

Diabetes and the Off-Reserve Aboriginal population in Canada

by

Stephanie A. Crocker
BDSc, University of British Columbia, 2010

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

MASTERS OF SCIENCE

in the Social Dimensions of Health Program

© Stephanie Crocker, 2013
University of Victoria

All rights reserved. This thesis may not be reproduced in whole or in part, by photocopy or other means, without the permission of the author.

Supervisory Committee

Diabetes and the Off-Reserve Aboriginal population in Canada

by

Stephanie Crocker
BDSc, University of British Columbia, 2010

Supervisory Committee

Dr. Jeffrey Reading, Co-supervisor (Indigenous Governance program, Director of the Centre for Aboriginal Health Research)

Dr. Michael Hayes, Co-supervisor (Social Dimensions of Health program, Director of Health Research and Education)

Abstract

Supervisory Committee

Dr. Jeffrey Reading, Co-supervisor (Indigenous Governance program, Director of the Centre for Aboriginal Health Research)

Dr. Michael Hayes, Co-supervisor (Social Dimensions of Health program, Director of Health Research and Education)

The purpose of this study is to describe findings of the 2006 Aboriginal Peoples Survey (APS) that was conducted by Statistics Canada. They collected data on the living conditions and lifestyles of Aboriginal peoples living off-reserve in Canada. The thesis describes diabetes, co-morbidities, and social determinants of health that affect this population through the lens of intersectionality and Dr. Nancy Krieger's eco-social theory.

Table of Contents

Supervisory Committee	ii
Abstract	iii
Table of Contents	iv
List of Tables	vi
List of Figures	vii
Acknowledgments	viii
Dedication	ix
Chapter One: Introduction	1
1.1 Introduction	1
1.2 Statement of the Problem	3
1.3 Structure of the Thesis	3
1.4 Background of the Problem	6
1.5 Theoretical and Conceptual Foundation	10
1.5.1 Intersectionality	10
1.5.2 Concepts of determinants of health and Eco-Social Theory	11
1.5.3 Eco-Social theory	12
1.6 Research Questions	15
1.7 Significance of the Study	15
Chapter Two: Review of the Literature	16
2.1 Introduction	16
2.1.1 Off-reserve Aboriginal peoples	16
2.2 Health Conditions/Co-morbidity	17
2.2.1 Diabetes	18
2.2.1.1 Oral Health	19
2.2.1.2 Prevalence of diabetes	25
2.2.1.3 Metabolic Syndrome	26
2.2.2 Obesity	26
2.2.3 Cardiovascular disease	27
2.2.4 Stress	28
2.2.5 Determinants of Health	28
2.3 Reported barriers to diabetes diagnosis and care	32
2.3.1 Income	32
2.3.2 Cultural acceptance	33
2.4 Summary of Literature Reviewed and Rationale for the Study	34
Chapter Three: Research Design and Methods	37
3.1 Introduction	37
3.2 Research Design	38
3.3 Population of the Study	39
3.4 Sampling design	40
3.4.1 Domains of estimation	40
3.4.2 Sampling Plan	41
3.5 The Sample	42

3.6 Data Collection	42
3.6.1 Mode of collection	42
3.6.2 Aboriginal languages	43
3.7 Ethical Considerations	43
3.8 Data Processing	43
3.8.1 Data capture	43
3.8.2 Editing	43
3.8.3 Weighting	44
3.9 Data Quality	45
3.9.1 Sampling Errors	45
3.9.2 Non-sampling Errors	45
3.10 Dissemination	45
Chapter Four: Results	46
4.1 Introduction	46
4.2 General Description of the Data	46
4.3 Hypothesis-by-Hypothesis Presentation and Interpretation of Results	48
4.3.1 Null Hypothesis 1	48
4.3.2 Hypothesis 2	51
4.3.3 Hypothesis 3	52
4.4 Summary of Findings	54
Chapter Five: Discussion	56
5.1 Introduction	56
5.2 Discussions	57
5.2.1 General Health Status	57
5.2.2 Health Conditions	58
5.2.2.1 Diabetes	59
5.2.2.2 Obesity	60
5.2.3. Access to Health Services	60
5.2.4. Income	60
5.2.5 Chronic Stress	62
5.3 Implications	63
Chapter Six: Conclusion	64
6.1 Conclusion	64
6.2 Limitations	65
6.3 Recommendations	66
6.4 Suggestions for Further Studies	67
Works Cited	69
Appendix A Ethics Waiver Form	78
Appendix B Statistics Canada Methods Guide	79

List of Tables

Table 1 Social Determinants of Health.....	29
Table 2 Adult Health (Census, APS, 2006)	47
Table 3 Child Health (Census, APS, 2006)	48

List of Figures

Figure 1: Comparison of Aboriginal Males General Health.....	49
Figure 2: Comparison of Aboriginal Females General Health.....	50
Figure 3: Comparison of Aboriginal Children’s General Health.....	50
Figure 4: Comparison of Aboriginal Adults with and without diabetes, by weight.....	51
Figure 5: Total Aboriginal Family Income with and without diabetes, off-reserve.....	52
Figure 6: Aboriginal Family Income off-reserve by gender, with diabetes, under 30 years old.....	53
Figure 7: Total Family Income, off-reserve Aboriginal Children 6-14, with and without diabetes.....	54

Acknowledgments

It has been a pleasure to be part of the Interdisciplinary Program called the Social Dimensions of Health. My time at the University of Victoria was enriched through the connections I made with my classmates and faculty.

I would sincerely like to thank the National Association of Friendship Centres for permission to use the Statistics Canada data, specifically Heather King Andrews and Tricia McGuire-Adams. Thank you both for your agreement and support for me working with Jeff on your contract/project, without that, this Masters Thesis would not be. My hope is that through partnerships like this, positive changes can and will take place for Aboriginal peoples health.

To my supervisors:

Jeff- This study would not have been possible without your willingness to include me in the opportunity you had with Statistics Canada and the National Association of Aboriginal Friendship Centres. Thank you for making me feel welcome at the Centre for Aboriginal Health Research, for your mentorship, discuss my research proposal and all of the data tables. Also, your help and clarification with the data at the eleventh hour was greatly appreciated!

Michael- I would like to first thank you for being involved with the Social Dimensions of Health program, and for sharing your knowledge and wisdom with myself and the rest of the class. Most importantly, I would like to give you my greatest gratitude for standing with me and seeing me through the thesis writing process. I truly would not have completed this, if it weren't for your leadership and support. Thank you!

Next I would like to acknowledge my writing coach, Lindsay, who opened my eyes to dangling modifiers and the passive voice..... thank you for taking the time to work with me on this paper, and for helping me to become a better writer.

And lastly, to my colleagues at Vancouver Island University who offered words of encouragement, gentle nudges and reminders that I needed to keep moving forward, and believed I would get this done.

Dedication

To my partner, Peter.....I love you! You believed in me when I did not believe in myself. Your encouragement has never waned and you constantly reminded me to keep putting one foot forward. You have read many assignments, and helped with editing many papers. You have endured my growing pains throughout this process and thus endured many tears and lots of doubt. You have seen me through two degrees in the past four years. Thank You! Through all of this you never lost faith in my ability to see this journey through. We did it!

To my mum.....thank you for your unfailing love and support, and for *always* believing in me. I have achieved a feat I never imagined I would. Thank you for all the support you gave during this process.... I love you!

Chapter One: Introduction

1.1 Introduction

“According to the United Nations Human Development Index, which measures health through longevity, educational achievement and adult literacy, First Nations people in Canada rank 63rd in the world, yet Canada ranks 6th in the world” (NAHO, March 2012).

Life expectancy for people with type 2 diabetes may be shortened by five to ten years, and type 2 diabetes has reached epidemic proportions in Canadian Aboriginal¹ peoples with prevalence rates 3-5 fold higher than the non-Aboriginal Canadian (Canadian Diabetes Assoc.(www.diabetes.ca); Young, Reading, Elias & O’Neil, 2000). Type 2 diabetes trajectories are developing earlier in the life course, and at much higher rates in Canadian Aboriginal populations. The health impact on Aboriginal peoples now and in future generations is an area that is in great need of more effective disease interventions, health promotion strategies, and culturally relevant programs. In Canada, First Nations² children as young as eight years of age are being diagnosed with type 2 diabetes, and one-third of Aboriginal peoples over 15 years of age have been told by a health practitioner they have a chronic condition such as type 2 diabetes, cardiovascular disease, and high blood pressure

¹ Aboriginal peoples- Defined as the descendents of the original inhabitants of North America. The Canadian constitution recognizes three groups of Aboriginal peoples: First Nations, Métis, and Inuit. These are three separate peoples with unique heritages, languages, cultural practices, and spiritual beliefs. Aboriginal is respectively used in this thesis to describe these groups and their descendants.

² First Nations- is a term that became common usage in the 1970’s to replace the word “Indian” which people had found offensive. The term First Nations is widely used, however, no legal definition exists. The term “First Nations peoples” refers to the North American Indian people of Canada, both Status and Non-Status. (**Métis**- are people of mixed North American Indian and European ancestry who identify themselves as Métis people. The Métis have a unique culture that draws on their diverse ancestral origins, such as French, Scottish, Ojibway and Cree. **Inuit**- means “people” in Inuktitut, the language of the Inuit people. Most Inuit people live in the NorthWest Territories, Nunavut, Northern Quebec and Labrador).

(First Nations and Inuit Regional Health Survey National Steering Committee/ FNIRHSC, 1999, 2003). As reported in the 2002/03 Regional Health Survey, over 19.7% of First Nations adults have been diagnosed with type 2 diabetes compared to just 4.5% in the general Canadian population (McKee, Clarke, Kimetic & Reading, 2009).

Obesity is an accepted risk factor for type 2 diabetes, and the percentage of overweight to obese First Nations children is 62.3%, which indicates a potential for even higher diabetes rates in the future (First Nations Information Governance Committee/ FNIGC, 2011). With rising prevalence of type 2 diabetes and obesity in Aboriginal youth, there is an impending increase in the diabetes health crisis. The Aboriginal population is the fastest growing population in Canada, and more than half of the urban off-reserve population is 25 years of age or younger. This is a crucial point to consider in the coming decades. As these young adults and youth become older, there is potential for immense stress on the health care system, not to mention the heavy burden of disease that will be experienced. Effective interventions that begin early in the life course will have the greatest impact on type 2 diabetes trajectories, and interventions at any point in the life course would aid in a positive change in trajectory.

1.2 Statement of the Problem

To date there is limited research explicitly devoted to off-reserve Aboriginal populations in Canada. The health of Aboriginal peoples is generally not a priority in Canadian society, or for the current Federal government. Consequences of this low priority are illustrated by the magnitude of the Aboriginal diabetes health crisis, and the burden of illness in the lives of the Aboriginal population. Disease trajectories continue to increase in prevalence, thus it is crucial to examine the health status of Aboriginal peoples with diabetes living off-reserve in Canada, along with those living on-reserve.

1.3 Structure of the Thesis

I describe and analyze findings from the 2006 Aboriginal peoples Survey (APS) conducted by Statistics Canada, which collected data on the living conditions and lifestyles of Canadian Aboriginal peoples living off-reserve. Quantitative analysis was done through an exploratory study of secondary data in the form of anonymized, coded data tables compiled by a Statistics Canada analyst using the data collected in the 2006 APS. These data tables were assessed and categorized in relation to diabetes³, and diabetes care in the life course from childhood to adulthood. Charts and graphs were then created using excel spreadsheets, to illustrate the findings from the coded data tables, which are discussed in more detail in Chapter 4. The Statistics Canada data was made available for my thesis in partnership with the National Association of Friendship

³ For the purpose of this thesis, I will be using the term “diabetes” when discussing methods, results, and findings, as the data tables I received from Statistics Canada do not differentiate type 1 or type 2 diabetes. I do acknowledge and recognize that type 2 is more prevalent.

Centres (NAFC) through my supervisor, Dr. Jeffrey Reading, Director of the Centre for Aboriginal Health Research, University of Victoria.

The NAFC was established in 1972, and acts as a central unifying body for a network of 119 Aboriginal Friendship Centres from coast to coast to coast. Friendship Centres are primary providers of culturally-enhanced programs and services to urban Aboriginal residents, and facilitate the transition of Aboriginal peoples from rural, remote, and reserve life to the urban environment. Aboriginal Friendship Centres play a critical role in community and economic development through training and employment opportunities, building resources, and facilitating social development.

Core activities of the NAFC include:

- enhancing governance practices
- promoting and advocating for the Friendship Centre movement
- coordinating and facilitating the delivery of national programs and services
- developing policy
- acting as a mediation body during difficulties
- working with service agencies, volunteer organizations, private industry and all levels of government to improve the lives of urban Aboriginal peoples.

Study findings and suggested interventions will empower the NAFC in advocating policy changes that will improve Aboriginal health outcomes.

When I first entered the Social Dimensions of Health program, my hope and intent was to conduct a study looking at the link between diabetes and oral health in Aboriginal peoples, specifically with Cowichan Tribes, in Duncan, BC. For study design, I had wanted to do a forensic chart audit of dental charts, studying dental hygiene

care, periodontal treatment, and glucose monitoring for those clients who had indicated they had type 2 diabetes in their health history, as Cowichan Tribes has a dental office accessible to their band members. My supervisor had a contact through the Centre for Aboriginal Health at UVIC that I was to use, and unfortunately she could not arrange introductions, and therefore I was unable to follow that path. In discussing this closed door with my supervisor, I was fortunate to be given the opportunity to work on this present study, which is to analyze data tables sent from Statistics Canada, regarding specific questions from the 2006 Aboriginal peoples Survey (APS) directly related to diabetes and off-reserve Aboriginal⁴ populations in Canada.

I describe the characteristics of health and social determinants of Aboriginal peoples off-reserve with and without diabetes, with areas of focus being self perceived overall health, obesity, health conditions/co-morbidities of diabetes, access to healthcare, and income. Further, I discuss the burden of illness, allostatic load, access to culturally relevant healthcare, and determinants of health that play a role in and potentially affect disease prevalence across the life course of Aboriginal populations living off-reserve.

This thesis is organized as follows: a review of literature researched for this study will be discussed in Chapter 2, followed by a description of methods and study design in Chapter 3. The results are reported in Chapter 4, followed by a discussion in Chapter 5. The thesis will close with conclusions and recommendations in Chapter 6.

⁴ As stated in footnote 1, Aboriginal is respectively used in this thesis to describe three distinct groups of people: First Nations, Inuit and Métis. The data received from Statistics Canada did not differentiate into FN, Inuit and Métis groupings for this study, perhaps due to the small sample size of 61,000, but also due to the study being interested in the social dimensions of health for mostly urban, and some rural Aboriginal Canadians off-reserve. I am aware that the prevalence rates presented in my thesis are not equal across these very unique populations, and a question I am unable to take on is whether FN=Inuit=Métis in regard to the burden of illness of diabetes and social dimensions of health.

1.4 Background of the Problem

Aboriginal peoples in Canada have historically and persistently experienced poor health outcomes because they are socially marginalized. Factors linked to poor health outcomes include access to employment, adequate housing, potable water, as well as non-material resources such as social and cultural exclusion, connectedness, and communication. Upstream factors affecting health are poverty, addictions, food security, lifestyle, and poor housing. Inequalities are directly tied to social class, as shown by The Black Report⁵ which found that at a population level, poverty matters. Occupational class is a marker for power, as is access to material and non-material resources. Inequalities in health were found to be caused by economic inequality.

Historically, the marginalization and oppression of the Aboriginal population in Canada is a direct result of the colonial policies that aimed to erase Aboriginal culture and assimilate Aboriginal peoples into the dominant colonial population (Wilson, Rosenberg & Abonyi, 2011). The Federal government has been in control of Aboriginal affairs since 1867, and the Indian Act (1876) was a paternalistic, intrusive piece of Federal legislation that has governed most aspects of First Nations life, from Indian status, resources and land, to education and health (Mikkonen & Raphael, 2010). The Indian Act is a policy which determines who is an Indian by way of assigning Status, and is used by the Federal government to determine who is considered an Indian, and therefore a Federal fiduciary obligation. The Indian Act also established federal jurisdictional boundaries called “reserves” and Federal responsibility for health care is

⁵ The Black Report- This document was published by the Department of Health and Social Security in the United Kingdom. It was a report generated by an expert committee into health inequality and was chaired by Sir Douglas Black.

restricted to Aboriginal persons living on-reserve. In the past, as wards of The Crown, the First Nations peoples' were forbidden to speak their languages or practice traditions, had their ceremonial belongings taken and burned, and were placed on reserves. They could not leave the reserve unless they had a pass issued by the Indian Agent; any First Nations person who earned a university degree would automatically lose his or her Indian status, and status women who married non-status men would lose their Indian status (Mikkonen & Raphael, 2010). The Crown Indian Agents controlled the reserves which were arbitrary pieces of land decided upon by the Government.

The most aggressive step taken by the government towards assimilation was the creation of government and church run residential schools, the first of which opened in the late 1800s. By the 1930s, there were 80 such schools across the country. Aboriginal children were forcibly taken from their homes to become 'civilized' in the residential schools. These are all now closed, with the last residential school closing in 1996 (Assembly of First Nations, 2009; Wilson et al, 2011). Within the last 30 years, survivors of the residential school system began disclosing the physical, mental and sexual abuse they suffered as children. This government policy broke up families, and is responsible for abuse and suffering of children that has had, and will continue to have, impact across generations. Connectedness to their culture and families was fractured; mental illness and addiction stem directly from the experiences of residential school survivors. Experience in the residential schools has seriously inhibited the ability of individuals to look after their physical needs.

Iwasaki et al, (2005) argue that while it is obviously necessary to give attention to broader cultural, socioeconomic, historical, and political factors surrounding diabetes in

Aboriginal peoples, changes caused by colonization⁶ are a major factor for the rise in diabetes incidence among Aboriginal peoples globally (Iwasaki, Bartlett & O'Neil, 2005).

Delivery of health care services to Aboriginal peoples has been greatly influenced by the Indian Act of 1876. Aboriginal peoples suffer higher rates of morbidity and mortality which can be attributed to a fragmented delivery of health care service (Kelly, 2011). Also, the health care system contains public policies that create jurisdictional gaps regarding responsibility for delivery of health care to Canadian Aboriginal peoples (British Columbia Provincial Health Officer, 2009; Jacklin & Warry, 2004; Lavoie, Forget & Browne, 2010). The Federal government accepts responsibility for delivering primary health care on-reserve, and provides funding to the provinces for cost-sharing programs, contracted services, and premiums for Status Indians (Lavoie & Forget, 2008). Provincial governments are responsible for primary health care services, and hospital and physician services for off-reserve Aboriginal peoples.

The Federal government has never acknowledged its legal obligation to provide health care services to Aboriginal peoples. The government views its provision for health care services on-reserve as a matter of goodwill rather than responsibility, and takes the stance they have a special relationship with Canada's First Nations, which they are committed to maintaining (British Columbia Health Officer, 2009, First Nations Inuit Health Branch, 2007). The Indian Act (1876) did include a health related provision, but the language used in this provision failed to provide clear legislative authority for Indian

⁶ Colonization- defined as dispossession of ancestral lands, the imposition of colonial institutions and the disruption of traditional lifestyles.

health to the Federal government (“The Aboriginal Health Legislation and Policy Framework in Canada”, 2011). The Federal government’s role is primarily limited to public health and prevention services offered by the First Nations and Inuit Health Branch, with services being offered to status Indians living on-reserve and to Inuit living in their traditional territories (“The Aboriginal Health Legislation and Policy Framework in Canada”, 2011). The Branch provides non-insured health benefits such as prescription drugs, dental and vision coverage to all status/registered Indians and Inuit regardless of where they live, yet this benefit is not offered to the Métis⁷ (“The Aboriginal Health Legislation and Policy Framework in Canada”). Hospital and physician care is provided by the Provincial and Territorial governments (“The Aboriginal Health Legislation and Policy Framework in Canada”, 2011). For First Nations people living on-reserve, health care is predominately the responsibility of the Federal government; other Aboriginal groups fall under the Provincial or Territorial governments (“The Aboriginal Health Legislation and Policy Framework in Canada”, 2011). The Aboriginal legislation and health policy framework is complex, and the framework fails to address the health care needs of Aboriginal peoples who are either not registered or living off-reserve (“The Aboriginal Health Legislation and Policy Framework in Canada”, 2011). As Romanow, (2002) states “the jurisdictional gaps and debates add to this complexity in legislation and negatively impacts access to appropriate and responsive health care for Canadian Aboriginal peoples”.

⁷ As of the week of January 8, 2013, the Federal Court of Canada ruled that Ottawa (the Federal Government) must recognize Métis and non-status Indians under the Constitution Act, 1867. The ruling found that these peoples should be entitled to the same rights and benefits accorded to status Indians living on-reserve. This includes access to health, education and other benefits. This could deliver equality under the Canadian Constitution to over 600,000 Aboriginal peoples in Canada. However, this decision could yet be appealed. (www.cbc.ca/news)

In 2005, Prime Minister Paul Martin, the provincial premiers, and Aboriginal leaders met in Kelowna, British Columbia for the First Ministers Conference on Aboriginal Affairs. This meeting resulted in The Kelowna Accord, a five-year, five-billion dollar plan to improve the lives of First Nations, Inuit and Métis peoples in urban areas. The plan set targets to improve health and water services, education, housing, and economic development, with hope of eradicating poverty. Martin's government fell seventy-two hours later, and the Conservative government dismantled the Kelowna agreement by reducing and eliminating funding. Also, the federal government has now withdrawn funding for the National Aboriginal Health Organization (NAHO), which resulted in its closing June 30, 2012. The NAHO was a not-for-profit organization whose mandate was to advance the health of First Nations, Métis and Inuit people in Canada.

1.5 Theoretical and Conceptual Foundation

1.5.1 Intersectionality

Intersectionality is considered a critical analysis of privilege, power, identity and oppression that claims no one element of identity or oppression stands alone. Proponents of intersectionality suggest that we cannot claim any identity has a pure essence, or that any aspect of identity is inherently oppressive. It also acknowledges that identities are not fixed, but are fluid and shift over time and with context. Recognizing this complex diversity, an intersectional analysis does not ignore unjust social structures such as conscious or unconscious racism or patriarchy, or, how they play out in policies, practices, laws or unquestioned norms. Intersectionality focuses on simultaneous intersections between aspects of social difference and identity (gender, race, class, age) and forms of systemic oppression (racism, marginalization, classism) at micro and macro levels that are interdependent and complex (Hankivsky & Cormier, 2009).

As mentioned, the disproportionate burden of poor health experienced by Aboriginal peoples can be attributed in part to a fragmented system that is rooted in jurisdictional gaps and long-standing debates between Aboriginal, Federal and Provincial governments (Kelly, 2011). It can also be attributed to multifactoral complexities of health disparities. This complex phenomenon cannot be understood with the insufficient current approaches to health inequalities. Traditional frameworks have placed health vulnerabilities into categories such as gender, race, socioeconomic, geography or disease status. The influence and context of social power inequalities usually fail to be considered or analyzed. An intersectional perspective will be used in my thesis to investigate the interaction of numerous characteristics of the off-reserve Aboriginal population, at individual and social levels, to analyze the multiple contexts that shape their individual lives and health status.

1.5.2 Concepts of determinants of health and Eco-Social Theory

Although precise causal pathways in which the social determinants of health operate are not fully understood, it is clear that unequal distribution of employment, education, income, and housing, produce inequalities in health (Graham, 2000). Additionally, it is also the quality of these experiences, not just the distribution. Poor health outcomes are associated with marginalization and social disadvantage (Braveman, 2003). Four groups of theories have been proposed to explain these inequalities in health across socioeconomic position. Firstly, the *Materialist/structuralist theory*, proposes that ill health is produced through inadequate individual income levels which lead to a lack of resources to cope with the stressors of life (Frolich, Corin & Potvin, 2001). Secondly, the *Psycho-social theory* proposes that stress which comes from discrimination based on

one's place in the social hierarchy, causes a neuroendocrine response that produces disease (Evans & Stoddart, 2003; Siegrist & Marmot, 2004). Thirdly, the *Social production of health theory* proposes that capitalist priorities for accumulating wealth, power, prestige and material assets are achieved at the cost of the disadvantaged in society (Krieger, 2001). Finally, the *Eco-Social theory* brings together the psycho-social and social production of health models, and examines how social and physical environments interact with biology, and how individuals “embody” aspects of the life and work contexts (Krieger, 2001). This builds on the premise that lifestyle choices are influenced by life chances which are defined by the environment in which people live (Frolich et al, 2001).

1.5.3 Eco-Social theory

Dr. Nancy Krieger introduced the term “ecosocial” theory in 1994. Her visual fractal metaphor of an evolving tree of life intertwined at every level, micro and macro, with scaffolding of society that differing core social groups daily reinforce or wish to alter, is a metaphor that fits well when discussing health outcomes of off-reserve Aboriginal peoples (Krieger, 2001). This fractal metaphor elicits thought on current and changing population patterns of health, well-being and disease in relation to each level of ecological, biological and social organization, such as cell, organ, individual, family, community, population, and ecosystem (Krieger, 2001). Krieger's four core constructs of eco-social theory are embodiment, pathways of embodiment, cumulative interplay between exposure, susceptibility and resistance, and accountability and agency (Krieger, 2001). *Embodiment*, is defined by Krieger as referring to how people literally biologically incorporate the material and social world in which they live, from conception to death,

and that no aspect of a persons biology can be understood absent of knowledge of history and the individual and societal ways of living (Krieger, 2001). *Pathways of embodiment*, is structured simultaneously by: a) constraints and possibilities of a persons biology, shaped by evolution, ecological context, and individual histories; and b) societal arrangements of power and property, and contingent patterns of production, reproduction, and consumption (Krieger, 2001). *Cumulative interplay between exposure, susceptibility and resistance*, Krieger explains, is expressed in pathways of embodiment, and each factor and its distribution is conceptualized at multiple levels, such as individual, regional, national, and political. It also is experienced in multiple domains, like home, work, and school, in relation to ecological niches, and then manifested in processes at multiple scales of space and time (Krieger, 2001). *Accountability and agency* is expressed in pathways of knowledge regarding embodiment, in relation to institutions (business, government), individuals and households. Also, accountability and agency pertains to scientists for theories used or ignored to explain social inequalities in health (Krieger, 2001).

These constructs of eco-social theory begin to make clear the population patterns of health, well-being and disease as biological expressions of social relationships, and begin to view how these social relationships influence the basic understanding of biology, and the social constructs of disease (Krieger, 2001).

The construct and process that is central to eco-social theory is embodiment.

Krieger discusses how the notion of embodiment brings about three critical claims:

1. bodies tell stories about the conditions of a person's existence, and study of this cannot be divorced from this fact.
2. bodies tell stories that often match a person's stated accounts

3. bodies tell stories that people cannot or will not tell, because they are unable, forbidden, or choose not to.

Social and economic deprivation and discrimination, physical and sexual abuse, inadequate health care; food insecurity and fast food; lack of potable water and inadequate sanitation, and toxic exposures all leave marks on a person's body (Krieger, 2005). Krieger argues embodiment is literal- the eco-social premise states that clues to current and changing population patterns of health, which include social disparities in health, are found in the dynamic material, social, and ecological contexts into which a person is born, develops, interacts, and endeavours to live a meaningful life (Krieger, 2005). An embodied approach, then, would promote testing hypotheses to ascertain if the observed disparities are a biological expression of racial discrimination, considering the past and present (Krieger, 2005). Racial inequalities, as seen with health outcomes for Aboriginal populations, become biologically embodied over the lifecourse and across generations, which therefore create and perpetuate racial ethnic disparity (Krieger, 2001; Krieger, 2005).

Suffice it to say, determinants of health are multi-faceted and complex, and while causal pathways are not fully understood, there is increasing evidence to show how social determinants of health (such as income, housing and food insecurity) interact with biology to shape health outcomes (Yu & Raphael, 2004). It appears that type 2 diabetes is a disease that is particularly susceptible to the effects of these factors (Yu & Raphael, 2004).

