

The Relationship between Traditional Cultural Engagement and Health: Data
from Miawpukek First Nations Regional Health Survey

By

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ABSTRACT

Background: It is widely accepted that culture is an important determinant of health. However, the impact that cultural engagement has on health outcomes among First Nations peoples is not well understood. **Purpose:** This study explored the relationships between cultural engagement in traditional activities and health outcomes among a representative sample of adults from Miawpukek First Nations using data from the 2008 First Nations Regional Health Survey. This study also considers other social determinants of health such as housing, diet and exercise, demographics and personal wellness. **Methods:** Traditional activities included indices for traditional language, foods, physical activities and spiritual involvement. Housing included indices for home repairs, crowding and drinking water. Diet and exercise indices were junk food, healthy food and non-traditional physical activities. Personal wellness had indices for life balance, depression, alcohol, gambling and smoking. Demographics indices included income, education, age and gender. Step-wise regression was performed with five subject groupings: all subjects, males 18-49 years, females 18-49 years, males 50 years and over, and females 50 years and over. There were 197 adult participants from a population of 850 people. **Findings:** Although the correlation between traditional activities and health was less than the other variables (but slightly greater than diet and exercise), traditional activities had significant findings in some of the results, showing that even after considering all the variables included in the other four categories, traditional activities still had significant correlation with the sample as a whole and in several subject groupings. **Conclusion:** Although this study showed modest correlation between health and cultural engagement, even after including other social determinants it can be said that cultural engagement does impact health. Further research is needed with larger longitudinal data sets in more First Nations communities to fully understand the complexity of the relationship between cultural engagement and health.

LIST OF ABBREVIATIONS USED

AFN: ASSEMBLY OF FIRST NATIONS

APS: ABORIGINAL PEOPLES SURVEY

COPD: CHRONIC OBSTRUCTIVE PULMONARY DISEASE

CWB: COMMUNITY WELL-BEING INDEX

HC: HEALTH CONDITIONS

HDI: HUMAN DEVELOPMENT INDEX

HPAIED: HARVARD PROJECT FOR AMERICAN INDIAN ECONOMIC DEVELOPMENT

HUI: HEALTH UTILITY INDEX

NAHO: NATIONAL ABORIGINAL HEALTH ORGANIZATION

OCAP: OWNERSHIP, CONTROL, ACCESS, AND POSSESSION

RHS: FIRST NATIONS REGIONAL HEALTH SURVEY

SAS: STATISTICAL ANALYSIS SOFTWARE

SES: SOCIAL ECONOMIC STATUS

UNSI: UNION OF NOVA SCOTIA INDIANS

WHO: WORLD HEALTH ORGANIZATION

WUIR: WIKWEMIKONG UNCEDED INDIAN RESERVE

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CHAPTER 1: INTRODUCTION

1.1 MIAWPUKEK AND RHS

First Nation philosophies about health often use a holistic approach that considers that good health is achieved through a balanced life. The medicine wheel model describes four interconnecting elements often used to describe the balance of the physical, mental, emotional and spiritual aspects of health (Iwasaki, Bartlett, & O’Neil, 2005; Waldram, Herring, & Young, 2006). The health issues of First Nations peoples in Canada have been associated with the loss of cultural identity after colonization and the resulting health difficulties (Waldram et al., 2006). Using data from the 2008 First Nations Regional Longitudinal Health Survey (RHS) from Miawpukek First Nations, a Mi’kmaq First Nations community on the island portion of the province of Newfoundland and Labrador, this study will consider how First Nations peoples engagement in cultural activity can influence health. Using the Health Utility Index (HUI) and a number of health conditions as health outcome measures, this study will consider how First Nations people’s engagement in cultural activity can influence health. Other determinants such as personal wellness, demographics, housing, and diet and exercise will also be tested for their effects on health outcomes.

Mi’kmaq reside in all four Atlantic Province which include Nova Scotia, Prince Edward Island, New Brunswick, and the island portion of the province of Newfoundland and Labrador. The language of the Mi’kmaq is a part of eastern Algonquian group of languages. Prior to European contact Mi’kmaq resided in parts of Maine and Quebec. The Mi’kmaq of Newfoundland are thought to have arrived thousands of years ago, traveling to and from Cape

Breton by canoe, indicating that they hold strong relations and ties with the Mi'kmaq in the rest of the Atlantic region (McMillan & Yellowhorn, 2004; Paul, 2006; Stories of Conne River, 2010). Miawpukek First Nations reserve is located on the south-eastern coast of the island of Newfoundland. Miawpukek is also known as Conne River. The population of this reserve is approximately 850 and the off-reserve population number is over 1700 (Statistics Canada, 2006). It is estimated that the Mi'kmaq have lived in what is now Atlantic Canada for ten thousand years and have a long history of living with the land and developed a highly structured society rich in culture. Eastern Canada had the first contact with European settlers, therefore has had a longer history of political, economical and social disturbances than other Aboriginal people in Canada (Paul, 2006). The Miawpukek community has revitalized its economic development, where employment rates are virtually zero, and a return to First Nation community culture has occurred in recent years. The community has also made great improvements in social and medical services offered on-reserve (Stories of Conne River, 2010). Tracking the health of the people of Miawpukek is challenging, but the First Nations Regional Health Survey (RHS) is attempting to help in this regard.

The RHS is administered to First Nations communities across Canada and each region is responsible to analyze its own data. The data are also analysed nationally. The data represents a comprehensive range of questions covering health status, wellness, traditional culture and health determinant measures. Importantly, each region has ownership of the data and controls the data. This has been a significant change in the way research has been done with First Nations people (Waldram et al., 2006). In the past research was often done on First Nations people with little to no consultation with First Nations people. Miawpukek agreed to take part

in the RHS in the 2002 and 2009 surveys. The initial survey occurred in 1997, although Miawpukek did not take part in this survey. Two other surveys are planned in the coming years. This study analyzed the 2009 adult data, considering the relationship between cultural activity engagement and health among Miawpukek First Nation people.

My personal connection to Miawpukek is through my mother's family. My Grandmother, Ida Benoit, was from Conne River (Miawpukek First Nation). Although I did not grow up in Miawpukek, my mother made our family aware that we had Mi'kmaq connections. Growing up in a small town in Cape Breton, our family was not identified as Mi'kmaq by our friends and neighbours. However, when visiting the Conne River area in Newfoundland or having contact with Mi'kmaq in Cape Breton, our mother made our family aware that the Mi'kmaq are our people. There was a negativity from small town Cape Breton towards Mi'kmaq that facilitated the silence of our family's Mi'kmaq heritage, but I always had a curiosity and in some way a sense of pride that our family had Mi'kmaq heritage. The Mi'kmaq traditions and culture had stopped with my mother. My mother, in her 90's, still recalled her mother and family being harassed and shamed for speaking the Mi'kmaq language. It is an honour to do this research, under the direction of Chief and Council, and contribute to the growing body of knowledge that suggests that revitalization of the Mi'kmaq culture will have a broad range of physical, mental, emotional and spiritual health benefits.

1.2 TERMINOLOGY

Aboriginal peoples in Canada include people of First Nations, Inuit and Métis decent. The term First Nations has been generally accepted among Aboriginal people of Canada in

recent years and is also being used by the Government of Canada. Historically, the Government of Canada used the word “Indians” in the Indian Act in 1876 to represent First Nations peoples. The term First Nations is a better representation of the different languages and cultures that exist across Canada. Mi’kmaq are First Nations people indigenous to Canada’s Maritime Provinces and areas of Newfoundland and Labrador (Paul, 2006).

Inuit, are primarily inhabitants of Northern Canada, and are also recognized by the Government of Canada. Inuit are entitled to some government benefits and treaty rights, and in most cases have settled land claim agreement with the Crown. The Métis have been acknowledged to be included as Aboriginal by the Government of Canada but generally do not have status, although a recent Supreme Court decision has indicated that Metis are in fact entitled to benefits under the Indian Act. Status Indians are registered with Department of Aboriginal Affairs and Northern Development Canada.

The Métis originated largely because of intermarriage resulting from the fur trade in Canada and initially represented people who were considered neither “Indian” nor “white”. Terms that represent people can be confusing and not representative of different cultural variations that exist across Canada among the different Aboriginal groups and among First Nations, Inuit and Métis groups. The term “Indigenous” is often used to represent the Aboriginal peoples of Canada. Indigenous is used more commonly internationally and, as with the term “Aboriginal”, represent people who are the first inhabitants of a particular geographic area (McMillan & Yellowhorn, 2004).

1.3 HEALTH DISPARITIES AND CULTURAL IDENTITY

National statistics reveal great health disparities between Aboriginal peoples and the rest of Canadian population (Waldram et al., 2006). In most cases, Aboriginal peoples within Canada have higher rates of chronic health conditions, such as diabetes and cardiovascular conditions, addictions, mental health disorders and suicide (Myers, 2002; Reading, 2006; Webster, Weerasinghe, & Stevens, 2004). The determinants of health model serves as a promising framework to understand the reasons for these health issues. The determinants of health can be classified into a number of groups including genetics, physical environment, social/economics and cultural factors (Wilson & Rosenberg, 2002). There is often a divergence of understanding regarding these social determinants in western biomedical approaches (towards addressing health issues) versus Aboriginal approaches. Whereas the western medical approach has historically viewed health as the absence of disease, Aboriginal approaches are more holistic in nature whereby health encompasses the mental, emotional and spiritual health of the person and the community in which people live (Health Canada, 2009; Waldram et al., 2006). In more recent years, western approaches to health have begun to incorporate a more holistic understanding of health, but the differences between the two conceptualizations are still quite vast.

Aboriginal approaches to health often describe culture as being an integral part of good health. The interconnections between health and culture are complex; however including culture as a determinant of health can be more important for people if their culture has been lost or de-valued by the larger/dominant culture (Paul, 2006). Colonization of North America has caused a long history of oppression, racism and systematic culture suppression for Aboriginal

peoples within Canada, resulting in unequal access to employment, education, health care and control of land and resources. This has resulted in reduced abilities of Aboriginal people to maintain their culture, which includes expressions of language, dress and tradition (Paul, 2006; Waldram et al., 2006). This study considered the interaction of cultural engagement on health for First Nations people.

There is a growing awareness of the importance of culture for one's health. Clarity of an individual's cultural identity is associated with personal identity and well-being across cultural groups, including Aboriginal peoples of Canada (Usborne & Taylor, 2010). Chandler and Lalonde (1998), for example, reported on the impact of cultural continuity on youth suicide rates in British Columbia's First Nation communities. They recognized that First Nation communities had significantly lower youth suicide rates when the communities were pursuing land claims and self-government and had community schools, health services, police and fire services and cultural facilities. Further evidence is needed to associate cultural continuity with other health outcomes.

First Nations of Canada, as well as many other Indigenous cultures in the world, describe good health as a balance of physical, emotional, mental and spiritual health (Iwasaki et al., 2005). This approach differs from the western biomedical model that deals primarily with biological illnesses. Self-determination and holism as being central to overall health is part of an effective model for understanding the health of Aboriginal people (NAHO, 2003). For Mi'kmaq, culture is ingrained into the land, language and community cultural activity. Miawpukek has made great improvements with increasing cultural activities in their community in recent years and the benefits of this may be realized with improved health

outcomes. This information may be of great benefit to other Aboriginal communities in Canada and elsewhere since cultural activities may enhance health initiatives.

1.4 RESEARCH QUESTIONS

This research project will use a quantitative approach to answer some questions concerning the relationship between health and traditional cultural engagement from the Miawpukek First Nation community using RHS data from 2009. The research questions are as follows:

1. To what extent does engagement in traditional cultural activities impact health outcomes?
2. How do other selected variables such as age and gender modify the relationship between culture and health outcomes?

To answer these research questions, this study will make a traditional cultural engagement scale with the data from the RHS. The scale will include use of Mi'kmaq language, frequency of traditional food consumption, participation in traditional physical activity and level of participation in community cultural events. This scale will be statistically compared to health outcomes including chronic medical conditions and behaviour.

CHAPTER 2: LITERATURE REVIEW

The following literature review will focus on the relationships between First Nations culture and health. Culture and health will be defined considering the differences and similarities between First Nations and western perceptions. The literature review will proceed with a description of the health disparities experience by First Nations people in Canada, and where possible, Miawpukek's data will be mentioned.

The Aboriginal social determinants of health framework, drawn from Loppie Reading and Wien (2009), will be used to describe how the social determinants of health affect First Nations people. Reading and Wien use proximal (health behaviours, physical and social environment), intermediate (community infrastructure, resources, systems and capacities) and distal (historical, political, social and economic) determinants to categorize social determinants of health for Aboriginal people. The impact of culture loss for First Nations will be considered in each category.

2.1 DEFINING CULTURE AND HEALTH

Health disparities among First Nations peoples have been well documented (Waldram et al., 2006). Health disparities are a disproportional distribution of morbidities and mortalities among a specific group of people within a larger population, increasing the burden of disease in a particular portion of the population (Adelson, 2005). Health inequities are often thought of as the causes of the health disparities. For example, a common health disparity among First Nations people is type II diabetes, as much as five times the national average. The inequities that are the likely causes of this health disparity are social economic status (SES), access to

appropriate health care, as well as political and cultural inequities (Health Canada, 2009; Waldram et al., 2006). Health determinants that may explain these disparities require further understanding.

Culture is considered a determinant of health (Health Canada, 2009); other health determinants include income, education, social support, and social/physical environment among others. Health Canada states that the social environment may create risks to health, when the dominant culture devalues other cultures. This environment perpetuates marginalization and stigmatisation of the non-dominant culture's language and cultural practices (McMillan & Yellowhorn, 2004; Williamson & Roberts, 2004). Enculturation is the process through which a person learns and identifies with their cultural roots. The level of enculturation can be measured by assessing a person's connection to traditional culture in terms of identity, participation and experience. Higher levels of enculturation in Aboriginal populations have been shown to increase resilience against disease and adverse living conditions (Whitbeck, McMorris, Hoty, Stubben, & Lafromboise, 2002; Winderowed, et al., 2008). In other words, a greater sense of cultural identity may provide a sense of pride and connections to other members of the group (Bombay, Matheson & Anisman, 2010). However, there may also be negative health effects of increased cultural identity when it involves discrimination.

