



Atlantic Seniors Housing  
Research Alliance  
Alliance pour la recherche  
sur le logement des  
personnes âgées dans  
les provinces de l'Atlantique

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# ***CURA - Projecting the Housing Needs of Aging Atlantic Canadians***

## ***PHASE ONE REPORT***

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# Table of Contents

<b>Table of Contents</b> .....	<b><i>i</i></b>
<b>1 Background</b> .....	<b>1</b>
1.1 Project Outline.....	1
1.2 The ASHRA Team and Overall Project Goals.....	2
<b>2 Phase One</b> .....	<b>4</b>
2.1 Phase One Tasks.....	4
2.2 Phase 1 – General Conclusions.....	8
<b>3 Age and Housing</b> .....	<b>10</b>
<b>4 Community Profiles Model</b> .....	<b>11</b>
<b>5 Some Examples</b> .....	<b>23</b>
5.1 An illustrative example of applying the model.....	23
<b>6 Endnotes</b> .....	<b>28</b>
<b>Appendix A - Users' Guide to the Model</b> .....	<b>31</b>
<b>Appendix B - Profile of Seniors in Nova Scotia</b> .....	<b>32</b>
<b>Appendix C - Profile of Seniors in Prince Edward Island</b> .....	<b>36</b>
<b>Appendix D- Profile of Seniors in New Brunswick</b> .....	<b>40</b>
<b>Appendix E - Profile of Seniors in Newfoundland and Labrador</b> .....	<b>44</b>

# 1 Background

*ASHRA developed its name, logo and website with the needs of Atlantic Canadian seniors in mind. For example, [www.ashraca.com](http://www.ashraca.com), our website, has incorporated senior friendly design principles.*

This project is the collective effort of the Atlantic Seniors Housing Research Alliance (ASHRA), a consortium of universities, seniors' organizations, housing developers, service providers and government departments. ASHRA is building community research capacity to address the unique challenges facing seniors in Atlantic Canada:

- A higher and growing proportion of elderly, resulting in a higher demand for variety of housing options
- A lower than national average income level reducing the feasibility of some housing options, and
- A larger proportion of elderly living in rural areas requiring different strategies.<sup>1</sup>

## 1.1 Project Outline

This five year project (2005-2009) will develop a detailed profile of Atlantic Canadians over the age of 65 and their housing needs over a 20 year period to 2026 and match that profile with emerging options in housing choices. The research will utilize Census Canada data in combination with health and wealth predictors; survey more than 1700 individuals on their housing and service preferences; and undertake focus groups in all four provinces. An inventory of seniors housing supply will be constructed and profiles of housing options available in other regions and countries will be prepared. In addition, the project team will undertake research into housing policies and other determinants of both supply and demand.

Over the course of the project a report will be prepared at the completion of each phase of the project and a website – [www.ashra.ca](http://www.ashra.ca) – will provide electronic access to the geo-demographic model and other research activities and findings. The results of the project will inform public policy development and provide community and seniors' organizations with a greater capacity to engage in planning and advocacy initiatives.

## Project Funding

Principle funding for the ASHRA research project is supplied by the Social Sciences and Humanities Research Council of Canada (SSHRC) through its Community-University Research Alliance (CURA) Program.

ASHRA is most appreciative of its SSHRC support and its other funding partners, including: Canada Mortgage and Housing

Corporation, the Nova Scotia Departments of Community Services and Health, the New Brunswick Department of Family and Community Services, and the Newfoundland and Labrador Housing Corporation as well as the support of participating universities including Mount Saint Vincent University, Dalhousie University, University of Prince Edward Island, Memorial University of Newfoundland and the University of New Brunswick.

## ***1.2 The ASHRA Team and Overall Project Goals***

***ASHRA research team members represent a broad range of experience and expertise – from health care, seniors' advocacy, housing development – and work within the private, public, and community-based sectors.***

The alliance is composed of 37 representatives from Atlantic-based service providers, seniors' organizations, governments, and universities, all of whom represent various areas of expertise and focus. ASHRA's inaugural meeting took place at Mount Saint Vincent University (MSVU) on February 3 and 4, 2005, in Halifax, Nova Scotia.

Team members play different roles within the Alliance. Some act in an advisory capacity; others participate more actively in ongoing research program design, implementation, and evaluation. All members of the Alliance contribute to the intellectual direction of the project and the project has benefited greatly from ensuring representation from both university and community-based researchers in all decision-making and working groups. In addition, the Alliance works closely with stakeholders (including seniors, seniors' clubs and organizations, and municipal and other provincial representatives) in both the gathering and dissemination of information on seniors' needs and issues related to housing.

Since its inception, one of the main strengths of the alliance is the degree of collaboration among its 37 members. This high level of collaboration has been fundamental to the project's successes thus far and will be of critical importance as the Alliance continues to work to meet the project's main objectives, which include:

- To predict the housing needs of Atlantic seniors up to 2026
- To inform policy makers if existing policies and programs meet current and future needs
- To provide an inventory of housing options to Atlantic seniors and their families
- To increase capacity for research among community-based organizations
- To increase collaboration among community-based research partners and academics, and
- To increase the learning and employment capacity of students

A community-university collaboration of this size inevitably faces challenges related to engaging meaningful participation amongst all members across geographical, linguistic, and sectoral differences. For example, academics are required to adhere to

strict, scientifically-based guidelines for research about housing issues, while community-based researchers may focus on the use of equally valid experiential, personal accounts of housing situations involving seniors. As will be discussed in the next section, ASHRA is doing quite well at balancing these potentially divergent interests and approaches.

The degree of success achieved in ASHRA's first phase has a great deal to do with establishing effective communicative and decision-making structures – including the Research Management Team as well as provincial Research Implementations Teams and Stakeholder Groups – as well as responding to the ongoing ideas and concerns of members.

Along these lines, an ASHRA Evaluation program has been developed by a Steering Committee to assess the effectiveness of all aspects of ASHRA. The Steering Committee is comprised of seven community and academic-based members, representing all provinces, who were drawn from the 37-member research team. The evaluation team, made-up of members of the Alliance, has the responsibility to undertake a formative (ongoing) and summative (outcome) evaluation. This report draws heavily on the Phase I Evaluation Report that was completed in March 2006.<sup>2</sup>

## 2 Phase One

As we age a wide range of factors shapes our needs and wants and, our ultimate choices, as consumers. Three of these factors, actual age, health status and wealth status, can be effectively used to segment the older adult market, typically those 65 years of age and older, into sixteen groups.<sup>3</sup> These groups can then be used to predict likely housing needs over time.

In the first year of the ASHRA project our primary focus has been on

(a) building the ASHRA research team, administrative structure, and outlining a research protocol, and

(b) developing a website and on-line database driven model that allows community based groups the ability to research their community both today and up to 2026.