1.6 Research Questions

1. Do off-reserve Aboriginal peoples with a diagnosis of diabetes report a difference in excellent-very good health status compared to Aboriginal peoples without this diagnosis?
2. Do off-reserve Aboriginal people's obesity rates exhibit higher rates when they have diabetes, than when they don't?
3. Do off-reserve Aboriginal peoples with diabetes show a difference in total family income compared to those without diabetes?

1.7 Significance of the Study

Off-reserve Aboriginal populations are likely to suffer a disproportionate burden of ill health, although little to no research has been conducted about this population. This study will fill a gap in the literature, as it uniquely examines the characteristics of health and social determinants of Aboriginal populations with diabetes living off-reserve within the framework of intersectionality and the theoretical concepts of determinants of health, specifically the eco-social theory.

Chapter Two: Review of the Literature

2.1 Introduction

There is limited research on or with, and data about, Aboriginal off-reserve populations, as the majority of research done to date on Aboriginal populations has been done in rural settings, on-reserve. To address this gap, research is needed for off-reserve populations. In this chapter, I will synthesize literature I reviewed on characteristics of urban Aboriginal populations, Aboriginal health status and health conditions.

2.1.1 Off-reserve Aboriginal peoples

In 1951, the Canadian census revealed 6.7% of the Aboriginal population lived in cities, by 2001 that percentage increased to 49% and in 2006 reached 54% (APS, 2006; Policy Research Initiative, 2003). Of this population, approximately 34% live in five major cities: Winnipeg, Edmonton, Vancouver, Calgary, and Toronto (www.aandc-aadnc.gc.ca). The urban Aboriginal population is young. In 2006, 28% were under 15 years of age compared to 17% of non-Aboriginals. Today, in 2012, more than half of Aboriginal populations are under 25 years of age (www.aandc-aadnc.gc.ca).

Cultural adaptation was the challenge of early urbanization, but by the 1980s, the emphasis shifted away from adaptation to poverty, and urban Aboriginal peoples faced challenges such as unemployment, inadequate housing, and low levels of education and income (Policy Research Initiative, 2003).

The report of the Royal Commission on Aboriginal peoples (RCAP) accurately represents the contemporary discourse on the urban Aboriginal experience; the tension between loss and opportunity (Policy Research Initiative, 2003). On the one hand, the

city represented loss of culture and community for Aboriginal migrants, yet there was also an emerging urban Aboriginal culture (Policy Research Initiative, 2003). On the other hand, the city represented opportunity for better education and employment. The downside to this migration was it drew many of the best and brightest away from reserve and rural communities (Policy Research Initiative, 2003). The RCAP emphasized the importance of Aboriginal culture to the well-being of urban Aboriginal peoples.

Urban Aboriginal peoples are similar to other urban Canadians, for they have interests, aspirations, goals, and needs that they wish to pursue within an urban landscape (Policy Research Initiative, 2003). While some Aboriginal peoples experience marginalization, others experience success; some maintain connection to their culture, many do not; some experience low socioeconomic status, others experience success and wealth. Contemporary urban Aboriginal peoples are more positive about their identity now than they have been historically (Policy Research Initiative, 2003).

2.2 Health Conditions/Co-morbidity

Research has proven that hypertension, metabolic syndrome, and diabetic complications such as cardiovascular disease (CVD), stroke, and neuropathy are all major contributors to poor health (Oster et al, 2009; Bruce & Young, 2008; Bruce et al, 2011). CVD is one of the leading causes of death in Canada, and Aboriginal populations have twice the CVD death rate of non-Aboriginal populations. The CVD rate was 8% among people of European ancestry, but 18% among Canadian Aboriginal peoples, based on a random sample (Bruce et al, 2011).

2.2.1 Diabetes

Diabetes is a chronic condition and can be caused by resistance to insulin, too little insulin, or both (www.diabetes.ca). The body gets energy by making glucose from food. To use glucose, the body needs insulin. Insulin is a hormone that helps the body control the level of glucose in the blood, and is secreted by beta cells in the pancreas. If diabetes is left uncontrolled, the results are consistently high blood sugar levels, which is known as hyperglycemia. Over time, this condition of hyperglycemia can damage nerves, blood vessels, and organs such as the heart, eyes and kidneys (“Diabetes Facts and Figures”, 2011). There are different types of diabetes. The causes and risk factors are different for each, as listed below:

Type 1 diabetes: is most often diagnosed in children, teens, or young adults, but can occur at any age. The body makes little or no insulin, and the exact cause is not known. Daily injections of insulin are needed (www.diabetes.ca).

Type 2 diabetes: most often occurs in adulthood, however, due to high obesity rates, younger people are being diagnosed. Type 2 diabetes makes up most diabetes cases. This type of diabetes is avoidable, and once contracted, can be treated or controlled through a healthy diet and exercise (www.diabetes.ca).

Gestational diabetes: is defined as high blood sugar that develops any time during pregnancy in women who do not have diabetes (www.diabetes.ca).

As explained by the World Health Organization (WHO), diabetes can, over time, damage the eyes, kidneys, nerves, heart and blood vessels (www.who.int/mediacentre/factsheets/fs312/en).

The list below describes common consequences of diabetes taken from the WHO website www.who.int/mediacentre/factsheets/fs312/en

- Diabetes increases the risk of heart disease and stroke. 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).
- Combined with reduced blood flow, neuropathy in the feet increases the chance of foot ulcers, infection and in extreme cases consequential limb amputation.
- Diabetic retinopathy is an important cause of blindness, and occurs as a result of long-term accumulated damage to the small blood vessels in the retina. After 15 years of diabetes, approximately 2% of people become blind, and about 10% develop severe visual impairment.
- Diabetes is among the leading causes of kidney failure. 10-20% of people with diabetes die of kidney failure.
- Diabetic neuropathy is damage to the nerves as a result of diabetes, and affects up to 50% of people with diabetes. Although many different problems can occur as a result of diabetic neuropathy, common symptoms are tingling, pain, numbness, or weakness in the feet and hands.
- The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes.

2.2.1.1 Oral Health

The American Diabetes Association states another consequence or complication of diabetes is oral health, as research demonstrates there is an increased prevalence of gum disease among those with diabetes (www.diabetes.org). Oral health is an overlooked complication of diabetes in Canada. Diabetes and periodontal disease⁸ are common chronic illnesses. Research has found that associations between diabetes and periodontal disease are biologically linked, and related conditions of inflammation, obesity, and

⁸ Periodontal disease- occurs when inflammation of the gingival (gum tissue) is untreated or delayed, and spreads to the ligaments and bone that support the teeth. Loss of this support causes the teeth to become loose, which can eventually be lost.

insulin resistance are considered to have an important role in this association (Ide et al, 2011). Several epidemiological studies have suggested diabetes increases the risk of periodontal disease (Mealey & Oates, 2006; Mealey & Ocampo, 2007; Taylor & Borgnakke, 2008). Ide et al, (2011) state that clinical and epidemiologic findings further suggest that periodontal infection contributes to lessened glycemic control in people with diabetes. Relatively little is known about the effects periodontal disease have on the occurrence of diabetes in the general population, or the off-reserve Aboriginal population.

Effects of hyperglycemia enhance the formation of glycosylated proteins and lipids which are biologically active, and these promote inflammation and intensify the effects of the periodontal infection (Lalla, et al, 2000).

Dunning, (2009) lists several explanations for the association between periodontal disease and diabetes that have been proposed in the literature, including:

- Microvascular disease, also known as small vessel disease, is a condition in which small arteries in the heart become narrowed (www.mayoclinic.com/health/small-vessel-disease)
- Formation of irreversible advanced glycated end products associated with oxidative stress, which affects the function and structure of the basement membranes, particularly in the small blood vessels, therefore contributing to microvascular disease
- Changes in the composition of gingival cervical fluid
- Altered collagen metabolism

- Changes in the flora of the oral cavity and overgrowth of anaerobes, such as *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis*
- Altered immune response and changed white blood cell function during hyperglycemia that contributes to delayed infection control and wound healing
- Over expression of inflammatory cytokines, such as interleukin-1B, tumor necrosis factor, and prostaglandin E₂

There is an abundance of general literature available regarding periodontal disease and therapy. Literature suggests several risk factors that affect and promote periodontal disease. These risk factors included plaque and oral hygiene, tobacco use, systemic conditions such as diabetes, specific sub-gingival bacteria, age, gender and other factors such as genetics, and environment (“Epidemiology of Perio”, 1996; Lux, 2006; “Originating group”, 2001). It has been hypothesized that high prevalence of diabetes and tobacco use coupled with reduced access and use of preventive dental/dental hygiene services could put Aboriginals at higher risk for periodontal disease (Ellerby, et al, 2000; “Epidemiology of Perio”, 1996; Lamster, Lalla, Borgnakke & Taylor, 2008; MacEntee et al., 2001; Wardman, Clement & Quantz, 2005; Ziebarth, 2003). Unfortunately, little information was found that directly stated the incidence of periodontal disease and no studies were found related to periodontal disease in Aboriginal populations.

Curiously, oral health is not addressed in the 2006 APS. Only one question was included which asked respondents if they had seen a dentist or orthodontist in the past 12 months. There were no questions about gum health or missing teeth, both of which can affect quality of life. Diabetes, periodontal disease and dental caries (decay) are of high

concern to the Aboriginal population in all stages of the lifespan. This absence of oral health in the survey could be explained through the study parameters, or survey constraints, or could reflect a gap in research design when looking at health.

National and local surveys provide evidence of substantial child oral health inequalities in Canadian Aboriginal children who experience a higher prevalence and severity of dental caries (decay) than non-Aboriginal Canadian children (FNRLHS, 2002,2003; Environmental Scan, 2012; Lawrence et al, 2008). The 2012 Environmental Scan Oral Health Services in British Columbia for First Nations and Aboriginal Children aged 0-7 years found 28.5% of Aboriginal kindergarten-aged children had evidence of visible decay, compared to 16.2% of non-Aboriginal children. 8.8% of these Aboriginal children had evidence of decay in three or four quadrants, compared to 3.7% of non-Aboriginal children (p.5). Further, the dental health of kindergarten-aged First Nations children in First Nations schools is poorer than the dental health of Aboriginal children in public or independent schools (Lawrence et al, 2008). 41.5% of Aboriginal children attending public or independent schools were caries immune (no evidence of visible decay and no existing restorations), while only 18.1% of First Nations children attending First Nations schools surveyed were caries immune (Lawrence et al, 2008).

Aboriginal families living off-reserve often face unique problems such as navigating the health care system, finding a dentist and claiming benefits (Lawrence et al, 2008). These realities further deepen the oral health divide between non-Aboriginal and Aboriginal Canadians. Research supports the fact that oral health status is linked to socio-economic status, and that people living in more isolated areas with fewer dental

caregivers generally have poorer oral health (Lawrence et al, 2008). Research has also shown that until the 2002/2003 RHS, the only national indicator of First Nations oral health in Canada was the data obtained from the NIHB program, which is limited to actual users of dental services and neglects those who don't access care through this program (Lawrence et al, 2008). Findings from the RHS 2002/2003 questionnaires revealed 41% of First Nations adults did not receive any dental care in the previous 12 months; moreover, 19% of First Nations children had experienced some dental pain in the previous 12 months (Lawrence et al, 2008).

Research has also identified periodontal disease as an additional oral health concern for Aboriginal peoples (First Nations and Inuit Health Branch, 2003). Unfortunately, little information was found that directly stated the incidence of periodontal disease and no studies related to periodontal disease in Aboriginal peoples were found.

Lamster et al, (2008), report on two longitudinal studies of the Gila River Indian Community in Arizona which support the relationship between the risk of clinical complications of diabetes and poor periodontal health (Lamster et al, 2008).

They report the following:

“Saremi and colleagues studied 628 adults 35 years or older who had diabetes for a median of 11 years. Using a fully adjusted model, the researchers found that the risk of death from cardiac or renal disease for people with severe periodontitis was 3.2 times higher than that of people with no, mild, or moderate periodontitis. Shultis and colleagues examined periodontitis as a risk factor for renal complications of diabetes, including nephropathy and end stage renal disease. They used the same definitions of periodontal disease, as did Saremi and colleagues and observed similar findings. Using a fully adjusted model, they found that the incidence of nephropathy was 2.0 to 2.6 times greater in people who had moderate to severe periodontitis or

who were edentulous than it was for those who had no or mild periodontitis” (pp. 234-235).

Additional research suggests that diabetic patients with periodontal disease may have an increased risk of diabetic complications. Deshpande et al, (2010) cite a study which analyzed over 600 subjects. Their findings indicate that periodontal disease is a significant risk factor for myocardial infarction and stroke, as well as diabetes. The study also found that patients with severe periodontitis have a 2.3 times higher death rate from ischemic heart disease compared to those with no or mild periodontitis (Deshpande et al, 2010). Also, in patients with severe periodontitis, the death rate from diabetic nephropathy was 8.5 times higher, and the overall mortality rate from cardio renal disease was 3.5 fold higher (Deshpande et al, 2010). Further research involving Aboriginal communities is required to increase our understanding of the oral health status and related issues within this population.

2.2.1.2 Prevalence of diabetes

Causes of type 2 diabetes are complex; age, obesity, inactivity, genetics and ethnicity are important risk factors. Economic, social, environmental and lifestyle factors have significant effects on the distribution of type 2 diabetes in the Canadian population. In 2008/09, almost 2.4 million Canadians were living with diabetes. From 1999- 2009, the prevalence of diabetes among Canadians increased by 70%, with the greatest increase seen in the 35-39 and 40-44 year old age groups, in which the proportion doubled (“Diabetes facts and figures”, 2011). However, at every age group, individuals with diabetes experienced mortality rates at least two times higher than those without (“Diabetes fact and figures”, 2011).

The 2002/2003 First Nations Regional Health Survey reported over 19.7% of First Nations adults having been diagnosed with type 2 diabetes, whereas in the general Canadian population the rate is 4.5% (McKee et al, 2009). Diabetes was rare in the North American Aboriginal population prior to 1940, with rates increasing rapidly after 1950 and currently reaching epidemic levels (“Diabetes facts and figures”, 2011). In the First Nations, Inuit and Métis populations, rates of diabetes and its complications have increased in the last fifty years, with significant contributors being socio-cultural, environmental, biological and lifestyle changes (“Diabetes facts and figures”, 2011). Current theories found in the literature suggest the transition to a western diet of high carbohydrate and fat-rich type food, lifestyle changes, and complex psycho/social factors have resulted in increased obesity rates, obesity being the accepted risk factor for diabetes (Sharp, 2009). However, there are other possible risk factors not yet fully explored by health researchers which may contribute to the observed high prevalence rates in the Aboriginal population.

2.2.1.3 Metabolic Syndrome

According to the Canadian Diabetes Association, metabolic syndrome is a term used to describe a group of conditions that places a person at higher risk for developing type 2 diabetes, heart disease, and heart related problems (www.diabetes.ca). A person is considered to have metabolic syndrome if 3 or more of the following are present:

- Abdominal obesity or too much fat around the waist (a waist circumference greater than 102cm in men and greater than 88cm in women).
- Low levels of HDL, the “good” cholesterol (lower than 1.0 mmol/L in men or 1.3 mmol/L in women)

- High fasting blood glucose levels (5.6 mmol/L or higher)
- High blood pressure (130/85 mmhg or higher)
- High level triglycerides, a type of fat in the blood (1.7mmol/L or higher)

There is continued debate regarding the exact cause of metabolic syndrome; some researchers believe the cause to be insulin resistance, others feel it is caused by genetics, old age or lifestyle (www.diabetes.ca). Abraham et al, (2007), add to this debate by stating “accumulating epidemiological, biological, and mechanistic evidence indicates that psychosocial, neuroendocrine, immunogenic, and oxidative stress play critical roles in the development of metabolic syndrome, cardiovascular disease, and type 2 diabetes (Abraham, Brunner, Eriksson & Robertson, 2007)”.

2.2.2 Obesity

The prevalence of being overweight and obese is much higher among Aboriginal peoples than among the rest of the population in several countries, including Canada, the United States, Australia, New Zealand, and the Pacific Islands (Garriguet, 2008). Being overweight or obese has been associated with several chronic systemic conditions, such as diabetes, cardiovascular disease and high blood pressure. According to the 2000/2001 Canadian Community Health Survey, 33.5% of off- reserve Aboriginal peoples were overweight and an additional 24.7% were obese (Tjepkema, M, 2002). However, in the 2006 APS, 80% of Aboriginals living off-reserve reported being overweight to obese. One study found the prevalence of obesity and associated co-morbidities was higher among women than men (Bruce et al, 2011). Factors associated significantly with obesity among women were employment status, diastolic blood pressure, and insulin resistance

(Bruce et al, 2011). In a sample drawn from Manitoba First Nations adults, co-morbidity was high among young people in the 18-29 year age group (Bruce et al, 2011). This is a finding of concern, especially for young women in this age group who are of reproductive age. The relationships between maternal obesity and type 2 diabetes, gestational diabetes, poor birth outcomes, and development of obesity and type 2 diabetes among the offspring are well documented (Bruce et al, 2011). Bruce et al, (2011) observe that despite the evidence of excess obesity, diabetes, and related metabolic conditions among Canada's First Nation populations, few researchers have investigated their coexistence (Bruce et al, 2011 p. 2). According to Katzmarzyk and Janssen, (2004) the direct and indirect medical costs associated with overweight to obesity in Canada in 2001 were estimated at \$1.6 billion (CAD) and \$2.7 billion (CAD), respectively. This represents 2.2% of the total healthcare costs (Pouliou & Elliott, 2010).

2.2.3 Cardiovascular disease

Bruce et al, (2011) found that among participants with abdominal obesity, 48% had hypertension and 35% had diabetes, yet alarmingly, about one-third of the hypertension and one-quarter of diabetes cases among this group were undiagnosed (p. 4). Prevalence of cardiovascular disease among Aboriginal peoples in Canada has been increasing and is now higher than the prevalence in the non-Aboriginal population (Riediger, Bruce & Young, 2011). In a random sample of Canadian Aboriginal peoples, prevalence of cardiovascular disease was 18%, compared to just 8% in Canadians of European descent (Riediger et al, 2011).

Despite the high rate of type 2 diabetes and cardiovascular disease among Canadian Aboriginals, little research has gone beyond examining traditional risk factors

(Riediger et al, 2011 p. 1). In addition, research has been based on chart review, and the few population-based studies conducted have been limited to localized First Nation communities (p. 1-2). A shortcoming of this data is that due to its cross-sectional nature, no health outcome data is available.

2.2.4 Stress

Literature also suggests a critical link between stress and diabetes. Stress has been recognized as a key etiology of type 2 diabetes and directly affects the management of diabetes among people already diagnosed with this disease through behavioural and physiological mechanisms (International Diabetes Foundation, 2003). Stress can arise when Aboriginal peoples cope with conditions such as low income, poor quality housing, unstable employment, food insecurity, and discrimination based on Aboriginal status, gender, or disability (Mikkonen & Raphael, 2010). Also, stress is increased through social isolation, lack of supportive relationships, and mistrust of others (Mikkonen & Raphael, 2010). Chronic stress, at a physiological level, can lead to prolonged biological reactions which strain on the body, for evidence has shown this continuous stress weakens the resistance to disease and disrupts metabolic and hormonal function (McEwan, 2008; Mikkonen & Raphael, 2010). These physiological stresses make people more vulnerable to serious illnesses such as type 2 diabetes, cardiovascular disease, and immune system conditions (Mikkonen & Raphael, 2010).

2.2.5 Determinants of Health

According to the World Health Organization (WHO) the social determinants of health are defined as the conditions in which people are born, grow, live, work and age,

including the health care system. These conditions are further influenced by the distribution of wealth, power and resources. (www.who.int/social_determinants/en).

Table 1 Social Determinants of Health

Social Determinants of Health

Among the variety of models of the social determinants of health that exist, the one developed at a York University Conference held in Toronto in 2002 has proven especially useful for understanding why some Canadians are healthier than others. The 14 social determinants of health in this model are:

Aboriginal status
 disability
 early life
 education
 employment and working conditions food insecurity
 health services
 gender
 housing
 income and income distribution race
 social exclusion
 social safety net
 unemployment and job security

Each of these social determinants of health has been shown to have strong effects upon the health of Canadians. Their effects are actually much stronger than those associated with behaviours such as diet, physical activity, and even tobacco and excessive alcohol use.

Source: Raphael, D. (2009). *Social Determinants of Health: Canadian Perspectives*, 2nd edition. Toronto: Canadian Scholars' Press.

The impact of the social determinants of health manifests quite differently among the Aboriginal groups in Canada (Loppie-Reading, Wein, 2009), and the social determinants of health affecting Aboriginal peoples are analogous to parts of a tree. The branches represent the *proximal* or surface determinants such as poverty, conditions that affect people meeting their daily needs, and stressors that generate or exacerbate health issues; the tree trunk represents the *intermediate* or core determinants of health. These intermediate determinants are the origin of proximal determinants such as labour systems, education systems, community infrastructure, resources and capacities; the *distal* or root determinants have the most profound influence on the health of populations and represent

political, economic and social systems or structures. An example of distal determinants are colonization, racism, marginalization and oppression. All of these determinants of health illustrate intersectionality: the complex simultaneous intersections of identity, systemic oppression and social difference, both at micro and macro levels, which seem to impact the Canadian Aboriginal population.

Proximal determinants (or surface determinants) of health are conditions that have a direct impact on mental, spiritual, emotional and physical health. These conditions act as stressors which can increase behavioural, emotional and social problems for youth and adults (Loppie-Reading, Wein, 2009). It is difficult to find literature that describes the mechanism with which the proximal determinants influence health. Proximal determinants of health are key factors in a person's ability to gain access to the basic material resources (Loppie-Reading, Wein, 2009).

Well recognized proximal determinants are health behaviours. Among Aboriginal peoples, the documented health behaviours include the overuse of alcohol, and cigarettes (Loppie-Reading, Wein, 2009). Lack of exercise and poor diet are also behavioural factors that contribute to the increase of type 2 diabetes rates in both Aboriginal adults and youth. While the 2006 APS did not find a significant difference in the percentage of self-reported smokers with and without diabetes (31% vs. 34%), Loppie-Reading & Wein (2009), reported that Aboriginal adults are more than twice as likely to smoke cigarettes as non-Aboriginal adults (p.7).

Intermediate or core determinants of health are defined as the origin of proximal determinants discussed above. Poverty and harmful living environments stem from a lack of community infrastructure, resources, and restricted environmental stewardship

(Loppie-Reading, Wein, 2009). The inequitable health care and educational systems create barriers to developing or accessing health promoting behaviours, opportunities, and resources (Loppie-Reading & Wein, 2009). Current health care services remain focused on communicable diseases, while mortality and morbidity among Aboriginal peoples increasingly result from chronic illness, while social access to health care is limited or denied to Aboriginal peoples through health systems that fail to account for culture, language, or social and economic determinants of Aboriginal peoples' health (Loppie-Reading & Wein, 2009). Current research suggests that adequate education continues to be denied to Aboriginal peoples, which impacts their potential income, employment and living conditions (Tjepkema, 2002). Most Canadian educational curriculum continues to lack Indigenous content or learning styles, through culturally competent curriculum even though this has demonstrated benefits and facilitates retaining Aboriginal high school students (Loppie-Reading, Wein, 2009). An important step in improving these intermediate determinants is to include culturally competent curriculum in all levels of education.

Environmental stewardship is another recognized intermediate determinant of health. Prior to European colonization of the Americas, traditional ties to the natural environment provided a major resource to maintaining the superior health of Indigenous peoples, but the contamination of fish, vegetation, wildlife, and water has forced Aboriginal peoples to rely less on their natural environment.

Distal or root determinants are believed to have the most profound influence on the health of populations, for they represent economic, political and social contexts that construct both intermediate and proximal determinants (Loppie-Reading & Wein, 2009).

For Aboriginal peoples, social exclusion, colonialism, racism, and repressed self-determination act as the distal determinants from which all other determinants are constructed (Loppie-Reading & Wein, 2009). Again, this is an illustration of intersectionality, which was discussed in Chapter 1.

While neo-colonialism detrimentally influences the health of contemporary Aboriginal peoples, historic, successively traumatic events continue to affect generations through what can be referred to as ‘historic or cultural’ trauma (Klem, 1998). The collective burden of a repressive colonial system on Aboriginal peoples has created conditions of economic, political, psychological, and physical disadvantage.

Aboriginal peoples cannot attain the same level of health as other Canadian people unless there is equitable distribution of the determinants of health (Loppie-Reading & Wein, 2009). Often marginalized by colonization and access to material resources, Aboriginal peoples continue to be exposed to health damaging intermediate and proximal determinants, which increase their vulnerability to illness and reduce their capacity to address ill health (Loppie-Reading & Wein, 2009). This is evident in the results and findings reported in the 2006 APS and the results chapter of this thesis.

2.3 Reported barriers to diabetes diagnosis and care

2.3.1 Income

The legacy of colonization has left Aboriginal peoples disproportionately ranked among the poorest of Canadians. In 2006, the median income for Aboriginal peoples was \$18,962 (Wilson & Macdonald, 2010). This is 30% lower than the median income of \$27,097 for the rest of Canada; the income gap in urban settings is \$7,083 and \$4,492 in rural settings (Wilson & Macdonald, 2010). While income disparity between Aboriginal peoples and other Canadians narrowed slightly between 1996 and 2006, it will take 63

years for the gap to be erased when using this current rate of change (Wilson & Macdonald, 2010). According to Frohlich et al, (2006) Canadians with the highest household incomes are two and a half times more likely to report excellent to very good health than those with the lowest income (p. 137).

Income could be the most important social determinant of health, as level of income affects psychological functioning, shapes overall living conditions, and influences health related behaviours such as excessive alcohol use, tobacco use, quality of diet, extent of physical activity, food security, and housing (Mikkonen & Raphael, 2010). Low income predisposes people to social and material deprivation; the greater the deprivation the less likely people are able to afford the basic pre-requisites of health, such as clothing, housing and food (Mikkonen & Raphael, 2010). Many studies show that type 2 diabetes and heart attacks are more common among low income Canadians (Mikkonen & Raphael, 2010). In theory, low income as a barrier to care can be manifested indirectly through expressions of poverty including lack of knowledge regarding availability of care, due to lack of television, computer, newspapers or literature; transportation costs to access care, either automobile or public transit and apathy or hopelessness about their health and other factors unique to individual circumstances.

2.3.2 Cultural acceptance

Although cultural acceptance is a barrier to care, Aboriginal healthcare providers may help to overcome this barrier. The traditional view of health among most Aboriginal peoples is a holistic view of the manifestations of illness, (Wien et al., 1999; McKee et al., 2009) such as treating minor illnesses, colds or headaches, with herbal medication, while relying on healers to treat serious illnesses (Wien et al., 1999; McKee et al., 2009).

Even though Aboriginal peoples in Canada can now benefit from the Non-Insured Health Benefits Program (NIHB) of the First Nations and Inuit Health Branch of Health Canada, there have been difficulties balancing cultural differences and awareness of how health care is understood between Aboriginal communities and non-Aboriginal communities (“First Nations Action”, 2005; Gerlach, 2007; Schroth et al., 2008; Wien et al., 1999).

As a result, The First Nation and Inuit Regional Health Survey (FNIRHS) found complaints such as poor communication between patients and doctors, as well as separation of knowledge and power between Aboriginal peoples and non-Aboriginal providers (Wien et al., 1999). A report of the Health Status of Canada’s First Nations, Métis and Inuit peoples outlined the lack of culturally sensitive workers and programs as one of the determinants of health (Schroth et al., 2008). Therefore, in order to approach Aboriginal peoples with cultural sensitivity, several qualities have been suggested: respecting the individual, practicing conscious communication (listening well and taking notes), using interpreters, involving the family in decision making, recognizing alternative approaches to truth-telling (avoiding direct communication), practicing non-interference (decisions made by personal identity and cultural knowledge), and allowing for aboriginal medicine (involving of aboriginal elders and healers) (Ellerby et al., 2000).

