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SECTION 1: INTRODUCTION

First Nations people in Canada have a special relationship with the land – one that is rooted in the heavy reliance and connection to the natural environment for subsistence as well as social, cultural and economic well-being. Traditions and cultural practices are passed on with the understanding, commitment and vision adopted by each generation to respect, preserve and protect the health of the environment for the next seven generations.

For First Nations people, the health of the environment and the health of the individual are intimately connected:

"First Nations people are the environment. We are not separate. We reflect the state of the world.”
- Ken Tabobondung, 2007
("Through the Eyes of a Child: First Nations Children’s Environmental Health Report”)

In recent times however, due to increased pollution and over-exploitation of natural resources, this traditional dependence on the land has presented higher than “normal” risks to the health of First Nations people (AFN, 2009). The traditional use of plants and regular consumption of wild foods has significantly increased the rates of exposure to certain chemical and biological contaminants in the environment. This in turn has caused a decline in the overall health status of First Nations people as a result of consuming contaminated foods and/or from turning to less nutritional processed foods (AFN, 2009).

In addition to contamination of food sources, First Nations people are also exposed to contaminants and toxins from an array of other sources including:

- Exposure to toxic chemicals
- Poor air quality
- Chronic drinking water problems
- Living near industrial facilities and processing plants (mines, pulp and paper mills, power plants, etc.)

Environmental health is a vital component of the overall health of First Nations people, as many continue to rely heavily on the environment for their social, cultural, economic and physical survival and well-being. In addition to the environmental risks associated with traditional lifestyles and consumption of traditional foods, First Nations people across Canada are deeply concerned about environmental health issues related to the deterioration of clean air, the need to address chronic drinking water contamination problems, exposure to contaminants and toxins in food, poor housing and the potential long-term impacts of climate change. The Assembly of First Nations (AFN) recognizes that protecting the environment and human health are of paramount concern and must also be harmonized with economic development (AFN, 2009).
In particular, a basic understanding of the environmental health issues facing First Nations women must be examined. Aboriginals as a group are recognized as vulnerable populations and are at a greater risk of exposure to environmental hazards. This research paper will provide a basic understanding of the environmental health issues affecting Aboriginal and (where specific information exists) First Nations women. It will cover a broad range of effects and potential risks posed by environmental exposure that occurs in indoor and outdoor environments. In addition to influences in their physical environment, the paper will focus on the socio-economic, biological, and cultural factors that exist in the environment that impact women’s health. It will also examine what is being done in the areas of environmental health research in Canada. Finally, it explores potential strategies to address these issues and help to create healthier environments for First Nations women.

FIRST NATIONS WOMEN AND VULNERABILITY TO ENVIRONMENTAL HAZARDS

Unfortunately, the distribution of environmental benefits and risks associated with environmental hazards are not equal for all segments of society. Even the Canadian government recently admitted this to be true, stating that “we know that some segments of our population are exposed to unacceptably high levels of environmental pollutants.” (Government of Canada as cited in David Suzuki Foundation, 2007). Vulnerable groups of Canadians include children, Aboriginal people, individuals with environmental sensitivities or compromised immune systems, and people experiencing social and economic disadvantages, such as poverty and homelessness. Environmental hazards can have particularly severe health consequences for individuals facing multiple compounded vulnerabilities - e.g., poor, aboriginal, pregnant women. The complex problem of environmental injustice requires special attention and action (David Suzuki Foundation, 2007).

Women are more vulnerable than men to many environmental hazards for a variety of reasons and Aboriginal women in particular are even more susceptible to environmental hazards due to their already marginalized status. As a result of their roles as home-managers, economic providers, and their role in reproduction, women are susceptible to health problems and environmental hazards in several situations.

Gender relations determined largely by social, economic and political structures create inequality that leads to increased vulnerability for women. In these situations, women have few options regarding the kind of lifestyle they want to lead and fewer opportunities to change unsatisfactory conditions and improve their families’ and personal health (Chelala, 2001).

Women also tend to face discrimination within labour markets and with regard to obtaining housing, land, basic services and credit. Furthermore, women are especially susceptible to many environmental hazards when pregnant, since the reproductive system is particularly sensitive to adverse environmental conditions (DANIDA, 2000).
Women around the world are and have been the traditional protectors of the environment. A global survey on public attitudes on the environment sponsored by the United Nations Environment Program showed that women, when compared with men, are more likely to choose a lower standard of living with fewer health risks rather than a higher standard of living with greater health risks (Chelala, 2001).

ABORIGINAL WOMEN’S VIEW OF HEALTH

According to a report by the Prairie Women’s Health Centre of Excellence, Aboriginal women view health as a holistic condition, one that is directly related to the community. Kinship networks and the physical environment were recognized as important determinants of health (Dieter and Otway, 2001). This is in contrast to the western view of health that is largely based on being free from disease or illness and focusing on treatment rather than promoting wellness (although this is now changing to incorporate a more holistic view of health). The Medicine Wheel has been used to represent the inseparability of the individual from family, community and the larger world. The Medicine Wheel also represents harmony and balance in all aspects of a person’s physical and social environment — and balance is an essential requirement for an individual’s life and growth (Dieter and Otway, 2001). It is important that governments embrace the more holistic and encompassing view of health held by Aboriginal women (Deiter and Otway, 2001) in order to make more relevant and effective decisions and policies.

PURPOSE OF ENVIRONMENTAL HEALTH AND FIRST NATIONS WOMEN RESEARCH

The World Health Organization (WHO) broadly defines environmental health as:

“...those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling and preventing those factors in the environment that can potentially affect adversely the health of present and future generations.” (WHO, 1993).

Environmental health research is preventative in nature and its objective is to characterize the impact of environmental contaminants as health determinants (RRSE, 2009). By its very nature, environmental health is a vast discipline due to the sheer number of environmental contaminants that are responsible for a range of toxic effects on various aspects of human health (RRSE, 2009). As well, environmental health deals with chronic and infectious disease prevention, safety issues, food safety, vector control, water quality control and a variety of other concerns related to the environmental aspect of public health.
Environmental protection is a concept that cannot be excluded when it comes to a discussion of First Nation’s environmental health issues. Environmental protection:

“...pertains to protecting (keeping from harm, attack or injury) the combination of external conditions which affect the life, growth, development and survival of an organism or group of organisms. Subject areas include: air and water quality; biodiversity; ecological dynamics; environmental effects; environmental monitoring; hazardous substances and exposures; land use; pollution; resource management; and waste treatments.” (WHO, 2003).

First Nations have long recognized the links between the health of the environment and the health of their people. From a First Nations holistic perspective, health includes the physical, mental, emotional, social and spiritual aspects. The environment plays a vital role in all these aspects of health. Understanding the linkages between the environment and the health of First Nations women is crucial in order to enhance the protection of their health from exposure to future environmental hazards.

Environmental hazards (physical, biological, chemical and radiological) can have a negative impact on the quality of air, water, soil and traditional foods. Many First Nations women (particularly older women and Elders) continue to practice traditional lifestyles and consume traditional foods. They can be more susceptible to greater health risks associated with the consumption of traditional food contaminants. Other environmental factors, i.e., inadequate housing, poor indoor and outdoor air quality, socio-economic and climate change, etc., could have potential negative health impacts. These environmental factors can lead to greater health risks and diminished quality of life.

Although all Canadians face some degree of risk from a range of environmental contaminants, First Nations people and women in particular tend to be at greater risks of exposure and/or may be more susceptible to the effects of environmental exposures. For the purpose of this paper, the focus of environmental health issues will be from a First Nations’ perspective. This paper provides a general overview of environmental health concerns for women; an in-depth analysis of any single issue is beyond the scope of discussion contained here. By providing a basic overview of the key issues of concern, this paper is meant to serve as a starting point for dialogue and further discussion. It is important to note that due to the lack of overall environmental health research for First Nations people, there is a need to enhance the understanding of the relationship between the health of First Nations women and the environment.

