SOCIAL ASPECTS AFFECTING MOLD GROWTH IN ONTARIO'S FIRST NATION HOUSING

By

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Abstract

Many First Nation communities face Third World living conditions affecting the health of the people living there. It is important to understand the underlying social aspects of First Nation communities to gain a better understanding of the living conditions that foster problems such as mold growth in Aboriginal homes. This research investigates the extent of mold problems in First Nation communities, and the underlying social aspects contributing to mold growth in these communities. This research incorporates community based research methods adapted specifically for Aboriginal communities by conducting surveys, a roundtable discussion and interviews that allow the ideas and concerns of community members to be heard. This analysis shows that a community driven housing strategy needs to be developed by the individual communities in order to address sustainable housing and planning for each community.

Key Words: First Nations, Mold, Sustainable Housing, Sustainable Planning, Social Aspects

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Susan Chiblow
(Waasnode kwe)

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Chapter One

1.0 Introduction

First Nation people lived for thousands for years in what is now known as North America. Prior to contact with the settlers, much diversity existed among First Nation communities culturally, socially, politically, economically and spiritually. The many hundreds of First Nation communities were fully functioning sovereign Nations and included sophisticated methods of relating to and utilizing the natural environment including sustainable planning for their communities. The principle of planning for the next seven generations was integral to sustainable planning, while still addressing the immediate needs of the community. First Nation people recognized the importance of sustainable planning and incorporated local materials into their planning, such as the use of birch bark for containers and as roofing materials. This allowed communities to maintain their individual identity and integrity by incorporating their traditional cultural, social, economical and spiritual values into their community planning and their housing design. These types of efforts were embedded by passing this information to the next generation of people in each community allowing the community to be sustained for the next seven generations. First Nation governments today must re-evaluate these specific needs to address cultural, social, economical and spiritual values to ensure they are incorporated into the current government driven housing programs to ensure sustainable planning can once again prevail in First Nation communities.

Traditionally, the dwellings of First Nations people were built with materials from their immediate environment and their homes evolved and reflected their way of life. Today, most houses in First Nation communities are dwellings designed for urban, non-Aboriginal culture, which use industrially produced materials, and do not reflect the culture and values of the community. This change has been a concern of many First Nation communities, and they have explained to the many government departments involved in First Nations housing that the design of their housing is not appropriate to their culture. One example is row housing. Building materials are often imported and made of materials that are not suited for different climate environments, such as green-board commonly known as drywall (Pettit, 2004). In order to effectively develop sustainable housing programs for First Nation communities, it is important that First Nation leaders evaluate current housing design and materials to address the needs of their community. This should include assessing ecological systems and the natural environment needs and choosing appropriate materials for their specific ecological systems and natural environment. Linking ecological systems and our natural environment with community housing is crucial for sustainable development. Housing design coupled with appropriate construction materials are additional factors to successful sustainable housing.

Housing in First Nation communities is among the worst in Canada and poor housing conditions threaten the health and safety of community members (Auditor General of Canada, 2006; AFN Health and Social Secretariat, 2005). Numerous reports have confirmed that many of Canada's First Nation people experience a poverty level comparable to those living in developing countries and that housing conditions in First

Nations communities are compared to those in the Third World (AFN Health and Social Secretariat, 2005; Canada Mortgage and Housing Association, 1996). In 1990, the United Nations introduced its *Human Development Report*, which included a new definition and measure of development, the Human Development Index (HDI) (United Nation Development Programme, 1990). Since then, Canada has scored at or near the top of the United Nations Development Programme's (UNDP) rankings of countries by their HDI scores. Despite the high ranking of Canada on the HDI, it is clear that not all share high average levels of well-being, and that Aboriginal peoples in particular have long been identified as generally having poorer health outcomes than other Canadians (Indian and Northern Affairs Canada, 2004). Residents of First Nation communities suffer on a daily basis from living conditions which the general population rarely experience (Royal Commission on Aboriginal Peoples, 1996). Conditions such as overcrowding, inadequate ventilation and chronic flooding have resulted in poor indoor air quality and harmful molds in houses (INAC, 2002). The poor health of First Nation peoples has been investigated by many researchers and is a primary concern for First Nation leaders. It is well documented that the health of First Nations people lags behind that of the general Canadian public (MacKinnon, 2005; INAC, 2003; First Nations Regional Longitudinal Health Survey, 2005).

One of the key problems identified relating to housing issues and the health First Nations communities is indoor mold. The Regional Longitudinal Health Survey stated that First Nation's communities suffer from mold at a much higher rate than the general Canadian public (2005). This thesis examines the extent of mold problems in two Ontario

First Nation communities, and investigates the underlying social aspects contributing to mold growth in both of the First Nation communities.

It is important to understand social aspects of First Nation communities to gain an understanding of Third World living conditions in First Nation homes. Studies have demonstrated a positive association between social status and health status (Dunn, 2001). In order to investigate the troubling and persistent divide in the housing status of First Nations people, new approaches are needed to incorporate holistic perspectives into studies of the mainstream housing policies. It is anticipated that this integrated approach may enable dramatic improvements in housing conditions for First Nations people.

There are a number of terms used to describe the knowledge that the original peoples of North American have gained from living off the land for thousands of years. The terms include Aboriginal Traditional Knowledge (ATK), Traditional Ecological Knowledge (TEK), naturalized knowledge, and simply Traditional Knowledge. This knowledge is the accumulated and living knowledge of the Aboriginal peoples of Canada, which poses a depth of information that builds upon the historic experiences of those peoples (McFetridge et al., 2001). It is the holistic and integrated knowledge of a people, and its value that is integral to understanding sustainable housing management. This knowledge is increasingly used to benefit improved decision making in numerous areas such as resource management, conservation planning, impact assessments, and scientific research. Aboriginal peoples have urged governments to allow for the inclusion of their knowledge at the beginning of policy development, including community housing programs, maintaining that the inclusion of their community knowledge can only benefit policy development and consequently, their communities.

Chief Wilfred King and Elder Fred Kelly have stated that First Nation leaders and housing directors are inundated by community members with concerns and investigations over household molds and related health problems. Elder Fred Kelly explained that adequate, affordable and sustainable housing in First Nation communities is a priority among many First Nation leaders since the signing of Treaties. For example, Chief King and Boyer of Gull Bay First Nation and Mississauga First Nation are equally concerned about the social aspects affecting poor housing conditions and the lack of First Nation involvement in developing housing programs for their communities. The common social and health problems found in First Nation communities are similar to those experienced by other Indigenous Peoples worldwide, particularly those who share a history of colonization and encroachment of industrial forces on traditional lifestyles (Maar, 2004). One of the most damaging visible signs of colonization and encroachment is row housing located in First Nation communities. Row housing is not reflective of how the northern First Nations traditionally arranged their living spaces (Weber-Pillwax, 2001). Housing programs are consistently developed without regard for the traditional lifestyles, values and culture or the community knowledge of individual First Nation communities. International and domestic pressures, however, have resulted in an emerging trend, the incorporation of Aboriginal or Indigenous knowledge into a variety of sustainable policy planning (McGregor, 2000). It has been acknowledged by the Rio Declaration on Sustainable Development that incorporating First Nation people's knowledge will assist in the development of more effective policies that benefit both long-term health and housing needs.

First Nations are adamant that all approaches to the First Nation housing problems must be coordinated through integration and partnership models to improve the efficiency and effectiveness of housing delivery (AFN Health and Social Secretariat, 2005). The social aspects affecting First Nation housing need to be addressed in order to effectively determine some of the causes of mold in First Nation communities. These social aspects must be incorporated into First Nation housing programs in order to provide sustainable housing options to First Nations people.

Integrating social aspects will allow First Nations and various housing authorities to identify housing gaps and address underlying problems with First Nation housing programs. Moreover, the National Study of Aboriginal housing conditions concludes that further research relating to housing designs and existing support mechanisms and organizations for First Nations will be needed in order to address gaps within First Nation housing (Canadian Housing and Mortgage Corporation, 1996).

Mold is of particular concern because it can be found in large colonies and can cause adverse health effects such as allergic reactions, asthma and other respiratory ailments. Over the years, the presence of mold in homes has become a matter of concern for health professionals and for the general public (d'Halewyn et al., 2003). Respiratory aliments such as asthma and bronchial symptoms are prevalent in First Nation people, and numerous studies have indicated a relationship between mold and respiratory symptoms (Zock et al., 2002). Mold growth also affects the respiratory health of the young and elderly. The First Nations Regional Longitudinal Health Survey (RHS) 2002/03: The Peoples' Report (2005) states that allergies are quite common among First Nations children (12.2%) and chronic bronchitis is more common among First Nation

children at 3.6% than among children in the general population (1.4%). Several research studies have gathered evidence that there is an increased prevalence of respiratory symptoms in the young occupants of a home with visible mold (Gunnbjornsdottir et. al, 2002; Jussila et. al, 2002; Cuijpers et. al, 1995). First Nation people are exposed to a variety of health ailments such as asthma due to living in moldy indoor environments. Many First Nation residents have developed a myriad of symptoms, the majority relating to the respiratory system from living in moldy environments (INAC, 2003).