### 2.1 Phase One Tasks

#### ***Phase One: January - December 2005 (12 months)***

In our SSHRC proposal we described the Phase One objectives as ascertaining the housing demand of the target population based on the 2001 census data at the local level of three digit postal codes (Forward Sortation Areas or FSAs) and predicting the likely housing choices seniors could need based on their health and wealth states. The development of a geo-demographic model that identifies where our aging population is most likely to live for the next 20 years was planned. Geo-demographic models combine statistical projections with the richness of geographic or place based information allowing the development of dynamic maps that portray the changes in the selected population variables. Our model is based on age, gender, place of residence, the predictive factors of health outcomes and wealth for each FSA.<sup>4</sup>

In Phase One the ASHRA team had four major objectives:

- 1. To increase collaboration and capacity building in the community and academic venues**
- 2. To build infrastructure to support ASHRA**
- 3. To develop the ASHRA website**
- 4. To test the geo-demographic model**

Specific activities planned to achieve those objectives included:

- Develop a memorandum of understanding between MSVU and all the participants and partners

- Develop a research protocol document reflecting the collaborative spirit and intentions of the CURA, while assuring full community partner engagement and informed participation
- Design a visual identity program for the project (i.e. a logo, website design, letter head, newsletter design)
- Design the predictive geo-demographic model based on an existing model used successfully to predict seniors demand for assisted living choices
- Acquire the 2001 geo-demographic files for each of the 218 FSAs in Atlantic Canada
- Produce the model
- Develop a user-friendly searchable web site that houses the geo-demographic model within a searchable application. The web site will be updated regularly throughout the CURA
- Develop the design, instruments and infrastructure for the qualitative phase (Phase Two) of the project ensuring participatory input and decision-making from project co-applicants, collaborators and partners

The Evaluation Steering Committee reported that ASHRA largely met its Phase One objectives. Evaluation results also indicated that the team could enhance its successes in each of the areas. The following discussion briefly outlines the activities, key successes, and challenges associated with the four Phase One objectives.<sup>5</sup>

## ► Phase One, Objective 1: Collaboration and Capacity Building

### Activities

- Established four provincial stakeholder groups that represented a broad range of organizations, communities, and sectors
- Development of project network, building of relationships, outreach to seniors, ongoing stakeholder recruitment
- Convened provincial stakeholder meetings and teleconferences
- Ongoing communication between stakeholders and Research Implementation and Management Teams through meeting minutes, phone calls, and circulation of other documents
- ASHRA Team collaborated on promoting awareness of the project through the media, conferences, meetings, and community events
- Student learning and active involvement in all aspects of project
- Community-university survey working group convened and guided development of Phase 2 research design

### **Key successes**

The ASHRA team successfully met its objective of engaging members and stakeholders which enabled meaningful collaboration and progress towards capacity building among both community and academic members of the Alliance. The project developed many relationships including a diverse participation from representatives of seniors' organizations, government and the private sector.

The provincial stakeholder groups identified new issues that need to be addressed during the project, and they influenced the research process (e.g., identifying the need to provide provincial summaries from the geo-demographic model to be useful for policy purposes). There has been effective communication, which facilitated good decision-making by the Research Management Team. As reported by the evaluation team, "...incalculable acts, such as showing respect and valuing members' input illustrate how ASHRA members were not only willing to reach out to their community counterparts, but were also willing to listen to what they had to say. An example of this is the special effort made to resolve issues of some committee members feeling undervalued by academics."

### **Challenges**

Although ASHRA met many of its objectives in this area, the team has room for further improvement. The high degree of collaboration has not extended to all members, indicating a need for additional opportunities for inclusion and involvement. Also, some feedback indicated that meetings themselves could be improved in terms of accessibility. Progress has already been made in addressing these issues in Phase 2, including broader member participation in various aspects of the survey promotion and implementation as well as the improved accessibility of meeting locations and structures.

## **► Phase One, Objective 2: Infrastructure**

### **Activities**

- Held start-up meeting and regular provincial stakeholder meetings
- Developed formal agreements between project partners (MOUs)
- Defined work plan, timeline, roles and responsibilities, hiring policies, financial administration system
- Established and built on the Research Management Team (RMT) partnership
- Created formalized roles and hired staff, e.g. project coordinator, RMT and Stakeholder Group Co-Chairs, student workers
- Generated and circulated team member contact lists
- Developed working groups for various project tasks

- Used private side of the website for communication and document development

### **Key successes**

The infrastructure successes included formal agreements, hiring of staff, and development of a senior friendly web site, with a private side for member communication. The private side was also used to develop clearly defined structures including the RMT, stakeholder groups and implementation teams. These structures provide a common forum for examination of the issues, a place to conduct research and identify policy gaps on housing. The evaluation team reported that ASHRA's solid infrastructure has helped to ensure effective communication, essential in building partnerships. The involvement of students was a truly comprehensive and coordinated effort on behalf of the team members and the students themselves. ASHRA students are an integral part of the projects' infrastructure.

### **Challenges**

One challenge was identified as the lack of representation for some of the more remote areas in the region (i.e. Labrador, Northern NB, Cape Breton, Southern NS, eastern PEI) and a lack of representation for certain groups (i.e. baby boomers). A special effort will be made in phase two to reach out to seniors' groups in remote areas.

## **► Phase One Objective 3: Develop ASHRA Website**

### **Activities**

- Conducted research on senior-friendly websites
- Created the ASHRA website
- Edited and performed internal testing of the website
- Received training on how to present research content on website

### **Key successes**

The ASHRA team successfully met the objective of developing, testing, and publishing a senior-friendly website for the project. The Evaluation report indicates that the stakeholders and ASHRA partners perceive the website to be a key activity and user friendly. ASHRA members, in general, saw the website to be useful for passing information and learning amongst its team members. This speaks to the level of skills ASHRA has to draw upon and to the building of skills related to computer training.

### **Challenges**

The website may be a challenge for some seniors as some do not have computers and / or Internet access.

## ► Phase One Objective 4: Test Geo-demographic model

### Activities

- Produced the geo-demographic model
- Tested and reviewed the model
- Promoted the model within and beyond ASHRA stakeholder network
- Held a press conference and conducted media interviews on the model

### Key successes

The geo-demographic model was successfully developed and information from the model has already been shared with provincial stakeholders (e.g., provincial summaries were shared with two seniors' policy initiatives in Nova Scotia). The Evaluation report indicates that ASHRA stakeholders and partners see it as a user-friendly learning tool for the team and beyond. This speaks to the commitment and willingness to learn among the members, and to the fact that the public will be able to manage and understand the model. Members feel that the model will be useful for government planning purposes and could thus be the impetus for future collaborations on seniors housing issues.

### Challenges

As with the website in general, the model will be less useful for those seniors without Internet access. The Evaluation report indicates that some members find they are not able to make use of all of the relevant FSAs, indicating that some may have difficulty in understanding its full applicability at this point in time. Steps have been taken to address these issues with the development of a simple User's Guide<sup>o</sup> for the model and a series of speaking engagements where project team members have explained the model's use and implications to interested organizations and groups.

