohol can be obtained by community members. Both workers and residents may purchase unlimited quantities from the sales outlet, run by Cree Construction Corporation, situated at the camp. This has led to increased drinking by community members, with reports of more partying, fighting, fatigue, and performance problems in school and at work. It is believed that the greater volume of outsiders within the community has also brought increased drug use and trafficking. There have been reports of sexual violence involving project workers from the camp and women from the community. On weekends, elders sometimes leave the community to avoid the noise and problems, many of them returning to the old community (Old Nemaska) which is still used as a camp ground.<sup>25</sup>

Problems with youth have also been noted. These include: vandalism at the school and throughout the community; behavioural problems and violence in school; and disciplinary problems generally. These have led to perceived declines in community safety and increased fear of violence and criminality. These concerns are sufficient that some residents are altering their customary patterns of movement. Questions have been raised as to whether several serious incidents - including a shooting spree and the death of a Mistissini man in a drinking-and-fighting related situation - are related to the development project. Anecdotal reports by outsiders convey the impression that the people and the overall community of Nemaska seem somewhat depressed compared to other Cree communities.<sup>26</sup>

### **3.4. Results of the Literature Review**

#### **3.4.1. Effects on Income and Social Status**

##### **Development and Income Levels**

Development projects are generally promoted as providing opportunities for economic advancement. Studies suggest that both positive and negative impacts occur on local communities. Those impacts are mediated through intervening variables and may change over time.

Positive impacts on income and social status have been found in terms of both wage and subsistence incomes, as well as in the balance among them. The JBNQA and associated developments - notably the Income Security Programme (ISP) and the creation of jobs in the public-service sector - are said to have accelerated a pre-existing trend by raising the revenue of Cree families covered by the Agreement.<sup>27</sup> Hobart noted positive effects on subsistence income in his report on development impacts in Coppermine, NWT. Better than-usual fur harvests during the development period were said to have resulted from better equipment (snowmobiles, boats etc) available in the community because of employment at the relevant mine.<sup>28</sup> Similar results were reported in a study using survey and sales data in Nanasivik. There, wages from a zinc mine were primarily spent on equipment that had the effect of helping to stabilize the subsistence economy.<sup>29</sup>

Positive impacts of the Alaska pipeline were noted on individual, community, and family income. Positive impacts were also noted in the relative size of subsistence, cash, and public assistance income inputs.<sup>30</sup> Development projects outside Canada are also instructive. An example concerns the monitoring studies during the implementation of a major population resettlement for the URRa I project in Columbia. These showed that overall economic outcomes for the population were positive, with higher standards of living in the resettled population. This was attributed in part to the promoter's efforts to ensure economic adaptation and social integration of the resettled population. Until then, this population had received little government attention despite a deterioration of social and economic conditions before the project.<sup>31</sup>

Increased economic diversification and prosperity has been linked to increased community resilience (see below).<sup>32</sup>

Other studies have concluded that development projects have little or no effect on the economic situations of communities. For instance, the Beaufort Sea drilling programme was found in a post-impact study to have produced no substantial negative socio-economic impacts in terms of business expenditures.<sup>33</sup> A survey of Dene communities, about the impacts of the Norman Wells oilfield and pipeline project, found that a majority of respondents received no direct or indirect benefit from the project.<sup>34</sup> Despite this determination, economic benefits were the most frequently cited positive outcome.

Some studies have found negative impacts in the longer term. A long-term evaluation of the construction of the St-Laurence Seaway in the mid-1950s found that it increased local prosperity in the first five years. Employment levels and incomes increased while social welfare cases declined. Yet, in the longer term, the social changes associated with the Seaway were associated with greater overall community poverty.<sup>35</sup>

### **Development and Income Distribution**

Several studies note that, while most northern communities are still working to strike a coherent and healthy balance between traditional subsistence and wage economies, “points of stress” can erupt when not all community members have equal access to the resources needed to adapt to the changing situation. As a result, some community members become increasingly disenfranchised.<sup>36</sup> Large-scale development can exacerbate this situation because the most vulnerable are the most likely to be left behind.<sup>37</sup> High wages paid to development workers may drive up prices in local communities. This increases the cost of living generally and reduces the purchasing power of individuals not involved in the development.<sup>38</sup> Studies suggest that road development in the Cree Region is linked to decreased prices for food and other goods. This leads to the purchase of personal vehicles. This in turn increases personal debt.<sup>39</sup>

The James Bay development has been shown to have contributed to the entrenchment of social strata. At the bottom of this stratification are individuals who have access neither to the income security programme nor to salaried work.<sup>40</sup> Multi-lingual status has been shown to further the participation of stakeholder communities in the bureaucratic elite.<sup>41</sup> These impacts may be greatest on elders in the community who are less likely to speak a second language. They may suddenly be left with no means of support if development workers do not share their wages and have no time to hunt.<sup>42</sup> This increasing economic inequality may undermine social resilience within impacted communities.<sup>43</sup>

### **3.4.2. Effects on Employment and Working Conditions**

There is consensus in the literature that, while the potential exists for large-scale development projects to benefit local communities in terms of employment, the actual impacts on employment are small and often have unexpected negative aspects. There is evidence that Aboriginal workers have constituted but a small proportion of the total workforce in many northern development projects.<sup>44</sup> Often their participation is confined to low-wage, short-term, poor-quality positions.<sup>a</sup>

A post-impact study of the Beaufort Sea Drilling Programme found little change in northern employment and skill levels. Hobart<sup>45</sup> compared employment-related impacts in three communities affected by large-scale developments in northern Canada (Coppermine, Baffin – Nanisivik, and Fort MacKay). The latter is especially relevant for this context because it involves the impact of a development on a small community only 15 km from the development site. This study found that employment impacts were

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<sup>a</sup> Refers to evidence that work in conditions of low control and few opportunities for growth and mastery is deleterious to health (ACPH, 1999).

much less than expected in all three communities. Rotation schedules were found to be the element which had the most disruptive effects on families' economic and food security.<sup>46</sup> Other studies suggest that incompatibility of work schedules, with the demands of subsistence hunting, is a main reason for the low employment of Native workers. This effect is more pronounced if work is insufficiently attractive because it renders families unable to maintain an adequate meat supply.<sup>47</sup>

However, post-project monitoring studies of the Norman Wells oilfield and pipeline development showed that Native and non-Native employment increased at the same rate.<sup>48</sup> One of the few surveys of workers was done on the Norman Wells project. It found that workers were generally satisfied with wages and benefits, schedules, job safety, job orientation, work camps, and working relationships.<sup>49</sup> However, they were dissatisfied with the low number of indigenous people (Dene) who were hired.<sup>50</sup>

A 1983 study looked at the barriers preventing development projects from having more positive effects on employment. The study identified barriers at three levels: pre-employment (getting hired), employment (job types and working conditions), and advancement. Four types of barriers were found to be present:

- barriers related to training, education and experience;
- barriers related to large geographic areas and sparse populations;
- barriers related to culture and lifestyle differences; and
- barriers related to employers and supervisors.<sup>51</sup>

Lévesque's review of social impacts of the James Bay development found few empirical data to confirm initial projections relating to employment, the nature of the jobs created, and the characteristics of the work force.<sup>52</sup>

Some studies have noted impacts related to the inexperience of individuals and organisations (such as band councils) in dealing with the large sums of money that may result from mitigation measures<sup>53</sup> or from highly paid work on the development project itself.<sup>54</sup> This often takes the form of unrestrained spending. This leads to deepened impoverishment when the money runs out.

The Panarctic oil development project's employment policy, in the Inuit communities of Pond Inlet and Arctic Bay, was found to have positive effects on employment. The policy made use of existing leadership strengths in the job selection process, thus reinforcing traditional decision-making lines.<sup>55</sup> Some more recent developments seem to have learned from previous negative experiences. For example, the negotiation of the Ekati diamond agreements with four Aboriginal groups stipulated, with measurable targets, that the developers would first hire NWT Aboriginal people, then non-Aboriginal NWT residents, then other Canadians. Hiring would be based on personal aptitudes rather than formal qualifications (education, training, or experience) and it would include training in all necessary skills, from basic literacy to technical ones.<sup>56</sup> Similarly, Syncrude Canada has formal policies on hiring and training Aboriginal workers, and on capacity development among the Athabaskan First Nations and Métis communities. Syncrude publishes information annually on its performance in these areas.<sup>57</sup>

### **3.4.3. Effects on Education**

There is little empirical evidence about the impacts of development projects on education as a health determinant. A few studies among workers in energy and mining projects found little increase in employability or access to employment.<sup>58</sup> A study conducted in 1983 (using interviews and reviews of companies' annual reports) found that northern residents filled only 38% of the jobs created by

development projects. This was attributed, in part, to lack of the skills required for advancement among the low-education trainees hired into entry-level positions.<sup>59</sup>

#### 3.4.4. Effects on the Social Environment

Supportive social environments are key determinants of health and well-being. Several studies provide evidence that large development project can influence the quality of the social environment, although the impacts tend to be moderated by the pre-existing social strength or fragility of the communities. Social resilience of the community may be one important intervening variable which mediates the effects of development on social environments. Social resilience has been defined as “the ability to cope with and adapt to environmental and social change mediated through appropriate institutions.”<sup>60</sup> It is similar to the concepts of communal mastery (defined as a sense of shared efficacy)<sup>61</sup> and collective efficacy (defined as community cohesion and control).<sup>62</sup>

Durst used key informant interviews to compare the impacts of hydrocarbon development on Fort MacPherson and Tuktoyaktuk.<sup>63</sup> Although both communities reported increases in social problems after development, Fort MacPherson had a higher level of communitarianism prior to development, and it was able to retain it to a greater extent than Tuktoyaktuk. “Communal efficacy” is a shared sense that social and personal outcomes can be mastered through collective action. In this connection, among Native American women a strong sense of provides better protection against depression and anger in stressful circumstances than does high personal self-efficacy.<sup>64</sup> Higher levels of communal efficacy are associated with lower levels of family violence and spousal homicide.<sup>65</sup> Efficacy may also be seen as social disorganisation’s flip side.<sup>66</sup> Social disorganisation is linked to community instability, crime, and violence.<sup>67</sup> It is linked to decreases in community attachment,<sup>68</sup> to higher rates of health problems,<sup>69</sup> and to poorer educational behaviour, attendance and grades.<sup>70</sup> Studies of suicide among Aboriginal adolescents have shown that suicide rates are attenuated in Aboriginal communities that undertake to preserve and promote their cultural identity, thus strengthening youth’s sense of personal continuity and identity.<sup>71</sup>

One aspect of development said to have social impacts is the familiar “boom and bust” cycle. This has been hypothesised to weaken community attachment, and to increase social isolation and social pathologies. In examining the longitudinal effects of energy development in one American community, Brown et al.<sup>72</sup> found that community attachment and social ties weakened over time. This weakening occurred even after controlling for shifts in the community’s socio-demographic composition. Most of the impact occurred prior to the beginning of construction. This echoes similar findings from studies of remote hydro-electric projects. These studies suggest that apprehension of impacts at the pre-project stage produces the highest levels of community tensions and stress.<sup>73</sup> However, another study of energy boomtown development in three rural American communities showed that ties to the community were not disrupted by the development, and that informal ties among community members increased.<sup>74</sup> In studies of residents of remote development towns in Australia, loneliness or social isolation were found to be both directly and indirectly related to degree of psychiatric symptoms<sup>75</sup> and life dissatisfaction.<sup>76</sup> Increased road access associated with development in the Cree Region has been linked to weaker relationships among community members, while also intensifying relationships within nuclear families.<sup>77</sup>

Strength of organisation and local capacity for solving collective problems are considered to be key aspects of healthy communities.<sup>78</sup> They can have positive effects to the extent that development projects can reinforce existing strengths in community leadership and consolidate capacity for autonomy and self-government.<sup>79</sup> However, development projects have been associated with increased predominance of White in-migrants in political development.<sup>80</sup> This issue, closely tied to the larger one of self-government of Native communities,<sup>81</sup> nevertheless seems to have specific implications in communities affected by

development projects. The negative impacts of development projects on local ability to manage community life<sup>82</sup> seem to be greatest in communities that are less organised at the outset.<sup>83</sup>

The creation of Cree-controlled social and political institutions is said to have been an important factor in reducing negative impacts of the James Bay development upon the Crees of northern Québec.<sup>84</sup> On the other hand, the JBNQA resulted in the creation of a new administrative social class. This class quickly mastered the skills required for effective bureaucracy and technocracy. This led to increasing social differentiation within Cree society and to unequal access to centres of decision-making within social groups.<sup>85</sup> For example, early assessment of the impacts of wildlife management provisions of the JBNQA showed that the hunting sector remained excluded from decision-making in matters that affected their livelihood.<sup>86</sup>

Community capacity to use an environmental crisis as an opportunity for growth is more strongly related to organisational characteristics and community leadership than to economic prosperity.<sup>87</sup> In a study of values in a community affected by a large development project, residents were shown to prefer problem-solving approaches founded on commitment, initiative and local involvement.<sup>88</sup> In the broader context of globalisation, it has been argued that if remote northern communities are to overcome existing exploitation, oppression and political isolation, they must rediscover and build on their strengths and abilities. They must also undertake community economic development along with the development of social infrastructure.<sup>89</sup> Some isolated communities have successfully used community economic development as a strategy to prevent the negative effects of major socio-economic disruption.<sup>90</sup> A follow-up study of communities affected by the Hibernia oil development found that early and ongoing public involvement contributed to improved quality of life resulting from the development.<sup>91</sup>

Large-scale development projects have been associated with increased transmission of contagious diseases - including sexually transmissible ones - due to more extensive and frequent social interaction between local and external populations.<sup>92</sup> This problem has been acute in Africa where mine development has served as a major vector for the transmission of HIV-AIDS.<sup>93</sup> In the development context, the most recent approaches to prevention emphasise organisational and environmental factors over individual behaviour. In this approach, management, unions, government and community organisations (including both traditional and biomedical practitioners) use community outreach and peer-education strategies to address the entire community affected by the mine's activities.<sup>94</sup>

Some evidence exists that corporations are increasingly willing to assume responsibility for complex social and environmental issues as a form of good business practice. This promotes improved financial benefits and enhanced corporate citizenship. For example, a natural gas project in Peru derived a net benefit of US \$50M by fully addressing and managing social and environmental concerns.<sup>95</sup> Deliberate corporate policies reduced the impacts of the development of the indigenous people's social environment. These policies included:

- Complete segregation of the worker and local communities, with no contact permitted between the two except through designated liaison officers.
- A no-road policy (both within the site and to the site) so as to not facilitate access to the region by other interests (hunters, poachers, colonists, squatters: the "attraction of population is a predictable consequence of dam building"<sup>96</sup>).

These measures were derived through authentic consultation with local communities. These consultations are as opposed to the "tokenistic" mode of consultation which has characterised some hydro development projects, where systemic barriers and a focus on operational rather than strategic issues preclude full citizen participation.<sup>97</sup> In addition, the Corporation's community-liaison programme focused on

community investment and development rather than on compensation, in order to strengthen local infrastructure and social capital.<sup>98</sup>

These results are similar to those found in a study of sustainable energy development in England. This study found that regions with higher levels of social capital were more likely to achieve the stakeholder involvement, dialogue, and eventual consensus required for sustainable development.<sup>99</sup>

### **3.4.5. Effects on Personal Health Practices and Coping Skills**

The “personal health practices” category of the health determinants framework generally includes “lifestyle” issues such as nutrition, physical activity, substance use, use of safety equipment, etc. However, it is growing ever clearer in the research literature that the “personal choice” paradigm underlying much previous research has mistakenly directed emphasis away from the determining role of the social environment in “lifestyle.” For example, longitudinal studies have clearly established that the introduction of alcohol outlets and greater access to alcohol in remote communities leads to increases in violent crime.<sup>100</sup>

In our review, many “lifestyle” issues are integrated into the sections dealing with the social and physical environments. This section focuses solely on the psychological and psychosocial impacts of development, and on how personal and collective coping skills mediate those impacts. Chief among the impacts considered are psychological distress, crime and violence, alcohol and drug abuse, and family breakdown including separation and child neglect.

#### **Individual Coping**

Niezen<sup>101</sup> used data from social service files to examine the impacts of hydro-electric development upon the James Bay Crees. Niezen concluded that the accompanying shift to village lifestyle was responsible for social instability as reflected in increased rates of suicide, child neglect, and alcohol and drug abuse. Schafer<sup>102</sup> reported that resource development activities in the Canadian Arctic produced increases in family breakdown, alcohol abuse, and violent deaths. A study comparing ten northern Canadian communities, all undergoing rapid change due to development projects, found that the associated social disruption caused a number of problems. These included family breakdown and reduced social participation.<sup>103</sup> Similar findings were reported by Hobart<sup>104</sup> in his case study of Nanisivik, where the main psychosocial impacts were marital conflict as well as behavioural and discipline problems among children.

A study using a controlled design by Currie, Coopers & Lybrand (1984) showed that rates of suicide, violence, and drug abuse were much higher in communities affected by hydro-electric development than in unaffected communities. Another study found that the oil sands development produced deterioration in community social fabric through alcohol, drug abuse, and associated violence.<sup>105</sup> Increased alcohol use was reported in a monitoring study of the Norman Wells development.<sup>106</sup> A 25-year retrospective study of the psychosocial impacts of hydro-electric development at Grand Rapids, Manitoba, attributed increases in crime and violence, alcohol abuse, and family breakdown (including separation and child neglect) to the developments.<sup>107</sup> Increased alcohol abuse and violence were also shown to have resulted from the Cyprus Anvil Mine in the Yukon.<sup>108</sup>

In contrast to the negative impacts described above, a survey of Fort McMurray, Alberta, residents during and after the Syncrude and Suncor oil sands projects found few negative psychosocial impacts.<sup>109</sup> Similarly, another study of Manitoba Hydro’s Grand Rapids project found no adverse effects on residents.<sup>110</sup> Possibly the time of measurement plays a role in what problems are detected: Hobart’s study in Coppermine found that violent wounds and alcohol consumption increased in the first year of

development, then declined to levels lower than pre-development over subsequent years, and then increased again with the end of employment at the development. The study found no changes over time in indicators of child neglect or overall health.<sup>111</sup> Neufeldt et al<sup>112</sup> describe similar findings in a longitudinal study of the cycles of uranium mine development in Elliot Lake, Ontario. In one study in the Canadian Arctic, changes in alcohol consumption were heavily influenced by the presence of transient outsiders, with most alcohol-related problems associated with lonely men drinking for the sake of drinking, or to ward off boredom.<sup>113</sup> A similar finding was noted in a study of the impacts of the Alaska Highway.<sup>114</sup>

Two studies suggest that development projects are associated with increases in health problems leading to psychiatric hospitalisations in the general population<sup>115</sup> or in the population 65 years and older.<sup>116</sup>

Although many studies have failed to detect negative impacts of development on substance abuse, Giesbrecht and McKenzie<sup>117</sup> have argued that the use of administrative data systems (such as health data, police records, or sales records) can fail to capture meaningful shifts in patterns of problem behaviours. Similarly, English<sup>118</sup> noted that examination of caseloads failed to capture significant shifts in the complexity and severity of the cases seen.

### **Community Coping**

Studies of communities' response to disasters and threats have distinguished between individual and community-level coping skills. In some circumstances, individuals in stressed communities turn their coping energies outward, increasing their community involvement and proactively searching for solutions. Effective community coping skills are associated with strong individual self-efficacy and a strong sense of community. Conversely, where the sense of community is weak or eroded, individuals in stressed communities tend to focus their coping strategies inward, dealing with their own emotional response.<sup>119</sup> Assessing community coping is recommended as the first step in developing interventions to help communities manage the psychosocial impacts of large-scale environmental problems.<sup>120</sup>

Based on an extensive review of research on the socio-economic impacts of development in northern Native communities, Cunningham<sup>121</sup> argues that Native communities and other minority cultures confronted by majority-led development initiatives must take a proactive, community development stance rather than a reactive one. This is necessary in order to avoid "under-development" (destruction of the traditional economy as well as exclusion from new economic opportunities). In his assessment, under-development is linked to "a high incidence of structural unemployment, social pathologies, a dependence on transfer payments, and a "client" political relationship with "senior" government."<sup>122</sup>

### **3.4.6. Effects on the Physical Environment**

Existing research on the physical environment as a health determinant has focussed on the direct links between environmental quality, contamination, and well-being. However, this issue is considerably more complex in Indian societies, because of their highly articulated and integrated relationship with the environment and their view of themselves as guardians of the land.<sup>123</sup> Cultural identity and sustainability are intrinsically linked to ongoing access to the renewable resource base and the preservation of the biophysical environment.<sup>124</sup> The impacts of large development projects can thus be examined at several levels.

First, hydro-electric development projects have fairly well-researched implications for environmental contamination and human health through the release of methyl mercury into the food chain, as well as other environmental toxicological effects. Although not the focus of the present review, this level of impact leads directly to the second level: disruption of traditional eating patterns because of real or

perceived contamination of the traditional food supply. Large-scale mining and hydro-electric development in the north has tended to follow or coincide with increased exposure of Aboriginal communities to southern cultures. Because of this, it is difficult to isolate the specific role of development projects in changing people's relationships to food sources, their food-preparation habits, and the social meaning associated with food.

A comprehensive literature review of social issues related to the James Bay development, conducted in 1988, concluded that the social aspects of mercury contamination on the Cree had been (to that point) inadequately studied.<sup>125</sup> However, some studies have concluded that development projects have accelerated the disruption:

*On the other hand, the indirect negative effects of methyl mercury on health, mediated through the disruption of lifestyle and eating patterns and the associated socio-cultural and socio-economic consequences among the affected Native populations, have, in many cases, been significant.*<sup>126</sup>

At another level, development projects – as is the case in the Eastmain-Rupert project – often require the building, extension, or improvement of roads which transect traditional hunting territories. This has been shown to have positive impacts for subsistence hunters who gain easier access to their territories.<sup>127</sup> Unfortunately, development-supported roads also increase access for all other hunters as well. This sometime sparks conflict among northern and southern hunters<sup>128</sup> and among Native hunters.<sup>129</sup> Instances of over-harvesting of easily accessible areas have also been noted, with long-term impacts on the capacity of the physical environment to support the population's food needs.<sup>130</sup> However, improved road access and road traffic in the Cree Region have resulted in increased access to fresher, more varied, and higher quality produce.<sup>131</sup> Moreover, Feit (1988) found no over-utilisation or depletion of game resources ten years after the JBNQA was signed. Levesque's early literature review (1989) noted that inconsistent approaches to defining and measuring the impacts of increased road access had resulted in a lack of a clear overall perspective.

Impacts of hydro-electric development projects on other ecological systems have also been noted. These projects tend to disrupt patterns of ice formation in winter. This makes travel on the ice hazardous. Changes in fish behaviour and water flow patterns often render traditional knowledge useless. This makes both commercial and subsistence hunting and fishing less efficient.<sup>132</sup> One of the impacts documented as a result of the Tucuruí hydro-electric project in Brazil has been loss of opportunities for sustainable use of the forest, through loss of biodiversity, water cycling, and carbon storage.<sup>133</sup>

### **3.4.7. Effects on Health Services (Including Social Services)**

Findings from studies in several Canadian communities suggest that the main impact of large-scale developments on health services is a failure of supply fails to keep up with demand. While the prevalence of health and social problems may remain constant, the absolute levels of need for services increase sharply with population influx. Government bureaucracies are rarely agile enough to respond immediately. A vicious circle is then started: lack of services leads to cases being more difficult and complex when they are eventually seen. This increases the workloads of services provider personnel, which diminishes their ability to meet demand,<sup>134</sup> and also degrades the quality of services provided.<sup>135</sup>

A study of impacts of oil sands development on services in Fort McMurray, Alberta, showed that municipal planning for “soft” (viz., health and social) services lagged far behind the population's growth. Most planning was done to accommodate permanent workers while insufficient attention was paid to the influx of transient workers associated with the construction phase.<sup>136</sup> However, this study also found that

the biggest increase in social service caseloads came when families, rather than single men, moved into the area. This was due to the limited social support available to young families, and their high levels of residential and family instability. A fivefold increase in demand for social welfare accompanied the development in question. There was likewise an 84% increase in Family Court filings, large increases in debt and bankruptcy, and observed mental health problems. Family separations exacerbated existing housing strain, especially among families of non-permanent, subcontracted workers.<sup>137</sup> Similarly, a study of energy boomtown development in three rural American communities found that all three experienced declines in almost all aspects of community services.<sup>138</sup> Yet improved quality of community services was one of the three main impacts identified in the long-term post-project monitoring of the Norman Wells oilfield and pipeline.<sup>139</sup>

Over and above the lack of services associated with large development projects, the question of the cultural relevance of the services needs to be addressed. With an entirely different view of healing processes and practices, Cree people find several aspects of mainstream health and social services incongruous or incomprehensible,<sup>140</sup> resulting in different patterns of service utilisation<sup>141</sup> or compliance.<sup>142</sup>

### 3.4.8. Effects on Gender and Culture

What psychosocial impacts does resource development have on women living in isolated communities? One review concluded that these women are at particularly high risk of psychosocial disturbance. The reasons cited are: geographic and social isolation, alcohol-related violence, lack of opportunities for employment or skills upgrading, and a perceived lack of adequate health and social support services.<sup>143</sup> The psychosocial impacts of rapid community changes have been shown to be greatest on women.<sup>144</sup> In the development context this may be because women take on greater responsibilities during men's absences for work at the site.<sup>145</sup> This may be of particular concern in the current context; Cree women in northern Québec have higher baseline rates of many health problems and they have heavy family responsibilities.<sup>146</sup>

The impacts of development, on gender and culture, may be greatest when they result in loss of cultural identity through disengagement with traditional language and cultural practices.<sup>147</sup> Studies of suicide among Aboriginal adolescents have shown that suicide rates are attenuated in Aboriginal communities that undertake to preserve and promote their cultural identity, thus strengthening youth's sense of personal continuity and identity.<sup>148</sup>

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## Endnotes to Chapter 3

<sup>1</sup> Sugar et al. (1991).

<sup>2</sup> Freudenberg and Gramling (1992); D'Arcy (1983).

<sup>3</sup> Fearnside (2001).

<sup>4</sup> Alaska Highway Pipeline Panel (1979).

<sup>5</sup> Fearnside (2001).

<sup>6</sup> Goldsmith and Hildyard (1984).

<sup>7</sup> Berkes (1988).

<sup>8</sup> Osler et al. (1990).

<sup>9</sup> B.C. Hydro 1981, c.f. Knight et al. (1993).

<sup>10</sup> Stewart and Bone (1986).

<sup>11</sup> Égré and Sénécal.

<sup>12</sup> Hardy (1983); Quinn (1988); Fearnside (1999).

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- <sup>13</sup> MacDonald and Giesbrecht (1983).
- <sup>14</sup> MacKay et al (1990); Osler et al (1990).
- <sup>15</sup> Waldram (1987); Loney (1987); Currie, Coopers & Lybrand (1984).
- <sup>16</sup> Sénécal and Égré (2000). See also Égré and Sénécal (2003).
- <sup>17</sup> Niezen (1993).
- <sup>18</sup> Couch (2002).
- <sup>19</sup> Bielawski (2003).
- <sup>20</sup> Hydro-Québec/SEBJ and Crees of Eeyou Istchee (2004). Agreement Concerning a New Relationship Between Hydro-Québec/SEBJ and Crees of Eeyou Istchee, April 2004.  
<http://www.gcc.ca/francais/nouvelles/ConventionNouvellemars2004.PDF>.
- <sup>21</sup> James Bay Environmental and Social Impact Review Panel (1979).
- <sup>22</sup> Levesque (1990).
- <sup>23</sup> Hobart (1983); Kirmayer et al. (2000); Prince (1993); Barger (1977); Mitura and Bollman (2003).
- <sup>24</sup> James Bay Environmental and Social Impact Review Panel (1979). This is consistent with trends in the entire James Bay region, as documented in Boulet and Gagnon (1979) and in Sénécal and Égré (2000).
- <sup>25</sup> Diane Moir, Wellness worker, personal communication, July 2003.
- <sup>26</sup> Events reported to the Director of Public Health, Cree Region, June 2003.
- <sup>27</sup> Sénécal and Égré (2000); Feit (1988); Boulet and Gagnon (1979).
- <sup>28</sup> Hobart (1983).
- <sup>29</sup> Wenzel (1983).
- <sup>30</sup> Kruse et al. (1975).
- <sup>31</sup> Égré and Sénécal (2003).
- <sup>32</sup> Adger et al. (2002).
- <sup>33</sup> Foster (1980).
- <sup>34</sup> Green and Bone (1985); Dene Nation (1986), c.f. Knight et al. (1993).
- <sup>35</sup> Ellison (1986).
- <sup>36</sup> Palinkas (1987).
- <sup>37</sup> Palinkas et al. (1993).
- <sup>38</sup> Kruse et al. (1975); Alaska Highway Pipeline Panel (1979).
- <sup>39</sup> Vincent (1998).
- <sup>40</sup> Sénécal and Égré (2000).
- <sup>41</sup> La Rusic et al. (1979).
- <sup>42</sup> Kruse et al. (1975).
- <sup>43</sup> Adger et al. (2002).
- <sup>44</sup> Waldram (1987); Kruse et al. (1975); Mary Collins Consulting Ltd. (1976); MacPherson (1978); Charest (1980); House (1982); Justus Simonetta Consultants, c.f. Knight et al. (1993).
- <sup>45</sup> Hobart (1983).
- <sup>46</sup> *ibid.*
- <sup>47</sup> Gourdeau (1973); Hobart (1983).
- <sup>48</sup> Stewart and Bone (1986).
- <sup>49</sup> *ibid.*
- <sup>50</sup> Dene Nation (1986) c.f. Knight et al. (1993).
- <sup>51</sup> DPA Group Inc. (1986)..
- <sup>52</sup> Levesque (1989).
- <sup>53</sup> Fearnside (1999).
- <sup>54</sup> Gourdeau (1973).
- <sup>55</sup> *ibid.*
- <sup>56</sup> Couch (2002).
- <sup>57</sup> Syncrude Canada Ltd. (2002).
- <sup>58</sup> Waldram (1987); MacPherson (1978).
- <sup>59</sup> DPA Group Inc. (1986).
- <sup>60</sup> Adger et al. (2002).
- <sup>61</sup> Hobfoll et al. (2002).
- <sup>62</sup> Browning (2002).
- <sup>63</sup> Durst (1987) c.f. Knight et al. (1993).

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- <sup>64</sup> Hobfoll et al. (2002).  
<sup>65</sup> Browning (2002).  
<sup>66</sup> Cantillon et al. (2003).  
<sup>67</sup> Veysey and Messner (1999); Markowitz (2003); Bachman (1981).  
<sup>68</sup> Woldoff (2002).  
<sup>69</sup> McCulloch (2001).  
<sup>70</sup> Bowen et al. (12002).  
<sup>71</sup> Chandler et al. (2003).  
<sup>72</sup> Brown et al. (1989).  
<sup>73</sup> Égré and Senécal (2003).  
<sup>74</sup> England and Albrecht (1984).  
<sup>75</sup> Neil and Jones (1988).  
<sup>76</sup> Iverson and Maguire (2000).  
<sup>77</sup> Vincent (1998).  
<sup>78</sup> Smith et al. (2003).  
<sup>79</sup> Sundet and Mermelstein (1996).  
<sup>80</sup> MacPherson, c.f. Knight et al. (1993).  
<sup>81</sup> e.g., Brant (1983).  
<sup>82</sup> Justus Simonetta Consultants, c.f. Knight et al. (1993).  
<sup>83</sup> Hobart (1983).  
<sup>84</sup> Salisbury (1986).  
<sup>85</sup> La Rusic I et al.  
<sup>86</sup> Feit (1988).  
<sup>87</sup> Sundet and Mermelstein (1996).  
<sup>88</sup> Glick (1983).  
<sup>89</sup> Delaney et al. (2001).  
<sup>90</sup> Bennett (1992).  
<sup>91</sup> Storey and Jones (2003).  
<sup>92</sup> Parker et al. (2000); May et al.(2002).  
<sup>93</sup> Campbell and Williams (1999); Parker et al. (2000).  
<sup>94</sup> Campbell and Williams (1999); Williams and Campbell (1998); Heywood (1996).  
<sup>95</sup> Dabbs and Bateson (2002).  
<sup>96</sup> Fearnside (1999), p. 486; Fearnside (2000); Senécal and Égré (1999).  
<sup>97</sup> Sinclair and Diduck (2000).  
<sup>98</sup> May et al.  
<sup>99</sup> Devine-Wright et al. (2001).  
<sup>100</sup> Norstrom (2000); Gorman et al. (2001).  
<sup>101</sup> Niezen (1993).  
<sup>102</sup> Schaefer (1993).  
<sup>103</sup> Gartrell (1983).  
<sup>104</sup> *ibid.*  
<sup>105</sup> Justus Simonetta Consultants, c.f. Knight et al. (1993).  
<sup>106</sup> Stewart and Bone (1986).  
<sup>107</sup> Loney (1987).  
<sup>108</sup> MacPherson (1977) c.f. Knight et al. (1993).  
<sup>109</sup> Gartrell (1983).  
<sup>110</sup> MacKay et al. (1990).  
<sup>111</sup> Hobart (1983).  
<sup>112</sup> Neufeldt et al. (1983).  
<sup>113</sup> Gourdeau (1973).  
<sup>114</sup> Cruikshank (1977).  
<sup>115</sup> Hobart (1983).  
<sup>116</sup> Ellison (1986).  
<sup>117</sup> Giesbrecht et al. (1983).  
<sup>118</sup> English (1977).

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- <sup>119</sup> Bachrach and Zautra (1985).  
<sup>120</sup> Paton (1994).  
<sup>121</sup> Cunningham (1984); Weaver and Cunningham (1984).  
<sup>122</sup> Cunningham (1984).  
<sup>123</sup> Couch (2002).  
<sup>124</sup> George et al. (1996).  
<sup>125</sup> Levesque (1989).  
<sup>126</sup> Wheatley and Wheatley (2000); see also Rosenberg et al. (1995).  
<sup>127</sup> Berkes (1981); Proulx (1992); Proulx et al. (1994).  
<sup>128</sup> Senécal and Égré (2000); Rosenberg et al. (1995); Berkes (1981); Cruikshank (1977).  
<sup>129</sup> Senécal and Égré (1999); MacPherson (1978) c.f. Knight et al. (1993); Senécal and Égré (2000); MacPherson (1978) c.f. Knight et al. (1993).  
<sup>130</sup> Berkes (1981).  
<sup>131</sup> Vincent (1998).  
<sup>132</sup> Bodaly et al. (1995).  
<sup>133</sup> Fearnside (2001).  
<sup>134</sup> MacPherson (1978); Neufeldt et al. (1983); Alaska Highway Pipeline Panel (1979).  
<sup>135</sup> MacPherson (1978); English (1977).  
<sup>136</sup> English (1977).  
<sup>137</sup> *ibid.*  
<sup>138</sup> England and Albrecht (1984).  
<sup>139</sup> Stewart and Bone (1986).  
<sup>140</sup> Morse et al. (1991).  
<sup>141</sup> Thouez et al. (1989).  
<sup>142</sup> Rideout and Menzies (1994).  
<sup>143</sup> Evans and Cooperstock (1983).  
<sup>144</sup> Palinkas et al. (1993); Women's Research Centre (1979).  
<sup>145</sup> Kruse et al. (1975).  
<sup>146</sup> Lavalée and Bourgault (2000).  
<sup>147</sup> Barger (1977); Kirmayer et al. (2000).  
<sup>148</sup> Chandler et al. (2003).

## Chapter 4: Highlights of Analysis on Health Determinants and Health Status

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The purpose of this chapter is to present a brief overview of the highlights of the analysis of health determinants and health status. All of the content is discussed in other chapters in greater detail.

The highlights are drawn from Chapters 5 and 6 which analyse the evolving status of health determinants and evolving health status. Of course, those chapters are themselves summaries of the longer ‘reports’ found in Chapters 11 and 12 in Volume 2.

The highlights are presented in three categories, from the most general to the more specific.

- Analysis of determinants of health:
  - physical environment
  - social environment
  - employment, occupation, income
  - education
- Analysis of health status of specific sub-groups:
  - personal health practices
  - health of mothers and infants
  - children’s health
- Analysis of traditional health status indicators:
  - mortality and morbidity
  - chronic diseases
  - enteric and vaccine preventable diseases
  - sexually transmitted diseases
  - mental health and injuries.

### 4.1. Analysis of determinants of health

#### 4.1.1. Physical Environment

##### **Location of the communities**

Five of the Cree communities are located along the coast of James Bay / Hudson Bay, and four are located inland. The communities vary appreciably in size and in isolation. Many originated as summer settlements and trading areas that gradually became settled.

##### **Road Access**

There is great variation in the dates when the various communities became accessible by road. Some, such as Waswanipi, and Mistissini, have long had all-season roads. Others operated solely on winter (ice) roads until very recently, with the first all-season roads into Eastmain and Wemindji completed in 1995, and the road into Waskaganish completed only in 2000. Whapmagoostui, the most northern community, is accessible only by air or water.

##### **Housing**

Although there is little information on housing before 1980, what there is suggests that houses were in poor condition.

Statistics Canada data show that Cree houses are far more crowded than those of non-Aboriginal Quebecers, and also more crowded than those of other Aboriginal people. However, the situation appears to be better than it was in the early 80s: although still high, the average number of persons per room has decreased appreciably.

A substantial proportion of houses in the Cree Region are in need of major repairs: in 2001, a quarter needed repairs, compared to just 8% throughout Quebec and 18% for all Aboriginal people in Quebec.

### **Toxic Indoor Moulds**

The effect of moulds on health is a concern in some of the Cree communities. In Chisasibi, mould levels became an issue immediately after the relocation of the community, and culminated in a research project that found strong associations between mould levels and health problems. The relevant study concluded that measures to reduce mould levels in the houses of Chisasibi were urgently needed.

### **Water and Sanitation**

Documents from the early 1980s suggest very poor water supply and sewage disposal, with few communities having access to piped, clean water. Water supplies improved rapidly thereafter, with most communities having piped systems by the mid-80s. Today all communities have piped water systems. Concerns in recent years have revolved around the training of operators, the monitoring of water quality, and the adequacy of emergency and backup plans in the event of problems.

Although availability of clean water has improved dramatically, studies over the years have shown concerns about the taste and quality of the water, such that in some communities, appreciable numbers of residents are using other sources for their drinking water – ranging from undeveloped springs to bottled water.

Sewage treatment has likewise improved since the 1980s when many communities operated on inadequate privies. All communities except Whapmagoostui currently have some form of sewage treatment. Again, there are some concerns about monitoring, training of the operators, and the availability of equipment and technical support. Community systems for disposal of solid waste are also in place.

### **Mercury Exposure**

Human exposure to mercury has been an issue in the Cree Region since the early 1970s. Studies suggest that “background” levels of mercury present in the environment are in themselves sufficient to produce moderately high mercury levels in people who frequently eat fish. Onto this background level have been superimposed the possibility of exposure from industrial sources and the increases in mercury levels as a result of hydro-electric development.

Moderate to high mercury exposures among the Crees were first documented in the early 1970s during the screening programme conducted by the Medical Services Branch of the Department of National Health and Welfare. Later screening and surveillance programmes were conducted under the Mercury Agreement (1986-96) and more recently, within the Oujé-Bougoumou / Nemaska Health Study.

In general, human exposure levels have been declining since the early 1970s, in every age group surveyed, probably due to decreasing fish consumption. Nonetheless, in 1993, 10% of the population had mercury levels that exceeded the current Health Canada guidelines, and a 2002 study in Nemaska and Oujé-Bougoumou likewise found that some older adults had levels that exceeded the guideline, thereby falling into the range that Health Canada characterizes as “increasing risk”.