Homes in Ontario's First Nation communities have been condemned by local Health Inspectors due to the amounts of mold located in these homes (Gull Bay First Nation, 2003). Many First Nation homes have problems with water leakage, flooding and condensation build-up. Mold growth is directly related to excessive moisture and can grow on wood, drywall and carpets (US EPA, 2001). Overcrowding, along with excessive water damage are all contributors to mold growth found in First Nation communities (Mazey, 2002). Several studies indicate that the major way to control indoor mold growth is to control indoor moisture (US EPA, 2001; Cuijpers et al., 1995; and Haverinen et al. 2003). Effective housing programs need to address water leakage, flooding and condensation build-up in order to provide First Nations with adequate, sustainable housing programs.

Chapter Two

2.0 General Conditions in Ontario

Ontario has a registered Indian population of 155,234, with 76,239 of the registered Indians living on reserve (INAC 2006). Indian and Northern Affairs Canada has classified the location of First Nation communities as urban (within 50 km of a major centre), rural (between 50 km and 350 km), remote (over 350 km) and air access (INAC 2003). Nathan Wright of the Chiefs of Ontario office explained that Indian and Northern Affairs Canada only recognizes 126 First Nation communities in Ontario due to the lack of land base and governance issues such as a band not following the *Indian Act* election procedures. Of the 126 First Nation communities recognized by Indian and Northern Affairs Canada, 32 are classified as urban, 58 are classified as rural, 5 are classified as remote, and 31 are classified as air access (INAC 2003).

The Chiefs of Ontario (COO) is a coordinating body for the Chiefs located within the boundaries of Ontario. There are currently 134 First Nation communities located in Ontario ranging in population, culture origin and geographical location (COO, 2005). With the discovery of mold growth in Gull Bay First Nation located in Northern Ontario, many other First Nation communities' awareness has increased about the seriousness of the mold crisis in houses in Ontario's First Nation communities. The Canadian Mortgage and Housing Corporation in their article on *The Housing Conditions of Aboriginal People in Canada* stated that the number of households that fall below one or more housing standards are the second highest in Ontario of all areas in Canada at 71 percent. The housing crisis is not just related to the lack of homes for community members, but also to

the various health aliments associated to mold growth. In certain instances, residents have been evacuated from their homes permanently due to the quantity of mold found in the homes such as Gull Bay First Nation.

The Chiefs of Ontario, in partnership with Ontario First Nations Technical Services Corporation, Housing Unit administered a housing survey in Ontario for the purpose of identifying the gaps in First Nation housing. The survey was delivered to 134 First Nation communities, with 64 communities completing the survey. Irving George of the Ontario First Nations Technical Services Corporation explained that the survey found one fourth of the homes had mold contamination and that "complications due to mold growth" was ranked fifth as a priority by the First Nation. He further explained that the four priorities ranked above the "complications due to mold growth" were the need for additional home ownership units, lack of water & sewer infrastructure, need for elderly housing, need for additional rental units, and the need for housing/credit counseling. The Report of the Auditor General of Canada (2006) further states that mold contamination in houses on reserves continues to be a significant problem; however, none of the governments had fully assessed the extent of mold contamination in houses on reserves. The same report also states that, "…despite the establishment of committee by government intended to address mold problems … no federal organization had taken responsibility for assessing the extent of the problem and developing a comprehensive strategy for addressing it" (Ibid 2006).

Chapter Three

3.0 Mold

Over the years, the presence of indoor mold has become a concern for health professionals and the general public. This concern has been extended to First Nation health professionals, leaders and community members. Health inspectors have found an alarming rate of mold growth in British Columbia's First Nation communities, which has caused concerns among other residents of the First Nation communities (INAC, 2003). The health effects associated with indoor mold growth have also caused a ripple affect among the general public, including First Nation leaders and community members. The effects of indoor mold growth in First Nations are not limited to the health of community members, but also affect the community mentally, emotionally, socially and spiritually (INAC, 2003). Elder Fred Kelly reiterated this point by explaining that the balance between mental, emotional, physical and spiritual are not met when community members are faced with mold growth in their homes. He explained the importance of maintaining this balance in all aspects of life to ensure complete health for First Nation people.

Molds are a subset of fungi, are found in every ecological niche and are defined as a furry growth on the surface of organic matter (Peterman et al., 2002). In outdoor ecosystems, molds and fungi are essential and necessary components providing a natural decomposition of organic substances acting as recycling agents of organic materials necessary for sustaining plant, animal and human life (Mazey, 2002). Molds are a microscopic group of organisms, which also includes mushrooms and yeasts, and are highly adapted to grow and reproduce rapidly producing spores and mycelia in the

process. Most molds indoors can reproduce rapidly under moist conditions and can grow on nearly any type of surface (CHMC, 2002). Growing mold colonies are usually very visible and can be virtually any color. When easily disturbed by air movement or contact, they release thousands of airborne spores (Scott, 2004).

3.1 Factors Affecting Mold Growth

Molds are incredibly resilient and will proliferate in various environments and under numerous environmental conditions. Mold is contained in spores and can be green, brown or black in color flourishing in dark damp conditions (Peterman et. al, 2002). Indoor molds usually originate from outside sources and can be transported by people and pets or through open doorways, windows, heating, ventilation and air conditioning systems. The toxic by-products produced by molds are known as mycotoxins and can adversely affect home occupants' health.

Mold will grow in moist environments with the proper nutrients. In order for mold spores to germinate, essential nutrients such as organic matter or high cellulose materials along with a sufficient quantity of water and an appropriate temperature are needed (d'Halewyn et. al, 2003). Cellulose materials include drywall, paper products, wood materials and products, cardboard, insulation, carpets and ceiling tiles. Moist environments are caused by numerous factors such as leaking plumbing and the factors affecting moist conditions vary across climates, geographical regions and building types (Butler, 2004). Mold can survive many years in dry or hot environments; however, if they land on a moist food source, they will germinate quickly.

Building design, location, construction, types of building materials and maintenance practices are all factors affecting mold growth (Spengler, 2004). Water entering a poorly designed or constructed building will encourage mold growth attaching to building materials such as drywall and will be difficult to control unless measures are taken to address the design and construction practices. High moisture levels can also be affected by daily activities such as cooking, bathing and washing clothes (CMHC, 2001). Overcrowding can also have an impact of the amount of moisture released in the homes due to cooking and bathing. Moisture can accumulate in homes from daily activities when there is not sufficient ventilation to expel the moisture (Bornehag, 2001). Other common sources of moisture are natural occurrences such as floods and high humidity due to climate conditions.

3.2 Potential Effects of Mold in Housing

When mold is found growing inside a home, some occupants may experience health concerns such as asthma. Members of a family living in the home may respond differently and some may not show any visible signs of health aliments (CMHC, 2001). Gunnbjorndottir et al (2003), found an association between respiratory symptoms such as long term coughs of children and home dampness caused by water damage or mold. A number of health effects including respiratory symptoms and diseases and other symptoms have been associated with moisture damage and mold growth in buildings. Haverinen explains that there is an increase in the risk for certain health symptoms among occupants of moisture and mold damaged buildings. Mold contamination and

dampness is associated with a 50% relative increase in asthma and a 60% increase in upper respiratory disease (Health Canada, 2004).

Other effects of mold growth in homes include irritation to skin, eyes, nose and throat, resulting in symptoms such as difficulty in breathing, runny nose and watery eyes. Symptoms such as fatigue and headache have also been reported in moldy homes (Bornehag et. al, 2000). Zock et al. (2002) concluded in their research that indoor mold growth does have an adverse effect on adult asthma. Exposure to indoor mold has also been associated with pulmonary hemorrhage in infants and young children (Mazey, 2002; Health Canada, 2004).

Immuno-compromised individuals such as AIDS patients are found to be at an increased risk of developing rare conditions following exposure to molds. Persons receiving chemotherapy are very susceptible to certain mold growth compromising their health (Mazey, 2002). Marc Andrea et al. (2003) state that, "…certain individuals or groups of individuals, because of their underlying health status, are more likely to develop health problems when exposed to fungal contaminants" (Marc Andrea et al., 2003). These reports emphasize that individuals suffering from certain diseases (eg. cystic fibrosis), those suffering from respiratory problems such as asthma, infants and young children and the elderly are certainly more vulnerable when exposed to mold in homes.