2.4 Summary of Literature Reviewed and Rationale for the Study

Research is scarce for longitudinal trends of type 2 diabetes in Aboriginal populations (Oster, R.T, et al, 2011). Significant gaps found in the literature search support the need for research for Aboriginal populations with type 2 diabetes living off-reserve in urban centres. Cumulatively, the articles suggest need for more research into cultural sensitivity, and health implications of type 2 diabetes on Aboriginal children,

adults and families. There is a great need for culturally safe non-Aboriginal healthcare professionals, and for Aboriginal peoples to be trained in health professions. Cultural safety should be taught to students in healthcare professions as part of their curriculum to raise awareness of the social conditions regarding the gross inequalities that exist for Aboriginal children, youth and families, but perhaps more important, the health care providers' privileged role and challenging them to critically examine their underlying assumptions about Aboriginal peoples' health and the unequal power relationship experienced by many Aboriginal peoples, in hopes that inequality gaps will rapidly decrease through awareness and advocacy.

Non-Aboriginal Canadians need to recognize the horrific inequity experienced by many Aboriginal peoples in the form of marginalization, poverty, lack of healthcare and poor living conditions, yet improvements can only be made through changes in policies, education, eradication of extreme poverty and greater cultural understanding.

It is important for healthcare programs or health research to be done in partnership with Aboriginal peoples as a way of combating the historical impacts of colonization and oppression, as well as utilizing traditional Aboriginal culture and teachings to realized a better future regarding Aboriginal health.

Off-reserve Aboriginal communities, the Victoria Friendship Centre, the Diabetes Association, and the Centre for Aboriginal Health Research Centre at the University of Victoria are all key stakeholders that can interact to aid with informing the topic of type 2 diabetes, reducing barriers to diagnosis and treatment, and promoting best practices when

conducting health research with Aboriginal populations off-reserve because of the strength in diversity of vast information, resources and life experiences they can offer.

Chapter Three: Research Design and Methods

3.1 Introduction

Quantitative data evaluation was completed through an exploratory analytic cross-sectional study of secondary data from the APS received from Statistics Canada. The data came in the form of coded, anonymized data tables derived from two (2) National surveys, the Adult Core ⁹(15yrs +) and Child & Youth ¹⁰(6-14 yrs) that were conducted by Statistics Canada in 2006, as part of the Aboriginal peoples Survey (APS). The APS is a national survey of Aboriginal peoples (First Nations, Inuit and Métis) living off-reserve in urban, rural and northern locations throughout Canada. These tables reflected answers to survey questions related to obesity, diabetes, and diabetes care, from childhood to adulthood. Access to the original raw data information was not granted by Statistics Canada for this study.

Analytic cross-sectional studies observe a sample of a population at a single point or brief period of time. These are sometimes referred to as prevalence studies, since prevalence rates are the usual measure employed in the analysis. There are major strengths and weakness to this type of study. They are generally onetime surveys with little to no follow up, so are quick, easy to undertake, and economical. Yet, it can be a challenge to differentiate cause and effect from simple association, and cross-sectional studies do not provide an explanation for the findings.

⁹ Adult Core Survey- was administered to Aboriginal adults (all Aboriginal adults, which includes First Nations, Inuit and Métis), 15 years and older living off-reserve, in all provinces and territories.

¹⁰ Child and Youth Survey- was directed at Aboriginal children and youth, 6-14 years old living off-reserve in all provinces and territories. The parent or guardian answered the questionnaire on behalf of the child or youth.

Due to the constraints of this study, with coded data provided by Statistics Canada, the methods used for data analysis were theirs. Again, I stress that I did not have access to the data directly, and did not request the data directly, as this was done by my primary supervisor.

Therefore, the following chapter is a condensed summary of the full methods guide for this survey which may be accessed at <http://www.statcan.gc.ca/pub/89-637-x/89-637-x2008003-eng.htm>.

3.2 Research Design

The Aboriginal peoples Survey (APS) is conducted on citizens aged 6 years and older, and provides data on the economic and social conditions of First Nations people living off-reserve, as well as Métis and Inuit people (Appendix B ¹¹, p. 6). The 2006 Aboriginal peoples Survey was conducted by Statistics Canada and its design and implementation were done in partnership with national Aboriginal organizations (Appendix B, p. 6). With Statistics Canada releasing the 2006 survey, the Aboriginal peoples Survey (APS) provides a current picture of the situation for off-reserve Aboriginal peoples, as changes can be tracked by comparing it to the two previous Aboriginal peoples Surveys conducted first in 1991 and again in 2001 (Appendix B, p. 6). Survey objectives were primarily to provide data on the economic and social conditions of off-reserve Aboriginal peoples in Canada, specifically focusing on issues of income, employment, language, housing, schooling, mobility and health (Appendix B, p. 6). The APS 2006 was designed to address some of the gaps that exist in the data that had

¹¹ Statistics Canada Methods Guide for the 2006 APS can be found at <http://www.statcan.gc.ca/pub/89-637-x/89-637-x2008003-eng.htm>.

previously existed for Aboriginal peoples (Appendix B, p. 6). This information cannot be found anywhere else, and can be used to answer a wide range of questions related to community planning, program development and healthcare priorities (Appendix B, p. 6).

Over 60,000 people were invited to take part in the 2006 APS (Appendix B, p.6). The response rate was noted to be 80.1%. The Statistics Canada Methods guide includes a summary table of sample sizes and response rates by geographic domain under tab 5.4, p. 17, but does not provide more detailed statistics, such as age, gender, or educational attainment.

3.3 Population of the Study

The target population for the 2006 APS includes all Aboriginal peoples 6 years of age and older as of October 31, 2006 living in Canada who have North American Indian, Métis, or Inuit identity or ancestry; excluding those populations living in Indian settlements or on-reserve, but including all of the Aboriginal peoples living in the territories (Appendix B, p. 12). The Aboriginal peoples Survey is a postcensal survey, for the APS sample was selected from reported responses to the Census questionnaire (Appendix B, p. 12). The APS sample was selected from reported answers to four screening questions on the Census long form (Appendix B, p. 12). The four questions used to screen and identify the Aboriginal population are the ethnic origin question (question 17), the Aboriginal self-reporting question (question 18), the Indian band/ First Nation membership question (question 20) and the Treaty or Registered Indian question (question 21) (Appendix B, p. 12).

The Identity Aboriginal groups were defined as follows in the APS 2006 methods guide:

- North American Indian (NAI) only- individuals reporting only NAI to question 18

- Métis only- individuals reporting only Métis to question 18
- Inuit only- individuals reporting only Inuit to question 18
- Multiple identity- individuals reporting more than one group to question 18
- Registered Indian or band member only- individuals with a positive answer to question 20 or question 21 but NO to question 18

Geographic regions were separated between Inuit regions and outside Inuit regions (Appendix B, p. 15).

3.4 Sampling design

3.4.1 Domains of estimation

a) Domains

Domains of estimation are groups of units for which estimates are targeted (Appendix B, p. 14). The domains of estimation for the 2006 APS were very similar to the ones used in 2001, except that Indian reserves were not covered in 2006, with the exception of the Territories (Appendix B, p. 14). No estimate is targeted for the ancestry-only population, but the domains of estimation were based on the identity population mentioned in section 3.3 above (Appendix B, p. 14).

i) Inuit regions

Estimates are targeted for both children and adults in Inuit communities (Appendix B, p. 15). The target for individual Inuit community profiles in the adult population was to estimate a characteristic present in no less than 10% of the population, and a coefficient of variation (CV) of 25% (Appendix B, p.15).

ii) Outside Inuit regions

Large provinces were divided into the main Census Metropolitan Areas (CMAs), the rest of the urban portion of the province, and the remaining rural portion of the province (Appendix B, p. 15). Certain small provinces were divided into rural and urban

only, and Newfoundland was divided between Labrador and non Labrador (Appendix B, p. 15). Additionally, estimates were targeted for 5 Census Subdivisions (CSDs) with large Aboriginal concentrations for all Aboriginal groups combined, and children and adults counted separately (Appendix B, p.16).

The 5 CSDs are as follows:

- Thompson (Manitoba)
- Prince Albert (Saskatchewan)
- Prince Rupert (British Columbia)
- Whitehorse (Yukon)
- Yellowknife (Northwest Territories)

The target was to estimate a minimum proportion of 7.5% for adults and 10% for children, with a CV of 20%; for the CSDs; a minimum proportion of 10% for adults and 15% for children was used, with a CV of 25% (Appendix B, p.15).

b) Targets in each domain

Several factors could influence the ability of achieving the targeted CVs such as population size, the expected response rate, the number of long forms available, the expected number of false positives (for example, an Aboriginal person according to the Census but a non Aboriginal person according to the APS), the expected sample loss due to the constraint of selecting no more than three individuals per household, the expected loss due to the reduction of overlap with other postcensal surveys, and the expected loss due to overlap with the National Longitudinal Survey of Children and Youth (NLSCY) (Appendix B, p. 16).

3.4.2 Sampling Plan

The APS selects its samples from the Census long form sample, either from the 2B or 2D version of the long form (Appendix B, p. 16). Once the frame is constructed, it is stratified according to the domains of estimation, and then further stratified by the

2B/2D regions (Appendix B, p. 16). The next step is to select a simple random sample within each domain of estimation that is crossed by the 2B/2D regions (Appendix B, p. 16). A two-phase sample design is used since the Aboriginal peoples Survey (APS) is a long form sample, whereas a sample of households are selected in the first phase and a sample of individuals is selected in the second phase (Appendix B, p. 16).

3.5 The Sample

For the APS the initial sample size was 62,579. After the overlap reduction with other surveys, the number was reduced to 61,041 individuals (Appendix B, p. 17).

3.6 Data Collection

The Aboriginal peoples survey was conducted from October 2006 to March 2007 (Appendix B, p. 18).

3.6.1 Mode of collection

The APS was collected using paper questionnaires; the Adult questionnaire was administered to adults (15 years and older), and the Children and Youth questionnaire was administered to Aboriginal children and youth age 6 to 14 years old (Appendix B, p. 18). No interview could proceed without prior approval of an individual's parent or guardian for Aboriginals between the ages of 15 to 17 years of age (Appendix B, p. 18). For children and youth, the parent or guardian answered the questionnaire on their behalf, yet children from 12 to 14 years could respond with parent/guardian permission (Appendix B, p. 18). Children who lived on their own, however, could complete the questionnaire without parental or guardian consent (Appendix B, p. 18).

Telephone interviews were conducted in most areas; however, in Inuit regions, Labrador and the Northwest Territories personal interviews were conducted (Appendix B, p. 18).

3.6.2 Aboriginal languages

The Aboriginal peoples Survey was translated into 20 Aboriginal languages and both interpreters and translators were hired when necessary (Appendix B, p. 18).

3.7 Ethical Considerations

Ethical considerations were addressed through an application for ethical review waiver form, which was submitted to the University of Victoria ethics committee. Approval of this waiver was granted, as all data received from Statistics Canada was coded in the form of secondary data. Please see Appendix A.

3.8 Data Processing

3.8.1 Data capture

The data capture was performed at the head office of Statistics Canada in Ottawa. Two methods were used to capture the questionnaires: optical character recognition (scanning), and key entry (Appendix B, p. 19). When data quality fell below acceptable standards, questionnaires were recaptured and some abnormalities created by the optical reading system were identified and corrected during editing (Appendix B, p. 19).

3.8.2 Editing

The first stage of error detection was done during data collection. Interviewers were asked to check their questionnaires page by page to ensure everything had been filled out clearly and correctly, as well as making sure skips had been followed properly (Appendix B, p. 19). When questions had been incorrectly missed, interviewers were

instructed to contact respondents again to obtain the missing information (Appendix B, p. 19).

Stage two of the survey processing involved editing all survey records according to pre-specified edit rules (Appendix B, p. 19). This was done to check for gaps, errors and inconsistencies in the survey data (Appendix B, p. 19). Validity checks on each variable were made, and inconsistencies between related questions were corrected (Appendix B, p. 19). When errors were found, the information was replaced with “not stated” code, or corrected based on the answers to other questions (Appendix B, p. 19). Corrections were usually done in an automated way, but analysts reviewed some problematic situations on a case-by-case basis (Appendix B, p. 19). Lastly, a macro-level verification was done through analyzing frequency distributions to identify anomalies (Appendix B, p. 19).

3.8.3 Weighting

In a sample survey, each selected person represents not only herself/himself, but also persons not sampled (Appendix B, p. 19). Consequently, a weight is associated with each selected person to indicate the number of persons that she/he represents (Appendix B, p. 19). This weight must be used for all estimations; for example, in a simple random sample of 2% of the population, each person represents 50 people in the population (Appendix B, p. 19). The initial weight is then adjusted. There were seven steps used in the weighting process (Appendix B, p. 19).

These seven steps include: 1) Initial weights, 2) Adjustment for overlap with other surveys, 3) Adjustment for units selected in the Aboriginal Children’s Survey, 4) Adjustment for adult-child child-adult conversion, 5) Adjustment for out of scope units,

6) Adjustment for non-response, and 7) Post-stratification adjustments (Appendix B, pp. 20-22).

3.9 Data Quality

3.9.1 Sampling Errors

The APS used the coefficient of variation (CV) of the estimate as the measure of sampling error, which is the standard error of the estimate divided by the estimate itself (Appendix B, p. 23).

3.9.2 Non-sampling Errors

To aid in the reduction of non-sampling error, the 2001 APS experience was used to evaluate the entire 2006 APS survey process, from the questionnaire to the data processing (Appendix B, p. 24). The bias was assumed to be small due to the high response rate obtained in the Census, and the adjustments made on the initial Census weights (Appendix B, p. 24). The APS guide further discusses interviewer training and quality control measures which were used to minimize the occurrence of non-sampling errors.

3.10 Dissemination

The 2006 APS master file is available in Statistics Canada's Research Data Centres (RDCs) which has accompanying information that includes the record layout, SAS and SPSS syntax to load the file, as well as metadata in codebook form that describes each variable and provides weighted and unweighted frequency counts (Appendix B, p. 25). Upon request, custom tabulations will be produced on a cost-recovery basis (Appendix B, p. 25). All information regarding the Aboriginal people's Survey is available on Statistics Canada's website.

Chapter Four: Results

4.1 Introduction

In this chapter, I will discuss results of the Statistics Canada data tables to support the hypothesis that Canadian Aboriginal adults and children continue to suffer poor overall health, and struggle with low socioeconomic status as well as associated comorbidities. I will present the data, the interpretation of the hypotheses, and the summarized findings.

4.2 General Description of the Data

Distributions of selected health measures with and without diabetes are summarized in Table 1 for adults, and Table 2 for children and youth. The overwhelming theme is the profound effect diabetes has on the health and well being of Aboriginal adults, children and youth. Oral health is not included, as it was not significantly reflected in the APS, 2006. Therefore, significant data could not be analyzed and reported. According to the 2006 APS, 7.2% of the adult Aboriginal population self-reported being diagnosed with diabetes. Of those adults, 14.1% stated it was type 1 diabetes, 66.5% stated it was type 2 diabetes, and 19.4% of responses fell into the “unknown” category. Due to the nature of type 1 diabetes, it could be assumed that a person would know if they had type 1, therefore, the majority of the 19.4% would be type 2 diabetes.

Table 2 Adult Health (Census, APS, 2006)

Category	Indicator	With Diabetes (%) CI= 95%	Without Diabetes (%) CI= 95%
Self-reported Health	Excellent – Very Good	19.7 (CI= 16.1- 24.3)	58.5 (CI= 56.8 -60.2)
	Good	29.1 (CI= 26.4 - 32)	26.6 (CI= 25.8 -27.5)
	Fair - Poor	51 (CI= 45.4 - 57.1)	14.7 (CI= 13.7 -15.7)
Body Weight (WHO-BMI method)	Underweight-Normal weight	13.6 (CI= 11.3 – 16.2)	34.4 (CI= 33.3 – 35.6)
	Overweight-Obese Class 111	78.7 (CI= 69.2 – 89.5)	51.4 (CI= 49.2 – 53.7)
	Not Stated	5.7 (CI= 4.4 – 7.3)	4.2 (CI= 3.8 – 4.5)
Co-Morbidity	High Blood Pressure	50.8 (CI= 47.4 -54.3)	13 (CI= 12.3 – 13.7)
	Take Treatment for High BP	45 (CI= 41.6- 48.5)	8.7 (CI= 8.2- 9.2)
	Heart	23.4 (CI= 20.7 – 26.3)	5.7 (CI= 5.2 – 6.2)
	Treatment for Heart	19.5 (CI= 16.9 – 22.3)	3.2 (CI= 2.9 – 3.5)
	Circulation	31.8 (CI= 28.8 – 35)	0
	Neuropathy	39.4 (CI= 36.3 – 42.6)	0
	Infection	15.1 (CI= 12.8 – 17.7)	0
Health Services in past 12 months	Physician- General Practitioner	89.2 (CI= 87.4 – 90.9)	68.6 (CI= 67.8 – 69.5)
	Traditional Healer	10.8 (CI = 8.7 – 13.3)	5.8 (CI = 5.4 – 6.3)
Taking Insulin		24.3 (CI= 21.4 – 27.3)	0
Total Family Income	< \$ 25,000	32.9 (CI= 29.8 – 36.2)	22 (CI= 21.3 – 22.9)
	\$25,000 - \$49,000	30 (CI= 26.8 – 33.5)	25.9 (CI= 25.1 – 26.8)

Table 3 Child Health (Census, APS, 2006)

Category	Indicator	With Diabetes (%) CI= 95%	Without Diabetes (%) CI= 95%
Self-Reported Health	Excellent- Very Good	19.5 (CI= 10.4 – 33)	82 (CI= 80 – 83.9)
	Good	39 (CI= 24.8 – 53.9)	14.6 (CI= 13.8 – 15.3)
	Fair- Poor	22.1 (CI= 12.1 – 38.3)	3.4 (CI= 2.9 – 3.9)
Body Weight (CDC method)	Normal Weight	32.5 (CI= 20.1 – 46.8)	43.9 (CI= 42.8 – 45)
	Overweight	27.3 (CI= 15.8 – 43.6)	21.8 (CI= 21 – 22.7)
Co-Morbidity-diagnosed by a doctor, nurse or health professional	Psychological or nervous difficulty	24.7 (CI= 13.2 – 39.9)	3.8 (CI= 3.4 – 4.2)
Health Services in past 12 months	Physician- General Practitioner or Pediatrician	79.2 (CI= 66.2 – 87.9)	53.8 (CI= 52.7 – 54.8)
	Traditional Healer	0	4.5 (CI= 4 – 5)
	Hospital Stay	19.5 (CI= 10.2 – 33.3)	2.7 (CI= 2.4 – 3.1)
Child taking Insulin or other diabetes meds		46.8 (CI= 32.2 – 61.4)	0
Total Family Income	< \$25,000	45.5 (CI= 30.9 – 60.8)	25.5 (CI= 24.6 – 26.4)
	\$25,000 - \$49,999	18.2 (CI= 9.3 – 32.8)	29.4 (CI= 28.4 -30.4)

4.3 Hypothesis-by-Hypothesis Presentation and Interpretation of Results

4.3.1 Null Hypothesis 1

Aboriginal peoples report no difference in excellent-very good general health status when they have diabetes or don't have diabetes.

i) Adults – Self-Reported

19.7% (16.1-24.3 95% CI) of the proportion of Aboriginal Adults with diabetes reported general health status of excellent to very good, yet 58.5% (56.8-60.2 CI) of those without diabetes reported excellent to very good health status.

A comparison of the general health of Aboriginal males with and without diabetes is illustrated in Figure 1. The proportion of those males with diabetes who feel their general health is excellent to very good is 20.4% (15.7-26.5 95% CI), compared to 60.7% (58.3-63.3 95% CI) of males without diabetes.

18.4% (15-22.4 95% CI) of males with diabetes feel their health is poor, compared to only 3.6% (3.1-4.1 95% CI) males without diabetes.

Figure 1: Comparison of Aboriginal Males General Health

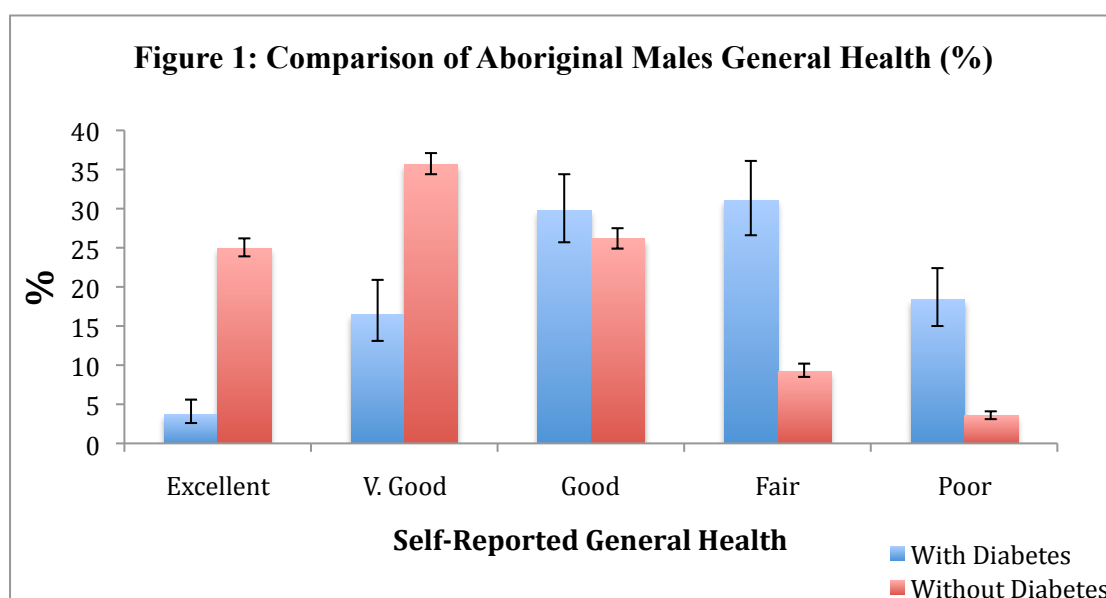
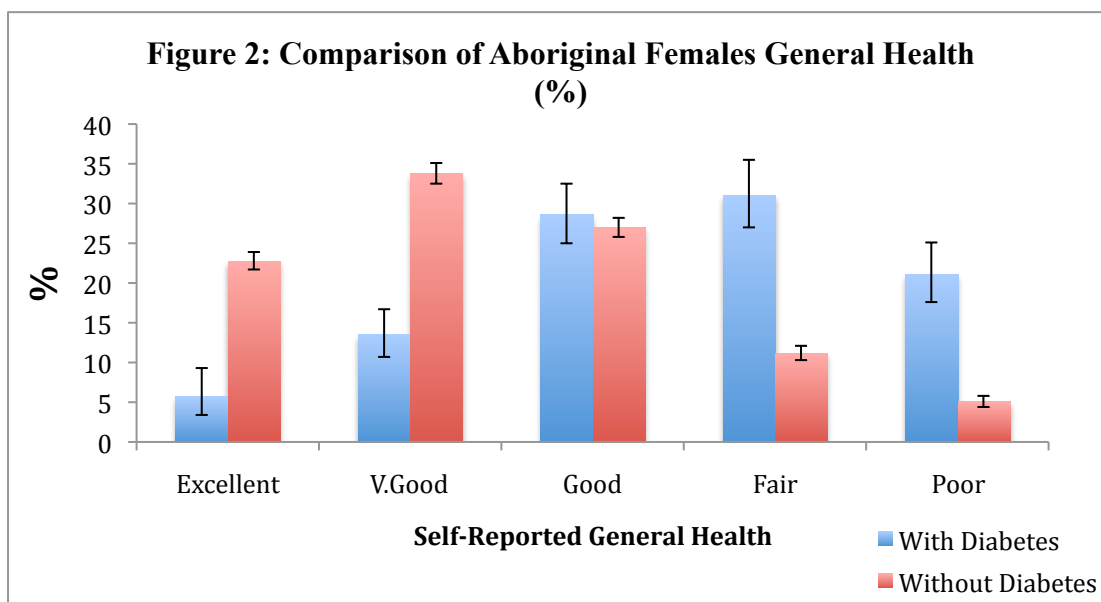
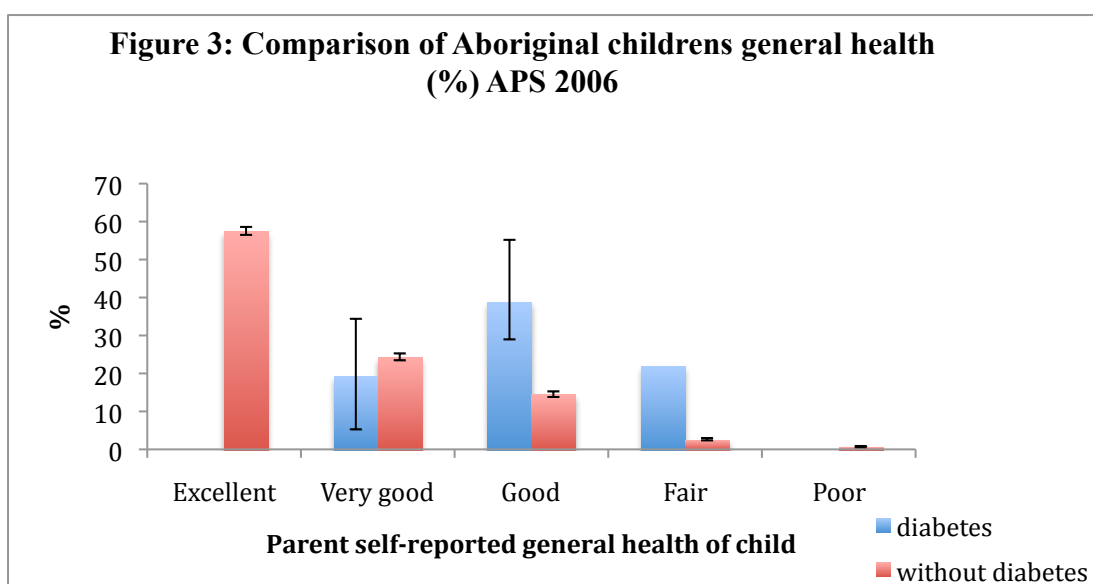


Figure 2 illustrates a comparison of Aboriginal females with and without diabetes and their general health. 19.2% (14.1-26 95% CI) of the proportion of females with diabetes reported excellent-very good health, while 56.6% (54.2-59 95%CI) of the proportion of females without diabetes reported excellent – very good health. The proportion of Aboriginal females with diabetes who feel they have poor health is 21.1% (17.6-25.1 95% CI), compared to 5.1% (4.4-5.8 95% CI) of females without diabetes.

Figure 2: Comparison of Aboriginal Females General Health

ii) Children 6-14 years

Parents responded to survey questions regarding general health of their children ages 6-14. The proportion of children reported to have excellent to very good health was 19.5% (10.4-33 95%CI), and 82% (80-83.9 95%CI) for children without diabetes. This is reflected in Figure 3.