Such exposures have not been associated with adverse effects, but the margin of safety between exposure levels and the levels known to produce adverse effects is clearly less than what Public Health authorities recommend. Any increase in the level of mercury contamination in fish consumed by Cree would only decrease this margin further. The region's Public Health authorities are faced with the dilemma of promoting fish consumption for its health benefits while warning against over-exposure to mercury, in a context where international guidelines for mercury exposure are increasingly strict.

### **Other Contaminants**

Cree people may be exposed to lead through hunting with lead shot. There are occasional reports of people with lead levels high enough to require reporting to Public Health authorities. There seems to be considerable variation between communities in terms of lead exposure. A recent study in Oujé-Bougoumou concluded that residents were not at risk from exposure to a series of other inorganic compounds.

Although mercury has long been a concern, in recent years scientists are also focusing their attention on other persistent organic compounds that can be transported in the air, and that build up in human tissue. Concern began with pesticides such as DDT, and has since broadened to other compounds that are (or were) commonly used in household applications. PCBs have long attracted attention, and recent evidence suggests that dioxins and furans can be produced not only by high-temperature combustion (which was a known source), but also by such things as forest fires or burning of municipal waste.

Evidence suggests that certain organochlorines can be deposited in, and retained by, the ecosystem in the boreal forests. Some of these compounds have been found in lake trout across broad parts of Canada, and were documented by recent studies in Nemaska and Oujé-Bougoumou. Studies have also found some of these compounds in waterfowl in the Cree Region, although there is no information about levels in land animals.

Besides the possibility of aerial transport, there are a variety of local sources that could expose the region's residents to persistent organic compounds. Possibilities include exposure to PCBs as a result of past mining around Chibougamau, and the former radar station at Obalski Mountain. Some exposure to compounds such as DDT might also result from local use of pesticides in the past; and current activities such as burning of municipal waste could potentially generate some dioxins and furans. Increased monitoring of persistent organic compounds in the Cree Region may be warranted.

## **4.1.2. Social Environment**

### **Population Growth**

Although population growth has slowed since the 1980s, the Cree population is still rapidly increasing. The rate of population growth dropped from about 3.5% per year in the late 1980s to 2.5% in the late 1990s. Nonetheless, if current trends continue, the Cree beneficiary population will double between 1999 and 2027.

The Cree Region is 94% Cree. The Census numbers suggest that the non-Cree residents are people who came to The Cree Region for specific jobs, since they are mainly adults of working age.

Children now make up a smaller proportion of the Cree population than they used to, but the population is still overwhelmingly young. In 1979, 43% of the Cree population was under 15; by 2003, this had fallen to 34% - still a very high proportion as compared to the rest of Quebec. Conversely, only 5% of Crees are over the age of 65.

The number of single-parent families has risen over time. It is now roughly similar to the proportion observed in Quebec as a whole.

Living arrangements for older Crees are very different from elsewhere in Quebec, in that most are living with family. Compared to other people in Quebec, Cree adults report many more hours of caring for elders. Almost half of all Cree adults devote some time each week to caring for a senior, and 15% report spending ten or more hours doing so. In contrast, only 1-2% of Quebec adults spend this much time caring for seniors.

### **Culture**

A majority of Crees still participate in traditional activities. In 1991, 79% did so, and 53% had bought equipment for hunting, fishing or trapping in the previous month. A study between 1998 and 2000 found that by nine months of age almost half of all Cree infants had been taken into the bush.

However, the proportion of Crees who make a living from land-based activities has dropped over time. The percent enrolled in the Income Security Programme has gone from 40% in the early 1980s to 21% in 2001-2002.

The proportion of people who speak Cree has remained high. In 1996, fully 97% of Cree residents were able to speak Cree and 85% spoke it in their homes. English is the second most common language followed by French. The percent of the population able to speak English or French has increased over time, such that 96% of young adults are now able to speak English, and over a third can carry on a conversation in French.

### **Violence**

Reports suggest that social problems such as alcohol abuse, violence, and neglect increased during the 1980s. In 1991, fully 10% of adults in the region reported having been assaulted in the previous year.

Although residents are most concerned about issues such as alcohol and unemployment, almost two thirds perceive family violence to be a problem in their community. About one half also report that sexual abuse is a problem. The proportion of people concerned about sexual abuse rose between 1991 and 2001.

## **4.1.3. Employment, Occupation and Income**

### **Income**

In 2001 the average individual incomes in the Cree Region were about 30% lower than elsewhere in Quebec. However, it is not clear what this means in terms of peoples' standard of living, because the regional economy is structured so differently from southern Quebec's.

Clearly, the cost of goods is higher in the north; but this disadvantage may be more than offset by things like the availability of "wild" food, the absence of various taxes, and the availability of a series of other benefits.

Wages now account for a much higher proportion of peoples' income than they did in the recent past: 73% in 2001, compared to just 32% in 1971.

Individual dependence on government transfer payments is higher than in Quebec as a whole, but is not unusual compared to other remote areas.

Rapid changes in the source and nature of income are believed to have had an impact on disparities in income and in social status.

### **Employment**

Participation in the labour force doubled between 1976 and 1996. Unemployment rates also rose – possibly as a result of more people seeking salaried jobs than before. In 2001, the unemployment rate was double the Quebec average at 17.5%.

The most common reasons for not working are the belief that no jobs are available in the area, and family responsibilities.

### **Occupation**

According to the 2001 Census, sales and service constituted the majority of salaried jobs in the region, followed by government services, health and education.

Development in the region has had a major impact on traditional activities. At first, the ISP boosted the number of people living on the land; but in recent years, hunter and trappers have made up a smaller and smaller proportion of the population – about 20% in 2001/02.

Because fur prices have dropped and the equipment and lifestyle associated with hunting has changed, people on the ISP now make less money than before. At present, those on the ISP are mainly young adults or old adults.

## **4.1.4. Education**

The proportion of the population in the Cree Region with a high school diploma or more has increased in the past twenty years, from 25% to at least 36%.

About 14% of adults have some college or university-level education.

The number of children registered in school has increased in the past five years. However, drop-out rates are among the highest in Quebec at 75%.

Some adults (e.g., 276 in the 2002/03 school year) later return to high school.

Despite the increases over time, the proportion of people with a high school degree is still far lower than elsewhere in the Province: 36% compared to 70% in 2001.

## **4.2. Analysis of health status of specific sub-groups**

### **4.2.1. Personal Health Practices**

#### **Nutrition and Weight**

Although between 34 and 69% of Crees still eat traditional foods, the amount of wild meat consumed per day has dropped over time from 1.3 kg per day in the 1950s to 0.23 kg in the 1990s, with a concomitant shift to a more “southern” diet. Fish consumption has also decreased since the 1970s. At the same time, increased road access has made commercial foods more available than before. The protective effects of

the traditional diet have been partly lost, increasing the risks for cardiovascular diseases and other chronic diseases such as diabetes.

Partial data from the early 1980s suggested that fewer than half of adults ate fruits and vegetables each day – but since consumption of these foods was much higher among younger adults, the proportions may have increased since that time. Although a majority of adults are aware that “junk” foods are not healthy and can contribute to obesity and diabetes, the available data suggest that at least a quarter of adults regularly consume soft drinks, and that most children eat sugary snacks each day.

Food costs are higher in the north. Although fewer people are running out of money for food than was the case in the early 1980s, food insecurity was still a worry for roughly 20% of mothers in the period 1998-2000.

Physical measures in the 1980s suggested that, depending on the community, anywhere from 2% to 45% of the population had nutritional deficiencies as measured by zinc levels. More recent studies have found that 7% of recent mothers and 13% of infants are affected by anaemia.

Surveys suggest an increase over time in the proportion of adults - especially women - who are overweight or obese. All nine communities are affected. As of 2001, 87% of adults were either overweight or obese. From 56-62% of children are also estimated to weight more than is medically desirable.

### **Smoking**

Smoking rates in the Cree Region are higher than the Canadian average (35% daily smokers in 2001), and seem to have held constant over time. Almost 90% of smokers begin before age 20.

Similar to Indian reserves across Canada, only 15% of the Cree population has never smoked. Whereas 18-35% of the people over age 65 have never smoked in their lives, this is true for only 6-9% of the younger adults (aged 25-44).

Smoking rates seem to vary appreciably between communities, with relatively lower rates in Nemaska and Waskaganish. Conversely, Whapmagoostui has consistently had the highest proportion of current smokers in the region.

Smoking is strongly age-related, with 75% of people age 15-24 smoking at least occasionally (a proportion comparable to Indian reserves elsewhere in Canada). After age 24, it appears that many manage to quit; while some older adults never began smoking in the first place.

Although smoking rates are high, the region’s residents smoke fewer cigarettes per day than other Quebecers: 63% of Crees, but only 23% of other Quebecers, smoke less than half a pack per day. And the Cree Region has an unusually high proportion of occasional smokers.

### **Alcohol and Drugs**

During the period 1975-77, Cree hospitalisation rates for “alcoholism” were higher than average. Yet as of 1983/84, residents in most communities were only “somewhat” concerned about alcohol abuse levels (the exceptions were the two communities with ready access to bars). Thereafter concern increased: by 1991, 73% of Crees felt that alcohol abuse was a problem in their community, and by 2001, 80% were concerned.

Survey results suggest that the proportion of the population that drinks alcohol has increased from around 35% in 1983-94 to over 50% in 2001. Part of this may be simply the result of demographic change, since formerly people in the older age groups were the ones least likely to drink.

A substantial proportion of Cree adults – far more than in the rest of Quebec – do not drink at all. However, the data suggest that large proportions of those who do drink alcohol “binge” at least occasionally, and that 10%-25% have experienced alcohol-related problems or could be classified as “at risk” drinkers.

Men report more use of alcohol, and more alcohol-related problems, than women. Much lower proportions of people report having used any type of drug in the previous year. Of those who have, the most common drugs by far are marijuana or hashish, with drugs such as cocaine less common and use of solvents (at least in people over 15) all but non-existent. People under age 24 are the most likely to have used any type of drug in the past year.

### **Preventative Health Practices**

In 1991, Cree women were far less likely than others in Quebec to have had a pap smear or a breast exam. There are no data for more recent years, although nurses now make efforts to schedule women for these exams on a regular basis.

### **Physical Activity**

As the proportion of people living on the land has dropped, it is likely that fewer Crees than before are compelled to be physically active as part of their everyday activities.

In 1991, 65% of the Cree population was classified as relatively or totally “inactive.”

Roughly half engaged in little physical activity as part of their daily routine while 83% were inactive during their leisure time.

Men were more likely than women to be physically active. Children were more active than adults. Activity levels in adults decreased with age.

No data are available for recent years, although it is known that some communities now have fitness centres.

## **4.2.2. Health of Mothers and Infants**

### **Birth Rates**

Birth and fertility rates in the Cree Region have decreased over time, but remain comparable to those of other Registered Indians and double the Quebec average

### **Characteristics and Lifestyle Habits of Mothers**

Twenty percent of births are to teenage mothers. The fathers in these pregnancies also tend to be young, although they are generally a few years older than the mothers.

Although teen pregnancy rates are high, they have decreased since the 1980s and 90s. Factors believed to contribute to these teen pregnancies include cultural values, the role ambiguity associated with rapid transitions, media messages, and a lack of information on contraception.

Studies over a period of years have not found any greater physical risk associated with these teen pregnancies.

Mothers in the Cree Region generally have less formal education than those elsewhere in Quebec: 53% have less than 11 years of schooling, compared to 12% elsewhere in the Province.

The proportion of women who smoke during pregnancy seems to have increased since 1988. Between 1998 and 2000, 55% of women smoked while pregnant, but almost all were light smokers (< 10 cigarettes per day). Smoking during pregnancy correlates with maternal anaemia and with worries about having enough money to buy food.

Over the period 1994-98 at least 18% of women drank alcohol during their pregnancies.

Breastfeeding rates fell during the 1950s, 1960s, and 1970s, reaching their lowest point (55% in Mistissini) in 1981. Thereafter, policies to promote breastfeeding were introduced, and rates rose rapidly, back into the 80% range. The most recent chart review suggests that 79% of women initiate breastfeeding. There are substantial differences in breastfeeding initiation according to whether the woman lives in an inland community (and therefore uses the Val d'Or or Chibougamau hospital) or in a coastal community (and therefore delivers at the Chisasibi Hospital). Duration of breastfeeding also seems to be lower in the inland communities.

Duration of breastfeeding seems to have dropped over time. In recent years roughly half of infants have been breastfed for less than four months.

As of 1998-2000, 20% of infants were growing up in households where there was concern about having enough money for food, and 13% were anaemic. Food insecurity correlates with other indicators of risk such as maternal smoking, maternal anaemia, and a tendency to bottle-feed exclusively. Predictably, it also correlates with isolation and with parity.

### **Maternal Health**

Over the period 1994-2000, 15% of pregnant Cree women had gestational diabetes. Rates of gestational diabetes have more than doubled since 1988.

In 1998-2000, 7.3% of pregnant women had anaemia at the time of their first prenatal visit. Stillbirth rates have never been a concern in the region, and were below the Quebec average as of the period 1991-1996, at 2.6 per 1,000.

Rates of pre-maturity and intrauterine growth retardation in the Cree Region are at or below Quebec averages. In 1994-98, 5.8% of births were premature, and just 1.9% had intrauterine growth retardation.

Rates of caesarean sections are average and have apparently been so since at least 1988. Since 1975 there has been one maternal death.

### **Infant Health**

Cree infants are less likely than other infants in Canada to be of low birth weight (<2.5 kg), and more likely to be of high birth weight (>4 kg). The proportion of low birth weight babies averages only 2.4 - 3.4% (depending which years you look at), while over a third of all Cree babies are of high birth weight. Low birth weight seems to be related to maternal alcohol use, but not to teenage motherhood.

Vaccine-preventable diseases are not a major concern but infections and anaemia may be. A study in 1998-2000 found that 53% of infants had had infections in the preceding two weeks, and that 13% had anaemia.

Infant mortality rates in The Cree Region have fallen over time, but remain triple the Quebec average and (depending on which time period you consider) are above the averages for Registered Indians in Canada. This is largely due to high post-neonatal mortality rates attributable to Cree leuko-encephalopathy and Cree leuko-encephalitis. These are distinct but related genetic conditions peculiar to the Cree population. They are fatal and they strike children. Rates for other causes of infant mortality are no higher than average.

Fluoride supplements are provided during Well-Baby clinics, and some children also receive dental exams as part of these clinics. However, an estimated 30% of Cree toddlers (12-24 months of age) have some degree of dental decay. This figure is believed to be high as compared to other parts of Quebec - perhaps up to eight times higher than elsewhere.

### **4.2.3. Children's Health**

#### **Children's Health Status**

As compared to other children in Canada, the health of Cree children is less often described as "excellent" or "very good".

Infectious diseases such as gastroenteritis and ear infections were common in the early 1980s, but less of a concern thereafter.

Vaccination rates improved by about 1983 and rates of diseases such as TB have fallen over time.

Sexually transmissible diseases such as chlamydia are a concern in teenagers, with much higher rates than elsewhere in Quebec.

Disability rates in the region seem to be about average.

Dental health is worse than elsewhere in Quebec. Depending on the age group being considered, Cree children have from 3-8 times more decayed/filled/missing surfaces<sup>a</sup> than others in Quebec, and the gap is largest in the younger age groups. By 2001 waiting lists had become an issue. More than half of children had unmet treatment needs. Rates of dental decay for Cree children have remained high since 1985, whereas in Quebec and in other Registered Indian groups they have fallen appreciably over time. The high rates have persisted despite improvements in preventative practices and in access to dental treatment.

Cree children, like others in Canada, are more likely to be overweight than before. Surveys in selected communities suggest that from 21-27% of Cree children are overweight and an additional 35% obese. This is higher than the proportion of obese children in the rest of Canada (15%), and represents an extremely rapid increase since the 1940s when only 2% of Cree children were obese.

The most commonly-reported chronic conditions in Cree children are ear infections, allergies, and asthma. Asthma rates are known to be rising rapidly throughout Canada. In the Cree Region 15% of children are reported to have asthma. This rate that is at least as high as the Canadian average (12%).

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<sup>a</sup> Note that there is a distinction between dfms (decayed, missing and filled *surfaces*) and dmft (decayed missing and filled *teeth*), since each tooth can have more than one surface affected.

### **Health-Related Habits in Children**

Available evidence on children's diets suggests adequate intake from the different food groups, except possibly fruits and vegetables. "Junk" foods are frequently consumed in addition to regular meals. Even in 1983 there seemed to be some cause for concern in this regard. More recent figures show a similar picture.

It is harder to draw conclusions about smoking rates in children over time since the available sources use very different age groups. The data show that in 1983, 61-88% of 15-19 year olds smoked; in 1986, 51% of high-school age children (Grade 6 –Secondary V) were current smokers, and about 2/3 of these smoked daily; while in 1991, 61% of 15-24 year olds were regular smokers. Another 16% smoked occasionally. It seems fair to conclude that by high school age about half of the children smoke regularly or occasionally, while for older teenagers, the rates approximate 60-75%.

In 1991, approximately 17% of 15-19 year-olds who drank were estimated to be "at risk" drinkers.

## **4.3. Analysis of traditional health status indicators**

### **4.3.1. Mortality and Morbidity**

#### **Trends in Mortality**

Before 1970 infectious diseases are believed to have been very common in the region and more often fatal.

Between 1975 and 1982, overall death rates were far higher than the Canadian average, and were comparable to those of other Registered Indians in Canada. Injury deaths were among the most prominent problems.

The years 1982-86 saw a substantial progress in mortality rates, and the gap between the Cree figures and national averages narrowed appreciably. Infant mortality rates fell substantially, particularly during the perinatal and neonatal periods. However, deaths from respiratory problems continued to exceed the Quebec averages. A wide gender gap in mortality was noted, with Cree women being at a disadvantage.

Mortality rates continued to decline from 1987 to 1992 (although more gradually than before), and fell well below those of other Registered Indians. Death rates from a few conditions - infectious diseases, ill-defined conditions, and drowning - decreased dramatically. Death rates from motor vehicle crashes went up.

As other causes became less common, circulatory diseases accounted for a steadily increasing proportion of all the deaths in the territory. And since death rates from circulatory disease had decreased in the rest of the Province but not in the Cree Region, the Cree rates now more closely resembled the provincial ones.

After 1993, Cree mortality rates (from all causes combined) approached the Quebec average. Death rates from circulatory disease were now similar to the provincial average. Death rates from cancer continued to be somewhat below it. Conversely, mortality from respiratory conditions continued to exceed the Quebec average by a wide margin.

## **Hospitalisation**

From 1975 to 1982 the Cree Region's hospitalisation rates were higher than Quebec's in almost all categories with the exceptions of cancer and circulatory disease. Infectious diseases were a problem and there were some serious outbreaks of gastroenteritis.

By 1982-86, although there were still occasional outbreaks of infectious disease, it was suggested that sanitation, crowding, refrigeration, and immunisation had improved to the point that "the conditions for this are no longer present in many Cree communities."

As of 1993, hospitalisation rates for most conditions were still higher than in the rest of Quebec. Hospitalisation rates for diseases of the digestive system and for respiratory conditions have continued to be high in recent years.

Diseases of the digestive system: Cree hospitalisation rates for diseases of the digestive system are above the provincial average, and similar to those seen in other northern areas of Quebec. However, hospitalisation rates for digestive conditions have fallen by half since the 1988-92 period. The drop is mainly due to fewer children being hospitalised for dental problems, possibly because more services than before are being provided in the communities themselves.

Respiratory conditions: Respiratory disease is the leading cause of hospitalisation in the Cree Region. The hospitalisation rates remain at least triple the Quebec average.

Hospitalisation rates for respiratory disease seem to have increased slightly since 1987. The increase is mainly due to greater numbers of children and elderly people being admitted to hospital for pneumonia and influenza.

Although 15% of children in the Cree Region are reported to have asthma, hospitalisation rates for this condition have not changed over time. Asthma is also the one type of respiratory disease for which Cree hospitalisation rates resemble those seen in the rest of the Province.

## **Self-Rated Health**

About half the adults in the region rate their health as "very good" or "excellent." This is a slightly lower proportion than in other Aboriginal groups in Canada, and is appreciably lower than the 61% of the general population who rate their health as very good or excellent.

### **4.3.2. Highlights - Chronic Conditions**

#### **Chronic Conditions - Overview**

Diseases of the circulatory system (hypertension, heart disease, and effects of stroke) are the most commonly reported chronic conditions among adults in the Cree Region with 19% of adults affected. This is followed by diabetes (12%) and respiratory conditions (10%).

Comparisons with other surveys are plagued by differences in methodology and differences in the age groups employed. However, it is clear that diabetes rates, for one, are far higher than in the rest of Quebec, and comparable to those seen in other Registered Indians. Conversely, people in The Cree Region seem to be somewhat less likely than others to report having been diagnosed with arthritis or rheumatism.

#### **Diabetes**

The prevalence of diabetes has increased rapidly since 1980, to 13% of adults (15+) in 2003.

The age-sex adjusted prevalence is four times the national average and 43% of cases when diagnosed are under the age of 40.

Over half the people with diabetes have complications. Usually these are kidney damage, followed by damage to blood vessels, eyes, and nerves.

The prevalence of gestational diabetes is one of the highest reported among Aboriginal peoples at 15%.

Obesity is a risk factor for both Type 2 and gestational diabetes, and surveys have found that high proportions of Cree adults are obese. This can be linked to changes in diet (greater reliance than before on market foods) and in physical activity patterns.

### **Cardiovascular Disease**

Historically, Cree death rates from diseases of the circulatory system were lower than average, but recent figures suggest rates similar to those in the rest of Quebec - lower for ischemic heart disease, but higher for some other types.

Hospitalisation rates for diseases of the circulatory system are close to Quebec averages, and have been so since at least 1987.

In 1991, Crees were less likely than other Quebecers to have high cholesterol levels. A study in 2002 (not yet published) of two Cree communities suggests that this still holds true.

High levels of n-3 fatty acids (associated with consumption of fish and wild game) may provide some protection against heart disease.

Although heart disease appears to be at average levels, rates of hypertension are higher than elsewhere. This pattern was noted as early as 1985.

### **Cancer**

The cancer death rate in the Cree Region is still marginally below the Quebec average, although this varies with the type of cancer.

The most common types of cancer are cancers of the bladder, kidney, and urethra. Mortality figures from the early years suggest that these types have been common since 1975.

Although cancers of the bladder/kidney/urethra are the most common types over all, the picture is different if looked at separately for men and women. In men, prostate cancer is the most common type; in women, breast cancer is most common.

As would be expected, most cases of cancer occur in older adults.

### **Chronic Conditions - Asthma**

In 2001, 15% of children in the Cree Region were reported to have asthma. In about 14% of cases, the asthma was serious enough to limit the child's activities.

## **4.3.3. Enteric and Vaccine-Preventable Diseases**

### **Tuberculosis**

TB is associated with housing and nutrition, and rates were historically epidemic among Aboriginals.

There are few good data from the 1970s, but there are enough to show that the absolute numbers of new and reactivated cases decreased from the early and mid-1970s to the early 1980s.

During the early 1980s, rates of TB among the Crees were ten times higher than Canadian and Quebec averages; they were high even as compared to other Registered Indians in Quebec, although lower than the rates seen among the Inuit.

After the early 80s, rates dropped dramatically and have continued to drop, although incidence rates in 2001 remained four times the Quebec average. The presence of many people with latent TB infections makes outbreaks a constant possibility, and rates did “spike” in 1990-91. There is concern that with rising diabetes rates and the threat of HIV, TB could make a comeback in future among immunocompromised people.

Unlike the non-Aboriginal general population, approximately 40% of the active Cree cases seen through the 1980s and 1990s were in children under the age of 14.

#### **Other Infectious and Parasitic Diseases**

Historically infectious diseases were major causes of mortality and morbidity. Outbreaks appear to have been common into the early 1980s. Contributing factors included crowded housing, poor water supply and sanitation, poor hygiene, poor nutrition, and low immunisation rates.

As all of these contributing factors improved during the 1980s, mortality from infectious diseases fell precipitously.

In recent years, the main concern among the enteric diseases is salmonella. Most other enteric diseases are infrequent, and rates in the Cree Region compare very favourably to those for other Registered Indian communities in Canada. Rates of vaccine-preventable disease were also low at the time of the last in-depth review (the period 1984-1991).

#### **4.3.4. Sexually Transmissible and Blood-Borne Diseases**

##### **Gonorrhoea**

Historically, gonorrhoea is said to have been rare in the Cree communities. However, it appears to have increased beginning around the mid-70s, and rates were roughly triple the Quebec average throughout most of the 1980s. The increase may be associated with development in the Cree Region, and with associated changes in social norms, in alcohol use, and in family cohesion. The number of reported cases fell thereafter, and since 1999, just 1-2 cases have been reported each year. These figures are too small to serve as a basis for reliable rates, although the indications are that rates are still above the Quebec average.

Most cases of gonorrhoea occur in people age 15-24. This is a pattern also observed in the non-Aboriginal general population.

##### **Chlamydia**

Chlamydia is the most frequently-reported STI in the Cree Region.

Rates are much higher than elsewhere in Quebec and comparable to those for Registered Indians across in Canada.

Like gonorrhoea, incidence of chlamydia is highest in people age 15-24.

### **Hepatitis B and C**

Hepatitis B is occasionally reported in the Cree Region. The most cases are chronic carriers rather than acute hepatitis. Vaccination is offered to schoolchildren. It is given at birth to babies in one community found to have an especially high proportion of carriers.

Cases of hepatitis C – primarily chronic carriers – continue to be reported.

### **HIV and AIDS**

Although no cases of AIDS have been reported so far, there is concern that HIV and AIDS could pose a serious threat in the Cree Region, which already has high rates of some other STIs.

At present, no information is available on the prevalence of HIV in the region. The last published information was for 1993.

## **4.3.5. Mental Health**

### **Mental Illness**

Before 1978, mental health problems in the region were reported to be at average levels or even below average.

In the early 1980s, there were reports of increasing psychosocial problems such as family violence and child neglect. These were variously attributed to the stresses associated with acculturation, to unemployment, and to the increasing use of alcohol and other substances.

During the mid-1980s, younger adults (16-30 years) were over-represented in the clientele contacting health services for help with mental health problems. There seemed to be considerable variation by community in the prevalence of mental health problems, but it was not clear if the numbers truly reflected underlying differences in the health of the population.

At this time, the most frequently diagnosed mental health problems were depression (most common in women) and alcoholism (most common in men).

### **Social Support and Spirituality**

A majority (3/4) of Cree adults report having access to emotional support, a factor which is known to play an important role in mental health.

Spirituality and religion also play a role in mental health. In 1991, 25% of Cree adults reported that they attended church at least once each week.

### **Suicide and Attempted Suicide**

Suicide rates in the Cree Region are below Canadian averages and well below that of other Registered Indians in Canada – and this has been the case since at least 1975.

Males make up the vast majority of completed suicides, and younger adults are particularly at risk. More than 80% of the people who commit suicide have serious personal or family problems. Alcohol is involved in over 80% of suicides.

Suicide attempts occur mainly in women, and mainly among those aged 15-29. They appear to have increased between 1982-86 and the more recent period, although hospitalisation statistics for the past five years do not show rising rates.

### **4.3.6. Injuries**

#### **Trends in Injuries**

Injury death rates have fallen to about half what they were in the period 1975-1984. Injuries are no longer the leading cause of death in the region.

Death rates from most types of injury have fallen. Drowning rates have decreased especially quickly. However, there are two exceptions to the downward trend: suicide rates have remained constant, and motor vehicle fatalities have increased.

Hospitalisation rates for injury have remained stable or decreased slightly over time, and are presently fairly close to the provincial average.

#### **Comparisons to Quebec and Canada**

Cree death rates from injury were double the Quebec average in 1982-1991. They have fallen since and are now only slightly above the Quebec rate.

Death rates from injury are much lower for Quebec Crees other Registered Indians.

Injury hospitalisation rates are now similar to the rest of Quebec, or somewhat higher, depending on the time period.

#### **Types of Injuries**

Although drowning used to be the leading cause of injury death among the Crees. In recent years motor vehicle crashes have become more important - a trend that may be attributable to more roads and more people owning motor vehicles than in the past.

As compared to other parts of the country the Cree Region has more deaths from drowning and motor vehicle crashes, and fewer deaths from suicides and falls.

#### **Contributing Factors**

Younger males are at particularly high risk for many types of injury.

Alcohol is frequently involved in motor vehicle crashes, in suicide, and in drownings that occur during recreational boating.

Low use of safety equipment such as personal flotation devices or seatbelts may contribute to high fatality rates.

#### **Geographic Patterns Within the Region**

The inland communities have consistently had higher rates of injury mortality than the coastal ones. This difference has persisted despite changes over time in the leading causes of injury death.

#### **Hospitalisations**

Injury hospitalisation statistics show a slightly different picture than the one derived from mortality statistics. The main difference is that in the hospitalisation data, falls are more prominent and drownings less so.

**The hospitalisation statistics also show that far more women than men are hospitalised for suicide attempts.**

## Chapter 5: The Evolving Status of Health Determinants

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### 5.1. Introduction

Health has been defined as “the capacity of people to adapt to, respond to, or control life's challenges and changes”.<sup>149</sup> The internationally recognised health determinants framework, which now forms the basis for much of the World Health Organisation’s approach to health assessment, emerged from growing recognition among researchers and policy-makers that population health and well-being are largely determined by social and environmental conditions. The material presented in this section summarizes what is known about the key determinants of health in the Cree territory.

### 5.2. Income and Social Status

Population health research shows that health status improves with each step up the income and social hierarchy. The healthiest populations are the most prosperous and those with an equitable distribution of wealth. Ergo, it is pertinent to consider trends in income and income disparity.

One study of the territory found that the JBNQA had had positive effects on both wage and subsistence incomes.<sup>150</sup> However, major changes in the sources and nature of income over the past 30 years make it difficult to precisely quantify the changes in total income. The 2001 Census data show an average individual income in the territory of \$20,814 (median = \$16,533). This is somewhat lower than the Québec average income of \$27,125 (median = \$20,665). Yet interpretation of these differences in individual incomes between the Cree Region and Québec is impeded by factors specific to the economy of northern areas.

On the one hand, food obtained from hunting and fishing may contribute to household income and Cree communities are in large measure tax-free zones. Within the Cree communities, Cree corporations and service delivery bodies do not pay GST or other taxes and Cree do not pay income taxes, although non-Indian residents do. There are no property, municipal, or school taxes. The effect on the upper-income Cree household is an increase in spending power which it appears can exceed 50%. Cree residents of the territory also receive a wide range of free “non-insured” health benefits (including dental care, medical transportation and optometric services) which equate to private health insurance elsewhere. In some communities (Wemindji and Waskaganish), houses are not individually metered for electricity, with the result that individuals do not pay, although the band may. In Oujé-Bougoumou the community’s common plant provides household heating.

On the other hand, the cost of living is higher in the North. Although road development in the Cree Region has reduced the price of food and other products, local goods and services remain expensive. So does transportation. There are also equipment costs for hunting and the costs of maintaining supplementary residences on the hunting territories. Hunting, either as an occupation or a leisure and food supplement activity, is still common among Cree people and it continues to confer positive social status. However, today’s modern hunting outfit requires substantial expenditures. In the case of part-time hunters, these are most effectively supported through stable income earned in the public sector wage economy.

<b>Cost of a Nutritious Food Basket, 1996<sup>151</sup></b>		
Ottawa	Waskaganish	Kuujjuaq
\$125	\$214	\$180
Cost of a nutritious food basket to meet the needs of a family of four. Figures from Indian and Northern Affairs Canada. Waskaganish was the only Cree community selected for this study. (Note that since the time of this survey, a permanent road has been built into Waskaganish). Based on the lowest regular price in northern villages and on one supermarket in Ottawa.		

<b>Cost of Selected Foods Suitable for Infants in 2002 Montreal, Chibougamau and Cree Communities Compared<sup>152</sup></b>			
	Montreal	Chibougamau	Cree communities
Fluid milk 3.25% fat, 2L	2.65	3.00	3.77
Bottled water (4L)	0.99	1.29	2.29
Iron-fortified infant formula, concentrate, 385 ml	2.54	3.50	4.29
Jarred baby food, 128 ml	0.61	0.62	1.03
Apple juice, 1L	2.69	2.75	3.83

In 1971, 61% of personal incomes in the region came from money transferred directly from government through programmes such as unemployment insurance, social welfare, the Old Age Security pension and so forth. In 2001, according to Census data, this kind of direct government transfer to individuals has halved to 28% of regional income.<sup>a</sup> This rate of dependence on transfer payments remains higher than in the general population, but similar to or lower than rates found in other remote or economically depressed regions or communities.

<b>Proportion of Individual Income Derived from Transfer Payments Cree Region Compared to Other Regions, 2001<sup>153</sup></b>	
Cree Region	28%
Nunavik	24%
Kitigan Zibi	31%
Obedjiwan	37%
La Romaine	50%
Aboriginal people in Quebec	25%
Aboriginal people in Canada	21%
Quebec total	14%
Canada total	12%
Note: percentages have been rounded.	

These figures indicate that individual dependence on government transfers in the Cree Region is not unduly high compared to other remote regions. They might also mask the true breadth of dependence. Other studies have suggested that up to 80% of reserve residents across Canada receive some form of government transfer payments, when these include both direct transfers to individuals and institutional

<sup>a</sup> Note that this figure is for the Cree Region's Aboriginal population only. When all residents are counted the proportion is 25%.

transfers into the public sector economies of reserves. It is significant and unique in the Cree context that new agreements, with the government of Québec and Hydro-Québec, are injecting significant levels of public sector transfer payments into the regional economy.

The rapid changes in the sources and nature of income have also had an effect on social and economic inequities within the Cree Region. Sénécal and Égré<sup>154</sup> concluded that development in the Cree Region had contributed to the entrenchment of social strata, at the bottom of which are individuals who have access neither to the ISP nor to salaried work. Observably there are still significant inequities in income: twenty percent of Cree mothers have recently reported worries about having enough money to buy sufficient food for their children.<sup>155</sup>

Social status has also changed in relation to the major institutional growth in the territory over the past three decades. The Crees were lauded as the last real group of subsistence hunters when the JBNQA was signed in 1975. At the time, social status among them was mainly predicated upon hunting skills. The JBNQA created a new administrative class who quickly mastered bureaucratic and technical skills. This in turn led to increased social differentiation within Cree society and to unequal access to centres of decision-making within social groups.<sup>156</sup>

### 5.3. Employment and Working Conditions

Employment patterns have an important influence on the health of a population. Research has shown that unemployment, under-employment and stressful or unsafe work are all associated with poorer health.<sup>157</sup>

Development in the Cree Region during the past 30 years has affected traditional subsistence activities in various ways. The building, extension, or improvement of roads transecting traditional hunting territories has been found to have positive and negative effects for subsistence hunters. Roads give hunters easier access to their traditional hunting grounds. They also increase access for other hunters. This sometimes sparks conflict between Cree and southern hunters and among Native hunters. It can lead to over-harvesting (although there is little evidence of this occurring in the Cree Region on a large scale).

The Income Security Programme, a provision of JBNQA, contributed to an immediate growth in the traditional sector in its first year of operation in 1976/77. That year, the \$4.5 million it introduced into the region displaced three-quarters of a million in cancelled welfare payments. During the period 1979-1986, the proportion of the total population participating in the ISP levelled off at around 40%. Thereafter it began to drop each year.<sup>a</sup> As of 2001/02, only 19.9% of the population was involved in the ISP.<sup>b</sup>

During the late 1970s and throughout the 1980s, building programmes in the communities drew men out of the traditional sector into the local labour force. In the early part of the period, the flexibility of the ISP released people from and reabsorbed them into the traditional sector in relation to the start-up and completion of community construction projects. However, throughout the 1990s there was no evidence that the ISP continued to be used in this way. The role of the traditional sector has been transformed: hunting and fishing are now seasonal activities of most wage-earning Cree, while ISP participants are predominantly single young adults, young childless couples and the elderly, using the Programme as their primary source of income. Although the ISP now contributes over \$15 million annually to the regional

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<sup>a</sup> The absolute number of people involved in the programme has not changed much, but rapid increases in the Cree population mean that ISP participants account for an ever-smaller proportion of the total.

<sup>b</sup> This differs slightly from some other sources, which show 21%. It is drawn from the Cree Hunters and Trappers Income Security Board Annual Report 2001/02. The resident Cree population is listed as 13,359. Beneficiaries of the programme are listed at 2,662 enrolment, comprising 19.9% of the resident population.

economy, full-time participants are poorer today in real dollars than they were when the Programme began, even though the benefits are indexed to inflation. This is partly because revenues from fur sales have dwindled with the collapse of the market for furs.

Moreover, substantial alterations<sup>a</sup> in the nature of the hunting lifestyle have introduced costs that were not part of the hunting economy at the time that the ISP was developed. According to the 2001 Census, the sales and services sector provides the majority of salaried jobs in the region (27%). This is followed by occupations such as government services, health and education (22%), then by business, finance, management and administrative occupations (21%).

Participation in the wage sector of the economy is likely to be related to linguistic skills and hence to age. In particular, participation in the bureaucratic elite is related to a respondent's multilingual status. The APS of 1991 found that 97% of Cree people could speak Cree. Census figures for 2001 showed that 16% of the region's Aboriginal residents spoke only Cree while the rest spoke a second language. Most (63%) spoke English, a few (3%) spoke French, and an increasing number spoke both English and French (18%).

The regional economy is overwhelmingly defined by the public sector. The largest Cree private sector corporations operate less like private industries and more like crown corporations. Relatively little wealth is generated by the comparatively new and small 'true' private sector. Most revenue of all types comes from government funding of local administration, municipal services, capital projects, and the administration of public services such as education and health. As of 2004, there is increased economic activity associated with large new payments resulting from negotiated agreements and with unprecedented participation by Cree individuals and corporations in the construction activities for the EM-1-A hydro project.

## 5.4. Education

Health status improves as the level of education improves. Closely related to income, education contributes to health and prosperity by equipping people for problem solving and providing a sense of mastery over life circumstances. It also increases opportunities for job and income security.<sup>158</sup>

Schooling in the Cree Region began in the early 1900s with mission-run schools at the trading posts. These operated when families returned during the warm-weather months. Later, this basic schooling system was expanded with funding from Indian Affairs. Children began to be sent to church-run residential schools. Two of these were located at Fort George. However, widespread residential schooling began only during the 1950s and by the 1960s its impacts, especially upon secondary level students, were mediated by a boarding home programme. The Cree School Board was created in 1978 to take over the regional administration of Cree education. Since then, it has operated primary and now secondary level schools in each community, along with an extensive boarding home programme for families on the ISP (especially in the inland communities).

The Cree secondary school completion rate is much lower than in Quebec as a whole. A report of the Cree School Board stated that 75% of students were dropping out before Secondary Level V. The Cree schools were said to have some of the highest dropout rates in Quebec and the highest levels of

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<sup>a</sup> Specifically, the basic set of hunting equipment has changed substantially in nature and cost since the 1970s. Travel costs have increased as roads allow people to move back and forth more frequently between their community and their hunting ground; and capital costs have risen as people have shifted to permanent cabins; and the development of several thousand kilometres of roads has created a situation in which some people - especially in the southern parts of the region - must maintain a presence in their bush camp year-round to protect their gear from vandalism and theft.

absenteeism among both students and teachers.<sup>159</sup> According to the 2001 Census, 36% of Crees aged 20 years old and over had a secondary school diploma or more - a lower proportion than for other Aboriginal people in Quebec (48%) and well below the Quebec average of 70%.

Those students who do complete secondary are older than they ought to be: one-fifth of students in Secondary Level V are aged twenty or older. This means that many students moving on to CEGEP are starting socially outside of the age group of their peers. Full-time school attendance among Crees aged 15 to 24 is low. In 2001, the participation rate in the region was 36%. This is similar to the 35% observed in Nunavik's Inuit population but lower than Quebec's other Aboriginal groups.