Although the connection between culture and health is agreed to exist, the connection is not well understood. In part, the reason for the complexity is that defining culture and health is extremely difficult. Common themes included in definitions of culture reflect the idea of peoples adaptively interacting with their environment. These interactions are shared among a

group of people and the activities are passed from generation to generation. Culture is further defined as socially transmitted and consisting of practices, items, symbols, values, norms and modifications of the physical environment (Cohen, 2009). First Nations' cultures will have many variations across Canada, given that over 50 linguistic variations exist. However, there are some similarities among First Nations cultures across Canada (Assembly of First Nations [AFN], 2007). Among these is the importance of oral tradition. First Nations cultures have used oral tradition for millennia. Meanings associated with oral tradition are at times difficult to retain when translated to other languages or when written. First Nations myths and stories carry many meanings that may be unique to the language and the location of the stories (Williamson & Roberts, 2004). Another important cultural characteristic shared by First Nations is the connection to the land. Many cultural practices and rituals of the Mi'kmaq come from the land (Paul, 2006). This concept of a strong connection to the land is evident among the Mi'kmaq of Miawpukek (Aosamiaji'jij Miawpukek, Stories of Conne River, 2014).

Defining health can be equally complex. Health can be described with a biomedical approach that focuses on disease, biology and physical health where a healthy person is identified as someone who is absent of disease and is otherwise physically healthy. This approach does not consider the complex interactions of the individual, family and community health. There is a growing understanding within western science that health is more than an absence of disease and a holistic approach is more useful when considering health for an individual or a community (Waldram et al., 2006). First Nations often consider health to be a balance of physical, mental, emotional and spiritual aspects if all these components are balanced then one achieves good health (AFN, 2007; Reading & Wien, 2009). There is also an

understanding that health can be a combination of both western and Aboriginal approaches. For a person to be considered healthy, absence of disease is important as is a balanced life that enables a person to have peace of mind and body that will sustain health.

The medicine wheel or circle is used in many Indigenous cultures to describe life's never ending cycles and interactions, having no beginning and no end (AFN, 2007; Dapice, 2006; Williamson & Roberts, 2004). The cycle can represent many aspects of life including the changing of the four seasons, illustrating that change will occur in four stages of life. Change occurs throughout life from childhood, throughout adulthood and as an elder. The wheel also represents the four seasons and the important balance in life that must occur to allow Mother Earth and all living things to exist. The circle can represent different aspects of nature including living animals and plants, and the entire universe from the earth to the stars. The medicine wheel demonstrates the important connection to land, acknowledging the interaction between earth, wind, fire and water (AFN, 2007; Dapice, 2006; Williamson & Roberts, 2004).

2.2 HEALTH DISPARITIES FOR FIRST NATIONS IN CANADA

Health disparities indicate an increased burden of disease on a particular group within a larger population. Literature points to social economic status (i.e., education and income), culture and political inequalities of First Nations people as the causes of the health disparities that exist between First Nations and non-First Nations persons (Waldram et al., 2006). The underlying reason for these inequalities is rooted in the effects of colonization. The systematic attempt to assimilate First Nations people has led to a loss of self-determination (Paul, 2006). The loss of control over the land, language and a diminished political influence occurred with

colonization. Following colonization and persisting today, First Nations people experience racism, discrimination and political exclusion as a result of the suppression of First Nations culture by government interventions and social marginalization (Williamson & Roberts, 2004). Government interventions such as residential schools had a multi-generational effect on Aboriginal people who were subjected to harsh living environments as children (Bombay, Matheson & Anisman, 2011). The creation of Indian Reserves in often isolated locations furthered the social-economic disparities and social marginalization of First Nations peoples. The mass media depiction of Aboriginal people as an inferior race facilitated the marginalization of Aboriginal people (Paul, 2006). Despite the improvements in health outcomes that have occurred in First Nations people in recent decades, disparities continue to exist between First Nations and non-First Nations people.

The health disparities that exist among First Nations people and communities across Canada are, of course, variable. Some First Nations communities have similar health outcomes as neighbouring non-First Nations communities, however the majority of communities are still below national averages (AFN, 2007; Waldram et al., 2006). Although improved health status has occurred among First Nations people since the 1950s, First Nations people still experience a shorter life expectancy compared to non-First Nations in Canada. First Nations males have seven years shorter life span and females have five years shorter than other Canadians (Waldram et al., 2006). The main reason for this disparity is higher infant mortality rates where First Nations infant mortality is about three times the national average (Waldram et al., 2006). First Nations people in Canada also suffer from higher incidences of diabetes, renal disease, cardiovascular disease, infectious disease compared to non-First Nations, as well as injuries or

death due to trauma, suicide and domestic violence (Martens et al., 2007; Reading & Wien, 2009; Waldram et al., 2006). These conditions not only shorten one's life, but the quality of life is also reduced. Miawpukek has shown to have a diabetes rate of 13 % for adults over twenty, compared to 8.3% for the same age group in the province of Newfoundland and Labrador (Giles et al., 2007).

Another measure of population health is the Human Development Index (HDI) as developed by the United Nations. The HDI considers education, life expectancy and wealth using GDP per capita. The general Canadian population generally ranges in the top five countries while the First Nations population of Canada ranked 63 using the HDI (AFN, 2007). This HDI gap has narrowed from 1981 to 2001, with the difference between the general Canadian population and First Nations improved from 0.18 to 0.12. However, this is another strong indicator of the disparities for First Nations people.

To further the comparison of First Nations and non-First Nations communities, the Canadian government produces a Community Well-Being (CWB) index. The CWB index has four components, each given a score from 0-100 with an average of the four as the CWB index: education, labour force participation, income and housing (Indian and Northern Affairs Canada [INAC], 2010). The index is applied to all Canadian communities with 65 or more residents. The list of communities in the top one hundred has only one First Nations community. Ninety-six of the bottom one hundred are First Nations communities. There have been improvements in the gap from 2001 to 2006 between First Nations and non-First Nations with education and labour force but no change in the income components. The housing component showed significant improvements from 1981 to 2001; however between 2001 and 2006, the housing

components have worsened for First Nations communities. Interestingly the Miawpukek CWB index (68) is comparable to neighbouring non-First Nations communities with similar populations and is near the average for all the communities in Newfoundland and Labrador with similar populations and close to the average of all Atlantic Canada non-First Nations communities (73). The Miawpukek index of 68 is well above the average index score of 57 for all First Nations communities in Canada (INAC, 2010).

2.3 SOCIAL DETERMINANTS OF HEALTH

The root causes of poor health can be largely attributed to the social determinants of health. The common social determinant indicators are income, education, employment, living conditions, social support and access to health care. However, a growing understanding of the unique circumstances of First Nations people call for other factors to be considered that includes First Nations perspectives and social-political factors (Waldram et al., 2006). The interaction of all the social determinants and how they influence health is not well understood. This section will consider how culture impacts the social determinants and thus, health outcomes.

Proximal Determinants of Health

The proximal determinants of health include health behaviours, physical and social environment (Loppie Reading & Wien, 2009). Proximal determinants may enable a person to meet basic survival needs, provide a health environment and refrain from harmful activities. Income and education are considered the two most important proximal determinants stated in academic literature (Frohlich et al., 2006; Mikkonen & Raphael, 2010). Providing appropriate

food, clothing and shelter are essential for a health. Furthermore, having the essentials to meet basic needs will reduce stress; high stress is associated with increased health risks such as diabetes and cardiovascular diseases (Iwasaki & Bartlett, 2006). Education can enable a person to make informed decisions about lifestyle choices and an increased ability to cope with ill health and injuries (Frohlich et al., 2006; Mikkonen & Raphael, 2010).

There is evidence when looking at large scale data that those households with the highest incomes are two and a half times more likely to report excellent or very good health than those with the lowest incomes (Frohlick et al., 2006). When income is considered independently, the inequality between residences within a community is an important factor when considering income as a health predictor. Areas where income inequality is the greatest show the largest health disparity between the highest and lowest household incomes. When incomes have a smaller inequity there is less health disparity (Frohlick et al., 2006). Martens et al. (2007) found that income was a predictor of diabetes in First Nations people in Manitoba. Lower incomes were associated with diabetes; however lower incomes were not associated with amputations resulting from diabetes. Other reasons for amputations, other than low income, were access to health care services such as specialist referrals (Martens et al., 2007). There is an inter-play between the SES influences on health and local community influences that must be considered, since income level is only one aspect of many variables that impact health and does not account for all health variability (Irvine et al., 2006).

Jacklin (2009) studied the health of Wikwemikong Unceded Indian Reserve (WUIR) in Ontario. Over 350 interviews were collected in the seven First Nations villages within WUIR. The data showed that there were large variations between the villages with regard to health

status and personal history. At the community level, WUIR household incomes were well below the general Canadian average. The vast majority of incomes in the villages were below adequate levels to produce good health; however health variations exist. The strongest association was between higher income and greater health, although this was not the case in all communities where higher incomes did not translate into improved health. The same was evident for education levels in some of the communities. Education is another important indicator of SES; however Jacklin (2009) did not find a correlation between higher education levels and better health. This data indicates that determinants of health models that focus on SES factors may not be entirely appropriate for First Nations communities. Veenstra (2009) studied the effects of race on the Canadian population and found that SES and geographic location alone did not explain health disparities indicating that racism and discrimination in everyday life may also deserve further investigation on its impact on health.

Wilson and Rosenberg (2002) used the Aboriginal Peoples Survey (APS) data from 2001 to study how traditional activities enhanced health. APS data is collected from those who self report their Aboriginal identity and who live on and off reserve in this data set. Future APS include only off reserve data. The data showed that as income and education levels increased, reports of poor health decreased. These SES variables are consistent with the general Canadian population with the 2001 Census. Interestingly, only one variable related to traditional activities was associated with improved reported health, the traditional activity was spending time on the land. First Nations people who live on reserve who spent time living on the land in the past year reported better health, providing evidence for the importance of traditional activities in the health of First Nations People.

Traditional Aboriginal activities have shown to be associated with protective health behaviours and as treatment in mental health and substance abuse. A study that considers how traditional culture activities among American Indian women living on a Hopi Reservation in Arizona, found that higher levels of traditional activities were significantly associated with protective health behaviours such as reduced smoking and obesity (Coe et al, 2004). Traditional cultural activities have been used in the treatment of substance abuse and with mental health programs in community based programs among Aboriginals in North America (Hanson & Hampton, 2000; Kirmayer, Bass & Tait, 2000; McCormick, 2000; Stones et al., 2006; Varcoe et al, 2010). It is surmised that cultural treatment and wellness programs that consider the complex history of the community when initiating a program and incorporate activities will have a deeper meaning to the individual and community (Green, 2010).

When considering what may influence one's health, the proximal determinants of income and health are widely accepted as two of the most important influences. However, the impact of cultural activity may be an important modifier of income and educational influence on health among First Nations peoples. Jacklin (2009) and Wilson and Rosenberg (2002) have shown in two different studies that cultural activities may have modified the influence of income and education on health in First Nations people. Evidently, in addition to cultural activities, both income and education are also important contributors to health behaviour modification in Aboriginal people, thus improving individual health.

Intermediate Determinants of Health

The intermediate determinants of health can be the underlying reason for the proximal determinants of health. Intermediate determinants may include community infrastructure that would support education, health care and employment (Loppie Reading & Wien, 2009). Although First Nations community infrastructure has improved considerably in recent years in many communities across Canada, a long history of insufficient community infrastructure investment has led to less than ideal infrastructure in many First Nations communities (Gehlert et al., 2008). Lack of, or deteriorating, community infrastructure has shown to negatively impact community relationships and collective cohesiveness. Community environments with decreased social interactions have shown to have more health issues than communities with better infrastructure (Gehlert, et al, 2008). Community involvement to create health care and education infrastructure will ensure the community receives culturally safe health care and education. However, increased responsibility on communities to provide appropriate programs without financial support will create increased community stress (Kimbrow et al., 2008).

Generally speaking First Nations people have increasing rates of chronic health issues which in turn, increases the need to access appropriate health care services in a timely fashion. The public provincial health care system that supplies care for First Nations people living on and off reserve has significant disagreement with respect to jurisdictional responsibility for health care. The three levels of government (federal, provincial and First Nations) require further collaborative talks to resolve the jurisdictional issues and this communication must include the Health Authorities that are responsible for health care in First Nations communities. Health Authorities and First Nations communities require ongoing dialogue that may include

memorandums of understanding providing effective, timely health care for First Nations people that is culturally safe (British Columbia Tripartite, 2010). Financial support for community health care facilities that include traditional and mainstream health care will facilitate improved health care services on First Nations communities.

Similarly, education levels for First Nations people are well below national averages. Education levels have a direct impact on proximal determinants of health; high levels of education have benefits that go beyond the individual, it can provide appropriate income and living conditions for an entire family. There are multitudes of reasons for the lower education levels for First Nations peoples. One important reason is the lack of culturally relevant education provided in a safe cultural environment (Postlethwaite, 2007; Tsey, 1997). Educational programs at all levels, early childhood through high school, that incorporate culturally competent curricula can provide both short and long term benefits. Retention rates of First Nations high school students may improve if First Nations social determinants and learning styles are considered. Long-term benefits can be seen in improved SES status of adults with higher education levels. Optimal childhood educational development has shown to have a positive impact on adult health (Postlethwaite, 2007; Tsey, 1997).

Environmental stewardship is another important intermediate determinant of health for First Nations people (Loppie Reading and Wien, 2009). The loss of ownership and control of traditional First Nations lands has contributed to the economic disparity between First Nations and non-First Nations peoples, having direct impact on proximal determinants. The relocation to small reserves has reduced the possibility of economic profits and food sources available from the land. The loss of environmental stewardship may have the most profound effect on

culture due to the rooted connection to the land in First Nation culture. The land and water, “Mother Earth”, has always been an integral part of daily activity and accounted for many cultural activities including cultural ceremonies and language (Paul, 2006). The balancing concepts of “Mother Earth” ensuring longevity and health of the environment, including the health of the people, were very important concepts for many First Nations people. These concepts early settlers did not understand, but in recent decades more people are becoming aware of First Nations conceptualization of sustainability of nature. Indigenous perspectives on sustainable environmental issues can be useful in mainstream education and economic use of land (Beckford, Jacobs, Williams & Nahdee, 2010)

First Nations communities require both infrastructure and community control that involves cultural values and practices that are important to that community. Cultural continuity is the degree of connection between the community and culture (Loppie Reading & Wien, 2009). Cultural discontinuity has been linked to higher rates of violence, alcoholism, depression and suicide. The higher prevalence of mental health problems among Aboriginal populations has also been linked to cultural oppression and change. There is a link between community control of infrastructure and cultural continuity, and mental health (Kirmayer, Brass & Tait, 2000). Chandler and Lalonde (1998) studied the high suicide rates among youth living in First Nations communities in British Columbia. The suicide rates from the communities varied from zero to many times the provincial average. A key underlying variable that explained the difference in suicide rates was the degree of cultural continuity within each First Nation. Communities had no or low youth suicide rates if the community achieved some

self-government, ownership of traditional lands, local control of health care and education, and had community facilities that preserved culture (Chandler & Lalonde, 1998).