The Assembly of First Nations is increasingly concerned about the potential effects of environmental exposures and the health of First Nations women. Understanding this relationship is of importance in terms of preventing and communicating potential risks, and creating a better quality of life for First Nations women. Relatively little data exists about the health and development of First Nations women. In particular, comprehensive national data concerning environmental health of First Nations women are not readily available.
DEMOGRAPHICS AND GENERAL HEALTH STATISTICS

According to the Indian Registry, the 2001 First Nations population size in Canada was 690 101. Of those, approximately 58% lived in First Nations communities (and on Crown Land), while 42% lived outside First Nations Communities (FNC, 2005).

The population of First Nations communities has been increasing for many years, but there has been an accelerated growth in the past decade. This increase has been mistakenly attributed to increased levels of fertility or to migration back to First Nations communities (FNC, 2005). Although it is true that First Nations women on average tend to have more children than non-First Nations women, this fact alone cannot explain the recent population increase. In reality, the increase can be explained largely by ethnic mobility (i.e. the phenomenon of people changing their response to the ethnicity question on a census over time), either by: the choice of ethnic identity for newborns and/or the change to self-reporting as First Nations during one’s lifetime.

Life expectancy at birth of Inuit and Registered Indian women in 1991 was less than 75 years (compared to 82 for Canadian women). By 1995, this number had risen to 76.2 – acknowledging that progress has been made but that the gap still remains large. While the reasons for this difference are undeniably complex, socio-economic marginalization, along with the poor health status of many Aboriginal women play a significant role in skewing the end results (Stout et al., 2001).

SELF-PERCEIVED HEALTH

Self-perceived health has been shown to be one of the most useful and reliable health indicators in population health surveys – as good as or better than other measures such as functional ability, chronic diseases and psychological well-being. Self-perceived health has also been found to be a reliable predictor of chronic disease incidence, recovery from illness, functional decline and mortality (Lundberg and Manderbacka, 1996, as cited in: Statistics Canada, 2006).

In general, Aboriginal people tend to report lower levels of health than other Canadians (Statistics Canada, 2006). For example, in 2001, approximately 30% of Aboriginals aged 55 and over reported excellent or very good health. In contrast, approximately 40% of the total Canadian population reported excellent or very good health (Statistics Canada, 2006).

Table 1 lists the medical conditions afflicting First Nations women, presented in descending order. Overall, women reported lower rates of chronic musculoskeletal, respiratory and cardiovascular conditions. However, women did report higher rates of vision or hearing conditions and in general, were less likely to consider themselves to be in ‘very good’ or ‘excellent’ health (FNC, 2003).
Although cardiovascular diseases and other chronic illnesses linked to sedentary lifestyles and high fat, high sugar diet have traditionally been low among Aboriginal peoples, there is evidence to suggest that this situation may be changing (Stout et al., 2001). In the case of diabetes, up until the 1940s, the disease was virtually unknown in Canada’s Aboriginal communities. However, in the last few decades there has been a startling increase even though the incidence of diabetes has remained relatively stable among non-Aboriginal Canadians during this time (Stout et al., 2001). Diabetes among First Nations is now at least 3 times the national average, and rates appear to be higher on-reserve than off-reserve (Bourrier-LaCroix, 2002). Approximately two-thirds of First Nations people diagnosed with diabetes are women. This means that Aboriginal women are contracting the disease at a rate roughly twice that of Aboriginal men – a gender difference not observed in the wider Canadian population (where diabetes affects more men than women) and First Nations women in particular have over 5 times the rate of diabetes compared to women in the general population (Bourrier-LaCroix, 2002).

It is unclear as to why diabetes has become an epidemic in First Nations populations and particularly among First Nations women. The effects of colonization, poverty, and a change to a more sedentary western lifestyle are all contributing factors. Other contributing factors could include the lack of health care services, diabetes education and early screening available to First Nations communities (Bourrier-LaCroix, 2002). More research specific to First Nations women is needed in this area.

First Nations women are also more likely to report chronic diseases such as arthritis, hypertension, and heart problems. First Nations women in particular are characterized by a death rate due to ischemic heart disease and stroke which is significantly higher than that of non-Aboriginal Canadian women (PAHO 1999 as cited in: Stout et al., 2001).
Cancer (such as cervical cancer) is another disease whose prevalence appears to be increasing for Aboriginal women. Among Aboriginal women, the incidence of cervical cancer is believed to be especially high – a fact highlighted by the results of a 30-year study in British Columbia that found the rate of death from cervical cancer for First Nations women was 33.9 per 100,000 people, as compared to 8.1 for non-Aboriginal women (Stout et al., 2001).

REGISTERED INDIAN HUMAN DEVELOPMENT INDEX

The Registered Indian Human Development Index (HDI) was developed by Indian and Northern Affairs Canada (INAC) to compare the average level of well-being of Registered Indians and other Canadians. It is based on the United Nations Human Development Index, which is a composite index used by the United Nations Development Program (UNDP) to measure and compare the quality of life in 170 countries (INAC, n.d.).

The UNDP uses three important dimensions of well-being, each of which is captured by the HDI: 1) a long and healthy life, 2) knowledge and 3) a decent standard of living. INAC developed the Registered Indian HDI using Statistics Canada census data and life expectancy estimates to measure these three dimensions (INAC, n.d.).

In 2001, at the national level, the gap in well-being between Registered Indian men and women was much higher than the gender gap seen among other Canadians. This gap was even more pronounced among Registered Indians living in reserve communities or settlements. Among Registered Indians, women scored higher than men in both education and life expectancy, but they had lower average incomes than men. The largest gender gaps in well-being were seen in the Prairie Provinces (INAC, n.d.)

Figure 1 – Registered Indian Human Development Index Gender Gap in 2001
(Source: http://www.ainc-inac.gc.ca/ai/rs/pubs/re/wbp/wbp-eng.pdf)

When considered together, these statistics and data emphasize the extent to which Aboriginal women continue to bear the burdens of ill-health, shorter life-spans, decreased
quality of life and marginalization – all to a degree that is unimaginable to most of the Canadian population (Stout et al., 2001). Despite all this, Stout et al. (2001) believe that recognition must also be given to the strength and resilience of Aboriginal women which “has allowed them to move forward and succeed, despite the countervailing forces of racism, prejudice and a colonialist legacy which they are now seeking to reverse”.

SECTION 2: OVERVIEW OF FIRST NATIONS-RELATED ENVIRONMENTAL HEALTH RESEARCH

ENVIRONMENTAL HAZARDS

The following is a brief overview of various environmental hazards (adapted from Health Canada, 2008):

Physical Hazards

Physical factors/hazards in the biophysical environment can occur in the natural and built environments, whether urban, rural, agricultural, aquatic or marine. They can relate to land use and quality, water quality and availability, mechanical agents, and forces of climate, weather and earth processes. They also include hazards related to global environmental change such as threats to habitats, natural resources and the services provided by ecosystems.

Biological Hazards

Biological factors/hazards refer to pathogenic micro-organisms in food, water, soil, air and products encountered in both the natural and built environments, including vector-borne microbes and pathogens, pollen, fungi and spores and invasive species.

Chemical Hazards

Chemical hazards are chemicals that are, or may be, dangerous to human health and that are present in indoor and outdoor air, water, soil, food and consumer and commercial products. They may be of natural or anthropogenic origin.

Radiological Hazards

Radiological hazards refer to ionizing and non-ionizing radiation from both natural and anthropogenic sources, including ultraviolet radiation, and electromagnetic frequencies.
FIRST NATIONS ENVIRONMENTAL HEALTH RESEARCH

The major challenge for First Nations peoples is to develop their own definition of what environmental health encompasses, to collect and access adequate quantities of baseline environmental monitoring and health data, to develop First Nations-specific research methods, to implement community-based environmental health projects, to effectively share research findings and to create networks of environmental health experts on First Nations.