Figure 3: Comparison of Aboriginal Children's General Health

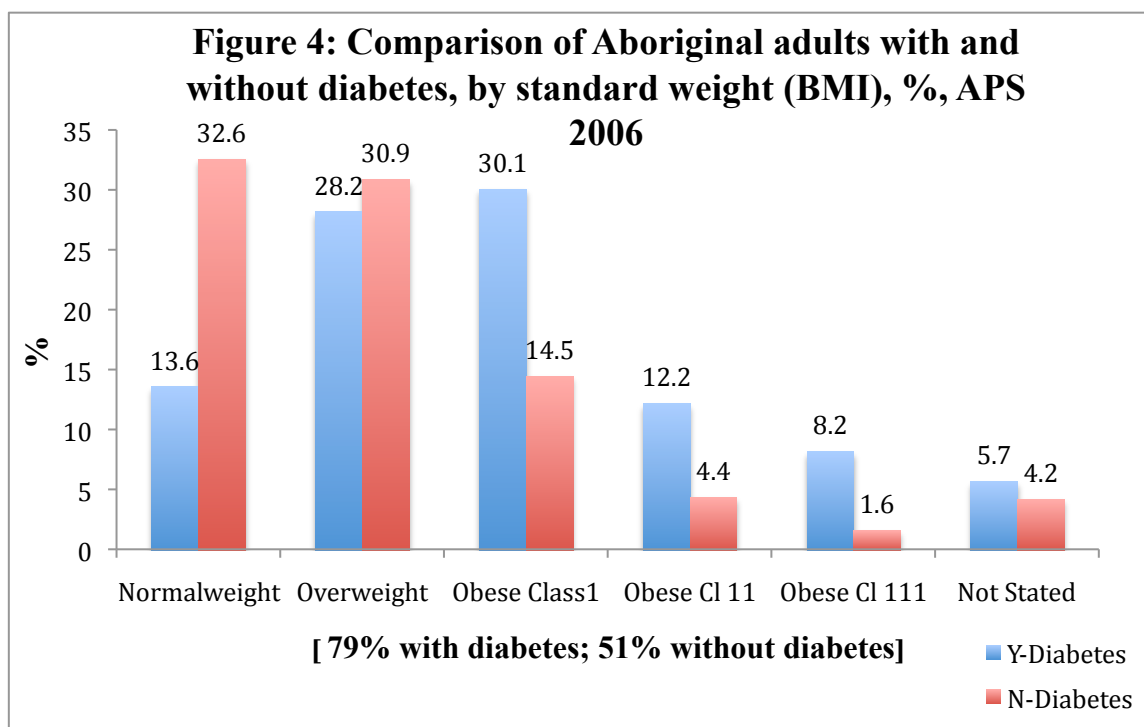
4.3.2 Hypothesis 2

Aboriginal people's obesity rates do not exhibit higher rates in those with diabetes than those without.

i) Adults- Self-reported

Using the WHO body mass index (BMI), Aboriginal adults classified as normal weight represent only 13.6% of those adults with diabetes, whereas 78.7% of adults with diabetes have a BMI of overweight to obese. In comparison, the proportion of Aboriginal adults without diabetes who reported being normal weight is 32.6%, and 51.4% reported a BMI of overweight to obese, as illustrated in Figure 4.

Figure 4: Comparison of Aboriginal Adults with and without diabetes, by weight



ii) Children age 6-14 years

According to data collected in the Census and APS, 2006, 27.3 % of children with diabetes were reported to be overweight, compared to 21.8% without diabetes, when using the CDC method of body composition.

However, also in the APS, 2006, the body weight reported by parents is in kg. Children with diabetes who had a weight of 55kg and over were reported at a proportion of 41.6%, compared to only 17.2% without diabetes.

4.3.3 Hypothesis 3

Aboriginal peoples with diabetes show no difference in total family income compared to those without diabetes.

i) Adults- Self-reported

Aboriginal peoples living off reserve struggle with low socioeconomic status. Of those with diabetes, 32.9% had a total family income of less than \$25,000 per year. 62.9% had a total family income under \$50,000. In Figure 5, note the difference between family income and diabetes.

Figure 5: Total Aboriginal Family Income with and without diabetes, off-reserve

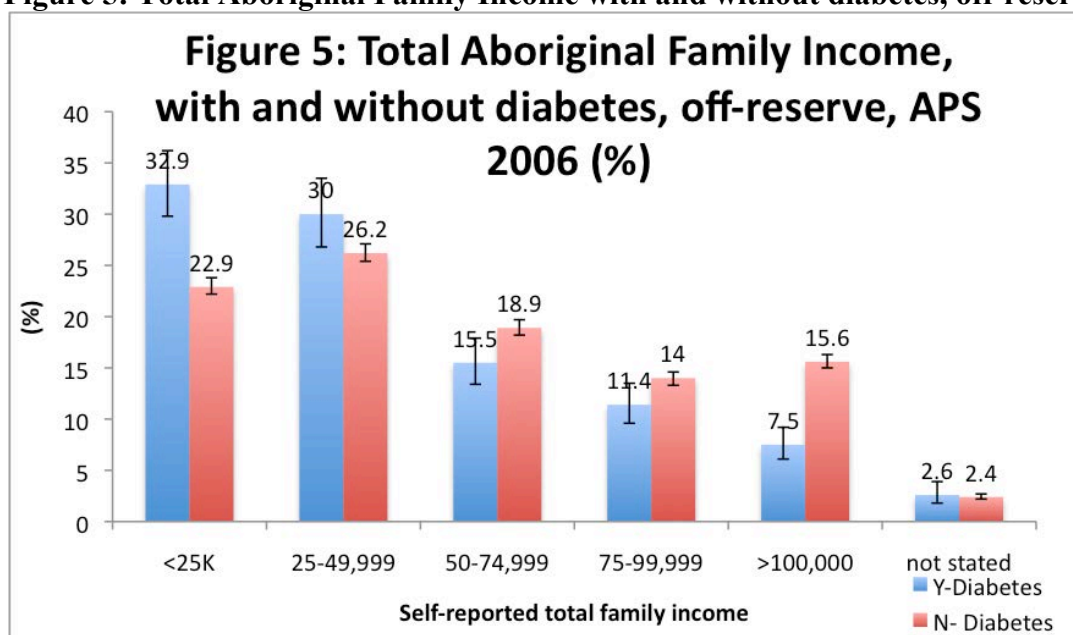
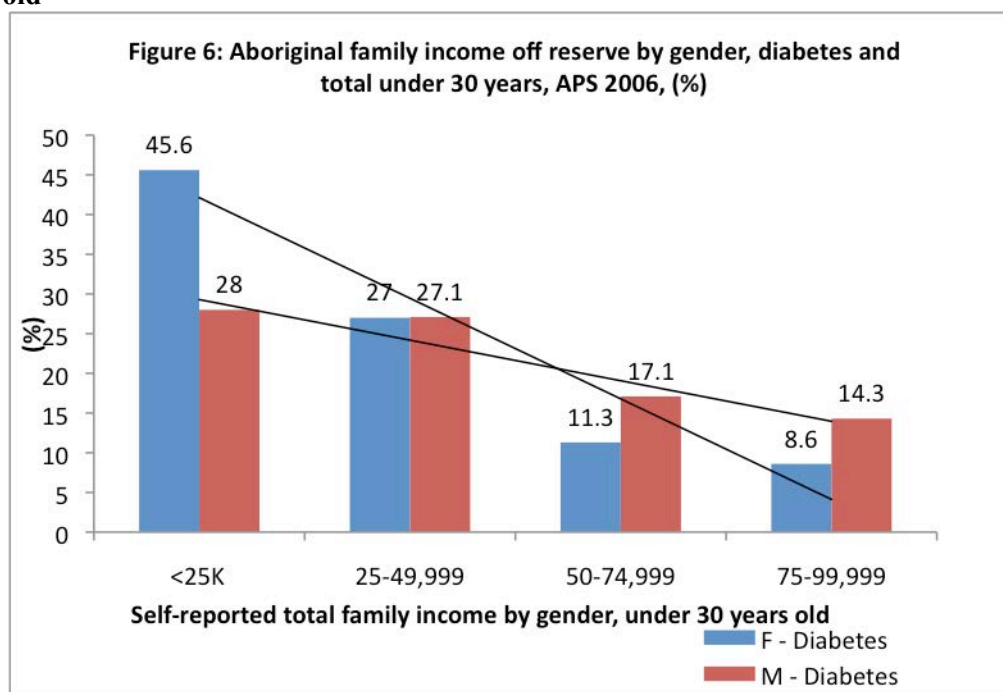


Figure 6 illustrates the trend lines for diabetes that illustrate a steep correlation between income and diabetes for females under 30 years of age, showing a significant

disadvantage for this segment of the population when it comes to diabetes and low income.

Figure 6: Aboriginal Family Income off-reserve by gender, with diabetes, under 30 years old

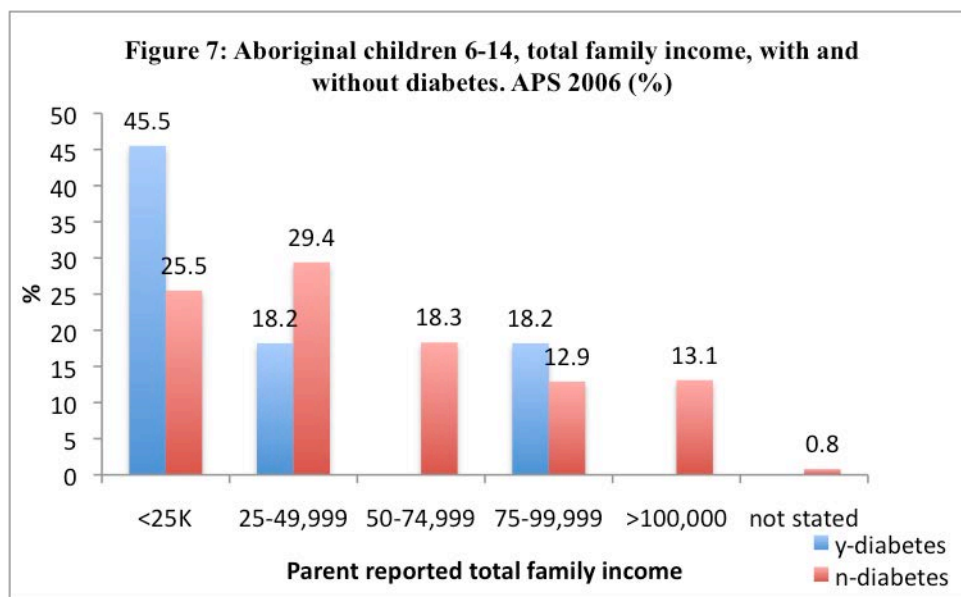


ii) Children 6-14 years

According to the Census and APS 2006, of all diabetic cases reported by parents of children aged 6-14 years, almost half were concentrated in very low-income families, with annual total income of less than \$25,000. Families without diabetic children were less likely to be represented in this income category.

Figure 7 illustrates total family income for children with and without diabetes.

Figure 7: Total Family Income, off-reserve Aboriginal Children 6-14, with and without diabetes



4.4 Summary of Findings

i) Adults

One in five Aboriginal adults with diabetes self reported their health as excellent to very good compared to three in five Aboriginal adults without diabetes.

As family income increased, the number of reported cases of diabetes decreased. The pattern showed a negative gradient, suggesting that diabetes rates increased as incomes decreased from high to low. When the data was sorted by gender, almost 50% of female diabetes cases (under 30 years of age) were concentrated in a household whose total family income as less than \$25,000, while women with an income greater than \$75,000 reported diabetes at a rate of less than 10%.

Aboriginal diabetic adults reported higher health care utilization rates than non-diabetic adults. The rates of co-morbidity for Aboriginal adult diabetics were disturbingly

high for conditions including high blood pressure (50.8%), treatment for high blood pressure (45%), heart conditions (23.4%), treatment for heart conditions (19.5%), circulation (31.8%), neuropathy (39.4%), and infection (15.1%).

ii) Children 6-14 years

Parents or caregivers were asked to report for Aboriginal children 6-14 years of age. Approximately one in five Aboriginal children with diabetes was reported to have excellent to very good health, compared to four out of five children without diabetes. Of all cases of reported childhood diabetes, almost half were found to be concentrated in very low-income families with a total family annual income of less than \$25,000. Children without diabetes were less likely to be represented in this income category.

Parents reported a 6.5 fold higher diagnosis for “psychological or nervous difficulty” by a doctor, nurse or health professional for children with diabetes compared to children without (24.7% vs. 3.8%). Visits to general practitioners and pediatricians were higher for children with diabetes (79.2% vs. 53.8%). Children with diabetes were seven times more likely to have spent the night in the hospital in the 12 months preceding the survey. Alarming, in a similar pattern to the adult insulin utilization reports, less than half (48.6%) of diabetic children were reported to be taking medication or insulin for diabetes.

Chapter Five: Discussion

5.1 Introduction

Michael Gracey and Malcolm King (2009) summarize the Indigenous health crisis:

“The world’s almost 400 million Indigenous people have low standards of health. This poor health is associated with poverty, malnutrition, overcrowding, poor hygiene, environmental contamination, and prevalent infections. Inadequate clinical care and health promotion, and poor disease prevention services aggravate this situation. Some Indigenous groups, as they move from traditional to transitional and modern lifestyles, are rapidly acquiring lifestyle diseases, such as obesity, cardiovascular disease and type 2 diabetes, and physical, social and mental disorders linked to misuse of alcohol and other drugs. Correction of these inequalities needs increased awareness, political commitment, and recognition rather than governmental denial and neglect of these serious and complex problems. Indigenous people should be encouraged, trained and enabled to become increasingly involved in overcoming these challenges” (p. 65)

Indigenous people are proportionately increasing in urban communities through migration from rural areas, socioeconomic opportunities, and high fertility rates; this migration could also be spurred by a loss of housing, resources, and traditional lands (Cardinal, 2006). The Canadian Aboriginal population has significantly higher growth rates than non-Aboriginal populations, and approximately 50% already live in urban areas (Cardinal, 2006). Yet even with these statistics available, almost no jurisdictions or organizations report on the condition of Aboriginal populations living in urban areas, despite the fact that this population often faces oppression, discrimination, and poverty in these urban

centres, and significant barriers to equal opportunity to education, employment, and housing (Cardinal, 2006). Further exacerbating the poor quality of life for the majority of this population is the lack of research and related information regarding urban Aboriginal peoples, and a lack of public awareness (Cardinal, 2006).

5.2 Discussions

I assumed that living off-reserve would reflect more positive health outcomes due to increased access to health professionals for diagnosis, treatment and care, as well as employment opportunities. This, however, was not the case. The results reveal that diabetes, obesity and several determinants of health are affecting the Canadian Aboriginal population living off-reserve with as much, if not or more frequency then studies reveal for on-reserve populations. This is consistent with the overall picture for Indigenous health outcomes as discussed in Chapter 2.

5.2.1 General Health Status

Population health surveys commonly use self-reported health as a measure of health status, and self-reported health measures have been reliable across different cultures (Tjepkema, 2002). Off-reserve Aboriginal populations in each geographic region (urban, rural, and territories) have reported higher levels of fair or poor health than non-Aboriginal peoples in the same region (Tjepkema, 2002). The proportion of Aboriginal peoples reporting poor or fair health decreased as the household income increased (Tjepkema, 2002). As observed in the results chapter, only 1 in 5 Aboriginal adults with diabetes rated their general health as very good or excellent, compared to 3 out of 5 Aboriginal adults without diabetes. A strikingly similar result was found for Aboriginal children and youth age 6-14 years, when parents or caregivers were asked to report on

their children's general health. Only 1 in 5 children/youth had parents rate their general health as very good to excellent, whereas 4 out of 5 children/youth without diabetes reportedly had very good to excellent health according to their parents or caregivers.

Research substantiates the fact that Canadian Aboriginal peoples have a significantly lower life expectancy than non-Aboriginal Canadians, regardless of their living in urban centres or rural communities (King, 2010).

Tjepkema et al, (2010), studied mortality of urban Aboriginal adults over an 11-year period, from 1991-2001, linking mortality registry data with census and tax filers data, and found life expectancy 4.7 years lower for men and 6.5 years lower for women. The result parameter in Chapter 4 are consistent with these analyses of premature mortality.

5.2.2 Health Conditions

5.2.2.1 Diabetes

Historically, diabetes has gone undetected in Canada's Aboriginal populations, yet recent evidence reveals epidemic proportions of type 2 diabetes in First Nations communities (AFN, 2005). The 1991 Aboriginal peoples Survey reflects a crude prevalence for diabetes in First Nations people as 6.4% and 8.5% for those living on- and off-reserve respectively (Bobet, 1998). In contrast, the 2002/2003 Regional Health Survey (RHS) reported an age standardized prevalence of 19.7% for First Nations peoples, which indicates a substantial increase since 1991 (First Nations Governance Committee/FNIGC, 2005). This is significantly higher than the national average of diabetes in 1991, which was reported as 3.1% (Bobet, 1998), reported in 2002/2003 as being 4.5% (FNIGC, 2005). The RHS 2008/2010 shows this prevalence had reached 20.7% (FNIGC, 2011). The disease trajectory is overwhelming increasing in the Canadian Aboriginal population.

It could be hypothesized that Aboriginal adults with type 2 diabetes have a feeling of hopelessness about their diagnosis, or that they lack sufficient access to care and education. Type 2 diabetes is both avoidable and treatable, so why does research show its prevalence in these population?

The results of the APS 2006 reflect 7.2% of off-reserve Aboriginal adults self-reported a diagnosis of diabetes. Of these adults with diabetes, 71% reported living in urban areas, compared to 25% living in rural areas. The 2006 APS also reveals 83% of children/youth age 6-14 years with diabetes living in urban areas, compared to 17% living in rural areas, as reported by parents or caregivers.

The RHS 2008/2010 showed that First Nations women have higher rates of diabetes than men across all age categories, with close to 50% of women over 65 years with diabetes (FNIGC, 2011). In the general Canadian population, the opposite pattern is reflected, with diabetes being more prevalent in men in the same age group.

5.2.2.2 Obesity

Obesity affects Aboriginal peoples of all ages, and is increasing in prevalence. This could be attributed to changes in food choice due to poverty or food availability, lack of traditional diet, sedentary lifestyles, and family history. Obesity is a risk factor for several diseases, one of which is type 2 diabetes. Obesity and diabetes are rising in prevalence among Aboriginal children and youth, and results of this thesis study demonstrate that this is true of the off-reserve Aboriginal populations. 79% (APS, 2006) of Aboriginal adults self-reported being overweight to obese, while parents reported 27.3% (APS, 2006) of children age 6-14 years being overweight.

The prevalence of obesity in Canada has risen steadily over the past 29 years (Garriguet, 2008). Research has previously shown obesity to be a recognized risk factor for type 2 diabetes and cardiovascular diseases. The 2004 Canadian Community Health Survey (CCMS), found that Ontario and the Western provinces had a much higher prevalence of overweight-obese and obesity among 19-50 year olds and was much higher among off-reserve Aboriginal peoples than among non-Aboriginal peoples. The study also found that those living in a low-income household had associated higher rates of obesity for Aboriginal peoples, yet household income was not associated with obesity among non-Aboriginal peoples (Garriguet, 2008).

5.2.3. Access to Health Services

Off-reserve Aboriginal populations may encounter a lack of cultural sensitivity or cultural acceptance when seeking health care. Although there is more healthcare available in major centers off-reserve, Aboriginal peoples fear of being misunderstood may prevent their accessing it. Aboriginal peoples living off-reserve may also feel isolated living away from family networks, elders and traditional healers, which affect their sense of connectedness and belongingness.

5.2.4. Income

Historically, socioeconomic status (SES) has been linked to health; individuals who are higher in the social hierarchy typically enjoy better health than those below (Adler et al, 1994). Almost every disease and condition finds SES differences in mortality and morbidity rates (Adler et al, 1994). A recent cross-sectional analysis of The Canadian Community Health Survey (CCHS) made clear the magnitude the role of income plays when determining the health of Canadians (Frolich et al, 2006). The CCHS

demonstrates that those with the highest incomes in Canada are two and a half times more likely to report very good or excellent health than those with the lowest incomes. The 2006 APS reports similar findings as noted in the results chapter. Researchers commonly believe that inequalities in income translate into disparities of health, through inequities in material conditions, such as nutrition, and lack of housing (Frolich et al, 2006). It is postulated that the poorer one is, the less likely one will be engaged in with healthy behaviours. Behavioural factors account for about half of premature mortality, and almost all vary by socioeconomic status (SES) (Frolich et al, 2006). This evidence is supported by the findings in the British Whitehall Study in which almost half of the lowest socioeconomic group experienced increased risk of heart disease. Mortality in the lowest socioeconomic group was attributed to risk factors and health behaviours such as smoking, obesity, blood pressure and cholesterol. Coping styles, optimism, social support, and personal control are all traits and factors related to health outcomes and appear to vary across socioeconomic groups (Taylor & Seeman, 1999).

The average family income is generally lower in off-reserve Aboriginal families than that of the general Canadian population with 45.6% of females under 30 years of age earn less than \$25,000/yr as reported in the 2006 APS. Inequalities in income are linked to health disparities since people earning lower incomes live and work in environments that are more stressful, perpetuating the cycle (Frolich et al, 2006). This is another example of how intersectionality impacts the lives of Canadian Aboriginal peoples. Wilson and Macdonald, (2010) found the median incomes for Aboriginal peoples in 2006 had still not reached the \$21,431 median income level that non-Aboriginal Canadians achieved in 1996 (p. 8). Colonialism has left Aboriginal peoples ranked among the

poorest of Canadians and current national studies show that income inequality exists today.

5.2.5 Chronic Stress

Living with constant stress, oppression and poverty likely have generational impacts on the health of Aboriginal peoples. The historical impacts of colonization including the Indian Act, lack of educational opportunity, and racism also likely contribute to health disparities experienced among Aboriginal peoples. Both chronic and acute exposure to stress may have long-term health consequences. Research suggests that stress, which is associated with neuroendocrine responses, can have cascading effects on other body systems by increasing blood pressure and immune responses (McEwan, 1998, Mair et al, 2011). Allostatic load (AL) refers to the body's ability to adjust physiologically to stressors and is measured through a diverse set of clinical measurements. These biomarkers are collected from blood and saliva, and reflect cardiovascular, metabolic, inflammatory, neuroendocrine, and immune-related risk (McEwan, 1998; Mair, Cutchin, Peek, 2011). This could be a piece of the puzzle, explaining the increase in obesity and type 2 diabetes in children and youth. Diabetes in this population group is as high or higher than previous studies have stated for on-reserve populations.

As has been highlighted by McEwen (2006), recurrent stress responses triggered in early life by adverse social environments can initiate enduring physiological changes, such as alterations in lipid metabolism and the accumulation of body fat, the development of hypertension, and the development of insulin resistance leading to Type 2 diabetes mellitus and CVD. In a Norwegian study, the highest risk of mortality among men and

women was observed in the group that was poor both in childhood and in adulthood, suggesting a cumulative influence of social circumstances across the life course on mortality risk (Claussen et al., 2003). In the same study, cardiovascular mortality was more strongly associated with childhood than with adulthood social circumstances. The patterning of behaviour and lifestyle habits, which occurs in childhood, highlights the need to focus on childhood circumstances.

5.3 Implications

The 2006 Aboriginal peoples Survey conducted by Statistics Canada has revealed diabetes as an important health issue for off-reserve Aboriginal adults and children. Type 2 diabetes is reaching epidemic proportions in Aboriginal adults and is increasing in prevalence in Aboriginal children and youth. Diabetes is associated with growing obesity challenges; and is also associated with upstream determinants of health including poor self-perception of overall health and well-being, challenges in access to preventive services, medical treatment and care, and household income.

Diabetes is recognized nationally as a major health concern for Aboriginal populations living on-reserve. More research is needed to investigate the burden of diabetes affecting Aboriginal peoples in these communities, but this research should include off-reserve populations.

Chapter Six: Conclusion

6.1 Conclusion

The 2006 Aboriginal peoples survey conducted by Statistics Canada indicates that diabetes is a very important health concern for off-reserve Aboriginal peoples in Canada. Type 2 diabetes trajectories are increasing at alarming rates in the Canadian Aboriginal population. Children and adults with diabetes rarely rated their general health as very good or excellent. Research has substantiated that Canadian Aboriginal peoples have a significantly lower life expectancy than non-Aboriginal Canadians.

Obesity is rising in prevalence among Aboriginal children and youth, and occurring at younger ages. Those Aboriginal peoples living in a low-income household had associated higher rates of obesity. Dental caries and periodontal disease are of concern for Aboriginal peoples of all ages, and periodontal disease has been scientifically linked to diabetes (Ellerby, et al, 2000; “Epidemiology of Perio”, 1996; Lamster, Lalla, Borgnakke & Taylor, 2008; MacEntee et al., 2001; Wardman, Clement & Quantz, 2005; Ziebarth, 2003). Past research has identified periodontal disease as an oral health concern for Aboriginal peoples, yet this research was focused on the rural on-reserve population. Further study is needed to identify if oral health is also of concern for off-reserve populations.

Type 2 diabetes is clearly connected to a number of chronic conditions, such as hypertension, renal disease, visual impairment and blindness, stroke, neuropathy and cardiovascular disease (CVD). All of these co-morbidities contribute to poor health and significant disability and disease. Aboriginal peoples have twice the CVD death rate of

non-Aboriginal Canadians. 40-80% of those Aboriginal peoples with diabetes reported having neuropathy, high blood pressure and/or were receiving treatment for heart conditions in the APS 2006 . Type 2 diabetes is shown to be associated to upstream health determinants including household poverty, poor self perception of general health and well being, food insecurity and changing diet. Aboriginal peoples continue to face challenges in access to preventive services and medical care/treatment.

Aboriginal health does not seem to be an important or urgent issue for the general society of Canada, a point exacerbated by racism and reinforced by political apathy witnessed through broken policies, removal of funding or blatant lack of action. This will present challenges for researchers of Aboriginal health; perseverance is encouraged in tackling these challenges through dialogue, determination, education, and advocacy.

As discussed in Chapter 1, an intersectional approach to Aboriginal health outcomes is complex and focuses on simultaneous intersections between social difference and identity, and forms of systemic oppression at micro and macro levels (Hankivsky & Cormier, 2009). Results in Chapter 4 show that this is true of the off-reserve Aboriginal population of Canada. Also discussed in Chapter 1, regarding intersectionality, is that identities are not fixed, but are fluid and change over time. This could also be said regarding the off-reserve Aboriginal population; their movements could be fluid and shift with context, living on and off-reserve at different times of life is a likely a reality.

6.2 Limitations

I did not have access to individual data, as data requests went through Statistics Canada who then prepared and presented the grouped data in table form. Survey

questions were used to gather the APS data, and all responses were self-reported with no confirmation from health professionals.

I would like to mention that I am acutely aware of the problem of stating the prevalence numbers for the “Aboriginal” population as if the prevalence rates were equal in all of the First Nations, Inuit and Métis populations. Due to the nature of the study, I could only conduct a “status blind” study that put all of these unique groups of people into one grouping. What I estimate in my thesis is either an overestimate or an underestimate of the true prevalence, yet due to the small sample size, and therefore the assumed unequal representation of FN, Inuit and Métis people in the population sample, the change would be minor in either over or under estimations.

6.3 Recommendations

It is time to address the Aboriginal issues of social and economic disparity and initiate health reforms grounded in cultural sensitivity. Poverty, reflected as low household income, appears to be connected to diabetes. Thus, it seems likely that diabetes rates will be reduced if income can be improved to mitigate the corrosive effects of poverty on Aboriginal peoples growth and development. Gender specific interventions need to be structured to ensure equal opportunity and access to programs and services for everyone.

The National Association of Friendship Centres is well positioned to play a role in improving health and wellness of Aboriginal adults, youth, and children by creating programs that are designed with, by and for Aboriginal peoples to promote self-determination. This could be accomplished through community-based Aboriginal health

centres, as well as diabetes screening and education. Friendship Centres do offer community ‘healthy meals’ classes, where cooking is done together and portions taken home by all participants. A variety of exercise classes are also available. Coordinated oral screenings and oral health education seminars could be implemented in partnership with an interdisciplinary health team. All of these suggestions would need to support connectedness to Aboriginal culture and tradition.