Cornell and Kalt (2003) included the role of culture when they examined economic development in an American Indian population. They discussed how American Indian sovereignty was important for economic success. Sovereignty includes genuine control over reservation decision-making on economic matters. Control in some reservations meant control from a strong leader who makes most of the decisions in the best interests of the community while other American Indian communities had a more democratic approach from a group of community leaders. Cornell and Kalt determined that the important aspect for economic success was that the tribal culture was respected. Economic success was more likely when there was a match between the norms of each community and the governing institutions in place to serve the residents of the community and this structure was respected and supported by external governmental agencies.

Distal Determinants of Health

Distal determinants are possibly the most important factors that influence health for First Nations people, since they directly influence all other determinants. Distal determinants represent an important political, economic and social influence on health. The loss of self-determination from colonization, racism and systematic social marginalization has led to the physical and psychological problems in First Nations people (Loppie Reading & Wien, 2009).

With European contact in the 1400's, First Nations use of natural resources changed. Direct reliance upon the land and its resources to sustain life for the people changed when

resources were used for gathering of wealth. With the fur trade that occurred initially, land animals were hunted to supply the desire of Europeans to purchase fur. This transformation from working with the land to sustain life to taking from the land for wealth was one of the initial changes of First Nations culture (Paul, 2006).

The treatment of Native Americans by the European settlers became progressively more aggressive. The systematic assimilation and at times attempted annihilation occurred. The Beothuk, Indigenous peoples of the Island of Newfoundland, had initial and sustained contact with Europeans became extinct in the 1800's. The lost of the cultural ways that had sustained the Beothuk for thousands of years were disrupted and led to the extinction of the Beothuk in a few hundred years (Paul, 2006). The population decline of First Nations people in Canada is difficult to estimate; the general estimation is a decline from tens of millions to present day near one million. The Mi'kmaq population decline has been estimated from 200,000 at the time of European contact (McMillan & Yellowhorn, 2004; Paul, 2006) to present day population of about 40,000 (Stats Canada, 2014). A new First Nation Band has been formed in Western Newfoundland, Qalipu Mi'kmaq First Nation, which may significantly increase Mi'kmaq population. The total number of band members is currently being determined with discussion between Qalipu and Aboriginal Affairs and Northern Development Canada (Aboriginal Affairs and Northern Development Canada, 2014).

The impacts of colonialism led to large population decline and a loss of a way of life that existed for thousands of years. The initial impact on First Nations culture caused a disruption of land use and then through the creation of reserves that led to further change in cultural activities which further disrupted the traditional ways. The systematic assimilation continued in

to the 1900's with the residential schools that were created to further reduce Native culture including language and traditional cultural activities (Knockwood, 1992; Williamson & Roberts, 2004). With the removal of many young children from their homes, the traditional teaching that would have come from youth contact with their parents, grandparents and community elders again reduced the knowledge of traditional culture. Besides the loss of culture, the effects of the physical, emotional and psychological trauma that was experienced by the people who attended residential schools persists in the children and grandchildren of the residential school survivors (Knockwood, 1992; Williamson & Roberts, 2004).

The racial and social marginalization of First Nations people that continue to exist further impacts the health of the First Nations people. The distal determinants will impact the intermediate and proximal determinants causing poor health. The complicated interactions between the determinants of health that can explain why First Nations have health disparities require further understanding. The importance of culture has been recently investigated; this research will explore the importance of culture on the health of the Miawpukek people using the RHS data.

CHAPTER 3: METHODS

3.1 ETHICS

Typically secondary data does not require ethics approval when the data are accessible to the general population. However, the RHS data is not accessible without the agreement of the First Nations community. This data analysis followed the OCAP principles. The data is owned by Miawpukek and the UNSI, and will not be shared without the written approval of Miawpukek Chief and Council and UNSI. The results will only be shared outside the agreed forms (e.g. for the thesis presentation) with Chief and Council approval. Miawpukek First Nation will have access to any results or data generated from this research project. The RHS data will be returned to Miawpukek and UNSI for their possession, ensuring no further analysis is done without their consent.

Ethics approval was received from the Mi'kmaq College Institute at Cape Breton University and Health Sciences Research Ethics Board at Dalhousie University.

3.2 ACCESS TO THE DATA

The data were received from the UNSI after ethical approval was obtained. The computer data is protected with a password and paper information is locked in a filing cabinet. All precautions were followed to preserve anonymity and confidentiality. Analysis and reporting of the data will not divulge the identity of any survey participants.

3.3 COMMUNITY CONSULTATION

Consultation has occurred with Miawpukek from the initial phase of the research. A research agreement was signed by Chief Mi'sel Joe and Union of Nova Scotia Indians representative Sally Johnson (Appendix A). Two presentations were given to Chief and Council to outline the project and a follow-up presentation reported on the progress. Both presentations were well received and the support of the Chief and Council to proceed was given. The Chief and Council all agreed that this topic is important because the community had made great improvements in reviving cultural activity in their community in recent decades and believed this study would support their actions. Miawpukek Chief and Council and UNSI were invited to attend the thesis defence or view over the internet. Any comments of concerns will be added as footnotes. Report summary and final presentation will also be given to the Miawpukek after the thesis defence.

3.4 BACKGROUND OF RHS

There is limited research that studies the social determinants of health for Aboriginal people (Loppie Reading & Wien, 2009). The Regional Health Survey (RHS) is an important improvement, increasing health related data available for First Nations peoples. Furthermore, the RHS is owned and controlled by First Nations peoples of Canada, and will improve First Nations research capacity. The stewardship of the RHS data by First Nations people is a marked change from many years of research controlled by non-First Nations. Collecting non-dominant cultural data from a large-scale data collection process that is controlled by the dominant culture does not effectively represent the non-dominant culture (Iwasaki & Bartlett,

2006). The RHS data in this research project is owned by Miawpukek First Nation and Union of Nova Scotia Indians (UNSI). There was an agreement among all thirteen First Nations communities in Nova Scotia to participate in the RHS, including communities within the Confederacy of Mainland Mi'kmaq (CMM) and UNSI. Miawpukek was included within this group of First Nations communities for RHS data collection and storage.

Statistics Canada includes available data on Aboriginal people if participants self-identify in the census data. The Aboriginal People's Survey (APS) was initially intended to include on- and off-reserve data. Although Aboriginal people were consulted at a national level, after the first survey in 1991, the data was only collected for the off reserve Aboriginal population. Furthermore, the data are controlled by Statistics Canada which has been criticized for not maintaining the principles of ownership, control, access and possession (OCAP), which are now considered standard operating procedure for research with Aboriginal peoples (Schnarch, 2004). In addition, while APS had Aboriginal persons involved in survey development, the APS did not work towards building research capacity within the Aboriginal population (Harvard Project of American Indian Economic Development [HPAIED], 2006; Statistics Canada, 2006). The RHS has made great improvements in First Nations health data given the development, data collection and analysis are controlled by First Nations people (AFN, 2006). The RHS has been praised by an independent evaluator for its scientific rigour while at the same time maintaining the principles of ownership, control, access and possession of the data (HPAIED, 2006). Ownership refers to the community ownership of the data the same way an individual owns his or her personal information. Stewardship of the data by an institution is a mechanism by which ownership can be applied. OCAP asserts that control of all aspects of the

data by First Nations communities or representative bodies is necessary. Control is extended to review processes, frameworks and data management. OCAP states that First Nations people must have access to all data concerning their communities regardless of the data location and that access to any data concerning First Nations people should be managed by First Nations. To have possession of the data will ensure ownership is protected. In addition to reducing the risk of misuse of the data, possession builds towards self-determination and self-governance in the area of Aboriginal research and information (National Aboriginal Health Organization [NAHO], 2003).

The first RHS, conducted in 1997, included some Inuit and totalled 14,000 mostly First Nation people in 186 communities. The Miawpukek community did not participate in the 1997 survey, but was included in the following survey and has agreed to participate in future surveys. The 2002/2003 and 2008-10 RHS included Miawpukek First Nation. Across Canada the 2008-10 version of the RHS included over 21,000 individuals from 216 First Nations communities. The RHS survey in Miawpukek has questions for three age groups: children (0-11 years), youth (12-17) and adults (18 and older). The surveys were administered in the respondents' home; children's surveys were completed by a parent or guardian. Due to the low numbers of youth and children included in the RHS data from Miawpukek, only the adult data has been analyzed for the purpose of this study. This study uses the most recent survey data available (2008-10) with 197 individuals, 100 females and 97 males, representing approximately 25% of the overall population of Miawpukek. Over 90% of the target sample was achieved.

3.5 RESEARCH QUESTIONS AND OBJECTIVES

The focus of the project is to study the relationship between First Nations cultural engagement and health. Specifically the study aims to answer the following questions:

1. To what extent does engagement in traditional cultural activities impact health outcomes?
2. How do other selected variables such as age and gender modify the relationship between culture and health outcomes?

3.6 INDEX DEVELOPMENT AND STEP-WISE REGRESSION

Two health outcomes (dependent variables) were used; Health Utility Index (HUI) and total number of health conditions. HUI uses eight attributes to describe an individual's health (vision, hearing, speech, ambulation, dexterity, emotion, cognition and pain). HUI has been used to measure many aspects that contribute to individual health in population surveys and has been shown to have strong reliability and validity (Feng, Bernier, McIntosh & Orpana, 2009; Furlong, Feeny, Torrance & Barr, 2001; Horsman, Furlong, Feeny & Torrance, 2003). The utility score can range from 0.00 (poor health) to 1.00 (completely healthy). The total number of health conditions ranged from zero to 28 health conditions. The type of health conditions included chronic musculoskeletal conditions, cardio vascular conditions, sensory impairments, mental disorders, abdominal diseases and immune/hormone disorders.

The Traditional Activities in Table 3.1 include Traditional Language, Traditional Foods, Traditional Physical Activities and Traditional Spiritual involvement. In traditional language, if

the individual indicated they understood or spoke Mi'kmaw, the traditional language index considered how well the individual understands and speaks the language. The possible responses in the questionnaire ranged from a few words to fluent traditional language. Traditional activities and food were also included. The traditional spirituality index included responses concerning involvement in traditional cultural events, the importance of traditional spirituality and use of traditional healer.

The independent variable groupings shown in Table 3.1 include personal wellness which considers a life balance score for the combined rating of physical, emotional, mental and spirituality balance. The subject reported if these components were in balance ranging from all the time to almost none of the time. The personal wellness variable also has a depression score, which was generated from ten questions in the RHS that asked questions about depression. The wellness variable also had scores for alcohol use, smoking and gambling. Alcohol consumption considers the frequency and amount. Smoking scores consider number of years smoking and amount of smoking. Gambling scores consider frequency and severity of gambling.

The housing variable (Table 3.1) includes scores for home repairs, over-crowding (persons per room) and water safety. The home repair score considers if the repairs needed are major repairs, minor repairs or regular maintenance. Over-crowding considers the number of people living in the house and the number of rooms in the house (kitchens, bedrooms, living rooms and finished basement rooms). Water safety asks the question if the main water supply is safe to drink.

The diet and exercise variable (Table 3.1) has scores for junk food and healthy food consumption as well as non-traditional physical activity. Junk food considers soft drink and fast food consumption while healthy food considers milk products, proteins, fruits, vegetables and bread/pastas/rice/grains consumption. The non-traditional physical activity score includes physical activities that were not considered traditional activities (walking, biking, skating, skiing weights, exercise equipment and other sports). Demographics (Table 3.1) have scores for income, level of education, age and gender.

The demographics indices included total household income. The education index was the highest level of education completed with a range from elementary school through secondary, vocational, technical and other post secondary education.

Table 3.1 Independent Groupings

Traditional Activities	Personal Wellness	Diet and Exercise	Housing	Demographics
Trad. Language	Life Balance	Junk Food	Home Repairs	Income
Trad. Food	Depression	Healthy Food	Persons per Rooms	Education
Trad. Physical Activities	Alcohol	Physical Activity	Drinking water	Age
Trad. Spirituality	Gambling			Gender
	Smoking			

Five groups were used for the multi-linear regression: 1. all subjects 2. males 18-49 years 3. males 50 years and over 4. females 18-49 and 5. females 50 years and over. The age split of 49 years was used because the adult population in Miawpukek in the 2008 RHS had a median age of 49 years. There were 97 males and 100 females in the survey.

Five independent groupings were constructed to measure possible determinants of health (Table 3.1). Indices were developed for each independent variable within the groupings. When

possible, Cronbach's alpha (coefficient of reliability) was used to determine the internal consistency of the indices. Variables included within each index scored higher on the same dimension and the dimension had a high Cronbach's alpha to be included. For example, when deciding to include or exclude food in the food categories (junk, healthy and traditional foods), Principal Components Analysis for Categorical Data was used. Figure 3.1 shows how traditional food is separate from non-traditional foods (junk and healthy foods). Non-traditional foods were higher on dimension 2 and traditional foods were higher on dimension 1. Within traditional foods (figure 2) there is a separation between two different groups of traditional foods, with the output indicating which foods to select for the traditional food index (Figure 3.2); Corn soup, wild rice and sea-based animals (dimension 2) were excluded having a low Cronbach's alpha. Within non-traditional foods (Figure 3.3), there was a clear separation between junk foods (pop and fast foods) and healthy foods, both had a sufficiently high Cronbach's alpha.