## **2.2 Phase 1 – General Conclusions**

The demonstrated ability of the project to achieve its overall goals and meet timelines in Phase I was seen to build community partner and stakeholder interest in participating in later stages of the project. Late in Phase One a working group was established to guide the design, coordination, and implementation of the principle research piece in Phase Two – the surveying of over 1700 Atlantic Canadians Seniors about their housing and support service needs and preferences. The Survey Working Group and Nova Scotia and New Brunswick stakeholder survey review committees began work to adapt a CHMC interview questionnaire for mail-out methodology; to respond to the Atlantic Canadian context; and to be driven by a determinants-of-health approach.

The remainder of this report will be dedicated to a more detailed description of the rationale for, development of, and examples of use of the predictive geo-demographic model.

### 3 Age and Housing

**Atlantic Canadian seniors:**

- **Represent a greater proportion of the population than seniors in the rest of Canada**
- **Have lower incomes than seniors in most other provinces**
- **Are more likely to live rurally than seniors in the rest of Canada**

Much has been written about the housing needs of an aging population. The 2005 report "Strategy for Positive Aging in Nova Scotia"<sup>7</sup> captured the essence of this need in defining their positive aging goal for housing as "affordable, accessible, safe and supportive housing options available to seniors". Canada Mortgage and Housing Corporation (CMHC) has actively developed material since 1991 to assist communities in determining seniors' needs and preferences for housing and support services, and to identify options for meeting them.<sup>8</sup>

Despite the obvious aging of our population, the general public seems to be surprised at the scale and intensity of the challenge facing all parts of our country, but in particular, Atlantic Canada.

This region differs from the other regions in Canada in three main age-related aspects. First, the Atlantic Provinces have seen a higher rate of increase of the elderly population compared to the rest of Canada.<sup>9</sup> Only a decade ago, the median age for the four Atlantic Provinces was lower than the median age for the nation. By 2001, the median age had increased above the national average, largely as a result of continuing out-migration. As these trends continue, Atlantic Canada will need to increase its capacity to accommodate this rapidly increasing elderly population.

Second, the income level of seniors in the Atlantic Provinces is lower than the national average. The median income of individual seniors in 1995 was \$14,200 in the Atlantic region. Quebec was the only province with a lower median income (\$14,000 for individual seniors). Because of this limited income, housing costs usually represent the largest single expense for seniors.<sup>10</sup> Although the average income of seniors has been increasing over the last few decades as noted above, the average income of Atlantic seniors will still be lower than the national average, limiting their housing options.

Third, the proportion of Atlantic Canadians living in rural areas is considerably greater than those in other areas of Canada. According to the 2001 Census, 46% of the Atlantic Canadian population lives in rural areas compared to 20% of the nation's population. The median age of residents in rural areas in Atlantic Canada is also higher than the national level. The greater proportion of the population living in rural areas will affect the living choices of seniors as well, as they will not have the variety of options available to those living in urban areas. This combination of higher median age, lower income level and larger rural population makes Atlantic Canada a unique area with an urgent need to address both the current and future housing needs of seniors.

## 4 *Community Profiles Model*

Just as the post-war baby boom shaped the very fabric of everyday life in North America for the past five decades, similar far reaching impacts on our society will continue to happen as these cohorts age. As the oldest boomers turn 60 this year and the youngest near their forties, people are recognizing that this is not just a short term phenomena, rather it represents a significant permanent shift. In the past, we used the term “seniors” to cover anyone over 65. That term is no more descriptive than the concept “teenager” is to describe the characteristics of that age group. It is unlikely that a product or service would be designed for a vague concept such as teenagers based solely on birth date. It is the same for the aging population; some will be healthy and wealthy; others will not; some will value travel and family; others will not.

Just as consumers differ greatly in their needs and wants when they are twenty, so too will they differ greatly when they are seventy. Marketers have always understood the value of the aging market but have been reluctant to pursue this group of consumers. Part of this reluctance is a negative association with aging. Businesses do not want to be associated with target markets that may be perceived as “old fashioned” or customers who are seen as infirm or weak.<sup>11</sup> Another factor in this reluctance is the lack of understanding many may have of the aging process and how this affects different groups. Despite this reluctance, one more Canadian reaches 55 years of age every minute of every day and there are over 7 million Canadian baby boomers marching up the age ladder representing 23.6% of Canadians.<sup>12</sup> In the United States the numbers are even more impressive as 76.9 million baby boomers make up just fewer than 27 percent of the population.<sup>13</sup>

Housing has been described as the foundation of social care.<sup>14</sup> The importance of housing is further reinforced in the United Nation's International Plan of Action on Ageing<sup>15</sup> which states

‘suitable housing is even more important for the elderly, whose abodes are the centre of virtually all of their activities’.

It has been estimated that older people spend between 70% and 90% of their time in their home therefore, an appropriate living environment should be considered crucial to maintain and/or enhance independent living. Retaining independence and autonomy are recognized by the UN as being crucial for maintaining quality of life, underpinning policy and practice.<sup>16</sup> For older people, health is widely acknowledged as one of the key elements of the ageing process.

## **Geo-Demographic Modeling**

Geo-demographic models, also referred to as geographical information systems, are used publicly and privately to forecast and control information relating to supply and demand<sup>17</sup>. Geo-demographic models rely on such information as age, socio-economic status, marital status, health status, gender, and location to predict the future needs of local communities, private organizations, and municipal, provincial, and federal governments<sup>18</sup>. A majority of the information used in geo-demographic modeling is derived from census data.

Geo-demographic information systems can be used for the purpose of producing a wide range of information, such as, predicting housing needs, university recruitment information, and socio-demographic changes. With the increased presence of geo-demographic information systems on the World Wide Web, "any member of the public with access to the Internet can quickly and easily gain huge amounts of information in a format that requires no special training to interpret"<sup>19</sup>.

Geo-demographic information systems were, by and large, developed by private business, such as retailers, and have in recent years become increasingly popular among academics and governments<sup>20</sup>. Some organizations have been combining geo-demographic modeling with other methods to optimize their ability to create profiles. For instance, one Australian university is combining Geo-demographic data with profiling data from a regional centre to forecast the feasibility of developing a satellite campus in a given area<sup>21</sup>.

Geo-demographic modeling has been recognized as being on "the vanguard of social science research"<sup>22</sup>. Counter points of view stress the importance of geo-demographics in contributing to the delivery of public and social services, as well as policy development and debate<sup>23</sup>.

## **Forecasting Housing Needs Using Predictive Modeling**

The use of predictive modeling to produce information regarding housing demand is an area where geo-demographical information has assisted in forecasting future demand while also affecting public policy. Forecasting future housing needs by means of using predictive modeling allows for policy and social program improvements, as well as the development of specific building plans that suit the needs of the population<sup>24</sup>.