<b>% of the Population Age 20+ by Education Level Completed Cree Region Compared to Other Regions, 2001</b> <sup>160</sup>						
Education level completed	Aboriginal population				Total population	
	Cree Region	Nunavik	Quebec	Canada	Quebec	Canada
No high school diploma	63.6	69.7	51.6	48.0	29.9	27.9
High school diploma	6.8	5.5	11.2	9.9	17.0	13.9
Trades certificate or diploma	6.7	4.1	4.9	3.8	11.5	11.8
Other postsecondary	20.9	20.2	27.6	33.8	26.5	29.6
Bachelor's degree or higher	2.0	0.4	4.7	4.4	15.1	16.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
<hr/>						
% of pop'n 15-24 attending school full-time	36.1	35.4	46.2	45.1	60.7	57.1

A strong Cree language school programme is instrumental in ensuring that the Cree language remains vibrant in the region. Nevertheless, there is an emerging debate in Cree circles about whether the classroom time devoted to cultural teaching unduly reduces time spent on other subjects such as sciences. Some believe that this contributes to poor school completion rates and to requirements by post-secondary institutions that Cree applicants take upgrading training. A recent evaluation found significant deficits in the language skills of primary school children in one community school and attributed this situation to inadequacies in the Cree School Board language programmes.<sup>161</sup>

## 5.5. Social Environment and Social Support

The social environment, including levels of social support, affects the health of the population as a whole. Research shows that support from families, friends and communities is associated with better health. The caring and respect that occur in social relationships and the resulting sense of satisfaction and well-being, are a buffer against health problems. The health effect of social relationships may be as important as medical risk factors such as smoking, physical inactivity, obesity, and high blood pressure. In addition, the importance of social support extends to the broader community. Civic vitality, social stability, recognition of diversity and community cohesion make for a supportive society that reduces or avoids potential risks to good health.<sup>162</sup>

Until the 1950s - except for certain families who lived year-round in coastal settlements - the Crees moved around on a seasonal basis throughout their hunting territories. They gathered at the trading posts

in the warm weather months. As a result of historical patterns, some of the Cree coastal communities are among the oldest in North America, while other communities, like Oujé-Bougoumou, are among the newest in Canada. In 1975 people from Waswanipi and Nemaska were living in various places around the region subsequent to the closing of their Hudson Bay Company posts. Following the JBNQA, new communities were built. Waswanipi and Nemaska were re-created in new locales. The people of Fort George Island were moved as a single community to a new mainland location in Chisasibi. A quarter of the Cree population was relocated during the five-year “implementation period” of the JBNQA (1976-1981). Oujé-Bougoumou was in the 1990s. All communities in the region have undergone substantially rebuilding since 1975. In the inland communities, moving into wage labour in a community was a major change for most families.

The creation of Cree-controlled social and political institutions is said to have been an important factor in reducing negative impacts of the James Bay development.<sup>163</sup> Nonetheless, the first documentary reports on social conditions in the region for the period 1975-1981 describe elevated and rising rates of social problems. Police reports during the years immediately after 1975 indicated a strong increase in crime, youth deviance, and drug and alcohol related problems. Data collected under the *Youth Protection Act* suggest that active cases increased from a rate of 177.7 per 10,000 in 1982/83 to 490 in 1987/88 and stabilised thereafter.<sup>164</sup> Field reports indicated that Chisasibi’s social problems worsened rapidly in the early 1980s; for example, the Youth Protection Act caseload there tripled (13 to 39) during 1982/83.

Data included in the Cree Health Board’s annual report for 1983 showed wide variations between communities in the rates of social interventions of all types (including assistance to the elderly).<sup>165</sup> Some communities were close to provincial norms, while others were many times above them: for example, Waskaganish reported one intervention for each 10 persons in the population. The high rates were attributed to new roads, improved air connections and changed economic conditions; however, the possible role of increased reporting must also be kept in mind. Wide annual variations in the rates and gaps in the data series, since 1993, make it difficult to describe with certainty more recent trends in social problems. Nonetheless, the population remains concerned about high levels of social dysfunction: in 2001, substantial proportions of adults agreed that problems such as family violence, alcohol abuse and sexual assault were an issue in their community.<sup>a</sup>

<b>Youth Protection Cases in the Cree Region, March of 1983, 1988 and 2000</b>						
<b>Number of Active Files and Crude Rates per 10,000 Population <sup>166</sup></b>						
Community	Number of Active Files			Crude rate per 10,000		
	1983	1988	2000	1983	1988	2000
Chisasibi	39	101	145	197	433	453
Eastmain	2	10	28	59	265	490
Mistissini	27	94	90	150	459	344
Nemaska	0	28	12	0	747	216
Ouje-B.	-	-	13	-	-	224
Waskaganish	28	45	108	272	363	641
Waswanipi	25	83	66	303	907	553
Wemindji	6	42	42	83	515	390
Whapmag.	4	16	57	97	349	785
<b>Total</b>	<b>131</b>	<b>419</b>	<b>561</b>	<b>178</b>	<b>490</b>	<b>460</b>
Note: rates are based on the entire population.						
<b>Figures may differ from other sources. Please see the endnote for details.</b>						

<sup>a</sup> A detailed discussion of this documentary evidence and caseload statistics can be found in *Evolution of Health Services in the Cree Region*, Chapter 5 of this Report (See Volume 2).

<b>Perceptions of Social Problems in the Community, 2001</b> <sup>167</sup>			
% of Adults Who Say "Yes" When Asked If ...Is a Problem in Their Community			
Social Problems	Coastal	Inland	Cree Region
Alcohol abuse	87	<b>71</b>	80
Drug abuse	77	68	73
Family violence	70	59	65
Sexual abuse	52	51	52
Suicide	39	48	43
Unemployment	78	<b>65</b>	72

See endnote for a list of the inland and coastal communities.  
**Bold type** indicates that the difference between coastal and inland communities is statistically significant at the 0.05 level.

The effects of some of these social problems may be partly mitigated by high levels of social interaction and support in the Cree population. In a 1991 survey, ninety-one percent of adults reported having someone they could turn to in an emergency and, in 2001, 75% reported having some form of emotional support, such as a person they could confide in or turn to for advice.<sup>168</sup> Families are large relative to Québec norms and include several generations. In 2001, just 4% of Cree seniors (65+) were living alone, as compared to 31% of seniors in Quebec as a whole. And compared to other Quebeckers, Cree adults spend considerably more time each week caring for seniors. However, there are indications of changing social trends. Increased road access associated with development in the Cree Region has been linked to weaker relationships among community members, but intensifying relationships within nuclear families.<sup>169</sup> More and more communities are planning or building homes for seniors and the construction of childcare centres cannot keep up with demand.

<b>Proportion of Persons Providing Unpaid Care for Seniors, by Hours/Week</b>		
<b>Cree Region Compared to Quebec, 2001</b> <sup>170</sup>		
# hours per week	Cree	Quebec
None	68	82
<5	16	12
5 to 9	8	3
10+	8	2
	100	100

Birth rates, although declining slightly, are much higher than the provincial norm (23.9 vs.10.0 per 1,000 in 1999).<sup>171</sup> The high birth rate places greater demand on community resources such as housing. Historically, Cree mothers have tended to be younger than mothers elsewhere in Quebec: 20% today (1996-2000) are teen mothers.<sup>172</sup> Although this pattern has been stable since at least 1983, in recent years it has created concern because of changing marriage patterns. Traditionally, marriages were arranged among families; now, it is reported that many young fathers (and the families of these young fathers) are not shouldering their responsibilities.<sup>173</sup> This places a heavier burden on the mother and her family, both for childcare and for the financial costs of childrearing.

The population in the Cree Region has doubled in the past 25 years. With a continuing high birth rate in the future, the Cree Health Board's 2003 Strategic Regional Plan<sup>174</sup> assumes that the total service population could reach 25,000 individuals by 2027, including more than 1,000 persons aged 65 and over. A 2001 survey identified 587 elderly and other persons with disability or loss of autonomy. These figures did not include the population of Eastmain nor 30 disabled and/or dependent persons housed in foster homes, group homes, or hospitals outside the region.<sup>175</sup> Increasing numbers of elderly will add to this to place greater pressures on services, as will the high numbers of people experiencing complications of diabetes.

## **5.6. Personal Health Practices and Coping Skills**

Personal health practices such as smoking, nutrition, physical inactivity and alcohol use clearly affect health status. There is a growing recognition that these kinds of personal "life choices" are greatly influenced by socio-economic environments. Effective coping skills enable people to be self-reliant, solve problems and face life's challenges in positive ways, without recourse to risky behaviours.<sup>176</sup>

### **5.6.1. Diet, Overweight, and Physical Inactivity**

Several factors have contributed to negative changes in Cree eating habits over the last 30 years. The available data suggest that dietary quality has been poor since the early 1980s. As the proportion of people living on the land has declined, so has the proportion of the diet which is derived from the land. The average amount of "wild" meat consumed has dropped from an estimated 1.3 kg/day in the 1950s to 0.23 kg/day in the 90s.<sup>177</sup> Fish consumption has also declined in response to public health warnings about mercury levels during the 1970s.<sup>a</sup> High prices in the north, low incomes, and increased availability of "southern" foods (as roads were built) have created a situation conducive to unhealthy diets. However, on the positive side, the roads have also made fresher and more varied produce much more readily available.

The proportion of overweight and obese adults has increased greatly over time. In pre-development times when the fur trade was the dominant economic activity, the Crees were renowned for their daily and seasonal mobility and for their physical endurance. Historical records - and photographs - indicating obesity are thus very rare. Today, the rates of obesity in the Cree Region are among the highest rates ever documented at a population level. In 2001, 87% of Cree adults in the territory were reported to be overweight or obese.<sup>178</sup> A very high 56% to 62% of children are estimated to be overweight or obese.<sup>179</sup> It is assumed that historically anyone living on the land was fairly active; but in 2003, the Canadian Community Health Survey classified 56% of the Cree population as totally inactive, the highest in all of Quebec's health regions. The data on obesity and activity levels is of special concern because diabetes rates - for which obesity and inactivity are major risk factors - are rapidly rising.

### **5.6.2. Smoking**

Smoking rates among the Crees are higher than the Canadian average (37% vs. 21.5% daily smokers in 2001)<sup>180</sup> and seem to have held constant or increased slightly over time. However, most smokers are light smokers (<10 cigarettes/day) and the Cree population has a higher proportion of occasional (i.e., not daily) smokers than the rest of the country.

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<sup>a</sup> Note that since 1990, public health advisories have promoted some consumption of fish for its health benefits. A study by Imrie (1997) suggested that the main obstacles to fish consumption now are the costs of fishing equipment and the lack of time for fishing due to full-time jobs.

### 5.6.3. Alcohol and Drug Use

Alcohol consumption among the Crees has become more common over time. This is evidenced by high proportions of people in the older cohorts who have never drunk alcohol, by reports that the traditional role for women did not include drinking, and by surveys showing rising proportions of drinkers over time. The 1991 Santé-Quebec survey found that only 16% of 15-24 year-olds had never consumed alcohol, whereas this was the case for 29% of men and 53% of women 65 years and over. The authors concluded: “alcohol consumption seems to be a relatively recent phenomenon in the Cree communities.”<sup>181</sup> Not only are people in the younger cohorts more likely to drink than their elders were at the same age, but improved road access has made alcohol more readily available. The proportion of adults who drink at least occasionally has risen from 35% in the early 1980s to 49% in 2001. Despite these increases, the proportion of drinkers in the Cree population remains well below the “norm” in other parts of the country.

How does one reconcile relatively low proportion of drinkers in the Cree Region with the frequency of alcohol-related problems in some communities? The explanation may be that, in the Cree Region, most of those who drink do so heavily. In 2001, 92% of Cree drinkers “binged” at least occasionally and almost half (47%) did so several times a month.<sup>182</sup> Binge episodes are strongly associated, by Cree police and Cree social services, with crime and social problems needing intervention. Consistent with this picture, the 1991 Santé Québec survey estimated that from 10-20% of Cree drinkers had experienced problems due to their drinking, or were otherwise “at risk.” Residents’ levels of concern about alcohol abuse have also risen over time: as of 2001, it was the most commonly identified problem in the communities with 80% of adults saying that it was an issue.<sup>183</sup>

In the Cree Region 73% of adults also considered drug abuse to be a problem in 2001,<sup>184</sup> although fewer people use drugs than alcohol. According to a 1991 survey, the most commonly used drugs were marijuana or hashish: 7% of women and 21% of men reported having used these drugs in the previous year. People under the age of 24 were most likely to use drugs. Male users outnumbered female users approximately 3 to 1.

<b>Proportion of Population by Type of Drinkers, Persons Aged 15 or More Cree Region and Quebec 1991</b> <sup>185</sup>				
Type of drinkers	Coastal	Inland	Cree Region	Quebec (1987)
Non-drinkers	28	16	23	15
Ex-drinkers	27	30	28	6
Occasional drinkers	24	20	22	20
Regular drinkers	21	35	27	60
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Note: percentages have been rounded.  
 Non-drinkers: people who never consumed alcohol. Ex-drinkers: no alcohol in past year.  
 Occasional drinkers: consumed alcohol less than once a month in the past year. Regular drinkers: drank at least once a month in the past year.

Proportion of Adult Drinkers Who Have "Binged," 2001 <sup>186</sup>		
Territory	Number	%
Coastal communities	2020	93
Inland communities	1270	91
Cree Region	3290	92
Quebec Total (1998/99)		41
Canada Total (2000/01)		44
Percentages are based on the people who have had an alcoholic drink in the past 12 months, (i.e., adults who drink at all) and who provided a valid answer to the question on binge drinking. Please see endnote for a list of the coastal and inland communities.		

## 5.7. Physical Environment

Factors in the man-made environment can significantly influence physical and psychological well-being.<sup>187</sup> Housing and sanitation have long been known to affect health. Certain levels of exposure, contaminants in air, water, food and soil, can cause adverse health effects.

### 5.7.1. Sanitation and Water

Sanitation in traditional bush camps relied on established practices of waste disposal. These were predicated upon relatively few people being in one place at any time, a seasonal change of locations, and a three-year cycle of rotation around the hunting territory. Sanitary standards in the more settled parts of the coastal communities were not cause for concern in the historical accounts.

However, government incentives<sup>a</sup> introduced from the 1930s to the 1960s gradually induced more and more people to settle in communities. Conditions had begun to deteriorate by the 1970s because these increases were not matched by sufficient sanitary planning. Only the houses of non-Crees had piped water when the Indian Affairs began to offer housing assistance in the 1940s and 1950s. Everyone else relied on outdoor latrines. As a consequence local water sources often became contaminated. Later, Indian Affairs introduced standpipes but without any system of drainage or sewers. Gastro-intestinal outbreaks and skin infections were frequent according to historical records.

In 1980, four of the Cree communities experienced alarming gastro-enteritis outbreaks. Some infant deaths resulted although the precise number is unclear. This occurred during the period of administrative confusion and jurisdictional disputes between different levels of government surrounding implementation of the JBNQA. During this five-year period there was serious deterioration in infrastructure and services. Judgmental inspection reports, coupled with media attention and lawsuits, prompted major government investments in socio-sanitary infrastructure during the early 1980s. Through this and public health measures, sanitary conditions rapidly improved.

All the Cree communities now have garbage disposal, piped water, and piped sewage systems. Some concerns persist although enteric disease rates have declined dramatically, to levels comparable to those seen in the rest of Quebec. In the five years 1986-90, 154 cases of enteric disease were reported, while over the five years 1999-2003 only 35 cases were reported. This sharp decline was despite substantial population growth in the interim. Similarly, the death rate from infectious and parasitic diseases fell from

<sup>a</sup> These incentives included mandatory school attendance for children (along with a provision that family allowance be paid only to those families whose children were actually living with them) and the increasing availability of social benefits such as welfare, housing, and medical care in the communities.

five times the Quebec average in 1982-86<sup>188</sup> to below the average in 1987-1992.<sup>189</sup> Indian reserve communities across Canada did not see comparable declines in the same period.<sup>190</sup>

### 5.7.2. Housing Quality

The housing conditions in the Cree communities reflect the fact that the private housing market is relatively new. Local governments act as housing associations, providing a basic grant for each house and offering a collective mortgage. Despite this, a legal prohibition against seizure of assets on reserves makes personal financing for house construction harder to obtain than on non-Indian land, even for an affluent family. Capital for housing has mostly come from Indian Affairs, which operates with Canada Mortgage and Housing Corporation. The number of houses and the condition of the housing stock depend upon several factors: the amount of capital funds available; the operations and maintenance funds budgeted; and the planning efficiency of the local administration.

With almost no private housing available, the regional Cree service delivery organisations or “entities” provide “government” housing for their employees working in the region. The regional organisations are growing. In recent years, some - such as the Cree Construction Corporation and the Human Resources Department of the Cree Regional Authority - have moved their employees from southern locations back to the territory. This increases the need for local housing. Weather, long road distances, lack of local sources of materials, and the need to expand community infrastructure such as sewage and water capacity, all contribute to a situation in which demand outpaces supply in these quickly-growing communities. In Whapmagoostui the obstacles are even greater because construction materials must be brought in by barge during the summer.

Housing shortages and crowded housing have been major problems from the 1980s onwards. Despite improvements over time they remain serious issues. The most recent assessment of the regional housing needs suggested an urgent requirement of 1,400 units additional to the current (2003) stock of 2,678 social units.<sup>a</sup> Since the early 1980s, housing subsidies have supported only one-half of the growth resulting from new family formations. Housing quality remains low: the proportion of houses that need major repairs is far above the Quebec average (25% vs. 8%) and the effect of moulds on health is now a concern in many communities. In Chisasibi, levels of toxic moulds became an issue immediately after the relocation of the community. Three hundred of the houses moved from Fort George were found to have mould caused by water seeping into the basements and by inadequate ventilation.

### 5.7.3. Mercury and Other Contaminants: Mercury

Human exposure to mercury has been an issue in the Cree Region since the early 1970s. Studies suggest that “background” levels of mercury present in the environment are themselves sufficient to produce moderately high mercury levels in people who frequently eat fish. Onto this background level have been superimposed the possibility of exposure from industrial sources. These include effluent discharged into water, long-range air transport, and increases in mercury levels as a result of hydro-electric development. In the 1980s, fish from the reservoirs of the La Grande hydro-electric complex were found to have four to six times the mercury levels of those in nearby natural lakes. These levels are declining but concentrations in predatory species have not yet returned to background levels.

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<sup>a</sup> Note that in addition to the social housing, there are a limited number of “government” houses and houses built with private funds. As a point of comparison for the extent of the backlog, DIAND estimates that there are 93,500 houses on Indian reserves across Canada but 115,000 households, i.e., there is a backlog of 21,500 houses (figures provided by Fred Smith, DIAND, 13 April 2004). In other words, to meet national demand, the housing stock would need to increase by 23% over current levels. The comparable proportion for social housing in the Cree Region (1,400 divided by 2,678) would be 52%.

Disruption of traditional eating patterns because of real or perceived contamination of the traditional food supply has been found in several studies of northern areas. It appears to have had an impact in the Cree Region.<sup>191</sup> Advisory campaigns in the 1970s issued blanket warnings against any fish consumption. These stimulated a sudden reduction in the activity of subsistence fishing and in the amount of fish in the diet. The Native Harvesting Research Committee estimated that fish harvests in Mistissini and Waswanipi fell by over than 75% in 1975/76.<sup>192</sup> Health professionals serving the region and the region's residents perceive these changes as some of the reasons for increases in inactivity, obesity and diabetes.

<b>Mercury Exposures in the Cree Population *</b>						
Year	Group (N= )	Mercury Concentrations in Hair (ppm)				Source of data
		50 <sup>th</sup> percent tile	90 <sup>th</sup> percent tile	99 <sup>th</sup> percent tile	Max	
1975	All communities, > 4 yr.**	5.2	<b>24</b>	-	<b>196</b>	Medical Services Branch of Health and Welfare Canada <sup>193</sup>
1988	All communities, > 15 yr. (N= 3682)	3.9	<b>17.5</b>	<b>36.8</b>	<b>91.7</b>	Dumont, Noël et al.1998 <sup>194</sup>
1993-94	All communities, > 15 yr. (N= 2289)	2.5	<b>11.1</b>	<b>23.3</b>	<b>42.2</b>	Dumont, Noël et al.1998
2002	Oujé-Bougoumou, all ages (N=218 )***	0.8	4.3	-	<b>13.9</b>	Dewailly and Nieboer, 2003 <sup>195</sup>
	Nemaska, all ages (N=97)****	0.3	2.7	-	<b>8.8</b>	Dewailly and Nieboer, 2003
<p>* The comparisons between the results of different authors are approximate, in that sampling for the surveys varied.</p> <p>** The Medical Services Branch (MSB) Screening Programme monitored mercury exposure by analysing blood samples. In the table, blood mercury levels have been converted to hair mercury levels using a factor of 3.3 : 1 (blood in ppb to hair in ppm), a conversion factor established within the MSB Screening Programme.</p> <p>*** This survey contained 54 individuals in Oujé-Bougoumou under 15 years of age, which lowers the overall mercury exposure results, as this age group is the least exposed.</p> <p>**** This survey contained 29 individuals in Nemaska under 15 years of age, which lowers the overall mercury exposure results, as this age group is the least exposed.</p> <p><b>Bold type</b> indicates that Health Canada guideline of 6 ppm is exceeded.</p>						

Since the 1970s, mercury levels have been declining in every age group surveyed. This is most likely as a result of the reductions in fish consumption. Nonetheless, in a 2002 health study in Nemaska and Oujé-Bougoumou, one-sixth to one-third of individuals over the age of 40 years (19 people) exceeded the recommended Health Canada mercury hair level of 6 ppm. This puts them in the range that Health Canada characterises as “increasing risk”. Public Health authorities are faced with the dilemma of promoting fish consumption for its health benefits while warning against overexposure to mercury, in a context where international guidelines for mercury exposure are increasingly strict. Any significant increase in the level of mercury contamination in the fish consumed by Crees would only exacerbate an already problematic situation.

The Mercury Agreement (2001) signed between Hydro Québec and the Grand Council of the Crees provides \$22 million to promote fishing activity and fish consumption and \$8 million to study health and

environmental impacts until 2011. The effect that this Agreement will have on exposure to mercury in the population is unknown at this time. This is why the Agreement has established funding for surveillance and follow-up.

#### 5.7.4. Mercury and Other Contaminants: Lead

The principal source of lead exposure among the Crees is through hunting with lead shot. This exposure appears to be related to breathing in lead in gun smoke, ingesting lead dust on hands, or eating meat contaminated with lead fragments. Limited data available from the 1970s indicate that exposures greater than 20 µg/l were not uncommon.<sup>196</sup> Today, cases of lead exposure exceeding 10 µg/l (the level requiring legal declaration to Public Health authorities) occur on an occasional basis (see the table below). There appears to be considerable variation between communities with respect to lead exposure.

<b>Lead Levels Declared to Public Health Authorities, Region 18</b>				
Year	Total cases declared	New cases	Already known cases	Comments
1999	6	4	2	Included 4 children; all children's values less than 1 micromole/L; 2 children detected in N. Willows' anaemia study; 2 others, aged 9 and 16, in Whapmagoostui.
2000	9	6	3	All adults.
2001	5	2	3	Includes one adolescent.
2002	4	At least 2		Declarable level 1.5 for adults and 0.5 for children under 18 years of age. Numbers include one adolescent.
2003, up to Nov.	22			Declarable level for adults changed from 1.5 micromoles/L to 0.5. Includes 2 adults from Mistissini. One adolescent.
Note: except where otherwise noted, all cases were adults in Whapmagoostui.				

#### 5.7.5. Mercury and Other Contaminants: Other Persistent Organic Compounds

There is potential concern about other persistent organic compounds which build up in human tissue and can be transported in the air; e.g., DDT, PCBs, dioxins, and furans. There is evidence that some of these compounds might be retained in boreal forests.<sup>197</sup> In a 2002 health study in Nemaska and Oujé-Bougoumou, exposure to PCBs was characterised as moderate to high in comparison to other population groups, and also comparable to what has been found for a Quebec Inuit population.<sup>198</sup> Persistent organic compounds have also been documented in waterfowl in the Cree Region.<sup>199</sup>

#### 5.8. Health Services

Health services, particularly those designed to maintain and promote health and to prevent disease, contribute to population health.<sup>200</sup> In early industrial England, it was not improvements in health services that shifted the burden of infectious diseases, but rather improvements in municipal infrastructure for water and sewage. However, in recent years, some types of health services have been measurably shown

to decrease the burden of disease in populations when the core type of service model is based on prevention and primary care<sup>201</sup>.

When the new CBHSSJB began to deliver services in 1978, the status of Cree health reflected patterns similar to that of developing countries with high infant mortality, high rates of infectious diseases, non-existent municipal water and sanitation infrastructure and so forth<sup>202</sup>. At that time, the WHO and UNICEF Alma Ata declaration of “health for all” had just been prepared. The core principals of the declaration, which then and now reflect prevailing wisdom, provide criteria against which to assess the success and failure of the services of the CBHSSJB to serve as a determinant of health<sup>203</sup>.

There has always been a maternal and child health care programme which was inherited from the time of federal services and which was, until the end of the 1990s, still at the forefront of such services in Québec. Today, not including those babies who die of an incurable genetic disease, the infant mortality rate is only slightly higher than that of Québec.

Since the 1980s, the Cree communities have all put in place effective water and sewage systems and the CBHSSJB has achieved wide coverage with its immunisation programme for major infectious diseases, along with an effective tuberculosis control programme. As a result, the gastrointestinal outbreaks of 1980 have not reappeared, tuberculosis rates, while historically higher than Quebec, have steadily decreased, and there have not been any major outbreaks of other infectious diseases, except for the endemic situation of sexually transmitted diseases and dental decay which the CBHSSJB lacked the resources to check.

The CBHSSJB clinics in each community offer weekday services, round-the-clock emergency services and a sophisticated system for consultations with specialists outside the territory. Waiting times for most care are relatively short. As well, the CBHSSJB provides comprehensive pharmacy services in each clinic, as well as a complete range of non-insured health benefits, including free transportation to access specialised medical and dental services available outside the region.

However, while these improvements were happening, there were major changes taking place as the food supply of Cree communities continued to shift from bush foods to low quality, but abundant, market foods, coupled with the rapid sedentarisation of the population. Until very recently, the CBHSSJB offered almost no effective, population-based education concerning prevailing health problems and methods of preventing and controlling them. It was not able to predict the diabetes ‘epidemic’, although such patterns in other Aboriginal groups had already been reported. Ten years after nurses had first warned about this emerging problem, the CBHSSJB was unable to respond due to chronic under-financing and lack of capacity.

Today, the extent to which the Board’s services act as a determinant of health in the population can be assessed against the criteria for preventive and primary care services which have been shown to be effective in this regard<sup>204</sup>. In preventive services, the territory’s new public health department may possibly give the region the most advanced public health capacity of any Aboriginal group in North America once it is fully implemented. Up to 2002, the CBHSSJB relied on basic public health services delivered from the Montreal General Hospital. Since then, it has been financed for a fully functional department under the Quebec Public Health Act. This has given the region extensive planning and new programming in all aspects of health surveillance, health promotion and preventive services and programmes. These compliment the effective services in health protection previously organised. The impact of these changes is already being realised through revisions of community-health programmes on an evidence-base as well as well-organised and efficient new preventive programmes such as mammography screening for women. The changes to the social environment will be slower to realize over the next few years.

Other services at the CBHSSJB are undergoing - in mid 2004 - changes as profound as those described for Public Health. Recently, the Board of the CBHSSJB adopted a Strategic Regional Plan (SRP) which has begun to propel the organisation into a primary care services model, with a target date of 2010. In this context, the discussion below reflects the present situation that is rapidly changing.

At present, the CBHSSJB's global health and social services do not stand up well when assessed against the criteria for primary care services. These include: a system based on effective information systems; a system that is flexible, responsive and adaptable; financing of the system that supports excellence in primary care practice; practice that is always revitalised through education, new training sites and new delivery models; and a system characterised by continuous improvement, documentation and communication<sup>205</sup>.

Assessing a patient centred approach may appear deceptive where the clinics and offices of social services are located in small, isolated communities each of which has a representative on the regional Board of the CBHSSJB. At odds with the community control implied by the provision of local representatives, the organisation is highly centrally administered, hierarchical, and has a labour force represented by strong Québec-based unions. There has been no autonomous decision-making at the clinic level to address community-specific concerns. Standard approaches for patient-centred care are rare, such as same care provider, in the language of the patient, at the location where the patient can be most effectively reached, team-centred care, multi-disciplinary case work, various types of delivery models and so forth.

Major structural discontinuities in care exist. There is a chronic and very high personnel turnover. There is reliance, to a greater extent than in any other region, on using the specialised services of other service organisations outside of the region. Although all services in the region have long been offered through the single CBHSSJB organisation – in 2004 the new model for services in Québec – the service areas work in isolation. For example, there is minimal interaction between clinical services and social services. There is also considerable linguistic confusion between the three languages as only a few professionals are fluent in Cree which is the language of the population.

Before the recent SRP, there had never been a planning process for services; the region's health and social services information systems are fragmented and, where they do exist, the system has been characterised by rigidity and unresponsiveness; and, a corporate culture of continuous improvement, documentation and communication has been absent.

The SRP (based on substantial new financing) will correct many of these problems. For example, community-based Cree integrated health and social service centres will be a single-point of delivery for all health and social services in each community, and with local control and decision-making. Programmes are being planned on an evidence-base. Appropriate communication and information systems are being planned and implemented and a complete, long-term workforce training plan is being developed. In short, the CBHSSJB does not meet the criteria for primary care services today; but it has a new plan and the resources to make a revolutionary institutional change towards a primary care model over the next few years.

## **5.9. Gender and Culture**

Some persons or groups may face additional health risks due to a socio-economic environment that contributes to marginalisation, stigmatisation, loss or devaluation of language and culture, and lack of access to culturally appropriate health care and services.<sup>206</sup> Gender and culture ought therefore to be considered as among the determinants of health.

With a few exceptions, most leadership positions in the Cree Region continue to be occupied by men and only one woman has occupied the position of Chief. Women have significantly higher rates of morbidity and mortality from many diseases, although the factors underlying this difference have not yet been studied. This is particularly true for diabetes. The Cree population differs from the Québec-wide pattern of higher diabetes rates in men. Gestational diabetes is also a great concern in the Cree Region.

<b>Proportion of Population by Knowledge of English and French and by Age, 2001<sup>207</sup></b>				
Age group	English only	French only	English and French	Neither one
0-4	35	1	4	58
5-14	63	4	17	17
15-24	56	2	40	1
25-34	64	0	34	1
35-44	68	1	30	1
45-54	74	1	21	5
55-64	59	0	15	32
65 and over	29	0	4	63
<b>Total</b>	<b>58</b>	<b>2</b>	<b>24</b>	<b>16</b>

*Note: All residents (Aboriginal and non-Aboriginal) included.*

While the rate of teenage pregnancies has not changed appreciably since the late 1980s, the context is continuing to change. Single parenthood (especially for women) has increased. This reflects changes in marriage patterns. Some single mothers have excellent support within their families. Others do not, and they are living in poverty.<sup>208</sup>

There has been little or no decline in knowledge of the Cree language since 1975. More youth are literate in Cree syllabics than ever before although syllabic reading materials are scarce. Over 90% of the population speak Cree and grades 1-3 are taught in Cree. Cree is becoming the predominant language in the workplace within Cree entities and band offices. The most popular media in the region is Cree language radio. At the same time, Census figures show that increasing proportions of young people are also able to speak English and (more recently) French.

In the early 1970s, except for persons with hunting grounds near the southern boundaries of the territory where new logging and mining economies were opening up, the majority of Crees had had no experience with participation in industrial labour. In a very few years, Cree life was transformed by the impact of the hydro project and the new role of Cree within Québec and Canada. The pace of continuous change over the past thirty years has outstripped community-level reflections about the impact of these changes on core Cree values, activities, land-holding patterns, marriage patterns, approaches to health and so forth. While individuals get on with their lives within their own families and communities, there is a continuing discussion at the level of the public institutions about the best way to incorporate and strengthen a Cree-specific approach within the regional entities.<sup>209</sup>

## Endnotes to Chapter 5

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- <sup>149</sup> Frankish et al (1996), c.f. Health Canada at [http://www.hc-sc.gc.ca/hppb/phdd /approach/index.html#def\\_health](http://www.hc-sc.gc.ca/hppb/phdd /approach/index.html#def_health).
- <sup>150</sup> Sénécal (1998).
- <sup>151</sup> Indian and Northern Affairs Canada, c.f. Scharch (2001), p. 61.
- <sup>152</sup> Willows (2003).
- <sup>153</sup> 2001 Census files. Table produced by Pierre Lejeune, Epidemiological Programme Officer, CBHSSJB.
- <sup>154</sup> Sénécal (1998).
- <sup>155</sup> Willows (2003).
- <sup>156</sup> La Rusic et al.
- <sup>157</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- <sup>158</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- <sup>159</sup> Mianscum (1999).
- <sup>160</sup> 2001 Census, op. cit.
- <sup>161</sup> Lapointe (2003).
- <sup>162</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- <sup>163</sup> Salisbury (1986).
- <sup>164</sup> Figures from *Annual Reports* of the CBHSSJB. In some cases, these data may differ substantially from those published by the Ministère de la Santé. The Annual Report data were used because they provide the longest time series and because they appear to be the more valid of the two sets of figures, i.e. they tally best with the caseload counts produced for individual financial periods (of which there are 13 in the year).
- <sup>165</sup> *ibid.*, Annual Report, 1983.
- <sup>166</sup> *ibid.*, various years.
- <sup>167</sup> 2001 APS, custom tabulations prepared for the CBHSSJB, February 2004. Coastal communities = Whapmagoostui, Chisasibi, Wemindji, Eastmain and Waskaganish. Inland = Nemaska, Mistissini, Waswanipi and Ouje-Bougoumou.
- <sup>168</sup> 1991 APS, Community Profiles. 2001 data from custom tabulations prepared for the CBHSSJB.
- <sup>169</sup> Vincent (1998).
- <sup>170</sup> 2001 Census.
- <sup>171</sup> Schnarch (2001), p. 22.
- <sup>172</sup> Bobet (2003b).
- <sup>173</sup> Saganash (2003).
- <sup>174</sup> Cree Board of Health and Social Services of James Bay (2003b).
- <sup>175</sup> CBHSSJB (2002).
- <sup>176</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- <sup>177</sup> Receveur (ca. 2002).
- <sup>178</sup> 2001 APS, custom tabulations op. cit. For a table showing these results in more detail, see the Health Status section of this report, under “Diabetes”.
- <sup>179</sup> Teta et al. (2002).
- <sup>180</sup> 2001 APS, custom tabulations op. cit.
- <sup>181</sup> Daveluy et al. (1994), p. 53.
- <sup>182</sup> 2001 APS, custom tabulations op. cit.
- <sup>183</sup> *ibid.*
- <sup>184</sup> *ibid.*
- <sup>185</sup> Daveluy et al. (1994), p. 52.
- <sup>186</sup> 2001 APS, custom tabulations op. cit. Data are valid percent (i.e. percentages excluding refusals and “don’t know” answers) for adults 15+ in the territory who self-identify as Aboriginal. “Binge” drinking is defined as consuming 5 or more drinks at one sitting. Data for Canada as a whole from the Statistics Canada website, based on the Canadian Community Health Survey. Data for Quebec from the Statistics Canada website at <http://www.statcan.ca/english/freepub/82-221-XIE/00503/tables/html/2152.htm>. Coastal communities = Whapmagoostui, Chisasibi, Wemindji, Eastmain and Waskaganish. Inland = Nemaska, Mistissini, Waswanipi and Ouje-Bougoumou. The six-community grouping refers to the communities thought by Hydro-Quebec most directly affected by the next round of hydroelectric development: Waskaganish, Eastmain, Wemindji, Chisasibi, Nemaska and Mistissini.
- <sup>187</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.

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- <sup>188</sup> Courteau (1989), pp. 51-52
- <sup>189</sup> Saint-Pierre (1995), p. 46
- <sup>190</sup> e.g., figures in Lemchuk-Favel (1996) and in Canada (2003a).
- <sup>191</sup> Wheatley and Wheatley (2000).
- <sup>192</sup> NHRC (1976), c.f. Native Harvesting Research Committee, Environmental and Social Impact Review Panel (1978).
- <sup>193</sup> Canada (1979a).
- <sup>194</sup> Dumont et al. (1998).
- <sup>195</sup> Dewailly and Nieboer (2003).
- <sup>196</sup> Barbeau et al. (1976); Kosatsy, Tom, personal communication to Jill Torrie.
- <sup>197</sup> Wanie and MacLachlan (2001).
- <sup>198</sup> Dewailly and Nieboer (2004).
- <sup>199</sup> Unpublished data compiled by SOMER for Hydro-Québec in connection with the Nottaway-Broadback-Rupert hydro-electric project, ca. 1992.
- <sup>200</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- <sup>201</sup> Acheson (1990).
- <sup>202</sup> Macinko et al (2003).
- <sup>203</sup> WHO (1978).
- <sup>204</sup> Magnussen et al. (2004).
- <sup>205</sup> Showstack et al (2003). Note also other articles in the same issue.
- <sup>206</sup> <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- <sup>207</sup> 1996 Census.
- <sup>208</sup> Saganash (2003).
- <sup>209</sup> Torrie et al. (2003).

## CHAPTER 6- The Evolution of Cree Health Status

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### 6.1. Introduction

The previous chapter examined the evolution of health determinants in the Cree Region over the past three decades. This chapter presents the evidence showing the evolution in the status of Cree health during this same period. It also draws comparisons between Cree health and the health of Aboriginals and non-Aboriginals in other regions, and, to the extent permitted by the available data, describes changes at both regional, sub-regional *and* community levels.

### 6.2. Overall Trends in Mortality and Illness

From 1970 to 2003, the overall trend of health status in the Cree Region was one of improved mortality rates, declining rates of enteric and vaccine-preventable diseases and injuries, but increasing chronic diseases and escalating social pathologies. Women's mortality rates are higher than men's mortality rates, for most causes, in the Cree Region. This pattern was first noted in the statistics for the period 1982-1986.

Overall mortality rates have decreased despite increases in some chronic diseases. In the late 1970s and early 1980s, mortality rates in the Cree communities were similar to those of Indian reserves across Canada, and hence far higher than national or Quebec averages.\* Subsequently they have dropped to levels only somewhat above the Quebec average, and much lower than those of other Indian groups.

#### Crude Death Rates in the Cree Communities, 1975 to 2002.

Period	Rates for 1,000
1975	5.3
1982-1986	4.6
1987-1992	4.2
1993-1997	4.3
1998-2002	3.8

Source: Figures for 1975, 1982-1986 and 1987-1992 from Saint-Pierre (1995). More recent figures are estimates obtained by dividing the total number of deaths reported to the Cree Death Data File by the (unadjusted) population on the Beneficiaries List.

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\* For instance, in 1976 the Cree rate was 6.8 per 1,000, the same as the rate for all Registered Indians in Canada (1978). Using figures age-standardised by the indirect method, the Cree rate of 6.8 was higher than the Quebec-wide rate of 4.3. (Source: Bernèche, 1980, pp. 12-13.)

**Standardised Mortality Ratios <sup>a</sup>,  
Cree Region Compared to Quebec and to Other Indian Communities in Canada.**

	Male	Female	Total
Cree 1982-1986	0.96	1.61	1.18
Cree 1987-1992	1.07	1.42	1.19
Registered Indians in Canada, 1991	1.52	1.75	1.61

<sup>a</sup> SMRs calculated with respect to Quebec figures for 1990.

Source: Saint-Pierre (1995), p. 38.