The Assembly of First Nations responded to this need when it was articulated by the First Nations Environmental Health Innovation Network. The Assembly of First Nations conducted a comprehensive review of existing First Nations-related environmental health literature in order to gain a greater understanding of what research knowledge currently exists and which topic areas require the most attention in order to fill those knowledge gaps (AFN, 2008a). It is imperative that research projects are developed and carried out by First Nations peoples to ensure that information is collected and presented in a culturally-sensitive and contextual manner that is meaningful to the communities who the research is intended to serve.

SCOPE OF RESEARCH ON ENVIRONMENTAL RISKS TO FIRST NATIONS WOMENS HEALTH IN CANADA

The majority of research on Aboriginal Women has been on health issues based on five common themes: violence and sexual abuse; substance abuse; maternal health; health seeking behaviour and access to services (Stout et al., 2001). The effects of colonization, community stress and substance abuse has created an environment that seeks to intensify violence. Maternal health has been correlated with poverty, victimization by a partner and abuse of alcohol during pregnancy. Although Aboriginal women seek higher education than Aboriginal men, they also experiences higher rates of economic instability and reliance on income assistance. Studies have found that Aboriginal women accessing health services experience: racism and cultural insensitivity, services are often geographically inaccessible services, language barriers, with many services simply not available due to a severe lack of funding (Stout et al., 2001).

The Prairie Women’s Health report (2004) found that Aboriginal women’s health has been affected by colonization with the family dynamic changing from the traditional extended family to the European male dominated nuclear family. This has had an impact on Aboriginal women’s health as the altered family structure changes the role of Aboriginal women from that of an equal partner to becoming dependant on the male for food, shelter and protection - often resulting in violence.
In contrast, prior to European contact Aboriginal people practiced a holistic approach to medicine and healing. Aboriginal women could be trained as healers and/or shamans and practiced midwifery. Aboriginal women had knowledge of nutrition, herbology, gynaecology, counselling and obstetrics (Dieter and Otway, 2001). Colonization outlawed ceremonies, demonized this knowledge and destroyed this holistic and traditional way of healing. Colonization brought an end to the traditional nomadic way of life for Aboriginal peoples with the creation of reserves. The creation of reserves also contributed to the decline of use and gathering of traditional medicines (Dieter and Otway, 2001).

As both female and Aboriginal, Aboriginal women are doubly marginalized and little attention has been paid to them by policy makers and researchers. What health-related research has been focused on them has been in the areas of childbearing and childbirth, although this has changed in recent years due to the research and advocacy work of Aboriginal women’s organizations and other supportive groups (Stout et al., 2001). Research has also begun to focus on how Aboriginal men and women use the formal health system and examining the barriers they face. Other areas of research include: HIV/AIDS, diabetes and the implications of Bill C-31 and health determinants (Stout et al., 2001). Despite all this, there is a still notable gap in research on environmental health and Aboriginal women.

There are many organizations currently engaged in conducting research on First Nations environmental health research. These initiatives include (but are not limited to) the First Nations Regional Longitudinal Health Survey (RHS), National First Nations Environmental Contaminants Program (NFNECP), the Climate Change and Health Adaptations in Northern First Nations and Inuit Communities Program. All of these projects are in collaboration with Health Canada’s First Nations and Inuit Health Branch (FNIHB). The Centres of Excellence for Women’s Health Research Synthesis Group is an excellent network of research groups that have identified Aboriginal women’s health research as a priority. The initiatives undertaken or supported by these Centres of Excellence for Women’s Health reflect the holistic definition of health, and cover an increasingly broad range of issues being addressed by researchers and practitioners, many of whom are Aboriginal themselves, in the area of Aboriginal women’s health (Stout et al., 2001).

**NATIONAL FIRST NATIONS ENVIRONMENTAL CONTAMINANTS PROGRAM**

The National First Nations Environmental Contaminants Program (NFNECP), launched in 1999, provides funding to individual communities to conduct their own research projects on environmental contaminants-related issues. The NFNECP provides a model for conducting community-based environmental health-related research and has helped to pave the way for additional First Nations’ community-based research initiatives. Refer to Section 4 for a more detailed description of the NFNECP.
FIRST NATIONS ENVIRONMENTAL HEALTH AND INNOVATION NETWORK

The First Nations Environmental Health Innovation Network (FNEHIN) is a ‘virtual’ network whose aim is to bring together environmental health researchers and experts with First Nations communities in order to help build research capacity and work towards improving the health of First Nations peoples (FNEHIN, 2009a).

The FNEHIN has three main functions:

1. **Access Point** – provide a place for communities to: access information, research findings, obtain research tools and assist with connecting First Nations communities and researches together to engage in research partnerships.
2. **Synthesis of Knowledge** - determine current state of knowledge, research gaps, and community research needs for environmental health.
3. **Mobilization of Knowledge** - use research to inform decision making in First Nations and government policy.

The FNEHIN website (http://www.fnehin.ca) serves as the virtual network’s hub, and includes tools and resources for First Nations communities to use in building their environmental health research capacity, such as: a research and project database, building research partnerships, funding resources and environmental health newsletters (FNEHIN, 2009).

FNEHIN is housed at the National Collaborating Centre for Aboriginal Health (http://www.nccah.ca), at the University of Northern British Columbia. FNEHIN is a partnership-based initiative consisting of nine founding partners:

- Health Canada’s First Nations and Inuit Health Branch Environmental Research Division
- The National Collaborating Centre for Aboriginal Health
- The National Collaborating Centre for Environmental Health
- The BC Leadership Chair for Aboriginal Environmental Health
- The Assembly of First Nations
- The National Aboriginal Health Organization
- The Centre for Indigenous Environmental Resources
- The Canadian Water Network
- The Public Health Agency of Canada, Foodborne, Waterborne, and Zoonotic Infections Division

FIRST NATIONS REGIONAL HEALTH SURVEY

The First Nations RHS is the only First Nations governed national health survey in Canada. It is longitudinal in nature (i.e. a research study that involves repeated observations over the same individuals over a period of time) and collects information
based on both western and traditional understandings of health and wellbeing. This is the largest number of First Nations individuals and First Nations communities that have ever participated in a national level health survey.

The First Nations RHS was coordinated by First Nations through the First Nations Centre at the National Aboriginal Health Organization (NAHO). The survey was conducted between August 2002 and November 2003, and asked questions about those areas of life that relate to the health of First Nations peoples (FNC, 2005). The purpose of the RHS is to: support First Nations research capacity and control and provide scientifically and culturally validated information; support decision-making; planning; programming and advocacy with the ultimate goal of improving First Nations health (FNC, 2005). The RHS is a research project designed to collect information and document the changing nature of First Nations health over a 12-year period. This will be accomplished by conducting three more surveys, with the last one being administered in the year 2014.

The RHS provides a statistical overview of First Nations seniors living on reserve. The most prevalent medical conditions burdening First Nations seniors are: arthritis, high blood pressure, diabetes, hearing impairment, chronic back pain, allergies, cataracts, and heart disease. Among First Nations adults with diabetes, seniors are more likely than young adults to have complications with their vision, blood circulation, kidney function, and cardiac function (due to complications from diabetes) (FNC, 2006). How much of these conditions are directly related to environmental contaminants is still unknown although what is known is that there is a link between exposure to environmental contaminants and potential health risks.

**Health Determinants**

Based on the 2006 AFN First Nations Health Reporting Framework, First Nations have accepted four broad determinants of health. They include: Community, Individual, Environmental and Social/Cultural determinants of health as a reflection of their holistic view of wellness and balance in one’s life.

**Community Health:** Include incidence of chronic diseases, diabetes, and alcohol and drug consumption in the community. Also includes immunization coverage, availability of traditional health services, access to primary or mental health care, access to home care services, and satisfaction with health care services.