In northern regions, such as Ontario, where the average temperature is relatively low, people spend more time indoors, which makes them more susceptible to mold exposure. In Ontario, there are 134 First Nation communities, with approximately half of those communities located in Northern Ontario, where temperatures are relatively low

for the majority of the year and consequently, people spend more time indoors. For example, Environment Canada's National Climate Data and Information Archive state that the yearly average temperature for Timmins, Ontario is 1.3 degrees Celsius. Although mold may be common in the general population of Canada, it is pervasive in First Nations' homes as almost one half of First Nations in band housing reported mold in their homes (First Nations Centre, 2005). Comparing the rate of unhealthy molds in the general population versus First Nation homes is rather difficult since the general population is not subject to the departmental authorities that control housing programs, such as Indian and Northern Affairs housing programs. In Canada, it is difficult for First Nations living in the boreal or artic regions to go outdoors for 3-6 months of the year because of cold weather (Berghout et al, 2003). Remaining indoors for extended periods of time make First Nation's residents more susceptible to mold exposure than the general population since most of the general population resides in Southern Ontario where climate conditions are not as severe.

Thus, residents of First Nation communities suffer on a daily basis from living conditions which the general population rarely experience (Royal Commission on Aboriginal Peoples, 1996). In 2002, the United Nations quality of life index ranked Canada as one of the top five countries in the world. However, the native reserve conditions were described as deplorable (Beavon and Cook, 2003). Health conditions such as diabetes, asthma and allergies are common among First Nation adults, youth and children. The most chronic long-term health conditions facing First Nations are asthma and allergies (First Nations Centre, 2005). It has been reported that First Nation children suffer a much higher prevalence of asthma and respiratory tract infections than the

general population. The First Nations Regional Longitudinal Health Survey (RHS) 2002/03: The Peoples' Report states that allergies, asthma and chronic ear infections are the most common of the chronic conditions affecting First Nations youth (First Nations Regional Longitudinal Health Survey (RHS), 2005). The same report states, "…at 14.6%, the frequency of asthma among First Nation children is quite high given the prevalence among children in the general population is 8.8%" (19). The report further explains that allergies are quite common among First Nations children (12.2%) and chronic bronchitis is more common among First Nation children (3.6%) than among children in the general population (1.4%). The Royal Commission on Aboriginal Peoples of Canada reported chronic asthma or bronchitis in over 19 % of Aboriginal Canadians under the age of fifteen (Royal Commission on Aboriginal Peoples of Canada, 1996).

3.3 Exposure Limits

Exposure limits to mold have not been defined since variances in personal sensitivities, level of exposure and the vast array of species of molds are factors affecting exposure and it is impossible to set an exposure limit that can be equally applied to all humans. Research regarding the exposure limits and the health effects of living in moldy conditions is readily available; however, few studies exist regarding exposure limits and the effects of inhaled molds on individuals. Currently there are no exposure limits or risk assessment procedures to accurately predict health risks associated to mold exposure in homes. This is due primarily to the absence of biomarkers specific to molds. Biological markers of exposure are largely unknown due to susceptibility varying with the genetic

predisposition, age, state of health and concurrent exposures (New York City Department of Health and Mental Hygiene, 2000). Typically, guidelines for exposure to mold are related to worker protection during remediation and in the absence of national standards, guidelines published by other organizations are typically used, such as Manitoba Department of Labour & Immigration's Guidelines for the Investigation, Assessment, & Remediation of Mould in Workplaces.

There is considerable controversy over the acceptance of an appropriate standard for safe exposure to mold. Since there are many factors that must be considered in the establishment of such a standard, guidelines are typically based on a large data set gathered over a period of several years. The guidelines are useful for workers in the field. If visible mold is present, it requires further investigation and remedial action regardless of the airborne spore load. One such guideline prepared by the Manitoba Department of Labour and Immigration provides guidelines for the investigation, assessment and remediation of mold in workplaces, but this document is based on information from other agency guidelines and establishes minimum requirements for remediation and does not address exposure levels (Workplace Safety and Health Division: Manitoba Department of Labour & Immigration 2001).

Several research studies have made a correlation between mold exposure via inhalation and health affects such as respiratory symptoms in the occupants of a home with visible mold (Gunnbjornsdottir et. al, 2002, Jussila et. al, 2002, Cuijpers et. al, 1995). A comprehensive review of literature relating to the health affects of living in moldy conditions indicates that such studies have consistently detected an association between respiratory symptoms and mold growth but exposure limits have remained

limited due to personal sensitivities. Publications such as the Environmental Protection Agency's *Indoor Air Pollution: An Introduction for Health Professionals,* provides assistance to health professionals in diagnosis of patient symptoms that could be related to indoor exposure to mold, but once again, does not address exposure limits. Since research studies have indicated that there is health risks associated with exposure to mold, it would be prudent to remediate indoors sources but caution must be used because homeowners could potentially increase the levels of mold spores in the air by attempting clean-up efforts themselves. Numerous guidelines produced by agencies such as the Occupational Health and Safety Council of Ontario are available to assist in remediation efforts (Health Canada, 2004).

In most epidemiological studies on indoor mold and health, the exposure assessments were based on self-reports and the mold taxa present in homes was not identified. The difficulty of quantifying human exposure to mold is thus a major obstacle in determining the existence of cause-and-effect relationships, and response relationships are difficult to assess.

Since much of the data gathered in health studies are self-reported, biomarkers would complement this information by providing an objective profile of a health condition. Biomarkers are objective biologic measures of health conditions and are chemicals in the body that make it possible to measure if an individual has been exposed to pathogenic organisms. Currently, there are no known biomarkers available to prove an individual has been exposed to indoor mold. Therefore, surrogate makers of fungal growth such as ergosterol and (1- >3)-β-D-glucan need to be investigated further as (1- >3)-β-D-glucan has been associated with increased peak expiratory flow in asthmatic

children (Health Canada 2004). Since few studies exist regarding exposure limits to inhaled mold on individuals and are related to the limitations of available science due to the absence of biomarkers specific to molds, further research to develop standardized protocols for the determination of (1- >3)-β-D-glucan in the environment is needed.

Chapter Four

4.0 Research Methodology

This thesis examines the social aspects affecting mold growth in First Nation housing through the use of community based participatory research by conducting surveys, a roundtable discussion and interviews with key First Nation people in Ontario.

This research follows the new spirit of partnership between researchers and First Nations people described by ACUNS (2003), whereby the process of conducting high quality research is dependent upon researchers understanding the needs and concerns for First Nation communities. First Nation people maintain distinctive perspectives and understandings embedded in their cultures and histories and thus, research involving First Nations may raise challenging ethical issues as it relates to intellectual property rights. Employing guidelines developed by various First Nation organizations (RCAP, 1999) and continuous communication with an elder advisor, the following methodological approach was designed to ensure minimal risk to First Nation participants and to ensure cultural sensitivity and appropriateness. This includes adherence to Royal Roads Ethical Code of Conduct and to the advice of both Chief and Council of Mississauga First Nation and Garden River First nation.

Culturally, different approaches to accessing knowledge imply the need for different methods of gathering and validating information. The Royal Commission on Aboriginal Peoples (RCAP) (1996) hosted a series of workshops in which harsh criticism of past research and serious skepticism on past methodologies was voiced as a major concern when First Nation communities were being researched. Research has acquired a bad name among Aboriginal Peoples because the purposes and meanings associated with its practice by academics and governments were perceived to be non-aligned to the people themselves and the outcomes often misguided and harmful to the people being studied. In many cases, research in First Nation communities is often initiated by agencies from whom First Nation communities receive essential services and the research is funded by governments that control resources on which the community depends (Castellano, 2004). This had led to concerns about the use of data and to lack of control over the data. The need for a new approach for research in First Nation communities allowing First Nation people to have the capacity to conduct research themselves providing the First Nation communities with empowerment and real solutions to problems is a key research issue when working with Aboriginal communities.

Community based research holds promise for addressing this issue (Bagley, 2003). In this research model, the community plays a direct role in the design and conduct of the research by bringing community members into the study as partners, not just subjects. A variant on participatory action research, it connects the community members directly with how the research is done and what becomes of it, thus providing immediate benefits from the results of the research to the community that participates in any study. This type of research has received a positive reception from First Nation

communities because community members become advisors to the research and it provides a real service to the community by addressing real community needs. Based on this type of process, this research used a survey instrument, a roundtable process and face-to-face interviews with community members.