Dialogue and communication are critical in building relationships with Aboriginal peoples, with their needs and opinions regarding health interventions being a high priority in determining health policies. Working with the National Association of Friendship Centres, healthcare professionals can begin a partnership for the journey of change that is so desperately needed. To improve treatment and care, healthcare professionals should be trained in cultural sensitivity and competency. Education is critical for Aboriginal peoples regarding health, nutrition, and oral health; prevention strategies constitute a step in breaking the cycle of poor metabolic health outcomes. Access to education for Aboriginal populations should be made a priority for the current and future governments. Encouraging and supporting Aboriginal students to become involved in the healthcare field could aid in bringing cultural safety to Aboriginal populations, which in turn could promote greater access to care.

6.4 Suggestions for Further Studies

The lack of information about the health of Aboriginal peoples living off-reserve is due in part to past emphasis being placed on researching only Aboriginal populations living on-reserve. There is ample opportunity for researchers to investigate off-reserve

Aboriginal health with the intention of implementing policy change that can positively impact Aboriginal peoples health. For example, addressing the barriers to culturally relevant and culturally safe care, investigating roles of how traditional healers could compliment western medical practitioners, studying traditional Aboriginal diet and western diet as they relate to health, and comparing data from research conducted on-reserve to off-reserve, to suggest a few.

It is evident that further research is needed in specific areas of Aboriginal health in Canada. Yet, the evidence clearly indicates continued poorer health for Aboriginal peoples when compared to non-Aboriginal Canadians. Advocacy of this injustice is key in educating Canadians regarding this health crisis, with the end goal being governmental policy change that supports improved health outcomes for Canadian Aboriginal peoples.

Works Cited

- Aboriginal peoples Survey (2006). Statistics Canada.
- Abraham, N.G., Brunner, E.J., Eriksson, J.W., Robertson, R.P. (2007). Metabolic Syndrome: psychosocial, neuroendocrine, and classical risk factors in type 2 diabetes. *Annals New York Academy Science*, October 2007 1113: pp 256-275.
- Adler, N.E., Boyce, T., Chesney, M.A., Cohen, S., Folkman, S., Khan, R.L., Syme, S.L. (1994) Socioeconomic status and health: The challenge of the gradient. *American Psychologist* 0003-066x 49(1).
- AFN (2005) First Nations health research and information action plan. AFN, Editor
- Bobet, E. (1998) Diabetes among First Nations people: information from the Statistics Canada 1991 Aboriginal peoples Survey. Health Canada and Statistics Canada. Ottawa, Health Canada.
- Braveman, P.A. (2003) Monitoring equity in health and healthcare: A conceptual framework. *Journal of Health Population Nutrition*. 12(3): pp. 181-192.
- British Columbia Provincial Health Officer (2009). Pathways to health and healing- 2nd report on the health and well-being of Aboriginal peoples in British Columbia. Provincial Health Officer's annual report 2007. Victoria, BC: Ministry of Healthy Living and Sport.
- Brothwell, D., Ghiabi, E. (2009) Periodontal Health Status of the Sandy Bay First Nation in Manitoba, Canada. *Circumpolar Health*. 68(1): pp. 23-33.
- Bruce, S.G., Riediger, N.D., Zacharias, J.M., Young, T.K. (2011) Obesity and Obesity- Related Comorbidities in a Canadian First Nation Population, *Prev. Chronic Dis* 8(1).
- Bruce, S.G., Young, T.K. (2008) Prevalence and risk factors for neuropathy in a Canadian First Nation community. *Diabetes Care*, 31(9): pp. 1837-1841.
- Cairns, A.C. (2000) *Citizens plus: Aboriginal peoples and Canadian state*. Vancouver, BC: University of British Columbia Press.
- Cardinal, N. (2006) The exclusive city: Identifying, measuring, and drawing attention to Aboriginal and Indigenous experiences in an urban context. *Cities*, Vol 23, No. 3 pp. 217-228.

Claussen, B., Davey Smith, G., & Thelle, D. (2003). Impact of childhood and adulthood socioeconomic position on cause specific mortality: The Oslo Mortality Study. *Journal of Epidemiology and Community Health*, 57(1): 40-45.

Collard J. (2007) Constructing Theory for Leadership in Intercultural Contexts. *Journal of Educational Admin.* Vol. 45 No. 6 p 740-755 Emerald Group Publishing Ltd. University of Canberra.

Department of Justice (2010). Canada Health act. Retrieved from <http://laws.justice.gc.ca/eng/C-6/FullText.html>.

Deshpande, K., Jain, A., Sharma, R., Prashar, S., Jain, R. (2010) Diabetes and periodontitis. *J Indian Soc Periodontol*. Oct-Dec, 14(4): pp. 207-212.

“Diabetes Facts and Figures” (2011). Public Health Agency of Canada, Diabetes in Canada: Facts and Figures from a public health perspective. Ottawa, 2011.

Diabetes. (2005) In: First Nations Regional Longitudinal Health Survey (RHS) 2002/03: results for adults, youth and children living in First Nations communities. Ottawa: First Nations Centre; Retrieved from: URL: <http://www.rhs-ers.ca/english/pdf/rhs2002-03reports/rhs2002-03-technicalreport-afn.pdf>

Dunning, T. (2009). Periodontal Disease- The Overlooked Diabetes Complication. *Nephrology Nursing Journal* Sept-Oct. 2009 36(5) pp. 489-495

Ellerby J.H., McKenzie J, McKay S, Gilbert J. Gariépy, Kaufert J.M. (2000) Bioethics for Clinicians: Aboriginal Cultures. *CMAJ* 163(7) pp. 845-850.

Epidemiology of Periodontal Diseases (1996) *J Periodontol* 67 pp.935-945

Environmental Scan- Oral Health Services of British Columbia for First Nations and Aboriginal Children aged 0-7 years (2012). Ministry of Health. Healthy Women, Children and Youth Secretariat. First Nations and Inuit Health Branch, Health Canada.

Evans, R.G., Stoddart, G.L. (2003) Consuming research, producing policy? *American Journal of Public Health*. 93(3): pp. 371-379.

First Nations Action Plan For Non-Insured Health Benefits. (2005) Assembly of First Nations, April 25, 2005. Retrieved from: URL: http://www.afn.ca/cmslib/general/NIHB%20Action%20Plan_Fe.pdf

- First Nations Health Blueprint for British Columbia*. (2005) BC First Nations Leadership council. Retrieved from URL:<http://www.fns.bc.ca/pdf/HBprintBC150705.pdf>
- First Nations and Inuit Health Branch (2003). A statistical profile on the health of First Nations in Canada. Ottawa: Health Canada.
- First Nations and Inuit Health Branch (2007). Indian Health Policy 1979. Retrieved from: http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/fnihb-dgspni/poli_1979-eng.php.
- First Nations and Inuit Regional Health Survey National Steering Committee (1999). First Nations and Inuit regional health survey. Ottawa: First Nations and Inuit Regional Health Survey National Steering Committee.
- First Nations and Inuit Regional Health Survey National Steering Committee (2003). First Nations Regional Longitudinal Health Survey, in RHS 2002/2003. Ottawa: First Nations and Inuit RHS National Steering Committee.
- First Nations Information Governance Committee (2005), First Nations Regional Health Survey (2002/03). Ottawa: FNIGC
- First Nations Information Governance Committee (2011). First Nations Regional Health Survey, Phase 2 (2008/10) Preliminary Results. Ottawa: FNIGC.
- Frolich, K.L., Corin, H., Potvin, L. (2001) A theoretical proposal for the relationship between context and disease. *Sociology of Health & Illness*. 23(6): pp. 776-797.
- Frohlich K, Ross N, Richmond C. (2006) Health disparities in Canada today: some evidence and a theoretical framework. *Health Policy* 79 pp. 132-143.
- Garriguet, D. (2008) Obesity and the eating habits of the Aboriginal population. *Health Reports* 19 (1): pp. 1-11.
- Gerlach A. (2007) Steps in the Right Direction- Connecting & Collaborating in Early Intervention Therapy with Aboriginal Families & Communities in BC. *BC Aboriginal Child Care Society*. pp. 1-48.
- Gracey, M., King, M. (2009) Indigenous health part 1: determinants and disease patterns. *Lancet* 374: pp. 65-75.
- Graham, H. (ed) (2000) *Understanding Health Inequalities*. Buckingham: Open University Press.

- Green, C., Hoppa, R.D., Young, T. K., Blanchard, J.F. (2003) Geographic analysis of diabetes prevalence in an urban area. *Social Science and Medicine* 57 (3) August 2003 pp.551- 560 (10).
- Hankivsky, O., Cormier, R. (2009). *Intersectionality: Moving Women's Health Research and Policy Forward*. Vancouver: Women's Health Research Network.
- Harrison R.L., MacNab A.J., Duffy D.J., Benton D.H.J. (2006) Brighter Smiles Service Learning, Inter-professional Collaboration and Health Promotion in a First Nations Community. *Cad J of Pub Health*. May-June; 97(3) pp. 237-40.
- Health Canada (2005) Ten years of health transfer First Nation and Inuit Control. Retrieved from http://www.hc-sc.gc.ca/fniah-spnia/pubs/finance/_agree-agree-accord/10_years_ans_trans/2_intro-eng.php.
- Ide, R., Hoshuyama, T., Wilson, D., Takahashi, K., Higashi, T. (2011). Periodontal Disease and Incident Diabetes: a Seven-year Study. *Journal of Dental Research* 90(1) pp. 41-46.
- Indian Affairs and Northern Canada (2010) Fact Sheet: Treaties with Aboriginal people in Canada. Retrieved from <http://www.ainc-inac.gc.ca/ai/mr/is/tra-eng.asp>.
- International Diabetes Foundation (2003). *Diabetes atlas*. (2nd ed.). Brussels, Belgium: International Diabetes Foundation.
- Inuit Health and social conditions. (2006) Statistics Canada, *Aboriginal Survey 2006* [Online] Retrieved from: URL: <http://www.statcan.gc.ca/pub/89-637-x/89-637-x2008001-eng.htm>
- Inuit Health and social conditions. (2006) Statistics Canada, *Aboriginal Survey 2006* [Online] Retrieved from: URL: <http://www.statcan.gc.ca/pub/89-637-x/89-637-x2008001-eng.htm>.
- Iwasaki, Y., Bartlett, J., O'Neil, J. (2005). Coping with stress among Aboriginal women and men with diabetes in Winnipeg, Canada. *Social Science & Medicine* 60: pp. 977-988.
- Jacklin, K.M., Warry, W. (2004) The Indian health transfer policy in Canada: Toward self-determination or cost containment? In A. Castro, & M. Singer (Eds), *Unhealthy health policy: A critical anthropological examination* (pp. 215-234). Walnut Creek, CA: AltaMira Press.
- Katzmarzyk, P.T., Janssen, I. (2004). The economic costs associated with physical inactivity and obesity in Canada: an update. *Canadian Journal of Applied Physiology*, 29(1) pp. 90-115.

- Kelly, M.D. (2011) Toward a New Era of Policy: Health Care Service Delivery to First Nations. *The International Indigenous Policy Journal*, 2 (1) pp. 1-12.
- King, M. (2010) Chronic diseases and mortality in Canadian Aboriginal peoples: learning from the knowledge. *Chronic Diseases in Canada*. 31 (1): pp. 2-3.
- Klem, M. E. (1998). *Colonizing bodies: Aboriginal health and healing in British Columbia, 1900-50*. Vancouver: UBC Press.
- Krieger, N. (2001) Theories for social epidemiology in the 21st century: an ecosocial perspective. *International Journal of Epidemiology*. 30(4): pp. 668-677.
- Krieger, N. (2005). Embodiment: a conceptual glossary for epidemiology. *Journal of Epidemiology and Community Health* 59: pp. 350-355.
- Laboratory Centre for Disease Control. Diabetes, D. (2000). Diabetes in Canada, National statistics and opportunities for improved surveillance, prevention and control. Ottawa, Health Canada, Health Protection Branch, Laboratory Centre for Disease Control, Bureau of Cardio-Respiratory Diseases & Diabetes, Diabetes Division: 70, xiii,76.
- Lalla, E., Lamster, I.B., Drury, S., Fu, C., Schmidt, A.M. (2000). Hyperglycemia, glycoxidation and receptor for advanced glycation endproducts: potential mechanisms underlying diabetic complications, including diabetes-associated periodontitis. *Periodontology* June 2000, 23: pp. 50-62.
- Lamster I.B., Lalla E, Borgnakke W.S., Taylor G.W. (2008). The relationship between oral health and diabetes mellitus. *JADA* 139(10supp) pp. 195-245
- Lavoie, J.G., Forget, E.L. (2008) The cost of doing nothing: Implications for the Manitoba health care system. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health*, 6 (1): pp. 107-121.
- Lavoie, J.G., Forget, E.L., Browne, A.J. (2010) Caught at the crossroad: First Nations, health care, and the legacy of the Indian Act. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health*, 8 (1): pp. 83-100.
- Lawrence, H.P. (2010) Oral health interventions among Indigenous populations in Canada. *International Dental Journ* 60: pp. 1-6.

- Lawrence, H.P., Binguis, D., Douglas, J., McKeown, L., Switzer, B., Figueiredo, R., Reade, M. (2009) Oral health inequalities between Aboriginal and non-Aboriginal children living in Ontario, Canada. *Community Dent Oral Epidemiol* 37: pp. 495-508.
- Loppie-Reading, C., Wein, F. (2009) Health Inequalities and Social Determinants of Aboriginal peoples' Health. National Collaborating Centre for Aboriginal Health. Retrieved at http://www.nccah-ccnsa.ca/docs/.../NCCAH-loppie-Wien_report.pdf.
- Lux J. (2006) Review of the Oral Disease-Systemic Disease Link. Part 1: Heart Disease, Diabetes. *Canadian J of Dent Hyg.* Nov-Dec 40 (6) pp. 288-342
- McKee G, Clarke F, Kmetc A, Reading J. (2009) Health Practitioners' Perspectives on the Barriers To Diagnosis and Treatment of Diabetes in Aboriginal peoples on Vancouver Island. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health.* 7(1) pp. 49-64.
- McEwan, B.S. (1998) Protective and damaging effects of stress mediators. *New England Journ of Medicine* 338: pp. 171-179.
- McEwen, B. (2006). Protective and damaging effects of stress mediators: Central role of the brain. *Dialogues in Clinical Neuroscience*, 8(4): 367-81
- McNab, A.J., Rozmus, J., Benton, D., Gagnon, F.A. (2008) 3-year results of a collaborative school based oral health program in a remote First Nations Community. *Rural and Remote Health.* [Online] Retrieved from: URL: <http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=882>
- MacEntee M, Harrison R, Wyatt. (2001) Strategies to Enhance the Oral Health of British Columbians, specifically Aboriginal peopless, Tobacco-Users, and those of Low Socioeconomic Background. *Tobacco Reduction and Control Branch Preventive and Health Promotion Division of the Ministry of Health of the Government of British Columbia.* May: 1-59.
- Mair, C.A., Cutchin, M.P., Peek, M.K. (2011) Allostatic load in an environmental riskscape: The role of stressors and gender. *Health & Place* 17: pp. 978-987.
- Mealey, B.L., Oates, T.W. (2006). Diabetes mellitus and periodontal diseases. *Journal of Periodontology* 77(8) pp. 1289-1303.

- Mealey, B.L., Ocampo, G.L. (2007). Diabetes mellitus and periodontal disease. *Periodontology* 2000. 44(1): pp. 127-153.
- Mikkonen, J., Raphael, D. (2010). *Social Determinants of Health: The Canadian Facts*. Toronto. York University School of Health Policy and Management.
- National Aboriginal Health Organization (NAHO). March, 2012. Retrieved on July 18, 2012. [URL://www.naho.ca/health-health-issues-of-aboriginal-canadians-scrutinized/](http://www.naho.ca/health-health-issues-of-aboriginal-canadians-scrutinized/)
- Navara, A.S., Sequist, T.D. (2010) Reducing Health Disparities in American Indians with Chronic Kidney Disease. *Seminars in Nephrology* 30 (1): pp. 19-25.
- Newbold, K. B. (1998) Economics of Health Care Systems, Aboriginal Physician Use in Canada: Location, Orientation and Identity. *Health Economics*. Dec; 6(2) pp.197-207.
- Ng, C., Young, T.K., Corey, P.N. (2010) Associations of television viewing, physical activity and dietary behaviours with obesity in Aboriginal and non-Aboriginal Canadian Youth. *Public Health Nutrition* 13 (9): pp. 1430-1437.
- Obesity in Canada: A Joint Report from the Public Health Agency of Canada and the Canadian Institute for Health Information. (2011) Public Health Agency of Canada. Ottawa, 2011.
- Originating group: American academy of Periodontology-Research, Science and Therapy Committee. (2001) Treatment of Plaque-induced Gingivitis, Chronic Periodontitis and Other Clinical Conditions. *J Periodontal*, 72(12) pp.1790-1800
- Oster, R.T., Toth, E.L. (2009) Differences in the prevalence of diabetes risk-factors among First Nations, Métis and non-Aboriginal adults attending screening clinics in rural Alberta, Canada. *Rural and Remote Health* 9 (2).
- Oster, R.T., Johnson, J.A., Hemmelgarn, B.R., King, M., Balko, S.U., Svenson, L.W., Crowshoe, L., Toth, E.L. (2011) Recent epidemiologic trends of diabetes mellitus among status Aboriginal adults, *Canadian Medical Assoc Journal* 183(12): pE803- E809
- Panagiotopoulos, C., Rozmus, J., Gagnon, R.E., MacNab, A.J. (2007) Diabetes screening of children in a remote First Nations community on the west coast of Canada: challenges and solutions, *Rural and Remote Health* 7(771).

- Pouliou, T., Elliot, S.J. (2010) Individual and socio-environmental determinants of overweight and obesity in urban Canada. *Health and Place*, 16: pp. 389-398.
- Raphael, D. (2009). *Social Determinants of Health: Canadian Perspectives*, 2nd edition. Toronto: Canadian Scholars' Press.
- Riediger, N.D., Bruce, S.G., Young, T.K. (2011) Cardiovascular Risk According to Plasma Apolipoprotein and Lipid Profiles in a Canadian First Nation. *Prev Chronic Dis*. 8 (1): A05 pp. 1-8.
- Romanow, R. (2002). *Building on Values: The Future of Health Care in Canada*. Retrieved on Nov. 20, 2012 from www.publications.gc.ca/collections/Collection/CP32-85-2002E.pdf
- Schroth R, Harris R, Lawrence HP, Peressini S. (2008) Oral health and the Aboriginal child: A forum for community members, researcher and policy makers. *JCDA*. June; 74(5) pp. 429-432.
- Sharp, D. (2009). Environmental Toxins, A Potential Risk Factor For Diabetes Among Canadian Aboriginals. *International Journal of Circumpolar Health* 68 (4): pp. 316-326.
- Siegrist, J., Marmot, M. (2004) Health inequalities and the psychosocial environment—two scientific challenges. *Social Science & Medicine*. 58: pp. 1463-1473.
- Statistical Profile on the Health of First Nations in Canada*. (2005) [Online] Health Canada Retrieved from: URL: http://www.hc-sc.gc.ca/fniah-spnia/pubs/aborig-autoch/stats_profil-eng.php
- Taylor, GW, Borgnakke, WS. (2008) Periodontal disease: association with diabetes, glycemic control and complications. *Oral Diseases*. 14 pp.191-203.
- Taylor, S. E., & Seeman, T. E. (1999). Psychosocial resources and the SES-health relationship. *Annals of the New York Academy of Sciences*, 896, 210-25.
- The Aboriginal Health Legislation and Policy Framework in Canada (2011). Retrieved from: www.nccah-ccnsa.ca/docs/Health%20Legislation%20and%20Policy_Eng
- Tjepkema, M. (2002) The Health of the Off-Reserve Aboriginal Population. Supplement to Health Reports, 13: pp. 1-16.

- Wardman, D., Clement, K., Quantz, D. (2005) Access and utilization of health services by British Columbia's rural Aboriginal population. *Leadership in Health Services*. 18 (2) pp. xxvi-xxxii.
- Wien F, McIntyre L. (1999) Health and Dental Services for Aboriginal peoples. Nations and Inuit regional health survey national report. *The First Nations and Inuit Regional Health Survey National Steering Committee*. pp. 219-245.
- Wilson, D., Macdonald, D. (2010) The Income Gap Between Aboriginal peoples and the Rest of Canada. Canadian Centre for Policy Alternatives. pp. 1-34 [online] Retrieved at <http://www.growinggap.ca>.
- Wilson, K., Rosenberg, M.W., Abonyi, S. (2011) Aboriginal peoples, health and healing approaches: The effects of age and place on health. *Social Science & Med* 72: pp. 355-364.
www.aadnc-aadnc.gc.ca Aboriginal Affairs and Northern Development Canada
- www.diabetes.ca Canadian Diabetes Association
- www.diabetes.org American Diabetes Association
- www.who.int/mediacentre/Factsheets/fs312 World Health Organization
- www.who.int/social_determinants/en World Health Organization
- Yeates, K., Tonelli, M. (2010) Chronic Kidney Disease among Aboriginal peoples living in Canada. *Clinical Nephrology* 74: pp. S57-S60.
- Young T.K., Reading J, Elias B, O'Neil J.D. (2000) Type 2 Diabetes Mellitus in Canada's First Nations: Status of an Epidemic in progress. *Canadian Medical Assoc or its Licensors*. Sept 163(5) pp. 561-566.
- Yu, V., Raphael, D. (2004). Identifying and addressing the social determinants of the incidence and successful management of type 2 diabetes mellitus in Canada. *Canadian Journal of Public Health*, 95(5) pp. 366-368
- Ziebarth, S. (2003) First Nations and Inuit Oral Health: An oral presentation to the House of Commons Standing Committee on Health, *Canadian Dental Hygienists Association*. Retrieved from URL:
http://www.cdha.ca/content/newsroom/pdf/aboriginal_peoples.pdf

Appendix A Ethics Waiver Form



University
of Victoria

Human Research Ethics Board

Office of Research Services
Administrative Services Building
PO Box 1700 STN CSC
Victoria British Columbia V8W 2Y2 Canada
Tel 250-472-4545, Fax 250-721-8960
Email ethics@uvic.ca Web www.research.uvic.ca

Certificate of Approval of Waiver

PRINCIPAL INVESTIGATOR Stephanie Crocker	ETHICS PROTOCOL NUMBER 12-043
UVic STATUS: Master's Student	ORIGINAL APPROVAL DATE: 30-Jan-12
UVic DEPARTMENT: SDH	APPROVED ON: 30-Jan-12
SUPERVISOR: Dr. Jeffrey Reading	APPROVAL EXPIRY DATE: 29-Jan-13
PROJECT TITLE: Diabetes, Oral Health in Aboriginal people living in urban areas off reserve	
RESEARCH TEAM MEMBERS: None	
DECLARED PROJECT FUNDING: None	
CONDITIONS OF APPROVAL	
This Certificate of Approval is valid for the above term provided there is no change in the protocol.	
<p>Modifications To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol.</p> <p>Renewals Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.</p> <p>Project Closures When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.</p>	
Certification	
This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants.	
 <hr style="width: 20%; margin: auto;"/>	
Dr. Rachael Scarth Associate Vice-President, Research	

12-043 Crocker, Stephanie

Certificate Issued On: 30-Jan-12

Appendix B Statistics Canada Methods Guide

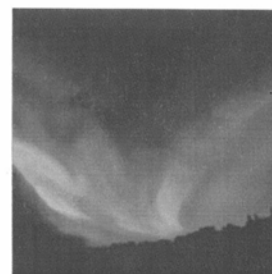
Catalogue no. 89-637-X — No. 003
ISSN 1710-0224
ISBN 978-1-100-11477-4

Concepts and Methods

Aboriginal Peoples Survey, 2006: Concepts and Methods Guide

Social and Aboriginal Statistics Division
Jean Talon Building, 7th Floor, 170 Tunney's Pasture Driveway
Ottawa, Ontario K1A 0T6

Telephone: 613-951-5979



 Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website at www.statcan.gc.ca or contact us by e-mail at infostats@statcan.gc.ca or by telephone from 8:30 a.m. to 4:30 p.m. Monday to Friday:

Statistics Canada national contact centre

Toll-free telephone (Canada and the United States):

Inquiries line	1-800-263-1136
National telecommunications device for the hearing impaired	1-800-363-7629
Fax line	1-877-287-4369
Depository services program inquiries line	1-800-753-7943
Depository services program fax line	1-800-565-7757

Local or international calls:

Inquiries line	1-613-951-8116
Fax line	1-613-951-0581

Information to access the product

This product, catalogue no. 89-637-X no. 003 is available for free in alternate format. To obtain a single issue, visit our website at www.statcan.gc.ca and select "Publications."

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, the Agency has developed standards of service which its employees observe in serving its clients. To obtain a copy of these service standards, please contact Statistics Canada toll free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca "About us" > "Providing services to Canadians."

Statistics Canada
Social and Aboriginal Statistics Division

Aboriginal Peoples Survey, 2006: Concepts and Methods Guide

Published by authority of the Minister responsible for Statistics Canada

© Minister of Industry, 2009

All rights reserved. The content of this electronic publication may be reproduced, in whole or in part, and by any means, without further permission from Statistics Canada, subject to the following conditions: that it be done solely for the purposes of private study, research, criticism, review or newspaper summary, and/or for non-commercial purposes; and that Statistics Canada be fully acknowledged as follows: Source (or "Adapted from", if appropriate): Statistics Canada, year of publication, name of product, catalogue number, volume and issue numbers, reference period and page(s). Otherwise, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, by any means—electronic, mechanical or photocopy—or for any purposes without prior written permission of Licensing Services, Client Services Division, Statistics Canada, Ottawa, Ontario, Canada K1A 0T6.

January 2009

Catalogue no. 89-637-X no. 003

ISSN 1710-0224

ISBN 978-1-100-11477-4

Frequency: Occasional

Ottawa

La version française de cette publication est disponible sur demande (n° 89-637-X n° 003 au catalogue).

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

Symbols

The following standard symbols are used in Statistics Canada publications:

.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0 ^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
P	preliminary
r	revised
x	suppressed to meet the confidentiality requirements of the <i>Statistics Act</i>
E	use with caution
F	too unreliable to be published

Table of contents

1.0	Introduction	6
2.0	Background	6
3.0	Survey objectives	6
4.0	Survey development	7
5.0	Survey design	12
6.0	Data collection	18
7.0	Data processing	19
8.0	Data quality	22
9.0	Dissemination	25
10.0	The relationship between the Aboriginal Peoples Survey and the Census	26
11.0	Levels of geography of output	32
	Appendix 1: Domains of estimation	34
	Appendix 2: Glossary of terms	38
	Appendix 3: Questionnaires	46
	References	47

1.0 Introduction

This guide is intended to provide an understanding of the concepts and methods used in the 2006 Aboriginal Peoples Survey (APS), which was conducted in the fall of 2006 through the spring of 2007.

The Aboriginal Peoples Survey provides data on the social and economic conditions of First Nations people living off reserve, Métis and Inuit, aged 6 years and older.

Technical details on sampling, processing and data quality are included in this guide. Further, the guide explains the relationship between the APS and the 2006 Census and cautions users about important differences in the data produced from the two sources.

In Inuit regions, data from the 2006 Aboriginal Peoples Survey is available for selected Inuit communities. Outside Inuit regions, data is available for selected census subdivisions (CSDs) with large concentrations of Aboriginal people, for selected census metropolitan areas, as well as for a number of other geographical domains. Within each of these geographical domains, data is available for specific Aboriginal groups for, generally, both children and adults. A list of the different domains of estimation for the survey (groups of units for which estimates are targeted) is found in appendix 1.

Appendix 2 contains a glossary of terms that relate to the APS. Links to the 2006 APS questionnaires are found in appendix 3.

2.0 Background

The 2006 Aboriginal Peoples Survey was conducted by Statistics Canada to collect data on the lifestyles and living conditions of Aboriginal peoples in Canada. The survey was designed and implemented in partnership with national Aboriginal organizations.