**Individual Health:** Includes rates of life expectancy, infant mortality, suicide and unintentional injuries in the community. Also includes income and education level.

**Environmental Health:** Includes housing, water, land, [and air] quality in the community.
**Socio/Cultural Health:** Includes the effects of colonization and residential schools. Also includes self-determination and community involvement (Elders & Youth), knowledge and use of traditional language, cultural practices - ceremonies, etc., and traditional use of land.

Each of the determinants extends beyond its own area and intersects/interacts with all others.

**CLIMATE CHANGE AND HEALTH ADAPTATION IN NORTHERN FIRST NATION & INUIT COMMUNITIES**

This program was established in 2008 and provides funding to northern First Nation and Inuit communities to conduct research on how climate change is likely to impact human health and what adaptation strategies might be employed to deal with novel health challenges. The findings of research conducted through this program may provide valuable insight into health challenges that will face First Nations women. Identifying specific vulnerabilities and proactive adaptation strategies will help to protect women’s health as the northern climate changes.

**SECTION 3: SELECTED KEY ISSUES OF CONCERN**

The following section provides a brief overview of some key issues of concern with regards to environmental health of First Nations women along with a summary of some the research that is currently being undertaken in those areas.

**TRADITIONAL FOOD QUALITY**

There is a growing concern among First Nations people regarding the presence of environmental contaminants in traditional foods including the health implications of consuming such foods. First Nations consume a great amount of traditional foods which may result in high exposure to certain contaminants. Reliance on traditional foods makes First Nations at particular risk of environmental contaminant exposure.

Along with the growing concern is a growing body of research and literature on contaminants in First Nations’ traditional food sources. Some of this research measures concentrations of certain contaminants and outlines possible health impacts of exposure to these contaminants while other research considers the broader health impacts of changing diets that place less emphasis on traditional foods (AFN, 2008a). To date, research findings provide community-level results and have not been coordinated to
provide a national-level picture of human tissue contamination resulting from the consumption of traditional foods.

Industrial practices, i.e., mining, oil extraction, pulp and paper operations, hydro-electric plants, and agricultural activities, etc, can release chemicals into the environment. Chemicals, such as heavy metals (mercury) can alter the environment and have negative health effects. Other contaminants like persistent organic pollutants (POPs) (PCBs, pesticides, dioxins and furans) can bioaccumulate in the food chain and end up in humans.

For example, the amount of mercury mobilized and released due to human activities has greatly increased, leading to elevated concentrations in air, water, soil, sediments, and living organisms. The main effects of mercury exposure to humans are understood to be neurological, renal (kidney), cardiovascular and immunological. Chronic exposure to mercury can cause damage to the brain, spinal cord, kidneys, liver and developing fetus. Recent findings have described adverse cardiovascular and immune system effects at very low levels (Environment Canada, online; and Health Canada, 2004).

The main pathway for methyl mercury intake in humans is through the consumption of certain species of predator fish or marine mammals that bioaccumulate. People who eat a lot of fish and marine mammals as part of their daily diet tend to have higher methyl mercury exposures, because the potentially high levels of methyl mercury found in some of these species can be passed on to humans (Health Canada, 2004).

Exposure to mercury can result in damage to virtually any system or organ in the human body, particularly the nervous system. Mercury and its compounds are particularly toxic to fetuses and infants. Prenatal exposure to mercury can interfere with the development of the fetal nervous system, resulting in neurological and developmental delays, or other birth defects. Women who breastfeed and have been exposed to methylmercury, may also expose their children through their breastmilk.

Methylmercury accumulates in the tissues of fish and animals, and works its way up the food chain as contaminated fish and animals are eaten by other fish or animals further up the chain. Consumption of contaminated fish and seafood is the most common means of mercury contamination in humans.

The EAGLE (Effects on Aboriginals of Great Lakes Environment) project was a 10-year study (started in 1990) that examined impacts of traditional ways of life on physical and socio-cultural well-being among First Nations peoples (Health Canada, 2005a). Part of this program was a study of contaminant levels in human tissue among First Nations populations living in the Great Lakes area. Other regional studies on contaminants that were carried out in partnership with Health Canada in the late 1990s include the Lesser Slave Health Study, the Northern River Basins Study and the Sioux Lookout Zone Environmental Contaminants Study. These studies all included eating surveys and human tissue sampling to determine contaminant levels (Health Canada 2005a).
The National First Nations Environmental Contaminants Program was launched in 1999 to replace regionally-based studies like the EAGLE project. This program is both national and regional in scope, with the national component aiming to address contamination issues that are common to First Nations across the country and the regional component aiming to address those issues that are specific to smaller regions within the country. Studies conducted through the NFNECP look at contaminants in foods, medicines, water, air and soil.

In addition to considering the physical health repercussions of consuming food with high levels of contaminants, many studies consider the broader social context of the discussion, noting that consuming contaminated food may be no worse than the combined socio-cultural and health impacts of consuming imported store-bought foods. Of note is an article by Furgall et al. (2005) which discusses the challenges associated with much of the research on contaminants in traditional foods. Furgall (2005) identifies a communication challenge that can render entire studies meaningless to the communities they target when concepts such as ‘risk’ are discussed entirely according to Eurocentric understandings of environmental risk. Furgall et al. (2005) points out that these studies often fail to orient themselves within communities’ ways of knowing and interacting with their environments. Lack of acknowledgement and respect for methods already used by communities to assess and avoid environmental risk factors like unsafe food must be incorporated if studies are to be meaningful and add to the body of literature on contaminants that is relevant to the First Nations communities who require it. The best way to overcome challenges associated with culturally inappropriate research is for research to be conducted by community members, with community ownership over research findings. Programs like the NFNECP provide useful research opportunities by funding such community-based research.

First Nations’ issues related to contamination of traditional food have received a relatively large level of research attention compared to other environmental health topics. Despite this attention, consistent national-level baseline data on First Nations’ food consumption patterns, nutritional composition, presence of contaminants in food and temporal changes to diet have not been collected. In addition, the literature lacks approaches for developing contaminated food advisories. Furthermore, research is required to begin developing remediation measures and alternative food practice solutions for communities whose traditional food sources do contain unsafe levels of contaminants. This is especially important for communities where extreme environmental degradation or contamination has occurred. In these cases the community may identify certain foods that are no longer safe to eat or that are no longer present in adequate quantities for harvesting as a result of the impacts of climate change or other environmental degradation.

FIRST NATIONS FOOD, NUTRITION AND ENVIRONMENT STUDY

The First Nations Food, Nutrition and Environment Study (FNFNES) is a national scope 10-year study examining the benefits and risks of food and water in First Nation communities. The study will gather information in over 100 randomly selected First Nation communities across Canada regarding current traditional and store bought food
use and food security. Key partners in the study are: the Assembly of First Nations, Health Canada, the University of British Columbia and the University of Montreal.

From 2008-2018, the study team will: test many traditional foods for nutrient values and environmental chemical hazards; test drinking water for heavy metals and surface water for pharmaceutical metabolites; and examine the body burden of mercury among First Nations people in remote communities. This study will help to fill existing knowledge gaps and guide future research.

The goals of the FNFNES are to: address environmental concerns of First Nations communities, develop plans to protect First Nations traditional food systems and promote well-being and a healthy lifestyle. In partnership with First Nation communities, the research team and partners aim to:

- Document traditional and market food consumption and estimate intake of nutrients across communities
- Document food security
- Document water quality issues in communities
- Estimate exposure to contaminants
- Document self-reported health status and lifestyle habits across communities

Issues of particular significance and concern include:

- The conservation of traditional subsistence within sensitive environments
- Increasing contaminant levels in traditional food due to pollution
- Nutrient deficiencies in individuals due to the reduction and quality of traditional food resources altered by degradation of the environment
- Increasing occurrences of chronic diseases such as diabetes, cancer and heart disease
- Social, economic, and political forces affecting traditional lifestyles and access to traditional harvesting areas.