The communities of Mississauga and Garden River First Nation played a key role in the development of this research. Chief and Council for both communities were contacted and meetings were held to explain the research question and provide them with an opportunity for incorporating their needs into the design of the research. The band administrator and housing directors also had opportunities to provide feedback in the design of the research. This allowed the Chief and Council to become advisors to the research along with community members directly involved in housing programs. Also, several meetings with various First Nation Elders were held regularly to discuss the research objectives and integrate their advice into the research design. This allowed the research to be conducted in a true community sense and it was structured to address concerns of direct benefit to First Nations communities in Ontario.

4.1 Research Question

The primary research questions were the following.

- To what extent is mold growth present in Ontario First Nation communities?
- What are some of the social aspects affecting mold growth in First Nation communities?

In addressing these questions, the following sub issues were investigated in varying degrees:

- examination of current remediation options along with effectiveness of that remediation;
- examination of current housing design, housing programs and community planning options, and
- awareness of health effects associated with mold growth.

4.2 Design

The most important component of community based research in interacting with First Nation people who live in poor housing conditions is constantly communicating with elders for their advice on conducting research in First Nation communities. Numerous and iterative discussions were held with Elder Fred Kelly on conducting this type of research and approaching a First Nation to participate in the study. His advice was sought in survey design, roundtable design and methodology and who to interview in Ontario regarding overall housing conditions.

For the purposes of this research, Mississauga First Nation and Garden River First Nation communities were approached due to their close proximity and also their differences in demographics and housing policies. Mississauga First Nation is located along the north shore of Lake Huron and houses approximately 460 people. The band membership clerk of Mississauga First Nation explained that the housing program consists of a program director and the homes are mostly band owned and band built with

housing designs being chosen by Indian and Northern Affairs. Alternatively, Garden River First Nation is located along the northern boundaries of the St. Mary's River and houses approximately 1010 people. The housing program consists of a program director and the homes are band-owned, Canadian Mortgage homes, bank-mortgaged homes, and rent-to-own homes. The construction of the homes is tendered to First Nation construction companies located within the community. Housing design in Garden River First Nation is based on the type of housing package the member chooses. The Housing Director of Garden River First Nation explained that if the member chooses the bank-mortgaged homes, they choose their design based on the mortgage, but if the homes are band-owned, rent-to-own or Canadian Mortgage homes, the designs come from Indian and Northern Affairs and are often dusted off from year to year.

The first stage of this research project involved contacting the Chief and Council and determining if they would be interested in participating in this research. Meeting with Chief and Council to explain the purpose and objectives of the study was needed in order to determine if their communities would be interested in this type of research. Personal communication with Chief and Council involved discussions on survey and roundtable methodologies. Also, advice was sought from Chief and Council on types of questions and who should be involved in the roundtable. Permission to conduct the study in their communities was obtained in both verbal and written format. Complete information was made available to the band administration and housing director about the purpose and objectives of the research.

Surveys and the roundtable were conducted only in Mississauga First Nation and interviews were conducted with Garden River First Nation community members. Since a

small amount of surveys were returned in Mississauga First Nation, a roundtable was implemented to obtain further data. The Chief and Council of Garden River First Nation recommended that interviews be conducted to gather the data from their community members as they felt that surveys and a roundtable would not be adequate.

4.3 Surveys

The survey instrument was designed based on advice from Chief and Council, Mississauga First Nation band administrator, Mississauga First Nation housing director and personal communication with Elder Fred Kelly. A draft survey was tested on various individuals in Mississauga First Nation band office and other First Nation individuals. The final survey was completed based on feedback from these individuals. Participation in the survey was strictly voluntary and recording of names was optional. The survey was distributed to community members only in Mississauga First Nation by a weekly information package that is delivered by the community to each residence. Included in the survey was contact information for individuals who may have wanted to discuss the research in more depth or had any questions and a brief description of the purpose and objectives of the research. No one contacted the researcher in regards to obtaining more information about the research. The individuals completing the survey were provided envelopes to seal the survey in and options on returning the completed survey. (See Appendix A).

Mississauga First Nation, as of 2004 had a total population on-reserve of 443. Residential structures include 156 houses, 4 duplex houses and 6 units located in the

Elder's Complex for a total of 170. Each residence received one survey including the duplexes. The Elder's Complex were issued surveys for each unit in the complex. Only 18 surveys were returned for this study, which is 10% of the total residential facilities located in the community. All surveys received were from separate households with the majority being completed by female adults between the ages of 30 to 45. There was no further attempt to have individuals complete the surveys as participation in the surveys was voluntary, and recording of personal information such names and gender was optional.

Blinding the subjects is an important factor that contributes to the research quality, by preventing conscious or subconscious biases or expectations from influencing the outcome of the research. The surveys were not blinded and as such, the respondents knew why the questions were being asked, which can definitely bias the results. It was impossible to keep the information and reasons for the research from becoming public within the community, as some of the information gathered assisted the housing director in delivering the housing program in the community.

Types of housing currently offered in MFN are as follows:

- band owned housing;
- CHMC;
- rent to own;
- Elder's complex;
- women's shelter;
- privately owned homes;

- private lands on land claim settlement;
- 16 units on Darrel Lake, and
- 8 at Chiblow Lake and the rentals belong to the band.

Other housing programs offered in MFN are as follows:

- Royal Bank of Canada provides First Nation house financing;
- Anishinabae Credit Union provides mortgages for privately owned homes by First Nation members;
- Red cross offers assistant services for housing;
- HASI program (CHMC) handicapped offers housing assistance, and
- RRAP program offers renovation program for current homes.

Data in the survey was collected on the following areas.

1. general health
2. chronic respiratory conditions and allergies
3. design of home
4. awareness of mold growth, the health affects associated with mold growth and remediation options
5. types of house
6. general conditions of house
7. problems associated with mold growth

Questions were designed to assess the awareness of mold growth, assist the housing director with the communities' housing policy, and obtain information on a communication strategy for mold remediation options.

4.4 Roundtable

Since such a small percentage of surveys were returned, discussions were held with the Mississauga First Nation band administrator and the community housing manager to discuss another process in obtaining information from community members. A roundtable format was chosen to gather further information for the research. Further discussions were held with the band administrator and the community housing manager to establish questions to initiate the discussion with participants. The dialogue questions were tested on community members for feedback on the effectiveness of initiating discussions relating to mold growth, social aspects affecting mold growth and the awareness of health problems related to mold growth (See Appendix B). Participants were invited on the advice of the community housing manager and the band administrator. The participants of the roundtable included elders, youth, community residents and community leaders.

For the purposes of the roundtable discussion in Mississauga First Nation, 21 participants were invited from different age categories such as youth and elders. Of the 21 participants invited, 14 individuals participated in the roundtable discussion. Representation from the different age categories were adequately represented as a youth, an elder and a variety of individuals in between those ages participated. Invited participants were not informed prior to the roundtable of honorariums.

Data in the roundtable was collected on the following areas.

1. types of housing programs
2. health/mold related
3. housing design
4. social aspects/traditional knowledge
5. other recommendations and thoughts

Invitations were drafted and delivered to the selected participants for the roundtable. The meeting facility, a note taker, meals and modest honoraria were put in place for the roundtable process. Consent forms were provided to each participant explaining the purpose and objectives of the roundtable and each participant had the option of completing a survey for general information of the participants. The surveys were not signed by participants to try to maintain confidentiality for those who chose to complete the survey.

4.5 Interviews

For the purposes of compiling data in Garden River First Nation, interviews were chosen due to the lack of participants in the surveys from Mississauga First Nation. Also, since the primary researcher is a community member of Garden River First Nation, participants in the interviews are familiar with the primary researcher, which would raise the level of participation as opposed to having a complete stranger conduct the

interviews. It is recognized, however, that this familiarity might impact the information provided.

Interview questions were based on compiling the survey and roundtable questions from the first case study community to probe more deeply. The questions were used as a topic guide to help cover important areas while allowing the direction to be tailored according to the participants' interest and expertise. This is a standard method for gathering information, in an open-ended format that has been successful in promoting dialogue and that allows for the participant to be guided in discussions (Huntington, 1998). Interviews were held in places chosen by the participants allowing them to feel more comfortable and willing to participate without any time restrictions. This also provided an interpersonal context in which some participants may be more comfortable than in a group setting. The participants of the interviews included elders, youth, community residents and construction workers.

Interviews were conducted in Garden River First Nation with individuals from different age groups and some were chosen because they play a critical role in the housing program. Other key individuals from Ontario's First Nation communities such as elders, Chiefs and individuals who have a role in housing were also interviewed. In all, 33 representatives were interviewed: 20 from Garden River First Nation and 13 other First Nation individuals.