The most prevalent health problems prior to 1960 were infectious diseases and respiratory infections.<sup>210,211</sup> By the year 1975, injuries and respiratory problems were the main problems in terms of utilisation of health resources, with periodic and demanding outbreaks of infectious disease related to poor water and sanitation. The rate of infections of all kinds was very high. For example, in 1978, 22% of Cree children inspected by the federal clinic nurses had otitis media. Routine health monitoring and intervention - particularly regarding children - declined during the JBNQA implementation period (1975-1981) when administrative control was handed over from the federal government to the MSSSQ, thence to the Cree Health Board. For instance, in 1981 the nurses at Mistissini found that 219 out of 442 local students were infested with lice, 13 had impetigo, 4 had running ears, and 4 needed consultation for scoliosis. Furthermore, the immunisation schedule had suffered major lapses.

**Infant Mortality Rate by Period, Cree Region, 1976 to 1998.**

Period (source)	Rate per 1,000 live births
1976 (Robinson)	49.7
1978 (Robinson)	36.5
1975-1981(Courteau)	37.0
1980 (Robinson)	31.2
1982 (Robinson)	22.2
1981-1983 (QMHSS)	20.1
1982-1986 (Courteau)	17.2
1984-1986 (QMHSS)	14.5
1984-1988 (Choinière)	10.7
1987-1992 (St-Pierre)	11.0
1988-1992 (QMHSS)	8.9
1989-1993 (Choinière)	12.1
1993-1997 (GMHSS)	11.0
1994-1998 (Choinière/ISQ)	14.9

Source: Schnarch (2001), p 111.

This picture changed considerably during the 1980s concurrent with improvements in housing and hygiene, the building of new clinics, and the introduction of new health services. The overall mortality rates had dropped substantially by 1986. They continued to decrease (although more gradually) during the ensuing years. By 1998, infant mortality was less than a third of its level in 1976, although it remained above the Quebec average primarily due to an incurable genetic disease of infants afflicting the

Cree population. Overall mortality rates were approaching the Quebec average but Cree hospitalisation rates, for most conditions, continued to be far higher than average. Mortality from infectious diseases had ceased to be an issue. Most types of injury mortality - especially drowning - had decreased substantially. Injury mortality rates were now fairly similar to the provincial average, and death rates from cancer continued to be somewhat below it. However, mortality rates from respiratory diseases still exceeded the Quebec average by a wide margin.

**Deaths from Infectious and Parasitic Diseases, Cree Region Rates Compared to Quebec (1990), using Standardised Mortality Ratios.**

ICD	1982-1986	1987-1992
Infectious & parasitic	2.21	0.60
Note that the difference between the Cree and Quebec figures was not statistically significant in either period.		

Source: Saint-Pierre (1995), p. 46.

**Age-standardised Mortality Rates, 1994 to 1998, Major Causes of Mortality, Cree and Quebec Rates per 100,000.**

<i>Causes of Mortality</i>	Cree Region <sup>a</sup>	Quebec
Cancer	204	220
Circulatory system	264	258
Respiratory system	178	66
Digestive system	44	26
Unintentional injury	52	27
All causes	937	728
<sup>a</sup> Caution: high sampling variability for all the Cree figures. None of the differences shown reaches statistical significance at the 0.05 level.		

Source: Pageau et al. (2003).

It is tempting to look at trends in mortality in individual communities, since the different communities face different environmental conditions and social circumstances. Unfortunately, however, the small absolute numbers involved make mortality rates for individual communities extremely variable. An analysis for the years 1995-1999 found that observed differences in community mortality rates were statistically significant only for the two largest communities (Mistissini and Chisasibi). It is nevertheless possible to look at rates for groupings of communities, such as the group of four communities that Hydro-Quebec considers the most affected by the Eastmain-1-A-Rupert diversion.

### Crude Mortality Rates in the Cree Communities, 1995 to 1999.

Community	Total deaths 1995-1999	Annual mean	Population 1997	Rate per 100,000
Chisasibi	89	17.8	3,046	584.4
Eastmain	7	1.4	514	272.4
Mistissini	38	7.6	2,491	305.1
Nemaska	8	1.6	509	314.3
Oujé-Bougoumou	11	2.2	513	428.8
Waskaganish	30	6.0	1,576	380.7
Waswanipi	18	3.6	1,096	328.5
Wemindji	23	4.6	1,014	453.6
Whapmagoostui	17	3.4	651	522.3
4 communities group <sup>a</sup>	83	16.6	5,090	326.1
Remaining 5 communities	158	31.6	6,320	500.0
Cree Region	241	48.2	11,410	422.4

<sup>a</sup> The four communities considered by Hydro-Québec most directly affected by EM-1-A (Eastmain, Mistissini, Nemaska, and Waskaganish). Note that the difference between these four communities and the remaining five is statistically significant at the 0.05 level. The difference as compared to the territorial average is not significant.

Source: MSSSQ mortality databanks.

### 6.3. Injuries

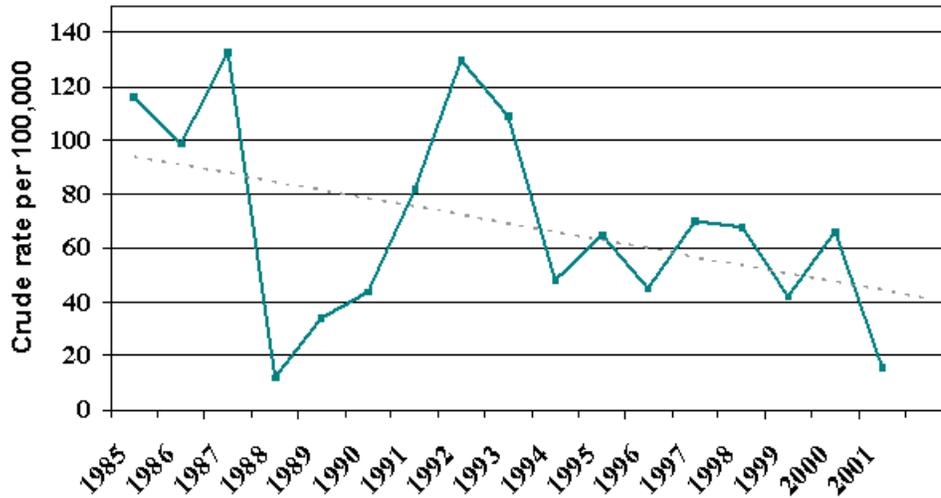
In 1975 the Cree Region - then served by the Department of National Health and Welfare - had more accidents than that Department's other Indian health administrative regions in Quebec. Health and Welfare personnel considered this disturbing given the smaller population involved in the Cree Region. Since then, injury death rates have fallen to the point where they are fairly similar to the Quebec average. Over the 1985-2001 period, the age-standardised injury mortality rate was 68 per 100,000 for the Cree communities, compared to 50 per 100,000 for Quebec.<sup>212</sup> However, there are differences in the most common types of injury. The Crees are far more likely than other Quebecers to die from a motor vehicle crash\* and far less likely to die from a fall or from suicide.

Rising rates of fatal motor vehicle crashes coincided with increases in road access, in vehicle ownership (as a corollary of access to wage income), and in alcohol use. All but one of the communities (Whapmagoostui) now have year-round road access, although for some this access came as late as 2000. A recent report<sup>213</sup> showed that alcohol was involved in 43% of the 35 fatal crashes in the Cree Region over the 1986-1999 period. The corresponding figure for non-Cree residents of the surrounding region (Region 10) was 24%.

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\* Note that much of this is explainable by the greater distances northern residents must travel in the course of their daily activities, and by the amount of travel over highways. Over the 1986-1999 period, Cree motor vehicle fatality rates were in fact similar to those seen in the rest of Region 10.

### Injury Death Rates in the Cree Region, 1985 to 2001.



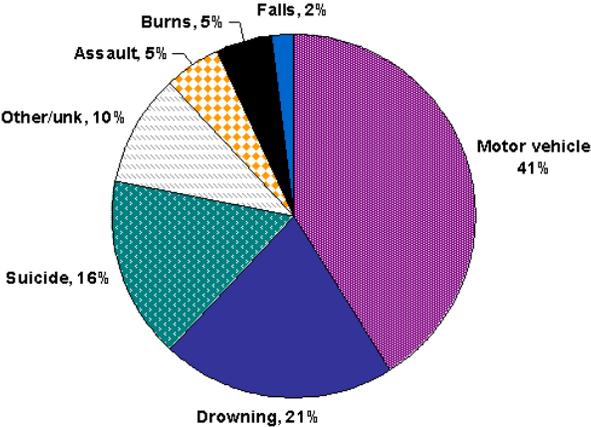
Source: Bobet (2003a).

### Injury Deaths in the Cree Region, 1975 to 2001.

Period	Average number per year			Rate per 100,000		
	Male	Female	Total	Male	Female	Total
1975-1984 (est.)			7.0			98.0
1986-1989	4.3	1.5	5.8	0.5	35.6	68.1
1990-1993	6.3	2.8	9.0	0	128.	92.4
1994-1997	4.8	1.5	6.3		86.5	57.2
1998-2001	4.5	1.3	5.8		74.2	47.7
Total 1986-2001	4.9	1.8	6.7		95.6	65.0

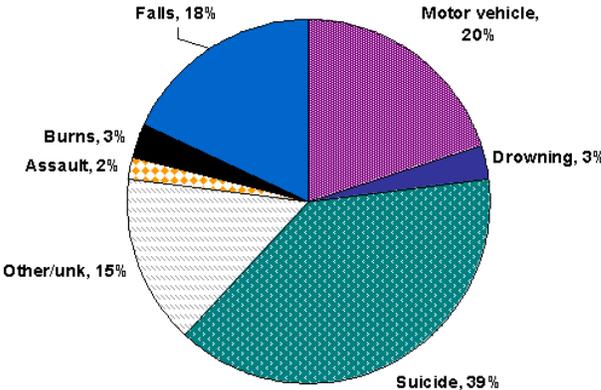
Source: Figures for 1975-84 are an estimate based on data provided in Robinson (1985a), p. 61, which show 65 deaths from unintentional injuries, plus 5 suicides (no information on homicide) = at least 70 injury deaths over the ten-year period. Using the 1981 Census population of 7,158 as the denominator, this gives a rate of 98 per 100,000 (more if there were any homicides). The remaining figures are from Bobet (2003a).

**Fatal Injuries in the Cree Region, by Type of Injury, 1985 to 2001.**



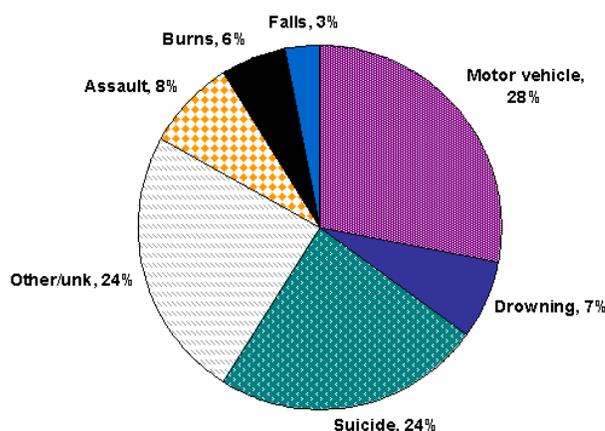
Source: Bobet (2003a).

**Fatal Injuries in Quebec as a Whole, by Type of Injury, 1997 to 1998.**



Source: Bobet (2003a). Original data from Hamel (2001).

### Fatal Injuries for Registered Indians in Canada, by Type of Injury, 1990 to 1994.



Source: Bobet (2003a).

Hospitalisations due to injuries have also fallen over time. The figures for in the most recent period (1997/98 - 2001/02) do not differ significantly from the Quebec average. This conclusion holds true for the group of four communities considered by Hydro-Quebec most affected by the Eastmain-1-A-Rupert diversion, as well as for the Territory as a whole.

### Hospital Separations<sup>a</sup> for Injury, 1997/98 to 2001/02, Cree Region vs. Other Regions.

Territory	Average number per year	Crude rate per 100,000	Age-standardised rate per 100,000
4 communities group <sup>b</sup>	75	1,408	1,259
Remaining 5 communities	87	1,311	1,290
Cree Region	162	1,355	1,274
Nunavik	237	2,493	<b>2,849</b>
Nord-du-Québec	283	1,598	<b>1,716</b>
Québec	79,011	1,075	1,055

<sup>a</sup> “Separations” is a standard term referring to the fact that hospitalisations are entered in electronic databanks when the patient either leaves the establishment or dies, rather than at the time of admission.

<sup>b</sup> Eastmain, Mistissini, Nemaska, Waskaganish. Note that the crude rate in these four communities does not differ significantly from the remaining five communities at the 0.05 level of significance.

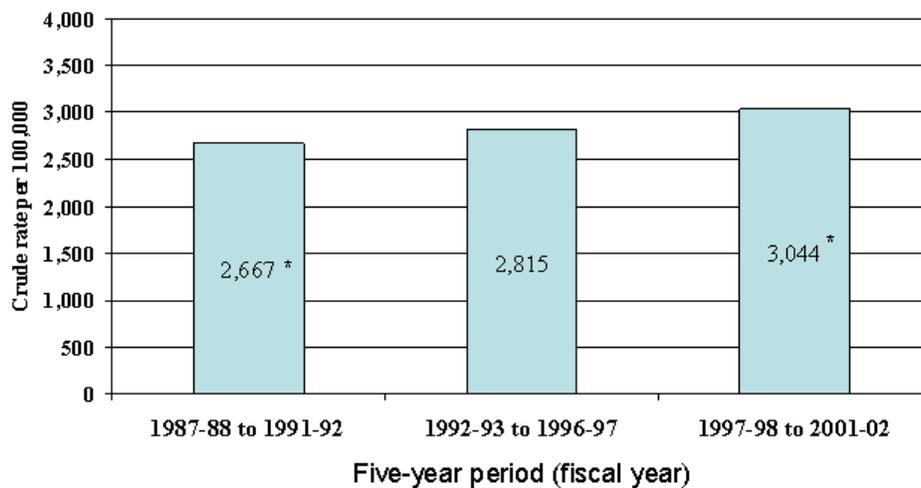
- Figures in **Bold type** indicates that the rate is significantly different from the Quebec average, at the 0.05 level of significance.

Source: MED-ECHO (hospitalisation) files.

## 6.4. Respiratory Problems

Respiratory conditions - especially pneumonia and influenza - are still more common than average in the Cree communities. The age-standardised death rate from respiratory diseases is almost triple the Quebec average, at 178 compared to 66 per 100,000.<sup>214</sup> The associated hospitalisation rate is also nearly three times the average. It has shown signs of increasing in recent years, with greater numbers of children and elderly people requiring treatment for pneumonia and influenza. It is worth noting that, between 1997/98 and 2001/02, the crude hospitalisation rate for respiratory conditions was significantly lower in the four communities considered by Hydro-Quebec most affected by the Eastmain-1-A-Rupert development than in the remaining Cree communities.

**Hospital Separations for Respiratory Conditions in the Cree Region,  
Crude Rates Over Time, 1987/88 to 2001/02.**



\* The difference between the rates in 1987-1992 and in 1997-2002 is statistically significant. The difference between these years and the middle period (1992-97) is not statistically significant.

Source: MED-ECHO (hospitalisation) files.

## 6.5. Diabetes

The presence of diabetes among the Crees is a relatively new phenomenon. It has emerged only within the past two decades. No cases of diabetes appear to have been documented in the Cree Region before to 1975. Subsequently there has been a rapid progression in the incidence and prevalence of the disease. Thouez et al.<sup>215</sup> in 1983 reported a diabetes prevalence of 1.9% among the Cree population 15 years and older. In 1989, a study conducted by Brassard et al.<sup>216</sup> documented a prevalence of 4.1%. By 1991, the rate had risen again by almost 2%.<sup>217,218</sup> By the year 2003, no less than 13% of the population over the age of 15 had been diagnosed with diabetes, according to information from the Cree Diabetes Information System. Thus, the total number of adults diagnosed with diabetes increased almost seven-fold between 1983 and 2003, with the crude prevalence rising from 1.9% to 13%.

The age-sex adjusted prevalence rate in 2003 was 17.7%. This was three to four times the provincial and national averages. In the Cree Region, 43% of cases are less than 40 years of age at time of diagnosis.

Over half of all people with diabetes are experiencing complications. Kidney damage is the most frequent, followed by damage to blood vessels, eyes, and nerves.

**Diagnosed Cases of Diabetes in the Cree Region, 1983 to 2003.**

Year	Cases of diabetes (age 15+)	Crude Prevalence Rate (%)
1983		1.9
1989	230	4.1
1993	410	6.2
1997	607	8.2
1998	720	9.4
1999	817	10.4
2000	886	11.0
2001	975	11.8
2002	1,065	12.5
2003	1,135	13.0

Source: 1983 data from Thouez, Ekoé et al. (1990). 1989 data from Brassard et al. (1993). 1993 data from Veronneau and Robinson (1993). Remaining data from the Cree Diabetes Information System.

**Crude Prevalence of Diagnosed Diabetes<sup>a</sup>, Population Age 20 and Over<sup>b</sup>, Cree Region Compared to Other Areas, ca. 2000.**

Population	Year	Prevalence (%)
Cree Region	2000	12.8
Nunavut	1999/2000	1.0
Québec	1999/2000	5.1
Canada	1999/2000	5.1
American Indians & Alaska Natives	2002	12.7
U.S. general population	2002	7.3
<sup>a</sup> Refers to diabetes rates as established from review of medical records, not from self-report. <sup>b</sup> Note that the other tables for the Cree population included in this section are for age 15+ rather than 20+. (Rates for 20+ were calculated here to maximize comparability with the other available figures). Note: Rates have not been age-standardised.		

Source: Cree data from the Cree Diabetes Information System, CBHSSJB. American data from the US Centres for Disease Control, Weekly, 1 August 2003. Remaining data from Health Canada (2004), National Diabetes Surveillance System.

### Self-Reported Diabetes, Population Age 15 and Over, Cree Region vs. Aboriginal Groups.

Aboriginal Group	Age group measured	Prevalence (%)
<b>1991</b>		
Cree Region	15+	6.1
Registered Indians on-reserve in Canada	15+	8.5
Registered Indians off-reserve in Canada	15+	5.3
Inuit in Canada	15+	1.9
Métis in Canada	15+	5.5
<b>1997</b>		
Cree Region	15+	8.1
On-reserve Registered Indians & Labrador Inuit	17-18+	11.0

Source: Cree data for both 1991 and 1997 from the Cree Diabetes Information System, CBHSSJB. Remaining data for 1991 from Canada (2002b). These numbers were originally from the 1991 APS. Data for 1997 deduced from a chart on page 60 of Canada (1999). The report is based on a series of regional surveys that used slightly different age ranges - hence the stated age range of "17-18+".

### Prevalence of Diabetes in the Cree Region by Community, 2003.

Community	People aged 15+ with diabetes	Population aged 15+	Prevalence %
Chisasibi	220	2,348	9.4
Eastmain	63	393	16.0
Mistissini	302	1,905	15.9
Nemaska	46	396	11.6
Oujé-Bougoumou	68	370	18.4
Waskaganish	159	1,181	13.5
Waswanipi	169	857	19.7
Wemindji	75	816	9.2
Whapmagoostui	33	468	7.1
4 communities group <sup>a</sup>	570	3,875	14.7 (13.6 - 15.8)
Remaining 5 communities	565	4,868	11.6 (10.7 - 12.5)
Cree Region	1,135	8,743	13.0 (12.3 - 13.7)

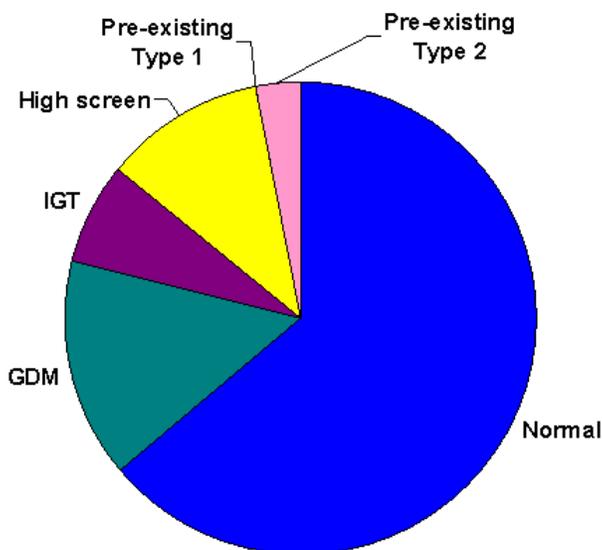
<sup>a</sup> Eastmain, Mistissini, Nemaska and Waskaganish. As shown by the confidence intervals (figures in brackets), the difference between these four communities and the territorial average is not statistically significant at the 0.05 level, but the difference between them and the remaining five communities is statistically significant.

Source: Cree Diabetes Information System, 2003. Figures prepared by Dr. David Dannenbaum, CBHSSJB.

Gestational Diabetes Mellitus (GDM) is also a major concern in the Cree Region. For the years 1994 to 2000, the prevalence of GDM in the Cree population was 15%. This is one of the highest reported among Aboriginal peoples. In addition to this, 6% of pregnant women had Impaired Glucose Tolerance (IGT). This means that their glucose levels were elevated but below the threshold for diagnosis of GDM.

Another 11% had high glucose levels on initial screening, but no follow-up test to establish a definitive diagnosis.

**Glucose Levels of Pregnant Cree Women, 1994 to 2000.**



Source: Data from Willows and Johnson (2003c).

Overweight is the main risk factor for both Type 2 diabetes and gestational diabetes. In 1991 Santé Quebec reported that among the Crees 57% of women and 38% of men were obese (viz., Body Mass

**Body Weight by BMI, Cree Region Adults, by Geographic Area, 2001.<sup>a</sup>**

Body Weight	Coastal <sup>b</sup>	Inland <sup>c</sup>	Cree Region
Underweight (BMI <18.5)	0 %	0 %	0 %
Acceptable weight (BMI 18.5-24.9)	11 %	14 %	13 %
Overweight (BMI 25-29.9)	36 %	30 %	33 %
Obese (BMI 30+)	53 %	56 %	54 %
Total	100 %	100 %	100 %

<sup>a</sup> The BMI cut-off points are those currently recommended by the World Health Organisation. They differ slightly from those used in some past Canadian surveys. Pregnant women are excluded from the numbers. The figures are based on self-reported height and weight.

<sup>b</sup> Coastal communities = Whapmagoostui, Chisasibi, Wemindji, Eastmain and Waskaganish.

<sup>c</sup> Inland communities = Nemaska, Mistissini, Waswanipi, and Oujé-Bougoumou.

Source: 2001 APS, Custom tabulations prepared for the CBHSSJB, February 2004.

Index  $\geq 30$ ). These prevalence rates were among the highest reported anywhere in the world at a population level. Figures from a survey in 2001 (based on self-reported weight rather than actual measures) were similar or higher, while a recent study in Ouje-Bougoumou and Nemaska<sup>219</sup> found even greater proportions of overweight and obesity. This study showed that, in Ouje-Bougoumou, 27% of

adults were overweight (BMI between 25 and 29.9), and another 60% were obese (BMI >30); only 13% of the population had a BMI in the normal range. Comparable figures for Nemaska were 22% overweight, 71% obese, and just 7% normal weight. Although changes in patterns of physical activity must be responsible in part for the level of obesity in the Cree communities, the increasing reliance on market foods has been linked to obesity among both children and adults.

## 6.6. Circulatory Diseases

Rates of cardiovascular diseases have risen over time. They have surpassed respiratory diseases and injury as leading causes of mortality. Historically, Cree death rates from cardiovascular disease were lower than average, but recent figures suggest rates similar to the rest of Quebec. For example, in 1982 to 1986, the Standardised Mortality Ratio (SMR) as compared to Quebec was only .71; but by 1987-1992, it had risen to .95.<sup>220</sup> Hospitalisation rates for cardiovascular disease are likewise close to the Quebec average, and have been so since at least 1987. There are some variations in this pattern according to the specific type of cardiovascular disease being considered: for instance, although mortality figures suggest that ischemic heart disease is less common than average in the Cree communities, the prevalence of hypertension is higher than in the rest of Quebec. This pattern was first noted as long ago as 1985.<sup>221</sup>

**Age-Standardised Mortality Rates from Diseases of the Circulatory System, Cree Region and Quebec, 1994 to 1998. Rates per 100,000.**

Circulatory diseases	Cree Communities	Québec
Ischemic heart disease	119	149
Cerebrovascular	77	45
Disorders of arteries	3	14
Cardiac insufficiency	25	15
Hypertensive disorders	0	4
All types of circulatory disease	264	258

<sup>a</sup> Caution: high sampling variability for the Cree figures. Differences shown do not reach statistical significance at the 0.05 level.

Source: Pageau et al. (2003), p. 153.

**Hospital Separations for Diseases of the Circulatory System <sup>a</sup>, 1987 to 2002, Cree Region Compared to Other Regions. Numbers, Crude Rates, and Age-Standardised Rates per 100,000.**

Territory	1987-1988 to 1991-1992			1992-1993 to 1996-1997			1997-1898 to 2001-2002		
	Ave. annual number	Crude rate	Age-std rate	Ave. annual number	Crude rate	Age-std rate	Ave. annual number	Crude rate	Age-std rate
4 communities group <sup>b</sup>				28	606	1,388	46	874	2,049
5 other communities	48	1,007	2,188	50	861	1,787	63	949	1,913
Cree Region	76	856	1,933	78	748	1,619	109	915	1,971
Nunavik <sup>c</sup>	58	825	1,860	75	887	1,998	72	755	2,093
Nord-du-Québec	283	1,329	3,041	275	1,422	2,553	264	1,488	2,554
Québec	103,592	1,492	1,654	124,099	1,723	1,772	122,742	1,670	1,573

<sup>a</sup> “Diseases of the circulatory system” include all hospitalisations classified under chapter 7 of the International Classification of Diseases, 9th revision.

<sup>b</sup> Eastmain, Mistissini, Nemaska and Waskaganish. The rate in these four communities in 1997/98-2001/02 did not differ significantly from the remaining five communities (at the 0.05 level of significance).

<sup>c</sup> Note that because the Tullatavik Health Centre of Ungava did not provide data in 1996/97, Nunavik’s figures for the 1992/93-1996/97 period are based on only four years.

- Figures in **Bold type** indicates that the rate is significantly different from the Quebec average, at the 0.05 level of significance.

Source: MED-ECHO (hospitalisation) files.

**Self-Reported <sup>a</sup> Hypertension in Adults, Cree Compared to Other Populations, circa 1991.**

Cree 18-74 years	Quebec 18-74 years		Canada 12+ years	
1991	1987	1998	1994-1995	2000-2001
15.0 %	6.3 %	8.5 %	9.0 %	12.6 %

<sup>a</sup> Number of people who have ever been told by a health professional that they have high blood pressure. Note that using physical measures, the proportions for the Cree in 1991 were: men, 13%, women 13%.

Source: Cree data from Daveluy et al. (1994). Quebec data from Pageau et al. (2003). Canada data from Statistic Canada: 1994/95 figure from Health Indicators, Cat. 82-221 XIE; 2000 figure drawn from the Canadian Community Health Survey, as provided on Statistics Canada’s website.

## 6.7. Cancer

The cancer mortality rate in the Cree Region remains marginally below the Quebec average. Cancers of the bladder/kidney/urethra are the most commonly diagnosed in the Cree population. The picture is different when looked at separately for men and women. Prostate cancer is the most common type of men, breast cancers of women. Most cancers occur in older adults, as one might expect.

### Age-Standardised Cancer Mortality Rates 1994 to 1998, Cree Region and Quebec, Rates per 100,000.

Cancer type	Cree	Québec
Lung	69	65
Colorectal	10	27
Breast (female)	59	32
Prostate	53	30
Pancreas	0	11
Stomach	0	9
All types of cancers	204	220

Caution: high sampling variability in the figures for the Cree. Differences shown do not reach statistical significance at the 0.05 level.

Source: Pageau et al. (2003).

### Cases of Cancer Recorded in Quebec's Tumour Registry, Cree Region, 1992-1996.

Cancer type	Male	Female	Total
Bladder, kidney and urethra	6	7	13
Breast	-	10	10
Colorectal	5	5	10
Lung	6	3	9
In situ cervix <sup>a</sup>	-	9	9
Prostate	7	-	7
Leukemia and lymphoma	5	1	6
Other - intestinal	4	2	6
Ovary	-	4	4
Uterus	-	3	3
Bone and connective tissue	1	2	3
Other - respiratory	2	0	2
Other	8	5	13
Total	44	51	95

<sup>a</sup> Cancer *in situ* of the cervix is a localised form of cancer that is not malignant at time of diagnosis and may never become so. Although the number is provided here, it is recognised that many cancer registries do not count this form of cancer.

Source: Schnarch (2001), p. 106. Data are originally from the Quebec Ministry of Social Affairs. Eight cases assumed to be duplicates were removed.

## 6.8. Sexually Transmissible and Blood-Borne Infections

Gonorrhoea was rare in the Cree communities until the mid-1970s according to a report from 1985.<sup>222</sup> The rates increased thereafter, becoming were far higher than elsewhere in Quebec throughout the 1980s. The incidence has fallen since 1989. Since 1999 only one or two cases have been reported each year.

Reporting for chlamydia was introduced in 1988.<sup>223</sup> Since 1991 it has been by far the most frequently reported STI with rates roughly ten times the Quebec average.<sup>224</sup> These rates are comparable to those documented in Indian reserve communities across Canada. Women outnumber men by a large margin in the chlamydia figures. This margin is thought to reflect differences in screening practices rather than a true difference in underlying rates.<sup>225</sup> Characteristically, in the Cree communities most cases of gonorrhoea or chlamydia occur in people aged 15-24. Because rates of other STIs and blood-borne diseases are high, HIV and AIDS are believed to be serious threats to the Cree communities if and when they are introduced into the Cree population.

### Rates of Gonorrhoea, Cree Region and Quebec, 1984 to 2000, Rates per 100,000.

Year	Cree	Québec	Ratio of Cree <i>age-standardised rate</i> to Quebec rate
1984	379	105	3.3
1985	260	103	2.4
1986	329	88	3.5
1987	198	67	2.8
1988	149	42	3.2
1989	328	25	14.5
1990	75 <sup>a</sup>	29	
1991	41	31	
1992	48	14	
1993	0	11	
1994	117	10	
1995	106	8	
1996	60	7	
1997	72	8	
1998	121	7	
1999	12	8	
2000	24	9	

<sup>a</sup> Note that programmes to prevent HIV and other STIs were introduced in 1989.

- Caution: rates are based on small numbers – especially since 1990 – and are therefore extremely variable.

Source: Numbers for 1984-1991 from Smeja (1992), pp 25- 26. Numbers for subsequent years from Carlin (2002), p. 3.

**Rates of Declared Chlamydia, 1992 to 2000, Cree Region and Quebec,  
Rates per 100,000.**

Year	Cree	Québec
1992	1,164	170
1993	1,044	145
1994	1,195	109
1995	1,309	96
1996	1,070	90
1997	922	87
1998	1,642	97
1999	1,022	106
2000	782	115

Source: Carlin (2002), p. 3. Original source of the data is *Analyse des cas d'infection génitale 1996-2000*, published by the MSSSQ.

**Chlamydia Rates by Community, Five-year Averages for 1998 to 2002.**

Community	Average number of cases per year	Population 2000	Rates per 100,000
Chisasibi	20	3,199	637.7
Eastmain	3	572	559.4
Mistissini	15	2,616	558.1
Nemaska	5	555	900.9
Oujé-Bougoumou	4	581	688.5
Waskaganish	15	1,686	866.0
Waswanipi	8	1,193	687.3
Wemindji	8	1,077	779.9
Whapmagoostui	13	726	1,818.2
Communauté inconnue	4	-	-
4 communities group <sup>a</sup>	37	5,429	688.9
5 other communities	54	6,776	799.9
Total	95	12,205	781.6

<sup>a</sup> Eastmain, Mistissini, Nemaska and Waskaganish. Note that the rate in the four communities group does not differ significantly from the other five communities, or from the average for the Territory as a whole.

Source: *Ministère de la santé, Maladies à déclaration obligatoire (MADO) system.*

## 6.9. Mental Health

In 1975 if not earlier, a Mental Health Programme was on the list of services offered by Health and Welfare Canada in the region. However, there were no dedicated mental health staff resident in the region, and no indications of visits by psychologists or counsellors have been found. Beginning in the early 1980s, there were reports of increasing psychosocial problems such as family violence and child neglect. These were variously attributed to the stress associated with acculturation, to unemployment, and to the use of alcohol and other substances. An alternative possibility - not considered in the original reports - is more systematic measurement as the number of social service personnel in the region

increased. Any such a feedback effect would initially have been small because these reports generally pre-dated these services. The resident first social worker arrived about 1975 and the first addictions counsellor several years later. A “complete” (albeit minimal) regional social services presence did not appear until the early 1980s.

Changing patterns of migration and mobility may also have been contributing factors to the alarming documentary reports of rising social problems. Recall that one quarter of the Cree population migrated during the late 1970s and early 1980s. Between April 1986 and March 1988, Laverdure carried out a study of the clientele contacting health services for mental health problems.\* The study found that women were slightly over-represented in the clientele for mental health services (57%), and younger adults were greatly over-represented (53% of patients were between the ages of 16 and 30, and another 25% aged 31-45). Rates in Whapmagoostui were considerably higher than in other communities. It was not clear if this represented more mental health problems, or the greater use or availability of services.<sup>226</sup> The most frequently diagnosed mental health problems at the time were depression (most common in women) and alcoholism (most common in men). No studies have been conducted in recent years.

**Prevalence of Mental Health Problems by Diagnostic Category, 1986/87 to 1987/88,  
Among People Consulting Health Services in the Cree Communities.**

Diagnostic Category	N	%	Rate per 1,000
Psychotic problems	58	24	6.7
Depression / anxiety	72	30	8.4
Alcoholism	40	17	4.7
Family problems	31	13	3.6
Learning or behaviour problems	10	4	1.2
Attempted suicide	21	9	2.4
Other	10	4	1.2

Source: Laverdure and Lavallée (1989), p. 41.

**Contact with Health Services for Mental Health Problems (of Any Type),  
By Community, 1986/87 to 1987/88.**

Community	N	Rate per 1,000
Chisasibi	44	20
Eastmain	15	41
Mistissini	73	38
Nemaska	10	28
Waskaganish	27	23
Waswanipi	19	20
Wemindji	18	22
Whapmagoostui	36	81
4 communities group <sup>a</sup>	125	33
Cree Region	242	29

<sup>a</sup> Eastmain, Mistissini, Nemaska and Waskaganish.

Source: Laverdure and Lavallée (1989), p. 37.

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\* Note that this did not include people who might have contacted *social* services for help. Since schools apparently tended to refer children with mental health problems directly to social services, children were under-represented in this study.

Suicide rates for the Crees are below those of other Canadians and substantially below those of other Registered Indians in Canada. This has been so since at least 1975. Small numbers make the rates extremely variable, but they seem to have jumped around 1986, and again during the 1991-1993 period. Suicide attempts also increased after the period 1982-1986, although there is some indication that they have remained stable during the past five years. Studies in the Cree Region show that over 80% of the people who commit suicide have serious personal or family problems. They also show that alcohol is involved in over 80% of suicides.<sup>227,228</sup> Males outnumber females by 5:1 in completed suicides, while females outnumber males 5:1 in suicide attempts. In both cases younger adults (15-29) are at greatest risk.

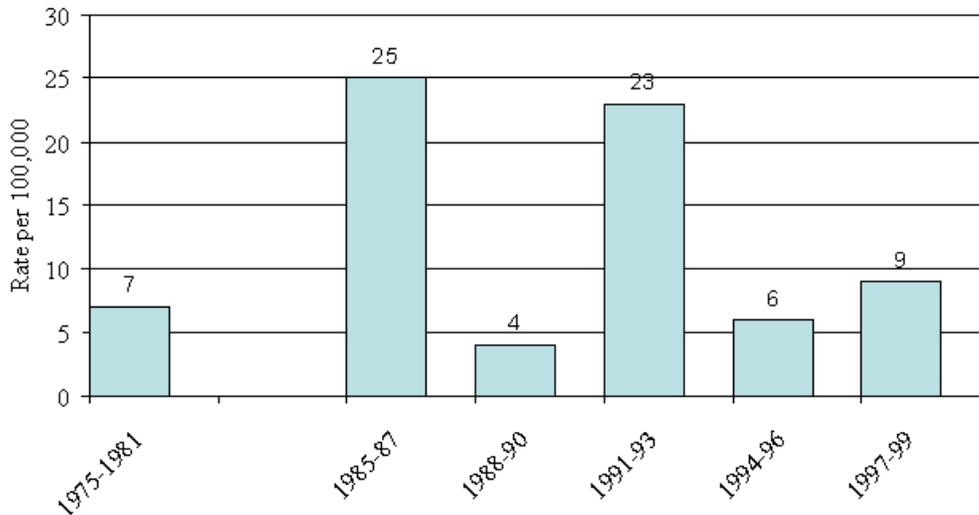
**Suicide Rates, Cree Communities, Other Canadian Registered Indians, Quebec and Canada Compared, Rates per 100,000.**

Period	Cree		FN of Canada	Québec	Canada
	N	Rates	Rates	Rates	Rates
1975-1985	5	6.9	30.0 (1976)		12.1 (1974)
1985-2001	19	11.0	27.9 (1999)	18.7 (1997)	13.2 (1996)

Caution: rates extremely variable due to the small numbers involved.

Source: Cree data are from Robinson (1985a) and Bobet (2003a). Canada and Quebec data are from Robinson (1985a) and from Statistics Canada's Health Division (www.statcan.ca). -Data for Indian communities elsewhere in Canada are from Robinson 1985 and from Canada (2003a).

**Suicide Rates in the Cree Region, 1975 to 1999, Multi-year Averages.**



Source: Data for 1975-81 from Robinson (1985a). Data for other years drawn from Bobet (2003a).

## 6.10. Maternal and Infant Health

Maternal and infant health issues have long been accorded a high priority in the Cree Region. In 1975, they were already a priority in The Department of National Health and Welfare's Quebec Region, and in each of the James Bay federal clinics. The Cree Board of Health and Social Services continued a Maternal and Infant Health Programme and considered it important. It was delivered in much the same way but with increased resources. In recent years it has been found that about 7% of Cree mothers are anaemic (1998-2000) while 18% have either gestational diabetes or pre-existing diabetes (1994-2000). Many pregnancy outcome indicators are reasonably good however. Rates of intrauterine growth retardation, pre-maturity, and stillbirths are all at or below Quebec averages, and there has been only one maternal death since 1975. Cree babies are less likely than average to be of low birth weight, but much more likely to be of high birth weight (which may be partly related to higher gestational diabetes rates).

Consistent with the rest of our information on lifestyle practices in the Cree Region, half of mothers during the period 1994-2000 smoked while pregnant. Those most likely to do so seemed to be the women in poor situations - those worried about having enough money for food - and so these mothers tended to be anaemic. Although there are no data on Foetal Alcohol Syndrome (FAS) for the region, chart reviews for the years 1994-2000 showed that at least 18% of mothers consumed alcohol during their pregnancies. Infant health has been positively linked to the mother's educational level. In 1995/96, 58% of Cree mothers had less than 11 years of schooling, and the proportion in 1998/99 was only marginally different, at 53%. In contrast, in Canada in that year only 12% of mothers had less than secondary education.

Breastfeeding rates fell during the 1950s-1980s until policies to promote breastfeeding were introduced. Then they rose back into the range of 80% at birth, with substantial variation according to the hospital in which the woman delivered (and therefore between coastal and inland communities, which used different hospitals). A study of the 1994-2000 period showed that 90% of new mothers delivering in the Chisasibi Hospital chose to breastfeed.\* In contrast, the figures for mothers delivering in the Val d' Or and Chibougamau hospitals were 76% and 67% respectively. Figures for 2001 continue to show large differences in breastfeeding initiation between coastal and inland communities. Although breastfeeding initiation has been brought back up to desirable levels, the duration of breastfeeding seems to have fallen over time. High costs for store-bought infant foods contribute to food insecurity for some families: 20% of mothers report worries about having enough money to buy sufficient food for their children.