The following organizations have applied predictive modeling to examine current and future living arrangements and/or housing needs:

► **The Alberta Mortgage and Housing Corporation (Canada)**  
***Cohort Survival Model***<sup>25</sup>

In 1985 the Alberta Mortgage and Housing Corporation produced the Cohort Survival Model. The model is designed to forecast housing needs based on past population estimates and other relevant community information. For each Alberta community of interest the model relies on past population projections, fertility rates, survival rates, and migration rates to produce reports of actual population by age as well as predicted population by age up, to and including the year 2031. Though the model was developed with urban planners, real estate developers and economists in mind, there is no indication that the model was used to predict housing needs and there is no review or measure of the model's success.

► **The Real Estate Foundation of British Columbia (Canada)**  
***Seniors Housing Development Forecast Tool***<sup>26</sup>

In 2002 the Real Estate Foundation of British Columbia produced the Seniors Housing Development Forecast Tool (SHDFT). SHDFT was designed for the purpose of developing and planning adequate housing and support services for seniors. The model provides data for 30 years, from 1996 to 2026. The model combines statistical data and consultations in an attempt to provide an in-depth understanding of seniors housing at present, and relies on current trends to forecast how many seniors will live in a given area in a given future year and what their housing needs will be. The SHDFT model was developed as an instrument for development and policy planning. Here again no information is available indicating how and when the model has been used, or by whom.

► **The North Dakota State Data Centre (United States of America)**  
***Housing Needs Assessment***<sup>27</sup>

In 2004 the North Dakota State Data Centre released a final report detailing their extensive study of current and future housing needs in North Dakota. As a part of this initiative the North Dakota State Data Centre introduced an online housing projection model. The online projection model allows the general public to access such housing projection information as household projections by age and income of householder (both owner-occupied and renter), all of which can be broken down by region. The final needs assessment of housing needs in North Dakota provides profiles of each of North Dakota's eight regions.

► **Urban Futures (Canada), *Urban Futures Projection Model***<sup>28</sup>

In 2006 Urban Futures released *Seniors' Housing Demand in British Columbia over the Next Thirty Years*. The report forecasts growth and changes in BC's population based on the Urban Futures' projection model. This model relies on Statistics Canada (1996 and 2001) data such as living arrangements and patterns of household maintenance, as well as age specific information. The model forecasts housing needs for seniors in the age cohorts from

65 to 85+ from 2005-2035. Since its released in January, 2006, no examples of implementation or measures of success have been made available.

► **The Elmsbridge Borough Council (Australia) *Housing Needs Survey***<sup>29</sup>

In 2005 the Borough Council of Elmsbridge commissioned a housing study that included a component that forecasted housing needs by age up to and including the year 2016. The study relied on mixed methodologies, incorporating a postal questionnaire of 8,500 households; A housing market survey of estate agents; and secondary data as the 2001 Census. Collectively, the data was used to determine the housing needs of the municipality. Trends in birth rates, death rates, age, and migration were used to forecast the future population of Elmsbridge, placing emphasis on the age distribution of the municipality. There has not been a formal review of this assessment; however, the findings will inevitably affect policy and development. For instance, the assessment pointed out that increased consideration has to be given to affordable and accessible housing for the aging population.

Predictive models that forecast housing needs rely on secondary data that is gathered through large surveys, such as the Assets and Health Dynamics Among the Oldest-Old (AHEAD) national survey in the United States<sup>30</sup>, or national census data, such as the Statistics Canada data that was used by Urban Futures to forecast the seniors' housing demand in British Columbia<sup>31</sup>. Combining census and survey information with postal codes, or other community indicators, allow researchers to accommodate the housing needs of individuals, communities and regions<sup>32</sup>.

Predictive models often rely on the same methods of data collection; however, the models often use different indicators, such as health, wealth, birth rates, death rates, and in and out migration rates.

## **A Marketing perspective**

Market segmentation has been a core concept in marketing for many years<sup>33</sup>. As a rule, markets have been divided into segments based on either general variables, which classify consumers by broad characteristics such as demographics or life styles; and by situation-specific variables, which group consumers on some pattern related to consumption like frequency of use<sup>34</sup>.

In a review of the advances in market segmentation, argue that our ability to accumulate and manage ever increasing amounts of data would lead to ever increasing demand for more and finer definition of target markets in most product and service categories.

Predicting the future housing needs of an aging population was presented as a research question to the author as part of a five year project exploring the housing needs of aging Atlantic Canadians. When viewed as a market segmentation problem, housing needs can be seen as composed of four core variables: age, location, health and wealth. Taken together they can be used to identify groups of individuals with differing needs and resources. By using demographics based on geographic location we are able to focus on predicting possible housing choices in specific locations over time.

### **Community Profiles Model Overview**

The ASHRA community profile model has been created to help users gain a better understanding of the possible future housing needs of the aging population in Atlantic Canada.

The starting point is the geographic location defined by the first three (3) designators of a postal code, referred to as Forward Sortation Area (FSA); the smallest geographic unit used by Census Canada and Statistics Canada to collect and report population data. Atlantic Canada has 222 postal FSAs, distributed as follows:

Newfoundland and Labrador	(A)	33
Nova Scotia	(B)	73
Prince Edward Island	(C)	7
New Brunswick	(E)	109

Postal code details and maps can be viewed on the Canada Post website [www.canadapost.ca](http://www.canadapost.ca) .

Each FSA is designed to include roughly 10,000 households. The largest FSA in Atlantic Canada (AOA) has a population of 57,949 and the smallest FSA (B2J), has a population of 144. These illustrate the wide variation in the actual population size of postal code areas.<sup>35</sup>

The choices an individual makes about living arrangements as they age are influenced by many factors. Research has told us that 75% of our aging population would like to age in place – in their own home. Other research tells us that as we age we are likely to move three times after age 65.<sup>36</sup>

Three factors are considered to be most important in determining our living accommodation choices as we age; our health, our wealth, and, the distances to our children.<sup>37</sup> This model uses two of these, health and wealth, as likely predictors of housing need. The underlying assumption is that the healthier and wealthier you are, the greater number of possible housing options you may consider.

The implications for community planning are that those in a healthier state, with access to moderate wealth or more will find housing solutions along the continuum from their own home, to seniors' apartments, condominiums, assisted living complexes. Those in a less healthy state, with limited wealth resources will rely on public or subsidized housing solutions.

By combining the results of queries of several FSAs that make up a community or region, you can build a picture of the likely needs and the individual's ability to pay for housing and care solutions for a larger geographic area.

### **Using the Model**

The Community Profile Model provides the opportunity to obtain information in relation to six (6) key variables, as described below.

