ENVIRONMENTAL HEALTH
OLDER ADULTS AND SENIORS
(ELDERS)

RESEARCH PAPER

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SECTION 1: INTRODUCTION

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. Unfortunately, in recent times, this dependence on the land has also presented higher than ‘normal’ risks to health (AFN, 2009). The consumption and use of traditional plant species and “wild” foods has significantly increased exposure to chemical and biological contaminants which has in turn resulted in a suspected decline in the overall health status of First Nations people either due to consuming contaminated traditional foods and/or by turning to less nutritious processed market foods (AFN, 2009).

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 research 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 older adults must be examined. Older adults are recognized as vulnerable populations and are at a greater risk of exposure to environmental hazards (Health Canada, 2008). This research paper will provide a basic understanding of the environmental health issues affecting First Nations older adults and seniors (Elders). It will cover a broad range of effects and potential risks posed by environmental exposure that occur 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 on their health. It will also examine what is being done in the areas of environmental health research in Canada. It also explores potential strategies to address these issues and help to create healthier environments for First Nations older adults and seniors (Elders).

OLDER ADULTS 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).

Older adults may have different vulnerabilities to environmental contaminants due to:

- physiological changes associated with aging that can alter their degree of susceptibility;
- existence of chronic diseases and the use of medications to treat those conditions;
- changes in activities and lifestyles that can alter the types and amounts of contaminants exposed to;
- other factors such as socio-economic and nutritional status that can affect vulnerability to environmental hazards (Health Canada, 2008).

Environmental health risks to older adults may be due to current exposures, but they can also result from exposures earlier in life and/or result of cumulative exposures, such as the build-up of persistent contaminants in the body over years or decades (Health Canada, 2008). This point is particularly important for Aboriginal seniors who continue to consume traditional foods as a larger portion of their diet compared to other (younger) members of the community. Traditional foods consumed in Aboriginal communities often contain elevated levels of persistent bioaccumulative toxics such as dioxins and mercury, which originate from distant sources and are passed up the food chain. For example, a study of the Inuit population of Nunavik showed that consumption of traditional foods is higher among people aged 40 years or older, as compared to Inuit 18-39 years of age, which suggests that (at least for those communities), older adults are at a higher risk of ingesting persistent bioaccumulative contaminants (Health Canada, 2008).

PURPOSE OF ENVIRONMENTAL HEALTH AND FIRST NATIONS OLDER ADULTS 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
Although all Canadians face some degree of risk from a range of environmental health hazards, First Nations older adults may be at greater risk of exposure and/or may be more susceptible to the effects of environmental exposures due in part to their physical and cognitive changes. Health Canada recognizes that there are gaps in scientific knowledge on how environmental health hazards impact vulnerable populations. In order to enhance the protection of older adults from environmental hazards, more research is needed on the health of First Nations older adults. This research should include a focus on environmental exposures that affect the health of First Nations older adults, with an emphasis on identifying and addressing environmental risks. The burden of environmental exposure should be assessed and understood in order to develop effective strategies to reduce exposure and prevent health effects. The Health of Older Adults and the Environment, a discussion paper by Health Canada, highlights the importance of recognizing environmental health issues in the context of aging and provides recommendations for future research. First Nations older adults, who have a strong connection to their environment and traditional ways of life, have unique needs and are at risk of environmental exposures that can affect their health. Understanding the relationship between the environment and the health of First Nations older adults is crucial for developing effective strategies to protect their health and well-being.
perspective. This section is not meant to be an exhaustive list but rather to provide a
general overview and highlight some key findings. The aim of this paper is to provide a
basic overview of the issues of concern and provide background information on the
environmental health status of First Nations older adults. The paper is meant to serve as a
starting point for dialogue and further discussions on the issues. It is important to note
that due to the lack of environmental health research, there is a need to enhance the
understanding of the relationship between the health of First Nations older adults and the
environment.

The Assembly of First Nations is increasingly concerned about the potential effects of
environmental exposures and the health of First Nations older adults and seniors (Elders).
Understanding this relationship is of importance in terms of preventing and
communicating potential risks, and creating a better quality of life for First Nations older
adults and seniors (Elders). Relatively little data exists about the health and development
of First Nations older adults in Canada. In particular, comprehensive national data
concerning environmental health of First Nations older adults are not readily available.