### Proportion of All Children Under Four Years of Age, who Were Breastfed, 2001.

Territory	%
Coastal communities <sup>a</sup>	78
Inland communities <sup>b</sup>	47 <sup>c</sup>
Cree Region	66

<sup>a</sup> Coastal communities = Whapmagoostui, Chisasibi, Wemindji, Eastmain and Waskaganish.  
<sup>b</sup> Inland communities = Nemaska, Mistissini, Waswanipi and Oujé-Bougoumou.  
<sup>c</sup> The difference between the Coastal and Inland communities is statistically significant at the 0.05 level. The question applied to children who were under 4 years old at the time of the survey in 2001, so this measures breastfeeding initiation rates over the 1998-2001 period.

Source: 2001 APS, custom tabulations prepared for the CBHSSJB, February 2004.

\* Because of a sudden loss of all six permanent physicians in late 2000, Chisasibi Hospital stopped its obstetrics activities. Although there is now (2004) a full complement of physicians, an obstetrics programme has not been re-introduced due to a high proportion of high-risk cases, lack of minor surgical capacity including an operating room, and lack of a surgical team.

While infant mortality in the area is triple the Quebec average, this is because of the incurable hereditary diseases Cree leuco-encephalopathy and Cree encephalitis. Other causes of infant mortality are at average levels. Vaccine-preventable diseases in infants are not a major concern, but infections and anaemia may be: a study during 1998-2000 found that 53% of infants had had infections in the two weeks prior to the survey and 13% had anaemia. A recent study found that infant anaemia was most common in low-income families, and in ones where the parents lacked nutritional knowledge and/or had poor nutritional practices.<sup>229</sup>

## 6.11. Child Health

Infectious diseases such as gastroenteritis, ear infections (otitis), and TB were common in the early 1980s. They became a lesser concern thereafter as living conditions and immunisation rates improved, although otitis is still relatively common. The most frequently reported chronic conditions in Cree children are ear infections, allergies, and asthma. The proportions of children suffering from these ailments seem to be roughly similar in the inland and coastal communities.<sup>230</sup> Throughout Canada, asthma rates in children have skyrocketed during the past 20 years. They are now almost five times higher than in 1978/79. Children in the Cree communities seem to have participated in this trend: fifteen percent are reported to have asthma, a rate similar to the Canadian prevalence of 12%.

Evidence on Cree children's diets suggests that they eat enough foods from each of the different food groups, but they frequently eat 'junk' foods in addition to their regular meal.<sup>231</sup> There is also evidence of sedentary lifestyles. It is estimated that since the 1930-1950s period, the proportion of Cree children who are obese has risen from 2% to 35%.<sup>232</sup> This is double the proportion of obese children in Canada as a whole (17%). A study published in 1996 found that, on average, Cree children spent 13 hours each week watching television, but less than three hours engaged in physical activity. In studies in other North American Indian groups, these patterns have been associated with increased rates of Type 2 diabetes in youth.

"Junk" foods can also contribute to dental caries. Studies show that the Cree children's dental health is extremely poor. While preventative practices (e.g. brushing) and dental treatment have improved over time, dental caries rates have not declined appreciably in most age groups. These rates are three to five times higher than elsewhere in Quebec (eight times higher among toddlers).

In teenagers, health-related habits such as sexual practices, smoking, and alcohol are problematic. Rates of chlamydia among teenagers are ten times higher than elsewhere in Quebec. The available data on smoking suggest that by high school age about half of children smoke regularly or occasionally, while for older teenagers, the rates approximate 60-75%. As for drinking, in 1991 a significant proportion (17%) of the 15-17 year-olds who drank did so heavily enough to be considered "at risk".<sup>233</sup>

## Endnotes to *Chapter 6*

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<sup>210</sup> Robinson (1985a).

<sup>211</sup> Medical Services Branch, Quebec Region, *Annual Reports* for the period 1960-1974.

<sup>212</sup> Bobet (2003a)

<sup>213</sup> Kischuk (2003).

<sup>214</sup> Pageau et al. (2003).

<sup>215</sup> Thouez et al. (1990).

<sup>216</sup> Brassard et al. (1993).

<sup>217</sup> Daveluy et al. (1994).

<sup>218</sup> Veronneau and Robinson (1991).

<sup>219</sup> Nieboer and Dewailley (2004).

<sup>220</sup> Sainte-Pierre (1995), p. 46.

<sup>221</sup> Robinson (1985).

<sup>222</sup> *ibid.*

<sup>223</sup> Smeja (1992).

<sup>224</sup> Carlin (2002).

<sup>225</sup> Schnarch (2001).

<sup>226</sup> Laverdure and Lavallée (1989).

<sup>227</sup> Damestoy (1994).

<sup>228</sup> Barss (ca. 1999).

<sup>229</sup> Verrall and Gray-Donald (2004).

<sup>230</sup> The study included 144 children in grades 4-5 and secondary 2-3. The two communities were chosen on the reasoning that they represented the extremes in term of availability of commercial food (Eastmain having at that time only an ice road for two months of the year).

<sup>231</sup> Bernard and Lavallée (1993).

<sup>232</sup> Teta et al. (2002)..

<sup>233</sup> Daveluy et al. (1994).

## Chapter 7 – Evolution of Health Services

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### 7.1. Situation and Evolution Prior to 1970

In earlier times in the Cree Region, or Eeyou Istchee, as the territory covered by the James Bay and Northern Quebec Agreement (JBNQA) is called today, midwives, leaders, healers and knowledgeable people in the family and community assumed responsibility for prevention of illness and child-birth, as well as care of the sick and infirm. Medicines were made from plants, animals and minerals. The Cree concept of health and well-being articulated through the concept of *miyupimaatisiun* expressed health as a function of all aspects of individual and social well-being, not at odds with a modern health determinants framework.

In 1673, the King of England gave the Hudson's Bay Company (HBC) an absolute monopoly of Rupert's Land which comprised the complete drainage system of all rivers flowing into Hudson and James Bays. The aboriginal population was not informed of this transaction. For 200 years the company controlled a profitable fur industry on this vast territory, managed by a small number of English and Scottish traders who introduced a select range of European trade wares – metal utensils, tools and cloths (which soon became necessities), as well as a limited amount of food stuffs and brandy. With European contact also came the European infectious diseases for which the Crees had no immunity.

With monopoly came responsibility. Within their forts and post settlements, the HBC managers provided for European-style curative care, as well as destitute relief, according to the practices of the time. In 1870, Rupert's Land was ceded to Canada (again without consultation with its aboriginal inhabitants). Although the HBC continued to provide 'medical relief' and/or 'destitute relief', Indian Affairs now reimbursed the HBC according to a departmental scale of issue.

Catholics visited Mistissini in 1844 for the first time, Methodists were baptising at Rupert House in 1840 and permanent missions appeared after the 1850s. Where larger missions existed, they gradually supplemented, then largely replaced, the HBC in providing curative care. In smaller places, the HBC continued to help with curative care and remained the principal dispenser of destitute relief until the 1950s. In 1930 a Catholic residential school and hospital with dispensary and "ambulance-canoe" opened in Fort George. This was the first medical establishment in a Cree community and began a pattern. As health care professionals settled in the region, especially nurses, they assumed all responsibility for curative care that had previously been managed within the family, community, HBC post and mission.

### 7.2. Growing Federal Health Care Presence in the Cree Region

The 20<sup>th</sup> Century had began with elevated federal interest in Indian health and the establishment of a small Indian health unit within Indian Affairs. Subsequent to this, the first direct federal involvement in welfare dates from around 1903 when a physician visited the coastal communities aboard an annual government patrol ship, and another made tours to the inland settlements. During the 1920s and 1930s, Indian Affairs arranged visits by a medical doctor who vaccinated and inoculated any Crees they found in the settlements. And as early as 1926, emergency visits by a doctor and emergency medical evacuation by aircraft were happening.

On the coast, the first federal nursing station was opened at Fort George in 1942, which already had the mission hospital. A new two-storey, fully-functional, Catholic hospital was built in 1950 to replace the one build in 1930. Under contract with Medical Services Branch (MSB) of the Department of National

Health and Welfare it provided full hospital services, including minor surgery, for the Cree coastal communities as well as several Inuit communities. Most coastal Crees needing hospitalisation were flown there, or to Moose Factory Indian Hospital in Ontario (which continued to serve Crees into the early 1980s).

People living in the inland communities were in closer proximity to the advancing non-Aboriginal communities in Lac St. Jean and the Abitibi. Beginning in the 1920s and more regularly by the mid 1930s, doctors were making regular visits to the post settlements and very sick people were evacuated out. An Indian tuberculosis hospital was located at Macimic, near Val d'Or. There was a nursing station in Mistissini from 1954 and at Waswanipi Post between 1950 and the closing of the post in 1965.

At the signing of the JBNQA in 1975, there were six federal health establishments in the region.

From the late 1940s, with the exception of certain groups living in coastal settlements, most Cree families were still living in the bush most of the year, moving over their hunting grounds and living in canvas-topped shack tents. They still met at the posts for the summer months to socialise and trade. The decline of the fur trade, the establishment of day schools on the posts, and general government incentives and disincentives, resulted in people moving into more permanent shack tents in the vicinity of the HBC posts.

Following World War 2 a vigorous federal programme of preventative and curative health services was initiated in parallel with free housing, local schooling, sanitation, nutrition, and for the first time, income assistance and pensions. Applied across Canada, these federal initiatives arrested the centuries-old decline in Aboriginal populations and led to the gradual, and then rapid increase in the Indian population that continues today. Records of the Cree population prior to the 1960s are fragmentary and their accuracy is debatable. However, documentary evidence, and the recollections of older elders today, recount epidemics and famines well into the 20<sup>th</sup> Century. In the decade following 1945, with sulphur drugs, penicillin, and tuberculosis chemotherapy available, the historically important cyclical epidemics of contagious diseases as well as lethal infectious diseases such as pneumonia, were eliminated or reduced to nuisance outbreaks. Better health and government assistance generally, allowed the Cree population to grow significantly.

Health and social services to Indians expanded considerably immediately after the Second World War. The federal government reorganised its services to Indians, dividing them into programmes, much as the provinces were doing within their own rapidly evolving departments. Responsibility for Indian health services was taken away from the Indian Department and placed with the new Department of National Health and Welfare. Within the Indian Department, the remaining services were split into separate sections for Education and for Social Services.

In the social services, the Indian Department gradually loosened its relief policies, and by the late 1950s it began replacing in-kind relief and rations with cash payments. In a marked departure from past practice, the new federal social legislation (e.g., federal *Family Allowance Act* and the *Old Age Assistance Act*) did not specifically exclude Indians. Assistance by individual transfer payment replaced assistance in kind as the 1950s progressed. Thus, as the fur trade rapidly declined and alternative means of support did not present themselves, Crees became overwhelmingly dependent on cash transfers such as social assistance. By the 1950s, federal social workers began to visit the region, replacing the Department's Indian agents in the social intervention and assistance roles. Social service agencies based in the non-Aboriginal communities later furnished long-distance support, through a system of referrals and occasional visits, under contract with Indian Affairs. This minimal level social service persisted until the latter 1970s.

From the outset in 1945, National Health and Welfare took a more interventionist approach to health services than had Indian Affairs. It increased the number of doctor visits to the Cree area. It opened new clinics and put greater effort into preventative services such as vaccination and tuberculosis-detection campaigns. Waskaganish received a nursing station in 1951, Wemindji in 1960, Whapmagoostui in 1962, and Eastmain in 1963. A nursing station was established in Mistissini in 1954, while another served the Waswanipi Post between 1950 and its closing in 1965. Following this, an itinerant nurse served the scattered Waswanipi settlements until the establishment of the present-day Waswanipi community with its clinic, in 1980. Federal records indicate other federal dispensaries in the region. These were small and apparently all associated with camps. Some were aid posts with a lay-dispenser while others saw the occasional visit of a nurse.

In 1970 the former mission hospital at Fort George was replaced by a provincial public establishment known as Chashasipich Hospital. Under contract with the Department of National Health and Welfare's Medical Services Branch (MSB), Chashasipich Hospital, like its predecessor, provided full hospital services, including minor surgery, for the Cree coastal communities as well as several Inuit communities to the immediate north. Moose Factory Hospital continued to receive Cree patients. Since 1976 Chibougamau Hospital has been the designated hospital for people from Mistissini. At this point in time, the inland communities of Waswanipi and Mistissini have been receiving regular hospital care in non-Aboriginal communities for over half a century.

### **7.3. Entry of the Government of Quebec into the Cree Region**

Canada formally ceded control of Quebec's northern regions in two stages: between the Height of Land up to the Eastmain River in 1898, and the portion north of the Eastmain River in 1912. The constitutional terms of this acquisition required Quebec to treat and to obtain land surrenders with the Indians on generally the same conditions as those in western Canada and Ontario. Quebec did not fulfil these obligations at that time. The Crees were unaware that their territory had been transferred to Quebec, and indeed, the transfer had little noticeable impact on the lives of most Crees for decades. The HBC, the churches, and the federal departments continued to administer the isolated Cree settlements and provide such services as were available.

However, following WWI and especially during the 1920s and 1930s, some inland Crees were disrupted by colonisation of their traditional hunting territories in the south when the parishes of Beaucanton, Val-Paradis, and Villebois were created. At this time they were also disturbed by significant mineral exploration in the areas that would later - by the 1950s - become the boom towns of Chibougamau and Chapais. During these periods, health and social services in Quebec were minimal, and without any organised provincial delivery system and primarily the responsibility of municipalities and charities.

Until the 1950s and 1960s all Indians, treaty or not, were the administrative and fiscal responsibility of the federal Crown. Municipalities and provincial governments, who rarely gave relief to Indians, routinely sent any bills incurred to Indian Affairs, who generally paid. Today's "federal on-reserve / provincial off-reserve" fiscal demarcation arose in the 1960s. As late as 1974 Canada still funded some services in 65 off-reserve Indian communities including 20 in Quebec. This included the Cree communities which were not situated on federal land until the JBNQA took effect in 1976.

Around 1965, Quebec began intensive planning for hydro development in the Cree Region. By 1972 the hydro construction activities brought the Province and the Crees into contact, conflict, and then negotiations. The settlement of these conflicts took the form of the JBNQA. Section 14 of this Agreement resulted in transfer of fiscal responsibility for health and social programmes from Canada to Quebec for purposes of Cree administrative control. This was an unprecedented agreement at the time,

since, in the rest of Canada, Indian band control of programmes was limited to a handful of experiments in management of basic municipal services. It remains an unprecedented agreement because no other province has accepted a general fiscal and administrative responsibility for health and social services delivery to Indian communities on federal land. Elsewhere in Canada and Quebec these services on Indian reserves remain federal responsibility to this day.

In 1972 a major provincial reform of health and social services replaced the responsibilities of municipalities and charitable organisations with a system of publicly-run, publicly-funded establishments under a Ministry of Social Affairs (MAS). The Cree administrative territory stipulated by Section 14 of the JBNQA was created as Health Region 10b, a series of jurisdictional islands centred on the existing Cree communities, surrounded by jurisdiction of the non-Aboriginal Region 10 which serviced the Abitibi area's towns. An Inuit board administered Region 10a to the north of Regions 10 and 10b. Also pursuant to the reforms, in 1978 the Cree Board of Health and Social Services of James Bay (CBHSSJB) was created as a four-category establishment under the new reforms: CLSC, Hospital Centre, Social Service Centre, and Reception Centre. It retains these responsibilities today.

#### **7.4. From Difficult Beginnings**

The five-year transition period for fully establishing the CBHSSJB – dictated by the JBNQA - was beset with problems. Against the backdrop of poor health and outbreaks of infectious diseases described in the previous section, there were administrative and financial difficulties related to the takeover of the Chashasipich Hospital by the CBHSSJB, and the belated creation of the CBHSSJB itself. Inexperience, shortage of administration staff, lack of an accountant, staff morale problems, difficulties in fusing the federal and provincial administrative protocols, the new challenge of incorporating and running the first federal outlying clinics (Eastmain, followed by Wemindji and Waskaganish), escalating demand for social services, and delays in adjusting budgets upwards were immediate and serious pressures. At each level of government involved, there seems to have been a lack of understanding of the implications of the innovative transfer project.

Further dislocation surrounded the closure of health facilities on Fort George Island, and the building of Chisasibi and its new Hospital Centre. Concurrently, the communities of Waswanipi and Nemaska were built, with new clinics opening in 1980 and 1981 respectively. In 1977 important central functions of a regional board had been assigned to Montreal General Hospital, including responsibility for public health and patient transportation services. While necessary in light of pressing need, this began a long-term trend of relying on external establishments for core regional functions.

The initial disorganisation and inadequacy of Region 10b's health and social services obviated any possibility of a mutually beneficial administrative extension of the CBHSSJB's operations to include the Hydro-Québec camps. In places, these were close to Cree communities. Hydro-Quebec subsequently established a parallel health system, generally in partnership with the MAS, as well as Region 10 and other regions, to meet the needs of its thousands of camp workers. With capital and some other funding from Hydro-Quebec, the administration of these services conformed to provincial norms and included provincial funding where insured services were involved. A substantial health facility developed at Radisson, which was later downgraded to a health centre (Centre de santé de Radisson) administered by Region 10. This resulted essentially in three health systems in competition for increasingly scarce public funds within one immense, lightly populated geographical zone.

In the spring and summer of 1980, simultaneous with the emergent concerns over mercury that created new pressures for the CBHSSJB, the communities of Waskaganish, Nemaska, Fort George, Wemindji, Waswanipi, and Mistissini experienced serious outbreaks of gastro-enteritis. To some extent this

stemmed from a public health and socio-sanitary service void related to the withdrawal of regional services previously provided by the Quebec offices of MSB and Indian Affairs. In September, the Crees filed suit in Court to compel Quebec to either implement s. 14 or to have it declared null and void. This triggered a new and somewhat hostile relationship between the MAS and the CBHSSJB, and began two decades of legal battles over JBNQA implementation. One month after the s.14 implementation suit was launched, Quebec placed the CBHSSJB in trusteeship. This was lifted in early 1981, but the organisation faced new challenges while it struggled to recover.

Nemaska clinic opened only weeks after trusteeship ended. Simultaneously, Canada ceased administration of the Waswanipi, Whapmagoostui, and Mistissini clinics. The inherited federal clinics were in disrepair; patient files were in disarray or absent; critical equipment was missing or unserviceable; and vaccination and health inspection programmes had sometimes fallen into neglect. In June 1981 a tuberculosis outbreak occurred in Mistissini. This facility had just come under CBHSSJB control and, indeed, it had just ceased to be operated by Chibougamau Hospital under contract to MSB. The Mistissini clinic was overwhelmed and the embryonic CBHSSJB administration, based in Chisasibi and without public health staff based in the region, was too geographically isolated to offer effective assistance. The outbreak was addressed and resolved by the public health unit of the Montreal General Hospital.

Gradually the CBHSSJB's services improved. By 1982 the new Cree Social Services Centre had outlets in all the existing communities. Previously there had been no permanent presence of social services except for a provincial social worker in Fort George from about 1975. Until recently social workers from external agencies had visited the communities, on contract to Indian Affairs, on average one day a month. With the new Social Services Centre a regional social services structure began to develop. In 1982 a short-lived group home for the aged was established in Mistissini. A reception module for aged in loss of autonomy was created at Chisasibi Hospital Centre in 1984. A federally-funded alcohol and drug programme tried to address reports of high rates of social dysfunction that were linked, at the time, with the hydro developments. While these and subsequent other programmes were not without their problems, they signalled the arrival of social services.

After Chisasibi Hospital Centre's construction, it became apparent by the mid 1980s, that it had not received the level of financing necessary to assume a fully functional role as a regional hospital centre. Although the old Fort George hospital had served many Inuit, once new facilities had been built in the Inuit region, these potential clients had been removed from the catchment area for the new Chisasibi Hospital Centre. It also became apparent to planners, that the continued viability of hospitals at Val d'Or, and especially Chibougamau, was contingent upon including the considerable inland Cree clientele in the catchment areas of those facilities. Moreover, at the time, it appeared in the short-term to be more economic to transport patients to services outside of the region, rather than to develop and maintain such services within the vast and scarcely populated Cree Region.

The CBHSSJB began functioning as a coherent system of clinics and social services offices from about 1985 onwards. Its accountability problems diminished with the introduction of financial management improvements including financial computerisation. In November 1999, an entente with the *Ministère des services de santé et des services sociaux* (MSSSQ, the successor to the MAS) established a Cree/MSSSQ negotiations table. Sectoral discussions resulted in an agreement in late 2000 to fully fund non-insured health benefits (an entitlement of all Registered Indians in Canada) and also medically necessary patient transportation. This provided a \$4M recurrent cash injection which allowed for investments in missing or depleted core services, and full cost protection for almost a quarter of the CBHSSJB's budget. Agreements in 2001 led to a well-funded Public Health Department within the CBHSSJB and an ambitious diabetes programme.

## 7.5. Current and Evolving Status of Health Services in the Cree Region

Today the health services of the Cree Region are delivered through a mixture of intra-regional and inter-regional facilities and programmes, with a much higher than average reliance on services obtained outside the region. The CBHSSJB presently has a regional hospital centre and nine clinics spread over a geographic area similar in size to France. Its Social Services Centre, based in Chisasibi, operates youth group homes in Chisasibi and Mistissini for coastal and inland clientele respectively. It also runs a regional youth rehabilitation centre in Mistissini. Although the CBHSSJB is technically one 'establishment', service delivery happens through two functional CLSCs: the "Coastal" in Chisasibi and the "Inland" in Mistissini. The Inland CLSC receives almost all of its hospital support from Region 10's hospitals, particularly Chibougamau.

The larger clinics have full-time doctors on staff and the smaller clinics have regular rotations of doctors. All doctors<sup>a</sup> and all but a handful of nurses are non-Aboriginal. Recently, some Cree community workers have been licensed as qualified social workers. The lack of Cree health and social services professionals is a serious and continuing health services issue. It reflects the low numbers of graduates from the region's schools and the poor quality or absence of science and math curricula.

A 2001 survey identified a disproportionately large number (587) of elderly and other persons with disability or loss of autonomy who had little access to appropriate services. Nine "multi-services centres", offering specialised day services for this clientele, are under construction and should be completed during 2004, although it will take a year or two longer to obtain the funding and trained personnel to fully staff them. One residential chronic care facility (Waswanipi) is part of this project. There are plans, but no funding yet, for a chronic care residence in each community.

A substantial and unique infrastructure exists for dealing with special nordic conditions, reflecting the geographic isolation and the absence of local private service providers. A Dental Department, based in Chisasibi Hospital, offers a wide range of preventative and curative dental acts. It also supervises travelling dental teams that visit the communities. The average waiting time for a non-emergency appointment is over 12 months, reflecting not only insufficient dental personnel, but also an extremely high incidence of dental disease, especially among youth. There are pharmacies in Chisasibi Hospital and Mistissini clinic, as well as dispensaries in the other eight clinics.

The CBHSSJB has numerous (over 130) buildings including residential units spread amongst the nine communities, and it rents space in Chibougamau, Val d'Or and Montreal. The existing CBHSSJB facilities need in many cases to be repaired or rebuilt. New CBHSSJB construction is linked to and limited by insufficient community infrastructure in most of the quickly-growing Cree communities. A Reservation Services, in the Human Resources Department, organises an exceptional amount of staff travel and accommodation in connection with hiring, management, professional development, and long-distance programme delivery. A high turnover of staff - especially nurses - and a constant need to rotate teams and bring in short-term replacements including "dépanneur" physicians, contribute to a large volume of staff movement.

A parallel 'travel agency' - Cree Patient Services (CPS) - maintains offices at Chisasibi, Chibougamau, and Val d'Or Hospitals, with a headquarters in Montreal. This unit transports medical patients and, when needed, their escorts. The importance of CPS is attributed to the exceptional degree of reliance on outside establishments. In 2000/01, 74% of hospitalisations in Chisasibi were of local people or those from coastal communities, while almost none came from the inland communities. In the same year, 80%

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<sup>a</sup> The first Cree physician - but who grew up on the Ontario side of the Bay - is completing her final examinations in the spring of 2005.

of cases from inland communities were hospitalised in southern facilities. Between 1982 and 2001 the percentage of in-region hospitalisations decreased from 31.4% to 26.7%, a decline of 4.7% in total in-region hospitalisations. In comparison, the percentage of hospitalisations within the Inuit region increased from 37.7% to 71.7 over the same period. This shows that the reliance on hospital services in the Cree Region has declined over time. Accordingly, the transport caseloads originating in most Cree communities continued to grow, almost doubling in the decade before 2002/03. Cree Patient Services has evolved into an efficient medical travel agency requiring a tenth of the CBHSSJB's budget. During 2002/03, 16,193 patient and escorts were transported, mostly to external facilities. The present trend is for 20,000 transports to be reached by the end of 2005/06. The volume of this movement is exceptional and is considered unsustainable.

The region experiences similar difficulties to other remote Québec regions in recruiting and retaining medical staff, although it is disadvantaged by exceptionally inadequate staff housing. While the region had a capacity for 17 full-time physicians in 2000/01, the actual supply fell by six that year to 2.7 full-time equivalents including the Public Health Physician. There are currently 19 full-time equivalent physicians in the region. These places are occupied by 10 full-time physicians and the rest of the work is covered by transient physicians known as *dépanneurs*. This variability affects the number of patients who must be transported out of the region to see a physician and it forced the closing of the obstetrics department in Chisasibi Hospital. It also illustrates how official scales of establishment are an unreliable indicator of the "health" of regional services.

The Paix des Braves Agreement, ratified in early 2002, has led to the development of a Strategic Regional Plan (SRP) for CBHSSJB, completed in June 2003 and accepted in principle by the MSSSQ. At the time of writing, an understanding has been reached with the MSSSQ that critical services cost over 1.5 times the southern cost to deliver in The Cree Region. Discussions continue with a view to implementing a multi-year formula funding regime, which would be partially driven by changes in population and caseloads. This is considered an important aspect of a "pro-active approach" to dealing with the effects of hydro development, whereby services should be equipped before caseload impacts are felt, rather than afterwards. The SRP includes replacing the two-CLSC system with one Cree Integrated Centre (CICs) per community. Control would be decentralised and certain top-heavy central functions, not considered core business but necessary to northern operations, could be delivered by new modes such as privatisation.

The SRP redefines the mission of Chisasibi Hospital Centre as an acute services, non-specialised category general hospital serving the coastal communities including Nemaska, and also to co-ordinate hospital services throughout the region. Chronic services will be provided by chronic care facilities in the various communities. The re-organisation of regional hospital services would correct the decline in regional hospital capacity that was observed in the 20 years previous. Different measures are planned for improving services in the three southernmost communities, where the geographic reality dictates bring some "light hospital" services (e.g. dialysis, light surgery, laboratory) into the communities, improving pre-hospital services, and new partnerships with external hospitals.

The CBHSSJB and the MSSSQ realise that these plans require mutually beneficial partnerships with external hospitals. New relationships would have to be negotiated. The SRP also affirms the position of the CBHSSJB that it has the option to deliver, if it chooses, health services in the new and existing hydro camps in the region. This possibility might require overdue administrative clarifications of the service boundaries between boards. Today there is a positive dialogue and co-operative spirit between the CBHSSJB, Hydro-Quebec, and Region 10; e.g. Chisasibi provides radiology and laboratory services for the Radisson clinic; the CBHSSJB is considering a request to take over certain CSSST administration outside of its boundaries; and Nemaska clinic provides some services to nearby Hydro camp residents. The desirability of the CBHSSJB assuming a more robust regional role will depend upon the interests of

the stakeholders, but also on the timely implementation of the service augmentations that the CBHSSJB has planned.

Within this movement towards a revitalised regional system, there is a focus on integrating traditional and other alternative medical practices within the curative and preventive services of the CBHSSJB. This would provide clients with choice and more vigorously inject traditional values and a Cree ethos into services, finally completing the transfer and providing services that reflect the needs of the Crees.

## **Chapter 8- Expected Impacts and Implications for Intervention: Lessons from the Literature Review**

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We now consider how, based on the post-impact empirical research literature, how we might imagine the potential health and social impacts of the EM-1-A development project upon the Cree communities. Like the rest of this report, this discussion is organised according to the health determinants framework.

Contradictions in the literature notwithstanding, potential interventions can be identified with respect to address health determinants in communities affected by large development projects. As per our literature review (Chapter 3) we use Nemaska for purposes of illustration. The general aim is movement towards outcomes that are “orderly and beneficial” rather than “sudden, massive and overwhelming”.<sup>234</sup> These interventions should recognise the need for mutual adaptation, where the actions reinforce the capacity of all stakeholders (project proponents, local government and institutions, local private interests, and community members) to “restore their own pathway to wholeness and find their own way of participating in the changes associated with resource development.”<sup>235</sup>

### **8.1. Income and Social Status**

Based on the findings in the literature - particularly those relating to the evolution in income and social status since the implementation of the JBNQA - we can expect that the impacts of the overall Eastmain-1-A project are likely to be mixed. One expects an overall pattern of economic benefit and increased stabilisation of both the wage and traditional economies, but with a potential increase in disparities among segments of the population. Persons with less access to either of the main economies (i.e., those without traditional skills or capabilities and those less qualified to access work in the development sector) are likely to be most affected, and hence to contribute to health and social problems. Currently, these risk groups in the affected communities include the elderly and also men and women aged 25-45 who did not complete high school.

The most critical implication for intervention on income and social status is thus to ensure that development does not create or exacerbate socio-economic disparity or contribute to social and economic exclusion. Careful analyses of new policy and programme measures, through a social and economic inclusion/exclusion lens, may help ensure that these measures contribute both to overall economic prosperity and to equity in income and social status.<sup>236</sup>

### **8.2. Employment and Working Conditions**

The potential impacts of the overall EM-1-A development on employment and working conditions are difficult to predict. This is because of the generally positive employment situation in the region and the unprecedented involvement of Cree-owned firms in the construction phases (an involvement that is itself an indirect result of the JBNQA). If these firms support the hiring of local labour across the spectrum of work levels, the impacts on employment are likely to be more positive than existing post-impact studies would lead us to expect.

Provisions of the recently signed agreement, between Hydro-Québec and the Crees,<sup>237</sup> are meant to increase Crees' access to contracts resulting from the operation, maintenance and upkeep of the La Grande Complex. Similar provisions for the overall EM-1-A development would provide an important opportunity to address aspects of population health that are associated with unemployment, under-employment, and stressful or unsafe work.

### **8.3. Education**

It seems likely that the overall EM-1-A development will have little positive or negative effect on this important health determinant. In the long term, this may become a lost opportunity for improving population health unless systematic efforts are made to link the development to educational outcomes for the Crees. The interaction between education/training and employment deserves special attention. This is in order to ensure that access to adequate education and training improves outcomes in terms of employability, occupational status, and advancement<sup>a</sup>.

### **8.4. Social Environment**

The Cree communities may each be affected somewhat differently by the development project, according to their existing levels of social capital. Communities whose social environment is least likely to be disrupted by the project will be those with strong local leadership, who have not undergone significant recent stresses such as relocation, and who can implement community-level coping strategies. Health, social, education, and other services in the communities are likely to experience major impacts from the development project as supply struggles to keep up with demand. Increased demand can be expected for all types of services, especially when longer-term workers with families begin to move into the region. Communities who can effectively anticipate the increased demand may be able to provide a more supportive social environment.

Community economic development may be an effective strategy to reduce the negative impacts of major socio-economic disruption in isolated communities. Impacts are also likely to be mediated by the corporate policies of the developers and their subcontractors. This suggests that another intervention strategy may involve advocating for healthy policies among the various corporate interests involved in the development.

### **8.5. Individual and Community Coping**

Many of the negative impacts of development projects on individual and community coping capacity - which would be expected in the region based on a reading of the literature - have already been felt in association with the original James Bay project. The newest development seems to be contributing to a resurgence of problems in Nemaska. This would likely be because of its geographic proximity to the Némiscau camp. All available evidence suggests that continued development is likely to be associated with increased levels of social pathologies. These include family breakdown, child neglect, alcohol and drug abuse, reduced social participation, and increased violence - especially if alcohol sales outlets within the region continue to multiply. These problems are likely to peak in the pre-construction phase, before

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<sup>a</sup> The Cree-Hydro-Québec Cree Employment Agreement (Apatisiwin) targets 150 jobs of four types to work at H-Q's northern facilities but does not address the larger link between training and education at the regional level. See: [http://www.hydroquebec.com.publication/en/enviro\\_performance/2002/pdf/fiches/fiche22.pdf](http://www.hydroquebec.com.publication/en/enviro_performance/2002/pdf/fiches/fiche22.pdf).

health and social service capacities have had time to adjust to the changing situation. Increased rates of sexually transmitted infections are also to be expected in the short term.

The literature suggests several interventions to promote adequate individual and community coping. The first is to ensure that effective preventative measures are implemented, focusing on the determinants of social pathologies, including social isolation, ineffective parenting, lack of social engagement, and poor self-esteem and social skills. Interventions aiming to preserve and promote Cree cultural identity, and hence individuals' sense of personal continuity, may be most effective, as well as those designed to increase community-level social capital. Effective, accessible and timely health and social services are also required.

## **8.6. Physical Environment**

The expected social impacts of the Eastmain-1-A and Rupert Diversion project on contaminants in the physical environment as a health determinant are largely unknown and require ongoing monitoring, especially among vulnerable groups (notably women of child-bearing age). One might predict with fair accuracy the environmental health effects of, say, methyl mercury and also fairly predict the likely human uptake. The reasonably predicted biophysical effects might be well within acceptable limits. However, people can react to a minor environmental threat in ways which engender unanticipated spin-off problems.

Real or perceived contamination may exacerbate the ongoing trend away from consumption of traditional foods, and toward greater rates of poor nutrition, obesity, overweight and poor dental health. At another level, increased road access throughout the development sites will likely have both positive and negative impacts on the population involved in the ISP. The long-term impacts on opportunities for sustainable forest and fisheries management are unknown and worthy of further investigation.

## **8.7. Gender**

The overall EM-1-A development is likely to have differential impacts on men and women. These will vary according to their employment and family situations. The greatest impacts may be expected among women whose sources of household income shift away from the traditional economy and toward employment at the development sites, and whose partners are absent from the community for long periods. This would particularly apply to young mothers whose partners or family members have been most involved in the ISP. Interventions designed specifically to enhance these women's economic inclusion may help to attenuate these impacts.

## **8.8. Conclusions About Expected Health and Social Impacts**

The literature review of the impacts of large developments on small remote communities suggests four conclusions in respect of the overall EM-1-A development and the Cree communities:

1. Impacts of the next phase of hydro-electric development are likely to be mixed, with both positive and negative impacts in terms of health determinants.

2. The impacts are likely to vary across the communities and within population subgroups, suggesting a need for careful community-level monitoring so that health inequities are not increased.
3. Different health and social impacts are likely to be felt at different stages, requiring a phased, preventative response that anticipates each wave of impact.
4. There are significant opportunities to reduce negative health and social impacts and maximise gains for the people of the region.

## Endnotes Chapter 8

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<sup>234</sup> Berger (1983)..

<sup>235</sup> Stickert (1983).

<sup>236</sup> <http://www.acewh.dal.ca/eng/reports/inclusionkit-e.pdf>

<sup>237</sup> Hydro-Québec/SEBJ and Crees of Eeyou Istchee (2004). Agreement concerning a New Relationship Between Hydro-Québec/SEBJ and Crees of Eeyou Istchee, April 2004.

<http://www.gcc.ca/francais/nouvelles/ConventionNouvellemars2004.PDF>.

## **Chapter 9- Measuring the CBHSSJB Against the Benchmarks of the Canadian Health Services Research Foundation**

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In Chapter 8, the empirical post-impact literature was used to pose the question about the kinds of impacts, both negative and positive, that might be expected from the EM-1-A project. Chapter 9 is a similar exercise, assessing the current regional health services against ten benchmarks proposed as leading themes for health services in the next few years.

### **9.1. Context**

The extent to which regional health (and social) services have been, and will be, a determinant of improved health for the population depends upon how appropriate, well-resourced, well-administered, inter-connected, and robustly mandated those services are. The section in Chapter 5, on health services as a health determinant, used the criteria set forth in the Alma Ata Declaration to assess the changes which have occurred over the years within the CBHSSJB. The text then assessed the current situation of the CBHSSJB against the criteria for preventive and primary care services.

Chapter 9 has a slightly different but related approach. It is important to evaluate the potential of regional services to deal with health and social challenges which may follow from the EM-1-A project. The key to this lies not just in what those challenges might be, but also in the preparedness of the regional services to meet them.

### **9.2. Regional Services Assessed Against the Ten Benchmarks**

A series of ten benchmarks developed by the Canadian Health Services Research Foundation were used to review the administration and the trajectory of services in the region:

#### **9.2.1. Workforce Planning, Training, and Regulation**

The CBHSSJB faces chronic personnel shortages and high turnover rates, due to factors such as heavy workloads, frequent travel, and housing shortages. Unlike other regions, the CBHSSJB has to house and arrange travel for staff and this puts a heavy burden on the organisation that does not happen elsewhere, except in Region 17. Teamwork is impeded by different hierarchies within the organisation, and by complex or unclear lines of responsibility for results. The need to import health professionals from the South perpetuates a divide between clinical services run mainly by non-Crees, and support services run largely by Cree para-professionals. This divide is accentuated by linguistic divisions between Cree, French and English. In order to comply with provincial regulations, a position for Director of Nursing was finally filling in the past two years. For quite a number of years the organisation has had trouble keeping stability in the important position of Director of Professional Services clinical.

Training is not integrated into the work of the CBHSSJB, the formal attempts to establish joint working groups with the Cree School Board have never progressed beyond planning, and there are no current initiatives to establish special training programmes with educational institutions to promote vocational training in the health and social field. The CBHSSJB did carry out a Bachelor of Social Work programme for long-term social services staff. The programme was costly. It has not been repeated and an impact evaluation has not been carried out.

### **9.2.2. Management of the Healthcare Workplace**

Many Crees are irked by the slow progress in achieving a Cree-dominated workforce, and there are calls for preferential hiring and promotion. However, the CBHSSJB has no strategy to identify and support Cree candidates with management or professional potential. At the same time, the Cree School Board does not graduate many from secondary school and the regional curriculum is very weak in science and math. As a result, there are few Cree who continue into health sciences fields at the vocational, general post-secondary, and university levels.

### **9.2.3. Timely Access to Care for All**

Although basic care is readily available in all the communities, access to hospital care can often take six hours or more. The Chisasibi Hospital remains under-developed, as are all the specialised services in the region. As a result, there is a great focus on sending people out to use services in other jurisdictions. Another way to look at timely access to care is in preventive community health programmes. Whereas CLSCs in the cities offer group courses in many areas, for example pregnant women, people with heart disease, people with mental health issues, there are no similar types of courses offered in the Cree communities. As well, there are no alternative health care providers.

### **9.2.4. Managing for Quality and Safety:**

Quality of service varies, and is affected by deficiencies in equipment and infrastructure; by heavy reliance on para-professionals; and by a lack of benchmarks and data to assess service quality. There is no quality assurance programme for services in place. Similarly, the CBHSSJB has not done any risk management assessments. Patient safety can be compromised by the frequent migration between local and outside-of-region services, by language barriers, by deficiencies in equipment, and by personnel shortages. The CBHSSJB has had no planning capacity.

### **9.2.5. Understanding and Responding to Public Expectations**

The Public Health Department is making effective use of media to transmit public health messages. However, local media tend to be critical of regional health services. Internally, the CBHSSJB does not have any regular communications systems between Departments. Similarly, there is no well-developed complaints process for staff or for the public. The new SRP has plans for more local decision-making involving the communities in their own health care decisions for the first time.

### **9.2.6. Sustainable Funding and Ethical Resource Allocation**

Perhaps the most perplexing long-term issue has been a paucity of specialised medical services in the region. In particular, Chisasibi Hospital lacks a minor surgical capability, and the patient transport corridor routinely ships large numbers of patients to southern hospitals for treatment. There are other contentious historical funding issues, but most or all of these appear to be close to final resolution through negotiations. Additionally, issues of value-for-money have historically received little attention within the CBHSSJB as an organisation.