Using an ecozone sampling framework, the FNFNES aims to gather information with 100 randomly selected First Nation communities across Canada about:

- Current traditional and store bought food use
- Food security
- Test many traditional foods for nutrient values and environmental chemical hazards
- Test drinking water for heavy metals and surface water for pharmaceutical metabolites
- To examine the body burden of mercury among First Nations people in remote communities.

Information resulting from this study is essential for the development of community-level dietary advice and food guidance for First Nations at a national level. The information on
background exposures to Persistent Organic Pollutants, heavy metals and pharmaceutical products is also essential for First Nations as an enabling foundation for any future food monitoring at the community level.

WATER QUALITY

Drinking water can also be contaminated with chemicals from natural and anthropogenic sources. For example, well water with elevated levels of arsenic has been linked to atherosclerosis and vascular disease and long-term exposure to high levels of arsenic can cause cancer, cardiovascular problems and the likelihood of developing diabetes (Health Canada, 2006).

Regionally stresses on water will be experienced by communities as poor quality source water for drinking, degraded waterways for participating in traditional hunting and fishing activities and loss of water ecosystems like the shallow lakes that create vital wild rice habitat. In the short-term, First Nations communities require research, technology development, capacity and infrastructure support to create and maintain robust, resilient water and wastewater treatment facilities that will ensure high quality drinking water for all community members and adequate levels of wastewater treatment prior to its release into surrounding environments (AFN, 2008a).

In some cases it will be obvious that drinking and wastewater treatment systems require remediation, but in others, the symptoms will be more subtle. For example, disease-causing microbes in water can remain undetected in the general population because they result in only mild gastrointestinal symptoms, such as stomach cramps and diarrhoea. Peterson (2008) notes that fetuses and infants are more susceptible to these same waterborne diseases and would suffer more acute symptoms than the general population.

In 2001, Indian and Northern Affairs Canada (INAC) found a significant risk to the quality or safety of drinking water in 75% of the water systems in First Nations communities (Office of the Auditor General of Canada, 2005 as cited in: Health Canada, 2008).

Programs and research are required to address these challenges. Indian and Northern Affairs Canada’s First Nations Water Management Strategy (FNWMS) and Health Canada’s Environmental Research (ER) program are two initiatives that work in tandem to ensure that communities can access safe drinking water. Health Canada’s ER program conducts research and collects data to support the FNWMS. Research focuses on monitoring drinking water to establish a baseline collection of data, identify knowledge gaps and establish research priorities (Health Canada, 2007). Health Canada’s Environmental Health Program (EHP), also helps to ensure that monitoring programs to assess potential water health risks are in place. This program also offers protection by reviewing sewage system design plans from a public health perspective (Health Canada, 2007).
In addition to safe drinking water provision, research and programs are required to clean up and better care for contaminated waters by identifying and eliminated ongoing sources of contamination. Projects initiated through the National First Nations Environmental Contaminants Program (FNECP) are helping to expand the existing knowledge base. Numerous communities within this program are studying water contamination originating from various sources including nearby landfills, abandoned Radar Lines sites and various industrial activities.

In the long-term, First Nations communities require the water monitoring information described above, as well as capacity support, to participate in community-level, watershed-level, regional, national and international watershed governance initiatives and water management decision-making. Federal water policy is currently coming under criticism from many non-governmental organizations and will likely receive major attention at the Federal level in the coming years. For examples of current advocacy projects, see the Gordon Water Group’s Blueprint for Federal Action on Freshwater (Morris et al., 2007). First Nations’ water rights must be accounted for to ensure that vital watersheds exist to support and enhance individual, family and community health.

AIR QUALITY

OUTDOOR AIR QUALITY

Outside air pollutants of concern include particulate matter, ground-level ozone, sulphur dioxide, nitrogen dioxide and carbon monoxide. Ample research exists that demonstrates the association of air pollution to a wide range of adverse health effects, including premature mortality, hospital admissions, emergency room visits, physicians visits, aggravation of existing respiratory conditions, increased medication use and difficulty breathing (Health Canada, 2008).

First Nations’ outdoor air quality issues may arise from a variety of sources including nearby or distant industry emissions, improper waste disposal, activities within the community like barrel-burning or climate change impacts to air. For example, uranium mining can result in the presence of radon, which is an odourless and tasteless gas that is the by-product of uranium breakdown (CanNorth, 2003). Mining activities may also result in release of dust, diesel emissions and contaminants in mine stack emissions (Coumans, 2005).

In addition to mining and industry activities, particulate matter or dust may also be released through barrel burning or garbage dump burning in or near a community, as well as by forest fires. Climate change may exacerbate some of the above activities. For example, climate change is predicted to increase the incidence of forest fires. In addition, while studies on the effects of higher ambient air temperatures remain inconclusive, warmer temperatures may result in higher mortality rates resulting from accompanying elevated ozone levels (Haines and Patz, 2004).
In order to effectively respond, First Nations communities require the capacity and research-training support to determine which contaminants pose threats to community health and well-being and how best to respond to these potential and realized threats. Health Canada’s Environmental Health Program (EHP) provides support for improving indoor air quality within individual homes on First Nations (see Health Canada, 2007). The National First Nations Environmental Contaminants Program (FNECP) funds community-based research on contaminants. One community focused part of their research on outdoor air quality concerns associated with two landfills within their traditional territory. Their study looked at the impacts of burning landfill gas without pollution controls. Additional studies and remediation projects are required to address indoor and outdoor air quality concerns facing First Nations and in particular, the effects specific to First Nations women.

**INDOOR AIR QUALITY**

Older adults and particularly women can spend 90% of their time indoors, thus exposure to indoor air pollutants can be significant. Air pollutants in the indoor environment include radon, second-hand smoke, carbon monoxide contaminant-laden dust, moulds, pesticides, asbestos, chemicals from cleaning products and building materials, flame retardants, asbestos insulation, radon in basements, cleaning agents, carbon monoxide and wood burning stoves. Indoor air pollutants can aggravate pre-existing conditions such as asthma and chronic obstructive pulmonary disease and, depending on the type of pollutant, may contribute to other effects (Health Canada, 2008).

Environmental health concerns exist for both indoor and outdoor air. Indoor air quality can be negatively impacted by presence of asbestos insulation, leaded paint on walls (particular a problem for children who might ingesn paint chips), moulds growing in damp parts of a building, inadequate air exchange in sealed energy efficient homes and radiation from basements. Health Canada provides informative backgrounders for many of these topics, including sources of poor air quality and how to avoid them. First Nations require additional community outreach and engagement programs to tackle problems like mould in housing that may exist undetected for years, causing subtle health problems (malaise, environmental allergies).

**HOUSING**

**LACK OF APPROPRIATE HOUSING INFRASTRUCTURE**

In 2001, Indian and Northern Affairs Canada reported that approximately 16% of homes on First Nations reserves were in need of major repairs and more than 1 in 20 homes were considered unfit for human habitation (Health Canada, 2008).

Numerous studies have documented the serious problems associated with housing and infrastructure for First Nations and the correlation between lack of housing and chronic health conditions is significant (AFN, 2007b). The 2005 First Nations Housing Action Plan prepared by the Assembly of First Nations details problems such as:
shortages leading to severe overcrowding
- lack of plumbing and electricity
- poor insulation
- toxic mould
- substandard construction
- major repairs

Overcrowding is a recurring problem with 19% of dwellings on reserves having more than one person per room compared to 2% in the general Canadian population – a rate of overcrowding close to 10 times greater for First Nations than Canadians (AFN, 2007b). Over one third of First Nations adults live in homes requiring major repairs, which includes defective electrical wiring, plumbing, and the need of structural repairs to walls, etc. (AFN, 2007b).