**Year:** In addition to being able to examine the 2001 census count of males, females and the total population in each age cohort, you can see the projections of these FSA populations for the years 2006, 2011, 2016, 2021 and 2026. The drop down menu will allow selection of one year. The default option is 2001.

**FSA:** The 3 digit FSA code. The total population of the selected FSA is always displayed as a reference point.

**Gender:** Male, Female and Both.

**Age:** The 2001 Census count of persons aged 50 and over in each FSA forms the demographic base of the model. The model allows searching using the following eight (8) age cohorts: 50-54; 55-59; 60-64; 65-69; 70-74; 75-79; 80-84; and 85+

**Health:** Three surveys representative of the population form the basis of Health States 1, 2 and 3. These are:

- The Health and Activity Limitation Surveys (HALS) of 1986 and 1991.<sup>38</sup>
- The National Health Survey (NPHS) of 1996.<sup>39</sup>

The fourth Health State (Institutionalized) was estimated from the 1996 Census. The prevalence of each health status by age and sex, estimated by means of survey (for health statuses 1, 2 and 3) and census (for health status 4) is historical. The perception of health evolves over time and evidence has shown that life expectancy can grow faster than dependence-free life expectancy.<sup>40</sup> As well, the progressive changes in health care for the aging and new medical solutions for the challenges of age would necessarily impact these data over time.

The model includes 4 Health States (described below), referenced as H1, H2, H3 and H4.

<b>H1</b>	Dependence free Good Health	Individuals who do not need assistance, with the possible exception of heavy housework, and who generally live in single family or multiple-unit housing, either rented or owned.
<b>H2</b>	Moderate Dependence	Individuals who need assistance with meal preparation, shopping, or everyday housework. Home care may be provided within the residence by family caregivers and/or paid care providers.
<b>H3</b>	Severe Dependence	Individuals who need a high level of support, including assistance to move about or for their personal care. They may continue to live in their own home with significant support or may move into an assisted living facility or senior's retirement residence.
<b>H4</b>	Institutionalized	Individuals whose very high level of required assistance usually dictates that they reside in a nursing home or other institution where they can receive extensive support and specialized care.

**Wealth:** The *1999 Survey of Financial Security*<sup>41</sup> provides our second factor, wealth. The survey asked a sample of Canadian families and individuals about the value of their assets and the amount of their debts as follows:

**Assets**

Total value of all financial assets, non-financial assets and equity in business. Respondents were asked to report the market value of the asset that is the amount they would receive if they had sold the asset at the time of the survey. If available, respondents were encouraged to consult financial records. When the value could not be determined through an independent source, the respondent was asked to estimate the value. The assets included are categorized as follows:

- Private pension assets
- RRSPs and RRIFs
- Employer pension plans
- Other private pension assets
- Financial assets, non-pension
- Deposits in financial institutions
- Mutual/investment funds
- Stocks
- Bonds (savings and other)
- Other financial assets
- Non-financial assets
- Principal residence
- Other real estate

- Vehicles
- Other non-financial assets
- Equity in business

Debts are categorized as follows:

- Mortgage
- Principal residence
- Other real estate
- Line of credit
- Credit card and installment debt
- Student loans
- Vehicle loans
- Other debt

Net worth (sometimes referred to as wealth): Defined as the difference between the value of its total asset holdings and the amount of total indebtedness.

The total value of assets less debt is an individual’s net worth. Our model uses the net worth of each age cohort of Atlantic Canadians to develop four (4) wealth states, as follows:

<b>W1</b>	Well off	More than \$301,000 net worth
<b>W2</b>	Moderately wealthy	Between \$151,000 and \$300,000 net worth
<b>W3</b>	Limited Resources	Between \$51,000 and 150,000 net worth
<b>W4</b>	Very Limited Resources	Less than \$50,000 net worth

These wealth states have been set by including all those within one standard deviation of the mean for their province in either Wealth state 2 or 3 and those two standard deviations from the mean in either Wealth states 1 or 4.

### **Assumptions and Limitations of the Model**

Population Projections: These projections have been based on the population projection factors developed by Statistics Canada to produce *Population Projections for Canada, Provinces and Territories 2000-2026*.<sup>42</sup> The key difference between these StatsCan projections and the ones used in the ASHRA model is the starting point. This model begins with the actual 2001 Census count in each FSA while StatsCan projections use the 2000 preliminary population estimates which are based on the 1996 census.

The result of this difference is that our model projections are consistently lower than ones using the current StatsCan projections.<sup>43</sup> This is because the approach based on the 1996

Census typically overestimates the 2001 Census actual results by  $\pm 4\%$ .

In selecting which StatsCan projection scenario to use as the basis of our model projections we have chosen the Low Growth assumption projections. This choice was made as the result of our analysis of the variance between the StatsCan 2001 population projection for each of the four Atlantic Provinces and the actual 2001 Census counts, as follows:

	Low Growth Scenario 2001 Population Projection based on 1996 Census	2001 Actual Census Count Report	% Difference between Low Growth Scenario and actual count
NL	536,600	512,930	-4.6%
NB	757,100	729,500	-3.8
NS	942,500	908,010	-3.8
PEI	139,400	135,295	-3.0

44

By starting with the 2001 Census actual count and using the low growth scenario we anticipate our projections will present a reasonable picture of what may happen in Atlantic Canada through 2026.

Our population projections begin with the actual 2001 census count in each FSA and then use the Provincial level projection factors of the low growth scenario to produce our projections for each FSA.

Our model lets you select an FSA and then examine the 50+ population (male and female) by age cohort to see the likely impacts of health and wealth on these relatively small populations. Because of the nature of population sizes in each FSA and age cohort we are necessarily dealing with small numbers. When a particular result is less than 5 individuals, our model replaces the number with an asterisk (\*).

Appendix A contains a brief user guide for the model.

### **Examples of the Model Queries**

A few examples will help you to understand how you can use the model.

- If you wanted to see the 2001 Census population in a particular FSA or group of FSAs you could simply look at these for each of the eight cohorts and for each of the projection years. You might be interested in understanding how many 85+ persons are projected to live in your area in 2026.

- A. Enter Year
- B. Enter FSA
- C. Enter age cohort

The following result will be shown:

Total Population for **B3T** is 14767

FSA	Gender	Age Group	Number of People
B3T	F	85+	66
B3T	M	85+	25

- You might also ask how many of this population will likely fall into each of the four health states.

