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Population aging and immediate family composition: implications for future home care services*

1. INTRODUCTION

In Canada, there has been significant discussion over the aging of the population and other socio-demographic trends which affect the availability of informal support. Noting the lower fertility rates of baby boomers, the increased participation of women in the labour force and the changing family structure in terms of increased divorce and reconstituted families, assumptions of continued high level assistance from informal support networks are often criticised.

The main objective of this research is to project the availability of informal support to meet the need for assistance in performing everyday activities among the disabled elderly population for the period 2001-2031. Future trends are analyzed in terms of demand for support, (e.g., disability among the elderly population), and supply of support, (e.g., the extent and composition of the informal network, mainly the family network).

2. LITERATURE

Over the years the shift to community care has become dominant in Canada. Similar to many European countries there is a renewed focus on using home care services to keep people in their own homes for as long as possible. Services provided by the formal network to help elderly persons remain in the community are provided through government-sponsored home care programs or private enterprises. Publicly-funded home care programs exist in every province and territory in Canada and their expenditures over the past two decades on home and community care grew from \$205 million to \$2.7 billion, an increase of over 1000% (Government of Canada, 2002). In this study our interest focuses mainly on chronic home care services, which include assistance with everyday activities (e.g., grocery shopping, everyday

* Please note: The opinions expressed in this paper are those of the authors and not of Statistics Canada.

housework, meal preparation and personal care) because of a long term disability or chronic illness. Although recent policy initiatives center on acute home care, a more medical approach of reducing hospital stays, the demand for chronic home care services continues to rise. Several factors have contributed to this increased demand, including population aging and deinstitutionalization.

The aging of the baby boomers and increasing life expectancy at age 65 will accelerate the growth in the number of elderly people over the next three decades. Health and social support, especially assistance in performing activities of daily living (ADLs – personal care) and instrumental activities of daily living (IADLs – meal preparation, housework, *etc.*), are among the most important factors related to quality of life for the elderly. Given the fast increasing number of seniors, and the functional decline that accompanies the aging process, meeting the required needs in assistance to perform ADLs and IADLs should be a major concern of public policy over the next few decades. Both formal and informal supports are involved in addressing this need for elderly persons with the majority of such assistance provided by informal supports (includes family, friends and/or neighbours). The demographic changes in the Canadian population and future trends with regard to the health of the senior population will likely have a significant impact on the need for formal support in Canada.

2.1 Demographic factors driving future needs

Since chronic home care services are more social than medical and can be provided by the informal support network, it is important to consider the factors affecting the availability of the informal support network in order to project the need for this type of services. In fact, most disabled persons receive services from their informal support network – mainly family, but also friends and neighbours. Hébert and colleagues in their study on resources and costs associated with the elderly disabled (2001) confirmed previous studies in which 70% to 80% of the care of these individuals living at home is provided by informal caregivers. Similarly, Lafrenière *et al.* (2003) found that more than 70% of the hours of service provided to elderly disabled persons were attributed to the informal network. Spouses are most likely to be primary caregivers for elderly persons in need, followed by daughters, daughters-in-law, and sons. Other family members such as nieces, nephews and cousins are less likely to help and the help they do provide tends to be with transportation, grocery shopping, *etc.* and not personal care (Chappell, 1992; Keating *et al.*, 1999). According to Himes (1992), as the baby boom generation ages, it is the women who have a greater probability

of providing care for children as well as elderly parents.

Given the important role that the informal network has in the provision of support services, the nature and extent of the informal network, specifically, the living arrangements of the elderly population, the composition of the family network (e.g., spouse, children), and gender differences in employment and caregiving will need to be taken into account in the future. When looking at living arrangements, it has been found that living alone is associated with the use of formal services for the elderly disabled (Chappell, 1985; Grabbe *et al.*, 1995). Likewise, those living with others have the greatest probability of using only informal sources (Carrière *et al.*, 2005). More specifically, those living with their spouse are more likely to rely on their spouse to receive the needed assistance (Walker *et al.*, 1995), while childless elderly and the elderly living apart from their children are more likely to use social services than elderly persons living with their children (Choi, 1994). One factor that will influence the living arrangement of future seniors is the narrowing gap in life expectancy between men and women. Mortality gaps have decreased since the late 1970s in Canada (Nault *et al.*, 1997) and may result in fewer older women living alone and greater availability of informal support. Internationally, since the 1990s, the proportion of women living alone in some countries has stabilized, while for others it has declined (e.g., Italy, Germany, Austria) (Tomassini *et al.*, 2004). Tomassini and colleagues also note that this trend corresponds to an increase in the proportion of married women aged 65 and over. If this trend continues, it could, in relative terms, decrease the demand for formal assistance.