Principal Components Analysis for Categorical Data was also used for physical activities. There was a clear separation between traditional and non-traditional physical activities based on high Cronbach's alphas. The traditional activities were higher on one dimension while the non-traditional activities were high on the other dimension.

Figure 3.1: All Foods

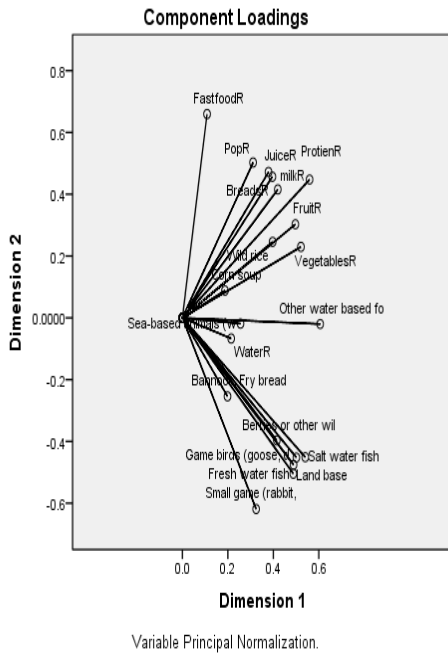


Figure 3.2: Traditional Foods

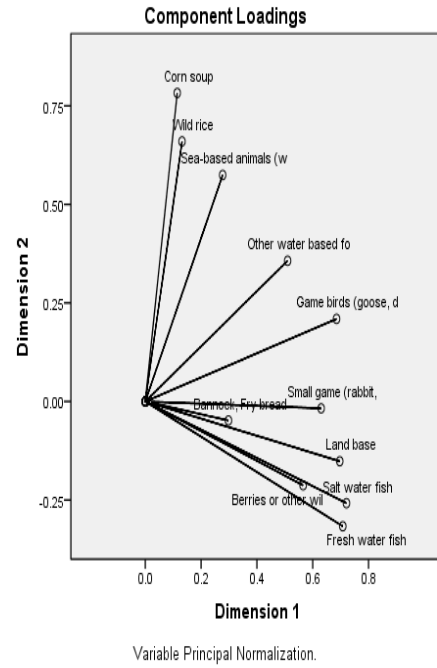
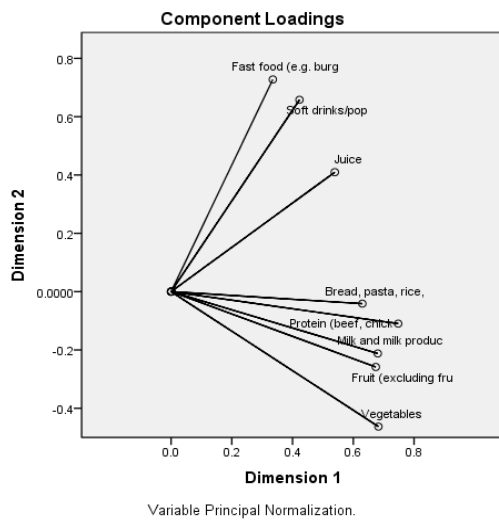


Figure 3.3: Junk Foods and Healthy Foods



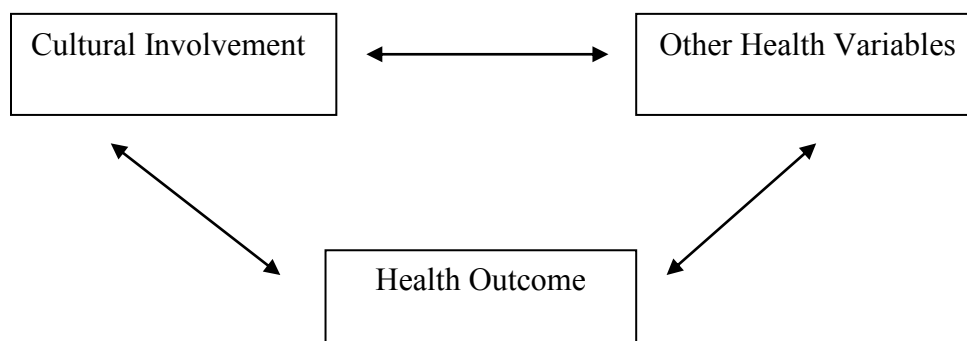
A separate step-wise-regression was performed on each independent variable grouping to demonstrate whether and how each independent variable affected the dependent variables of HUI and health conditions. A regression analysis was then performed with each independent grouping and dependent variable. Adjusted R square was used to determine the strength of the relationship between the five independent groupings (Table 3.1) and dependent variables. The grouping with the highest adjusted R square was shown first, followed by the grouping with the next highest adjusted R square. When the adjusted R squares were similar for two groupings, both were tried and the grouping that increased the collective adjusted R square most was used. Step-wise- regression explained how each independent grouping impacted the dependent variables in order of the strength of influence. Step-wise-regression was performed with five subject groups: all subjects, females <50, female ≥50, males <50 and males ≥50 years old. The age of 50 years old was used because the median age of the individuals was approximately 50 years old.

CHAPTER 4: RESULTS AND DISCUSSION

Measuring personal health can be complicated because defining good health or poor health may be different for each person. There are many aspects of health, from diseases such as cancers or cardiovascular conditions, to mental health issues, that may impact health status. Many Aboriginal descriptions of health incorporate the medicine wheel depicting four dimensions that influence health: physical, mental, emotional and spiritual.

This study considers the relationship of many health variables including cultural involvement on specific health outcomes (Figure 4.1). Figure 4.1 also reflects the relationship health variables have with cultural engagement and its impact on health outcomes. The Figure depicts how health variables may either impede or facilitate the positive influence of cultural engagement on health. This relationship may also work in the opposite direction, with cultural involvement impeding or facilitating other health variables impact on health quality.

Figure.4.1: Healthy Relationships



The Health Outcome measure (dependent variable) includes the health utility index (HUI) and number of reported health conditions (HC) (Table 4.1). HUI is a robust outcome that

has shown good reliability and validity (Feng et al., 2009). Self reported number of HC is also a well accepted indicator of health quality.

Table 4.1: Outcome Measures

Outcomes Measures	<ol style="list-style-type: none"> 1. Health Utility Index 2. Number of reported Health Conditions
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The aspects of cultural involvement (independent variables) used from the RHS consider traditional language, traditional food, traditional physical activity and spiritualities (Table 4.2). The health environment independent variables are also shown in Table 4.2. Personal Wellness includes scores for life balance, depression, alcohol, gambling and smoking. Housing includes scores for home repairs needed, persons per room and safe drinking water. Diet and exercise include scores for junk food, healthy food and non-traditional physical activities. Demographics have scores for income, education, age and gender.

4.1 DESCRIPTIVE FINDINGS

Tables 4.2- 4.5 describe traditional activity involvement among the respondents. The Mi'kmaw language was spoken or understood among 11.7% of the respondents (Table 4.2). The degree of use ranged from fluent to understanding/speaking a few words. Most of the respondents had a low level of Mi'kmaw language use.

Table 4.2: Traditional Language

Mi'kmaw Language	11.7 % spoke or understood at some level	13 Males and 10 Females
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Traditional spirituality shows high involvement among the majority of respondents for ‘importance of traditional spirituality’ and ‘attending cultural events’ (Table 4.3). A very low percentage of respondents (7 %) consulted with a traditional healer.

Table 4.3: Traditional Spirituality

Importance of Traditional Spirituality	68% very to somewhat important
Attending Cultural Events	80% sometimes to always attends
Consulted a Traditional Healer	7% in the past 2 years

Table 4.4: Traditional Food: Consumed in the Past Year

Land Based Animals	93%
Salt Water Fish	89%
Berries or other wild vegetation	86%
Fresh Water Fish	78%
Small Game	50%
Other water based foods	36%
Game Birds	35%

Table 4.5: Traditional Physical Activities in the Past Year

Berry Picking	39%
Fishing	34%
Dancing (including Traditional)	30%
Hunting or trapping	25%
Canoeing/Kayaking	7%
Snowshoeing	4%

Traditional foods and traditional physical activity involvement are shown in Tables 4.4 and 4.5. A large majority of respondents consumed traditional foods in the past year, as high as 93% for land based animals and 89% for salt water fish. Traditional physical activities ranged from 39 % (berry picking) to 4 % (snowshoeing).

4.2 MULTI-LINEAR REGRESSION

Multi-linear regressions were performed and in particular step-wise-regression was used to demonstrate how each independent variable grouping increased adjusted R square; variable groupings were added in order of highest increase on adjusted R² (Table 4.6). R² indicates how much of the dependent variables, HUI and number of health conditions, is explained by the independent variables, e.g. housing. A low R² of (i.e. below .100) would explain very little of the dependent variable's variance. For example, when looking at the association between all subjects and HUI, personal wellness (R² .234) was the highest value when each variable grouping was tested with HUI separately. Then, the demographics variable grouping was the next grouping that increased the R² the most among the remaining variables, followed by

housing, traditional activities, and diet and exercise. The tables in the index show all the results from each variable grouping.

The total R^2 were very high in 8 of the 10 subject groupings, ranging from .862 to .498. The low R^2 were .310 and .109. The R^2 was .498 for both HUI and HC with all subjects. Male R^2 ranged from .518 to .688 in the four groups. Adult Female 18-49 R^2 was .862 and .677, HUI and HC respectively. For females 50 years and over, R^2 was low at .164 and .317 for HUI and HC respectively. Clearly the independent variables used in this study do not sufficiently account for the health variability of females 50 years and over, when considering HUI and health conditions. This indicates that there are other variables that impact the health of females 50 years old and over that are not included in this project. The variable groupings are discussed below in order of greatest to least impact on health outcomes with the 10 subject groups.

Table 4.6: Step-Wise-Regression

Subject Groupings	HUI		Health Conditions	
	Variable Groupings	R ²	Variable Groupings	R ²
All Subjects	1. Personal Wellness	.234	1. Demographics	.311
	2. Demographics	.368	2. Housing	.415
	3. Housing	.402	3. Diet and Exercise	.431
	4. Trad. Activity	.416	4. Personal Wellness	.484
	5. Diet and Exercise	.498	5. Trad. Activity	.498
Females 18-49	1. Personal Wellness	.545	1. Housing	.340
	2. Demographics	.766	2. Personal Wellness	.490
	3. Housing	.773	3. Trad. Activity	.575
	4. Trad. Activity	.778	4. Demographics	.589
	5. Diet and Exercise	.862	5. Diet and Exercise	.677
Males 18-49	1. Housing	.324	1. Housing	.276
	2. Diet and Exercise	.384	2. Diet and Exercise	.441
	3. Personal Wellness	.446	3. Demographics	.552
	4. Demographics	.518	4. Trad. Activity	.629
	5. Trad. Activity	.514	5. Personal Wellness	.688
Females 50 and over	1. Personal Wellness	.060	1. Trad. Activity	.082
	2. Housing	.126	2. Demographics	.112
	3. Trad. Activity	.128	3. Housing	.317
	4. Diet and Exercise	.164	4. Diet and Exercise	.312
	5. Demographics	.109	5. Personal Wellness	.310
Males 50 and over	1. Personal Wellness	.271	1. Personal Wellness	.374
	2. Housing	.330	2. Demographics	.468
	3. Demographics	.615	3. Housing	.494
	4. Trad. Activity	.653	4. Trad. Activity	.574
	5. Diet and Exercise	.670	5. Diet and Exercise	.658

4.2 TRADITIONAL ACTIVITIES

The possible health benefits of traditional activities are not well understood. This study considers the following aspects of traditional culture from the RHS: traditional food, traditional physical activity, traditional language use and cultural activity involvement.

Traditional activities of food, physical activity and spirituality were significantly correlated with improved HUI scores when all subjects were included. However, traditional activities were less strongly related to our health outcomes than the other factors we have considered so far. Language was not significant (.05) in this group of subjects but did show a trend with a .083 result in the final grouping that had an overall R^2 of .498. Higher language scores did have a significant correlation with lower HC when all subjects were included. Adult males 18-49 years had a significant correlation between higher language scores and lower HC. Females 18-49 years also had a significant correlation between higher language scores and improved HUI scores in one variable grouping.

Adult females 18-49 years had significant correlations between traditional foods and improved HUI scores and lower number of HC in one variable grouping. Higher traditional physical activities scores had a significant correlation with lower HC also with younger females. Females 50 years and over had significant correlations between more traditional food consumption and lower number of HC. Females 50 years and over also had significant findings between higher traditional physical activity and spirituality scores with lower HC in several groups and several trends that were below .10.

Males 50 years and over had significant findings between higher traditional physical activities and spirituality scores and lower number of HC. Also, older males had a significant correlation between higher spirituality scores and improved HUI scores. Younger males had a significant correlation between traditional physical activity and lower number of HC in one variable grouping and a trend (below .10) in the other grouping.

While there are discrepancies, on the whole our findings in this segment are consistent with the literature. The importance of food and physical activity among all people is important and its relationship with health status has been well documented (Mozaffarian, Tao Hao, Rimm, Willett & Hu, 2011). This will be discussed further in the diet and exercise section. The transition from an indigenous diet and traditional physical activities to western lifestyles had a negative health impact on many indigenous populations (Damman, Eide & Kuhnlein, 2007; Paul, 2006; Schulz et al., 2006; Thatcher, 2001). The western lifestyle of increased calorie consumption and decreased physical activity has led to many chronic health problems most notably obesity and diabetes (Mozaffarian et al., 2011).