DEMOGRAPHICS

Health Canada defines an older adult as a person aged 65 years of age or older as this age
group is associated with retirement and eligibility for national income security programs.
This definition is also consistent with other government departments like Statistics
Canada and the Public Health Agency of Canada (Health Canada, 2008).

From a First Nations cultural perspective, aging is part of the cycle of life, a natural
process that culminates in old age and finally passing to the spirit world. With aging
comes wisdom and understanding; elders are respected for their knowledge and the
guidance they can offer. Many First Nations in Canada share a common understanding of
the “medicine wheel”, a circle with four quadrants relating to the four cardinal directions,
the physical, mental, emotional and spiritual aspects of the self, and life stages of
infant/child; youth; adult; and elder (AFN, 2007).

For First Nations peoples, the term “Elder” can refer to anyone who has reached a certain
age and in some cases is used interchangeably with the term “senior” as in a senior
citizen. An Elder or senior has accumulated enough life experience to have something to
offer younger generations and can be considered “experts on life” (Stiegelbauer, 1996).
Stiegelbauer (1996) states that an Elder’s specific expertise depends on the nature of their
experience but generally involves some aspect of traditional knowledge and culture or an
interpretation of their experience in traditional terms. Communicating this learning and
knowledge is also considered to be an important aspect of being an Elder and thus Elders
are considered to be key role models for younger generations, communities and even to
the world.

Recent research by First Nations health organizations suggests that age 55 is equivalent to
65 when referring to First Nations seniors (AFN, 2007). Another report entitled, “Our
Nations’ Elders Speak – Ageing and Cultural Diversity: A Cross-Cultural Approach”
also refers to First Nations and Inuit seniors as any person 55 years of age and older, noting that First Nations and Inuit have the lowest life expectancy of all groups in Canada (Ship and Tarbell, 1997). Ship and Tarbell (1997) also define old age as “whenever health and functioning deteriorate to a level that results, as we age, in decreasing independence and mobility” – this definition emphasizes level of function as opposed to chronological age.

Among First Nations living on-reserve, 16% are 55 years or older; compared to 24% for the Canadian population. Among those 65 and older, the rate is 4% for First Nations compared to Canadians at 13%. Half of the First Nations population is over 55 years of age are women (52%), compared to 54% among Canadians. The First Nations Regional Longitudinal Health Survey (RHS) used a cut-off of age 55 to identify seniors, citing lower life expectancy and earlier onset of chronic conditions experienced by First Nations living in their communities (FNC, 2006).

The population of First Nations seniors (Elders) is relatively young compared to the rest of Canada; projections by Statistics Canada indicate that this number is expected to grow. Projections by Statistics Canada have indicated that the number of seniors in the general population is projected to grow from 3.9 million in 2001 to 5.8 million by 2017. The number of Aboriginal seniors is expected to grow more than two-fold by 2017. In 2001, seniors represented 4% of the total Aboriginal population, and this is expected to increase to 6.5% of the total Aboriginal population by 2017. The number of First Nations seniors is projected to grow in the next decade (Statistics Canada, 2006).

The First Nations population age 55-64 will increase by 236% and the 65+ age group by 229% over the next several decades. Life expectancy is also anticipated to improve. By 2010, First Nations males’ life expectancy will increase from 59.2 to about 72 years and from 65.9 to 79 years for First Nations females. As a result, there will be 57,000 more First Nations members aged 65 and older in 2021 (Katenies Research and Management Services, 2002).

A brief overview of First Nations older adults was provided by the AFN for the Special Senate Committee on Aging (AFN, 2007c). Below are some key findings of the report related to the health and wellbeing of First Nations older adults:

- Senior First Nations population expected to double from 2001-2017 (28,200 to 59,500)
- By 2010, First Nations life expectancy will increase from 59.2 to 72 years among men, and from 65.9 to 79 years among women
- First Nations population is growing at a higher rate (50% is under the age of 25)
- Increased demand on vital resources in First Nations communities
- Over 40% of First Nations Seniors suffer from impacts of Residential Schools
- First Nations Seniors are nearly twice as likely to report one or more chronic health conditions (85.2% vs. 47.8%)
- Arthritis affects 45.5% of First Nations seniors
First Nations seniors have a median personal income of $12,991 and a median household income of $24,650
Nearly 80% of First Nations seniors rely on income from government sources

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 that 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.