As the population ages, baby boomers will have a limited potential support network, as the birth rates decline with this generation, therefore reducing the availability of children as informal caregivers. However, this trend may not come into effect for some time; research conducted by Murphy and Grundy (2003) in England showed that over the next two decades the proportion of 80 year olds with at least one surviving child will increase, as fertility rates were higher and mortality rates lower for this generation. Furthermore, an increasing divorce rate could affect the availability of informal support to provide care to the elderly disabled in need of assistance to perform daily activities (Connidis and McMullin, 1994; Martel and Légaré, 2000). Also, relationships that end in divorce may distance parents from their children. For example, it was found that divorce can induce a more negative impact on adult children/parents relationships than widowhood, especially in the case of child/father relationships (Furstenberg *et al.*, 1995; Harris and Furstenberg, 1995; De Jong Gierveld and Dykstra, 1997; Kaufman and Uhlenberg, 1998; Pezzin and Schone,

1999; Carrière and Martel, 2003a, 2003b). In the late 1980s, Furstenberg and colleagues found that adult children were twice as likely to give money or time to a divorced mother than to a divorced father. However, divorced fathers may play a more significant role in the lives of their children today, and therefore the negative impact may be less dramatic.

Gender is also a critical factor to consider when looking at future needs of formal home care services. The majority of female caregivers aged 45 to 64 are also employed (63%), most in a full-time capacity (Cranswick, 2003). Women may therefore be less willing to retire partially or totally in order to provide daily assistance. Among younger generations, it appears that the proportion of women taking on multiple roles (caregiving, working, *etc.*) is increasing (Evandrou and Glaser, 2002). However, for those individuals starting or increasing caregiving responsibilities, it appears that their employment is often affected, most often resulting in a decrease of weekly work hours (Spiess and Schneider, 2003).

An important component of projecting the need for chronic home care services is disability. Disability, whether measured through the presence of chronic illness or disease, or through functional ability, plays an important role in determining whether or not a person will need assistance with ADLs or IADLs. Research studies examining disability among previous generations noted a decline in disability in the 1990s (as measured through help or difficulties with ADLs) (Freedman *et al.*, 2004). Similarly, others have noted an increase in disability free life expectancy for men and women between the 1980s and 1990s in the United States (Crimmins *et al.*, 1997). It is important to note, however, that other researchers have only observed this decline among those with severe disabilities (Mathers and Robine, 1997). When examining disability free life expectancy in several European countries, Robine (2005) noted varying trends (reduction, stagnation, and increase) between 1995 and 2003 further demonstrating the difficulty in predicting future trends in disability. The magnitude and the direction that these trends will take in the future are still largely unknown.

2.2 *Projecting need for home care services*

Attempts to forecast the need for future home care services have been made. These models are limited in that, first, they are focused usually on projecting professional health care workers (e.g., doctors, nurses, pharmacists, social workers, therapists), rather than considering core workers such as home support personnel who are essential in providing home care services to seniors (Fooks and Maslove, 2004; Maslove, 2004; O'Brien-Pallas *et al.*, 2003). Secondly, existing approaches typically use current

service utilization patterns rather than those based on evidence of need which drives service utilization (Home Care Sector Study Corporation, 2003). Finally, and notably, these models do not consider other drivers of need such as contextual variables (e.g., fertility, divorce rates) that affect the availability of informal support. Internationally, research by Pickard *et al.* (2000) has addressed some of these limitations. They used a macrosimulation approach to project the demand for long term care for persons aged 65 and over in England to 2031. Their model incorporates both demand (as measured through dependency) and supply of informal support (as measured through probability of receiving help with IADLs).

In the future, the changing nature and extent of the family network, the number of seniors, as well as their health status, will have a significant impact on the need for formal support in Canada. Although the aging of the population should not be perceived as a crisis, the gradual arrival of the baby boomers among the elderly population will raise new challenges. It is critical that more attention be given to understanding the impact of these changes. The present study looks at the impact of the potential decrease in the availability of informal support on the use of formal services. Findings are discussed in terms of their impact on future reliance of the formal home care system. Like any projections, they should not be regarded as predictions, but as a tool to better understand what lies ahead if patterns of use of formal and informal assistance remain constant.