The correlation between lack of appropriate housing and chronic health conditions is significant. Inadequate housing can be associated with a host of health problems. For example, crowded living conditions can lead to the transmission of infectious diseases such as tuberculosis and hepatitis A, and can also increase risk for injuries, mental health problems, family tensions and violence (Statistics Canada, 2008).

INDUSTRY IMPACTS – ENVIRONMENTAL TOXICS/CONTAMINANTS AND CONTAMINATED SITES

Industries like mining, oil extraction, pulp and paper operations, hydro-electric plants and agricultural developments tend to adversely impact the surrounding environment and generally negatively alter the composition of air, water, soil and ecosystems, often introducing contaminants that would not otherwise be present. Much of the current environmental health literature relevant to Canadian First Nations is community-level analyses that focus on developing ways of understanding the impacts of industry on individual, family and community health (AFN, 2008a).

In addition to introducing contaminants into the physical environment, extractive industries severely alter ecosystem integrity and vitality. Harvesting activities (like fishing, hunting, gathering medicinal and food plants) are often important parts of First Nations’ spiritual and cultural traditions and in many cases have been compromised by conflicts over land use and allocation with incoming prospectors and settler populations. Also, other researchers have found that the physical, mental and emotional health impacts experienced in relation to industrial activities (such as mining) shape the social fabric of mining communities, and that impacts on happiness and sense of well-being are sometimes more significant in community members’ lives than the physical impacts of contamination (AFN, 2008a).
NFNECP research projects have begun to establish regional knowledge bases, the literature reviewed thus far indicates the need for more studies on the impacts of environmental contaminants and specific industries on human health and even more specifically on the health impacts to First Nations women. In many cases, the long-term health impacts of exposure to particular environmental contaminants are not yet known. For example, the community of Fort Chipewyan (located downstream from major tar sands extraction projects) is experiencing abnormally high rates of cancers, auto-immune diseases and a condition called cholangiocarcinoma (Petersen, 2007). Specific research linking these illnesses with the tar sands activities has not been completed. Additional studies linking the specific impacts of industry activities to environmental and human health outcomes are required so that communities have leverage for inclusion of health impact mitigation measures in environmental assessments of proposed future developments.

Further research is also required on contaminant clean-up and remediation for communities that have already been impacted by environmental contamination. Research that links the impacts of specific contaminants with industry activities and human health (cancers) is also lacking. A legal analysis of a path forward is also required to support community initiatives to assert the right to a clean and safe environment.

Contextual research methods are required to gather evidence that will be useful to communities. For example, assessment of contaminant impacts must be conducted over the long-term and should be studied intensively prior to creation of new industry developments. This period of study will often be at odds with the economic benefits of a given project but is essential to a proper environmental assessment. In many cases a First Nation community might benefit from the economic opportunities offered by an incoming industry and conflicting interests within communities will impact the breadth, depth and direction taken with research initiatives.

MINING

Numerous studies have been conducted on women’s health and mining internationally and in Canada, specifically in Labrador and the iron ore mining and in the North on diamond mining. Studies also found a lot of the health problems are related to social problems as a result of mining activity such as shift work and isolation leading to marriage breakdown, depression as well as addiction and abuse (Mining Watch, 2004).

The majority of mining research and health has been very general and primarily focused on male mining workers. Mining and resource extraction impacts to health vary depending on the resource being extracted, technology being used, and the type of mining - open cast or underground. Mining creates extensive environmental damage, pollutes air and water, destroys entire ecosystems and landscapes (Mining Watch, 2004). Women living in mining affected communities are impacted by physical and social factors that affect health. The social implications to health include stress, accidents, displacement, migration, malaria, AIDS, sexually transmitted diseases, violence, addiction and health care.
The majority of women’s health problems in mining regions are caused by unchecked pollution, mine tailings and mine disasters (Coumans, 2004). In the early 60’s and 70’s, a major study, the Labrador West Dust Study found that miners suffered from high rates of pneumoconiosis, a condition in which accumulated dust in the lungs produces noncancerous tissue. The study was repeated in subsequent years under public pressure and repeated high rates of lung and respiratory disease despite the mines air quality improvement efforts to reduce dust levels. The increased use of diesel powered equipment meant to improve mining efficiency has increased workers exposure to diesel emissions, a known carcinogenic health hazard that with long term exposure increases lung cancer, coughs, headaches and reversible decreased lung functions (Coumans, 2004).

An international woman’s and mining conference was held in India in 2004 that has provided ample evidence of the effects of mining on Indigenous women around the world. The report “Overburdened” (CCSG, 2004) found that women are affected by mining physically, emotionally, spiritually, sexually at all stages in life, by all types of mining and their pollutants such as cadmium, lead, mercury and copper.

Cadmium is mined around the world and is used mainly for batteries and is also found in tobacco smoke. Cadmium is a toxic metal that causes extensive liver and kidney damage, anemia, osteoporosis, osteomalacia. When cadmium builds up in the body it is stored in bones often resulting in Itai-Itai disease, commonly known as a women’s disease. Itai-itai from cadmium build up, causes bone damage fractures and pain. Women are more susceptible to cadmium build up than men due to lower iron levels especially during menstruation and the childbearing years. Iron prevents cadmium from absorption during digestion and women tend to have lower iron levels than men due to physical differences (CCSG, 2004).

Lead has many environmental sources other than mining that includes smoking, and gasoline. Lead has no biological purpose and is toxic to the human body and is stored in bones for decades after exposure causing harm to reproductive organs, central nervous system and the cardiovascular system. Lead poisons the blood leading to high blood pressure and hypertension. Women tend to have lower levels of lead exposure due to lower occupational exposure; however women are more likely to experience adverse lead effects than men due to women’s more sensitive haematopoietic system, the blood regulation system. Lead is passed from the placental barrier to the fetus during pregnancy. Women lead mineworkers have reported higher rates of miscarriages (CCSG, 2004). In older women lead that has been stored in the bones is released through demineralization and can decrease reserve capacity of the brain and harm neuropsychological function (CCSG, 2004).

Mercury is used in gold mining to extract the gold from the ore. Mercury toxicity is dependant on the form that it takes. If mercury is inhaled it is harmful to the kidneys and the central nervous system. In its biological form as methylmercury it is commonly
ingested in fish and seafood that affects the central nervous system. Eating fish contaminated with mercury in non gold mining communities was a major source of contamination found in hair and urine samples in northern Quebec (CCSG, 2004). Mercury and methymercury are passed on to the fetus and may result in harm later to the child development of psychomotor and cognitive skills (CCSG, 2004).

Copper toxicity can cause irregular menstruation and women living in copper mining communities have been found to have higher levels of skin and lung cancer (CCSG, 2004). Studies have also found that elevated levels of copper in drinking water have been linked to Wilson’s disease at metabolic disorder that causes accumulation of copper in the liver, central nervous system and kidneys (CCSG, 2004).

The Overburdened (2004) study found very little gender specific information for a range of metals and minerals that include arsenic, selenium, aluminium, antimony, and nickel, coal, boron and uranium. A study in New Mexico of Navajo children found a statistical significant outcome for unfavourable birth outcome for mothers living near tailing or mine dumps (CCSG, 2004). Women mineworkers hold various positions from small scale or “artisinal mining” to living in mining affected communities. The study found that women mineworkers suffered numerous health problems often related to poverty and often illegal mining practices. In Australia a study found that the Aborigine female populations had the highest incident of malignant mesothelioma (CCSG, 2004).

Mining Impacts to Air
Couman (2004) found that in Labrador West dust was an ongoing problem that clouds the air and coats everything from cars, houses to laundry. Dust was identified as having dual hazards to health from contaminants and women found the dust to be “oppressive” raising mental health issues. Furthermore in 1980 the Newfoundland and Labrador Government commissioned a study by Memorial University that found pneumoconiosis and unacceptable levels of particulate matter in the air. The finding of the Labrador West women’s study found that “breathing problems” in general was a major health issue, also identified was asthma, silicosis and allergies.