- A. Enter year
- B. Enter FSA
- C. Enter age cohort
- D. Enter Health

The following result will appear:

Total Population for **B3T** is 14767

FSA	Gender	Age Group	Health State	Number of People
B3T	F	85+	H1	16
B3T	F	85+	H2	13
B3T	F	85+	H3	14
B3T	F	85+	H4	23
B3T	M	85+	H1	10
B3T	M	85+	H2	6
B3T	M	85+	H3	*
B3T	M	85+	H4	5

*The use of an \* indicates that there are less than 5 persons in this category. Any number less than 5 will not be reported in the tables.*

- If you are only interested in the wealth state of the 85+ age group you can:

- A. Enter Year
- B. Enter FSA

C. Enter Age   
 D. Enter Wealth

Total Population for **B3T** is 14767

FSA	Gender	Age Group	Wealth State	Number of People
B3T	F	85+	W1	17
B3T	F	85+	W2	28
B3T	F	85+	W3	11
B3T	F	85+	W4	9
B3T	M	85+	W1	6
B3T	M	85+	W2	11
B3T	M	85+	W3	*
B3T	M	85+	W4	*

- The final level of analysis combines health and wealth to produce sixteen possible outcomes ranging from H1W1 to H4W4. In the first case (H1W1) would be people who are dependence free, in good health and well off. At the other end of the continuum would be persons with institutionalized dependence and very limited resources.

A. Enter Year   
 B. Enter FSA   
 C. Enter Gender   
 D. Enter Age   
 E. Enter Health State   
 F. Enter Wealth State

The result is shown below:

Total Population for **A0A** is 57949

FSA	Gender	Age Group	Health State	Wealth State	Number of People
A0A	F	75-79	H1	W1	147
A0A	F	75-79	H1	W2	165
A0A	F	75-79	H1	W3	130
A0A	F	75-79	H1	W4	136

AOA	F	75-79	H2	W1	31
AOA	F	75-79	H2	W2	34
AOA	F	75-79	H2	W3	27
AOA	F	75-79	H2	W4	28
AOA	F	75-79	H3	W1	14
AOA	F	75-79	H3	W2	15
AOA	F	75-79	H3	W3	12
AOA	F	75-79	H3	W4	13
AOA	F	75-79	H4	W1	12
AOA	F	75-79	H4	W2	13
AOA	F	75-79	H4	W3	10
AOA	F	75-79	H4	W4	11

## 5 Some Examples

Appendix B through E provide profiles of each of the four Atlantic Canadian provinces illustrating several factors about the emerging housing needs of seniors at that level as follows:

- The percent change in the seniors' population between 2006 and 2026.
- The percent change in seniors living in rural and urban area between 2006 and 2026.
- A comparison of the changes in numbers of individuals in each of the four Health states from 2006 and 2026.
- A comparison of the changes in numbers of individuals in each of the four Wealth states from 2006 and 2026.
- A prediction of the changing needs for institutionalized care from 2006 to 2026.
- A prediction of the changing demand for assisted living facilities from 2006 to 2026.
- A prediction of the potential numbers of 75+ year olds that would be able to remain in their own home comparing 2006 with 2026.

### 5.1 An illustrative example of applying the model

#### FSA: BOS

This FSA (i.e. BOS) consists of the following 12 communities in rural Nova Scotia: (Note that you can find the postal codes of the communities that compose an FSA on the Canada Post web site [www.canadapost.ca](http://www.canadapost.ca) )

Postal Code	Area	Postal Code	Area
BOS 1A0	ANNAPOLIS ROYAL PO	BOS 1K0	GRANVILLE FERRY PO
BOS 1B0	BEAR RIVER PO	BOS 1L0	HAMPTON PO
BOS 1C0	BRIDGETOWN PO	BOS 1N0	MARGARETSVILLE PO
BOS 1E0	CLEMENTSPORT PO	BOS 1P0	MIDDLETON PO
BOS 1G0	CLEMENTSVALE PO	BOS 1R0	PARADISE PO
BOS 1H0	CORNWALLIS PO	BOS 1S0	SMITHS COVE PO

In 2001, this area had a total population of 18,567 with 1,095 persons age 80 and over. We can use the model to investigate what might happen to the population aged 80 and over as we

move from 2001 to 2026. In this example we will look at health and wealth changes over time.

By 2026 this same population of persons 80 years of age and over is projected to increase to 1,670, an increase of 52.5%. The number of older males is projected to increase by 68.5% while the similar group of females only grows by 43.7%. By 2026 the number of females 80 years of age and over is projected to reach 1013 and that of males to reach 657. The total population of the FSA is projected to decrease to 18,432 in 2026, a decrease of less than one percent. This decrease in the total population highlights the greater impact a growing aged population is likely to have in the area.

By combining the two age cohorts of 80-84 and 85+ in a spreadsheet, (to use Excel or a similar spreadsheet you must open this program in another window and copy the model results into your spreadsheet), we can produce the following three tables from the information in the model:

- Table 1 presents the total population of those 80 and over in each of the sixteen possible health and wealth state combinations for 2001 and 2026.
- Table 2 compares those 80 and older in the wealthiest state in 2001 with those in 2026.
- Table 3 compares those 80 and older in the poorest state in 2001 with those in 2026.

**Table 1: The number of individuals in each health and wealth state in 2026 as compared to 2001 for BOS, illustrating the % increase and actual number of individuals increase.**

				2001			2026			%increase	#increase
				80-84	85+	total	80-84	85+	total		
BOS	F	H1	W1	49	23	72	67	34	101	40.28%	29
BOS	F	H1	W2	80	38	118	111	57	168	42.37%	50
BOS	F	H1	W3	30	14	44	41	21	62	40.91%	18
BOS	F	H1	W4	26	12	38	36	19	55	44.74%	17
BOS	F	H2	W1	19	18	37	26	27	53	43.24%	16
BOS	F	H2	W2	31	30	61	43	45	88	44.26%	27
BOS	F	H2	W3	12	11	23	16	17	33	43.48%	10
BOS	F	H2	W4	10	10	20	14	15	29	45.00%	9
BOS	F	H3	W1	8	20	28	11	30	41	46.43%	13
BOS	F	H3	W2	14	33	47	19	49	68	44.68%	21
BOS	F	H3	W3	5	12	17	7	18	25	47.06%	8
BOS	F	H3	W4	*	11	11	6	16	22	*	*
BOS	F	H4	W1	14	32	46	19	48	67	45.65%	21
BOS	F	H4	W2	23	54	77	32	80	112	45.45%	35
BOS	F	H4	W3	9	20	29	12	30	42	44.83%	13

BOS	F	H4	W4	8	17	25	10	26	36	44.00%	11
BOS	M	H1	W1	38	19	57	64	32	96	68.42%	39
BOS	M	H1	W2	63	31	94	106	53	159	69.15%	65
BOS	M	H1	W3	23	12	35	39	20	59	68.57%	24
BOS	M	H1	W4	20	10	30	34	17	51	70.00%	21
BOS	M	H2	W1	8	11	19	13	19	32	68.42%	13
BOS	M	H2	W2	13	18	31	22	31	53	70.97%	22
BOS	M	H2	W3	5	7	12	8	12	20	66.67%	8
BOS	M	H2	W4	*	6	6	7	10	17	*	
BOS	M	H3	W1	5	7	12	8	12	20	66.67%	8
BOS	M	H3	W2	8	11	19	14	19	33	73.68%	14
BOS	M	H3	W3	*	*	*	5	7	12	*	*
BOS	M	H3	W4	*	*	*	5	6	11	*	*
BOS	M	H4	W1	5	9	14	8	15	23	64.29%	9
BOS	M	H4	W2	8	14	22	13	24	37	68.18%	15
BOS	M	H4	W3	*	5	5	5	9	14	*	*
BOS	M	H4	W4	*	5	5		8	8	60.00%	3
						1054			1647	56.26%	593

\* There are differences in the total numbers that appear in the table when compared to the earlier totals. This occurs as cells with fewer than five individuals are excluded from the health state and wealth state projection. As the aging population grows, by 2026 the number of unreported individuals in the table has decreased from 41 to 23.