3. METHODS

The research design for the projection model included both cross-sectional and longitudinal data. The cross-sectional aspect of the model was partly derived from initial analyses where factors associated with disability, need for assistance and source of assistance among the elderly were identified. Sources of cross-sectional data included two surveys administered by Statistics Canada: the 1996/97 National Population Health Survey to identify factors associated with a disability, and the 1996 General Social Survey cycle 11 to identify factors associated with the need and the source of assistance (see Keefe *et al.*, 2004).

The 1996 General Social Survey collected data on social and community support in Canada. The target population for this survey was Canadians 15 years of age and over living in private households in Canadian provinces. In total, the sample consisted of 12,756 respondents, with a response rate of 85.3%. The target population for the 1996/97 National Population Health Survey was Canadians of all ages living in private

household in Canadian provinces. The sample consisted of 210,377 Canadians, a much larger sample than the General Social Survey, which is the reason why this survey was used to analyze disability. Data on specific needs for assistance and sources of assistance, however, were not collected in the National Population Health Survey, explaining the use of the General Social Survey to analyze these two critical elements of the study.

These cross-sectional surveys were used in tandem with the micro-simulation model (LifePaths) developed at Statistics Canada. More details are provided in section 3.2.

3.1 Measures

In this study, disability was defined using some attributes of the Health Utility Index (HUI). The HUI, based on the Comprehensive Health Status Measurements System (CHSMS), takes into account both the quantitative and qualitative aspects of health (Torrance *et al.*, 1996). It provides information on the functional health of an individual using a series of attributes. For the purpose of this study, information on an individual's mobility, dexterity, cognition, and pain and discomfort were used to develop four levels of disability (none, mild, moderate, and severe)¹.

Need for assistance refers to assistance needed (related to a long term health problem) to perform everyday activities. Only four everyday activities are considered throughout this research: grocery shopping, everyday housework, meal preparation and personal care, since they are more frequently associated with chronic home care services. The first three activities were identified through the following question: In the past 12 months, has any organization or anyone other than you, done any part of your meal preparation and clean-up; housecleaning, laundry, sewing; shopping for groceries or other necessities? Sub questions followed, making it possible to identify the specific activities that required assistance. Personal

¹ Four levels of disability included:

- *No disability*
- *Mild disability:*
Mobility problem but does not need any help; Dexterity problem but does not need any help from someone else (may or may not use special equipment); Somewhat forgetful and slight difficulty in thinking; Moderate and/or severe pain prevents performing some or few tasks.
- *Moderate disability:*
Requires wheel chair or mechanical support to walk; Dexterity problem and needs help to perform some tasks; Very forgetful and a lot of difficulty in thinking; Severe pain prevents performing most tasks.
- *Severe disability:*
Can not walk or needs help from others to walk; Dexterity problem and needs help for most or all tasks; Unable to remember or think.

care needs were identified using the following question: In the past 12 months because of a health condition or physical limitation, did you receive personal care such as assistance with bathing, toileting, care of toenails/fingernails, brushing teeth, shampooing and haircare, or bathing?

For each of the questions regarding receipt of support the respondents were asked about the relationship of those providing such support. The variable, source of assistance, is a derived variable referring to the provider of support in any one of the four tasks outlined above. Source of assistance includes (a) formal support which refers to the assistance provided by a paid employee (government or non-government) or volunteer from a private or public agency; (b) informal support which refers to the assistance provided by family, friends and/or neighbours; and (c) mixed support which refers to assistance received from both the formal and informal support networks.

3.2 Model

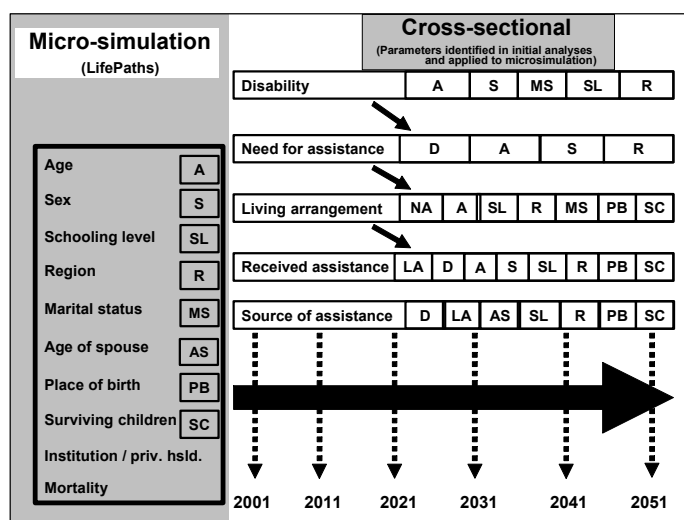
The family aspect of the projections (e.g. number of surviving children, surviving spouse) is based on Statistics Canada *LifePaths* microsimulation model, which makes use of a number of surveys (Statistics Canada, 2004; Wolfson and Rowe, 2004)². The longitudinal aspect of the model allows the user to take into account part of the complexity of the life cycle (birth, death, immigration status, inter-provincial migration, marital history, educational history, employment history, and the birth and presence of children at home) of individuals who constitute the Canadian population. The microsimulation creates a synthetic cohort of individuals going through their life cycle with different probabilities of having specific events occurring, probabilities that vary across individuals depending on their characteristics. Every time an event occurs, e.g., leaving school, probabilities of other events occurring in the future will vary taking into account the changing characteristics of this individual.