Mining Impacts to Water
Tailing and other mine effluent have been released into the environment and water systems despite regulations that prevent such practices in Canada like s. 36 of the Fisheries Act. Section 36 prohibits the dumping “deleterious substances” in “water frequented by fish” to protect fish habitat. Recently the federal government has amended the Metal Mining and Effluent Regulations allow the use lakes and ponds for tailing impoundment (www.eg.gc.ca).

Water becomes contaminated from mine waste and emissions that seep into the ground water and soil, for many communities there is no alternate sources of drinking water (CCSSG, 2004). Women in particular are more susceptible to water pollution due to their family roles involving the collection of water, washing and bathing children. In India research found that concentrations of metals like fluoride, manganese, nickel and sulphate in drinking water may have an impact on the life span of women living in nearby areas.
mining communities were the average life span was 45 years of age (CCSG, 2004). Hexavalent chromium in drinking water caused irritation of the respiratory tract, nasal septum ulcers, irritant dermatitis rhinitis, bronchospasm and pneumonia. In Germany, lead in tap water factors included gender, city of residence, lead in house dust, contact with dogs and dirtiness were factors that lead to blood lead levels (CCSG, 2004). Mining also affects water quantity when mining companies divert water for mining usage.

**Tar Sands**

Studies on the impacts to health from the tar sands in Northern Alberta have been done on the community of Fort Chipewyan, a largely First Nations community that has unusually high rates of extremely rare types of cancer. The research primarily focused on the entire community with little research solely into the effects of the tar sands to First Nations women’s environmental health. More research in this area is needed.

**CLIMATE CHANGE**

Climate change impacts are likely to exacerbate many of the environmental health issues identified throughout this report. Changes to climate are likely to result in warmer temperatures and thermal stress; poorer quality air and water; more floods, droughts and extreme weather; greater incidence of vector-borne diseases; more water and food borne contamination; increased exposure to UV radiation; increased vulnerability of subpopulations (including children, elderly, disabled and poor communities) (Haines and Patz, 2004; Health Canada, 2005b).

Climate change is likely to cause direct and indirect effects on human health including increased mortality, the spread of vector-borne diseases and changes in food production. As a northern country, Canada is likely to experience disproportionate climate change and more information is needed to understand fully how climate change will likely affect First Nations women specifically. Health Canada identifies eight major categories of negative health-related impacts associated with climate (AFN, 2008b):

- illnesses and deaths caused by hotter and colder temperatures;
- deaths, injuries, and illnesses caused by extreme weather events;
- increased exposure to outdoor and indoor air pollutants;
- water-borne and food-borne contamination;
- reducing drinking water availability (due to water shortages);
- increased exposure to ultraviolet radiation;
- the spread of vector-borne diseases to previously unaffected areas;
- disproportionate impacts on vulnerable populations; and
- socio-economic impacts.

Understanding how climate change will affect men and women differently will help to improve mitigation and adaptation strategies to reduce vulnerability (CIDA, n.d.). A report by the Canadian International Development Agency (CIDA) identified some
potential gender-specific vulnerabilities and responses to climate change particularly for those living in developing countries. Some issues that would also directly apply to First Nations communities include:

- As primary caregivers in their families, women may see their responsibilities increase as family members experience increased illness associated with the effects of climate change (as noted above).
- Increased food insecurity – since women tend to be primary food providers, they may experience difficulty in accessing resources and traditional foods/medicines due to the change or loss of natural resources as a result of climate change impacts.
- Women’s rights to resources and access to their traditional territories could decrease or disappear as land and habitat resources disappear due to climate change.
- Women experience different vulnerabilities and cope with natural disasters differently than men. As climate change continues to increase to the magnitude and frequency of natural disasters, they will have different implications for both genders – and these differences must be acknowledged and accounted for.

SECTION 4: KEY POLICY CHALLENGES & POTENTIAL STRATEGIES

Environmental contaminants are just one category of health determinants of health but, unlike genetics they are a largely preventable factor and thus many environmental health risks are essentially avoidable through reducing contamination (Health Canada, 2008). Environmental health is an area where policy intervention could provide very beneficial outcomes. Preventing or reducing environmental exposures can lower the incidence of environmentally-mediated diseases, and because environmental exposures and their harmful effects are largely beyond the control of individuals, environmental health must be addressed at the larger societal level (Health Canada, 2008). However, it could also be argued that exposure to environmental contaminants can be reduced to a certain extent if the individual is provided with enough information and has the capacity to appropriately act on that information.

EXISTING PROGRAM AND LEGISLATIVE GAPS

There are no national programs or legislation to specifically protect the health of Aboriginal women. There are also significant gaps in the Canadian federal environmental protection legislation, in particular, the Hazardous Products Act and the Canadian Environmental Protection Act with regards to inadequate regulation of toxic exposures from consumer products. Many Canadian health and environmental laws and
policies are lagging behind other industrialized countries such as the USA, Australia and many European nations. For example (from: David Suzuki Foundation, 2007):

- Canada does not have legally binding national standards for air quality and drinking water quality. Canada’s guidelines for drinking water quality are voluntary, quantitatively weaker and less comprehensive than other jurisdictions.
- Compared to the US, Australia and Europe, Canada does not have legally binding national standards for ambient air quality. The federal government already has the needed legislative authority with the Canadian Environmental Protection Act, 1999 to enact the reduction of smog-producing pollutants and particulate matter but a huge gap exists in implementation and enforcement.
- Canada permits the use of pesticides that other countries have banned for health and environmental reasons. For example, atrazine (one of the most heavily used pesticides in Ontario) has been banned in the European Union as studies have shown that this chemical causes reproductive abnormalities in frogs at very low doses.
- Compared to other nations, Canada allows higher levels of pesticide residues on food. For example, Canada allows up to 1400 times the European limit for methoxychlor on fruits and vegetables.
- Canada has not enacted regulatory restrictions on phthalates or nonylphenols – despite growing concerns that these chemicals can disrupt the normal function of the human hormone system. The European Union has banned the use phthalates in cosmetics, toys and other children’s products and has also banned nonylphenols in cleaning products.

The following are some of the current Acts of Parliament at the federal level that contribute to protection of human health from environmental hazards:

**Canadian Environmental Protection Act (CEPA)** - governs pollution prevention and protection of the environment and human health, all within the context of sustainable development goals. Unfortunately, the existence of knowledge gaps, lack of capacity, and the jurisdictional issues regarding First Nations health issues are some of the barriers that impede effective policy decision making. There is a need to complete a comprehensive review on the existing legislation and policies and frameworks for protecting and strengthening First Nations women’s environmental health.

**Canadian Environmental Assessment Act (CEAA)** - ensures all new projects with federal involvement include an environmental impact assessment, including an assessment of human health impacts

**Hazardous Products Act (HPA)** - prohibits the advertising, sale and importation of hazardous products

**Food and Drugs Act (FDA)** - ensures the safety of food, drugs, cosmetics and therapeutic devices
**Pest Control Products Act (PCPA)** - governs the importation, manufacture, sale and use of pesticides

Extensive literature gaps exist on the state of knowledge on environmental health for First Nations women in Canada. This is not surprising, as the literature also identifies significant gaps in research and professional development in the environmental health field for Canada as a whole. The current evidence base on the effects of the physical environment on human health in many areas is still fairly new, especially with respect to the cumulative effects of long-term exposure to environmental change.

The major challenge for First Nations is to develop their own definitions of what environmental health encompasses, to collect and access adequate quantities of baseline environmental monitoring and health data, to develop First Nations-specific research methods, to implement community-based environmental health projects, to effectively share research findings and to create networks of environmental health experts on First Nations issues.

Relatively little data exists about the health and development of First Nations women in Canada. In particular, comprehensive national data concerning environmental health of First Nations women are not readily available. While most developed countries have adopted national health and environment strategies or action plans, Canada has not.