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).

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.

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 (compared to approximately 40%) for the total Canadian population (Statistics Canada, 2006).

First Nations older adults are more than twice as likely to report themselves to be in fair or poor health compared to their younger counterparts (41% vs. 16%) and about half as likely to be in very good or excellent health (21% vs. 43%) (FNC, 2006).

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 Elders. Elders and young children have been identified as two vulnerable population groups in climate change literature as a whole. Identifying specific vulnerabilities and proactive adaptation strategies will help to protect Elders’ 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 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. With regards to First Nations older adults, there is a potential for greater risks due to the general tendency for First Nations older adults to consume more traditional foods than First Nations children and adults – although this may be changing as some research suggests a steady decline in the overall use/consumption of traditional foods. For example, in the last century, there has been a steady decline in the use of and consumption of traditional foods in the Nuxalk of British Columbia (Kuhnlein and Receveur, 1996). The younger generation of the Sahtu Dene of the western Canadian Arctic also consumed significantly less traditional food than Sahtu middle-aged adults and elders (Kuhnlein and Receveur, 1996). It is quite likely that a similar trend may be found in other First Nations populations.

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). First Nations older adults and seniors (Elders) continue to rely heavily on fish as part of their dietary intake. Aging is often accompanied by a weakened immune system which leads to a variety of health problems. Being older also means that contaminants may have accumulated in the body over time and that health-related conditions are more likely (FNEHIN, 2009b). Thus, the sharing of traditional foods within the community means that contaminants may have accumulated in the body over time and that adverse health-related conditions are more likely for First Nations older adults and seniors (Elders) than perhaps in the younger population. Although it must be noted that the consuming contaminated traditional foods may be no worse than the combined socio-cultural and health impacts of consuming imported store-bought foods – again, more research is needed to fully understand these complex interactions and their long-term effects.

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**

Older adults have a reduced immune function and are more susceptible to infection. As a result, microbial contamination of drinking water can cause gastrointestinal illness, particularly among the elderly (Health Canada, 2008). A study conducted in the United
States found a positive correlation between increased water turbidity and hospital admissions for gastrointestinal illness among older adults (Health Canada, 2008).

Drinking water can also be contaminated with chemicals from natural and anthropogenic sources. Older adults may be more sensitive to high exposures to chemical contamination due to their physiological changes. 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).

At a regional level, the above 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. This would also likely apply to older adults as they are also a vulnerable population and thus more susceptible to waterborne diseases than adults.

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. Air pollution poses significant risks to older adults and can exacerbate pre-existing health conditions (Health Canada, 2008). 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 older adults.

INDOOR AIR QUALITY

Older adults 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 exposures in home care settings and institutional care settings also need to be examined. Older adults living in home care or institutional care have increased vulnerabilities and sensitivities towards environmental risks due to their health conditions; therefore, environmental exposures within the home care and institutional care settings need to be addressed. These exposures include: household cleaning products, moulds, and other indoor air contaminants.

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 ingest 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

SAFETY HAZARDS

Falls account for more than half of all injuries among Canadians 65 years and over. Almost 80% of seniors injury-related hospitalizations can be attributed to falls, making this the leading cause of injury-related admissions for seniors (Public Health Agency of
Canada, 2008). Nearly half of all injuries among seniors occur at home, with approximately 15% of all falls occurring in the bathroom and stairs – two areas of the home that are responsible for more injuries than any other household area or product (Public Health Agency of Canada, 2008).

Potential environmental and safety hazards in a home include: dim or unclearly marked light switches, unclear or obstructed pathways, carpet edges and loose throw rugs/mats (tripping hazards), unsteady furniture/stepping stools, too low or wobbly toilet seat, slippery floor area, slippery bathtub/shower surface and no grab bars in bathtub/shower (Gill et al., 1999).

**LACK OF APPROPRIATE HOUSING INFRASTRUCTURE**

Aboriginal older adults are more likely than the general population to be living in substandard housing where moulds and other environmental hazards may pose health risks (Health Canada, 2008). 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. Approximately 58% of First Nations older adults (aged 55 and over) live in band-owned housing and over a third of seniors reported having mould or mildew in their homes in the past year (AFN, 2007b). Nearly 15% of First Nations older adults do not have access to garbage collection services.