Although the nutrient value of traditional foods is not well understood, several studies have shown that the traditional Aboriginal diets have sufficient nutrient value (Jamieson, Weiler, Kuhnlein & Egeland, 2012; Kuhnlein, Receveur, Soueida & Berti, 2007; Schaefer et al., 2011) and are possibly protective against various chronic health conditions (Schulz et al., 2006). The traditional food source that was rich in fruits, vegetables and proteins (Paul, 2006; Thatcher, 2001) is a very healthy diet (Insel et al., 2006). The labour intensive work that is involved with most Aboriginal food gathering and preparation also would increase the health benefits (Damman, Eide & Kuhnlein, 2007; Schulz et al., 2006)

Traditional activities have been used within addictive behaviour treatment programs for the treatment of alcohol misuse and smoking (Stone, Whitebeck, Chen, Johnson & Olson, 2006; Varcoe, Bottorff, Carey, Sullivan & Williams, 2010). The success of the treatments mentioned were not clear, however treatment for addictive behaviors is difficult for all treatment types. Being involved with traditional activities may also have the benefit of social support and a sense of belonging (Richmond & Ross, 2008). Whitbeck, McMorris, Hoyt, Stubben and LaFromboise (2002) also found that engagement in traditional practices protect from the negative effects of discrimination among American Indians. Clarity of cultural identity has been shown to have a positive impact on well-being and self esteem, indicating that cultural identity clarification may have psychological benefits when people are facing cultural identity challenges (Usborne & Taylor, 2009). First Nations communities in British Columbia showed lower rates of youth suicides in communities that have high traditional language knowledge, and youth suicides rates were even lower in communities where over half of the band members reported a conversational knowledge of their traditional language (Hallett, Chandler & Lalonde, 2007).

Although traditional activities did not have the strong relationships with health as did housing, wellness and demographics, even after considering all these factors in the data, traditional activities still had an impact on health outcomes at some level. There were some modest increases in R^2 when traditional activities were included, however that can also be said for most of the other variables. How independent variables impact these health outcomes cannot be fully explained with this study including the traditional activity variable, but what

can be said is that there is an interaction happening and further research is needed to fully understand this interaction.

4.3 HOUSING

For this study, housing had a strong correlation with the health outcomes. This study considered three aspects of housing: crowding, water and repairs. Housing had the highest impact on R^2 with three of the 10 subject groups. It was second in three other groups and third in the remaining four subject groups. With both genders and all ages included and with HC as the outcome, all but one variable grouping had a significant correlation between the housing variables and HC. With HUI as the outcome and all subjects included, home repairs had significant findings in two of three variable groupings and safe water was significant in the final variable grouping.

Housing was clearly the correlation with health for adult males under 50 years; home repairs had significant correlations with HUI and HC in every grouping. Safe drinking water was significant in every variable grouping for females 50 and over for both HUI and HC. Males 50 and over had only one significant finding, HUI and persons per room. In males 50 and over, overcrowding was positively correlated with higher HUI scores. Home repair was significant for adult females 18-49 years old when HC was the dependent variable.

Many people spend a majority of their time at home and in addition vulnerable populations with a higher proportion of sick and poor spend a greater amount of time in their home environment than the general population, making poor housing a greater issue for vulnerable populations (WHO, 2010). There is a strong connection between health status and

housing standards making housing a key component in the social determinants of health (Dunn, Hayes, Hulchanski, Hwang & Potvin, 2006; Jacobs, Wilson, Dixon, Smith & Evens, 2009; Krieger & Higgins, 2002; WHO, 2010). As is the case with all health determinants, this association is complex and has variability within small groups of any population.

Poor housing standards are associated with many health conditions including respiratory conditions, injuries, mental health and infectious diseases (Krieger & Higgins, 2002; Larcombe et al., 2010; WHO, 2010). From a socio-economic perspective, neighborhood infrastructures that go beyond housing also influence health. For example, sustainable communities with accessibility to amenities may have a positive influence on well-being. Amenities may include but are not limited to walking paths, parks, health centers, libraries and food stores (Dunn et al., 2006; Hood, 2006). Jacobs et al. (2009) did a 30-year retrospective analysis on the relationship between housing and population health and found a relationship between health conditions and housing quality and amenities. Jacobs et al. found cardiovascular, diabetes and respiratory conditions were associated with poor housing conditions. Fewer health conditions were associated with improved housing standards that included housing construction standards and neighborhood characteristics.

There has been a suggested relationship between health issues and mold growth in homes, over-crowding, water damage, and insufficient temperature control and ventilation (Optis, Shaw, Stephenson & Wild, 2012). These issues have been noted to be more prevalent in on-reserve homes across Canada (Optis et al.). Larcombe et al. (2010) found a relationship between over-crowding and tuberculosis on two First Nations communities in Manitoba. Larcombe et al. states that the presence of mold likely in itself does not cause tuberculosis, that

the tuberculosis is in response to mold's impact on the immune system making people susceptible to infectious conditions.

In addition, the connection between stress and health (Iwasaki & Bartlett, 2006) may also account for increased health conditions as a result of substandard housing. If a person is living in a house that is in need of major repairs, no access to safe drinking water and is over crowded, day to day living would be very stressful. There have been links shown between increased stress and health conditions such as cancer, cardiovascular conditions and mental health (Iwasaki & Bartlett, 2006). In addition, if the housing condition includes issues such as unsafe footing, musculoskeletal injuries may result. Unsafe water may lead to digestive disorders among other problems more severe if the water has harmful chemicals. Over crowding can impact health through hygiene issues and poor sleeping conditions (Larcombe et al., 2011).

This study does not attempt to measure or describe the degree of housing issues in Miawpukek only to suggest that there is a relationship between housing conditions and health. This study shows significant correlations between housing issues and poor health in some of the results. Men's health appears to be affected by home repairs while females appear to be affected by water issues. When comparing housing issues with neighbouring non-Aboriginal communities (total of seven communities with populations between 500 and 1900), Miawpukek's housing quality was the lowest (Community Well-Being Index, 2010). The RHS (2010) reports that one quarter of First Nations homes across Canada are over-crowded, the majority of homes require repairs (half report mold) and one third perceive water to be unsafe to drink year round. With the noted health issues associated with housing in past research and

this research, further research is needed to further the understanding between housing and health in Miawpukek. A stable housing environment with lower stress levels and less time spent attending to housing issues may allow individuals to engage in other health activities such as traditional activities and ceremonies. A further examination of the RHS across Canada, looking at the connection between housing and general health, would increase our understanding of this issue in First Nations communities. A deeper understanding of the importance of quality housing may influence future housing services.

4.4 PERSONAL WELLNESS

Personal wellness can be defined differently for different population groups. This study considers depression, sense of life-balance and addictive behaviour (alcohol, gambling and smoking) as indicators of personal wellness, and considers its impact on HUI and number of health conditions. Personal wellness had the strongest impact on R^2 in five of the ten groupings. In particular, personal wellness had the strongest impact on R^2 in the all subjects and HUI regression.

Personal wellness results show a significant correlation between HUI and the independent variables life balance, depression, alcohol and smoking when all subjects were included. As the independent variables improve, HUI improved. In addition, when all subjects were included, lower depression and smoking scores had a significant correlation with decreased number of HC. Alcohol was not significant with HC but did show a trend of .083 when all subjects were included.

Increased gambling scores improved both HUI and HC when all subjects were included. The gambling finding is interesting and difficult to explain. However, it is possible that individuals with good health have the income and physical mobility to access gambling. As will be discussed later, increased income has a significant correlation with better HUI and HC. Lower gambling scores had a significant correlation with better HUI and HC results in males 50 years and over.

When all independent variables were included, improved life balance scores were significantly correlated with improved HUI scores in adult females 18-49 years. Higher life balance scores also had a trend with lower number of HC in females 18-49 years this relationship became significant when all variables were included.

Lower alcohol consumption had significant correlations with improved HUI scores in adult males 18-49 years. Males 50 years and over showed lower number of HC with lower alcohol consumption. Adult females 18-49 years had a significant correlation between alcohol and improved HUI scores. However, females 18-49 years also had a significant correlation between higher alcohol consumption and lower number of health conditions. Although it is difficult to explain this finding, HUI does consider physical mobility more than HC, possibly explaining that people with more mobility may have more access to alcohol. HUI and HC do measure health differently; HUI scores may be more sensitive to the negative impact of alcohol consumptions and HC may be influenced by the possible positive health benefits of modest alcohol consumption. It is also possible that younger people may not show the negative effects of alcohol consumption that may show later in life.

Lower smoking scores significantly correlated with improved HUI and HC scores with all subjects. However, smoking had conflicting results in adult males 18-49 years. Higher smoking significantly correlated with higher HC scores and improved HUI scores. This may be explained that in younger males with better mobility, socialization occurs in activities that lend themselves to smoking such as hunting or fishing. In contrast, HC results may show the evidence of negative health from smoking in the younger adult population better than the HUI results. HUI may show the negative impact of smoking later in life.

In general, our findings on the personal wellness dimension are in accordance with other studies. Depression is associated with many health conditions. The morbidities include chronic obstructive pulmonary disease (COPD), cardiovascular conditions, digestive disorders, cancer and diabetes (Bhattari, Charlton, Rudisill & Gulliford, 2013; Chou, Huang, Goldstein & Grant, 2013; Schane, Woodruff, Dinno, Covivsky & Walter, 2008). Chou et al. did a prospective investigation study examining the temporal association between physical conditions and mental health. Mental conditions included mood disorders which include major depression, and anxiety disorders. Chou et al. found that psychological life stress is an important etiology for both physical and psychiatric disorders. This finding is in agreement with another study that found stressful life events are associated with disease (Cohn, Janicki-Deverts, Chen & Matthews, 2010). Bhattari et al. found that prevalence of depression was associated with the number of co-morbid diagnoses. The study also found that health care services increased as the number of co-morbid diagnoses increased, however when depression was also included, clinical care increased significantly more.

We are not aware of any quantitative studies that look at the relationship between life balance scores and health issues. Life balance is an Aboriginal approach to health that considers physical, emotional, mental and spiritual balance, and this approach has been used frequently in Aboriginal health literature (Waldram et al., 2006) but requires further research to determine the relationship between life balance and medical diagnosis prevalence.

Cigarette smoking causes most lung, oropharynx, larynx and esophagus cancers, one third of kidney, bladder and cervix cancers, and smoking has been associated with stomach, liver and colon cancers. Furthermore, smoking has been known to be associated with COPD, lung diseases and modifying DNA (Thun, Henley & Calle, 2002). Smoking impacts on the unborn, resulting in low birth rates and spontaneous abortions (Thatcher, 2001). Smokers have been shown to have higher hospitalization rates (Chew, Bryson, Au, Maciejewski & Bradley, 2010) and smoking bans have been linked to lower hospitalization rates for heart attacks and lung disease for smokers and non-smokers (Vander Weg, Rosenthal & Sarrazin, 2012). This furthers the support for reduced exposure for non-smokers. The extremely high prevalence of smoking among First Nations people (RHS, 2010) is very unfortunate considering that the traditional use of tobacco was treated with respect when used for ceremony and cultural purposes and did not result in the harmful effects that are evident with modern cigarette smoking (Thatcher, 2001).

Alcohol and gambling's impact on health is less clear than smoking, however certainly pathological gambling and excessive alcohol use have shown to have adverse health and life effects. Pathological gamblers may have financial problems, employment issues, social and family difficulties, and emotional stress, and an increase in suicide rates (Hodgins, Mansley &

Thygesen, 2006). When gambling is combined with mental disorders or excessive alcohol use, suicides rates often increase (Hodgins et al.; Shaffer & Korn, 2002). On the other hand, there are also groups, in particular older adults, who show lower number of health conditions amongst recreational gamblers (Desai, Maciejewski, Dausey, Caldarone & Potenza, 2004).

Health issues related to excess alcohol are extensive including cardiovascular, liver, pancreas, brain, gastrointestinal, nerve, bone, birth defects and trauma, in addition emotional and social problems from family, friends, community and work (Insel, Turner & Ross, 2006). Alcohol consumption in modest amounts may be a part of a health diet for some individuals with some evidence suggesting that modest alcohol consumption may lower cardiovascular disease prevalence. However more than one or two drinks per day is thought to dramatically increase the negative effects of alcohol (Insel et al., 2006). Klatsky (2009) found that heavy drinking was associated with higher risk of developing cardiovascular diseases, however this was not seen in moderate to light alcohol consumption.

The negative influence on personal wellness from smoking and alcohol use is evident in many groups in Canada, including some First Nations people. This study does show the possible negative impact of smoking and alcohol use, with a few discrepant findings. Gambling results in this study were less clear. Although, it is obviously clear that excessive gambling can have a negative impact on personal finances and relationships, its impact on health is less understood. Life balance had several significant correlations in this study and it appeared that the relationship was strongest among younger females. Depression scores had strong correlations with health in both genders. This study furthers the evidence in support of

improved mental health services that is lacking in many communities in Canada including First Nations communities.

4.5 DEMOGRAPHICS

Demographics had strong R^2 impact in several subject groupings. However, demographics did not have as strong an influence on R^2 as personal wellness and housing in most of the subject groupings. Most noticeably, demographics had the strongest R^2 impact when all subjects were tested with health conditions and second with all subjects and HUI.

Not surprisingly, demographic results for this study indicate that older individuals have significant correlation with both worse HUI and HC scores. The gender relationship was less clear. When considering all ages, females appeared to have a better HUI score than males while males showed better results on HC.

This study does show a significant correlation between higher income and improved health scores for both HUI and HC when all subjects were included. This relationship was stronger for males than females. This study does not show what level of income is needed to improve health, however it supports the idea that a minimal income level is needed to have a standard of living that enables good health. Income levels that would be acceptable would be dependent on the geographical area and amount of community support.

The significant relationship between higher education levels and poorer health when all subjects were included was interesting. However, there was a significant finding between higher education level and improved HUI score in younger females. This relationship between

higher education and worsening health may be explained by the evidence that people with higher education have more visits to doctors and tend to see medical specialists more frequently (Castro, 2008; Lebrun & Shi, 2011). In other words, these findings may indicate that individuals with higher education may be more aware of their health issues. Herd, Goesling and House (2007) found that education predicted the onset of health conditions but income strongly predicted the progression of disease. Higher education, in addition to income, may help with improved medical care, improved life style and health awareness, however income had a much larger impact on health disease progression over the life of the adult (Herd et al.). Nonetheless, there is overwhelming evidence to support higher education levels to improve quality of life in our society including among First Nations people. Wilson and Rosenberg (2002) used Canada Census data from 1991 where over 25,000 people self identified as Aboriginal and they found that both higher income and education was associated with reported higher well being.

Income is an important determinant of health (Ross, Wolfson, Dunn, Berthelot, Kaplan & Lynch, 2000), and our findings are largely consistent with the literature. Household income is associated with health status among Canadians (McLeod, Lavis, Mustard & Stddart, 2003). The relationship between income and health status can be seen in the association between low income and increased hospital visits, high medication use and higher disease prevalence (Muenning, Franks, Jia, Lubetkin, & Gold (2005); Lemstra, Mackenback, Neudorf & Nannapuneni, 2009). Clark et al. (2002) found that income levels predicted tuberculosis prevalence on First Nations communities. Higher income adds both quantity of years lived and quality of life during lived years in Canadians (Muhajarine, Labonte & Winqvist, 2012).