The left part of Figure 1 lists the characteristics needed in the logistic regressions performed in the cross-sectional part of the projection. The microsimulation produces additional characteristics of each individual, but only the ones presented in Figure 1 were used in the logistic regressions. We first had to run the microsimulation to obtain the population by age, sex, schooling level, region of residence, marital status, age of spouse, place of birth and number of surviving children. We also needed to determine who lived in an institution and who lived in a private household. This was done by calculating transition probabilities based on the 1996 Census. Only the

² For more detailed information on Statistics Canada's *LifePaths* microsimulation model, please see Statistics Canada (2004).

population living in private households was then kept, as by definition, home care services are strictly aimed at this population. This first step provided a snapshot of the Canadian population for any given year up to 2051 according to the characteristics on the left of Figure 1. Probabilities of disability status, need for assistance, living arrangement, receipt of assistance, and source of assistance were then applied to these populations in the sequence shown in Figure 1. As can be seen in this Figure, there is an assumption that living arrangements are partly determined by the need for assistance. Living with others is then partially seen as a strategy to cope with a need for assistance related to a disability. This was done only for the non-married population, married individuals being assumed to live with their spouse.

Figure 1 – *The microsimulation model*



The health status of an individual is strongly associated with the need and use of health care services. In order to test the sensitivity of the projections to eventual changes in the health of the population, three different scenarios were applied to the analysis: (1) probabilities of disability levels held constant at 1996 levels (constant scenario); (2) probabilities of disability levels gradually decreasing (compression scenario); and (3) probabilities of disability levels gradually increasing (expansion scenario). In the case of the compression scenario we assumed that the probability of having a given level of disability according to specific individual characteristics would gradually (over a 15 year-period) decrease to that of someone five years younger. The opposite was true for the expansion scenario. These probabilities were chosen because of the uncertainty

surrounding disability trends in the past, let alone in the future. Moreover, the disability scenarios are mainly used to test the sensitivity of the projections. Research on future disability trends based on solid evidence would be essential in providing input to projection models on home care services. For the moment, the lack of scientific consensus and the need to provide a sensitivity analysis have resulted in the three scenarios presented here.

4. MICROSIMULATION RESULTS

The results of the microsimulations are presented in three parts; supply, demand and source of assistance. These results will show if the present patterns of service utilization will result in a relative increase in the use of formal home care services.

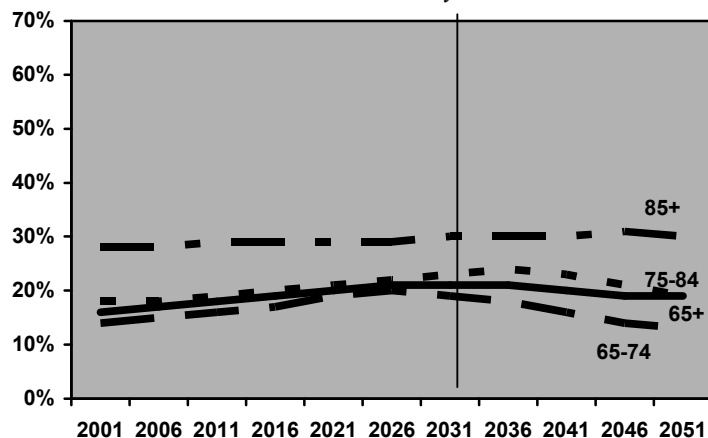
The projection period extends to 2051, providing an estimate of what the Canadian profile might look like given patterns of home care service utilization observed in 1996. The figures presented show a solid line dividing the period 2001-2031 from the period 2031-2051. Extending the projected period to 2051 permits an examination of the Canadian context once all the baby boomers have reached the age of 85. Of course, policies and behaviours will be different than they are today, but the exercise helps to understand what would happen once the baby boomers enter the oldest-old population if the context remains relatively unchanged.