**Table 2: The number of individuals in the wealthiest state in 2026 as compared to 2001 for BOS illustrating the % increase and actual number of individuals increase.**

				2001			2026			%increase	#increase
				80-84	85+	total	80-84	85+	total		
BOS	F	H1	W1	49	23	72	67	34	101	40.28%	29
BOS	F	H2	W1	19	18	37	26	27	53	43.24%	16
BOS	F	H3	W1	8	20	28	11	30	41	46.43%	13
BOS	F	H4	W1	14	32	46	19	48	67	45.65%	21
BOS	M	H1	W1	38	19	57	64	32	96	68.42%	39
BOS	M	H2	W1	8	11	19	13	19	32	68.42%	13
BOS	M	H3	W1	5	7	12	8	12	20	66.67%	8
BOS	M	H4	W1	5	9	14	8	15	23	64.29%	9
						285			433	51.93%	148

This table illustrates that there is a projected 25% increase in the number of wealthiest persons in BOS between 2001 and 2026 but

that the actual proportion of W1 state to the other three remains almost constant. (This is calculated by dividing the total number of individuals in Wealth state1 in 2001 by the total population and doing the same for 2026 and comparing the ratios.)

If we were investigating the potential need for a self-pay assisted living complex in the area we could forecast that the number of potentially interested individuals from Health States 2 & 3 would increase by 50 over the 25 year period. Since the average age in most assisted living facilities is currently 83 or higher, using the 80 and older group presents a useful indicator of potential demand. We would assume that most Health State 1 persons would choose to continue to live in their current residence as long as they were healthy while those in Health State 4 would already be in institutions. We could also expand our analysis to include all of the intervening years to gain a sense of how the aging population bubble will grow over the 25 year period.

**Table 3: The number of individuals in the least wealthy state in 2026 as compared to 2001 for BOS illustrating the % increase and actual number of individuals increase.**

				2001			2026			%increase	#increase
				80-84	85+	total	80-84	85+	total		
BOS	F	H1	W4	26	12	38	36	19	55	44.74%	17
BOS	F	H2	W4	10	10	20	14	15	29	45.00%	9
BOS	F	H3	W4		11	11	6	16	22	100.00%	11
BOS	F	H4	W4	8	17	25	10	26	36	44.00%	11
BOS	M	H1	W4	20	10	30	34	17	51	70.00%	21
BOS	M	H2	W4		6	6	7	10	17	183.33%	11
BOS	M	H3	W4	*	*		5	6	11		11
BOS	M	H4	W4		5	5		8	8	60.00%	3
						135			229	69.63%	94

This table illustrates that there is a projected 16% increase in the number of poorest of persons in BOS between 2001 and 2026. If we return to the same 2001 numbers and then compare these to 2026 we find that the actual proportion of W4 state to the other three increases from 12.3% in 2001 to 13.7% in 2026.

Many other types of analysis can be conducted using the model outputs. For example if we prepare another table looking at Health State 4 (institutionalized) the question of how much of an increase will there be in the demand for institutional care in BOS between 2001 and 2026 can be answered by looking at all the persons in Health State 4 in all age cohorts in 2001, and comparing this with the same ratio in 2026. This calculation projects that the proportion of those in Health State 4 will increase from 1.3% of the population in 2001 to 2.2% in 2026, a growth

from 245 individuals to 410, or a 67.3% growth. Calculations such as this can be used by planners to highlight areas of potential need that should be more closely investigated.

The model has proven to be a useful tool for planners and policy makers at both the local and the provincial level. It will be updated in 2007 to the 2006 Census data, making the tool even more useful in the future.

## 6 Endnotes

- <sup>1</sup> From a variety of Statistics Canada Sources including the 2001 Census.
- <sup>2</sup> Richards et al. (2006) *Atlantic Seniors Housing Research Alliance Phase 1 Evaluation Report*. ASHRA: Halifax, Mount Saint Vincent University.
- <sup>3</sup> Schafer, R. (1999). *Determinants of living arrangements of the elderly*. Retrieved May 26, 2006 from Harvard University , Joint Centre for Housing Studies Website: [www.jchs.harvard.edu/publications/seniors/schafer\\_W99-6.pdf](http://www.jchs.harvard.edu/publications/seniors/schafer_W99-6.pdf).
- <sup>4</sup> FSA stands for Forward Sortation Area which is represented by the first three digits of a postal code. More about the development, testing and use of the model are outlined in the next section.
- <sup>5</sup> The rest of this section draws heavily on the ASHRA report: Richards et al. (2006) *Atlantic Seniors Housing Research Alliance Phase 1 Evaluation Report*. ASHRA: Halifax, Mount Saint Vincent University.
- <sup>6</sup> The User's Guide for the model can be found on ASHRA's website, [www.ashra.ca](http://www.ashra.ca), by clicking on the "Community Profiles" button on the home page.
- <sup>7</sup> Nova Scotia Seniors' Secretariat. (2005). *Strategy for Positive Aging in Nova Scotia*. Seniors' Secretariat: Halifax. p.27
- <sup>8</sup> Canada Mortgage and Housing Corporation. (1991 and 1998), *Maintaining Seniors' Independence in Rural Area: A guide to Planning for Housing and Support Services*, 1991 and *Planning Housing and Support Services for Seniors*, 1998.
- <sup>9</sup> Nova Scotia Senior Citizens' Secretariat. (2003). *A Statistical Profile of Nova Scotia Seniors*. Seniors' Secretariat: Halifax.
- <sup>10</sup> Statistics Canada. (1999). *Survey of Financial Security*. Prepared by Pensions and Wealth Surveys Section. Catalogue no. 13F0026MIE – no.002
- <sup>11</sup> Shiner, D.V. (2002). Oakwood Terrace Market Feasibility Study for an Assisted Living Residence (Commercial Confidential Report).
- <sup>12</sup> Statistics Canada Census 2006.
- <sup>13</sup> <http://www.metlife.com/WPSAssets/34442486101113318029V1FBoomer%20Profile%202005.pdf>.
- <sup>14</sup> Rathge, R., Abidin, T., Danielson, R., Jenson, S., Nikle, J., & Olson, K. (2004). *North Dakota state-wide housing needs assessment: 2004 final report*. Retrieved May 16, 2006, from North Dakota State Data Centre at North Dakota State University, Website: <http://www.ndsu.edu/sdc>.
- <sup>15</sup> United Nations. (2000) *United Nations International Plan of Action on Aging*. United Nations: New York.
- <sup>16</sup> Wagnild, Gail. (2001). "Growing Old at Home." *The Journal of Housing for the Elderly* 14(1-2): 71-84.
- <sup>17</sup> Longley, P. (2005). "Geographical information systems: a renaissance geodemographics for public service delivery". *Progress in Human Geography*, 29, 57-63.
- <sup>18</sup> Ibid; Rindfleisch, J. M. (2003). "Segment profiling: reducing strategic risk in higher education management". *Journal of Higher Education Policy and Management*, 25, 147-159.
- <sup>19</sup> Burrows, R. & Ellison, N. (2004). "Sorting places out? Towards a social politics of neighborhood informatization." *Information, Communication and Society*, 7, 321-336.