The reasons people of low income have increased health issues may include the lack of essential requirements for life such as proper nutrition and adequate housing. This relationship may also be due to increased risk behaviour factors people of the low income experience such as smoking, alcohol abuse and obesity. In addition, the stress that comes from living in a low income environment may also increase health disparities; stress from economic and employment insecurity, unsafe living environment and overcrowding to mention a few (Frohlich, Ross & Richmond, 2006). The relationship between income and health, although strong, is as complex as any other health determinant. This association is strong when tested with large data sets but smaller data sets have more variability making other health determinants more important. Furthermore, the amount of one's life that is spent in lower income as well as the income disparity that exists within one's community will play a role in individual health outcomes (Jacklin, 2009).

Comparing Miawpukek with seven neighbouring non-Aboriginal communities with similar populations using the Community Well-Being Index, Miawpukek has the lowest income score, the highest labour score and the second highest education score. All these scores are below the national non-Aboriginal averages and above the national Aboriginal average (Community Well-Being Index, 2010). Although income is a strong predictor of health, when comparing Aboriginals to non-Aboriginals in Canada, Aboriginals do not see the degree of improvement in health status from higher income levels as one does with the non-Aboriginal population, indicating that the etiology of increased illness in Aboriginals must be more than poverty (Loppie Reading & Wien, 2009).

4.6 DIET AND EXERCISE

Diet and exercise had the weakest relationship with health outcomes. Higher healthy food consumption had the most significant correlation with improved health for all subjects with HC, young males with both HUI and HC, older males with HC and younger females with HUI. Higher healthy food consumption had a significant correlation with greater number of HC in younger adult females. Younger adult females also had higher HC with increased physical activities. Increased junk food consumption had significant correlation with improved health scores with younger males and HUI, older males and HC, and younger females and HC. When all subjects were included, increased junk food was significantly correlated with lower health conditions. It would appear that many other factors influence health outcomes more than food and physical activities with this data. This study does not dispute the many known positive influences of proper diet and physical activity. What these results may indicate is that the positive health benefits of diet and exercise are not realized in people who have stronger negative health influences from other aspects of their life such as housing, personal wellness and demographics, and possible traditional activities.

Diet and exercise are important tools in controlling population obesity (Mozaffarian et al., 2011; Plourde and Prud'homme, 2012). Obesity and resulting morbidities, such as diabetes, are a growing problem in Canada, however First Nations diabetes rates are still significantly higher than the general population of Canada (Dyck, Osgood, Lin, Gao & Strang, 2010; RHS, 2012). The high carbohydrate diets with increased sugars and processed foods (junk food) will increase calorie intake causing obesity and related medical problems (Insel et al., 2006). In addition, low calorie output (lack of exercise) will also help alleviate the obesity trend towards

diabetes (Myers et al, 2013; Schwingshackl, Dias, Stresser & Hoffmann, 2013). Fretts et al. (2012) found that modest exercise reduced the incidence of diabetes in an American Indian population with high rates of obesity.

Diet and exercise can influence many health conditions. Diet and exercise are associated with cardiovascular disease and certain types of cancers, therefore reducing the incidence of both and helping treat when diagnosed (Ballard-Barbash, George, Alfano & Schmtz, 2013; Lemanne, Cassileth & Gubili, 2013; Reineck et al., 2013). Diet and exercise will also have an impact on other health conditions. Lee et al. (2013) found that just increasing number of steps taken during the day will decrease the number of health conditions such as cancer, hypertension and stroke. Exercise and diet will help control cholesterol (Cesar et al., 2011) and improve the immune system (Romeo, Warnberg, Pozo & Marcos, 2010). It has also been suggested that proper diet and exercise will have a positive influence on a host of mental conditions (Munoz, Fito, Marrugat, Covas & Schroder, 2009).

CHAPTER 5: CONCLUSION

5.1 SUMMARY

First Nations health disparities in Canada have been well documented (Myers, 2002; Reading, 2006; Waldram, Herring, & Young, 2006; Webster, Weerasinghe, & Stevens, 2004). The reasons for the health disparities are multifaceted. To fully understand First Nations health disparities requires perspectives that consider proximal determinants of health such as housing and income to more distal determinants that considers the role colonization has played in devaluing First Nations culture (Reading & Wien, 2009). This study examines the impact traditional First Nations cultural engagement has on health outcomes on Miawpukek First Nations using RHS data from 2008. This study also considers other social determinants of health such housing, diet and exercise, demographics and personal wellness. The connection between culture and health status has limited existing research to determine the strength and nuances of this relationship (Usborne & Taylor, 2010). With the complexity of how the social determinants of health affect health outcomes and defining what is considered good health, the degree that culture impacts health is complex and there is potentially large variability among individuals. Furthermore, defining culture is also a complex task. Although many characteristics of culture are common among First Nations communities and individuals within First Nations communities, there are also many differences across First Nations communities in Canada. This study showed that cultural engagement had a modest impact on health outcomes while other factors such as housing, personal wellness and income has a greater impact on health.

The RHS is an important tool in gaining a greater understanding of health among many First Nations people living on reserve across Canada. The RHS was developed using the OCAP principles ensuring control of the data by First Nations communities and representative bodies (Schnarch, 2004). The 2008 RHS data from Miawpukek used in this study included adults 18 and older. The health outcomes used in this study included number of health conditions and HUI score. Step-wise regression was used with the following variables: traditional activities, housing, diet and exercise, personal wellness and demographics.

Traditional activities included indices for traditional language, foods, physical activities and spiritual involvement. Housing included indices for home repairs, crowding and drinking water. Diet and exercise indices were junk food, healthy food and non-traditional physical activities. Personal wellness had indices for life balance, depression, alcohol, gambling and smoking. Demographics indices included income, education, age and gender.

Step-wise regression was performed with five subject groupings; all subjects, males 18-49 years, females 18-49 years, males 50 years and over, and females 50 years and over. Adjusted R^2 was very high in eight of the ten groupings, .500 and above. The subject grouping of females 50 years and over showed low R^2 . There are other factors impacting females 50 years and over other than the variables included in this study. The adjusted R^2 step-wise regression showed that housing, personal wellness and demographics were the three top variables associated with health outcomes. Although traditional activities appeared to impact health less than the other variables (but slightly greater than diet and exercise), traditional activities had significant findings in some of the results showing that even after considering all

the variables included in the other four categories, traditional activities still had significant correlation with the sample as a whole and in several subject groupings.

Traditional Activities

Traditional activities were less strongly related to health outcomes than the other factors considered so far. There were correlations between higher traditional language scores and lower number of HC. Females 50 years and over had significant correlation between traditional foods and improved HUI and HC in one variable grouping. Males 50 years and over had significant findings between higher traditional physical activities and spirituality scores and lower number of HC. Also, older males had a significant correlation between higher spirituality scores and improved HUI scores. Younger males had a significant correlation between traditional physical activity and lower number of HC in one variable grouping and a trend (below.10) in the other grouping. There is evidence to support the negative effects on health with the transition to western high calorie diets and reduced physical activity. Traditional diets that were rich in fruits, vegetables and protein have merit in the literature. Traditional physical activities can be a valid form of exercise. Traditional spiritual activities are important to clarify culture identity which may be an important health benefit. In the 2009 RHS, cultural questions measure only cultural behavior and participation, additional questions that measure cultural identity would be beneficial in that they would allow a more complete understanding of traditional cultures impact on health.

Housing

Housing variable had a strong correlation with health outcomes. Housing was clearly the strongest influence for adult males under 50 years; home repairs had significant correlations with HUI and HC in every grouping. Safe drinking water was significant in every variable grouping for females 50 and over both HUI and HC. Males 50 and over had only one significant finding, HUI and persons per room. In males 50 and over, overcrowding was positively correlated with higher HUI scores. Home repair was significant for adult females 18-49 years old when HC was the dependent variable. Poor housing has been associated with many health conditions in the literature.

Personal Wellness

Personal Wellness also had a strong correlation with the health outcomes. Personal wellness results show a significant correlation between HUI and the independent variables life balance, depression, alcohol and smoking when all subjects were included. When all subjects were included, lower depression and smoking scores had a significant correlation with decreased number of HC. Lower gambling scores had a significant correlation with better HUI and HC results in males 50 years and over. When all independent variables were included, improved life balance scores were significantly correlated with improved HUI scores in adult females 18-49 years. Although there were some discrepant findings with smoking, alcohol and gambling, most of the findings are consistent with the literature. Smoking and excessive drinking and gambling are associated with many adverse health conditions. Depression is also associated with many health conditions. Very little was found in the literature connecting life

balance with health conditions, however life balance is an Aboriginal approach that considers physical, emotional, mental and spiritual balance.

Demographics

This study does show a significant correlation between higher income and improved health scores for both HUI and HC when all subjects were included. This relationship was stronger for males than females. The relationship between education and health was less clear showing significant correlation between higher education levels and poor health when all subjects were included. The association of higher education levels with more health conditions may be explained by the idea that people with higher education levels have more visits to doctors and see specialist more frequently. Household income is a strong indicator of health in the literature. Although this study does not associate higher education with improved health status, the literature supports higher education to improve health status.

Diet and Exercise

Diet and exercise had the weakest relationship with health outcomes. It would appear that many other factors influence health outcomes more than food and physical activities with this data. This study does not dispute the many known positive influences of proper diet and physical activity. What these results may indicate is that the positive health benefits of diet and exercise are not realized in people who have stronger negative health influences from other aspects of their life such as housing, personal wellness and demographics, and possible traditional activities. The health benefits of proper diet and exercise are well documented in the literature.

5.2 RECOMMENDATIONS

Further research in additional First Nations communities across Canada as well as use of the over-time data of the RHS to compare changes in health status over time are needed to increase the understanding of the traditional activities and health relationship. Qualitative studies that consider the contextual content of this topic are also needed to understand the complexity of this topic.

Traditional Activities

There is evidence that First Nations cultural engagement has positive health benefits. Further research is needed to have a better understanding of the relationship. However, this study suggests that it would be important to support the increased instructions in First Nations languages in secondary schools and to encourage the practice of traditional spiritual activities in communities. Recommendations would also include recognition of traditional foods and traditional physical activities as an important part of healthy living. In future RHS, there should be questions that measure cultural identity along with the cultural behavior questions.

Housing

This study has added to the body of work that associates good health with housing quality. In view of the housing issues that have been reported on First Nations communities across Canada, further studies that can understand this relationship would be helpful to improve the health of First Nations in Canada. Housing is such a basic requirement of life, especially in the often harsh climate of Canada, that improving the housing of First Nations people is an

obvious need. The lack of substantial improvements has been one of Canada's greatest oversights. It is recommended that resources are available to insure adequate housing standards with regard to maintenance, occupancy and water supply.

Personal Wellness

This study also added to the growing understanding of depression, life balance and addictive behaviors and their association with health outcomes. Further research and resources are needed in this area to improve the health of First Nations people. Recommendations include ongoing community health promotion initiatives to address addictive behavior and depression awareness. In addition, sufficient community health services are required to provide treatment when necessary.

Demographics

The literature review showed that education and income levels have a strong association with health. Lower education and income levels among First Nations may have an impact on the health disparity with the general population of Canada. Recommendations that flow from this observation include ensuring minimal income levels for First Nations people and initiatives to increase secondary student retention and greater access to post secondary education.

Diet and Exercise

This study also considered the association of diet and exercise with health. Although diet and exercise did not have the strongest association with health outcomes in contrast to the other variables, with the growing incidences of diabetes in the First Nations population, further

understanding of the relationship between diet and exercise with specific conditions is needed to decrease the incidence of serious chronic medical conditions in First Nations people. Recommendations include increase access to exercise facilities on reserve as well as availability of healthy food choices. In addition, on going education initiatives on the importance of diet and exercise are recommended.

With the existing health disparities between First Nations people and the rest of Canada, more research is needed, in partnership with First Nations people, to best guide future interventions that improve the health of First Nations people. The limited resources available for intervention need to be guided by quality research in these areas.

5.3 LIMITATIONS

This data is from one First Nations community and the results may not reflect other First Nations communities. Further research projects that study the possible beneficial relationships between traditional activities and health in other communities across Canada would be needed to understand this relationship completely. Furthermore, studies that consider both quantitative and qualitative aspects of these relationships are needed to add to the contextual content of this complex topic. A more inclusive list of cultural engagement should be used to gain the fullest understanding of the relationship between cultural engagement and health. Such a list might include questions that ask not only about cultural behaviours and participation in traditional activities, but also about cultural identity.

Although the sample was 197 adults of a total population of just over 800 people, with a response rate of over 90%, there are still limitations of the results from within this community.

The results are cross-sectional considering one year of the RHS. Studies that look at past years and subsequent years would be helpful in following the relationship between traditional activities and health over a longer period of time.

The RHS is self-reported data. There are inherent inaccuracies with self-reported data such as misunderstanding of medical diagnoses and not accurately recalling past activities. Studies that cross reference to medical reports to confirm medical diagnoses would strengthen the results.