4.1 Changes in the immediate family composition: the potential supply of family caregivers

Results from the microsimulation point to a stabilization of the proportion of both elderly males and females living alone in Canada for the period 2001-2031. As can be seen in Figure 2, the proportion of elderly females living alone is significantly higher than the proportion observed among males. This is not surprising considering the age differential at marriage – females marrying older males – and the differential in life expectancy favoring females. Also, males tend to remarry in greater numbers than females after a divorce or the death of a spouse. However, it is among females that we observe a decreasing proportion living alone, mainly between the 2031-2051 period. Over the entire projected period, the gap in the proportion of elderly females and males living alone should decrease quite significantly; from 37% versus 16% in 2001 to 30% versus 17% in 2051. A lower proportion of older females living alone should, all other

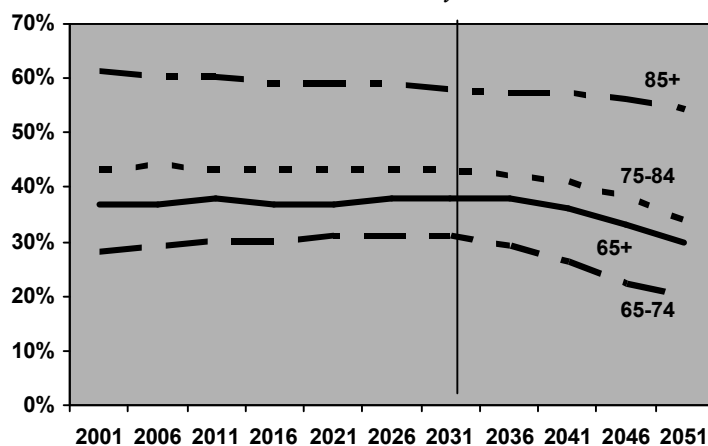
things being equal, lower the pressure on formal home care services in the future.

Figure 2a – *Proportion of males 65+ living alone among those living in the community*



Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

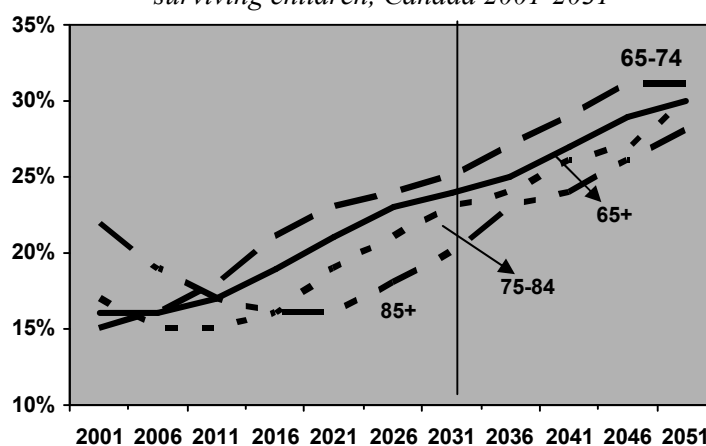
Figure 2b – *Proportion of females 65+ living alone among those living in the community*



Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

Lower fertility has been the major contributor of population aging over the last few decades. The microsimulation approach takes into account this decreasing fertility by concentrating on those with no surviving children in this analysis. Figure 3 shows that for females aged 65 years and over the proportion with no surviving children increases from 16% in 2001 to a high of 30% in 2051. Close to one out of three elderly women may be without a surviving child by 2051.

Figure 3 – *Proportion of females 65+ living in the community with no surviving children, Canada 2001-2031*



Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

Of special interest is the trend observed for the oldest-old (age 85 and over). This age group is the most vulnerable health wise and they are the ones who have the greatest need of assistance. In 2001, this age group is also the one showing the greatest proportion of people without any surviving children. However, this proportion decreases from 22% to 16% between 2001 and 2021, before moving up to 28% in 2051. This trend is of course related to the aging of the baby boomers. In the first part of the projected period (2001-2021), the 85 and over age group is mainly comprised of the parents of the baby boomers. By definition these older cohorts had many children. However, as these cohorts are slowly replaced by other cohorts who had fewer children, the proportion of those without any surviving children increases. In 2036, results from the microsimulation show that this proportion among the 85 and over age group will be roughly the same as the one observed in 2001. This suggests, at least in the near future, that the cohort who is most likely to need assistance will be more likely to have at least one child. In the short term, all other things being equal, this trend

should ease the pressure on formal home care services.