This is the third time the Aboriginal Peoples Survey has been carried out by Statistics Canada; the first time was in 1991 and the second was in 2001. The data from both the 1991 and 2001 APS were widely used. An extremely important user of the 1991 data was the Royal Commission on Aboriginal Peoples (RCAP). They used the data as a primary source of demographic, social and economic data for their final report and related research studies. The Commission's final report recommended that the APS be conducted regularly to monitor the demographic and social conditions of Aboriginal peoples. Data from the 1991 and 2001 APS have also been used by Aboriginal organizations, community planners, service providers, governments and researchers to inform decision-making (program / policy planning and development), to improve services for Aboriginal peoples and to support academic research. With the release of 2006 data, the APS can also be used to track changes over time and provide an up-to-date picture of the situation of Aboriginal peoples.

3.0 Survey objectives

The primary objective of the 2006 APS is to provide data on the social and economic conditions of Aboriginal people in Canada. More specifically, it focuses on issues such as health, language, employment, income, schooling, housing, and mobility.

There are gaps in the data that presently exist for Aboriginal people and the 2006 APS was designed to address some of these gaps. This is information that cannot be found anywhere else and it can be used to answer a wide range of questions related to community planning, program development and health care priorities, among others. Over 60,000 people were selected to participate in the 2006 survey.

4.0 Survey development

4.1 Content development

Statistics Canada is committed to working closely with Aboriginal peoples on projects of joint interest, and representatives of Aboriginal organizations were involved in all aspects of the design and implementation of the 2006 Aboriginal Peoples Survey (APS) through participation in the Implementation Committee.

The Aboriginal Peoples Survey, Implementation Committee (IC) is a unique forum bringing together representatives from national Aboriginal organizations, federal departments, provinces and territories. Representatives from the Congress of Aboriginal Peoples, the Inuit Tapiriit Kanatami, the Métis National Council, the National Association of Friendship Centres, the Native Women's Association of Canada, and an Elder / facilitator were involved in the development and implementation of the survey and continue to be involved in disseminating the data. The Assembly of First Nations was an active member until the spring of 2001. Two federal departments, Indian and Northern Affairs Canada and Canadian Heritage, are also on the committee to act as representatives of federal partners. The committee also includes a provincial / territorial representative and representatives from Statistics Canada.

4.2 Questionnaire content

The Aboriginal Peoples Survey collects a wide variety of data on the lifestyles and living conditions of Aboriginal people across Canada and was designed in collaboration with national Aboriginal organizations. The Aboriginal Peoples Survey had four questionnaires: Adult Core (people aged 15 and older); Children and Youth (people aged 6 to 14); Métis Supplement (adults who identified as Métis or who had Métis ancestry); and Arctic Supplement (adults living in Inuit regions).

4.2.1 Adult core

This questionnaire was administered to all adults (15 years and older). The following is a list of the sections and some of the key variables:

Education

- Highest level of schooling
- Aboriginal content in schooling (Aboriginal teachers, language, curriculum)
- Location of schools
- Reasons for not completing high school / post-secondary
- Funding for post-secondary schooling
- Residential school attendance

Language

- Aboriginal languages spoken
- Ability to understand, speak, read and write Aboriginal languages
- Extent of use in the home, at work, in school, at other places
- Services available in Aboriginal languages
- Importance of keeping, learning or re-learning Aboriginal languages
- Mother tongue

Labour activity

- Labour force status (employed, unemployed)
- Reasons for not working
- Reasons for working part-time
- Traditional activities (hunting, fishing, gathering, trapping)

- Income
 - Source of income
- Health
 - General health status (excellent, very good, fair, poor)
 - Contact with health professionals and traditional healers
 - Chronic conditions (including diabetes, tuberculosis, heart disease, cancer)
 - Height and weight (body mass index)
 - Smoking
 - Drinking
 - Social support
 - Social problems in community
- Communication technology
 - Use of communication technology (computers, Internet)
 - Location of use of communication technology
- Mobility
 - Number of moves in past 5 years
 - Reasons for moving
 - Temporary absences
- Housing
 - Subsidized Housing
 - Features in the home (running water, telephone, smoke detectors, etc.)
 - Special features to assist a household member with a health problem (ramps, alerting devices, etc.)
 - Quality of drinking water
 - Owned/rented
 - Social housing list, duration on list
 - Home insurance

4.2.2 Children and youth

This questionnaire was developed for Aboriginal children and youth 6 to 14 years of age. The parent or guardian of the child/youth answered the questionnaire on their behalf. Following is a list of sections and key variables:

- General health
 - Height and weight
 - Physical activity
 - Birth weight
 - Breastfeeding
 - Health care utilization
 - Contact with health professionals (pediatrician, public health nurse, etc.)
 - Location of contact with health professionals
 - Overnight stays in hospital
- Activities of daily living and medical conditions
 - Activity limitations
 - Chronic conditions
 - Medications
- Physical injuries
 - Type and cause of injuries

- Dental care
 - Dental treatment in past year
 - Dental care required
- Nutrition
 - How often child eats breakfast
 - Types of foods child eats
- Education
 - Aboriginal specific preschool attendance
 - School attendance
 - Assessment of school
 - Absent from school
- Social activities and relationships
 - Leisure activities (sports, clubs, cultural activities, watching TV, etc.)
 - Quality of relationships with peers, teachers, parents, siblings
 - Types of worries
- Language
 - Ability to understand and speak an Aboriginal language
 - Who provides help in learning language
- General household information
 - Number of persons in the household
 - Main source of household income

4.2.3 Métis supplement

This part of the survey, developed jointly with the Métis National Council, was administered only to the Aboriginal adult population (15 years and older) who self-identify as Métis and/or who have Métis ancestry. This portion of the survey was not conducted in Inuit regions. This supplement contains the following sections:

- Family background
 - Community of birth of respondent, mother and father
 - Ancestry of mother, father
 - Cause of death of mother, father
- Child Welfare
 - Removal of children
 - Adoption
 - Child care arrangements
- Social interaction
 - Marital status
 - Ancestry of spouse/partner
 - Use of Aboriginal languages in home
 - Métis cultural activities

Health

- Contact with health professionals
- Testing for diabetes, high blood pressure, PAP smear test, mammogram, Prostate specific antigen (PSA) blood test
- Type and cause of injuries
- Health care use
- Leisure activities (physical activities such as walking, bicycling, and non-physical activities such as watching television, playing video games)
- Depression
- Spirituality

4.2.4 Arctic supplement

The Arctic supplement was developed based on the Survey of Living Conditions in Circumpolar Arctic Countries (SLiCA), developed jointly with the Inuvialuit Regional Corporation, Nunavut Tunngavik Incorporated, Makivik Corporation, the Labrador Inuit Association, Inuit Tapiriit Kanatami and Laval University, was administered to the Aboriginal adult population (15 years and older) residing in Inuit regions. This supplement contains the following sections:

Household and harvesting activities

- Paid work (full-time / part-time jobs, self-employment, etc.)
- Unpaid work (taking care of children, process or prepare animals for food, skins or cook meals, etc.)
- Harvesting country food
- Equipment for harvesting activities (trucks, snowmobiles, etc.)
- Use of country food (eaten, shared, sold, etc.)
- Household income from harvesting activities

Personal wellness

- Social support (in times of need, for advice, etc.)
- Community ties

Community wellness and social participation

- Degree of satisfaction with conditions in community (such as job opportunities, quality of education, quality of housing, etc.)
- Participation in community (volunteer work, attendance at public meetings)
- Vote in recent elections

4.2.5 Census topics

Some information that was obtained from the 2006 Census has been appended to the APS analytical file to provide a very rich and detailed data set for analysis.

The following Census variables have been appended to the APS analytical file.

- Census subdivision type
- Period of construction of dwelling
- Structural type of dwelling
- Is anyone in the household a farm operator?
- Gross rent
- Primary household maintainer
- Marginal dwelling indicator
- Number of household maintainers
- Number of persons in household
- Owner's major payments
- Tenure - condominium
- Number of rooms
- Is dwelling in need of repair?
- Tenure of dwelling
- Value of dwelling
- Census family status
- Census family structure
- Common-law status
- Economic family status
- Marital status (legal)
- Census family total income
- Economic family total income
- Employment income
- Total government transfer payments
- Household total income
- Investment income
- Low income before tax status
- Total income
- Unpaid work: Hours Spent Doing Unpaid Housework
- Unpaid work: Hours spent looking after children, without pay
- Unpaid work: Hours spent providing unpaid care or assistance to seniors
- Unpaid work: Summary variable for unpaid work
- Number of children – Refers to the number of children in private households
- Presence of children – Refers to the number of children in private households by age group
- Labour force activity
- Industry sectors
- Industry sub-sectors
- Occupation major groups
- Weeks worked in 2005
- Work activity in 2005

- Official language
- Census subdivision type of residence 1 year ago
- Census subdivision type of residence 5 years ago
- Mobility status – place of residence 1 year ago
- Mobility status – place of residence 5 years ago
- Census subdivision of residence 1 year ago
- Census subdivision of residence 5 years ago
- Rural-urban place of residence 1 year ago
- Rural-urban place of residence 5 years ago
- CMA or CA of work
- Type of commuting
- Province or territory of work
- Commuting distance to work
- Census subdivision of work
- Place of work status
- Mode of transportation to work

Note:

Because these variables were obtained from the 2006 Census responses for APS respondents, they refer to the situation on the day of the Census, that is, May 16, 2006. Users should be aware that in some cases, the respondent could have moved or the composition of the household could have changed between Census day and the date of the APS interview, so that some of the information provided by the census data may not always be reflective of the respondent's situation when the APS interview took place.

5.0 Survey design

5.1 Target population and coverage

The target population for the 2006 APS is composed of the Aboriginal population in Canada living in private dwellings, 6 years of age and older as of October 31, 2006, excluding people living in Indian Settlements or on reserve. Reserves in the territories are included in the target population, however. The "Aboriginal population" is defined in section 5.1.1

5.1.1 Identifying the aboriginal population

The Aboriginal Peoples Survey is a postcensal survey, which means that the APS sample was selected from reported answers to the Census questionnaire. More precisely, the APS sample was selected from reported answers to four screening questions on the Census long form, which has two main versions, the 2B form and the 2D form.

The 2B form is completed by self-enumeration and is administered to approximately one in five households in most parts of Canada (2B regions). Other than the basic demographic questions, the 2B form asks questions on labour activity, income, education, activity limitations, citizenship, housing, ethnic origin and so on.

The 2D form, identical in content to the 2B form except for some adaptation of examples, is administered by personal interview to all households in remote areas and Indian reserves (2D regions).

Other households in Canada receive the short form, which only contains basic demographic questions (name, sex, date of birth, legal marital status, common-law status, relationship to person 1, first language learned in childhood and consent question to make data public in 92 years).

The four screening questions used to identify the Aboriginal population are the ethnic origin question (question 17), the Aboriginal self-reporting question (question 18), the Indian band / First Nation membership question (question 20) and the Treaty or Registered Indian question (question 21).

The derived Aboriginal identity concept refers to those persons who reported identifying with at least one Aboriginal group, that is, North American Indian, Métis or Inuit, and/or those who reported being a Treaty Indian or a Registered Indian, as defined by the *Indian Act* of Canada, and/or those who reported they were members of an Indian band or First Nation. The Aboriginal identity population is derived from three questions (questions 18, 20 and 21).

The reporting of an Aboriginal origin to question 17 defines the Aboriginal ancestry population (or ancestry population). Individuals with an Aboriginal origin without identity are defined as the Aboriginal ancestry-only population (or ancestry-only population). The Aboriginal population is defined as either the identity population or the ancestry-only population.

5.1.2 Survey reference date

October 31, 2006 was selected as the reference date for the Aboriginal Peoples Survey. This date approximately corresponds to the beginning of data collection for the survey (October 23 was the official start date). The age is determined as of this reference date and is used to determine which type of questionnaire to administer (children and youth or one of the adult questionnaires).

5.1.3 Census frame

A sampling frame provides a means of accessing the population to be covered by a survey. The APS frame was built in a series of steps. The frame was constructed for both the APS and the ACS. In the first step, a list was created containing all individuals falling in the Aboriginal population according to answers reported to the four screening questions of the Census long form (children and adults).

In a second step, household members of the Aboriginal people selected in the first step were added to the list. These correspond to additional household members belonging to an Aboriginal household (household containing at least one Aboriginal person). These additional individuals could be potentially added to the target population if they had missing information to the screening questions (at the time of sample selection, Census data were not imputed and could therefore be missing). These individuals were also used as potential contact persons to trace the selected individuals in the household.

In a third step, missing information on the screening questions was imputed. Individuals with missing information on the screening questions (or 'filters') belongs to an Aboriginal household have a good chance of being Aboriginal people as well. On the other hand, individuals with missing filters not belonging to an Aboriginal household have a very small chance of being Aboriginal people and were not considered as potential additions to the frame. In general, the imputation rules looked at the household composition for individuals with non missing filters. Individuals with missing filters were imputed as being Aboriginal people if at least 50% of the household members with non missing filters were Aboriginal people.

In the fourth and final step, (based on imputed data), all Aboriginal children aged 6 to 14 years old and all adults aged 15 and older were kept on the frame for the APS. Aboriginal people with missing age responses on the Census form were included in APS, (greater chance of being older than 5 years than being less than 6), but were excluded from the ACS. In these cases, a child / adult flag was derived from answers to the Census to determine whether they should be part of the child or adult APS frame.

5.2 Sampling design

5.2.1 Domains of estimation

a) Domains

Domains of estimation are groups of units for which estimates are targeted. The domains of estimation for APS were very similar to the ones used in 2001, except for the fact that Indian reserves were not covered in 2006 (with the exception of the territories). These domains of estimation correspond to geographical regions for which estimates with an "acceptable" level of precision for a particular Aboriginal group (i.e. North American Indian (NAI), Métis, Inuit) are targeted. No estimate is targeted for the ancestry-only population. Estimates are targeted for the identity population as well as the ancestry population (with or without identity combined). Since most individuals of the identity population also have Aboriginal ancestry, the domains of estimation were based on the identity population.

The identity Aboriginal groups were defined as follows:

- North American Indian (NAI) only - individuals reporting only NAI to question 18
- Métis only - individuals reporting only Métis to question 18
- Inuit only - individuals reporting only Inuit to question 18
- Multiple identity – individuals reporting more than one group to question 18
- Registered Indian or band member only – individuals with a positive answer to question 20 or question 21 but *No* to question 18

Geographical regions were separated between Inuit regions and outside Inuit regions.

i) Inuit regions

For Inuit regions, estimates are targeted for the Inuit communities. In general, for the adults estimates are targeted for all Aboriginal groups combined for all large enough Inuit communities (33 communities). Estimates are also targeted for the Inuit only at the Inuit region level (Nunavik, Nunatsiavut, Inuvialuit and Nunavut) for both adults and children.

For individual Inuit community profiles in the adult population, the target was to estimate a characteristic present for no less than 10% of the population (minimum proportion for which estimates are targeted, called) with a coefficient of variation (CV) of 25%. The coefficient of variation is a measure of precision of the estimate which is described in section 8.1 (*Sampling Errors*). As for estimates pertaining to the Inuit at the Inuit region level, a *min p* of 7.5% and 10% were selected for the adults and children respectively with a CV of 20%.

As a rule of thumb, it was decided, for confidentiality reasons, to target estimates for populations of at least 200 individuals based on the 2001 Census. When this could not be met, grouping was done.

ii) Outside Inuit regions

Outside Inuit regions, large provinces were divided into the main Census Metropolitan Areas (CMAs), the rest of the urban portion of the province and the rest of the rural portion of the province. Certain small provinces were divided into rural and urban only and Newfoundland was divided between Labrador and non Labrador. No estimate was targeted for Prince Edward Island separately.

In addition, estimates were targeted for 5 Census Subdivisions (CSDs) with large Aboriginal concentrations for all Aboriginal groups combined (adults and children separately). These are the CSD of Thompson (Manitoba), Prince Albert (Saskatchewan), Prince Rupert (British Columbia), Whitehorse (Yukon) and Yellowknife (Northwest Territories).

Outside Inuit regions, other than the 5 large CSDs, ideally estimates would be produced by region and Aboriginal group for both adults and children separately. Since some of these combinations would include a very small number of individuals, some grouping was done.

Other than the 5 large CSDs, the target was to estimate a *min p* of 7.5% for the adults and 10% for the children with a CV of 20%. For the 5 large CSDs, a CV of 25% was chosen with a *min p* of 10% for the adults and 15% for the children.

b) Targets in each domain

The ability of achieving the targeted CVs would depend on factors such as the population size, the number of long forms available, the expected response rate, the expected number of false positives (an Aboriginal person according to the Census but a non Aboriginal person according to the APS), the expected sample loss due to the constraint of selecting no more than three individuals per household, the expected loss due to the reduction of overlap with other postcensal surveys and the expected loss due to the overlap with the NLSCY (section 5.3). In certain domains, it was not possible to achieve this precision. In these cases, a CV of 25% or 33% was targeted.

5.2.2 Sampling plan

The Aboriginal Peoples Survey selects its sample from the Census long form sample (either from the 2B or the 2D version of the long form). Outside Indian reserves, the 2D covers the Northern part of each province and the three territories with the exception of Yellowknife and Whitehorse which use the 2B form. In 2D regions, all households receive the 2D version of the long form. In 2B regions (all parts of Canada outside 2D regions), a systematic sample of approximately one in five households receives the 2B version of the long form within each Collection Unit (CU).

Once the frame has been constructed, it is then stratified according to the domains of estimation, and further stratified by 2B/2D regions. A simple random sample is then selected within each domain of estimation crossed by 2B/2D regions. Since the Aboriginal Peoples Survey sample is a sample of the long form sample, its sample design is called a two-phase sample, where a sample of households is selected in the first phase and a sample of individuals is selected in the second phase.

5.3 Overlap with other surveys

In order to control respondent burden, it was decided to reduce the overlap between the APS and the other postcensal surveys as well as the National Longitudinal Survey of Children and Youth (NLSCY). For the Aboriginal Peoples Survey, a total of 1538 units were removed from the overlap and treated as a particular form of non-response in the weighting process. These different sample losses had been estimated before selecting the final sample and the original sample size was increased to compensate for the loss.

5.3.1 Overlap with other postcensal surveys

In 2006, five postcensal surveys were conducted at approximately the same time: the APS, the Aboriginal Children's Survey (ACS), the Participation and Activity Limitation Survey (PALS), the Survey on the Vitality of Official-Language Minorities (SVOLM) and the Maternity Experience Survey (MES). All of these surveys selected their sample from the Census and most of them only from answers to the Census long form. This means that a given household could potentially have been selected for up to five surveys if the household had members of all target populations. Although very unlikely, a household could have been selected for three or four surveys in some cases. Also, more than one person in each household could have been selected for the same survey. The absence of a procedure to reduce the overlap at the household level could have represented a very high response burden for many households.

Consequently, rules were used to limit the overlap between the different surveys once the samples were selected. The idea was to limit the number of surveys to two per household and to three interviews per household. In certain cases, four interviews per household (two for each of two surveys) were allowed. In a first step, the number of surveys per household was reduced to a maximum of two. If a household was initially assigned to more than two surveys, two surveys were selected at random. In a second step, the number of interviews per household was limited to three or four using another random procedure.

5.3.2 Overlap with National Longitudinal Survey of Children and Youth

The National Longitudinal Survey of Children and Youth (NLSCY) content is somewhat related to the children and youth component of the Aboriginal Peoples Survey (APS). For this reason, it was decided to exclude some selected APS children falling in households of certain NLSCY cohorts. There were also certain children selected in NLSCY cohorts overlapping with the APS sample who were dropped from the NLSCY sample.

5.4 Sample sizes

The initial sample size for the APS was 62,579 and after the overlap reduction with other surveys, this number was reduced to 61,041 individuals. The distribution of these 61,041 individuals in the various domains of estimation is given in Table 1 by geographical domain and type of population (identity and ancestry only) with their corresponding observed response rates. It should be noted that the number of individuals also includes those people who agreed to participate in the survey but who reported (or reported for their child) being non-Aboriginal in the APS (false positives).

Table 1
Sample sizes and response rate by geographical domain and type of population

Geographical domain	Identity Ancestry only		Total Respondents	Response rate	
	number of respondents				percent
Nunatsiavut	644	11	655	581	88.7
Nunavik	1,561	20	1,581	1,331	84.2
Inuvialuit	966	25	991	844	85.2
Nunavut	3,626	52	3,678	3,256	88.5
Nunaaat total	6,797	108	6,905	6,012	87.1
Newfoundland and Labrador excluding Nunatsiavut	1,796	639	2,435	2,081	85.5
Prince Edward Island	148	132	280	219	78.2
Nova Scotia	1,214	982	2,196	1,792	81.6
New Brunswick	1,023	943	1,966	1,586	80.7
Quebec excluding Nunavik	4,860	3,061	7,921	6,252	78.9
Ontario	6,818	2,894	9,712	7,808	80.4
Manitoba	4,722	470	5,192	4,034	77.7
Saskatchewan	5,966	519	6,485	5,097	78.6
Alberta	6,708	1,658	8,366	6,576	78.6
British Columbia	6,092	1,288	7,380	5,665	76.8
Yukon	868	51	919	721	78.5
Northwest Territories excluding Inuvialuit	1,260	24	1,284	1,078	84.0
Rest of Canada total	41,475	12,661	54,136	42,909	79.3
Canada total	48,272	12,769	61,041	48,921	80.1

Source: Statistics Canada, Aboriginal Peoples Survey, 2006

6.0 Data collection

The Aboriginal Peoples Survey was conducted from October 2006 to March 2007

6.1 Mode of collection

The Aboriginal Peoples Survey was collected using a paper questionnaire.

The Adult Questionnaire was administered to adults (15 years and older). (No interview with an individual who was between the ages of 15 and 17 could proceed without the prior approval of the individual's parent or guardian.)

The Children and Youth questionnaire was administered for Aboriginal children and youth 6 to 14 years of age. The parent or guardian of the child / youth answered the questionnaire on their behalf, however children from 12 to 14 years old could respond themselves if the parent permitted it. Children who lived on their own could complete the questionnaire without parental or guardian consent.

The survey was conducted using personal interviews in Inuit regions, Labrador and in the Northwest Territories (except Yellowknife). Telephone interviews were conducted elsewhere in Canada. In a number of locations, personal interviews were undertaken when people could not be reached by telephone.

6.2 Aboriginal languages

The Aboriginal Peoples Survey was translated into 20 Aboriginal languages and interpreters were hired. Translators were hired when requests were received for the survey to be conducted in other Aboriginal languages.

6.3 Coordination with the Aboriginal Children's Survey

The collection of the Aboriginal Children's Survey (ACS) occurred during the same period of time as the APS. In order to keep respondent burden to a minimum, the collection of these two surveys was coordinated. For households who were selected for both surveys, the surveys were conducted by the same interviewer during the same telephone contact or personal visit, whenever possible.

7.0 Data processing

7.1 Data capture

Data capture was carried out at the head office in Ottawa. Two methods, optical character recognition (scanning) and key entry, were used to capture the questionnaires. Checkboxes and numeric write-in responses (e.g. date of birth) were captured by scanning, while other write-in responses were captured by key entry. Questionnaires were recaptured when data quality fell below acceptable standards. As well, some abnormalities created by the optical reading system were identified and corrected during editing.

7.2 Editing

The first stage of error detection was done during the data collection. Interviewers were asked to check their questionnaires page by page ensuring that everything had been filled in correctly and clearly and to ensure that skips had been followed correctly. In cases where questions were incorrectly missed, interviewers were instructed to contact the respondent again to obtain the missing information.

The second stage of survey processing involved editing all the survey records according to pre-specified edit rules to check for errors, gaps and inconsistencies in the survey data. Validity checks on each variable were made to ensure, for example, that numerical answers to certain questions fell within acceptable logical ranges and that invalid multiple responses to certain questions were identified. Checks were also made to ensure that the questionnaire flows were followed properly and that portions of the questionnaire that were to be skipped in the interview because of a previous answer were in fact skipped. Inconsistencies between related questions were also corrected.

Where errors were found, the erroneous information was replaced by a "not stated" code, or corrected based on the answers to other questions. Although the corrections were generally done in an automated way, analysts reviewed some problematic situations on a case by case basis.

Finally, a macro-level verification was done by analyzing frequency distributions to identify anomalies (for example, missing categories or unusually large frequencies).

7.3 Weighting

In a sample survey, each selected person represents not only himself / herself, but also other persons who were not sampled. Consequently, a weight is associated with each selected person to indicate the number of persons that he / she represents. This weight must be used for all estimations. For example, in a simple random sample of 2% of the population, each person represents 50 persons in the population. The initial weight is then adjusted for such things as non-response and discrepancies between the characteristics of the sample and known totals for the target population (post-stratification adjustment). In fact, seven steps were used in the weighting process.

7.3.1 Initial weights

The initial weight was the inverse of the inclusion probability (probability of falling in the sample). The initial weight was the product of two components: the inverse of the stratum sampling fraction and the inverse of the initial Census sampling fraction. The stratum sampling fraction is calculated as the number of individuals selected in each stratum divided by the total number of individuals on all long forms available in that stratum on the Census frame. The initial Census sampling fraction, which is unique to each Collection Unit (CU), is calculated as the number of completed long forms divided by the total number of short and long forms for that CU (usually slightly smaller than 1/5 in 2B regions and slightly smaller than 1 in 2D regions because of non-response).

7.3.2 Adjustment for overlap with other surveys

As mentioned in Section 5.3, 1538 individuals were lost from the initial sample of size 62,579 due to the reduction of the overlap with other surveys. To compensate for that loss, a simple ratio adjustment was applied by population type (identity, ancestry-only), Aboriginal group and age group (adults / children). That is, for each of these groupings, the sum of the initial weights was calculated over the full initial sample and over the remaining sample of 61,041 individuals after reduction of overlap. Initial weights were then multiplied by these factors for the remaining sample to obtain the adjusted weights. The adjusted weights of the units removed were set to 0. Hence, the sum of the adjusted weights for the remaining units adds up to the sum of the initial weights within each combination.

7.3.3 Adjustment for units selected in the Aboriginal Children's Survey

A small number of individuals selected for the Aboriginal Children's Survey (ACS) were in fact "in scope" for APS and ended up completing the APS questionnaire. This was due to errors in the Census date of birth. Although interviewers were not supposed to convert an ACS to an APS questionnaire, a small number of such interviews were done. In order to keep these interviews, a special procedure was used to assign them a weight.

Looking at the ACS strata in which these individuals were selected, it was possible to assign the corresponding APS strata in which they would have fallen had the correct Census date of birth for these individuals been available. These individuals were initially assigned the average weight (weight adjusted for the overlap loss) of the corresponding stratum. The weights of all individuals in these strata were then slightly proportionally decreased to preserve the stratum totals.

7.3.4 Adjustment for adult-child child-adult conversion

Because of errors in the Census date of birth, 62 individuals selected as adults were in fact children and 127 individuals selected as children were in fact adults upon verification of the date of birth in the APS. Even though transfers of questionnaires between the ACS and the APS were not allowed, transfers of questionnaires between adults and children were allowed in the APS. Transfers from one stratum at the sampling stage to another stratum at the data collection stage are called *strata jumpers*. Had these strata jumpers been selected in the correct strata, they would have had a different weight. The following strategy was used for these cases.

For each adult in the APS selected as a child in the Census, it was possible to assign the corresponding adult stratum from the child stratum in which this adult was selected. Similarly, for each child in the APS selected as an adult in the Census, it was possible to assign the corresponding child stratum from the adult stratum in which this child was selected. For each strata jumper, the average previous stratum weight (weight adjusted for the addition of APS respondents selected in the ACS) was first assigned. Weights for all individuals were then adjusted by stratum such that the sum of the new weights was equal to the sum of the previous weights in each stratum, using a ratio adjustment.

7.3.5 Adjustment for out of scope units

Some individuals were found to be out of scope for reasons other than reporting that the individual was not an Aboriginal person. In fact, 153 individuals were too young (or too old) to complete the survey, 121 were deceased and 3 were no longer living in Canada.