Data in the interviews were based on the following topics.

1. general questions
2. health related/mold related

3. housing design
4. housing program
5. community planning related
6. social aspects/traditional knowledge
7. other recommendations and final thoughts

The questions were used as general discussion to allow for the participant to feel comfortable as the interview continued. The topic questions were designed to promote dialogue and gather knowledge from the individual participants. Individual participants were chosen randomly from groups of elders, youth, community residents and community construction workers. (See Appendix C)

Chapter Five

5.0 Research Results

This section summarizes the responses obtained through the surveys, roundtable discussions and interviews conducted with Mississauga and Garden River First Nation members. For reasons of confidentiality, the data are not presented in their entirety. Rather, they are shown in both textual and tabular form, following an initial phase of analysis. The initial analysis phase of the roundtable and the interviews accomplished an important task of grouping responses received to the questions (see Appendix A) into “Response Categories” as a first step in the search for core variables required to address the research question.

The response categories discussed in the interviews were: housing program; health related/mold related; housing design/community planning and social aspects/traditional knowledge. The response categories discussed in the roundtable were education/training; health/mold related issues; housing design/ownership and social aspects/traditional knowledge. The response categories are presented in three sections: the survey results, roundtable results and interview results. Each section's responses are summarized in a table, which also includes a more detailed description of information highlighted in the table.

The Band Membership Clerk of Mississauga First Nation and Garden River First Nation provided an overview of the total population, on reserve, off reserve and the number of homes in both Mississauga First Nation and Garden River First Nation, which is displayed in Table 5.0. At the time of accessing the population from each community, cautions was provided, as specific numbers for on and off reserve change quite frequently and hence, are rather difficult to track.

Table 5.0. Population in each community

Community	**Total Population**	**On-reserve**	**Off-reserve**	**Number of homes**
Mississauga First Nation	992	443	549	170
Garden River First Nation	2119	1010	1109	351

5.1 Survey Results

This section provides a summary of responses to the survey distributed to Mississauga First Nation community members. Surveys were also provided to the participants at the roundtable discussion to gather further information specific to the project. A total of 18 surveys were completed by the both the community and by participants at the roundtable. Of the 14 participants at the roundtable, 10 returned completed surveys and the other 8 surveys were completed by individuals from the households.

The ages of the participants varied from 20 to over 60 years of age. The age category that had the most participants was ages 20 to 30 years of age and 41 to 50 years of age. The age category that had the least amount of participants was 60+. The gender of the participants was predominately female and the level of education varied from no education to university education. Roles in the community varied from Property Manager to volunteer to community member. Length lived in the community ranged from 6 years to all my life. Amount of people living in the home also varied from one to six individuals. Participants answering the survey all rated their health as good or better except one individual who stated that the health of the family was poor. When participants were asked if anyone suffered from chronic respiratory conditions such as asthma, 11 responded no and 7 responded yes.

The survey asked what type of information was received regarding mold growth in homes and the responses were in the form of a newsletter or flyer, but two responded that they had never received any information. Individuals answering the surveys were

given an opportunity to provide comments on why they think mold growth occurs and the following reasons were identified: poor ventilation; dampness; poor workmanship; houses not built right due to lack of leadership in construction; inadequate care for homes; lack of mold knowledge; only given band-aid solutions for cleaning mold – not addressing why mold is in the home; poor training of construction staff; lack of knowledge in housing construction; lack of education on home ventilation systems such as venmars; and improper materials for local climate.

The following table (table 5.1) provides a summary of responses to several questions posed in the survey. The first column is the question that was asked in the survey and the second and third columns provide the type of response along with the number who chose each response.

Table 5.1. Summary of responses to questions in the survey

Question Posed	Response	Response
Do you have a basement	Yes	No
	10	8
Is there a venmar system in your home	Yes	No
	17	1
Years lived in current home	More than 5 years	Less than 5 years
	13	5
Time spent in home per day	0 to 8 hours	9 to 18 hours
	3	15
Did you assist in the design of home	Yes	No
	4	14
Like to design own home	Yes	No
	6	12
Awareness of mold growth in the home	Yes	No
	13	5
Awareness of health affects associated with mold growth	Yes	No
	10	8
Awareness of different options to repair mold growth	Yes	No
	6	12
Received information regarding mold growth	Yes	No
	10	8

5.2 Summary

Many of the questions in the survey were straightforward leaving no room for interpretation and were designed to obtain exact results to assist the housing director in obtaining data to improve the current housing program in Mississauga First Nation. There appears to be an overall trend in the survey results indicating that people are aware of mold growth, the health affects of mold and they are willing to assist in the design of their homes. First Nation communities are often overwhelmed by the requests to complete surveys, perhaps one reason for the poor response rate. In many instances, the results from the surveys are not shared with community members and many are therefore reluctant to complete as they see no benefit in responding. As stated, this problem within First Nations communities could explain the lack of surveys returned from Mississauga First Nation, as well as the impersonal nature of this research instrument.

5.3 Roundtable Results

This section presents summaries of the responses obtained through the roundtable discussions conducted with Mississauga First Nation participants. The responses varied and in some cases, respondents answered the question directly while others did so indirectly throughout the discussion. Some of the participants struggled with questions and were uncertain as to how to answer while others simply provided clear answers. The table below (table 5.2) summarizes the participant's responses.

Table 5.2. Summary of categories and responses from the roundtable discussions.

Category	Response
Education/Training	• Need more education on housing options • Community members must be more responsible for educating themselves on housing options • Need more information presented to community members • Need more training to provide different options to community members • Reluctance to try different housing options due to lack of awareness and education • Further venmar training required • Lack of adequate resources for training • Further education needed for maintenance of air tight homes • Inspector lacks proper resources and capacity to properly inspect all homes • Housing committee should have adequate resources for further training • More education and training needed to implement change in the housing program and policy change • Need for more inspectors • Need more resources and capacity for housing design options
Health/Mold related issues	• Health Canada presented a workshop on mold but there was very poor attendance • Mold information needs to be simplified for all home occupants • Every other home most likely has mold growth in it • Lack of a communication due to lack of adequate resources and capacity • Need to offer incentives to attend the workshops on mold problems • Need to involve the youth in mold workshops and in the design of mold information through different initiatives such as the diabetes camp • Provide mold information workshops for those who are getting new homes • Must have councilor involvement in information sessions

Housing design/ownership	• Not many options to chose from • Materials for homes come in standard packages • Home owners in the past not able to choose home design so don't feel it is their home • Home owners should have say in who constructs their homes • Not allowed to choose where you build your home • Problems with community planning • Many homes are now built in the swamp and advise was provided not to build there • Elders were not consulted on community plan – INAC dictates where homes are built without talking with the elders about the landscape • Bids should go out for work on the homes • Homes are to close to one another • No proper landscaping done – all trees are taken from the area leaving nothing to absorb wetness • Lack of ownership due to housing options and people knowing they don't own their homes – no incentive to maintain • Need to have more community involvement in design of community plans and where the homes should go • Still many old homes with no incentive to care for the home • Lack of funding for proper homes in this climate • INAC provides for services so dictates where homes can go – causes problems with ownership and design • Never had these new types of materials such as Styrofoam on cement in old days • Cost savings creates sub-standard housing • Limited as to where we can purchase housing materials – sometimes don't get the right materials and use them anyways do to constraints • People with wood stoves don't have mold problems • Lack of funding from INAC but INAC still dictates where to build and what type of

	home you can have
Social Aspects/traditional knowledge	• Subdivision with homes built in swamp • Lack of community input on subdivision plans • Lack of ownership of homes due to housing options • Need more family oriented housing planning • Lack of deciding who your neighbors are • Lack of individual ownership due to lack of training, and housing options • Need to support people to build where they want to protect boundaries which was traditional way • More community involvement needed to help one another • Generally not in our nature to complain • Need community plan and subdivision designs with community input • Need to have more ownership of homes and the land • Incentives need to be provided for people to take training and attend workshops • More resources is needed to implement change • Need to train for better home design and materials used in our climate

Perceptions of the current housing program varied among the participants from bad to improved, to very good. All participants agreed that the housing program has improved over the years but there is a need to change the perception on the housing options through further education and information availability. Some of the information that is available to the individuals seeking homes does not adequately present the pros and cons of the housing options.

5.4 Summary

The roundtable was designed to initiate discussions relating to four categories by presenting general questions in each category. A brief presentation was made on the objective of the roundtable along with the overall research question. Consent forms and confidentiality were explained to the participants along with the purpose of gathering this type of information. Community members were very interested in participating by providing feedback to assist in developing a comprehensive and integrated community housing program to better serve the community needs. Each participant was able to provide feedback at any time by participating in a relaxed mediated session.