### **9.2.7. Governance and Accountability**

Funding for specific activities is often dispersed among several units of the CBHSSJB, making it difficult to track how funds were spent and what results were achieved. Standard MSSSQ audit forms omit important elements of the CBHSSJB programmes, such as non-insured health benefits.

### **9.2.8. Managing and Adapting to Change**

The organisation lacks tools for evidence-based decision-making, and its management structure is unwieldy. Planning has tended to be ad hoc, with an emphasis on catching up to the rest of Quebec.

### **9.2.9. Linking Care Across Place, Time, and Settings**

Increases in chronic diseases such as diabetes, and associated increases in medical transports, pose a major challenge to continuity of care. Also, the absence of any specialised resources within the region, and the more than 15,000 medical transports sent out for care in other jurisdictions each year, pose major challenges for ensuring continuity of care.

### **9.2.10. Linking Public Health to Health Services**

Since the early 2000s, resources allocated to Public Health have been substantial, and further increases are scheduled under the SRP. This is expected to reduce the demand for curative services.

## **9.3 Potential of Regional Services to Mitigate Future Impacts**

To what extent will existing regional health services mitigate any negative health impacts arising from the Eastmain-1-A-Rupert diversion project? Unlike in 1975, an extensive regional health system already exists, and augmentations to this system on an unprecedented level will occur during EM-1-A construction. These augmentations will include substantial prevention measures, as well as a monitoring capacity that was formerly absent.

We do not wish to downplay any potential health and social impacts arising from the EM-1-A project. Likewise we do not wish to gloss over re-orientations and new ways of doing business that are urgently needed. However, it is fair to say that these will be felt by a Cree population that enjoys an extraordinary level of health service compared to comparable remote, northern, Aboriginal populations. It is likely that no such population has been better prepared, in terms of existing services and services being rapidly implemented, to avoid or to minimise many of the human impacts likely to be encountered.

It remains to be seen, then, what will be the positive influence of three decades of progress in health and in health services in dealing with the human consequences of the new hydro project. This generally favourable starting point, and the presumed preventative and mitigating effects of the changes and investments underway today, depart radically from the usual development scenario. The effectiveness of the existing and planned measures will doubtless be watched from afar. Among the potential lessons of broader application is the cost-effectiveness of the forward-looking approach to services in the Cree Region today.

## Appendix A: Biographies of Project Team Members

### Core Team

Jill Torrie (project co-ordinator and editor): As Director of Specialised Services in the Public Health Department, Jill Torrie is responsible for research, evaluation, public health surveillance, training, communications, and preventive clinical practices. Trained in anthropology, she has authored or co-authored various publications in areas such as diabetes, mercury pollution, addictions and treatment, criminal justice, and services evaluation. She first worked for the Crees as a consultant in 1994.

Ellen Bobet (health status): Ellen Bobet of Gatineau has a background in sociology and many years experience with Aboriginal health stakeholders including: First Nations and Inuit Health Branch, Statistics Canada, the Assembly of First Nations. She has authored various health statistics reports including, since federal service, several for the CBHSSJB.

Natalie Kishchuk (health determinants and literature review): Natalie Kishchuk of Montreal, with a doctorate in social psychology, is a nationally recognised expert in programme evaluation and applied social research. Ms. Kishchuk formerly worked for Montreal Region Public Health where she became involved in Cree Region health issues. More recently, she has conducted evaluations and studies in northern communities, including a study of motor vehicle deaths in Region 10 and the Cree Region 18.

Andrew Webster (health services): Based in Ottawa, Andrew Webster is trained in physical geography and in policy and administration. He is author of various programme evaluation and funding reports for the Royal Commission on Aboriginal Peoples, federal departments, government and service delivery organisations, as well as programmes and services analyses in support of negotiations and litigations. He has been consultant to the GCC(EI), the Cree Regional Authority, and the CBHSSJB for many years, including analyst on the Crees' health and social services negotiations team.

### Advisory Team

The project team had the expert assistance of the Institute national de santé publique du Québec's (INSPQ) surveillance team. The INSPQ brings together experts in all areas of health determinants and research in Québec, and it provides supplemental support to the public health teams of the smaller health regions. In particular, the Public Health Department was able to purchase extra services from the INSPQ for the health survey and for specific technical analyses in the Sectoral Report. The authors would especially like to thank Natalie Auger, Robert Choinière, Valérie Émond, Denis Hamel, Rabia Louchini and Danielle St.-Laurent.

### Adjunct Team

Pierre Lejeune has a background in statistics and surveillance techniques. Since working on this report, he has become the Epidemiologic Programme Officer in the Public Health Department. He had similar responsibilities at previous periods for the health board in Nunavik and for other health services delivery agencies in Québec. He contributed statistical analyses, tables, and graphics to the Sectoral Report

Olivier Receveur has a doctorate in nutrition and is a specialist in biostatistics. He is presently Professeur agrégé (Département de nutrition, Faculté de médecine, Université de Montréal), Adjunct Professor (School of Dietetics and Human Nutrition, McGill University), and Affiliated member (Centre for Indigenous Peoples' Nutrition and Environment, McGill University). He contributed specialised sections particularly regarding diabetes analysis and advised on other specific sections.

Deborah Schoen is a sanitary engineer with training in environmental management, environmental monitoring, and health risk assessment. For years she worked in the US and Canada in the areas of environmental management and impact assessment. For the past decade she had been an independent consultant in environmental research and evaluation, and a freelance writer for scientific and professional magazines. Recently she took the position of regional specialist in toxicology and risk assessment for Health Canada in Quebec. She contributed the sections on the physical environment including the environmental mercury analysis in collaboration with the Public Health Department's environmental health team.

Manon Girard has worked as epidemiologist and statistician for various health services delivery agencies in Québec, including the former CBHSSJB Mercury Programme. She contributed background material on employment and education.

### **Support Team**

Frances Couchees, who is a member of the Cree Nation of Oujé-Bougoumou, provided secretarial support. She now works full-time for the Public Health Department in the Montreal office. Rachel Martin, a Miq'Maw, worked as research assistant. She too now works full-time for the Department in the Montreal office.

### **Other Collaboration**

The project team received excellent collaboration from the other members of the Public Health Department, especially the following people who made specific contributions: Solomon Awashish, Robert Carlin, David Dannenbaum, George Diamond, Manon Dugas, Malika Hallouche, Valérie Lahaie, Paul Linton, Louise Pedneault, Bella Moses Petawabano, Wally Rabbitskin, Elizabeth Robinson, Reggie Tomatuk, Mathieu Trépanier, Jacques Véronneau, Yv Bonnier Viger, along with expert advice from Alan Penn, Scientific Advisor to the Cree Regional Authority.

The project team would also like to acknowledge the excellent cooperation it received from the Aboriginal People's Survey section of Statistics Canada in Ottawa, as well as the willing collaboration from the Health and Social Secretariat of the Assembly of First Nations in Ottawa.

## Appendix B: Critical Events in the Development of Health Programmes and Services in the Cree Region

Year	Event	Remarks
1903 Began	Annual visits by physicians.	By government ship, and inland by horse and canoe.
Est. 1930	Fort George Mission Hospital built. New hospital 1950.	The first health facility in the Cree Region. Focused initially on curative services and TB treatment. First government subsidies 1936. Fully-functional hospital from 1950.
1930s Began	Two residential schools Fort George (Chisasibi) and a few students begin to go out of region to school	A few children sent to Chapleau Residential School and 2 residential schools open in Fort George. School children have regular medical attention.. From the late 1940s more children are sent out to school and by early 1960s most go.
1942 Began	In-region prevention and promotion programming.	Fort George Health Centre was the first federal clinic, focusing on prevention especially epidemic control.
1945-55 Duration	Federal Indian Health initiative (approx. period).	An intensive programme of preventative and curative medical services, with social benefits including rations and housing. Administered at first by visiting teams. Vaccinations and improved rations were key elements. Regular examinations led to many TB hospitalisations (Fort George and Moose Factory).
1950-73 Duration	Expansion and consolidation of federal clinic system (operated by Medical Services Branch or MSB, Department of National Health and Welfare).	Starting with Waskaganish (1950), clinics were built (and sometimes replaced) in four more Cree communities. By 1973 three classes of clinic programmes existed: (1) Clinical Medicine: Acute treatment, observation, diagnosis, specialist visits and transportation, referrals to hospitals, dentist visits, optometrist visits. (2) Community Health: Promotion and prevention; disease control; sub-programmes for Dental Health; Maternal Health; Sanitary Health; Health Education; Nutrition; Mental Health; Alcohol and Drugs; Communicable Diseases; and Chronic Diseases. (3) Participation of Indians in the Health System: Training and recruitment measures; Community Health Representatives (CHRs). MSB Regional office provided visiting support staff and delivered some activities direct
Est. 1970	Chashasipich Hospital replaces Fort George Mission Hospital.	Full-functioning hospital serving local people and managing three federal Inuit clinics. Not (yet) a regional facility for the Crees.
1975 Began	Section 14 of JBNQA changes the programmes and services landscape, leading to a Cree Board and a Cree Socio-Sanitary Administrative Region 10b (renamed Region 18 ca. 1990).	Primary fiscal responsibility was accepted by Quebec and a CBHSSJB was to assume control of services (including the federal clinics) within 5 years (1976-1981). The implementation period was fraught with difficulties and the four classes of establishment under the 1972 legislation were not fully established in Region 10b until the mid-80s. Meanwhile service gaps and voids appeared, particularly due to withdrawal of federal long-distance supports.
1975 Event	First social worker in the region (approx.).	Provincial worker based in Chashasipich Hospital. Outside of Fort George, Indian Affairs contracted Abitibi agencies to have social workers visit occasionally and to arrange for services.
1975 Programme Introduced	National Native Alcohol and Drug Awareness Programme (NNADAP).	The Crees' NNADAP project was a counselling and education programme tailored to ameliorate elevated and rising social pathology rates which field reports suggested resulted from hydro development. The CBHSSJB continues to deliver NNADAP but no longer primarily to ameliorate effects of developments.
1976-80 Duration	Outsourcing of some clinic management to Chibougamau Hospital (approx. date).	MSB contracted Chibougamau to administer Mistissini clinic and specifically provide the three classes of Indian health programmes of MSB's Quebec Region. In 1980 Chibougamau assumed pre-hospital services until the Cree inland CLSC was created.

1976 Event	Crees protest delays in official creation of CBHSSJB by creating their own unofficial “provisional” CBHSSJB.	This had no legal powers (or MAS funding) and conflicted with Chashasipich Hospital’s Board who resisted Cree take-over of health services. The friction precipitated in 1977 a decree creating the CBHSSJB as a public body with small implementation budget, but still no administrative responsibilities.
1976-81 Duration	DNHW - Environmental Contamination Programme.	This resulted from environmental contamination research, particularly mercury in connection with hydro developments. The James Bay situation was the catalyst. This centrally-delivered programme was withdrawn when MSB vacated all of its clinics.
1976-81 Duration	Run-down of clinic services in the federal clinics that were later taken over by the CBHSSJB.	The clinics were found in disrepair and/or disarray. Some services had been reduced in frequency (e.g., physician and specialist visits). Inspections revealed high levels of preventable maladies and inoculation regimes were in arrears.
Est. 1978	CBHSSJB and Cree Region 10b are established by decree (20 April 1978) under 1971 L.Q. c.48.	Set out description for a Cree Region to be administered by a Cree Board with control also of Chashasipich Hospital. The service area included Nemaska (the site was abandoned in 1970) because a new Cree community would soon be built there.
1978 Event	Agreement with Département de Santé Communautaire (DSC) of the Montreal General Hospital.	Lacking capacity, the CBHSSJB agreed to let the DSC: co-ordinate tertiary level care; arrange visits by dentists and specialists to the communities; provide community health services, including prevention and promotion; and arrange for patient transportation. The effects were: (1) the CBHSSJB lacked capacity to make management decisions; and (2) a long-term reliance on external hospitals for basic regional functions began.
1979 Event	First federal clinics are received from MSB (Eastmain, Paint Hills and Rupert House).	The CBHSSJB used Chashasipich Hospital (152 staff incl. a few social services personnel) for administration of the new clinics. The Hospital was now overwhelmed; it also administered 3 Inuit clinics under contract. Funding did not increase synchronously with the new responsibilities. Service delivery suffered.
Est. 1979	Legal creation of a Social Services Centre, initially based in Fort George then Chisasibi.	This initially provided social services for the coastal communities and Nemaska. Waswanipi was served by the Amos Social Services Centre, still under contract with DIAND. Mistissini was served by Roberval Social Service Centre also still funded by DIAND. The CBHSSJB planned to assume the responsibilities of Amos and Roberval as soon as possible, under provincial funding.
1980 Built	Nemaska Clinic opens.	Signals a second phase of expansion of clinic services.
1980-81 Duration	CBHSSJB is placed under trusteeship (October 1980 to February 1981), triggering two decades of Section 14 litigation by the Crees. A fundamental issue in the development of programmes that cannot be left out	The extent of the social, economic, and physical changes that were underway, and the enormity of implementing the first Aboriginal health board with such large responsibilities, were under-estimated by all concerned. However, the CBHSSJB emerged from its trusteeship with greater will, and understanding, among the stakeholders to make the experiment succeed.
1980 Event	Fort Rupert, Nemaska, Fort George, Paint Hills, and Mistassini have major outbreaks of gastro-enteritis.	In several villages most children became ill. Four deaths were recorded in a year, and more followed. Reports showed deficiencies in socio-sanitary infrastructure (potable water and waste disposal), some of which was still DIAND’s responsibility, and Fort Rupert clinic (still under MSB) was discharging sewage into open ditches.
1980 Built	Waswanipi clinic opens.	Built with the new community. Opened while the CBHSSJB was under trusteeship (December), creating further difficulties.
1981 Event	MSB abandons remaining federal clinics (Waswanipi, Mistissini, and Great Whale River on 31 March 1981, leaving them to the CBHSSJB in disrepair and/or disorganisation.	The CBHSSJB, a month after trusteeship, was in a poor state to take these clinics over. The particularly deficient service situation in Mistissini became evident immediately upon the transfer. Chisasibi Hospital was too distant to provide all the necessary support. There followed increased reliance on Abitibi hospitals and urgent efforts to harmonise the former federal services with the services supported by the Province. The resulting harmonised regime applies today (2004).

Est. 1981	Chisasibi Hospital Centre opens (but takes about 18 months to reach a plateau of service delivery).	32-bed facility with less treatment capacity than Chashasipich Hospital had. Initially one permanent doctor (now 6) with visiting GPs and specialists. Had a surgery but a surgical team was not funded. Pharmacy, basic lab, radiology, and clinic, but no ambulance for several years. When it opened the CBHSSJB withdrew remaining satellite and hospital services to the Inuit communities. Hospitals in the Inuit region assumed this caseload, allowing the Crees to focus on their own region's health delivery.
1981 Programme Introduced	Dental Programme with full-time dentists (Chisasibi and Rupert House) is created.	Another dentist was hired in July 1983 to service Eastmain, Great Whale, and Mistissini, and a part-time dentist for Waswanipi and Nemaska. A major improvement over the curative dental services provided during the federal administration, but preventative dental resources were now almost absent following federal withdrawal.
1981 Programme Introduced	Planning Department is created.	A planning office was nominally created about 1981, which migrated between responsibility centres and failed to develop as an effective agency (with one staff member, a Director, in 2004). Occasionally it subsumed responsibilities whose direction resided elsewhere; e.g., for a while the Mercury Programme was considered a planning matter. Today it mainly produces functional plans for new capital projects.
1981-84 Programme Introduced	Creation and implementation of a long-distance Public Health Programme for the Cree Region, headed by the DSC of Montreal General and administered from Montreal.	The last tuberculosis epidemic (1980) led to better communications with the MGH and Montreal Children's Hospital. The gastro-enteritis outbreaks of 1980 drew attention to the diminution of regional public health capacity and to the substandard condition of socio-sanitary infrastructure inherited from Indian Affairs. New tuberculosis active cases in 1981 led to a regional Public Health Programme during 1981/82, the last of the 'great' epidemic control measures. By 1984 a regime of school health inspections and promotion was re-established, followed by protocols for mandatory notification of infectious diseases, and for the prevention of gastro-enteritis epidemics. In 1983 the MEQ began funding communities to test drinking water, relieving the CBHSSJB/DSC of this burden.
1981-85 Programme Introduced	Establishment and consolidation of a dedicated regional administrative unit, relieving front-line units of most administrative responsibilities.	An embryonic Administration Department followed the trusteeship of 1980/81. The computerisation of payroll in 1982 had a positive effect on management as did a basic computerised accounting system in 1985. By then most Nordic functions were concentrated in the Administration (housing, reservations, translation, patient transport, capital management, etc.).
Est. 1982	Permission was given to operate as a regional social services centre and a reception centre (letters patent).	However, the CBHSSJB had some involvement in social services delivery already. A Social Service Centre was created by decree in 1979, but until 1982 was not fully functional nor funded as an operational Centre responsible for all regional residents.
1982-84 Programme Introduced	Appearance and consolidation of Cree-controlled core social services across the entire region.	By 1982 the Social Services Centre had outlets in all 8 Cree communities. It had 22 employees in: youth protection, family and couple counselling, assistance to elderly persons (including chronic care), home care, and assistance to adult and community groups. Community workers performed much of the work but only accredited social workers could invoke legal provisions and compel persons to comply with orders, i.e., youth protection activities. By 1982/83 a small cadre of Cree social workers existed, although 85% of local social problems were resolved by minimally-trained community workers. In 1982 a short-lived group home for the aged was established in Mistissini. In 1984 a centre for maladjusted youth was established in Chisasibi
1982-86 Duration	CBHSSJB introduces a Mercury Programme (subsumed in 1986 by a new Mercury Programme under Cree-Quebec Mercury Agreement).	No special funding from the MAS, which however supported the DSC's Mercury Programme (1982-86 on \$26,000 p.a. adjusted for inflation). The CBHSSJB began occasional monitoring campaigns of its own simultaneous with construction of the LG reservoirs. In 1983 efforts were increased owing to high initial test results and soon hair sampling and umbilical cord blood testing was undertaken.

1982 Programme Introduced	Beginning of a Mental Health Programme.	A system of out-referrals commenced in 1982 under contract with Royal Victoria Hospital. Only in 1995 was an in-region Mental Health Programme established. This introduced periodic visits by psychologists, and when a manager was later hired (1999) attempts to integrate traditional healing methods began.
1983 Programme Realignment	Re-orientation of hospital utilisation corridors and last use of Moose Factory Hospital (approx. time).	Henceforth most hospital cases go to southern, establishing a strong reliance on Chibougamau, Val d' Or and Montreal especially. By 1984, 23% of Chibougamau's caseload was Cree even though the Crees were only 11% of the service population, and 50% of its paediatrics admissions were Cree.
Est. 1982 Programme Introduced	Cree Patient Services (CPS) is organised as a CBHSSJB unit under a single manager, but the MGH kept responsibility for the traffic to and from Montreal	Offices in Chisasibi and Val d' Or (later also Chibougamau). Responsibility to transport patients and escorts, and arrange for reception and assistance upon arrival. The importance of this activity increased because Chisasibi Hospital Centre was never equipped, as had been the hospital on the Island, to handle minor surgeries which were now all done out-of-region.
1982-84 Programme consolidated	Consolidation and re-organisation of clinic services towards the model still in effect in 2004.	Particularly: Outpatient Programme which deals with most cases on a walk-in / walk-out basis (arguably the cornerstone clinic activity); Maternal and Infant Health Programme (carry-over from federal administration); and Nutrition (i.e., breastfeeding) Programme; CPS relieved the clinics of transport responsibilities.
1982-88 Programme consolidated	Expansion of the Community Health Representatives (CHR) programme which had started under MSB administration.	CHRs continue to perform a variety of nurse-assistant functions including: translation, administrative assistance, and health counselling. Today the CHRs have a higher level of medical competence and have their own responsibilities (especially in prevention) in addition to assisting nurses.
Est. 1983	Creation of a second (Inland) Cree CLSC in Mistissini.	In 1982 Region 10a ceased being the CLSC designated to serve the inland Cree communities. However, Chisasibi was too remote to manage the inland clinics with their special problems. Access to hospital support was another factor behind creating a second (and still somewhat unofficial) Cree CLSC.
1983/84 Programme Introduced	Construction of staff housing including transit facilities	Major housing projects let the CBHSSJB significantly expand its services. Henceforth the special Nordic activity of allocating and maintaining housing became a major administrative burden.
1983-86 Programme Introduced	In some communities local Co-ordinators replace nurses in local management of auxiliary services.	Head nurses were formerly responsible for all local supervision including that of the maintenance staff. Local co-ordinators now managed operations and maintenance, allocated accommodation, and liaised with the local community.
1984 Programme Introduced	Introduction of pre-hospital services.	The first ambulances were received. Gradually all of the communities would acquire an ambulance although the number of trained ambulance attendants seems never to have exceeded three.
1984 Programme Introduced	Seven beds in Chisasibi Hospital are designated a Reception Centre for the Aged	This 7-bed module for aged in loss of autonomy was created in lieu of building a separate facility. The module reduced the number of acute care beds in the region to 25 and then to 22.
1984 Built	New Mistissini clinic.	Included the only pharmacy and dental clinic outside of Chisasibi.
1984 Programme Introduced	Re-introduction of preventative dental health measures.	Urgent efforts were made to recruit a dental hygienist when a study showed poor dental health among Cree children. A preventative capacity was slowly built up to replace the vacuum created when MSB's regional supports were withdrawn.
1984 Programme Realignment	First Regional Strategic Plan.	Part of a Cree-SAGMAI-MAS accord to expand and consolidate operations towards provincial standards. However, successive resignations of senior management in 1984 (mainly due to inadequate housing) precipitated management difficulties and extended the implementation of the 3-year plan to over 5 years.
1982-84 Programme Introduced	Bush Kit Programme is fully established (approx. date).	Former federal programme that was not fully implemented until 1984. Consists of a pool of medical kits, a radio to contact a nurse for assistance, and first aid training for holders of bush kits.

1984 Event	Cree-Naskapi Act lets Cree bands pass potentially robust regulations for local public health and sanitation	This potentially overlapped provincial Public Health legislation and made the delivery responsibilities of the CBHSSJB/DSC less clear. By 1986 an administrative understanding on the division of responsibilities was reached but service gaps emerged.
1986-96 Duration	10-year Cree-Quebec Mercury Programme (Agreement signed in November 1986) supported environmental, health services, and corrective measures.	The CBHSSJB had responsibility for the health services components: ascertain and monitor human dosages; evaluate and ascertain the toxic effects on Crees, particularly on pregnant Cree women; and determine and carry out measures to prevent or reduce human contamination and its effects. Today there is no Mercury Programme in the CBHSSJB although a follow-up Mercury Agreement was signed in 2001.
1987 Programmes Consolidated	The basic services set out in the 1972 provincial reforms (including social services) are now substantially established in the Cree Region, and change little over the next 15 years.	By 1987 the CBHSSJB had major Nordic support functions with no southern counterpart; e.g.: network of staff housing units; Reservations Service for personnel transports; allocation and maintenance system for staff housing and capital facilities; Patient Services unit oriented towards transporting patients out of the region for care; pharmacy system (pharmacies in Chisasibi and Mistissini, and dispensaries elsewhere); and a growing Dental Department. The ratio of administrative to health to social services costs reached 7:6:2, which remains much the same in 2004. The budget from the MAS grew from \$9M in 1982 to \$15M in 1987. Much was for expansion of social services, but more correctly it was for establishment of social services. The funds allocated by the MAS towards social services were \$880K in 1982 and \$2M in 1987.
1990 Event	MAS releases a Non-Insured Health Benefits (NIHB) policy regarding JBNQA beneficiaries, which was rejected by the CBHSSJB.	The NIHB Programme reflected a realisation that “free” NIHB was a JBNQA right, but the guidelines set an entitlement at a level similar to Aide sociale. The CBHSSJB continued using federal NIHB norms. The gap between what was delivered and what was funded grew over the next decade until core programmes were cannibalised by over \$4M in order to maintain NIHB.
1991 Event	Bill 120 signals a major statutory reform.	This was a response to the fiscal shock caused by reductions in federal transfer payments. A decade of fiscal restraint began.
1991 Programme Introduced	Haemodialysis Programme at Chisasibi Hospital	Initially one machine with 3 patients. Never expanded beyond a local service due to lack of patient housing. Now (2004) it has 6 machines and 10 patients, and Chibougamau Hospital provides non-Chisasibi Cree patients with dialysis.
1994 Event	CBHSSJB rejects Bill 120 as being inconsistent with s. 14 of the JBNQA.	The Board decided to remain within the legal framework of S-5 (in effect, the Cree Health Act) rather than have the new legislation apply. In 2004 it is the only board organised under the old legislation.
1994 Event	Ouje-Bougoumou clinic opens and CBHSSJB assumes responsibility for the local population.	This community was constructed on one square mile of provincial (not federal) land in an effort to resolve an entitlement matter that remained unsettled in 1975. The Board's funding allocation was slightly increased, but the CBHSSJB also took over NIHB delivery with no increase in NIHB funding.
1995 Programme Consolidated	Full assumption of all patient transportation responsibilities.	The MGH lost responsibility for patient transportation patients to and from Montreal but kept responsibility for Public Health. The CBHSSJB soon established its own Montreal CPS office.
1997-2001 Programme Duration	Federal Aboriginal Diabetes Strategy funding supports creation of a Cree Diabetes Programme.	The Cree Diabetes Programme was an accounting entity and its modest resources were distributed amongst stakeholders. No programme manager although a co-ordinator and some diabetes educators were later hired. A Cree Diabetes Registry was created in 1997. Replaced by a much larger Diabetes Programme in 2001.
2000 Programme Introduced	First reception centre in the region (Mistissini, 15 beds).	Due to various problems including inappropriate architecture and unsatisfactory planning, this centre has had two management crises, several fires, and questions are being asked over its architectural suitability. The CBHSSJB may construct a smaller, less institutional reception centre and use the new complex for other social services purposes.
1999 Event	Special General Assembly on Cree Health and Social Services.	Resulted in a Cree national vision for health and healing, which factored into subsequent initiatives of the CBHSSJB including its Strategic Regional Plan exercise during 2002/03.

2001 Situation	Reliance on Chibougamau Hospital, especially by Cree inland communities, reaches a peak after two decades of growth	In 1987 Chibougamau assumed a main role in laboratory services. In 1990 it received recurrent funding for services to Crees. In 1995 the CBHSSJB contracted with Chibougamau to clarify billing for services including: cafeteria, infectious laboratory work, emergency services, and medical imagery. In 2001 Chibougamau opened a specially funded haemodialysis unit whose main clientele is Cree.
2000 Programme Introduced	Federal Home Care Programme.	New federal Aboriginal programme that at first provided money to develop a regional homecare plan. In 2002 it began funding home care workers in each community. While not meeting all the needs, it significantly increased access to this service.
2001 Programme Consolidated	NIHB Programme (Cree/MSSSQ agreement) establishes 100% cost-recovery, using federal NIHB norms, of a quarter of the CBHSSJB's expenditures.	Prescription drugs; Over-The-Counter (OTC) drugs, and proprietary medicines; medical supplies; excepting ambulance, all transportation for health reasons including escorts, interpreters, lodging; vision care (e.g., eyeglasses); dental care; hearing aids; short-term emergency mental health services (new to Cree Region) - access to emergency counselling, excepting addictions and marital counselling. Five staff hired to administer the new programme. \$4M recurrent cash for investment in core services. 100% cost-recovery eliminates practice of cannibalising core services to cover NIHB shortfalls.
2001-02 Duration	Physician supply crisis causes emergency plan to take effect, with Hospital and some clinics reduced to essential services only.	By July, 1.5 FTEs of 13 FTE resident doctors remained with none at Chisasibi. The Board declared a "Public health crisis" and focused on basic services by: (a) using fly-in replacement doctors who often came for 2-3 weeks; (b) sending more patients out for of the region; and (c) more diagnosis and treatment by nurses. The supply has improved but the obstetrics ward remains closed.
2001-02 Programme Introduced	Creation and implementation of a Cree Public Health Department (agreement on funding reached in 2001, agreement on legislative amendment reached in 2002).	A Cree/MSSSQ working group noted disproportionate public health threats and inadequate resources. The MSSSQ reacted with \$1.2M in recurrent new funding for seven Public Health functions. Long-distance delivery from Montreal would be replaced by a Cree Public Health Department based in Chisasibi. It was necessary to negotiate an amendment to the "old law" (S-5) to permit the CBHSSJB "ownership" of a Public Health department.
2001 Programme Consolidated	Cree/MSSSQ agreement on diabetes supports creation of a coherent and substantial Cree Diabetes Programme.	\$2.2M in recurrent new money, to augment other funding, towards a new Diabetes assigned fund totalling \$2,686,000 for diabetes. About a third is currently (2004) directed towards the Public Health aspects of diabetes (i.e., surveillance, monitoring, promotion, prevention, and research) and is administered through by Public Health. The rest is distributed among the various units who deal with diabetes treatment, excepting the haemodialysis service and patient transportation.
2002 Event	Crees ratify the <i>Paix des Braves</i> Agreement-in-Principle (February).	This Agreement established an improved climate for Section 14 negotiations by suspending, until 31 March 2005, litigation respecting health and social services dating back as far as 1980.
2002 Event	Elevated health and social services negotiations begin.	Elevated negotiations begin with five objectives: (a) multi-year formula funding rules for the CBHSSJB; (b) modernised financial administration; (c) multi-year capital investment plan; (d) longer-term Social Services process dealing with issues like youth justice; and (e) resolution of court claims.
2002 Built	New Waswanipi clinic.	Has a light surgical station so the local GP, and visiting specialists, can perform procedures that otherwise require out-transport. However, transports actually increase.
2002 Programme Realignment	Chisasibi Hospital is further re-oriented towards clinic rather than hospital services.	The never-used surgical ward was demolished to make room for office space; a physiotherapy room was installed; one of two nursing stations became a computer room. Of 32 beds originally: 5 became haemodialysis space or office space; 27 remain with half the rooms (9 beds) occupied by chronic patients for whom other accommodation cannot be found; 3 beds for rotating respite care patients; 2 beds for obstetrics (births are no longer performed, these are patients with pre-natal or post-natal complications who need monitoring and possibly transport); 5 beds for low-risk paediatrics; and 8 beds for acute cases such as infections.
2003 Event	Negotiation of 100 staff housing	This facilitates the first major expansion of services in 20 years. The

	allows a major expansion of services.	agreement includes a higher building standard and a realistic unit cost that considers the elevated higher Nordic construction factors.
2003 Programme Realignment	Ten-year Hospital Services Reorganisation Plan seeks to reverse the hospital downgrades of 2002.	The CBHSSJB adopts a Ministry-supported plan to make Chisasibi Hospital fully functional, to make more hospital services available in the region (i.e., reduce reliance on external facilities), and to establish new partnerships with external hospitals.
2003 Programme Realignment	Five-year Strategic Regional Plan (SRP).	Much more ambitious than the SRP of 20 years earlier. Major improvements in services and capital facilities are to be funded by the MSSSQ in connection with an agreement involving cessation of litigation that goes back to 1980.
2003 Event	Reports of caseload impacts at Nemaska Clinic in connection with hydro development	The possibility of increased caseloads at Nemaska clinic, and socio-economic and demographic changes, will prompt a re-examination of clinic augmentation priorities under the SRP.
2004 Programme Introduced	Multi-services day centres built during 2002-2004, introducing services for elderly and disabled clientele which had been absent, and relieving the clinics of much of the high and growing caseload burden	Promotion and prevention; rehabilitation services (including physical and cognitive development / restoration, and community and social integration); general support and psychological support (including day relief services and support to caregiving families); specialised services (therapies, adaptive devices, visual impairment); health and general well-being services (e.g., fitness and health promotion for the disabled); Basic health services (day-emergency nursing, Rx administration and monitoring); Occupational services (organised and supported cultural and leisure activities); nutrition services (lunch, meal preparation stimulation).
2004	Implementation of SRP	Beginning of a 5-year implementation process where objectives are periodically re-evaluated as circumstances change.

## Appendix C- Health Services Facilities, 1930-2004

(Listed geographically north-to-south)

Facility / Office	Dates	Remarks
Whapmagoostui Clinics	Federal 1962 Provincial ca. 1970 Replaced by one clinic 1995	1962 federal GWR Nursing Station transferred to Inuit under JBNQA. A provincial nursing station existed in 1975 and was transferred to the CBHSSJB. A build date of ca. 1970 is suspected. In 1995 the CBHSSJB collaborated with Inuit and built the present building to replace earlier clinics. This has an Inuit and a Cree section and the doctor is provided by the CBHSSJB.
Fort George Mission Hospitals	1930 1950	1930 Catholic Mission Hospital on Fort George Island. First government subsidies 1936. Replaced in 1950 by 2-storey, fully-functional Hospital Sainte-Thérèse de l'Enfant-Jesus.
Chashasipich Hospital	1970	Transformation of the former hospital into a provincial public facility. Significant structural improvements were made at this time.
Fort George / Chisasibi clinic	1942 Replaced 1981	Federal health centre on Island (1942) closed when clinic in Chisasibi Hospital Centre opened. The 1942 health centre took over most Native clinic functions from the 1930 Fort George mission hospital.
Chisasibi Hospital	1981	Clinic is situated in the hospital and run as a unit
Chisasibi Social Services Office	1979	First in hospital, then rented space, then trailers (2001).
Chisasibi Weesapou Group home	1985	First group home in the region. Opened in 1985 in the old clinic. The new building for Weesapou Group Home was built in 1991.
Chisasibi Women's Shelter	mid-90s	Opened as a band initiative for local clientele but the CBHSSJB contributed financially. The building is now used by CBHSSJB as a supervised home for the mentally challenged. This is run as a supervised flat.
Chisasibi Youth Drop-in Centre	1982 Closed 1983	Run by Cree Social Services. Closed when funding ran out.
Wemindji Clinic	1960	Original Nursing Station building remains in use.
Eastmain Clinic	1963 Replaced 1973 Replaced 1984	1973 Health Centre which replaced a Nursing Station. Present clinic dates from 1984.
Waskaganish Clinic	1950 Replaced 1971 Replaced 1999	1971 Nursing Station replaced earlier Nursing Station. building. Present clinic dates from 1999.
Nemaska Clinic	1981	Built simultaneous with construction of community. No predecessor or successor.
Ouje-Bougoumou Clinic	1994	Built simultaneous with construction of community. No predecessor or successor.
Mistissini Clinic	1954 Replaced 1962 Replaced 1984	The 1962 replacement Health Centre is today the present green administration building, built on the original (1954) Nursing Station site. The present brick clinic, on a new site, dates from 1984.
Mistissini CLSC	1984	The CLSC community workers and Youth Protection workers worked out of the present brick clinic from 1984 until they moved into the basement of the green administration building in 1986. A trailer was attached to the CLSC trailer to accommodate the Home and Community Care Programme in 2002. Another trailer was set up next to the brick clinic for the office space for the Diabetes Initiative and

		Public Health.
Mistissini Reception Centre	2000	Major institutional secure facility of modern construction. Before this, the CBHSSJB used the services of l'Etape in Val d' Or. From 1995 to 2000, the clients of the earlier Reception Centre moved from a private home used as a centre and then exchanged buildings with the Upaahchikush Group Home until the construction of the new Reception Centre.
Waswanipi Clinic	See Remarks Replaced 1980 Replaced 2002	Present 1980 clinic was built simultaneous with the new community. It seems to have replaced two minor federal dispensaries nearby at Matagami and Miquelon. These might not have had a full-time nurse. The present building dates from 2002.
Chibougamau Upaahchikush Group Home	1989 built	Previously there was a group home run by the CBHSSJB in Chibougamau (est. ca. 1987).
Val d' Or CBHSSJB Headquarters	1978-81	Temporary headquarters of CBHSSJB during relocation of Fort George to Chisasibi.
CPS Offices	1982 -	Chisasibi and Val d' Or (1982 approx.); Chibougamau (early 1980s), Montreal (1994).
Montreal Public Health Office	1994 1998	Public Health Module for the Cree Region of James Bay technically under MGH moved to CBHSSJB offices with CPS. In January 1998, the offices moved to the Cree building on Duke Street.
Multi-Service Day Centres	2004	Nine day services centres, for elderly & disabled clientele, one per Cree community. Constructed 2002 to 2004.

## Bibliography for Volumes 1 and 2

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### Sources - General

#### Agreements

- James Bay and Northern Quebec Agreement. (1975).
- Complimentary Agreements to the James Bay and Northern Quebec Agreement.
- Cree-SAGMAI-MAS accord (1984).
- Mercury Agreement (1986, 2001).
- Agreement Concerning a New Relationship Between le Gouvernement du Québec and the Crees of Québec (2001).
- Service agreements pertaining to the CBHSSJB and its predecessors (including service delivery contracts).
- Agreement Concerning a New Relationship between le Gouvernement du Québec and the Crees of Quebec.

#### Federal and Provincial Records

- Orders-in-council, federal and Quebec.
- Spending Authorities of the Treasury Board of Canada (1956 to 1972).
- Records of the courts, especially Quebec Superior Court.
- Published health reports from government sources such as the Medical Services Branch of Health Canada, the *Institut national de santé publique du Québec* (INSPQ), and the *Ministère de la santé et des services sociaux du Québec* (MSSSQ).
- Policy and Procedure Manuals of Indian Affairs Branch (1954-1960).
- Policy and Procedure Manuals of the MAS and the MSSSQ, 1975 to 2003.
- Records relating to Indian Affairs, National Archives records groups RG10 and RG11.
- Records relating to the Department of National Health and Welfare, National Archives records group RG29.
- Records relating to the Northern Administration, National Archives records group RG85.

#### Cree Records

- Published and unpublished reports and working papers prepared for the CBHSSJB.
- Programme and administrative files from the CBHSSJB.
- Minutes of the Board of Directors of the CBHSSJB, most years 1978-2003.
- Programme evaluations and service utilisation studies.
- Periodic reports, including annual reports of the CBHSSJB and government departments.
- Records of the CBHSSJB and CRA; including: incoming and outgoing correspondence, court litigation documents, reports of meetings, internal reports on specific subjects.
- Records of Cree Nation Annual General Assembly meetings.
- Functional plans and architectural specifications for CBHSSJB facilities, 1982-2002.
- Reports of Activities, James Bay Mercury Committee, 1986-1997.

## **Annual Reports**

- Auditor General of Canada.
- Public Accounts of Canada.
- Indian Affairs.
- Department of the Interior.
- Health & Welfare (Headquarters and Quebec Region).
- Mines and Resources and its subsequent incarnations.
- MAS (later MSSSQ).
- CBHSSJB.
- Cree Regional Authority.
- Community Health Department of Montreal General Hospital, particularly the annual and biennial Report of the Northern Quebec Module of the Montreal General Hospital Public Health Unit for years 1981 to 1997.

## **Parliamentary Records**

- Hansard (1900-1960).
- Minutes, Proceedings & Evidence of House of Commons Committees. The principal ones are: Indian Affairs Committee, 1946-49; Joint Committee into Pensions, 1950; and Indian Affairs Committee 1980-1983.
- Debates of the National Assembly of Quebec (1960-1995).

## **Legislation and Regulations**

- Consolidated Statutes of Canada.
- Canada Gazette.
- Consolidated Statutes of Quebec.

## **Miscellaneous Sources**

- Publications relating to impact assessment of the James Bay, Great Whale, and EM-1 Hydro projects.
- Data from MSSSQ databanks (e.g., mortality data).
- Service consumption data (e.g., MED-ECHO hospitalisation files).
- Notifiable disease data, and data such as in the tumour registry and the Cree Diabetes Registry.
- Data collected by the CBHSSJB for purposes of programme management and for mandatory reporting to other agencies.
- Survey data particularly from the report of the Santé-Québec survey, from Statistics Canada's 1991 APS, and from the 2001 APS.
- Communications with CBHSSJB personnel.
- Communications with CRA personnel.