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APPENDIX A: RESEARCH AGREEMENT WITH UNSI AND MIAWPUKEK

The First Nations Regional Longitudinal Health Survey 2009: Analysis and Knowledge Translation

Miawpukek First Nations

Report AGREEMENT

[March, 2012]

Kenneth Long, as part of his Masters Thesis at Dalhousie University, agrees to analyse the data with the following understanding:

1. The purpose of this report, as discussed with and understood with the Chief and Council of Miawpukek First Nations and Union of Nova Scotia Indians (UNSI) as represented by Sally Johnson, further discussions will occur before the analyse begins:
 - *To determine the relationships between cultural involvement and health outcomes from the 2009 First Nations Regional Longitudinal Health Survey (RHS) in the Miawpukek First Nations community.*
2. The scope of this report:
 - *To find associations between cultural involvement and health determinants from the 2009 RHS from Miawpukek in consultation with Miawpukek community, UNSI and the Mi'kmaq Health Research Group (MHRG).*
 - *To compare these results with available findings from other First Nations communities in Canada.*
3. The method to be used:
 - *The Masters Thesis document will be available to Miawpukek First Nations, UNSI and MHRG.*
 - *A summarized document will be produced and made available to Miawpukek First Nations, UNSI and MHRG.*

4. Community participation, as agreed is to include:
 - *The development of this project is based on sincere communication between community members, representatives and researchers. All efforts will be made to incorporate and addresses local concerns and recommendations at each step of the project.*
 - *At the end of the project, the researcher will be available to participate in meetings to discuss the results of the analysis with interested groups.*
5. Information collected is to be shared, distributed, and stored in these agreed ways:
 - *The copy of the data held by the researcher on a password-protected USB and held by the researcher in a secure location. Upon completion of the project, the data and related programming and output files will be returned to the UNSI and all data-related files cleared from the computer utilized for analyses.*
 - *The researcher will be available to answer questions from Miawpukek community members and UNSI regarding the results of the report.*
 - *The Thesis and summary will be distributed after approval from the community representatives including: Miawpukek Chief and Council, Miawpukek's Health Director and UNSI.*
6. The names of participants are to be protected in these agreed ways:
 - *As outlined in consent forms, the interviews are confidential and in no instance will the name of a participant be attached to a record.*
 - *The researcher will sign an oath of confidentiality similar to that used by RHS fieldworkers*
 - *All identifiable information will be aggregated to larger grouping to preserve individual anonymity.*
 - *If seeking publication in a peer-reviewed journal the researcher will request approval from UNSI and Miawpukek community, and provide the paper for review and comments to ensure culturally appropriate interpretation of the results. The First Nations Information and*

Governance Committee (FNIGC) will be acknowledged as outlined in the First Nations Regional Longitudinal Health Survey Code of Research Ethics and the UNSI and Miawpukek will be acknowledged as the owners and stewards of the data.

- *In the event of a presentation of the research by the researcher, the above steps related to peer-reviewed publication will be followed. Additionally, efforts will be made to include a representative from the community reflecting the fact that this is a partnership.*

7. Project progress will be communicated to the community in these agreed ways:
 - Presentation will be delivered to Miawpukek Chief and Council monthly meetings at regular intervals as determined by researcher and Chief and Council.
 - Written reports will be delivered to UNSI at regular intervals as the presentations to Chief and Council.
8. Communication with the media and other parties (including funding agencies) outside the named researchers and the community will be handled in these agreed ways:
 - *Reports will be made available to Miawpukek and UNSI with an appropriate time frame to allow review and comments to ensure culturally-appropriate interpretation of results.*
 - *Comments will be incorporated into the report and/or included as footnotes.*

BENEFITS AND COMMITMENTS

Benefits

The project will be a part a researcher's Master Thesis at Dalhousie University.

The benefits likely to be gained by the Miawpukek community through this report are:

- *An analysis of the data collected in 2009 and 2002/03 RHS.*
- *A better understanding of the health issues in the Miawpukek First Nations community.*

Commitments

The community's commitment to the researcher is to:

- *Recommend capable and reliable community members to collaborate in this project.*
- *Keep informed about the progress of the project, and help in leading the project toward meaningful results*

The researchers' main commitment to the community is to:

- *Inform the community about the progress of the project in a clear, specific, and timely manner.*
- *Act as a resource to the community in the capacity of a research assistant on the secondary analysis of the RHS 2009 for the purposes of knowledge sharing with the community.*

Circumstances for interruption of the research project:

- *Access to the data, once approved, will not be unreasonable withheld or denied by Miawpukek, UNSI or MHRG.*

SIGNED BY:

(Signature of Report Author)

Date: _____

Name: _____

Position: _____

(Signature of Miawpukek
Community Representative)

Date: _____

Name: _____

Position: _____

(Signature of UNSI Representative)

Date: _____

Name: _____

Position: _____

Appendix B: HUI with All Ages and Gender

Demographics				Added: Housing				Added: Lifestyle				Added: Wellness				Added: Traditional Activities			
Adjusted R Square .311				Adjusted R Square .415				Adjusted R Square .431				Adjusted R Square .484				Adjusted R Square .498			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
Income	-.27	-6.55	.000	Income	-.26	-6.23	.000	Income	-.25	-6.06	.000	Income	-.19	-4.70	.000	Income	-.18	-4.49	.000
Educ.	.02	.40	.687	Educ.	.13	2.54	.011	Education	.16	3.20	.001	Educ.	.14	2.93	.004	Educ.	.13	2.77	.006
Age	.43	9.53	.000	Age	.43	9.45	.000	Age	.38	7.51	.000	Age	.39	7.93	.000	Age	.38	7.73	.000
Gender	.14	3.79	.000	Gender	.14	3.79	.000	Gender	.14	3.92	.000	Gender	.15	4.19	.000	Gender	.14	3.71	.000
				HomeRep.	-.27	-7.18	.000	HomeRep	-.28	-7.27	.000	HomeRep.	-.26	-6.95	.000	HomeRep.	-.25	-6.73	.000
				Pers/room	-.08	-2.24	.025	Pers/room	-.12	-3.20	.001	Pers/room	-.07	-1.96	.050	Pers/room	-.06	-1.60	.110
				Safewater	-.09	-2.55	.011	Safewater	-.09	-2.44	.015	Safewater	-.16	-4.18	.000	Safewater	-.15	-4.04	.000
								JunkFd	.08	1.96	.050	Junkfd	.11	2.80	.005	JunkFd	.10	2.51	.013
								HealthFd	-.15	-3.69	.000	HealthFd	-.13	-3.33	.001	HealthFd	-.13	-3.23	.001
								PA	-.00	-.06	.950	PA	.06	1.48	.139	PA	.03	.85	.398
												LifeBal.	-.03	-.78	.437	LifeBal.	-.01	-.38	.706
												Depress	.23	6.07	.000	Depress	.21	5.54	.000
												Alcohol	.06	1.74	.083	Alcohol	.06	1.74	.083
												Gamble	-.11	-2.99	.003	Gamble	-.09	-2.37	.018
												Smoking	.07	2.04	.042	Smoking	.09	2.49	.013
																Lang.	-.13	-3.70	.000
																TradFd	-.04	-1.13	.260
																Spiritual	-.02	-.55	.579
																TradPA	-.03	-.77	.441

Appendix C: Health Conditions with All Ages and Genders

Demographics				Added: Housing				Added: Lifestyle				Added: Wellness				Added: Traditional Activities			
Adjusted R Square .311				Adjusted R Square .415				Adjusted R Square .431				Adjusted R Square .484				Adjusted R Square .498			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
Income	-.27	-6.55	.000	Income	-.26	-6.23	.000	Income	-.25	-6.06	.000	Income	-.19	-4.70	.000	Income	-.18	-4.49	.000
Educ.	.02	.40	.687	Educ.	.13	2.54	.011	Educ.	.16	3.20	.001	Educ.	.14	2.93	.004	Educ.	.13	2.77	.006
Age	.43	9.53	.000	Age	.43	9.45	.000	Age	.38	7.51	.000	Age	.39	7.93	.000	Age	.38	7.73	.000
Gender	.14	3.79	.000	Gender	.14	3.79	.000	Gender	.14	3.92	.000	Gender	.15	4.19	.000	Gender	.14	3.71	.000
				HomeRep.	-.27	-7.18	.000	HomeRep.	-.28	-7.27	.000	HomeRep.	-.26	-6.95	.000	HomeRep.	-.25	-6.73	.000
				Per/room	-.08	-2.24	.025	Per/room	-.12	-3.20	.001	Per/room	-.07	-1.96	.050	Per/room	-.06	-1.60	.110
				Safewater	-.09	-2.55	.011	Safewater	-.09	-2.44	.015	Safewater	-.16	-4.18	.000	Safewater	-.15	-4.04	.000
								JunkFd	.08	1.96	.050	JunkFd	.11	2.80	.005	JunkFd	.10	2.51	.013
								HealthFd	-.15	-3.69	.000	HealthFd	-.13	-3.33	.001	HealthFd	-.13	-3.23	.001
								PA	-.00	-.06	.950	PA	.06	1.48	.139	PA	.03	.85	.398
												LifeBal.	-.03	-.78	.437	LifeBal.	-.01	-.38	.706
												Depress	.23	6.07	.000	Depress	.21	5.54	.000
												Alcohol	.06	1.74	.083	Alcohol	.06	1.74	.083
												Gamble	-.11	-2.99	.003	Gamble	-.09	-2.37	.018
												Smoking	.07	2.04	.042	Smoking	.09	2.49	.013
																Lang.	-.13	-3.70	.000
																TradFd	-.04	-1.13	.260
																Spiritual	-.02	-.55	.579
																TradPA	-.03	-.77	.441

Appendix D: HUI and Males 18-49 years Old

Housing				Added: Lifestyle				Added: Wellness				Added: Demographics				Added: Traditional Activities			
Adjusted R Square			.324	Adjusted R Square			.384	Adjusted R Square			.446	Adjusted R Square			.518	Adjusted R Square			.514
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
HomeRep	.53	8.89	.000	HomeRep	.452	7.460	.000	HomeRep	.51	8.16	.000	HomeRep	.54	8.01	.000	HomeRe.	.50	7.02	.000
Pers/room	-.24	-4.07	.000	Pers/room	-.199	-3.208	.002	Pers/room	-.22	-3.57	.000	Pers/room	-.10	-1.39	.165	Pers/room	-.07	-.90	.371
Safewater	.12	1.99	.048	Safewater	.182	3.075	.002	Safewater	.15	2.62	.010	Safewater	.10	1.47	.143	Safewater	.10	1.44	.151
				JunkFd	.189	2.880	.004	JunkFd	.21	3.08	.002	JunkFd	.28	3.85	.000	JunkFd	.29	3.72	.000
				HealthFd	.121	1.772	.078	HealthFd	.19	2.69	.008	HealthFd	.30	3.67	.000	HealthFd	.32	3.78	.000
				PA	.064	.998	.320	PA	-.07	-.97	.332	PA	-.12	-1.66	.098	PA	-.19	-1.96	.052
								LifeBal.	.11	1.81	.072	LifeBal.	-.06	-.80	.423	LifeBal.	-.09	-1.14	.258
								Depress.	-.11	-1.79	.074	Depress.	-.09	-1.39	.168	Depress.	-.09	-1.29	.200
								Alcohol	.50	2.49	.014	Alcohol	.76	3.32	.001	Alcohol	.77	3.25	.001
								Gamble	-.04	-.58	.561	Gamble	.01	.10	.919	Gamble	.01	.12	.902
								Smoking	-.65	-3.15	.002	Smoking	-.87	-3.73	.000	Smoking	-.88	-3.75	.000
												Income	.05	.73	.468	Income	.05	.63	.530
												Educ.	-.02	-.35	.726	Educ.	-.00	-.07	.942
												Age	-.00	-.04	.966	Age	-.03	-.45	.655
															Lang.	-.02	-.36	.718	
															TradFd	.07	.99	.325	
															Spiritual	.08	1.11	.270	
															TradPA	-.01	-1.19	.853	

Appendix E: Health Conditions and Males 18-49 years old

Housing				Added: Lifestyle				Added: Demographics				Added: Traditional Activities				Added: Wellness			
Adjusted R Square .276				Adjusted R Square .441				Adjusted R Square .552				Adjusted R Square .629				Adjusted R Square .688			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
HomeRep	-.46	-7.64	.000	HomeRep	-.45	-7.92	.000	HomeRep	-.41	-7.08	.000	HomeRep	-.44	-7.80	.000	HomeRep	-.47	-8.20	.000
Pers/rm	.13	2.24	.026	Pers/rm	.04	.66	.510	Pers/rm	.02	.276	.783	Pers/rm	.05	.89	.377	Pers/rm	.08	1.30	.196
Safewater	-.18	-3.08	.002	Safewater	-.19	-3.41	.001	Safewater	-.36	-6.26	.000	Safewater	-.31	-5.84	.000	Safewater	-.46	-8.16	.000
				JunkFd	.10	1.68	.095	JunkFd	.08	1.37	.173	JunkFd	.02	.38	.705	JunkFd	.07	1.13	.259
				HealthFd	-.38	-6.11	.000	HealthFd	-.21	-3.30	.001	HealthFd	-.22	-3.49	.001	HealthFd	-.31	-4.53	.000
				PA	-.14	-2.39	.018	PA	-.03	-.49	.627	PA	-.08	-1.01	.313	PA	.00	.03	.976
								Income	-.29	-4.51	.000	Income	-.25	-4.20	.000	Income	-.36	-5.58	.000
								Educ	.14	2.38	.019	Educ	.11	1.95	.053	Educ	.20	3.54	.001
								Age	.27	4.63	.000	Age	.25	4.57	.000	Age	.17	2.92	.004
												Lang.	-.20	-3.36	.001	Lang.	-.24	-4.28	.000
												TradFd	.08	1.36	.175	TradFd	.05	.81	.421
												Spiritual	-.01	-.20	.840	Spiritual	-.01	-.15	.877
												TradPA	-.22	-3.81	.000	TradPA	-.11	-1.85	.067
																LifeBal.	.00	.02	.984
																Depress.	.27	4.78	.000
																Alcohol	-.58	-3.08	.002
																Gamble	-.07	-1.27	.206
																Smoking	.46	2.45	.015