The trends and patterns that emerge from the data collected from the roundtable under the response categories had overarching themes relating to: lack of education, training, resources, capacity, communication, choices for building materials, ownership, community involvement in community planning, and design. Respondents recognized that the housing program had improved over the years but generally, still lacks community input which causes general problems such as lack of ownership and commitment to home maintenance. The trends and patterns that emerged from the roundtable discussions suggest that the dominant community planning process currently incorporated into the housing program is inherently ill equipped to deal with mold problems. The current housing program was not designed to deal with broader issues, particularly issues of importance to community members such as lack of choices in housing design and construction materials. Overall, the participants stated that the community needs to be involved in community planning in order to address the multiple

problems associated with mold growth in their community such as where the homes are built, construction materials, and the incorporation of their community knowledge.

5.5 Interview Results

This section presents summaries of the responses obtained through interviews conducted with Garden River First Nation participants. Interviewees offered personal insight relating to the response categories presented to them and were quite frank in their responses as many noted how general housing conditions affect their lives and those of their children. The table below (Table 5.3) summarizes the participants' responses under each response category.

Table 5.3. Summary of responses by participants from the interviews.

Category	Response
Housing program	• Lack of education presented to potential home owners • Housing program not designed to suit community needs • Housing programs offered are CHMC, band owned, personally owned through bank • Not sure what types of homes are offered • Lack of training to provide different options to potential home owners • Need to develop a housing committee • Need more resources and capacity for housing design options
Health/Mold related issues	• Mold growth is still very predominant in community homes • Not much information provided for mold growth • Health of community is related to housing options • Community lacks training to deal with mold issues • Community lacks resources and capacity in

Health/Mold related issues continued	relations to mold and health issues associated with mold • Many kids have asthma • Lack of education materials provided to community members • Community members don't have capacity to deal with mold issues • Need prevention education materials for all community members • Youth must be involved in education materials on mold •
Housing design/community planning	• Housing regulations seem to differ on reserve • Lack of housing inspection and not as strict on the reserve • Lack of housing options • Lack of housing design including location and trees in yard – all trees clear cut • Homes are built in high water table • Too much politics involved in housing program • INAC still dictates housing program • Housing materials not appropriate for this type of climate • Community planning lacks community input • Lack of training in management and housing program • Homes are to close to each other, to municipal looking • No involvement in landscape design • INAC dictates community design based on consultants without community input
Social Aspects/traditional knowledge	• Traditional knowledge not incorporated into housing design, materials used or community planning • Elders not consulted in community planning • Need to look at entire environment when dealing with housing • Community lacks input in housing design and community planning • Lack of resources provided for training

Social Aspects/traditional knowledge continued	• No choices on neighbors • Lacks family oriented based community planning like we used to have • Need to establish traditional boundaries for the land with the homes on it like we used to do • Lack of ownership of homes due to housing design and community planning

5.6 Summary

The interviews were conducted in personal settings initiating discussion relating to four categories by presenting general questions. Consent forms along with confidentiality were discussed at the beginning of the interview to ensure participants felt comfortable in providing honest discussion. Interviewees were also informed that if they did not feel comfortable at any point, the interview would be stopped immediately based on their request.

Specific patterns and trends that emerged from the interviews had overarching themes relating to lack of education, training, communication and incorporation of traditional knowledge. Participants acknowledged that the housing program has drastically improved over the years but still lacks community consultations. The current housing program does not incorporate any traditional knowledge and is predominately INAC driven. The community needs to be more involved in all aspects of the current housing program in an effort to alleviate health problems associated with mold growth in the community.

Chapter Six

6.0 Analysis and Discussion

This section provides analysis and discussion of the issues related to social aspects affecting mold growth as noted in previous sections. Further collapsing of survey, roundtable and interview results is undertaken in the search to determine core responses that will best assist in explaining the data. This section discusses limitations associated with surveys, roundtables and interviews and offers conclusions and recommendations based on the findings from the three methods. This section also provides insight into further research needed, along with information gaps as they relate to mold and housing issues for First Nations.

6.1 Limitations

First Nation people are often inundated by surveys requesting information from them and don't see any benefit in responding since in many instances, the results are not shared with the participants. This presents limitations when collecting data using this method because often not enough surveys are completed to provide a true picture or to provide enough data to perform meaningful statistical analysis, as is the case in this study. Also, First Nation people are traditionally an oral people, which is a barrier when trying to use impersonal written surveys to collect data. First Nation people prefer to discuss issues in a collaborative manner and as a collective, so surveys as a general rule should not be used to gather data. Unfortunately, due to time and financial constraints, surveys were issued to Mississauga First Nation as a first step in this research. Due to the

limited number of surveys returned, it is difficult to conduct meaningful statistical analysis on the data.

Roundtable discussions and interviews are more effective in collecting from First Nations participants, but do pose limitations in other ways. In particular to this study, the roundtable was designed with the assistance of the housing director and band manager, which ultimately presents human bias as to the specific participants invited to participate in the roundtable. Efforts were made to encourage inclusion of a variety of participants by grouping participants into categories, such as youth and elders, but even this type of method has human biases since the community is a relatively small community and most are related through family and marriages. These types of limitations are difficult to overcome in many First Nation communities, so randomly choosing participants for both the roundtable and interviews is more effective, but also breaking the potential participants into age groups, such as the youth and elders, will ensure data is collected from representative population.

For the survey, health status of the individual and family were self reported. This may influence the data as there are numerous factors that affect the health of an individual, and their perceptions. Obtaining information for this particular study is based on questions that reflect the particular person's opinion, which allows for biases to be reflected in the data. It is rather difficult to ascertain the amount of mold growth in an individual's house without doing physical inspections. Without the physical inspections, a clear indication of the amount of mold growth located in First Nation communities is difficult to determine.

The questions for the roundtable and interview were designed to initiate discussion on the social aspects affecting mold growth and to what extent mold growth is present. This allows for perceptions to be incorporated into the data collection which is biased by individual perceptions. Not all questions designed for the roundtable or interviews were specifically addressed since discussions flowed smoothly into topic categories without having to prompt individuals. Once again, personal bias is encountered in collecting data through roundtable and interviews due to the design and the research questions posed in this particular study, however, this is more than offset by the more robust and diverse participation of community members and for the purposes of participatory action research.

6.2 Conclusions

Studies such as Zock et al.(2002), have clearly indicated that molds are capable of adversely affecting human health. It is therefore apparent that reduction and prevention of mold exposure is needed to decrease the associated risks to human health. Molds are always present in the air; however decreasing the adverse health affects from mold exposure is to prevent mold growth in the indoor environment. Home occupants, home builders and housing managers need to know effective means of avoiding mold growth that might arise from maintenance and construction problems but also from housing programs and community planning.

The aim of this research analysis was to identify patterns, themes and relationships that emerged from the input provided by research participants. The patterns

and relationships that emerged are related to lack of ownership of the houses, lack of input into the design of the house, lack of community knowledge in community planning, and lack of a community driven housing program. Ultimately, the goal of this research was to share the findings with First Nations communities so that they might be able to develop better housing programs for their individual communities. According to the findings in this research, the patterns and relationships that emerged are all components of the mold issues in First Nations communities. The findings in this research indicate a need for a new First Nation driven model for housing in order to address the mold issues. In order for this research to be effective in assisting First Nation communities with their housing programs, solution based recommendations, such as a community driven housing program, had to be developed and designed to address real problems associated with housing programs and mold growth.

A sustainable community is a self-governing organization that can achieve economic and community development by instilling social interaction in the decision making process and a sense of social responsibility through community driven solutions. In the relatively recent history of First Nations peoples, the assumptions, values, and knowledge of the settlers have come to form the basis for most of the institutions, laws, programs, and policies of government institutions. First Nations are now demanding that culturally appropriate systems be developed by themselves so that they may work out their own problems. Community knowledge must be the foundation of these systems to reverse the cycle of dependency within First Nation communities. They will require holistic, integrative and unifying strategies that address social, economic and health improvement simultaneously.

First Nation communities are often forced to conform to the dominant housing programs developed by governments, often leading the community into a distressed state. The distressed communities often suffer from fragmented social fabric due to being forced to conform to inadequate dominant housing programs. Dominant housing programs are often imposed on First Nation communities and in many instances the communities are forced to accept them in order to gain access to new houses in their communities. These results in further suppression of First Nations people and inadequate housing programs which keeps First Nation communities living in third world living conditions.