## References

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- Abbott, F. H., 1915. *The Administration of Indian Affairs in Canada: Report of an Investigation Made in 1915 Under the Direction of the Board of Indian Commissioners*. Washington: U.S. Government Printing Office.
- Acheson, E.D., 1990. Public health: Edwin Chadwick and the world we live in. *Lancet*, 336(8729), pp. 1482-1485.
- Adelson, N., 1992. Being Alive Well: Indigenous Belief as Opposition Among the Whapmagoostui Cree. PhD. thesis, McGill University.
- Adger W.N., Kelly P.M., Winkels A, et al., 2002. Migration, remittances, livelihood trajectories, and social resilience. *Ambio*, 31(4), pp. 358-366.
- Alaska Highway Pipeline Panel, 1979. *Initial impact Assessment: Dempster Corridor*.
- Aldelson, N., 2000. *Being Alive Well: Health and Politics of the Cree Well-being*. Toronto: University of Toronto Press.
- Alicide, E., 1983. *A Picture of Facilities Surveyed in the Villages of the Cree Indian Community (Region 10b)*. Montreal: Northern Quebec Module, Department of Community Health, Montreal General Hospital.
- Allaire, A. and C Lavallé, 1986. *Dossier socio-sanitaire 1985-86: les Cris de la région 10b*. Montreal: Département de santé communautaire, Hôpital Général de Montréal.
- Allan, R.S., 1971. *A History of the British Indian Department in North America, 1755-1830. National Historic Sites Manuscript Report 109*. Ottawa: Department of Indian Affairs and Northern Development.
- Anderson, J.W., 1961. *A Fur Trader's Story*. Toronto: Ryerson Press.
- Armitage, A., 1990. Work and Welfare, in: *Ideology, Development and Social Welfare*. Kirwin, B. (ed.). Toronto: Canadian Scholar's Press. pp. 52-60.
- Atkinson, H.B. and G. Magonet (eds.), 1990. *The James Bay Experience: A Guide for Professionals Among the Crees of Northern Quebec*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- ATSDR, 1999. *Toxicological Profile for Mercury (Update)*. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, United States Department of Health & Human Services.
- Auger, N., Kofman, O., Kosatsky, T. and B. Armstrong, 2002. Low-level methyl mercury exposure as a risk factor for neurologic abnormalities in adults. *Unpublished (as of April/2003)*.
- Awashsish, A.M. and J. Bobbish, 1982. *Report on the Concerns and Recommendations of the Local Health and Social Services Committees, Subsequent to Facilitation Sessions Which Were Held in Each Cree Community*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- B.C. Hydro, 1981. *Review of Revelstoke Project Impacts on Social and Community Services and Agencies*. Vancouver: British Columbia Hydro.
- B.P.R., G-C., 2002. *Survey of Water and Wastewater Infrastructures, M37-01-35*. Quebec: Cree Regional Authority.
- Bachman, R., 1991. An analysis of American Indian homicide: A test of social disorganization and economic deprivation at the reservation county level. *Journal of Research in Crime & Delinquency*, Vol 28(4), November, pp. 456-471.
- Bachrach K.M. and A.J. Zautra, 1985. Coping with a community stressor: the threat of a hazardous waste facility. *J Health Soc Behav*, 26(2), pp. 127-141.
- Barbeau, A., Nantel, A. and F. Dorlot, 1976. *Etude sur les effets médicaux et toxicologiques du mercure organique dans le nord-ouest québécois. (76-E-358)*. Montreal: Ministère des Affaires sociales du Québec.
- Barger, W., 1977. Culture change and psychosocial adjustment. *American Ethnologist*, 43(1), pp. 471-495.

- Baxter, W., Ross, W., and H. Spaling, 2001. Improving the Practice of Cumulative Effects Assessment in Canada. *Project Impact and Assessment*, 19(4), pp. 253-262.
- Bay Cree 1987-1989*. Winnipeg: University of Manitoba Press.
- B.C. Hydro, 1981. *Review of Revelstoke Project Impacts on Social and Community Services and Agencies*. Vancouver: British Columbia Hydro.
- Bearskin, S and C. Dumont, 1991. The Cree Board of Health and Social Services of James Bay: The First Twelve Years, 1978-1990. In: *Circumpolar Health 90*, Postl, B.D. et al. (eds). Winnipeg: University of Manitoba Press, pp. 123-125.
- Beaulieu, D., 1984. *Les Cris et les Naskapis du Québec: leur milieu socio-économique*. Québec: Ministère de l'industrie, du commerce et du tourisme.
- Bennett, E., 1992. Community-based economic development: A strategy for primary prevention. *Canadian Journal of Community Mental Health*, Vol 11(2), pp. 11-33.
- Berry, J.W., Wintrob, R.M., Sindell, P.S. and T. Mawhinney, 1982. Culture Change and Psychological Adaptations Among the James Bay Cree. In: *Circumpolar Health 81*.
- Berger, T., 1983. Energy resource development and human values. *Canadian Journal of Community Mental Health*, 1983 Winter Suppl 1, pp. 21-31.
- Berkes, F., 1981. Some environmental and social impacts of the James Bay hydro-electric project. *Journal of Environmental Management*, 12, pp. 157-172.
- Berkes, F., 1988. The intrinsic difficulty of predicting impacts: Lessons from the James Bay hydro project. *Environmental Impact Assessment Review*, 8, pp. 201-220.
- Bernard, L., and C. Lavallée, 1993. *Eating Habits of Cree Schoolchildren: A Pilot Study*. Montreal: Community Health Department, Montreal General Hospital.
- Bernèche, F., 1980. *Mortalité et morbidité hospitalière de la population du territoire cri, 1975-1977*. Montreal: Département de santé communautaire, Hôpital général de Montréal, October 1980.
- Berrouard, D., 1980. *Rapport d' Inspection: Situation d'épidémie aux villages de Fort-Rupert et Nemaska*. Report prepared for Direction Regionale du Nouveau-Quebec, Ministère de l' Environnement.
- Beuter, A., and R. Edwards, 1998. Tremor in Cree subjects exposed to methylmercury: A preliminary study. *Neurotoxicology and Teratology*, 20(6), pp. 581-589.
- Beuter, A. and R. Edwards, 1999a. Analysis of rapid alternating movements in Cree subjects exposed to methylmercury and in subjects with neurological deficits. *Environ Res*, 80(1), pp. 64-79.
- Beuter, A. and R. Edwards, 1999b. Quantitative analysis of rapid pointing movements in Cree subjects exposed to mercury and in subjects with neurological deficits. *Environ Res*, 80(1), pp. 50-63.
- Bielawski, E., 2003. *Rogue Diamonds: The Rush for Northern Riches on Dene Lands*. Vancouver: Douglas and MacIntyre.
- Bjerre L. and J. Pickering, 1994. *Use of Outpatient Health Services in the Cree Communities of Region 18 (April 1992 to March 1993)*. Montreal: Public Health Module for the Cree Region, Montreal General Hospital.
- Black, D. N., 1985. *Neurological disease in Chisasibi*. Montreal: Public Health Module for the Cree Region, Montreal General Hospital.
- Bobbish-Rondeau, Emily et al., 1996. *The Cree Experience of Diabetes : A Qualitative Study of the Impact of Diabetes among the James Bay Cree*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Bobet , E., 2003a. *Injuries in Eeyou Istchee: A Description Based on the Statistics*. Report prepared for the Public Health Department, Cree Board of Health and Social Services of James Bay, April 2003.
- Bobet, E., 2003b. *Teenage Births in Eeyou Istchee, 1996-2002: An Analysis of Data from the Births Registry*. Report prepared for the Cree Board of Health and Social Services, October 2003.
- Bobet, E., 2003c. *Teenage Pregnancy: Literature Review and Scan for Programs in First Nation Communities*. Report prepared for the Cree Board of Health and Social Services of James Bay, October 2003.

- Bolt, M., Long, J.A., and L. Little Bear, 1986. *Indian Provincial Government Relationships: Proceedings of a Conference on Indian-Provincial Government Relationships*. Lethbridge: University of Lethbridge, 22-25 April 1986.
- Boothroyd, L., 1998. Suicidal behaviour among the Cree of James Bay: Information from the 1991 Santé Québec Health Survey and prevention strategies. *Unpublished draft, 19 August 1998*.
- Boswell, M. J, 1978. *Civilising' the Indian: Government Administration of Indians, 1876-1896*. PhD. thesis, Department of History, University of Ottawa.
- Boulet, E. and J. Gagnon, 1979. *Poste-de-la-Baleine After the James Bay and Northern Québec Agreement*. Ottawa: Environment Canada.
- Bourgeois, C-E., 1948. *The Protection of Children in the Province of Quebec*. Transl. by P.E. Marquis. Trois-Rivieres: Maurice Roy.
- Bowen, N., Bowen, G., and W. Ware, 2002. Neighborhood social disorganization, families, and the educational behavior of adolescents. *Journal of Adolescent Research*, 17(5), pp. 468-490.
- Brant, C., 1983. A response from the perspective of a Mohawk from the Bay of Quinte. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 57-58.
- Brassard P, Robinson E, and C. Dumont, 1993. Descriptive epidemiology of non-insulin-dependent diabetes mellitus in the James Bay Cree population of Quebec, Canada. *Arct Med Res*, 52, pp. 47-54.
- Brassard P, Robinson E, and C. Lavallée, 1993. Prevalence of diabetes mellitus among the James Bay Cree of Northern Quebec. *Can Med Ass J*, 149(3), pp. 303-307.
- Brassard, P., 1983. *Étude de la prévalence des bactéries entéropathogènes et des parasites intestinaux chez les Cris de la Baie James*. Montreal: Community Health Department, Montreal General Hospital, May 1983. As summarised by unstated author in: *Résumé de l'étude du DSC concernant la prévalence des parasites et des bactéries chez les Indiens cris de la Baie James (1983)*. Montreal: Department of Community Health, Montreal General Hospital.
- Brassard, P., 1991. *Diabetes in the James Bay Cree Communities of Quebec*. MSc. thesis, Department of Epidemiology and Biostatistics, McGill University.
- Brown, J., 1976. *Company Men and Native Families: Fur Trade Domestic and Social Relations in Canada's Old Northwest*. PhD. thesis, University of Chicago.
- Brown, J., 1977. Ultimate Respectability: Fur Trade Children in the Civilised World. *The Beaver*, Winter 1977, pp. 4-10; Spring 1978, pp. 48-55.
- Brown, R. Geertsen, H., and R. Krannich, 1989. Community response to rapid social change: Community satisfaction and social integration in a boomtown - A longitudinal analysis. *Rural sociology*, Vol 54, No. 4, p. 568.
- Browning C., 2002. The span of collective efficacy: Extending social disorganization theory to partner violence. *Journal of Marriage and the Family*, 2002, 64(4), pp. 833-850.
- Campbell C. and B. Williams, 1999. Beyond the biomedical and behavioural: towards an integrated approach to HIV prevention in the southern African mining industry. *Soc Sci Med*, June, 48(11), pp. 1625-1639.
- Canada, 1948. *British North America Act and its Amendments, 1867-1948*. Ottawa: Queen's Printer.
- Canada, 1955. *Northern Indians: Economical and Social Conditions*. Internal report by Indian Affairs Branch, Department of Citizenship and Immigration.
- Canada, 1958. *Review of Activities 1948-1958*. Ottawa: Indian Affairs Branch, Department of Citizenship and Immigration.
- Canada, 1960. *Mothers' Allowance Legislation in Canada - Memorandum 1, Social Security Series*. Ottawa: Research and Statistics Division, Department of National Health and Welfare.
- Canada, 1960. *Quebec Region Annual Report 1960*. Quebec: Medical Services Branch, Department of National Health and Welfare.
- Canada, 1964. Financing, including consideration of the scope and extent of provincial responsibilities. In: *Memoranda, Federal-Provincial Conference on Indian Affairs, 29-30 October 1964*.
- Canada, 1964. Standards of service. In: *Memoranda, Federal-Provincial Conference on Indian Affairs, 29-30 October 1964*.

- Canada, 1964. *The Administration of Indian Affairs - Prepared for the 1964 Federal Provincial Conference on Indian Affairs*. Ottawa: Indian Affairs Branch, Department of Citizenship and Immigration.
- Canada, 1974. Policy of the Federal Government Concerning Indian Health Services. Binder of associated policies from Treasury Board and Cabinet, issued by Medical Services Branch, Department of National Health and Welfare.
- Canada, 1975a. *Medical Services and You*. Ottawa: Medical Services Branch, Department of National Health and Welfare.
- Canada, 1975b. *Review of Health Services in Canada 1975*. Ottawa: Health Economics and Statistics Division, Health Programs Branch, Department of National Health and Welfare.
- Canada, 1978. *The Historical Development of the Indian Act*. Ottawa: Treaties and Historical Research Centre, P.R.E. Group, Department of Indian Affairs and Northern Development.
- Canada, 1979a. *Methyl Mercury in Canada: Exposure of Indian and Inuit Residents to Methyl Mercury in the Canadian Environment*. Ottawa: Medical Services Branch, Department of National Health and Welfare.
- Canada, 1979b. *Negotiating a Way of Life: Cree Experiences With the Administrative Structures Arising From the James Bay Agreement*. Report prepared by Ignatius E. La Rusic et al. of SSDCC Inc. for: Research Division, Policy, Research and Evaluation Group, Department of Indian Affairs and Northern Development, October 1979.
- Canada, 1979c. *Social Assistance and Related Social Development Programs of the Department of Indian Affairs*. Ottawa: Department of Indian Affairs and Northern Development, January 1979.
- Canada, 1980. Program Forecast Procedural Guidelines. Internal document setting out how Regions and Headquarters were to determine 1980-81 budget forecasts. Ottawa: Department of Indian Affairs and Northern Development.
- Canada, 1980. *Services de Santé des Indiens - Document de Référence*. Ottawa: Politiques, planification at évaluation, Direction générale des services médicaux, Department of National Health and Welfare.
- Canada, 1982. *James Bay and Northern Quebec Agreement Implementation Review*. Ottawa: Department of Indian Affairs and Northern Development.
- Canada, 1985. *Introduction to Medical Services Branch*. Ottawa: Medical Services Branch, Department of National Health and Welfare.
- Canada, 1988. *JBNQA Comparative Analysis of Conditions and Expenditures in Native Communities - Interim Report*. Report prepared for Department of Indian Affairs and Northern Development by Price Waterhouse, July 1988.
- Canada, 1990. *Proceedings of Thematic Consultation Meetings on Aboriginal Mental Health, 1989-90*. Ottawa: Mental Health Advisory Services, Indian and Northern Health Services, Medical Services Branch, Department of National Health and Welfare.
- Canada, 1993. *A Historical Survey of Indian-Government Relations, 1940-1970*. Report prepared for DIAND's Royal Commission Relations Office by John F. Leslie, DIAND Claims and Historical Research Centre, December 1993.
- Canada, 1996a. *Trends in First Nations Mortality, 1979-1993*. Ottawa: First Nations and Inuit Health Branch, Health Canada.
- Canada, 1996b. *Report of the Royal Commission on Aboriginal Peoples Vol. 1: Looking Forward, Looking Back*. Ottawa: Canada Communications Group Publishing.
- Canada, 1996c. *Report of the Royal Commission on Aboriginal Peoples Vol. 3: Gathering Strength*. Ottawa: Canada Communications Group Publishing.
- Canada, 1999. *First Nations and Inuit Regional Health Survey National Report 1999*. Ottawa: First Nations and Inuit Health, Health and Welfare Canada.
- Canada. 1999a. *Toward a Healthy Future: Second Report on the Health of Canadians*. Federal, Provincial and Territorial Advisory Committee on Population Health. Ottawa: Minister of Health and Welfare, Canada.

- Canada, 2000. *Comparison of Social Conditions 1991 and 1996: Registered Indians, Registered Indians Living On-Reserve and the Total Population of Canada*. Cat. R32-163-2000. Ottawa: Minister of Public Works, 2000. [http://www.ainc-inac.gc.ca/pr/sts/hac/socl\\_e.pdf](http://www.ainc-inac.gc.ca/pr/sts/hac/socl_e.pdf).
- Canada, 2002a. *Basic Departmental Data 2001*. Ottawa: First Nations Statistical Unit, Department of Indian Affairs and Northern Development.
- Canada, 2002b. *Diabetes in Canada*. Ottawa: Health Canada.
- Canada, 2003a. *A Statistical Profile on the Health of First Nations in Canada*. Ottawa: First Nations and Inuit Health Branch, Health Canada.
- Canada, 2003b. *Social Capital as a Health Determinant: How is it Defined? Health Policy Research Working Paper 02-07*. Ottawa: Health Canada.
- Canada. 2005. Health determinants. <http://www.hc-sc.gc.ca/hppb/phdd/determinants/index.html#determinants>.
- Canadian Health Services Research Foundation, 2004. *Listening for Direction II: A National Consultation on Health Services and Policy Issues (Draft Report)*.
- Canadian Population Health Initiative (CIHI), 2003. Measuring Social Capital: A Guide for First Nations Communities. [http://secure.cihi.ca/cihiweb/en/downloads/MeasuringSocialCapital2003\\_e.pdf](http://secure.cihi.ca/cihiweb/en/downloads/MeasuringSocialCapital2003_e.pdf).
- Cantillon, D., Davidson, W. and J. Schweitzer, 2003. Measuring community social organization: sense of community as a mediator in social disorganization theory. *Journal of Criminal Justice*, 31(4), pp. 321-339.
- Carlin, R., 2002. *Notifiable Disease Report for 2001 for Eeyou Istchee (Region 18)*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Carlin, R., 2003. *Review of Tuberculosis Control and BCG Vaccine Use in the Cree Territory of James Bay (Draft)*. Montreal: Public Health Department, Cree Board of Health and Social Services of James Bay.
- Cassidy, H.M., 1945. *Public Health and Welfare Reorganization in Canada*. Toronto: Ryerson Press.
- Chandler, M. Lalonde, C., Sokol, B and D. Hallett, 2003. Personal persistence, identity development, and suicide: A study of Native and non-Native North American adolescents. *Monographs of the Society for Research in Child Development*, (2), pp. vii-130.
- Charest, P., 1980. Les barrages hydro-électrique en territoire montagnais et leurs effets sur le communautés amérindiennes. *Recherches amérindiennes au Québec*, 9, pp. 323-337.
- Chavalier S., R. Choinière, M. Ferland, M. Pageau, and Y. Sauvageau, 1995. *Indicateurs socio-sanitaire: le Québec et ses régions*. Québec: Ministère des affaires santé et des sociaux du Québec, Collection Analyse at Surveillance, Direction Générale de la santé publique, May 1997.
- Colomeda, L. and E. Wenzel, 2000. Medicine Keepers: Issues in Indigenous Health. *Critical Public Health*, 10(2), 2000, pp. 243-256.
- Corporation d'hébergement du Québec, 2003. *Inventaire et évaluation technique des immeubles de la région 18*. February 2003.
- Couch, W., 2002. Strategic resolution of policy, environmental and socio-economic impacts in Canadian Artic diamond mining: BHP's NWT diamond project. *Impact Assessment and Project Appraisal*, 20(4), pp. 265-278.
- Courteau, J-P., 1989. *Mortality among the James Bay Cree of northern Quebec: 1982-1986*. MSc. thesis, McGill University.
- Cree Board of Health and Social Services of James Bay and the Cree School Board, 1998. Cree School Board Cree Health Board Protocol: Partnership in Health. Unpublished working agreement. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree Board of Health and Social Services of James Bay, 1997. Interregional Equity Draft Version, May 1997. Draft internal document. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree Board of Health and Social Services of James Bay, 1999. *General Assembly on Health and Social Services - Oujé-Bougoumou*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree Board of Health and Social Services of James Bay, 2002. *Needs Assessment of the Elderly and Disabled in Eeyou Istchee*. Chisasibi: Cree Board of Health and Social Services of James Bay, January 2002.

- Cree Board of Health and Social Services of James Bay, 2003a. Implementation Plan for the Strategic Regional Plan. Internal document. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree Board of Health and Social Services of James Bay, 2003b. *Strategic Regional Plan to Improve Health and Social Services*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree Board of Health and Social Services of James Bay, 2003c. *Ten-Year Plan for the Reorganisation of Hospital Services in Eeyou Istchee*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree Board of Health and Social Services of James Bay, n.d. *Medicine and the Cree of James Bay*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Cree School Board, 1998. *Eeyou Control of Eeyou Chiskotamachaoun: Milestones of the Cree School Board*. Mistissini: Cree School Board.
- Crowe, K.J., 1991. *A History of the Aboriginal Peoples of Northern Canada*. Montreal and Kingston: McGill - Queen's University Press.
- Cruikshank, J., 1977. *Alaska Highway Construction: a Preliminary Evaluation of Social Impacts on Yukon Indians, Yukon Case Studies, Alaska Highway Construction: Anvil Mine Development*. University of Canada North (Yukon), Research Division.
- Cunningham, A., 1984. *Socio-economic Impact Assessment, Development Theory and Northern Native Communities: A Theoretical Approach, UBC Planning Papers Studies in Northern Development SND#4*. Vancouver: School of Community and Regional Planning, University of British Columbia.
- Currie, Coopers & Lybrand, 1984. *Final Report to the Project Compensation Review Board: Strategy to Cope with the Adverse Effects of Electricity Generation on Northern Manitoba, Winnipeg*.
- D.P.A. Group Inc., 1986. *Northern Employment and Training in the Oil and Gas Industry*.
- Dabbs, A and M. Bateson, 2002. The corporate impact of addressing social issues: a financial case study of a project in Peru. *Environ Monit Assess*, May, 76(1), pp. 135-156.
- Dafoe, J.W., 1931. *Clifford Sifton in Relation to his Times*. Toronto: MacMillan Co. Ltd.
- Damestoy, N., 1994. *Injury Mortality Among the Cree of Northern Quebec, 1982-1991*. MSc. thesis, McGill University.
- Daveluy C. and L. Bertrand, 1998. *L'alimentation des Cris: Un état de situation. Rapport de l'Enquête Santé Québec auprès des Cris de la Baie James. Consommation alimentaire et apports nutritionnels*. Report prepared for Santé Québec. Montréal. Ministère de la Santé et des Services Sociaux.
- Daveluy, C., Lavallée, C., Clarkson, M. and E Robinson (eds), 1994. *A Health Profile of the Cree: Report of the Santé Québec Health Survey of the James Bay Cree, 1991*. Montreal: Santé Québec.
- Davidson, P. W., Myers, G. J., Cox, C. et al., 1995. Longitudinal neurodevelopmental study of Seychellois children following in utero exposure to methylmercury from maternal fish ingestion: outcomes at 19 and 29 months. *Neurotoxicology*, 16(4), pp. 677-688.
- Davidson, P.W., Myers, G. J., Cox, C. and C. Axtell, 1998. Effects of prenatal and postnatal methylmercury exposure from fish consumption on neurodevelopment. *Journal of the American Medical Association*, 280(8), pp. 701-707.
- Delaney, R., Brownlee, K. and M. Sellick, 2001. Surviving globalization: Empowering rural and remote communities in Canada's Provincial Norths. *Rural Social Work*. December Vol 6(3), pp. 4-11.
- Dene Nation, 1986. *The Dene Gondie Study: Dene perception of the impacts of the Norman Wells Project*. Yellowknife: Dene Nation.
- Devine-Wright, P., Fleming, P. and H. Chadwick, 2001. Role of social capital an advancing regional sustainable development. *Impact Assessment and Project Appraisal*, 19(2), pp. 161-167.
- Dewailly, E. and E. Nieboer, 2003. *Exposure and Preliminary Health Assessments of the Oujé-Bougoumou Cree Population to Mine Tailings Residues*. Draft report. Québec: INSPQ-CHUQ,
- Dewailly, E., Blanchet, C., Gingras, S. et al., 2002. Cardiovascular disease risk factors and n-3 fatty acid status in the adult population of James Bay Cree." *Am J. Clin Nutr*, 76, pp. 85-92.
- Diabaldo, R., 1981. The Absurd Little Mouse: When Eskimos Became Indians. *Journal of Canadian Studies*, 16(2), pp. 34-40.
- Diabaldo, R., 1985. *The Government of Canada and the Inuit, 1900-1967*. Ottawa: Research Branch, Corporate Policy, Department of Indian Affairs and Northern Development.

- Dolbec, J., Mergler, D., Sousa Passos, et al., 2000. Methylmercury exposure affects motor performance of a riverine population of the Tapajos River, Brazilian Amazon. *Int Arch Occup Environ Health*, 73(3), pp. 195-203.
- Dumont, C. and R. Wilkins, 1984. Mercury surveillance in several Cree Indian communities in the James Bay region, Quebec. *Circumpolar Health*, 84, pp. 88-91.
- Dumont, C., Girard, M., Bellavance, F. and F. Noel, 1998. Mercury levels in the Cree population of James Bay, Quebec, from 1988 to 1993/94. [comment]. *CMAJ Canadian Medical Association Journal*, 158(11), pp. 1439-1445.
- Dumont, C., Noel, F., Girard, M. and L. Saganash, 1998. *James Bay Mercury Agreement (1986) Health Component -1987-1997 Activity Report*. Chisasibi, Quebec, Canada: Cree Board of Health and Social Services of James Bay.
- Égré, D. and P. Senécal, 2003. Social impact assessments of large dams throughout the world: lessons learned over two decades. *Impact Assessment and Project Appraisal*, 21(3), pp. 215-224.
- Ekoe J.M., Thouez J.P., Petitclerc C., Foggin P.M. and P. Ghadirian, 1990. Epidemiology of obesity in relationship to some chronic medical conditions among Inuit and Cree Indian populations in New Quebec, Canada. *Diab Res Clin Pract*, 10, pp. 17-27.
- Ellison, D., 1986. Health and welfare consequences of a public works project: The St. Lawrence Seaway and power dams. *Case Analysis*, Vol 2(2), pp. 97-124.
- England, J. and S. Albrecht, 1984. Boomtowns and social disruption. *Rural Sociology*, Summer Vol 49(2), pp. 230-246.
- English, D., 1977. Fort McMurray: A Case Study of the Effects of the Boom on the Health, Social Services and Criminal Justice System. Whitehorse: Yukon Association of Social Workers.
- Evans, J. and R. Cooperstock, 1983. Psycho-social problems of women in primary resource communities. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 59-66.
- exposure as a risk factor for neurologic abnormalities in adults. *Unpublished paper (as of April/2003)*.
- Exposure to Methyl Mercury on the Health of Individuals Living in Certain Areas of the Province of Quebec, Final Report to the Steering Committee*, n.d. Montreal: McGill University.
- Fearnside, P.M., 1999. Social Impacts of Brazil's Tucuruí Dam. *Environ Manage*, 24(4), pp.483-495.
- Fearnside, P.M., 2001. Environmental impacts of Brazil's Tucuruí Dam: unlearned lessons for hydroelectric development in Amazonia. *Environ Management*, 27(3), pp. 377-396.
- Fearnside, P.M., 2002. Avança Brasil: environmental and social consequences of Brazil's planned infrastructure in Amazonia. *Environ Manage*, 30(6), pp. 735-747.
- Feit, H., 1988. The power and the responsibility: Implementation of the wildlife and hunting provisions of the James Bay and Northern Québec Agreement. In: S. Vincent and G. Bowers (eds). James Bay and Northern Québec: 10 Years After. *Recherches amérindiennes au Québec*, pp. 74-88.
- Finnie, R., 1942. *Canada Moves North*. Toronto: MacMillan Co. Ltd.
- Flanagan, R.T., 1962. *A History of the Department of Northern Affairs and National Resources in its Various Manifestations Since 1867 with Special Reference to its Role in the Existing Northwest Territories*. Ottawa: Department of Northern Affairs and National Resources.
- Foggin, P. and H. Lauzon, 1986. *Health Status and Risk Factors: The Cree of Northern Quebec*. Montreal: Département de géographie, Université de Montréal.
- Foggin, P. M., Robinson, E., and H. Lauzon, 1988. Risk factors associated with cardiovascular disease among the Cree Indians of northern Quebec. *Arctic Medical Research*, 47 (Suppl 1), pp. 455-457.
- Fortin, P. and K. Gray-Donald, 1984. *Food habits of the Cree Indians living in Chisasibi*. (Unpublished report - no specifics provided).
- Foster, T., 1980. *Socio-Economic Review of the Beaufort Sea Drilling Program 1976-1979*. Ottawa: Department of Indian Affairs and Northern Development.
- Frenette, J., 1985. *The History of the Chibougamau Crees: An Amerindian Band Reveals its Identity*. Chibougamau: Cree Indian Centre of Chibougamau.
- Freudenberg W and R. Gramling, 1992. Community impacts of technological change: toward a longitudinal perspective. *Social Forces*, 70(4), pp. 937-955.

- Galarneau, L., 1986. Hypotheses for Development of the Chisasibi Hospital, James Bay. Internal document. Montreal: Department of Community Health, Montreal General Hospital.
- Gartrell, J.W., 1983. Rapid growth, health and well-being: A comparison of ten communities. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 107-112.
- Gaston St. Pierre and Associates Inc., 2000. *The Housing Needs of the First Nations of Quebec and Labrador*. November 2000.
- George, P., Berkes, F. and R. Preston, 1996. Envisioning cultural, ecological and economic sustainability: the Cree communities of the Hudson and James Bay lowland, Ontario. *Can Jour Econ*, Vol 29, p. 356.
- Gibson, R., 2000. Favouring the higher test: contribution to sustainability as the central criterion for review and decisions under the Canadian Environmental Assessment Act. *Journal of Environmental Law and Practice*, 10(1), pp. 39-55.
- Gibson, R., 2002. From Wreck Cove to Voisey's Bay: the evolution of federal environmental assessment in Canada. *Impact Assessment and Project Appraisal*, 20(3), pp. 151-159.
- Giesbrecht, N. and D. McKenzie, 1983. Alcohol problems and resource development in Atikokan, Ontario: Benign effects or insufficient information? *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 93-99.
- Gilmore J., 2002. *Report on Smoking in Canada, 1985-2001*. Report prepared for Statistics Canada. Catalogue 82F0077XIE. Ottawa: Statistics Canada.
- Glick, I., 1983. Resident perceptions of community well-being in a resource town. *Canadian Journal of Community Mental Health*. Winter Suppl 1, pp. 39-44.
- Godue, C., 1987. *Évaluation du service d'évacuations médicales aériennes de la région socio-sanitaire 10b*. MSc. thesis, Department of Epidemiology and Biostatistics, McGill University.
- Goldsmith, E. and N. Hildyard (eds), 1984. *The Social and Environmental Effects of Large Dams - A report to the European Ecological Action Group (ECOPORA), Vol. 1 Overview*. Camelford: Wadebridge Ecological Centre, 15-48. Vol 2: Case Studies.
- Gorman, D, Speer, P, Gruenwald, P. and E. Labouvie, 2001. Spatial dynamics of alcohol availability, neighbourhood structure and violent crime. *Journal of Studies on Alcohol*, 62(5), pp. 628-636.
- Gourdeau, E., 1973. *Notes on the social impact of Panarctic's employment policy in Arctic Bay and Pond Inlet*. Arctic Institute of North America.
- Grandjean, P., Weihe, P., White, R. F. et al., 1997. Cognitive deficit in 7-year-old children with prenatal exposure to methylmercury. *Neurotoxicol Teratol*, 19(6), pp. 417-428.
- Grauer, A.B., 1938. *Social Insurance, Part 2*. Study prepared for the Royal Commission on Dominion-Provincial Relations.
- Grauer, A.B., 1939. *Public Health*. Study prepared for the Royal Commission on Dominion-Provincial Relations.
- Green, M. and R. Bone, 1985. Measurement of socio-economic impacts of a mega-project: The example of the Norma Wells Oil Development and Pipeline Project. II: Discriminant analysis. *The Operational Geographer*, 7, pp. 12-14.
- Guallar, E., Sanz-Gallardo, M. I., van't Veer, P. et al., 2002. Mercury, fish oils, and the risk of myocardial infarction. *N Engl J Med*, 347(22), pp. 1747-1754.
- Hamel, D., 2001. *Évolution des traumatismes au Québec de 1991 à 1999*. Québec: Institut national de santé publique.
- Hardy, D., 1983. Impact monitoring and mitigation : the case of Ontario Hydro's Atikokan generating station. *Canadian Journal of Community Mental Health*, 1983 Winter Suppl 1, pp. 155-161.
- Harris-Giraldo, R., Soares, K., Heijboer, E. and I. House, 1998. *The Effect of Housing Conditions on Health in the Cree Community of Chisasibi, Eeyou Istchee, Northern Quebec, Canada: A Qualitative Study*. Montreal: Grand Council of the Crees (Eeyou Istchee).
- Hayeur, G., 2001. *Summary of Knowledge Acquired in Northern Environments from 1979 to 2000*. Montreal: Hydro-Québec.
- Heywood, M., 1996. Mining industry enters a new era of AIDS prevention. Eye witness: South Africa. *AIDS Anal Afr*, 6(3), p. 16.

- Hobart C., 1983. Psychosocial problems associated with resource development in three northern native communities. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 73-79.
- Hobfoll, S.E., Jackson, A., Hobfoll, I. et al., 2002. The impact of communal-mastery versus self-mastery on emotional outcomes during stressful conditions: A prospective study of Native American women. *American Journal of Community Psychology*, December Vol 30(6), pp. 853-872.
- House, J., 1982. Big oil and small communities in coastal Labrador: the local dynamics of dependency. In: Bowles, R. (ed). *Little Communities and Big Industries*, pp. 199-220. Toronto: Butterworths.
- Hydro-Québec, 1995. *Banque de données sur les communautés isolées du Québec: Tableaux des statistiques régionales, 1970-1992*. Laval: Hydro-Québec and GÉTIC, Université Laval.
- Hydro-Québec/SEBJ and Crees of Eeyou Istchee, 2004. Agreement concerning a new relationship between Hydro-Québec/SEBJ and Crees of Eeyou Istchee. April 2004. <http://www.gcc.ca/francais/nouvelles/ConventionNouvellemars2004.PDF>.
- Igata, A., 1993. Epidemiological and clinical features of Minamata disease. *Environmental Research*, 63, pp. 157-169.
- IPCS-WHO, 1990. *Environmental Health Criteria 101, Methylmercury*. Geneva.
- Iverson, R. and C. Maguire, 2000. The relationship between job and life satisfaction: Evidence from a remote mining community. *Human Relations*, 53(6), pp. 807-839.
- James Bay Environmental and Social Impact Review Panel, 1979. *Relocation of the Nemaska Band: Review of the Nemaska Environmental and Social Impact Assessment Statement*. Ottawa: James Bay Environmental and Social Impact Review Panel.
- James, B., 1972. Continuity and Emergence in Indian Poverty Culture. In: M. Nagler (ed), *Perspectives on the North American Indians*. Toronto: McClelland and Stewart.
- Johnson, I.V.B., 1984. *Helping Indians to Help Themselves - A Committee to Investigate Itself: The 1951 Indian Act Consultation Committee*. Ottawa: Treaties and Historical Research Centre, Department of Indian and Northern Affairs.
- Johnson, M. and N. Willows, 2003. *Maternal Anemia During Pregnancy*. Report prepared for Lucie Leclerc, Community Nutritionist, and the Research Committee of the James Bay Cree Board of Health and Social Services.
- Johnson, P., 1983. *Native Children and the Child Welfare System*. Toronto: Canada Council on Social Development and James Lorrimar & Co.
- Justus Simonetta Development Consultants Ltd., 1979. Major Resources Impact Evaluation, Cold Lake, Alberta. Report prepared for Cold Lake Indian Band and Department of Indian Affairs and Northern Development.
- Kehoe, A.B., 1981. *North American Indians: A Comprehensive Account*. Englewood Cliffs, N.J.: Prentice Hall Inc.
- Kirmayer, I.J, Brass, G.M., and C.L. Tait, 2000. The mental health of Aboriginal peoples: transformations of identity and community. *Can J Psychiatry*, September, 45(7), pp. 607-616.
- Kischuk, N., 2003. *Motor Vehicle-Related Deaths among the James Bay Cree, 1986 to 1999*. Version 1, 7 January 2003. Report for the Cree Board of Health and Social Services of James Bay.
- Knight, N., Boothroyd, P., Eberle, M. et al., 1993. *What We Know About the Socio-Economic Impacts of Canadian Mega projects: An Annotated Bibliography of Post-Project Studies*. Vancouver: University of British Columbia.
- Kofman, O., Simard, D. and D. Marsh, 1979. Mercury intoxication of the nervous system in Canada (chronic Minamata Disease). *Le Journal canadien des sciences neurologiques*, 6(3), p. 397.
- Kosatsky, T., 1989. *James Bay Methyl Mercury Program: Human Exposure to Methyl Mercury, 1987*. Montreal: Cree Board of Health and Social Services James Bay.
- Kosatsky, T. and C. Dumont, 1991. *Determinants of Exposure to Methyl Mercury Among the James Bay Cree, 1987-89*. Winnipeg: University of Manitoba Press.
- Kosatsky, T. and P. Foran, 1996. Do historic studies of fish consumers support the widely accepted LOEL for methylmercury in adults? *Neurotoxicology*, 17(1), pp. 177-186.

- Krech, S., 1984. *The Subarctic Fur Trade: Native Social and Economic Adaptations*. Vancouver: UBC Press.
- Kruse, J., Kleinfeld, J., and V. Fischer, 1975. A cursory comparison of social impacts of alternative gas pipeline routes from Prudhoe Bay, Alaska. Washington: Bureau of Land Management, US Department of the Interior.
- Lapointe, L., 2003. *Student Language Evaluation Report: Voyageur Memorial School*. Report prepared for Voyageur Memorial School Committee and Administration, Cree School Board.
- La Rusic I., Bouchard, S., Penne A., et al., 1979. *Negotiating a way of life: Initial Cree Experience with the Administrative Structure Arising from the James Bay Agreement*. Ottawa: Research Division, Policy, Research and Evaluation Group, Department of Indian Affairs and Northern Development.
- Lavallee, C. and C. Bourgault, 2000. The health of Cree, Inuit and southern Québec women: similarities and differences. *Canadian Journal of Public Health*, 91(3), pp. 212-216.
- Lavallée, C. and C. Schaefer, 1992. *The Demographic and Socio-economic Situation of the Cree*
- Lavallée, C. and C. Schaefer, 1992. *The Demographic and Socio-Economic Situation of the Cree Population: Principal Results of the 1986 Census*. Montreal: Northern Quebec Module, Community Health Department, Montreal General Hospital.
- Lavallée, C., 1987. *Évaluation du programme des représentants en santé communautaire chez les Cris de la Baie James*. Montreal: Département de santé santé communautaire Hôpital Général de Montreal.
- Lavallée, C., 1988. *Evaluation of the Bush Kit Programme*. Montreal: Département de santé santé communautaire Hôpital Général de Montreal.
- Lavallée, C., 1988. *Socio-demographic and Health Profile, 1987-88: Region 10b*. Montreal: Département de santé santé communautaire Hôpital Général de Montreal.
- Lavallée, C., 1990. *Lifestyles and Physical Activity Among the James Bay Crees*. Montreal: Département de santé santé communautaire Hôpital Général de Montreal.
- Lavallée, C., 1992. *Evaluation and Extension of a Programme to Promote Physical Activity in a Cree Community*. Montreal: Département de santé santé communautaire Hôpital Général de Montreal.
- Laverdure, J. and C. Lavallée, 1989. *Profil de la clientèle et description des services de santé mentale au sein de la population crie de la Baie-James*. Montreal: Département de santé communautaire, Hôpital général de Montréal. English edition: *User Profile and Description of Mental Health Services Provided to the James Bay Crees*.
- Lebel, J., Mergler, D., Branches, F. et al., 1998. Neurotoxic effects of low-level methylmercury contamination in the Amazonian Basin. *EnvironRes*, 79(1), pp. 20-32.
- Légaré, G., 2004. *Project: Diabetes Surveillance Among the Cree of Eeyou Istchee*. Quebec: Institut national de santé publique du Québec and Cree Board of Health and Social Services of James Bay.
- Lemchuk-Favel, L., 1996. *Trends in First Nations Mortality, 1979-1993*. Report prepared for Health Canada. Ottawa: Public Works and Government Services Canada.
- Levesque, C., 1989. *Les enjeux sociaux du projet de la Baie James : Volume 1 – Bibliographie compréhensive*. Groupe Hélianthe inc.
- Levesque, C., 1990. *Chisasibi et Nemaska: les impacts de la relocalisation. Étude documentaire*. Groupe Hélianthe inc.
- Levesque, C., 1995. *Les impacts humains du complexe La Grande : Inventaire bibliographique et documentaire*. Groupe Hélianthe inc.
- Loney, M., 1987. The construction of dependency: The case of the Grand Rapids hydro project. *Canadian Journal of Native Studies*, 7, pp. 57-78.
- Loney, M., 1995. Social problems, community trauma and hydro project impacts. *Canadian Journal of Native Studies*, Vol. 15(2), p. 231.
- MacDonald, S. and N. Giesbrecht, 1983. Research into the socio-economic impact of resource development in northern Canada: Priorities and strategies of interest groups. *Canadian Journal of Community Mental Health*, Winter Supplement 1, pp. 119-124.
- Macinko, J., Starfield, B. and L. Shi, 2003. The contribution of primary care system to health outcomes within OECD countries, 1970-1998. *Health Services Research*, 38(3), pp. 819-854.