Appendix F: HUI and Males 50 years and over

Wellness				Added: Housing				Added: Demographics				Added: Traditional Activities				Added: Lifestyle			
Adjusted R Square .271				Adjusted R Square .330				Adjusted R Square .615				Adjusted R Square .653				Adjusted R Square .670			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
LifeBal.	-.05	-.50	.619	LifeBal.	-.03	-.30	.765	LifeBal.	.09	1.08	.283	LifeBal.	.05	.55	.586	LifeBal.	-.03	-.28	.777
Depress.	-.37	-3.8	.000	Depress.	-.37	-3.30	.002	Depress.	-.29	-3.16	.002	Depress.	-.34	-3.35	.001	Depress.	-.48	-4.15	.000
Alcohol	-.02	-.03	.974	Alcohol	.28	.48	.633	Alcohol	-.40	-.87	.386	Alcohol	-.62	-1.35	.183	Alcohol	-.93	-1.91	.061
Gamble	-.02	-.16	.871	Gamble	-.04	-.34	.730	Gamble	-.24	-2.46	.017	Gamble	-.35	-3.27	.002	Gamble	-.23	-1.91	.062
Smoking	-.32	-.59	.554	Smoking	-.61	-1.09	.278	Smoking	-.06	-.13	.895	Smoking	.14	.32	.748	Smoking	.40	.87	.385
				HomeRep	.18	1.69	.095	HomeRep	.07	.82	.416	HomeRep	-.08	-.91	.368	HmRep	-.03	-.33	.744
				Pers/rm	.22	2.29	.025	Pers/rm	.30	3.96	.000	Pers/rm	.39	4.95	.000	Pers/rm	.37	4.88	.000
				Safewater	.03	.26	.796	Safewater	-.10	-1.05	.296	Safewater	.00	.03	.979	Safewater	.17	1.30	.198
								Income	.15	1.55	.126	Income	.27	2.57	.013	Income	.15	1.27	.210
								Educ	-.18	-1.71	.091	Educ	-.30	-2.53	.014	Educ	-.22	-1.90	.062
								Age	-.61	-6.85	.000	Age	-.56	-6.15	.000	Age	-.37	-3.09	.003
												Lang.	-.01	-.15	.883	Lang.	.01	.15	.878
												TradFd	-.09	-.89	.378	TradFd	-.07	-.69	.495
												Spiritual	.30	2.80	.007	Spiritual	.43	3.50	.001
												TradPA	.19	1.79	.078	TradPA	.22	1.93	.058
															JunkFd	-.12	-1.14	.259	
															HealthFd	-.22	-1.97	.053	
															PA	-.10	-.91	.366	

Appendix G: Health Conditions and Male 50 years and over

Wellness				Added: Demographics				Added: Housing				Added: Traditional Activities				Added: Lifestyle			
Adjusted R Square .374				Adjusted R Square .468				Adjusted R Square .494				Adjusted R Square .574				Adjusted R Square .658			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
LifeBal.	.06	.66	.513	LifeBal.	.02	.21	.834	LifeBal.	-.01	-.12	.905	LifeBal.	.09	1.00	.321	LifeBal.	.16	1.66	.101
Depress.	.36	4.26	.000	Depress.	.34	3.77	.000	Depress.	.32	3.12	.003	Depress.	.29	2.83	.006	Depress.	.34	3.09	.003
Alcohol	.46	1.06	.292	Alcohol	.39	.85	.398	Alcohol	.08	.16	.870	Alcohol	.51	1.04	.300	Alcohol	1.11	2.36	.021
Gamble	-.09	-1.03	.305	Gamble	.08	.81	.422	Gamble	.16	1.61	.111	Gamble	.32	2.86	.006	Gamble	.17	1.51	.136
Smoking	-.03	-.07	.943	Smoking	.11	.24	.812	Smoking	.38	.81	.422	Smoking	.11	.24	.813	Smoking	-.41	-.93	.357
				Income	-.27	-2.72	.008	Income	-.35	-3.26	.002	Income	-.47	-4.49	.000	Income	-.56	-4.90	.000
				Educ	.01	.06	.951	Educ	.13	1.13	.262	Educ	.21	1.83	.071	Educ	.23	2.14	.036
				Age	.16	1.66	.101	Age	.11	1.22	.227	Age	.12	1.23	.224	Age	-.03	-.28	.777
								HomeRep	-.13	-1.40	.165	HomeRep	-.04	-.44	.664	HomeRep	.00	.06	.955
								Pers/rm	-.08	-1.00	.319	Per/rm	-.11	-1.45	.153	Per/rm	-.11	-1.61	.113
								Safewater	-.04	-.37	.713	Safewater	-.05	-.54	.588	Safewater	-.21	-1.71	.091
												Lang.	-.14	-1.59	.116	Lang.	-.10	-1.16	.251
												TradFd	-.11	-1.07	.288	TradFd	-.09	-.90	.372
												Spiritual	-.13	-1.29	.200	Spiritual	-.25	-2.01	.049
												TradPA	-.35	-3.15	.002	TradPA	-.39	-3.63	.001
															JunkFd	-.24	-2.33	.023	
															HealthFd	-.38	-3.26	.002	
															PA	.20	1.75	.084	

Appendix H: HUI and Females 18-49 years old

Wellness				Added: Demographics				Added: Housing				Added: Traditional Activities				Added: Lifestyle			
Adjusted R Square .545				Adjusted R Square .766				Adjusted R Square .773				Adjusted R Square .778				Adjusted R Square .862			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
LifeBal.	-.10	-2.10	.037	LifeBal.	-.13	-3.43	.001	LifeBal.	-.15	-3.83	.000	LifeBal.	-.19	-4.294	.000	LifeBal.	-.182	-4.282	.000
Depress.	-.75	-14.98	.000	Depress.	-.63	-14.58	.000	Depress.	-.71	-14.34	.000	Depress.	-.67	-12.80	.000	Depress.	-.77	-17.39	.000
Alcohol	-.02	-.45	.656	Alcohol	-.18	-4.39	.000	Alcohol	-.19	-4.38	.000	Alcohol	-.18	-3.87	.000	Alcohol	-.20	-5.37	.000
Gamble	-.02	-.33	.743	Gamble	.07	1.85	.066	Gamble	.14	3.01	.003	Gamble	.09	1.78	.076	Gambl	.10	2.39	.018
Smoking	.02	.40	.691	Smoking	.08	1.87	.063	Smoking	.05	1.21	.229	Smoking	.05	1.21	.229	Smoking	.08	2.05	.042
				Income	.03	.55	.583	Income	.03	.47	.636	Income	.02	.32	.749	Income	.01	.19	.849
				Educ	.38	7.93	.000	Educ	.31	6.13	.000	Educ	.31	5.87	.000	Educ	.41	9.45	.000
				Age	-.30	-7.34	.000	Age	-.22	-4.97	.000	Age	-.21	-4.77	.000	Age	-.19	-4.78	.000
								HomeRep	-.03	-.64	.520	HomeRep	-.07	-1.46	.147	HomeRep	-.05	-1.45	.150
								Pers/rm	-.02	-.46	.645	Pers/rm	-.02	-.46	.647	Pers/rm	-.18	-3.96	.000
								Safewater	.08	1.83	.069	Safewater	.07	1.63	.106	Safewater	.17	4.55	.000
												Lang.	.11	2.35	.020	Lang.	.05	1.19	.234
												TradFd	.01	.28	.777	TradFd	.13	3.31	.001
												Spiritual	.06	1.30	.197	Spiritual	-.02	-.42	.677
												TradPA	.04	.72	.471	TradPA	-.01	-.12	.901
															JunkFd	-.02	-.62	.535	
															HealthFd	.36	9.17	.000	
															PA	-.04	-.78	.436	

Appendix I: Health Conditions and Females 18-49 years old

Housing				Added: Wellness				Added: Traditional Activities				Added: Demographics				Added: Lifestyle			
Adjusted R Square .340				Adjusted R Square .490				Adjusted R Square .575				Adjusted R Square .589				Adjusted R Square .677			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
HomeRep	-.53	-8.37	.000	HomeRep	-.40	-6.59	.000	HomeRep	-.31	-5.16	.000	HomeRep	-.28	-4.37	.000	HomeRep	-.29	-5.03	.000
Pers/rm	-.11	-1.68	.096	Pers/rm	-.01	-.25	.804	Pers/rm	-.06	-1.06	.290	Pers/rm	-.04	-.59	.554	Pers/rm	-.14	-2.00	.047
Safewater	-.15	-2.42	.016	Safewater	-.19	-3.28	.001	Safewater	-.24	-4.47	.000	Safewater	-.33	-5.33	.000	Safewater	-.38	-6.63	.000
				LifeBal.	.10	1.94	.054	LifeBal.	.02	.41	.684	LifeBal.	.03	.50	.618	LifeBal.	.16	2.43	.016
				Depress.	.43	6.70	.000	Depress.	.33	5.27	.000	Depress.	.31	4.33	.000	Depress.	.40	5.88	.000
				Alcohol	-.05	-.80	.426	Alcohol	-.12	-2.27	.024	Alcohol	-.09	-1.40	.162	Alcohol	-.05	-.86	.389
				Gamble	-.11	-1.81	.072	Gamble	.04	.67	.503	Gamble	-.02	-.31	.756	Gamble	-.05	-.82	.414
				Smoking	-.01	-.11	.912	Smoking	.06	1.13	.259	Smoking	.08	1.28	.203	Smoking	.17	2.97	.004
								Lang.	-.30	-5.18	.000	Lang.	-.31	-4.65	.000	Lang.	-.28	-4.56	.000
								TradFd	.00	.04	.969	TradFd	-.01	-.24	.808	TradFd	-.20	-3.25	.001
								Spiritual	-.05	-.94	.347	Spiritual	-.11	-1.65	.101	Spiritual	-.35	-5.09	.000
								TradPA	-.16	-2.58	.011	TradPA	-.22	-3.07	.003	TradPA	-.16	-1.74	.083
												Income	-.11	-1.44	.153	Income	-.13	-1.91	.058
												Educ	-.02	-.22	.823	Educ	-.05	-.76	.446
												Age	.11	1.83	.069	Age	.18	2.96	.004
																JunkFd	.20	3.23	.002
																HealthFd	.16	2.62	.010
																PA	.41	4.74	.000

Appendix J: HUI and Females 50 years and over

Wellness				Added: Housing				Added: Traditional Activities				Added: Lifestyle				Added: Demographics			
Adjusted R Square .060				Adjusted R Square .126				Adjusted R Square .128				Adjusted R Square .164				Adjusted R Square .109			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
LifeBal.	-.19	-1.38	.174	LifeBal.	-.20	-1.38	.173	LifeBal.	-.22	-1.33	.190	LifeBal.	-.31	-1.89	.066	LifeBal.	-.32	-1.72	.095
Depress.	-.29	-2.19	.032	Depress.	-.25	-1.84	.072	Depress.	-.27	-1.74	.089	Depress.	-.25	-1.58	.122	Depress.	-.29	-1.57	.124
Alcohol	.25	1.51	.135	Alcohol	.42	2.38	.021	Alcohol	.34	1.72	.092	Alcohol	.23	1.16	.250	Alcohol	.28	1.15	.257
Gamble	.03	.24	.808	Gamble	.16	1.14	.261	Gamble	.12	.75	.458	Gamble	.18	1.16	.252	Gamble	.25	1.27	.213
Smoking	.31	1.87	.066	Smoking	.47	2.73	.009	Smoking	.29	1.38	.175	Smoking	.44	1.97	.055	Smoking	.51	1.79	.082
				HomeRep	.23	1.71	.093	HomeRep	.28	1.95	.057	HomeRep	.2	1.65	.106	HomeRep	.23	1.38	.175
				Pers/rm	.31	2.20	.033	Pers/rm	.21	1.34	.186	Pers/rm	.25	1.48	.145	Pers/rm	.19	.82	.420
				Safewater	.10	.75	.456	Safewater	.07	.46	.644	Safewater	.07	.43	.671	Safewater	.11	.56	.582
								Lang.	-.22	-1.39	.170	Lang.	-.24	-1.32	.195	Lang.	-.29	-1.42	.163
								TradFd	-.055	-.329	.744	TradFd	-.14	-.842	.404	TradFd	-.12	-.66	.512
								Spiritual	.263	1.43	.160	Spiritual	.15	.811	.422	Spiritual	.16	.73	.470
								TradPA	-.00	-.02	.987	TradPA	.02	.08	.936	TradPA	-.05	-.21	.837
												JunkFd	-.26	-1.68	.100	JunkFd	-.24	-1.31	.198
												HealthFd	.26	1.38	.176	HealthFd	.33	1.49	.146
												PA	.03	.15	.879	PA	.06	.26	.794
																Income	-.04	-.18	.858
																Educ	-.04	-.17	.867
																Age	-.10	-.48	.636

Appendix K: Health Conditions and Females 50 years and over

Traditional Activities				Added: Demographics				Added: Housing				Added: Lifestyle				Added: Wellness			
Adjusted R Square .082				Adjusted R Square .112				Adjusted R Square .317				Adjusted R Square .312				Adjusted R Square .310			
Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.	Variable	Beta	T	Sig.
Lang.	.02	.16	.874	Lang.	.09	.69	.494	Lang.	.30	2.19	.033	Lang.	.26	1.56	.126	Lang.	.14	.81	.423
TradFd	-.38	-2.62	.011	TradFd	-.36	-2.51	.015	TradFd	-.29	-2.24	.030	TradFd	-.31	-2.34	.024	TradFd	-.37	-2.38	.023
Spiritual	-.21	-1.73	.088	Spiritual	-.31	-2.32	.024	Spiritual	-.20	-1.56	.127	Spiritual	-.23	-1.74	.089	Spiritual	-.32	-1.75	.088
TradPA	-.23	-1.60	.114	TradPA	-.29	-1.76	.084	TradPA	-.30	-1.94	.059	TradPA	-.42	-2.41	.021	TradPA	-.44	-2.15	.038
				Income	-.13	-.81	.421	Income	-.39	-2.51	.016	Income	-.31	-1.77	.083	Income	-.23	-1.24	.221
				Educ	-.07	-.39	.700	Educ	.07	.43	.667	Educ	.14	.82	.416	Educ	.08	.41	.681
				Age	-.16	-.96	.343	Age	-.11	-.73	.467	Age	-.12	-.67	.506	Age	-.17	-.92	.362
								HomeRep	.19	1.51	.139	HomeRep	.15	1.17	.249	HomeRep	.18	1.27	.210
								Pers/rm	-.32	-2.48	.017	Pers/rm	-.27	-1.60	.117	Pers/rm	-.27	-1.37	.180
								Safewater	-.41	-2.87	.006	Safewater	-.39	-2.37	.022	Safewater	-.37	-1.99	.054
												JunkFd	.09	-.58	.566	JunkFd	-.12	-.76	.449
												HealthFd	-.01	-.09	.926	HealthFd	.11	.59	.557
												PA	-.26	-1.53	.133	PA	-.31	-1.61	.115
																LifeBal.	-.23	-1.44	.159
																Depress.	.09	.51	.612
																Alcohol	-.03	-.15	.883
																Gamble	.23	1.33	.193
																Smoking	-.00	-.01	.994