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).

Supportive housing or assisted living units would provide a viable option for some First Nations elders; however there is limited capacity at the community level to provide this type of facility. Indian and Northern Affairs Canada placed a moratorium on the construction of new care facilities for seniors in the late 1980s which has since been lifted and replaced with very restrictive terms for approval for new facilities (AFN, 2007b). In many cases, First Nations communities cannot access provincial funding for seniors housing because the Province takes the position that First Nations are a federal responsibility or funding is limited and local municipalities and urban centres are given priority (AFN, 2007b).

**EXTREME TEMPERATURES**

The body’s capacity to adapt to temperature extremes declines with aging, and thus older adults are particularly vulnerable to excessive heat and cold events. Their capacity to take personal actions to protect themselves against temperature extremes is also reduced. Older adults suffering from chronic disease, mental illness and obesity, or who are taking certain medications, are particularly at risk (Health Canada, 2008). Extreme temperatures can also cause social disruption and impact quality of life as older adults are forced to change living patterns in order to respond to abrupt climatic changes and the secondary effects associated with rising temperatures. Older adults with low incomes may not have air conditioning to effectively adapt to extreme heat events (Health Canada, 2008).

Because older adults are particularly vulnerable to extreme weather, they are especially at risk of the effects of climate change. The impacts of climate change may include changes in precipitation, rising sea levels, changes in the distribution and viability of species, including disease vectors, and more frequent and intense storms and tornadoes (Health Canada, 2008). Extreme temperature events and excess rainfall can create conditions that are favorable to the abundance, range, growth, survival and dissemination of infectious agents - particularly water-born related infections and food-borne diseases, which put older adults at further risk of adverse health impacts (Health Canada, 2008).

**RADIATION**

Chronic exposure to the sun (UV radiation) is associated with an increased risk of skin cancer (Health Canada, 2008). Compared to younger people, the skin cells in older adults are less able to repair the DNA damage that is caused by sun exposure. There is also evidence to suggest that cumulative exposure to low levels of UV-B radiation over many years – and not just the high-dose exposures that earlier research had suggested – place people at greater risk of developing cataracts, a major cause of blindness in older adults (Health Canada, 2008). There is little research available on the particularly
susceptibilities, if any, of older adults to the effects of ionizing radiation (Health 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 and are sometimes more significant in community members’ lives than the physical impacts of contamination (AFN, 2008a).

While 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 older adults. 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 of a major tar sands extraction project) is experiencing abnormally high rates of cancers, autoimmune 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.

**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. Older adults may be especially vulnerable to the effects of climate change because of their metabolism, physiology and behaviour. As a northern country, Canada is likely to experience disproportionate climate change and more information is needed to understand more fully how climate change will likely affect First Nations older adults. 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;
- increased exposure to ultraviolet radiation;
- the spread of vector-borne diseases to previously unaffected areas;
- disproportionate impacts on vulnerable populations; and
- socio-economic impacts.

**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 (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 their control 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 seniors. There are also significant gaps also exist in the Canadian federal 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 fo 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 older adult'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

An extensive literature gaps exists on the state of knowledge on environmental health for First Nations older adults 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 older adults in Canada. In particular, comprehensive national data concerning environmental health of First Nations older adults 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. It also includes information specific to children and Aboriginal populations in Canada.

Bio-monitoring “is 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 older adults and children (David Suzuki Foundation, 2007).

Increased research and improved surveillance on the Environmental Health of Older Adults is needed. This includes addressing the research needs of First Nations in this area and developing Environmental Health indicators specific to First Nations Older Adults. 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 older adults’ health outcomes (AFN, 2008b).
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 children. 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 in First Nations Older Adults environmental health policy making and must include the following:

- 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 older adults.
Figure 1 - 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 – need to incorporate and link traditional knowledge to environmental health and recognize and value the important role that First Nations older adults and Elders 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. A nation-wide communication plan is urgently needed so community members and community leaders can share information freely (Union of Ontario Indians, 2009).

Summary of key recommendations:

- 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 Nation specific research methods
- Implement community based environmental health projects
- Share research findings
- Create networks of environmental health experts
- 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
- Identifying 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-specific backgrounder fact sheets and other communications materials
- Dissemination of information at upcoming future workshops
- National communication strategy for the sharing of knowledge and best practices
REFERENCES