- MacKay, G. et al., 1990. *Post-Project Assessment of Kelsey and Lake Winnipeg Regulation Impacts on Wabowden V. I.* Winnipeg: Manitoba Hydro.
- MacKay, T., 1904. *A History of the English Poor Law, Being a Supplemental Volume to "A History of the English Poor Law," by Sir George Nicholls, K.C.B., Poor Law Commissioner and Secretary to the Poor Law Board, Vol 2, A.D. 1834-1898.* London: P.S. King and Son.
- MacPherson, J., 1978. Pine Point: mining development in the Canadian north. *Paper prepared for the 2<sup>nd</sup> national workshop on people, resources and the environment North of 60.* Edmonton. Ottawa: Canadian Arctic resources Committee.
- MacPherson, N., 1977. Impact of the trans-Alaska pipeline on social services, public assistance services, alcohol and drug services, vocational rehabilitation services of the state of Alaska. *Alaska Highway Pipelin Inquiry (Canada) Evidence, No. 10, 6 July 1977.*
- Magnussen, L., Ehiri, J. and P. Jolly, 2004. Comprehensive versus selective primary health care: Lessons for global health policy. *Health Affairs*, 23(3), pp. 167-176.
- Manga, P. and W. Muckle, n.d. *The Role of Local Government in the Provision of Health and Social Services in Canada.* Ottawa: Faculty of Administration, University of Ottawa.
- Markowitz, F., 2003. Socio-economic disadvantage and violence: Recent research on culture and neighbourhood control as explanatory mechanisms. *Aggression & Violent Behavior*. March-April Vol 8(2), pp. 145-154.
- Marsh, D. O., 1987. Dose-response relationships in humans: methyl mercury epidemics in Japan and Iraq. In: C. U. Eccles and Z. Annau (eds), *The Toxicity of Methyl Mercury*. Baltimore, MD: The Johns Hopkins University Press, pp. 45-53.
- Marshall, Dorothy, 1937. The old poor law. *Economic History Review*, 8(1), p. 43.
- Marshall, S., 1980. *Health Care in Mistissini.* Report prepared for the Mistissini Band Council.
- Marshall, S., 1981. *Good Milk, Bad Milk: A Study of Breastfeeding Among the Mistassini Cree.* Montreal: Northern Quebec Module, Montreal General Hospital.
- Marshall, S., 1982. L'allaitement maternel chez les Cris de la Baie de James: crise dans les services de santé. In: *Recherches amérindiennes au Québec*, 12(1), pp. 33-41.
- Marshall, S., 1984. The Articulation of the Biomedical and the Cree Medical Systems. M.A. thesis, Department of Anthropology, McGill University.
- Marshall, S., 1989. *Les grossesses adolescentes chez les Cris: un problème? Présenté au docteurs Louise Séguin et Jean-Yves Frappier ands le cadre du cours Santé des enfants et des adolescents.* Montreal: Université de Montréal.
- Mary Collins Consulting Ltd., 1976. *The Social and Economic Impacts of Canadian Marine Drilling Ltd's 1976 Operations on the Beaufort Sea Communities.* Report prepared for Canadian Marine Drilling Ltd.
- May P.H., Dabbs, A.W., Fernandez-Davila, P. et al., 2002. A corporate approach to social monitoring and assessment for development in a fragile environment. *Environ Monit Assess* (Netherlands), May, 76(1), pp 125-134.
- McCulloch A., 2001. Social environments and health: cross sectional national survey. *BMJ*, 28 July, 323(7306), pp. 208-209.
- McGill University Methyl Mercury Study Group, 1979. *Epidemiological Study of the Effects of Exposure to Methyl Mercury on the Health of Individuals Living in Certain Areas of the Province of Quebec, Final Report to the Steering Committee.* Montreal: McGill University.
- McKeown-Eyssen, G. E., Ruedy, J., & Neims, A. (1983). Methylmercury exposure in northern Quebec: II. Neurologic findings in children. *Am J Epidemiol*, 118, 470-479.
- McKeown-Eyssen, G. E. and J. Ruedy, 1983. Methyl mercury exposure in northern Quebec: Neurologic findings in adults. *Am J Epidemiol*, 118, pp. 461-469.
- M.G.H and C.B.H.S.S.J.B., 1983. *Résumé de l'étude du DSC concernant la prévalence des parasites et des bactéries chez les Indiens cris de la Baie James.* Montreal: Montreal General Hospital, Public Health Department and Cree Board of Health and Social Services.

- Mianscum, H., 1999. Report of Community Consultation on Organizational and Administrative Review of the Cree School Board: Identifying Problems Attributable to the State of the Cree Community Schools and the Post-Secondary Program. Mistissini: Cree School Board.
- Midgley, J., 1981. *Professional Imperialism: Social Work in the Third World*. London: Heinemann.
- Millar W.J. and T.K. Young, 2003. Tracking diabetes: prevalence, incidence and risk factors. *HealthReports*, 14(3), pp. 35-47.
- Mitura, V. and R. Bollman, 2003. The health of rural Canadians: A rural-urban comparison of health indicators. *Rural and Small Town Canada Analysis Bulletin*, 4(6), Statistics Canada.
- Morantz, T. 2002. The white man's gonna getcha: the colonial challenge to the Crees in Quebec. Montreal & Kingston: McGill-Queen's University Press.
- Morantz, T., 1984. Economic and social accommodations of the James Bay Inlanders to the fur trade. In: Krech, S (ed). *The Subarctic Fur Trade: Native Social and Economic Adaptations*. Vancouver: UBC Press, pp. 56-79.
- Morantz, T., 1985. *An Archaeological and Ethnohistorical Synthesis of the La Grande Complex*. Report for the James Bay Energy Corporation by the Cree Regional Authority. December 1985.
- Morel, J., 1989. *Les grossesses adolescentes chez les Cris: un problème?* Montreal: Département de santé santé communautaire, Hôpital Général de Montreal.
- Morisset, J., 1981. *Profil du Nord du Quebec - 1.0 L'histoire*. Quebec: Université du Québec à Chicoutimi and Office de Planification et du Développement du Québec.
- Morse, J., Young, D., and L. Swartz, 1991. Cree Indian healing practices and Western health: a comparative analysis. *Social Science and Medicine*, 32(12), pp. 1361-1366.
- Moscovitch, A and A. Webster, 1993. Aboriginal Social Assistance. Report to the Royal Commission on Aboriginal Peoples. Published on CD-ROM.
- Moscovitch, A., 1985. The Welfare State. In *The Canadian Encyclopaedia*. pp. 1930-1932.
- Moss, W., 1981. *Practically Millionaires?* Ottawa: National Indian Brotherhood.
- Muecke, C. and E. Robinson, 2002. *Ensuring the Safety of Tap Water in Eeyou Istchee Communities*. Chisasibi: Public Health Department of the James Bay Cree Territory, Cree Board of Health and Social Services of James Bay.
- Myers, G., Davidson, P. W., Cox, C., Shamlaye, C. et al., 2003. Prenatal methyl mercury exposure from ocean fish consumption in the Seychelles child development study. *The Lancet*, 361, pp. 1667-1668, 1686-1692.
- N.R.C., 2000. *Toxicological Effects of Methyl Mercury*. Washington, DC: National Research
- Neil, C.C. and J.A. Jones, 1988. Environmental stressors and mental health in remote resource boom communities. *Australian & New Zealand Journal of Sociology*, November Vol 24(3), pp. 437-458.
- Native Harvesting Research Committee, Environmental and Social Impact Review Panel (1978). *Relocation of the Nemaska Band: Review of the Nemaska environmental and Social Impact Assessment Statement*. January, 1979.
- Neil, C. and J.A. Jones, 1988. Environmental stressors and mental health in remote resource boom communities. *Australian & New Zealand Journal of Sociology*, November Vol 24(3), pp. 437-458.
- Neufeldt, A., Doherty, G. and J. Finkelstein, 1983. Myths and realities: A comparative examination of the impact of "boom" and "bust" conditions on the quality of community life. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 81-91.
- Neurologic findings in adults. *Am J Epidemiol*, 118, pp. 461-469.
- Niezen R., 1993. Power and dignity: The social consequences of hydro-electric development for the James Bay Cree. *Canadian Review of Sociology & Anthropology*, 30(4), pp. 510-529.
- Niezen, R. and R. St-Jean, 1988. *Clientele and Social Services in Region 10-B*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Niezen, R., 1992. *Traditional Helping Systems and Social Services in Region 10-B*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Norstrom T., 2000. Outlet density and criminal violence in Norway, 1960-1995. *J Stud Alcohol*, November 61(6), pp. 907-911.

- Nriagu, J.O., 1989. A global assessment of natural sources of atmospheric trace metals. *Nature*, 338, pp. 47-49.
- O'Neil, J. and A. Webster, 1993. Health and social conditions. Chapter of Health and Healing Policy Paper, Policy Directorate, Royal Commission on Aboriginal Peoples.
- O'Neil, J. D. and R. Tate, 2001. *Chisasibi Housing and Health Report*. Montreal: Grand Council of the Crees (Eeyou Istchee).
- O'Neil, J. D., 2000. *Housing Conditions and Health: A Review of the Literature*. Montreal: Grand Council of the Crees (Eeyou Istchee).
- Osler, C. et al., 1990. *Post-Project Evaluation: Grand Rapids Project Impact on Aboriginal Communities*. Winnipeg: Manitoba Hydro.
- Pageau, M, Choinière, R. and M. Ferland, 2003. *Le portrait de santé: le Québec et ses régions, édition 2001*. Québec: Institut national de santé publique du Québec.
- Palinkas, L.A., 1987. Points of stress and modes of adjustment in Southwest Alaska. *Human Organization* Winter Vol 46(4), pp. 292-304.
- Palinkas, L.A., Downs, M.A., Petterson, J.S. and J. Russell, 1993. Social, cultural, and psychological impacts of the Exxon Valdez oil spill. *Human Organization*, Spring Vol 52(1), pp. 1-13.
- Parker, R., Easton, D., and C. Klein, 2000. Structural barriers and facilitators in HIV prevention: A review of international research. *AIDS*, 14 (Suppl), pp. 22-32.
- Paton, D., 1994. Disasters, communities and mental health: Psychological influences on long-term impact. *Community Mental Health in New Zealand*, Vol 9(2), pp. 3-14.
- Paton, R., 1982. *New Policies and Old Organisations: Can Indian Affairs Change?* Ottawa: Centre for Policy and Program Assessment, School of Public Administration, Carleton University.
- Pekeles, G., 1981a. *Autonomous Native Health Services Government and University Hospitals*. Unpublished MSc. thesis, McGill University.
- Pekeles, G., 1981b. *An Epidemic of Infantile Gastroenteritis in the Hudson Bay and James Bay Regions: A Description With Recommendations to the Ministère des Affaires Sociales*. Montreal: Montreal Children's Hospital. March 1981.
- Pelchat, Y. and C. Larson, 1985. *Evaluation des enfants atteints de déficience motrice vivant sur le territoire desservi par le Conseil Cri de la santé et des services sociaux de la Baie James*. Montreal: Département de santé communautaire, Hôpital général de Montréal.
- Pelchat, Y. and R. Wilkins, 1986. *Frequentation Hospitalière de la Population Autochtone de la Baie James*. Report prepared for Département de santé communautaire, Hôpital général de Montréal. December 1986.
- Petawabano, B., 1986. *Homecare Services Among the Cree: An Exploratory Study*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Petawabano, B., 1992. *Report of the Local Health Conference and Elders Consultation, Mistissini, November 24-26 1992*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Petawabano, B. and J. Torrie (eds), 2001. *Working Together for Children, Youth, and Families, Report of the Cree Regional Working Group on Integrating Services*. Chisasibi: Cree Board of Health and Social Services of James Bay, Cree School Board, and Cree Regional Authority.
- Pickering, J and C. James, 1991. *Attitudes and Knowledge of James Bay Cree With Respect to Prevention of Sexually Transmitted Diseases and Teenage Pregnancies*. Montreal: Department of Community Health, Montreal General Hospital.
- Pickering, J, 1993. *Dental Health in James Bay Cree Children - 1991*. Montreal: Northern Quebec Module, Montreal General Hospital.
- Pickering, J., 1988. *The prevalence of cigarette smoking and the evaluation of an anti-smoking guide among Cree Indian school children*. MSc. thesis, McGill University.
- Pickering, J., 1993. *Dental health in James Bay Cree children, 1991. Based on the Report on the oral health survey of Canada's Aboriginal Children Aged 6 and 12 co-ordinated by J.R. Leake*. Montreal: Northern Quebec Module, Montreal General Hospital.

- Piven, F.F. and R.A. Piven, 1972. *Regulating the Poor: The Functions of Public Welfare*. Toronto: Vintage Books.
- Prince, R., 1993. Psychiatry among the James Bay Cree: A focus on pathological grief reactions. *Transcultural Psychiatric Research Review*, 30(1), pp. 3-50.
- Proulx, J.R., 1992. *Bilan des connaissances sur les impacts sociaux de la Phase I du Projet de la Baie James en milieu cri, inuit et naskapi. Volumes I et II*. Report prepared by ssDC inc for the Vice-President (Environment), Hydro-Québec.
- Proulx, J.R., Lauren, C. and C. Montpetit, 1994. *Bilan des connaissances sur les impacts sociaux de la Phase I du Projet de la Baie James en milieu cri, inuit et naskapi. Volume III*. Report prepared by ssDC inc for the Vice-President (Environment), Hydro-Québec.
- Quebec, 1963. *Report of the Study Committee on Public Assistance*. Quebec: Government of Quebec. June 1963.
- Quebec, 1971. *Report of the Commission Studying the Territorial Integrity of Quebec: The Indian Domain*. Quebec: Commission Studying the Territorial Integrity of Quebec.
- Quebec, 1976. *Quebec's Traditional Stands on the Division of Powers, 1900-1976*. Quebec: Ministère des Affaires intergouvernementales.
- Quebec, 1984. *Les Cris et les Naskapi du Québec: Leur Milieu socio-Economique*. Quebec: Ministère de l'Industrie du Commerce et du Tourisme.
- Quebec, 1986. *Review of the Application of the James Bay and Northern Quebec Agreement in Cree Territory, Volume 1*. Quebec: Secrétariat des activités gouvernementales en milieu amérindien et inuit. March 1986.
- Quebec, 1990. *Program for Uninsured Health Services - General Information* (Unofficial translation dated 11 March 1991, origin unknown). Original French Version by: Service de liaison avec les régions nordiques et les communautés autochtones, Ministère de la Santé et des Services sociaux, December 1990.
- Quebec, 1991a. *Programme global de santé publique*. Quebec: Direction de la santé publique, Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1991b. *Rapport de l'enquête Santé Québec auprès des Cris de la Baie James*. Quebec: Santé Québec.
- Quebec, 1992. *Cadre de référence pour l'élaboration du programme de santé publique et pour l'organisation du réseau de santé publique*. Quebec: Direction de la Santé Publique, Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1993a. *Éléments d'orientation pour l'élaboration du plan régional d'organisation des ressources en santé publique*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1993b. *L'effectif médical en santé publique*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1994. *Orientations des services en santé publique*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- Québec, 1995. *Et la santé, ça va en 1992-93?* Québec: Santé Québec.
- Quebec, 1997a. *L'équité interrégionale et les régions Nord-du-Québec*. Quebec: Ministère des affaires santé et des sociaux du Québec. May 1997.
- Quebec, 1997b. *Priorités nationales de santé publique 1997-2002*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1998a. *La Politique de la santé et du bien-être*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1998b. *La santé publique à l'aube de l'an 2000: action et concertation*. Quebec: Ministère des affaires santé et des sociaux du Québec.
- Quebec, 1999. *Towards Defining a Northern Development Policy: Situation, Issues, and Challenges*. Quebec: Ministry of Regions. July 1999.
- Quebec, 2000. *Programme national de santé publique. Annexe 2: La définition des fonctions essentielles de santé publique*. Quebec: Ministère des affaires santé et des sociaux du Québec.

- Québec, 2001. *Surveillance de la mortalité au Québec: 1976-1997*. Québec: Bureau de surveillance épidémiologique, Ministère de la santé et des services sociaux.
- Québec, 2002. *Les risques à la santé associés à la présence de moisissures en milieu intérieur*. Québec: Institut national de santé publique du Québec.
- Québec, 2003. *Remis à la Table de concertation et de coordination permanente sur l' allocation des ressources*. Québec: Direction de la planification stratégique, Ministère de la Santé et des Services sociaux, 21 October 2003.
- Quinn, F., 1991. As long as the rivers run: the impacts of corporate water development on native communities in Canada. *Canadian Journal of Native Studies*, 11, pp. 137-154.
- Rabbitskin, W. and R. St-Jean, 1995. *Program on Alcohol and Drug Addiction: Aftercare Services*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Rabbitskin, W. and R. St-Jean, 1995. *A Regional Plan of Services Organisation on Alcoholism and Drug Abuse*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Ray, A.J., 1990. *The Canadian Fur Trade in the Industrial Age*. Toronto: University of Toronto Press.
- Rea, K.J., 1968. *The Political Economy of the Canadian North: An Interpretation of the Course of Development in the Northern Territories of Canada to the Early 1960s*. Toronto: University of Toronto Press.
- Receveur, O., ca. 2002. *Market foods and the quality of the Cree diet*. Chisasibi: Public Health Department, Cree Board of Health and Social Services of James Bay.
- Recherches amérindiennes au Québec, 1988. *James Bay and Northern Québec: Ten Years After*. Proceedings of a "Forum on the James Bay and Northern Québec Agreement: Ten Years After," held in Montréal on 14-15 November 1985. Montreal: Recherches amérindiennes au Québec.
- Régie régionale de la santé et des services sociaux de Montréal-centre, 1998. *Pour une participation effective à l'amélioration de la santé de la population : Rapport sur la réorganisation de la Direction de la santé publique de Montréal-centre*. Montreal: Régie régionale de la santé et des services sociaux de Montréal-centre.
- Reiher, J.A. and B.C. Helliwell, 1988. Methylmercury and the health of autochthons in northwest Quebec. *Clinical & Investigative Medicine*, 11(2), pp. 71-97.
- Renaud, L., 1984a. *Identification des priorités de santé chez les Indiens Cris*. Montreal: Département de santé communautaire, Hôpital général de Montréal.
- Renaud, L., 1984b. *L'état de la tuberculose chez les Indiens Cris de la Baie James*. Montreal: Département de santé communautaire, Hôpital général de Montréal.
- Retfalvi, S., 2003. *Chisasibi Hospital Surgical Suite Upgrade with the Purpose of Performance of Minor Surgical Procedures - Final Report*. Montreal: Biomedical Engineering Department, Montreal Children's Hospital, 7 February 2003.
- Richardson, Leone, 1981. *A Study of the Present Dispensation of Medical and Administrative Services for the Communities of Nemaska, Waswanipi and Mistassini*. Report prepared for the Cree Board of Health and Social Services of James Bay, August 1981.
- Rideout M. and R. Menzies, 1994. Factors affecting compliance with preventative treatment for tuberculosis at Mistassini Lake, Quebec, Canada. *Clin Invest Med*, February 1994, 17(1), pp. 31-36.
- Robinson E. and R. St-Jean, 1995. *Health and Welfare Policy: General Issues in Region 18 - Working Paper*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Robinson, E., 1985a. *Health of the James Bay Cree*. Montreal: Community Health Department, Montreal General Hospital.
- Robinson, E., 1985b. Mortality among the James Bay Cree, Quebec, 1975-1982. In: *Proceedings of the Sixth International Symposium on Circumpolar Health*. Seattle: University of Washington Press, 1985, c.f. Damestoy, N. (1994).
- Robinson, E., 1985c. *Pregnancies, Deliveries and Perinatal Mortality in the James Bay Cree, Quebec, Canada, 1975-1984*. Montreal: Public Health Module, Montreal General Hospital.
- Robinson, E., 1990. Pregnancies, Deliveries, and Perinatal Mortality in the James Bay Area, Quebec, 1975-1984. In: O'Neil J and P. Gilbert (eds), *Childbirth in the Canadian North: Epidemiological*,

- Clinical and Cultural Perspectives. Monograph Series No. 2.* Winnipeg: Northern Health Research Unit, University of Manitoba.
- Rodrigues S, Robinson E. and K. Gray-Donald, 1999. Prevalence of gestational diabetes mellitus among James Bay Cree women in northern Quebec. *Can Med Assoc J*, 160(9), pp. 1293-1297.
- Rogers, E.S. and E. Leacock, 1981. Montagnais-Naskapi. Chapter in: *Handbook of North American Indians, Volume 6: Subarctic*. Helm, June (ed). Washington: Smithsonian Institution, pp. 169-189.
- Rose, M.E., 1972. *The Relief of Poverty, 1834-1914*. London: MacMillan.
- Rosenberg, D., Bodaly, R. and P. Usher, 1995. Environmental and social impacts of large scale development projects: Who is listening? *Global Environmental Change*, 5(2), pp. 127-148.
- Roy, B., 1999. Le diabète chez les autochtones: Regard sur la situation à Betsiamites, Natashquan et La Romaine. *Recherches amérindiennes au Québec*, Vol 24, No. 3, pp. 3-18.
- Saganash, E., 2004. *Wiipich aa utiwaashishimit ishkwaaash Consultations on Cree Youth Pregnancies in Eeyou Istchee*. In: Torrie J.E. and B. Moses-Petawabano (eds), 2004. *Non-traditional Pregnancies in Eeyou Istchee*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Saint-Pierre, M.-H., 1995. *Mortalité de la population des huit villages cris de la Baie James 1987-1992*. Report for the Public Health Department, Cree Module, Régie régionale de la santé et des services sociaux de Montréal-Centre.
- Salisbury, R., 1986. *A homeland for the Cree: Regional Development in James Bay, 1971-1981*. Kingston: McGill University and Queens University Press.
- Salonen, J. T., Seppanen, K., Nyyssonen, K. et al., 1995. Intake of mercury from fish, lipid peroxidation, and the risk of myocardial infarction and coronary, cardiovascular, and any death in eastern Finnish men - Response. *Circulation*, 92(8), pp. 2355-2356.
- Schaefer, C. and E. Robinson, 1992. *La santé des femmes enceintes cries et leurs jeunes enfants: indicateurs socio-sanitaires et revue de programme*. Montreal: Département de santé communautaire, Hôpital général de Montréal.
- Schaefer, O., 1993. Psycho-social problems experienced by native population groups in the Canadian arctic involved in resource development. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 53-55.
- Schetagne, R. and R. Verdon, 1999. Post-impoundment evolution of fish mercury levels at the La Grande Complex, Québec, Canada (from 1978-1996). In: Lucotte, M., Schetagne, R. et al. (eds), *Mercury in the Biogeochemical Cycle - Natural Environments and Hydroelectric Reservoirs of Northern Québec*. Berlin: Springer-Verlag, pp. 235-258.
- Schetagne, R., 2000. *Projet potentiel EM-1/Rupert: Prévion des teneurs en mercure dans les poissons. Rapport présenté au groupe IAC et SEBJ*. Montreal: Direction principale Expertise, Hydro-Québec.
- Schnarch B., Robinson E, Torrie J, 2001. *Health and What Affects it in the Cree Communities of Eeyou Istchee: A Compilation of Recent Statistics*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Scott, D.C., 1931. *The Administration of Indian Affairs in Canada*. Ottawa: Canadian Institute of International Affairs.
- Senécal, P. and D. Égré, 2000. Human impacts of the La Grande hydroelectric complex on Cree communities in Québec. *Impact Assessment and Project Appraisal*, 17(4), pp. 319-329.
- Senécal, P., 1998. Community impact management at the construction and operations phases. In: *UNDP: Public Participation in Electric Power Projects*, pp. 101-108.
- Shewell, H., 1991. The use of social assistance for employment creation on Indian reserves. In: Cassidy, F. and S. Seward (eds), *Alternatives to Social Assistance in Indian Communities*. Halifax: Institute for Research on Public Policy.
- Short, A. and A.G. Doughty (eds), 1914. *Canada and its Provinces, Volume 7*. Toronto: Glasgow, Brook, and Co.
- Showstack, J., Lurie, N., Larson, E.B. et al., 2003. Primary care: The next renaissance. *Annals of Internal Medicine*, 138 (3), pp. 268-72.

- Siggnier, A., 1979. *Aperçu de la situation démographique, sociale et économique de la population indienne inscrite au Canada*. Ottawa: Department of Indian Affairs and Northern Development.
- Simard, J.-J. et al., 1996. *Tendances Nordiques: Les changements sociaux 1970-1990 chez les Cris et les Inuits du Québec*. Quebec: Université Laval.
- Sinclair, A. and A. Diduck, 2000. Public involvement in environmental impact assessment: a case study of hydro development in Kullu District, Himachal Pradesh, India. *Impact Assessment and Project Appraisal*, 18(1), pp. 63-75.
- Smeja, C. and P. Brassard, 2000. Tuberculosis infection in an Aboriginal (First Nations) population of Canada. *International J. Tuberc Lung Dis*, 4(10), pp. 925-930.
- Smeja, C., 1992. *Rapport des maladies à déclaration obligatoire Région 10B, 1984-1991*. Montreal: Département de santé communautaire, Hôpital général de Montréal.
- Smith, J.R., ca. 1983. *Report on Mental Health Consultation: Visits of Nine Communities o the James Bay Cree*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Smith, N., Littlejohns, L, and D. Roy, 2003. Measuring Community Capacity: *State of the Field Review and Recommendations for Future Research*. David Thompson Health Region, Alberta.
- Sorensen, N., Murata, K., Budtz-Jorgensen, E. et al., 1999. Prenatal methyl mercury exposure as a cardiovascular risk factor at seven years of age. *Epidemiology*, 10(4), pp. 370-375.
- Spitzer, W.O., Baxter, D.W., Barrows, H.S., Thomas et al., 1988. Methyl mercury and the health of autochthons in northwest Quebec. *Clinical & Investigative Medicine*, 11(2), pp. 71-97.
- Stagg, J., (nd). Anglo-Indian relations in North America to 1763 and an analysis of the Royal Proclamation of 7 October 1763. Executive summary of an historical background report written by J. Stagg, prepared by M. Giuliani in consultation with J. Stagg.
- Stevens, T., 1994. *Smoking Among Aboriginal People in Canada, 1991*. Ottawa: Health Canada.
- Stewart, D. and R. Bone, 1986. *Norman Wells Socio-economic Impact Monitoring Program Summary Report No 1-86*. Ottawa: Department of Indian Affairs and Northern Development.
- Stickert, A., 1983. The impact of resource development on Native people. *Canadian Journal of Community Mental Health*, Winter Suppl 1, pp. 51-52.
- Storey, K. and P. Jones, 2003. Social impact assessment, impact management and follow-up: A case study of the construction of the Hibernia offshore platform. *Impact Assessment and Project Appraisal*, 21(2), pp. 99-107.
- Strong, M.K., 1930. *Public Welfare Administration in Canada*. Chicago: University of Chicago Press.
- Struthers, J., 1983. *No Fault of Their Own: Unemployment and the Canadian Welfare State, 1914-1941*. Toronto: University of Toronto Press.
- Sugar, J.A., Kleinman, A. and K. Heggenhougen, 1991. Development's 'downside': social and psychological pathology in countries undergoing social change. *Health Transit Rev*, October 1(2), pp. 211-220.
- Sundet, P. and J. Mermelstein, 1996. Predictors of rural community survival after natural disaster: Implications for social work practice. *Journal of Social Service Research*, Vol 22 (1-2), pp. 57-70.
- Surtees, R.J., 1982. *Canadian Indian Policy: A Critical Bibliography*. Bloomington Indiana: Oxford University Press.
- Syncrude Canada Ltd., 2002. *Social Performance - Sustainability Report*. [www.syncrude.ca](http://www.syncrude.ca).
- Taylor, J.L., 1975. *Canada's North-West Indian Policy in the 1870s: Traditional Premises and Necessary Innovation, National Museum of Man Mercury Series No. 25*. Ottawa: National Museum of Man.
- Taylor, J.L., 1984. *Canadian Indian Policy During the Inter-War Years*. Ottawa: Department of Indian Affairs and Northern Development.
- Teta, I. et al, 2002. *Secular Trends in the Physical Growth of Cree Children*. Report prepared for Public Health Department, Cree Board of Health and Social Services, and the University of Montreal.
- Thouez, J.P., Ekoé, J.M., Foggin, P.M. et al., 1990. Obesity, hypertension, hyperuricemia and diabetes mellitus among the Cree and Inuit of Northern Quebec. *Arct Med Res*, 49, pp. 180-188.
- Thouez, J-P., Foggin, P. and A. Ranou, 1990. Correlates of health care use: Inuit and Cree of Northern Québec. *Social Science and Medicine*, 30(1), pp. 25-34.

- Thouez, J-P., Rannou A. and P. Foggin, 1989. The other face of development: Native population, health status, and indicators of malnutrition the case of the Cree and Inuit of Northern Québec. *Social Science and Medicine*, 29, pp. 965-974.
- Titley, E.B., 1986. *A Narrow Vision: Duncan Campbell Scott and the Administration of Indian Affairs in Canada*. Vancouver: University of British Columbia Press.
- Tobias, J.L., 1976. Protection, civilisation, assimilation: An outline history of Canada's Indian policy. *Western Canadian Journal of Anthropology*, 6(2).
- Torrie, J. and B. Moses-Petawabano (1999). *Regional Needs Assessment Report, Aboriginal Head Start On-Reserve Program, Eeyou Istchee*. Montreal: Community Service Department, Cree Regional Authority, September 1999.
- Torrie J. and B. Moses-Petawabano (eds), 2004. *Non-traditional Pregnancies in Eeyou Istchee*. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Torrie, J. and R. Receveur, 2000. The rise of market food consumption and type 2 diabetes in Eeyou Istchee, Northern Quebec: Externalities of hydro and forestry. Paper for the 6<sup>th</sup> International Interdisciplinary Conference on the Environment, Montreal, 2000.
- Torrie, J., Moir, D., Muir, R.K. and B. Moses-Petawabano, 2003. *Mikuukanuweyiyimisuutaau (Taking Care of Ourselves): A Discussion Paper on the Integration of an Eeyou Ethos and Practices Into Health and Social Services in Eeyou Istchee*. Chisasibi: Cree Board of Health and Social Services of James Bay, February 2003.
- Trussart, S., Messier, D., Roquet, V. and S. Aki, 2002. Hydropower projects: A review of the most effective mitigation measures. *Energy Policy*, 30, pp. 1251-1259.
- Tsubaki, T. and K. Irukayama, 1977. History and background. In: Tsubaki T. and K. Irukayama Unpublished MSc. thesis, McGill University.
- Upton, L.F.S., 1973. The origins of Canadian Indian policy. *Journal of Canadian Studies*, 8(4), pp. 51-61.
- Usher, Peter J., 1976. *Fur Trade Posts of the Northwest Territories, 1870-1970*. Ottawa: Department of Indian Affairs and Northern Development.
- Veronneau, M. and E. Robinson, 1993. *Prevalence of Diabetes in James Bay Cree Communities*. Report prepared for the Cree Board of Health and Social Services of James Bay. Chisasibi: Cree Board of Health and Social Services of James Bay.
- Véronneau, J., Sirhan, H. and M. Hallouche, 2002. *Rapport sur la santé dentaire crie en Eeyou Istchee (nord du Québec)*. Montreal: Public Health Department of the Cree Territory, Cree Board of Health and Social Services of James Bay.
- Verrall, T. and K. Gray-Donald, 2004. Impact of a food-based approach to improve iron nutrition of at-risk infants in northern Canada. Unpublished paper. Montreal: Department of Human Dietetics and Nutrition, McGill University.
- Veysey, B. and S. Messner, 1999. Further testing of social disorganization theory: An elaboration of Sampas and Groves "Community Structure and Crime". *Journal of Research in Crime and Delinquency*, 36(2), pp. 156-174.
- Vincent, S, 1998. *Other Communities' Experiences: Changes Observed After the Opening up of Wemindji, Eastmain, Chisasibi and Several Other Northern Communities, Waskaganish permanent road – Environmental and social impact study. Volume 10*. ssDcc and INRS Société.
- Wade, S.A., 1966. *The Transfer of the Indian Department to Canadian Authorities*. M.A. thesis, University of Washington.
- Waldram, J., 1987. Native employment and hydroelectric development in Northern Manitoba. *Journal of Canadian Studies*, 22, pp. 62-76.
- Wallace, M.E., 1950. *The Changing Canadian State: A Study of the Changing Conception of the State as revealed in Canadian Social Legislation, 1867-1948*. PhD. thesis, Columbia University.
- Wanie, F. and M.S. MacLachlan, 2001. Estimating the influence of forests on the overall fate of semi-volatile organic compounds using a multimedia fate model. *Environmental Science and Technology*, 35, pp. 582-590 c.f. Bidleman, T., MacDonald, R. and J. Stow (eds) (2003). Sources, occurrence,

- trends and pathways in the Physical Environment in *Final Report of the Northern Contaminants Program, Vol 2, Chapter D*. Ottawa: Indian and Northern Affairs Canada.
- Weaver, C. and A. Cunningham, 1984. *Social Impact Assessment and Northern Native Communities: A Theoretical Approach*. Centre for Human Settlements, University of British Columbia.
- Webster, A., 1993. Statistics on Selected Aboriginal Social Pathologies: Veracity and Interpretation of the Data. Internal report of Policy Directorate, Royal Commission on Aboriginal Peoples.
- Webster, A., 1993. They Are Impossible People, Really: Social Administration and Aboriginal Social Welfare in the Territorial Norths, 1927-1993. Report prepared for Royal Commission on Aboriginal Peoples.
- Webster, A., 1994. Aboriginal Suicide Rates: Veracity and Interpretation of the Data. Internal report of Policy Directorate, Royal Commission on Aboriginal Peoples.
- Webster, A., 1995. Perceptions and Positions on Fiscal Responsibility for First Nations Social Assistance: Lessons Learned from the Historical Record. Report prepared for Department of Indian Affairs and Northern Development.
- Webster, A., 2001. *Impacts of Physician Supply on Caseloads, Budgets, and Services in the Cree Region: With Particular Emphasis on the Cree Board of Health and Social Services of James Bay's Attempts to Restore the Supply of Physicians*. Report prepared for Cree Board of Health and Social Services of James Bay, July 2001.
- Webster, A., 2003. *Cost and Volume Change in Patient Transportation, 1993-2003*. Analysis for a special audit by the MSSSQ, for Cree Board of Health & Social Services of James Bay.
- Webster, A., Bobet, E., Petawabano-Moses, B., Torrie, J. et al., 2003. Hospital Services Utilisation Analysis, Eeyou Istchee. Chisasibi: Cree Board of Health & Social Services of James Bay.
- Weller, G.R., 1981. The Delivery of Health Services in the Canadian North. *Journal of Canadian Studies*, 16(2).
- Wenzel, G., 1983. The integration of remote site labour into the Inuit economy of Clyde River, NWT. *Arctic Anthropology*, 20(2), pp. 79-92.
- Wheatley, B. and M.A. Wheatley, 2000. Methyl mercury and the health of indigenous peoples: A risk management challenge for physical and social sciences and for public health policy. *Sci Total Environ*, 2 October, 259(1-3), pp. 23-29.
- Wheatley, B., Barbeau, A., Clarkson, T. W. and L.W. Lapham, 1979. Methyl mercury poisoning in Canadian Indians - The elusive diagnosis. *Le Journal canadien des sciences neurologiques*, 6(4), 417-422.
- Whiteside, C., 1994. Diabetic nephropathy: successful treatment depends on early diagnosis. *Diabetic News*, 2:1-3, p. 8.
- WHO. (1978). Declaration of Alma Ata: International Conference on Primary Health Care, Alma Ata, USSR, 6-12 September 1978. [www.who.int/hpt/NPH/docs/declaration\\_almaata.pdf](http://www.who.int/hpt/NPH/docs/declaration_almaata.pdf) (September 28, 2004).
- Williams, B. and C. Campbell, 1998. Creating alliances for disease management in industrial settings: a case study of HIV/AIDS in workers in South African gold mines. *Int J Occup Environ Health*, October-December, 4(4), pp. 257-264.
- Willows, N., 2003. *Food insecurity in Cree communities*. Unpublished paper for Public Health Department, Cree Board of Health and Social Services.
- Willows, N. and M. Johnson, 2003a. *Self-Reported Alcohol, Drug and Smoking Use During Pregnancy: Prevalence of Use, a Description of Users, and Associated Risks to Their Offspring*. Draft 2 of a report for Research Committee, Cree Board of Health and Social Services of James Bay, November 2003.
- Willows, N. and M. Johnson, 2003b. *Breast-Feeding Initiation and Duration in James Bay Cree Communities*. Report for Lucie Leclerc, Community Nutritionist, and the Research Committee of the Cree Board of Health and Social Services of James Bay.
- Willows, N. and M. Johnson, 2003c *The Prevalence of GDM, and a High Screen for Abnormal Glucose Metabolism During Pregnancy in the James Bay Communities (1994-2000)*. Report for Cree Board of Health and Social Services of James Bay.

- Willows, N. and Johnson M., 2003d. *Canadian Aboriginal (Cree) Infants Have High Foetal Growth*. Poster presentation prepared by N. Willows, University of Alberta.
- Woldoff, R.A., 2002. The effects of local stressors on neighbourhood attachment. *Social Forces*, September Vol 81(1), pp. 87-116.
- Women's Research Centre, 1979. *Beyond the Pipeline: A Study of Women and Families in Fort Nelson BC and Whitehorse YT and on Identification of Their Socio-Economic Concerns Regarding the Construction of the Alaska Highway Gas Pipeline*. Vancouver.
- Yokoo, E. M., Valente, G., Grattan, L., et al., 2003. Low level methylmercury exposure affects neuropsychological function in adults. *Environmental Health: A Global Access Science Source*, 2(8).
- Yoshizawa, K., Rimm, E. B., Morris, J. S., et al., 2002. Mercury and the risk of coronary heart disease in men. *N Engl JMed*, 347(22), pp. 1755-1760.
- Young, T. Kue, 1994. *Measuring the Health Status of Canada's Aboriginal Population: A Statistical Review and Methodological Commentary*. Report prepared for Royal Commission of Aboriginal Peoples.
- Young, T.K., 1984. Indian Health Services in Canada: A Socio-Historical Perspective. *Social Science and Medicine*, 18(3), pp. 257-264.
- Zaslow, Morris, 1971. *The Opening of the Canadian North, 1870-1914*. Toronto: McLelland and Stewart Co. Ltd.