It is apparent that a community driven housing strategy needs to be designed by the individual First Nation community in an attempt to alleviate problems with mold growth. The assorted and multidimensional concerns that give rise to housing problems in First Nation communities have proven to be intellectually daunting and highly resistant to positive change. Significant changes to government driven housing programs, along with adequate resources, are critical to the development of a community driven housing strategy. Merely developing a generic housing program for First Nation communities and forcing the communities to conform is no longer adequate.

It is disturbing to discover that 13 out of 18 people surveyed indicated that they have mold growth in their homes; that all participants at the roundtable agreed it is most likely every other house in the community has mold growth; and in the interviews, the participants indicated that mold growth is still very predominant in community homes. This indicates a need for clear solutions to be designed by developing a community driven housing strategy specific to the First Nation community.

Possible components of the community driven housing strategy could include a communications plan, a training and education component, and the development of guides for designing, maintaining, and building homes that are culturally sensitive and reflect the values that First Nations communities wish to live by. The community driven housing strategy could also address community planning issues related to row housing and best geographical locations for the homes.

At the heart of all First Nation communities that have successfully addressed their housing needs has been the development of a community driven housing strategy with allocation of adequate resources (Green, 2002). A community driven housing strategy represents the culmination of a process in which community members take ownership for improving their housing conditions. The strategy should be based on an realistic assessment of the existing housing conditions and community needs; the development of a shared vision of what the community's housing will look like in the long term; the development of a series of goals to guide the community in attaining is long term vision; the development of specific workplans allowing the community to meet their goals and; consistent commitment to implement the community developed strategy.

A community driven housing strategy represents a road map to the future for the community. When multi-year plans are developed and communicated, there is greater likelihood of continuity in the community. A shared vision for the multi-year plan is powerful means of empowering community members. The multi-year plan will serve to clarify actions and initiatives which are required to move the community to becoming more sustainable for the next seven generations.

In order to develop an effective community driven housing strategy, key steps are required. First, community support and participation is essential. To obtain community support, a steering community comprised of community members would be beneficial. The steering committee should have key individuals from the community such as elders and youth and should also be gender balanced. Second, First Nation political support is essential. This can be obtained by meeting with Chief and Council to discuss a community driven housing strategy. Also, meeting with the housing portfolio holder Councilor from the community would ensure further political support. Lastly, their must be financial commitment by government in order to build capacity of the housing director. This can be obtained by accessing training dollars offered by various organizations such as the Canadian Housing Mortgage Corporation. The community driven housing strategy must follow a process that is transparent to all community members, and community leadership must fully understand the proposed process in developing the strategy.

The social aspects relating to inadequate housing programs in First Nation communities need to address individual communities concerns in order to become a more effective housing strategy. Linking holistic community planning in a way that builds community capacity can combat costly short-term solutions for alleviating mold conditions. The key to the development of an effective housing strategy is the involvement of community members which could entail the development of a community circle. The community circle would develop their mandate, functions, and guidelines based on collective decision making. Also, the community circle would be tasked with communicating the strategy to both community members and community leadership

through a communication plan. The community circle could incorporate local traditional customs, such as elder, women, and youth participation. The community circle would allow for social issues relating to inadequate housing, such as lack of ownership, to be addressed in a more traditional manner. Traditional circles are considered a form of education. Learning of traditional responsibilities associated with living in a family circle has the potential of dealing with modern ownership issues.

In the past, First Nations people have lived sustainably in community groups for thousands of years. The community groups' decisions were based on a collective and collaborative approach. In order for a community driven housing strategy to be effective and accepted, community members need to have the opportunity to provide input and commentary into the strategy. When community members are involved in the determination of their future, they are empowered and social capital is built, rather than destroyed (Dale and Onyx 2005). This type of approach forms a community unity and ownership of the strategy based on traditional methods of empowerment, fostering a climate of respect and confidence among community members.

Another component of the community driven housing strategy is the development of culturally appropriate guides for housing design, maintenance, and construction. All too often, housing designs are simply dusted off and presented to the builder. They typically do not reflect the specific climate, social, cultural and economic conditions of specific communities. These types of guides could be developed by the community circle with input from the housing director. This would address specific climate, social, cultural, and economic conditions of the specific community allowing each home owner to have a sense of pride and ownership in their homes. An example of a specific feature in homes

that might address social and cultural conditions of a specific community is homes with an open concept in the cooking and living area allowing for more interaction among the family members. Another example of a specific design of homes that might address economic conditions is using the materials to build the home from that particular area such as log homes.

According to the results in this study, the lack of effective communication materials to homes presents a problem in dealing with mold issues in First Nation communities. Since an association between respiratory symptoms and mold growth has been detected by health studies, it therefore stands to reason that an effective communication plan to implement successful mold remediation would improve the health of the First Nation communities. Occupant perceptions of health risks associated with mold growth will increase with an adequate communication plan. An effective communication strategy must be community driven with input from youth, elders, women, and leaders as a collective. Communication related materials that are driven by the community will ultimately lead to an increased awareness of mold and remediation options. A variety of strategies, such as community competitions to develop logos for cloth bags or fridge magnets, has been effective in many First Nation communities. The competitions incorporate local traditional values, and have an educational component as the competitors must first develop a general sense of the issue before developing logos. This increases community knowledge on the subject, which in this instance would be mold growth.

Another communication strategy is hosting a community event, such as a luncheon, to raise the awareness of an issue. A community facilitator tells a story relating

to a particular issue, such as health aspects associated with mold growth, at a personal level, incorporating local humor and local traditions such as the Ojibway infamous trickster. This type of strategy allows the community to learn of the issue in a comfortable setting and as a collective. Other examples of communication materials with mold information could include cloth bags, magnetic cards, and news flashes posted in the local community newsletters. The design of these types of communications materials could be driven by the community via youth, and community competitions for design of logos, and design of one sentence phrases to assist with awareness of mold growth. Ultimately, the communication plan needs to be developed by community members for the community in order for it to be effective in relaying the message of mold, mold remediation options and health effects related to mold growth.

The results in this study indicated a need for further training for the housing managers in providing adequate information to community members. The need for training is a component of First Nation capacity building leading to sustainability. Housing managers need adequate tools and education to be able to effectively communicate housing options for community members. Types of training for housing managers could include attending First Nation regional housing workshops that provide a variety of skills, such as effective communication skills. These First Nation regional housing workshops could serve as a networking system to allow housing managers to see how housing programs are delivered in neighboring communities. They could also serve as an opportunity to hear from financial institutions on what types of programs are offered to First Nation community members. The building of local capacity is vital to the communities' success in implementing community programs.

Historically, First Nation communities were shaped by family and the use of local traditional knowledge. Since contact with the settlers, a long history of misunderstandings and sustained attempts to colonize and assimilate First Nation people by a dominant society has forced First Nation communities to live in third world living conditions. How First Nation communities have learned to cope with such foreign impositions on their physical spaces is a story laden with courage, despair and ingenuity. Despite this, First Nations have maintained that their views need to be incorporated into policy development, such as housing strategies, so that effective policy development can occur. There needs to be a major shift in thinking with regard to recognition of First Nation knowledge so that First Nation communities can take the lead on policy development for their communities. This will allow for First Nation communities to move from third world living conditions into adequate living conditions like the mainstream society of Canada.

6.3 Further Research and Information Gaps

Current literature covers many aspects of mold contamination of buildings and their effects on human health. Despite this literature, exposure limits have not been adequately addressed. There are no health based exposure standards or guidelines for mold in residential settings, as well as exposure levels for major residential mold allergies and for asthma exacerbation. There are guidelines for remediation workers that are exposed to mold contaminated building materials, such as the New York City Department of Health, however, without health based exposure standards, appropriate levels of

protection are difficult to ascertain. The development of exposure standards or guidelines could potentially serve to link specific illnesses to indoor mold exposure, thus assisting First Nations in addressing illnesses associated with mold exposure. Quantifying mold exposure also presents a problem and needs further research in order to exposure limits and health effects associated with exposure.

Research funding and time has been spent on intervention of mold. Benefits have been realized in improving housing stock, but intervention programs that adequately address First Nation's communities need further research to determine which programs are more effective.

Environmental health research encompasses a wider range of topics and study designs, and understanding the health effects of environments in which humans live is connected to social concerns about environmental quality and disparities of power and privilege that place differential burdens upon members of underserved communities. Currently there is limited research in relation to social concerns for First Nations as it relates to policy development such as housing programs. First Nation communities vary in cultural diversity and location across the country. In Ontario alone, there are four major linguistic cultural groups, such as the Mohawk and Ojibway, and locations vary from remote communities to communities located beside municipalities.