The following are health research and surveillance initiatives in Canada that do exist but do not fully address the research gap. In 2006, a Report for the Committee on Health and the Environment (CHE) was completed which reviewed existing bio-monitoring studies of human exposure to environmental contaminants in Canada. The report includes 133 Canadian studies on human bio-monitoring for environment contaminants published between 1990 and 2005.

Bio-monitoring is defined as “a continuous or repeated measurement of potentially toxic substances, their metabolites or their biochemical effects in tissues, secreta, excreta, expired air or any combination of these”. Its purpose is to evaluate occupational or environmental exposure and health risk by comparison with appropriate reference values based on knowledge of the probable relationship between ambient exposure and resultant adverse health effect (Health Canada, 2006 as cited in AFN, 2008b). Although this study reveals that many environmental contaminants have been studied in Canada, in general, most authors recommended that further research needs to be undertaken with respect to establishing linkages between tissue concentrations and exposure levels and effects.

**CONSIDERATIONS**

First Nations communities need to take precautionary actions to reduce and prevent future harm. Precautionary action is an approach that advocates for immediately preventing harm in the absence of complete scientific information, as opposed to sacrificing the health of one generation in order to complete scientific research and belatedly preventing harm in the next. This approach denotes a duty, on all members of
society, to prevent harm, when it is within our power to do so, even when the evidence is uncertain or unattainable (Canadian Partnership for Children's Health and Environment, 2005).

Key challenges facing First Nations and environmental health research include: gaps in data, information and research, the need for better biomonitoring and health surveillance, increased understanding of vulnerability and risk assessment, the need for greater prevention and reduction of exposure and risks and the need to raise awareness about the effects of environmental contaminants and how to best reduce exposure to them.

Canada needs to strengthen federal laws, regulations and policies around Children’s Environmental Health which includes incorporating environmental justice in its policies. Environmental Justice promotes the equal protection of all citizens from environmental hazards, regardless of their economic status or race. It also recognizes that certain sub-populations are more vulnerable than others. Canada must “confront the unjust distribution of environmental harms and protect vulnerable populations” – particularly those of women, older adults and children (David Suzuki Foundation, 2007).

Increased research and improved surveillance on the Environmental Health of First Nations women is needed. This includes addressing the research needs of First Nations in this area and developing Environmental Health indicators specific to First Nations women. Baseline data is needed, as well as a longitudinal cohort study in Canada to aid in the investigation of the interactions between environmental exposures and women’s health outcomes (AFN, 2008b).

**ISSUES AND GAPS AFFECTING ABORIGINAL WOMEN’S HEALTH**

In April of 2005, the National Aboriginal Health Organization and Health Canada held a Roundtable on the Health of Aboriginal Women and Girls. Participants felt that the most significant issue was the destruction of relationships as a result of residential schools and forced relocations (NAHO, 2005). A number of issues and gaps affecting Aboriginal women’s view of holistic health were identified by participants of this roundtable. Recommendations stemming from these gaps and issues were also provided and are listed in the Recommendations section below.

Some key gaps identified by the roundtable participants that directly apply to First Nations women and environmental health issues included (from: NAHO, 2005):

- Lack of First Nations-specific gender-based research
- Absence of First Nations women in decision-making, leadership roles and as mentors
- ‘Research fatigue’ due to lack of full ownership, interpretation, and validation of research activities
- Lack of recognition of Aboriginal definitions of holistic health and healing
• Competition for scarce funds among women’s organizations and groups prevents women from working collaboratively
• Communication gaps and barriers prevent Aboriginal women from sharing information about what is being done, success stories and best practices
• Inadequate funding formulas
• Lack of professionally-trained Aboriginal people
• Lack of recognition of the contributions, skills and values of Aboriginal traditional healers
• Lack of knowledge about culture-based ethics such as Elder protocols and boundaries
• Lack of education/knowledge in parenting skills, healthy sexuality, relationship skills and traditional skills
• Lack of health information in relevant/accessible language
• Lack of knowledge and access to basic and specialized health services especially in the areas of maternal and mental health
• Lack of access to traditional medicines

POTENTIAL STRATEGIES AND RECOMMENDATIONS

In 2005, a First Nations Wholistic Health Strategy was developed which addresses the unique determinants of health relevant to First Nations communities. This strategy includes a proposed First Nations Wholistic Policy and Planning Model which emphasizes the significance of self-government in looking at potential new investments and partnerships in promoting positive health outcomes. This population health approach focuses on the interrelationship of the determinants of health, addresses health issues, considers community initiatives and may be used in making policy recommendations around environmental health and First Nations women. The model also provides a conceptual overview of how to approach health promotion when addressing First Nations community health issues.

For a policy initiative to be successful, it must both respond to and be directed by First Nations. In other words, First Nations must have a central role in directing change in order to achieve sustainable solutions. Also, past experience has demonstrated that all parties involved in a process of change must secure clear political commitment and mandates for change. Finally, it appears that joint or shared discussions and dialogue are the necessary vehicles to arrive at innovative, accountable and sustainable solutions” (AFN, 2007a). Characteristics of the model can be incorporated into First Nations women environmental health policy making and must include the following (see figure 2):

• Must be First Nations driven
• Based on a community health approach
• Social capital (bonding, bridging, and linkages between and outside of community)
• Build on successes
• Wholistic approach to healthy living
• Seek adequate funding to support research, infrastructure, programs and resources to promote action; and
• Be inclusive of solutions around determinant of health issues specific to First Nations women.
Figure 2 - First Nations Wholistic Policy and Planning Model

(Source: AFN 2007a)
RECOMMENDATIONS

According to a recent report by the Anishinabek Health Secretariat of the Union of Ontario Indians, First Nation policies and programs require a balance of culture, science and politics (Union of Ontario Indians, 2009). Some examples cited include the development of the Anishinabek Women’s Water Commission and the partnerships between First Nation organizations and mainstream governments (Chiefs of Ontario and Environment Canada) to address environmental issues such as source water protection in a holistic and culturally appropriate manner.

First Nations must continue to develop their own definitions of environmental health. These definitions need to incorporate and link traditional knowledge to environmental health and recognize and value the important role that First Nations women play in the transmission of this traditional knowledge. Communities across Canada are successfully developing strategies and programs for alternative housing, clean energy and alternative waste management systems. These community-based programs should be coordinated at a nation wide level so that community leaders can share information and build on each others’ successes and failures as they work toward enhancing their community health.

The following is a list of key recommendations that will help to solve the challenges that environmental health concerns pose for First Nations women:

- Collect and access adequate quantities of baseline health and environmental monitoring data
- Access to data by community leaders, policy makers, technicians and health professionals
- Develop First Nations gender-specific research methods
- Advance First Nations women’s research priorities and ensure they are integrated into all research efforts
- Ensure that First Nations women are integrated into all research and decision-making processes in a meaningful and participatory manner
- Promote coordination and collaboration among Aboriginal leaders, as well as federal, provincial and territorial governments to eliminate jurisdictional barriers to cooperation
- Implement community based environmental health projects
- Share research findings with the community and the public (in a respectful and community-approved manner)
- Create networks of First Nations women and environmental health experts
- Acknowledge and honour Aboriginal women who are the original researchers and keepers of knowledge in many Aboriginal traditions and communities
- Culturally sensitive research projects developed and carried out by First Nations that is meaningful to the communities
- Community based research methods and holistic approach
- National and regional programs and funds to respond to gaps in info and develop research bases
• Identify threats to health and well-being and how to best respond to potential and realized threats
• Capacity support, initiatives, management and decisions-making
• Develop First Nations gender-specific backgrounder fact sheets and other communications materials
• Disseminate information at upcoming future workshops
• Creating policy and programs that generate a greater appreciation for the complex interactions between gender equality, First Nations and environmental health would help to build capacity for future work.
REFERENCES


Canadian International Development Agency. (No date). *Gender Equality and Climate Change.* Gatineau, Canada.