Individuals too young for the survey may be cases with an error in the Census date of birth or cases for which no age was available in the Census (such individuals were put on the APS frame since they would be more likely to be 6 years of age or older than under 6 years old). If they were younger than 6 years old, they would be out of scope for the APS. If they were selected as adults and they were from 6 to 14, they would be too young for the adult questionnaire. In this case, interviewers were supposed to switch from an adult to a children and youth questionnaire. Some interviewers did not follow this procedure and these cases were coded as out of scope for being too young. In theory, no one should have been classified as being too old for the survey. This may be situations where someone was selected as an adult but was from 6 to 14 years old. Even though interviewers should have switched questionnaires in such cases, some of them classified these cases as being too old for the survey.

The Census age available for these individuals (too young or too old) had a tendency of being proportionally higher for the ages near the limits chosen for the survey (6 years old for children and youth and 15 years old for the adults). About 60% of the deceased individuals were more than 55 years old. Age groups were created accordingly and used for the adjustment. The weights of the out of scope individuals were set to zero. In order to compensate for these losses, a simple ratio adjustment by Census age group was done to preserve the total sum of weights in each age group. That is, the weights of the in scope units were inflated such that the sums of the new weights were preserved in each age group.

7.3.6 Adjustment for non-response

Two adjustments were made for two types of non-response: the selected persons for whom no contact was made with the person himself / herself or the parent or guardian of the child (4090 adults and 1740 children) and the persons contacted who did not (or could not) provide the information for themselves or their child (mainly refusals, 4360 adults and 1660 children). The weights were first adjusted for non-contact and then for other forms of non-response for the adults and the children separately. In what follows, the term 'non-response' will be used for both types of non-response. The term "respondent" refers to the person completing the information for the selected person (usually themselves for the adults or a parent or guardian for the children). The term "responding unit" refers to the selected person for whom a response was obtained (either from themselves or from the child parent or guardian).

Each non-response adjustment was done in three steps. First, a logistic regression model was used to predict the response probability (probability of obtaining a response) for each selected person (for both responding and non-responding units) from a series of explanatory variables. These variables, consisting of the selected person characteristics, the parent or guardian characteristics for the children and household characteristics, were either Census characteristics (for example family structure, Census Aboriginal group) or collection variables (for example number of attempts to contact a subject, whether field follow up was required, etc.). For children, as parent or guardian characteristics were required for responding and non-responding units, the Census family structure was used to determine who would be the "most likely" parent or guardian of the child for non-responding units. Collection variables were found to be particularly good predictors of the response or non-response as many of these variables measure the effort to contact a person or to obtain a response from a contacted person. For instance, individuals requiring a large number of attempts to be contacted were found to be very similar to individuals for whom no contact was made (all attempts failed).

The non-response adjustment was then done by forming non-response adjustment classes in such a way that selected persons in each class had similar response probabilities. Finally, the inverse of the weighted response rate in a class was used as the weighting adjustment factor for that class and the weights of the responding units within the class were adjusted accordingly.

7.3.7 Post-stratification adjustments

The post-stratification adjustment ensures that the sum of the final weights for the responding units matches the population counts from the Census, according to different groups. For the Aboriginal Peoples Survey, these groups, called post-strata, were defined from combinations of several variables: the Census Aboriginal group (North American Indian, Métis, Inuit, multiple Aboriginal responses or registered Indian/band member only), the Aboriginal population type (identity or ancestry only), the geographical domain and the age group (adults or children and youth). The weights were adjusted using the ratio of the Census weighted count to the sample weighted count for each post-stratum. This ensured that the sample did not under or over-represent certain combinations of Census Aboriginal groups, regions and age groups.

Since answers to the screening questions (presented in section 5.1.1) can differ between the APS and the Census, a second post-stratification was carried out. This guaranteed that the total Aboriginal population (identity or ancestry), as estimated from the APS filter questions, matched those from the Census filter questions. This post-stratification was done by geographical domain and by age group, according to the total count of Aboriginal people, and not according to each Aboriginal group, in order not to hide the transitions observed between the Census and the survey that are due to such factors as the proxy effect, the time effect and the survey instrument effect (see section 10.0 The Relationship Between the APS and the Census).

8.0 Data quality

8.1 Sampling Errors

The estimates that can be derived from this survey are based on a sample of individuals. Somewhat different estimates might be obtained if a complete census had been taken using the same questionnaire, interviewers, supervisors, processing methods, etc. as those actually used. The difference between an estimate obtained from the sample and the one resulting from a complete count taken under similar conditions is called the *sampling error* of the estimate.

In order to provide estimates of sampling error for statistics produced in the APS, a particular type of "bootstrap" method was developed. Several bootstrap methods exist in the literature but none of them was appropriate for the APS sample design. The particularities of the design that make the estimation of sampling errors difficult are the following:

- Two-phase sample design in which households are selected in the first phase and individuals in the second phase
- The sampling fraction of the first phase sample (long form sample) is non-negligible (about 20% in 2B regions) and the second phase sampling fraction is relatively high in most strata
- The second-phase strata (combinations of domains of estimation, 2B/2D regions) are non nested within first-phase strata (collection units).
- The method used has to be flexible enough to produce standard statistics such as proportions, totals, means and ratios but also more sophisticated statistics, including percentiles, logistic regression coefficients, etc.

The method developed is a general bootstrap methodology for two-phase sampling (Langlet, Beaumont and Lavallée, 2008). Several bootstrap methods exist in the literature for one-phase sampling. The most common one is called the "with-replacement" bootstrap and consists of selecting M *with-replacement* subsamples from the main sample and producing estimates for each subsample. The bootstrap variance estimate (the variance is a particular measure of sampling error) is then calculated as a function of the squared differences between estimates coming from each of the M bootstrap samples and the estimate coming from the survey sample.

The variance calculation is greatly simplified through the use of bootstrap weights. For each subsample, the initial sampling weight first has to be adjusted for bootstrap subsampling which produces what is called "initial bootstrap weights". Since each bootstrap sample is drawn by selecting the units with replacement, a unit can appear several times in a particular bootstrap sample. It can be shown that the bootstrap weights are a function of the initial weight of the observation multiplied by what is called "the multiplicity" of the unit in the bootstrap sample, which is the number of times the unit is selected in the bootstrap sample. The multiplicity of a unit in the bootstrap sample is a random variable following what is called a "multinomial distribution." Hence, the bootstrap weights can be seen as the product of the initial sampling weights of the units by a random adjustment factor (in this case, a function of the multiplicity of the unit). Once initial bootstrap weights have been derived, all weight adjustments applied on the initial sampling weights of the full sample are applied to the initial bootstrap weights to obtain the final bootstrap weights which will capture the variance associated with not only the particular sample design but also the variance associated to all weight adjustments applied to the full sample to derive the final weights.

Any bootstrap method can be used by deriving bootstrap weights and any bootstrap weights can be seen as the product of the initial sampling weights and a random adjustment factor. This is the idea of the general bootstrap methodology for two-phase sampling. In the case of a two-phase sample, the variance can be decomposed into two components, each one associated to a phase of sampling. The method generates a random adjustment factor for each phase of sampling. The initial bootstrap weight of a given unit in a bootstrap sample is the product of its initial sampling weight by the values of the two random adjustment factors for that unit.

There is a major advantage of having two sets of random adjustment factors. The first set of adjustment factors can be used for estimates based on the first phase only, that is, estimates based on the Census long form sample. These estimates are used when the weights are adjusted to the Census totals in the post-stratification adjustment. This will produce variable Census totals from each bootstrap sample and reflects the fact that the Census totals used are based on a sample and are not known fixed totals.

For the Aboriginal Peoples Survey, 1,000 sets of bootstrap weights were generated using the method described above. The method used is slightly biased in the sense that it slightly overestimates the variance. The amount of overestimation was found to be negligible for the APS. The method can also lead to negative bootstrap weights. To overcome this problem, a transformation was done on the bootstrap weights which reduced their variability. Therefore, the variance calculated on these transformed bootstrap weights has to be multiplied by a factor which is a function of a certain parameter, called *phi*. The value of the parameter is selected as the smallest integer that makes all bootstrap weights positive. For the Aboriginal Peoples Survey, this factor is 4. The variances calculated from the transformed bootstrap weights have to be multiplied by $4^2 = 16$. Alternatively, the CVs obtained (square root of the variance divided by the estimate itself) have to be multiplied by 4. However, most software producing sampling error estimates from bootstrap weights, have an option to specify this adjustment factor, such that the correct variance estimate is obtained without the need of an extra step to multiply by the constant.¹

It is of course extremely important to use the appropriate multiplicative factor for any estimate of sampling error such as variance, standard error or CV. Omission of this factor would lead to erroneous results and conclusions. This factor is often specified as the "Fay adjustment factor" in software producing sampling error estimates from bootstrap weights.

The measure of sampling error used for the APS is the coefficient of variation (CV) of the estimate, which is the standard error of the estimate divided by the estimate itself. For this survey, when the CV of an estimate is greater than 16.5% but smaller or equal to 33.3%, the estimate will be accompanied by the letter "E" to indicate that the data should be used with caution. When the CV of an estimate is greater than 33.3%, the cell estimate will be replaced by the letter "F" to indicate that the data is suppressed for reasons of reliability. An "X" is used to indicate that an estimate is suppressed to meet confidentiality requirements of the *Statistics Act*.

1. More information on the bootstrap method used can be obtained in the reference.

8.2 Non-sampling errors

Errors which are not related to sampling may occur at almost every phase of a survey. Interviewers may misunderstand instructions, respondents may make errors in answering questions, answers may be incorrectly entered on the questionnaire, errors may be introduced in the processing and tabulation of the data and so on. These are all examples of non-sampling errors. Over a large number of observations, randomly occurring errors will have little effect on estimates. However, errors occurring systematically will contribute to biases in the survey estimates.

The 2006 Aboriginal Peoples Survey being very similar to the 2001 APS in terms of content and methodology used, no pilot test was done for the APS. Hence, the experience of the 2001 APS was used to evaluate the entire survey process, from the questionnaire content to the data processing. This helped reduce the magnitude of non-sampling error.

Coverage errors occur when there are differences between the target population and the sampled population. Because the APS sample is selected from those who participated in the Census, individuals who did not participate in the Census could not be sampled for the APS. If this group of individuals is significantly different than the ones who participated in the Census with respect to the characteristics measured in the APS, a bias could be introduced. This bias is assumed to be relatively small given the very high response rate obtained in the Census and given the adjustments made on the initial Census sampling weights.

Total non-response can be a major source of non-sampling error in surveys depending on the degree to which respondents and non-respondents differ with respect to characteristics of interest. Total non-response occurred if the selected individual could not be contacted or refused to participate in the survey. High response rates are essential for quality data. To reduce the number of non-response cases, the interviewers were all trained by Statistics Canada's staff, provided with detailed interviewer manuals, and were under the direction of interviewer supervisors. Refusals were followed up by senior interviewers to encourage respondents to participate in the survey. In regions covered by telephone interviewing, a field follow-up procedure was put in place to further reduce the level of non-response.

Partial non-response occurred if the respondent did not answer a specific question, possibly because he/she did not know the answer or the question was too sensitive. Generally, the extent of partial non-response was small in the APS. Results from the 2001 APS were used to evaluate potential problems and changes to the questionnaires were made. In particular, special measures were put in place to facilitate the collection of data on sensitive topics. Where required, special introductions were included (e.g. question on mental, spiritual and emotional health in the Métis supplement), "refused" categories were added and so on.

A response error occurs when the respondent misunderstands a question or the interviewer records an incorrect answer. Several procedures were taken to minimize this type of error, including interviewer training and qualitative testing of the new questions.

Processing errors may occur at various stages including coding, data capture and editing. Quality control procedures were applied to every stage of the data processing to minimize this type of error.

9.0 Dissemination

9.1 Analytical products

Accompanying the release of data from the Aboriginal Peoples Survey was an analytical article entitled "Inuit Health and Social Conditions; Highlights from the 2006 Aboriginal Peoples Survey", which provides information on health status provided through data on self-reported health and chronic conditions. Determinants such as access to health care, education, housing, harvesting and country food consumption were examined.

A fact sheet, providing highlights from the analytical article, is also available.

In early 2009, analytical articles and fact sheets will be released focusing on First Nations children aged 6 to 14 living off reserve and on Métis people.

9.2 Data products and services

The master data file for the 2006 APS is available in Statistics Canada's Research Data Centres (RDCs). Accompanying the file, is the record layout, SAS and SPSS syntax to load the file, as well as metadata in the form of a codebook that describes each variable and provides weighted and unweighted frequency counts.

Supporting data tables that provide provincial and territorial estimates, as well estimates for Inuit regions, for key indicators from the analytical article are available.

Profiles that provide information on a variety of topics covered in the APS are available on Statistics Canada's website. Information is displayed for different concepts and levels of geography.

Custom tabulations will be produced, upon request, on a cost-recoverable basis.

9.3 Survey documentation

Information about the Aboriginal Peoples Survey is available on Statistics Canada's website. This information includes:

- Questionnaires
- Concepts and Methods Guide
- User's Guide
- Integrated Metadata Base (IMDB)

10.0 The relationship between the Aboriginal Peoples Survey and the Census

The Aboriginal Peoples Survey (APS) is a post-censal survey, which means that Census information was used to determine who would be included in the APS sample. More detailed information about how Census responses were used to determine the population of interest for the APS is provided in section 5.0 (*survey design*).

The Census and the APS are both rich sources of information on Aboriginal peoples that complement each other. The APS takes concepts that are touched on in the Census and asks questions that dig deeper in order to provide more detailed information. For example, the Census provides some information about highest level of certificate, diploma or degree. Adding information from APS provides an opportunity to learn about any schooling below high school completion, whether teachers were Aboriginal people, whether financial assistance was obtained to pursue post-secondary schooling or why people didn't continue their formal schooling.

The Aboriginal Peoples Survey also covers entire topics or themes that are not included in the Census. For example, the APS can provide information on the health of Aboriginal people, and their use of communication technology.

Both the Census and the APS conceptually cover the two types of Aboriginal populations; that is, the "identity population" and the "ancestry population" as described in section 5.

10.1 Differences in counts

While the post-stratification (see section 7.3.7) ensured that the total number of people with Aboriginal ancestry or identity is the same for the Census and the APS, it did not ensure that the counts for the Aboriginal groups would match. Indeed, the Census and the APS produce different counts at the Aboriginal group level. This is due to changes in the way respondents answered questions about their Aboriginal ancestry and Aboriginal identity from the time of the Census to the time of the APS. Respondents may have changed their responses for a number of reasons, including differences in how the information was collected.

10.1.1 Different modes of interview

Most of the 2006 Census data were collected through self-enumeration using a mail-out mail-back methodology (except for Indian reserves and remote areas, including all Inuit communities, where the canvasser methodology was used). In general, one household member completed the Census form for all household members. This is called proxy reporting, meaning someone other than the person for whom the information is reported answers the questions.

In all Inuit communities, all of the Northwest Territories (except Yellowknife) and Labrador, APS data were collected through personal interviews. Everywhere else in Canada, data were collected mostly through telephone interviews (some places had field follow-up done at the end of data collection to reduce non-response).

For the Aboriginal Peoples Survey, the interview was completed by the selected person for the adults or by one of the child's parent or guardian for the children. Proxy reporting for the adult population was allowed only in special circumstances. Because the person contacted for the APS may not be the same person who filled in the Census questionnaire, there may be some differences in responses.

10.1.2 Different questionnaires

Another source of discrepancy between the Census and the Aboriginal Peoples Survey is the "ethnic origin" or "ancestry" question. The Census uses an open-ended ethnic origin question (*to which ethnic or cultural group(s) did this person's ancestors belong?*) Answers to this write-in question are coded to determine whether the person has Aboriginal ancestry, and, if they do, which Aboriginal ancestry group(s) they fall into (North American Indian, Métis and/or Inuit). In the Aboriginal Peoples Survey, three Aboriginal group-specific questions are asked regarding North American Indian, Métis and Inuit ancestries.

As a result, more people reported Aboriginal ancestry in the APS compared to the Census, with many more multiple combinations. For example, one may have written in "Métis" on the Census ancestry question, and then reported having both North American Indian and Métis ancestries when asked about each group in the APS.

The Aboriginal self-reporting question (the "identity" question) is essentially the same on both the Census and the APS forms (*Are you / Is _____ an Aboriginal person, that is, North American Indian, Métis or Inuit?*). However, on the Census form, there is an instruction saying "*If 'yes', mark 'x' the circle(s) that best describe(s) this person now*". This may influence the respondent to choose the category that best describes the person concerned, and therefore mark only one category as opposed to many. During the APS training, interviewers were asked to pay attention to the possibility of having multiple Aboriginal self-reporting and to read the question completely, including the three Aboriginal groups. This may have led to the reporting of more Aboriginal groups in the APS compared to the Census. Also, because of the fact that in the APS, the Aboriginal self reporting question is preceded by three specific questions on Aboriginal ancestries (three questions in one) and not by a general open-ended ethnic origin question as in the Census, respondents may be more likely to report themselves as an Aboriginal person with the APS question.

10.1.3 Different context

The Census form is very general in terms of content whereas the APS is a survey specifically designed for Aboriginal people. As a result, individuals may have given more detailed information about their Aboriginal ancestry and Aboriginal identity in the APS.

10.1.4 Coverage and sampling methodology

The Aboriginal Peoples Survey sample was selected among those who reported Aboriginal ancestry and/or Aboriginal identity on the Census. However, when contacted for the APS, some individuals no longer reported having Aboriginal ancestry or Aboriginal identity. This may have been due to several factors. For example, perhaps the Census form was completed by a parent for all household members. The parent reported that all his/her children had Aboriginal origins. However, when the teenage son (at least 15 years old) was contacted for the APS, he did not report having Aboriginal origins. As mentioned above, in order to compensate for any such loss in the overall Aboriginal population, a post-stratification was carried out as part of the weighting process.

It is important to note that there were transitions between the Aboriginal ancestry population and the Aboriginal identity population from the time of the Census to the APS. Some individuals who reported having Aboriginal identity in the Census reported having only Aboriginal ancestry (with no Aboriginal identity) on the APS. Conversely, some individuals who reported having only Aboriginal ancestry (with no Aboriginal identity) in the Census reported having Aboriginal identity on the APS. For the reasons described above, a larger group of individuals fell into the second category; in other words many people "gained" Aboriginal identity on the APS. As a result of this effect, the count of the total Aboriginal identity population will be larger from the APS than from the Census. The count of people with only Aboriginal ancestry (with no Aboriginal identity) will be smaller from the APS than from the Census.

An example to illustrate how one may move from having only Aboriginal ancestry (with no Aboriginal identity) on the Census to the Aboriginal identity population on the APS may help clarify this. On the Census, a person reports that he / she has North American Indian ancestry (along with non-Aboriginal ancestry such as Irish and Scottish), but does not report identifying with any Aboriginal group. When contacted for the APS, the same person reports having North American Indian ancestry and North American Indian identity. This means that they have moved from the Aboriginal ancestry only population on the Census (and therefore not being counted in the identity population) to the Aboriginal identity population for the APS.

On the other hand, because of the Aboriginal group-specific nature of the ancestry question on the APS, the number of individuals who reported Aboriginal identity only (with no Aboriginal ancestry) is substantially smaller for the APS than for the Census. For example, on the Census one may report French ancestry with "Métis" identity. When contacted for the APS, they may have been more specific about their ancestry. They may have reported having both North American Indian and French ancestries in addition to reporting having a Métis identity. (It is common for Métis people to have both North American Indian and French ancestries). They have then moved from having only Aboriginal identity on the Census, to having both Aboriginal identity and Aboriginal ancestry on the APS.

Transitions between the different Aboriginal groups (North American Indian, Métis and Inuit) also occurred. For example, one may have reported having North American Indian identity on the Census, but both North American Indian and Métis identity in the APS.

The following tables compare the Census counts to the APS counts for different geographical regions and Aboriginal groups. The four Inuit regions are separated from the rest of Canada.

Table 2 and table 3 compare respectively the non-reserve² Census and the APS counts for the *identity population* and *ancestry only population* without double counting.

Table 4 and 5 are similar to tables 2 and 3, but include double counting. This means that someone with a multiple identity of NAI and Métis counts in both the NAI and Métis categories.

All counts in the next tables are rounded to the nearest 10. Since totals are rounded independently from individual cells, the cells may not add up exactly to the corresponding totals.

² Data for the Yukon and Northwest Territories include First Nations communities.

Table 2
Non-reserve identity counts for Census and Aboriginal Peoples Survey without double-counting

Geographical domain	NAI only		Métis only		Inuit only		NAI and Métis		Other multiples		Band/Registered only	
	Census	APS	Census	APS	Census	APS	Census	APS	Census	APS	Census	APS
	number of respondents											
Nunatsiavut	0	10	40	30	1,970	1,900	0	0	0	0	10	0
Nunavik	40	30	20	70	8,170	8,040	0	0	10	40	0	0
Inuvialuit	750	780	160	130	2,780	2,710	0	40	0	90	40	10
Nunavut	100	130	120	130	21,080	21,050	0	0	30	60	10	10
Nunsaat total	890	950	330	360	33,990	33,710	0	40	50	210	60	20
Newfoundland and Labrador	5,930	12,080	5,940	6,180	2,370	2,890	70	230	210	300	4,010	1,980
excluding Nunatsiavut	720	1,120	320	190	20	30	10	0	0	10	70	60
Prince Edward Island	6,780	11,770	7,250	8,560	320	400	70	320	30	40	740	850
Nova Scotia	4,930	8,240	3,970	5,090	170	360	40	270	60	40	600	710
New Brunswick	29,580	41,990	25,790	34,310	1,220	1,540	800	3,090	90	150	3,140	3,890
Quebec excluding Nunavik	100,360	136,080	68,410	78,800	1,720	1,710	1,510	4,810	220	350	5,870	5,390
Ontario	38,390	42,080	64,130	64,020	440	540	500	2,860	30	310	1,220	1,090
Manitoba	38,230	38,850	42,730	43,570	180	110	510	2,360	30	20	910	1,240
Saskatchewan	50,290	59,100	76,710	84,780	1,420	1,590	890	4,890	150	250	2,290	1,660
Alberta	71,580	81,030	54,240	60,490	710	860	1,310	3,310	170	330	3,200	2,890
British Columbia	5,690	5,870	730	780	220	170	30	80	10	0	170	170
Yukon												
Northwest Territories excluding												
Inuvialuit	10,560	9,940	3,090	3,060	900	1,050	60	640	20	100	100	40
Rest of Canada total	363,040	448,160	353,300	389,830	9,680	11,250	5,810	22,870	1,020	1,890	22,290	19,970
Canada total	363,940	449,110	353,630	390,190	43,670	44,960	5,810	22,810	1,070	2,100	22,350	19,990

Notes:

NAI = North American Indian

APS = Aboriginal Peoples Survey

Source: Statistics Canada, Aboriginal Peoples Survey and Census, 2006

Table 3
Non-reserve origin only counts for Census and Aboriginal Peoples Survey without double counting

Geographical domain	NAI only		Métis only		Inuit only		NAI and Métis		Other multiples	
	Census	APS	Census	APS	Census	APS	Census	APS	Census	APS
	number of respondents									
Numatsiavut	0	0	0	0	0	70	0	0	0	10
Nunavik	0	30	0	0	0	120	0	0	0	0
Inuvialuit	0	30	0	10	0	80	0	0	0	0
Nunavut	70	0	10	0	280	310	0	0	0	0
Nunaaq total	70	60	10	10	280	580	0	0	0	10
Newfoundland and Labrador excluding Nunatsiavut	9,450	4,780	780	830	1,820	1,010	80	380	230	200
Prince Edward Island	1,350	970	170	260	30	0	20	70	0	0
Nova Scotia	17,200	10,100	3,360	2,800	670	440	180	1,190	90	180
New Brunswick	13,070	8,260	2,090	1,020	230	180	210	1,010	40	250
Quebec excluding Nunavik	116,730	80,900	17,040	7,910	1,120	840	1,250	20,740	100	730
Ontario	126,070	76,910	28,890	16,170	1,570	1,550	1,260	14,380	290	680
Manitoba	7,160	4,370	11,830	6,310	240	160	280	2,460	50	70
Saskatchewan	5,770	2,420	5,090	3,770	70	20	170	1,330	40	40
Alberta	34,820	17,500	17,770	10,250	850	300	770	5,470	100	300
British Columbia	41,270	25,540	14,710	8,690	680	460	720	4,730	60	320
Yukon	570	320	90	90	40	0	10	70	0	0
Northwest Territories excluding Inuvialuit	440	280	80	70	120	0	0	60	20	0
Rest of Canada total	373,890	232,340	101,890	58,190	7,440	4,970	4,960	51,870	1,020	2,760
Canada total	373,970	232,400	101,900	58,190	7,720	5,540	4,960	51,870	1,020	2,770

Notes:
NAI = North American Indian
APS = Aboriginal Peoples Survey
Source: Statistics Canada, Aboriginal Peoples Survey and Census, 2006

Table 4
Non-reserve identity counts for Census and Aboriginal Peoples Survey with double counting

Geographical domain	NAI		Métis		Inuit		Band/Registered Indian	
	Census	APS	Census	APS	Census	APS	Census	APS
	number of respondents							
Nunatsiavut	0	10	40	40	1,970	1,910	0	0
Nunavik	60	60	20	80	8,180	8,080	0	0
Inuvialuit	760	910	160	210	2,780	2,810	40	10
Nunavut	120	170	130	170	21,110	21,110	10	10
Nunaa't total	930	1,140	340	490	34,040	33,910	60	20
Newfoundland and Labrador excluding Nunatsiavut								
Nunatsiavut	6,050	12,440	6,180	6,660	2,580	3,190	4,010	1,980
Prince Edward Island	720	1,120	330	190	20	40	70	60
Nova Scotia	6,850	12,100	7,350	8,920	350	440	740	850
New Brunswick	5,000	8,550	4,040	5,400	230	400	600	710
Quebec excluding Nunavik	30,440	45,180	26,640	37,520	1,310	1,690	3,140	3,890
Ontario	102,040	141,150	69,990	83,830	1,940	2,060	5,870	5,390
Manitoba	38,930	45,080	64,640	67,190	470	840	1,220	1,090
Saskatchewan	38,760	41,210	43,250	45,950	210	140	910	1,240
Alberta	51,270	64,180	77,720	89,800	1,580	1,830	2,290	1,660
British Columbia	73,000	84,510	55,630	64,040	890	1,190	3,200	2,890
Yukon	5,730	5,950	770	860	230	170	170	170
Northwest Territories excluding Inuvialuit	10,640	10,660	3,150	3,750	910	1,150	100	40
Rest of Canada total	369,430	472,130	359,690	414,120	10,710	13,150	22,290	19,970
Canada total	370,370	473,280	360,040	414,610	44,740	47,060	22,350	19,990

Notes:

NAI = North American Indian

APS = Aboriginal Peoples Survey

Source: Statistics Canada, Aboriginal Peoples Survey and Census, 2006

Table 5
Non-reserve origin only counts for Census and Aboriginal Peoples Survey with double counting

Geographical domain	NAI		Métis		Inuit	
	Census	APS	Census	APS	Census	APS
number of respondents						
Nunatsiavut	0	0	0	0	0	80
Nunavik	0	30	0	0	0	120
Inuvialuit	0	30	0	10	0	80
Nunavut	70	0	10	0	280	310
Nunaaat total	70	60	10	10	280	580
Newfoundland and Labrador excluding Nunatsiavut	9,680	5,240	950	1,380	2,050	1,210
Prince Edward Island	1,370	1,050	200	330	30	0
Nova Scotia	17,420	11,460	3,580	4,000	760	620
New Brunswick	13,320	9,470	2,330	2,090	280	430
Quebec excluding Nunavik	118,060	102,370	18,300	28,920	1,220	1,580
Ontario	127,500	91,840	30,260	30,810	1,860	2,220
Manitoba	7,450	6,840	12,140	8,830	290	230
Saskatchewan	5,980	3,760	5,270	5,120	110	50
Alberta	35,660	23,150	18,580	15,830	950	590
British Columbia	42,030	30,570	15,440	13,580	740	790
Yukon	580	390	100	160	40	0
Northwest Territories excluding Inuvialuit	460	340	80	130	140	0
Rest of Canada total	379,510	286,480	107,240	111,190	8,460	7,730
Canada total	379,590	286,550	107,250	111,200	8,740	8,310

Notes:

NAI = North American Indian

APS = Aboriginal Peoples Survey

Source: Statistics Canada, Aboriginal Peoples Survey and Census, 2006

11.0 Levels of geography of output

Because the APS is a sample survey, there are some limitations to the geographic areas for which data can be compiled. The population that reported that they identify as Aboriginal people (North American Indian, Métis or Inuit) and/or have registered Indian status and/or are members of an Indian Band / First Nation is commonly referred to as the "Aboriginal identity" population. See Table 6 for a summary of levels of geography for which estimates will be available for this population.