Further research on housing design, and location might also be helpful in assisting First Nations with mold problems. Traditional housing designs were based on traditional knowledge, such as the circular single family dwellings. The different linguistic cultural groups also arranged their homes based on their traditions, such as the clan system. The clan systems of the Ojibway determined how the homes were arranged such as circular,

and determined the geographical location of the homes, such as that the Bear Clan were typically located at the exterior of the community. This type of information would provide a sense of ownership both individually and collectively leading to better care and maintenance of the homes.

Chapter 7

7.0 A Future Agenda

It was stated in the introduction that First Nation communities are continually plagued with third world living conditions and inadequate housing that is among the worst in Canada. Mold growth continues to threaten the health of community residents and community leaders are inundated with mold growth and health related issues. There is a tremendous amount of information regarding construction and maintenance techniques describing how to reduce and mitigate mold growth, yet First Nation communities are still faced with very high levels of mold growth in their communities. Information is available to communities, but the message is not adequately addressing the concerns by the First Nation communities. Housing design/ownership, community planning, education and training and the inclusion of traditional knowledge are key components in developing sustainable housing strategies for First Nation communities.

A sustainable community is a self-governing organization that reconciles economic and community development by integrating social interaction in the decision-making process and a sense of social responsibility through community driven solutions. In order for a First Nation community to secure the benefits of a sustainable housing

program, increased community driven solutions must be incorporated into housing programs. The values of the community must be integrated into the current government housing program providing community based solutions to develop sustainable housing. These types of efforts will draw from the entire community and will also create a foundation for building social capital. Social capital has an important role in the move toward sustainable housing, and depends on a sense of confidence and mutual trust. In essence, social capital consists of health, knowledge, skills and motivation, all of which are required for the creative work of sustainable housing development. Sustainable communities are those that consider community consensus through participatory management and community consultations. First Nation communities require acceptance through consensus of the existing generations, then a consensus process must be passed on to those generations yet to come, always leaving room for improvement and an acute consideration for change.

At various levels of government, it is now being recognized that inclusion of First Nation perspectives into policy development for First Nations is needed in order to effectively implement policies for First Nations. It is also being recognized that this is a key ingredient in the development of sustainable housing and sustainable planning for First Nation communities. Sustainable development acknowledges the need to work with Aboriginal people to address their housing concerns, and to increase their participation in the resolutions, so that they themselves secure the benefits. Sustainable development in this context refers to the quality of life by allowing community driven solutions leading to social unity in the community. A sustainable community thus empowers itself to develop capacity to advocate a compelling vision of the future, and to promote

mechanisms that will offer a sustainable society. More specifically, it will empower the community to advance the principles and practices of sustainable housing and community development, and to support and encourage First Nation leadership and local community members, to identify, take ownership of, and act on community driven solutions.

Linking ecological systems and the natural environment with community housing and planning is key to progressive development in Aboriginal communities. Such strategic linkages have the potential to provide real opportunity, and self-sufficiency, for Aboriginal communities. The challenge for Aboriginal people is to create and maintain healthy local economies, based on a healthy environment and sustainable use of resources, by combining old and new ways. It becomes crucial and more productive to support First Nation people in developing their own community driven solutions in policy development including housing programs allowing for sustainable development to be incorporated for the next seven generations.

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Appendix A – List of Survey Questions

MOLD RESEARCH IN ONTARIO'S FIRST NATIONS

Sue Chiblow

Supervisor
Dr. Ann Dale
Royal Roads University

Anii, my name is Sue Chiblow and I am presently collecting information regarding mold growth in homes. The survey will only take a couple minutes of your time and is strictly confidential. No names will be used in the final report and the only information presented to the public will be in the format of numbers. Chief and Council have approved this survey.

If at any time, you do not want to answer a question, please state "NO ANSWER". There are no right or wrong answers and your answers are important and will be kept strictly confidential. If you have any questions, regarding this survey, please contact me.

Survey Questions

Overall Research Question:
What are some of the social aspects affecting mold growth in First Nations and to what extent is mold present?

1. In general, how would you rate your family's current health?
    a. Good
    b. Poor
    c. No response

2. Do any of your family members suffer from allergies?
    a. Yes
    b. No
    c. No response

3. Does any family member suffer from any chronic respiratory conditions (lung infections, asthma, bronchitis)/
    a. yes

   b. no
   c. no response

4. How long have you lived in this house?
   a. Less than 5 years
   b. More than 5 years

5. On average, how much time do you spend in the house per day?
   a. 0-8 hours
   b. 9-18 hours
   c. 19-24 hours
   d. No response

6. Did you assist in the design of your house?
   a. No
   b. Yes
   c. No response

7. would you like to assist in the design of your house?
   a. No
   b. Yes
   c. No response

8. are you aware of mold growth in your house?
   a. No
   b. Yes
   c. No response

9. are you aware of the health affects caused by mold growth?
   a. No
   b. Yes
   c. No response

10. Are you aware of the different options to repair mold growth in houses?
    a. No
    b. Yes
    c. No response

11. Have you ever received information regarding mold growth?
    a. Yes b. No

12. What type of information was it?
    a. Flyer
    b. Newsletter
    c. Pamphlet
    d. Other:_____

13. What type of house do you live in?
    a. CHMC housing
    b. Band owned
    c. Personally owned
    d. Other:_____

14. How many bedrooms in your home?
    a. 1
    b. 2
    c. 3
    d. 4
    e. Other:_____

15. Do you have a basement?
    a. Yes b. No

16. What are the walls made of?
    a. Drywall
    b. Wood
    c. Stucco
    d. Other:_____

17. Do you have a H-Vac (venmar) System in your home?
    a. Yes b. no c. not sure

18. Do you think the H-Vac system works properly?
    a. Yes b. no c. not sure

19. Are you happy with your home?
    a. Yes b. no c. sometimes

20. What do you think are the problems associated with mold growth in First Nation housing?

_____

_____

_____

_____

_____

Meegwetch

Appendix B – List of Roundtable Questions

Roundtable Questions

Overall Research Questions:
What are some of the social aspects affecting mold growth in First Nations and to what extent is mold growth present?

Education and Training

1. What are the perceptions of the housing program in your community.
2. What are the perceptions of mold growth in your community.
3. What type of housing programs are offered in your First Nation?
5. Is this housing program is effective?
6. Are you aware of any other housing programs for First Nation?

Health Related/Mold Related

7. How would you rate your health and your family's health?
8. [Are you aware of] what are the health affects associated with mold growth?
9. Have you ever received any information on mold growth from the band office/health station or any place?
10. Is there mold growth in your community's homes?
11. What causes mold to growth?

Housing Design/Ownership

12. Do community members have any say in the design of your house?
14. What type of community planning is in your First Nation community?
15. Is TK incorporated into the community planning?
16. In general, are the designs of community houses satisfactory? Does it feel like you home?

Social Aspects/Traditional Knowledge

17. Describe social aspects that are affecting mold in the FN housing programs?
18. How do our communities and the building of our houses differ from Canadian communities?
19. Is there a role for indigenous values and cultures to be integrated into community planning?
20. Should traditional knowledge be incorporated into the housing program?
21. What barriers exist to the inclusion of traditional values and cultural into the building of First Nations communities?

Appendix C – List of Interview Questions

Interview Questions

Overall Research Questions:
What are some of the social aspects affecting mold growth in First Nations and to what extent is mold growth present?

Please describe the following;

Housing Programs

1. Your general feelings/perceptions of the housing program in your community.
2. Your general feelings/perceptions of mold growth in your community.
3. How many people live in your home (including children)?
4. What type of housing programs are offered in your First Nation?
5. Do you think this housing program is effective?
6. Are you aware of any other housing programs for First Nation?

Health Related/Mold Related

7. How would you rate your health and your family's health?
8. [Are you aware of] what are the health affects associated with mold growth?
9. Have you ever received any information on mold growth from the band office/health station or any place?
10. Do you have mold growth in your home?
11. What do you think causes mold to grow in your home?

Housing Design/Community Planning Related Questions

12. What is the age of your home?
13. Did you have any say in the design of your house?
14. What type of community planning is in your First Nation community?
15. Is TK incorporated into the community planning?
16. In general are you satisfied with the design of your house? Does it feel like you home?

Social Aspects/Traditional Knowledge

17. Describe what social aspects you think are affecting mold in our housing programs?
18. How do you think our communities and the building of our houses differs from Canadian communities?
19. Is there a role for indigenous values and cultures to be integrated into community planning?

20. Do you feel traditional knowledge should be incorporated into the housing program?
21. What barriers exist to the inclusion of your values and cultural into the building of First Nations communities?

22. Any other issues?

Appendix D

Map of First Nation Communities Located in Ontario