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- <sup>20</sup> Longley, P. (2005). "Geographical information systems: a renaissance geodemographics for public service delivery". *Progress in Human Geography*, 29, 57-63.
- <sup>21</sup> Rindfleish, J. M. (2003). "Segment profiling: reducing strategic risk in higher education management". *Journal of Higher Education Policy and Management*, 25, 147-159.
- <sup>22</sup> Longley, P. (2005). "Geographical information systems: a renaissance geodemographics for public service delivery". *Progress in Human Geography*, 29, p 60.
- <sup>23</sup> Ibid.
- <sup>24</sup> Ibid; The Real Estate Foundation of British Columbia (2002). *Seniors Housing Development Forecast Tool (SHDFT): A guide for thinking about developing seniors housing*. Retrieved May 15, 2006 from [www.seniorshousing.bc.ca/SeniorsHousingDevelopmentForecastTool.pdf](http://www.seniorshousing.bc.ca/SeniorsHousingDevelopmentForecastTool.pdf)
- <sup>25</sup> Alberta Mortgage and Housing Corporation. (1985). Alberta Mortgage and Housing Corporation. *Cohort survival model*. Alberta: Mortgage and Housing Corporation, 1985.
- <sup>26</sup> The Real Estate Foundation of British Columbia (2002). *Seniors Housing Development Forecast Tool (SHDFT): A guide for thinking about developing seniors housing*. Retrieved May 15, 2006 from [www.seniorshousing.bc.ca/SeniorsHousingDevelopmentForecastTool.pdf](http://www.seniorshousing.bc.ca/SeniorsHousingDevelopmentForecastTool.pdf)
- <sup>27</sup> Rathge, R., Abidin, T., Danielson, R., Jenson, S., Nikle, J., & Olson, K. (2004). *North Dakota state-wide housing needs assessment: 2004 final report*. Retrieved May 16, 2006, from North Dakota State Data Centre at North Dakota State University, Website: <http://www.ndsu.edu/sdc>.
- <sup>28</sup> Berlin et al, 2006 Berlin, R., Ramlo, A., & Baxter, D. (2006). *Seniors' housing demand in British Columbia over the next thirty years*. Retrieved May 17, 2006 from Urban Futures website: [www.urbanfutures.com/UFI%20Reports/Report%2065%20-%20SeniorsHousing.pdf](http://www.urbanfutures.com/UFI%20Reports/Report%2065%20-%20SeniorsHousing.pdf)
- <sup>29</sup> Elmbridge Borough Council (2006). *2005 housing needs survey*. Retrieved May 16, 2006 from [www.elmbridge.gov.uk/services/planprop/HousingNeedsSurvey2005.htm](http://www.elmbridge.gov.uk/services/planprop/HousingNeedsSurvey2005.htm)
- <sup>30</sup> Schafer, R. (1999). *Determinants of living arrangements of the elderly*. Retrieved May 26, 2006 from Harvard University , Joint Centre for Housing Studies Website: [www.jchs.harvard.edu/publications/seniors/schafer\\_W99-6.pdf](http://www.jchs.harvard.edu/publications/seniors/schafer_W99-6.pdf).
- <sup>31</sup> Berlin, Ramlo, & Baxter, 2006 Berlin, R., Ramlo, A., & Baxter, D. (2006). *Seniors' housing demand in British Columbia over the next thirty years*. Retrieved May 17, 2006 from Urban Futures website: [www.urbanfutures.com/UFI%20Reports/Report%2065%20-%20SeniorsHousing.pdf](http://www.urbanfutures.com/UFI%20Reports/Report%2065%20-%20SeniorsHousing.pdf)
- <sup>32</sup> Longley, P. (2005). "Geographical information systems: a renaissance geodemographics for public service delivery". *Progress in Human Geography*, 29, 57-63.
- <sup>33</sup> Frank; Ronald E., Massy; William F., and Yoram Wind. (1972). *Market segmentation*. Englewood Cliffs, N.J., Prentice-Hall. pp26-89
- <sup>34</sup> Ibid.
- <sup>35</sup> For a detailed description of the Canadian Postal code system visit [www.canadapost.ca](http://www.canadapost.ca).
- <sup>36</sup> Schafer, R. (1999). *Determinants of living arrangements of the elderly*. Retrieved May 26, 2006 from Harvard University , Joint Centre for Housing Studies Website: [www.jchs.harvard.edu/publications/seniors/schafer\\_W99-6.pdf](http://www.jchs.harvard.edu/publications/seniors/schafer_W99-6.pdf).

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<sup>37</sup> Ibid.

<sup>38</sup> Statistics Canada. Catalogue Number 82C0011, The Health and Activity Limitation Surveys (HALS) of 1986 and 1991.

<sup>39</sup> Statistics Canada. The National Health Survey (NPHS) of 1996.

<sup>40</sup> L. Martel and A. Belanger . (1999) “An Analysis of the change in dependence-free life expectancy in Canada between 1986 and 1996”, *Report on the Demographic Situation in Canada 1998-1999*, Statistics Canada Cat no. 91-209-XPE, pp 164-186.

<sup>41</sup> Statistics Canada. (1999). Survey of Financial Security (Catalogue no. 13F0026MIE-no.002)

<sup>42</sup> Statistics Canada. (2001) Population Projections for Canada, Provinces and Territories 2000-2026 (Cat. No. 91-520-XPB).

<sup>43</sup> Ibid.

<sup>44</sup> Statistics Canada. (2005a, December). *Projected population by age group according to three projection scenarios for 2006, 2011, 2016, 2021, 2026 and 2031, at July 1*. Retrieved May 29, 2006, from [http://www40.statcan.ca/101/ind01/13\\_3867\\_3433.htm?hili\\_none](http://www40.statcan.ca/101/ind01/13_3867_3433.htm?hili_none)