Table 6
Availability of data for the Aboriginal identity” population

Geography	Data availability
National	Data will be available at the national level for all Aboriginal groups.
Provincial / Territorial	Data will be available at the provincial level (except for Prince Edward Island) and at the territorial level
Subprovincial	Data will be available for some sub-provincial breakdowns
Community level	For Inuit regions, data will be available for each large enough Inuit community. Outside Inuit regions, data will be available for selected Census subdivisions (CSDs) with large concentrations of Aboriginal people, and for selected Census metropolitan areas. (see appendix 1)

Domains of estimation for the identity population – Outside Inuit regions

Geographical domain	Aboriginal group	Age
00-Atlantic	Métis	Adults 15 and over
00-Atlantic	Métis	Children 6 to 14
00-Canada	Inuit	Adults 15 and over
00-Canada	Inuit	Children 6 to 14
10-Labrador	NAI	Adults 15 and over
10-Labrador	NAI	Children 6 to 14
10-North Labrador	NAI	Adults 15 and over
10-North Labrador	NAI	Children 6 to 14
12-Global	NAI	Children 6 to 14
12-Rural	NAI	Adults 15 and over
12-Urban	NAI	Adults 15 and over
13-Global	NAI	Children 6 to 14
13-Rural	NAI	Adults 15 and over
13-Urban	NAI	Adults 15 and over
24-Montreal	Métis	Adults 15 and over
24-Montreal	Métis	Children 6 to 14
24-Montreal	NAI	Adults 15 and over
24-Montreal	NAI	Children 6 to 14
24-Rural	Métis	Adults 15 and over
24-Rural	Métis	Children 6 to 14
24-Rural	NAI	Adults 15 and over
24-Rural	NAI	Children 6 to 14
24-Urban	Métis	Adults 15 and over
24-Urban	Métis	Children 6 to 14
24-Urban	NAI	Adults 15 and over
24-Urban	NAI	Children 6 to 14
35-Ottawa-Gatineau	Métis	Adults 15 and over
35-Ottawa-Gatineau	Métis	Children 6 to 14
35-Ottawa-Gatineau	NAI	Adults 15 and over
35-Ottawa-Gatineau	NAI	Children 6 to 14
35-Rural	Métis	Adults 15 and over
35-Rural	Métis	Children 6 to 14
35-Rural	NAI	Adults 15 and over
35-Rural	NAI	Children 6 to 14

Domains of estimation for the identity population – Outside Inuit regions (continued)

Geographical domain	Aboriginal group	Age
35-Toronto	Métis	Adults 15 and over
35-Toronto	Métis	Children 6 to 14
35-Toronto	NAI	Adults 15 and over
35-Toronto	NAI	Children 6 to 14
35-Urban	Métis	Adults 15 and over
35-Urban	Métis	Children 6 to 14
35-Urban	NAI	Adults 15 and over
35-Urban	NAI	Children 6 to 14
46-Rural	Métis	Adults 15 and over
46-Rural	Métis	Children 6 to 14
46-Rural	NAI	Adults 15 and over
46-Rural	NAI	Children 6 to 14
46-Urban	Métis	Adults 15 and over
46-Urban	Métis	Children 6 to 14
46-Urban	NAI	Adults 15 and over
46-Urban	NAI	Children 6 to 14
46-Winnipeg	Métis	Adults 15 and over
46-Winnipeg	Métis	Children 6 to 14
46-Winnipeg	NAI	Adults 15 and over
46-Winnipeg	NAI	Children 6 to 14
47-Regina	Métis	Adults 15 and over
47-Thompson	ALL	Adults 15 and over
47-Thompson	ALL	Children 6 to 14
47-Regina	Métis	Children 6 to 14
47-Regina	NAI	Adults 15 and over
47-Regina	NAI	Children 6 to 14
47-Rural	Métis	Adults 15 and over
47-Rural	Métis	Children 6 to 14
47-Rural	NAI	Adults 15 and over
47-Rural	NAI	Children 6 to 14
47-Saskatoon	Métis	Adults 15 and over
47-Saskatoon	Métis	Children 6 to 14
47-Saskatoon	NAI	Adults 15 and over
47-Saskatoon	NAI	Children 6 to 14
47-Urban	Métis	Adults 15 and over
47-Urban	Métis	Children 6 to 14
47-Urban	NAI	Adults 15 and over
47-Urban	NAI	Children 6 to 14
47-Prince Albert	ALL	Adults 15 and over
47-Prince Albert	ALL	Children 6 to 14

Domains of estimation for the identity population – Outside Inuit regions (concluded)

Geographical domain	Aboriginal group	Age
48-Calgary	Métis	Adults 15 and over
48-Calgary	Métis	Children 6 to 14
48-Calgary	NAI	Adults 15 and over
48-Calgary	NAI	Children 6 to 14
48-Edmonton	Métis	Adults 15 and over
48-Edmonton	Métis	Children 6 to 14
48-Edmonton	NAI	Adults 15 and over
48-Edmonton	NAI	Children 6 to 14
48-Rural	Métis	Adults 15 and over
48-Rural	Métis	Children 6 to 14
48-Rural	NAI	Adults 15 and over
48-Rural	NAI	Children 6 to 14
48-Urban	Métis	Adults 15 and over
48-Urban	Métis	Children 6 to 14
48-Urban	NAI	Adults 15 and over
48-Urban	NAI	Children 6 to 14
59-Prince Rupert	ALL	Adults 15 and over
59-Prince Rupert	ALL	Children 6 to 14
59-Rural	Métis	Adults 15 and over
59-Rural	Métis	Children 6 to 14
59-Rural	NAI	Adults 15 and over
59-Rural	NAI	Children 6 to 14
59-Urban	Métis	Adults 15 and over
59-Urban	Métis	Children 6 to 14
59-Urban	NAI	Adults 15 and over
59-Urban	NAI	Children 6 to 14
59-Vancouver	Métis	Adults 15 and over
59-Vancouver	Métis	Children 6 to 14
59-Vancouver	NAI	Adults 15 and over
59-Vancouver	NAI	Children 6 to 14
60-Yukon	NAI	Adults 15 and over
60-Yukon	NAI	Children 6 to 14
60-Whitehorse	ALL	Adults 15 and over
60-Whitehorse	ALL	Children 6 to 14
61-Northwest Territories	NAI	Adults 15 and over
61-Northwest Territories	NAI	Children 6 to 14
61-Yellowknife	ALL	Adults 15 and over
61-Yellowknife	ALL	Children 6 to 14
66-Territories	Métis	Adults 15 and over
66-Territories	Métis	Children 6 to 14

Appendix 2: Glossary of terms

Aboriginal people

The descendants of the original inhabitants of North America. The Canadian Constitution recognizes three groups of Aboriginal people – **First Nations** (or **North American Indian** people, consisting of **Status** and **non-Status Indians**), **Métis** and **Inuit**. These are three separate peoples with unique heritages, languages, cultural practices and spiritual beliefs.

Analytical file

A Statistics Canada **microdata** set for a given survey, available for use in **Research Data Centres** (RDCs) across Canada. RDCs provide researchers with access, in a secure university setting, to microdata from population and household surveys. The centres are staffed by Statistics Canada employees. They are operated under the provisions of the **Statistics Act** in accordance with all the confidentiality rules and are accessible only to researchers with approved projects who have been sworn in under the *Statistics Act* as 'deemed employees.'

B

Bootstrap method

The bootstrap method is an approach for estimating error in a dataset related to **sampling**. Sampling introduces error because data are not taken from the entire population, but only a sub-section, called a sample, which is then used to make **estimates** for the whole population. There are several methods for estimating the level of **sampling error**. The bootstrap method usually selects a number of subsamples from the main sample and produces estimates for each subsample. The sampling error is estimated as a function of the observed differences between estimates from the different subsamples.

C

Census metropolitan area (CMA) and Census agglomeration (CA)

Area consisting of one or more neighbouring municipalities situated around a major urban core. A census metropolitan area must have a total population of at least 100,000 of which 50,000 or more live in the urban core. A census agglomeration must have an urban core population of at least 10,000.

Census subdivision (CSD)

This is the general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g., Indian reserves, Indian settlements and unorganized territories).

Census of population

A census is the collection of information about all units in a population, sometimes also called a 100% sample survey. Under the **Statistics Act** of 1971, it is a statutory requirement to conduct a nationwide census every five years. The Census of Population provides information needed by community groups, businesses and governments to develop plans for education and training, seniors' housing, day care, fire protection, public transport, and many other programs.

Cohort

As used in demography, a number of people having a common characteristic, for example, all persons in a given population who were born in 1940, or all persons suffering from a particular disease.

Confidential information

This is a term used within Statistics Canada to describe information that is subject to the secrecy provisions of the **Statistics Act**. Information is deemed confidential either because it directly identifies a **responding unit**, for example, by name, or because it could permit specific responding units to be identified, even when the data is stripped of identifiers, due to the information's detail or its geographical structure or format.

Confidentiality

Confidentiality denotes an implied trust relationship between the person providing the information and the individual or organization collecting it. This relationship is built on the assurance that the information will not be disclosed without the person's permission. Under the *Statistics Act*, information that would identify an individual, business or institution can not be disclosed without their knowledge or consent.

Coverage

Coverage is the extent to which every person or unit intended for inclusion in a survey or census is in fact counted and counted only once. Coverage errors refer to when persons or units of the survey or census are missed (under-coverage) or over-counted (over-coverage). Studies are often conducted by Statistics Canada to provide estimates of under-coverage and over-coverage of a given survey or census or to examine related issues. For example, Statistics Canada has studied and analyzed the extent to which cell-phone use affects coverage for telephone surveys.

CV – Coefficient of variation

In a sample survey, results from the sample are used to estimate what the findings would be if the whole population were to be measured. In this process of estimation, some level of error is inevitable. The coefficient of variation (CV) is a way of expressing the **sampling error** associated with an **estimate**. First a **standard error** or 'average' error of the estimate is calculated. The CV is obtained by dividing the standard error of the estimate by the estimate itself and expressing the resulting fraction as a percentage. The lower the CV, the higher the data quality (see **margin of error**).

D**Data**

Observations and measurements collected during a survey, census or other study. Facts or figures from which conclusions can be drawn.

Data quality

A degree or level of confidence that the data and statistical information are "fit for use". The particular issues of quality or fitness for use that must be addressed by Statistics Canada are relevance, accuracy, timeliness, accessibility, **interpretability** and coherence.

Dataset, database

An organized and sorted list of facts or information about a set of individuals, households, businesses, or other relevant units. A Statistics Canada dataset is usually generated by a survey or administrative data, stored on a computer, and organized in such a way that it may be accessed easily by a wide variety of statistical application programs.

Dissemination

The process of providing statistical products and services to the general public and to specific data users. Statistics Canada disseminates data and analysis in the form of survey results, research reports, technical papers, periodical magazines, census products, and research compendia. Online products date from 1996 to the present. Historical material can be located using the Library Catalogue. Statistics Canada information is also distributed to an approved network of depository libraries.

The objective of dissemination activities is to provide relevant information in a timely fashion, in useful formats, and through accessible channels. Activities in place to support the dissemination of products include client consultation services, marketing, promotions, user-training and other client services.

Derived variable

A new **variable** constructed by applying logical or mathematical operations to one or more existing variables in order to meet particular data needs. For example, an age variable can be derived from date of birth information. As another example, a derived variable could be obtained called 'presence of a chronic health condition' based on whether or not a respondent answered 'yes' at least once to a series of questions asking about specific chronic health conditions such as asthma, diabetes, heart disease, etc.

E

Editing

Editing is a process that ensures survey data are accurate, complete and consistent. A set of editing rules or conditions is applied to a **dataset**. Data which do not meet the conditions are examined and corrected where appropriate.

Errors

In a sample survey, results from the sample are used to estimate what the findings would be if the whole population were to be measured. The accuracy of such an **estimate** is a measure of how much the estimate differs from the correct or "true" figure. Departures from true figures are known as errors. Errors can arise from many sources, but can be grouped into a few broad categories: coverage errors, non-response errors, response errors, processing errors and sampling errors.

Coverage errors

Coverage errors refer to when persons or units of the survey are missed (under-coverage) or overcounted (over-coverage).

Non-response errors

Non-response errors occur when it proves impossible to obtain a complete questionnaire from a person, household, or organization. Although certain adjustments for missing data can be made during processing, non-response means some loss of accuracy is inevitable.

Response errors

Response errors indicate that a response may not be entirely accurate. The respondent may have misinterpreted the question or may not know the answer, especially if it is given for an absent household member, for example.

Processing errors

Processing errors include mistakes made during data entry, coding, tabulation or other forms of data manipulation.

Sampling error

Sampling error refers to the fact that the results of the weighted sample differ somewhat from the results that would have been obtained from the total population. The difference is known as sampling error. The actual sampling error is of course unknown, but it is possible to calculate an "average" value, known as the "**standard error**".

Estimation, estimate

Using results of the weighted sample to estimate the characteristics of the total population.

E

First Nations

A term that came into common usage in the 1970s to replace the word "Indian," which many people found offensive. Although the term First Nations is widely used, no legal definition of it exists. Among its uses, the term "First Nations peoples" refers to the **North American Indian** people in Canada, both **Status** and **Non-Status**. Many people have also adopted the term "First Nation" to replace the word "band" in the name of their community.

Frame

A list, map, or conceptual specification of the units comprising the survey population from which persons can be selected. For example, a telephone or city directory, or a list of members of a particular association or group.

Frequency

The number of times an event or item occurs in a **dataset**.

Frequency distribution

A chart or table showing how often each value or range of values of a **variable** appear in a **dataset**. It is sometimes called a one-way frequency table to indicate that the distribution contains counts for one variable only.

G - H - I**Imputation**

Imputation involves replacing either missing or invalid data with valid data. This is normally performed using predetermined rules or with the use of data from a 'statistical neighbour'—another **responding unit** who has similar characteristics. Imputation is often combined with data **editing**.

In scope

A **unit** that meets all criteria for the survey. For the APS, in the provinces, all Aboriginal individuals living off reserve, aged 6 to 14 years of age as of October 31, 2006 were in scope for the children and youth component, and all Aboriginal individuals aged 15 and older as of October 31, 2006 were in scope for the adult component. In the territories, all Aboriginal individuals living on- and off-reserve aged 6 to 14 years of age as of October 31, 2006 were in scope for the children and youth component, and all Aboriginal individuals aged 15 and older as of October 31, 2006 were in scope for the adult component.

Indian Act

The Canadian federal legislation, first passed in 1876, that sets out certain federal government obligations, and regulates the management of Indian reserve lands. The act has been amended several times, most recently in 1985.

Indian band

A group of **North American Indian** people for whom lands have been set apart and money is held by the Crown. Each band has its own governing band council, usually consisting of one or more chiefs, and several councillors. Community members choose the chief and councillors by election, or sometimes through traditional custom. The members of a band generally share common values, traditions and practices rooted in their ancestral heritage. Today, many bands prefer to be known as **First Nations**.

Information

Data that have been recorded, classified, organized, related or interpreted within a framework so that meaning emerges.

Information product

Organization of results from Statistics Canada activities, including data files, **databases**, tables, graphs, maps, and text. This organization can be either pre-defined (standard information product) or made in response to special requests (customized information product). Information products can be made available on either print or electronic media.

Interpretability

Interpretability reflects the ease with which the user may understand, properly use and analyze the data or information. The degree of interpretability is largely determined by: the adequacy of definitions on concepts, target populations and variables; terminology underlying the data; and information on any limitations of the data.

Inuit

"Inuit" means "people" in Inuktitut, the language of Inuit people. Most Inuit live in the Northwest Territories, Nunavut, Northern Quebec and Labrador.

Inuit Nunaat

Inuit Nunaat is the homeland of **Inuit** of Canada. It includes communities in Nunatsiavut (Northern coastal Labrador), Nunavik (Northern Quebec), the territory of Nunavut and the Inuvialuit region (Northwest Territories). These regions collectively encompass the area traditionally used and occupied by Inuit in Canada.

Inuk

The singular form of the word **Inuit** (i.e. 'a person').

J - K - L**Logistic regression**

A form of **regression** analysis used when the response variable is a binary **variable** (a variable having two possible values).

M**Margin of error**

In a sample survey, results from the sample are used to estimate what the findings would be if the whole population were to be measured. In this process of **estimation**, some level of error is inevitable. The margin of error, a measure used to build confidence intervals, serves as a rough indicator of the precision of an estimate. For example, pollsters often say that a certain percentage of the population, plus or minus the margin of error (expressed in percentage points), is likely to vote for a certain candidate, 19 times out of 20. To calculate the margin of error, which in this example corresponds to a 95% confidence interval, the pollster would use the equivalent of plus or minus two standard errors of the estimate (see **Standard error**).

Methodology

A set of research methods and techniques applied to a particular field of study. At Statistics Canada, methodology refers to survey methodology.

Métis

People of mixed **North American Indian** and European ancestry who identify themselves as Métis people, as distinct from North American Indian people, **Inuit** or non-**Aboriginal people**. The Métis have a unique culture that draws on their diverse ancestral origins, such as Scottish, French, Ojibway and Cree.

Microdata

Files of **records** pertaining to individual **responding** units.

N - O**Non-status Indian**

A non-Status Indian is a person who identifies as **First Nation** or **North American Indian** but is not registered under the **Indian Act**.

North American Indian

A term that describes all **Aboriginal people** in Canada who are not **Inuit** or **Métis**. North American Indian peoples are one of three groups of people recognized as Aboriginal in the Constitution Act, 1982. This also refers to **First Nations** people consisting of **Status** and **non-Status Indians**.

Observation

Data collected for a given variable about a particular **responding unit**. Examples include the specific values for a responding unit on characteristics such as age, gender or marital status—the observation might be '77', 'woman' and 'widowed'.

Out of scope

A **sampled unit** that does not meet all criteria for being surveyed. For the APS, in the provinces, a person could be out of scope by, for example, being less than 6 years of age or by being non-Aboriginal or by living on reserve. In the territories, a person could be out of scope by being less than 6 years of age or by being non-Aboriginal.

P

Population

The complete group of units to which survey results are to apply. These units may be persons, households, businesses, institutions, etc. The term "Target Population" is often used to refer to all potentially **surveyed units**, as defined in a clear, precise way by the survey study. This is the population for which information is wanted.

Postcensal survey

A postcensal survey is one where **surveyed units** are selected based upon their responses to the **Census of Population**. These surveys are generally conducted shortly after the Census data have been processed.

Proportion

A proportion refers to how many responses fall into a given response category in relation to the total responses. It is calculated by dividing the frequency of the response category by the total number of responses to the question.

PUMF - Public use microdata file

Public use **microdata** files provide access to **responding units** so that users can conduct their own research or analysis. They involve a non-identifiable data set containing characteristics pertaining to the units of the survey (e.g., individuals, households or businesses). All such datasets have been authorized for release to the public by the Statistics Canada Microdata Release Committee. The dataset contains no confidential information in that individual identifiers have been removed and any data combination or geography which could potentially reveal the identity of a responding unit has been modified.

Q - R

Record

A record is the data for an individual **responding unit** in a file containing data for all of a survey's responding units.

Registered Indian

A Status or Registered Indian is a person who is registered under the *Indian Act*. The act sets out the requirements for determining who is a **Status Indian**.

Regression

A statistical method which tries to predict the value of a characteristic by studying its relationship with one or more other characteristics. This relationship is expressed through the means of a regression equation.

Research data centres (RDCs)

The research data centre program provides researchers with access, in a secure Statistics Canada governed setting, to micro data from population and household surveys. The RDC program is part of an initiative by Statistics Canada, the Social Sciences and Humanities Research Council (SSHRC) and university consortia to help strengthen Canada's social research capacity and to support the policy research community. The program is also supported by the Canadian Foundation for Innovation (CFI) and the Canadian Institutes of Health Research (CIHR).

Respondent

The respondent is the person providing the information for the **surveyed unit**, which could be a person, household, business or institution. In the case of APS, the respondents are the parent or guardian of the selected children and youth aged 6 to 14 years, and the adult aged 15 and older for the Adult component.

Responding unit

The responding unit refers to the **surveyed unit** for which a response is obtained. In the case of the APS, it would be the child/youth aged 6 to 14 years of age for whom a response is obtained from the parent or guardian. This term is defined to distinguish it from the term "**respondent**" which in the case of APS refers to the parent or guardian providing the information for the child/youth. For the Adult component for APS for aged 15 and older, the responding unit is the same as the adult respondent.

Response rate

The proportion of a sample for which a response to a questionnaire is obtained, usually expressed as a percentage. Non-response covers those who refused to participate as well as persons whom the survey was unable to reach.

Rural area

Rural areas include all territory lying outside urban areas. An urban area has a minimum population concentration of 1,000 persons and a population density of at least 400 persons per square kilometre, based on the current census population count. Taken together, urban and rural areas cover all of Canada. Rural population includes all population living in the rural fringes of census metropolitan areas (CMAs) and census agglomerations (CAs), as well as population living in rural areas outside CMAs and CAs.

Sample design

A set of specifications that describe the sampling elements of a survey in detail. These elements include **population, frame, surveyed units**, sample size, sample selection and **estimation** method.

Sampling

The process of selecting some part of a population to observe so as to estimate something of interest about the whole population. Examples of different sampling methods include simple random sampling, stratified random sampling, cluster sampling and multi-stage sampling.

Sampling rate / Sampling fraction

Sample size divided by the population size.

Sampling or sampled unit

The unit selected by the **sample design** and from which measurements are taken for a survey. Examples include persons, households, families or businesses. For APS, the sampling unit is the person.

Standard deviation

Standard deviation measures the dispersion of a data set around the mean. It is the most widely-used measure of dispersion. Mathematically, the standard deviation is the square root of **variance**.

Standard error

In a sample survey, results from the sample are used to estimate what the findings would be if the whole population were to be measured. **Sampling error** refers to the fact that the results of the weighted sample differ somewhat from the results that would have been obtained from the total population. The difference is known as sampling error. The actual sampling error is of course unknown, but it is possible to calculate an "average" value, known as the "standard error".

Statistics Act

An Act regarding statistics of Canada. Includes the definition of Statistics Canada's mandate: "There shall continue to be a statistics bureau under the Minister, to be known as Statistics Canada, the duties of which are:

- to collect, compile, analyze, abstract and publish statistical information relating to the commercial, industrial, financial, social, economic and general activities and condition of the people;
- to collaborate with departments of government in the collection, compilation and publication of statistical information, including statistics derived from the activities of those departments;
- to take the census of population of Canada and the census of agriculture of Canada as provided in this Act;
- to promote the avoidance of duplication in the information collected by departments of government; and
- generally, to promote and develop integrated social and economic statistics pertaining to the whole of Canada and to each of the provinces thereof and to coordinate plans for the integration of those statistics."

Status Indian

See Registered Indian.

Stratified sampling, stratification

A sampling procedure in which the population is divided into homogeneous subgroups or strata and the selection of samples is done independently in each stratum.

Suppression

The process by which particular data are prevented from being released based on criteria designed to protect confidentiality. 'Cell' suppression refers to procedures used to protect sensitive tabular data from disclosure; a cell being an individual entry in a table. For the APS, data was also suppressed for reasons of data quality (CV larger than 33.3%).

Surveyed unit

The selected unit from which measurements are taken for a sample survey or a Census. Examples include persons, households, families or businesses. For APS, the surveyed unit (which is also the sampled units since APS is a sample survey) is the children/youth 6 to 14 years of age and the adults aged 15 and older.

T - U - V**Treaty Indian**

A Status or Registered Indian who belongs to a First Nation that signed a treaty with the Crown.

Unit

Same as **surveyed unit**

Urban area

An urban area has a minimum population concentration of 1,000 persons and a population density of at least 400 persons per square kilometre, based on the current census population count. All territory outside urban areas is classified as rural. Taken together, urban and rural areas cover all of Canada. The urban population includes all population living in the urban cores, secondary urban cores and urban fringes of census metropolitan areas (CMAs) and census agglomerations (CAs), as well as the population living in urban areas outside CMAs and CAs.

User guides

These guides accompany Statistics Canada survey datasets, such as analytical files and **Public Use Microdata Files (PUMF)**, providing the detailed technical information required to use the data appropriately. The guide typically contains important information to know prior to data analysis: weighting variables to use, procedures related to the estimate of variance, and precautions to take in the dissemination of the data.

Variable

A characteristic that may assume more than one value to which a numerical measure can be assigned (e.g., income, age and weight).

Variance

A measure of dispersion for a given characteristic or variable in a dataset. It indicates how much variability exists for that characteristic. Technically, it is calculated as the average squared deviation from the mean of each observation in the data set for a particular variable.

W - X - Y - Z**Weight**

A weight is the average number of units in the population that a unit in the survey represents. Examples of a unit include a person or a household. Weights are applied to **responding units** in a sample database in order to ensure that, when making inferences from the survey data to population parameters, estimates of characteristics for the total population are obtained.

Appendix 3: Questionnaires

The questionnaires are available on the Statistics Canada website at <http://www.statcan.gc.ca/english/sdds/3250.htm>

Children and youth questionnaire:

This questionnaire was directed at Aboriginal children and youth (6 to 14 years), living off-reserve (in all provinces and territories). The parent or guardian of the child/youth answered the questionnaire on their behalf. The questionnaire included questions on: general health, health care utilization, activity limitations, chronic conditions, medications, physical injuries, dental care, nutrition, education, social activities and relationships, language, child care arrangements and general household information.

Adult core:

This questionnaire was administered to adults (15 years and older) living off reserve (in all provinces and territories). The following sections were included: education, language, labour activity, income, health, communication technology, mobility and housing.

Adult - arctic supplement:

For the 2001 Aboriginal Peoples Survey, Statistics Canada, the Inuvialuit Regional Corporation, Nunavut Tunngavik, Makivik Incorporated, the Labrador Inuit Association, Inuit Tapiriit Kanatami and Laval University developed jointly a supplement to the APS core survey. This supplement for those aged 15 and older included a number of questions from the Survey of Living Conditions in the Arctic (SLiCA), carried out in a number of circumpolar countries. The supplement contained the following sections: household and harvesting activities, personal wellness and community wellness. Questions from the supplement were asked of those living in the four Inuit regions across the north of Canada.

Adult - Métis supplement:

This part of the survey, developed jointly with the Métis National Council, was administered only to the Aboriginal adult population (15 years and older) who self-identify as Métis and/or who have Métis ancestry. This portion of the survey was not conducted on-reserve or in Inuit communities. This supplement contains the following sections: family background, household information, cultural background and health.

References

- Langlet, É., Beaumont, J.-F., and Lavallée, P. (2008). Bootstrap Methods for Two-Phase Sampling Applicable to Postcensal Surveys. Paper presented at the Statistics Canada's Advisory Committee on Statistical Methods, April 2008, Ottawa.
- Sitter, R.R. (1992). Comparing Three Bootstrap Methods for Survey Data. *Canadian Journal of Statistics*, 20, 135-154.