4.2 Disability status of the elderly population: the demand side

The main driver of home care services in the future is the number of elderly disabled persons. Explaining disability is quite complex and our model only accounts for age, sex, marital status, schooling level, and province of residence. Factors like lifestyle, income, and past occupation are not accounted for. Nonetheless, the model allows better projections of the number of disabled elderly than simple age by sex extrapolations.

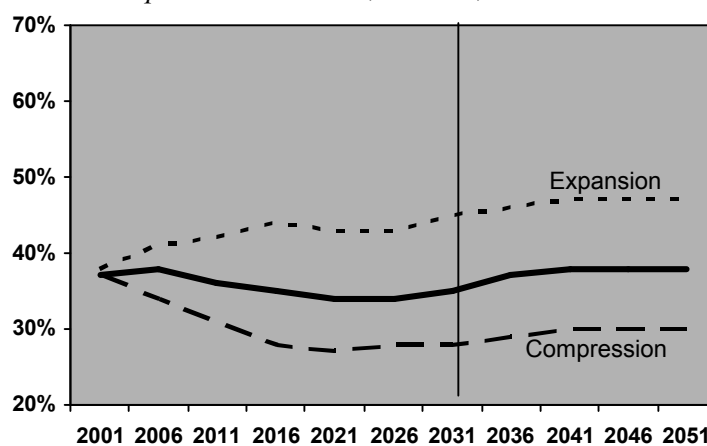
Results using the constant scenario (disability remains constant at 1996 levels) show that there is about a ten percentage point difference between males and females (Figure 4). For males, the percentage of those 65 and over with a disability varies from 38% to 34%, while for females the percentage varies from 47% to 43%. The trends observed are affected by the arrival of the baby boomers among the younger elderly around 2011 and by their gradual aging to the 85 and over age group in 2031. It is expected that the gradual journey of the baby boomers through the older age groups will affect the proportion of elderly persons having a disability, as the younger elderly will be in better health than the oldest-old.

As can be seen in Figure 4, different scenarios produce very different results. In the case of an expansion scenario, there is an increase of about ten percentage points. In the case of the compression scenario, there is a decrease of about seven percentage points.

Disability is only one measure of the possible demand for home care services in the future since not everyone with a disability is in need of assistance. The projections take this process into account in order to obtain a more accurate idea of what the needs could be in the future. As can be seen in Figure 5, the proportion of those needing assistance could remain relatively constant throughout the whole period varying between 15% and 18%, the lowest point being attained in 2021-2026.

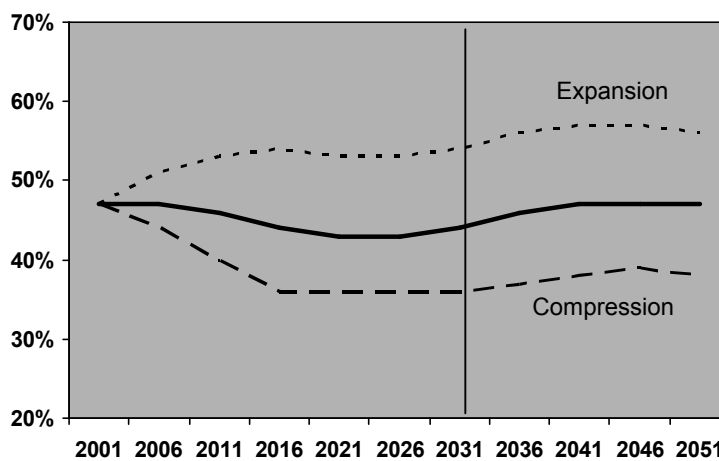
Although the proportion of elderly persons needing assistance might provide a rough measure of the health of this population, policy makers and service planners are obviously more interested in the number of elderly who might require home care services than in the proportion. For example, between 2001 and 2021 the proportion of elderly persons needing assistance could slightly decrease from 17% to 15%. According to this scenario, during the same period the number is increasing quite significantly from 619,000 to close to 950,000, an increase of more than 33%. By 2031 the number of elderly persons in need of assistance could more than double. As far as planning for services is concerned, these results are extremely important.

Figure 4a – *Proportion of disabled males aged 65+ among those living in private households, Canada, 2001-2031*



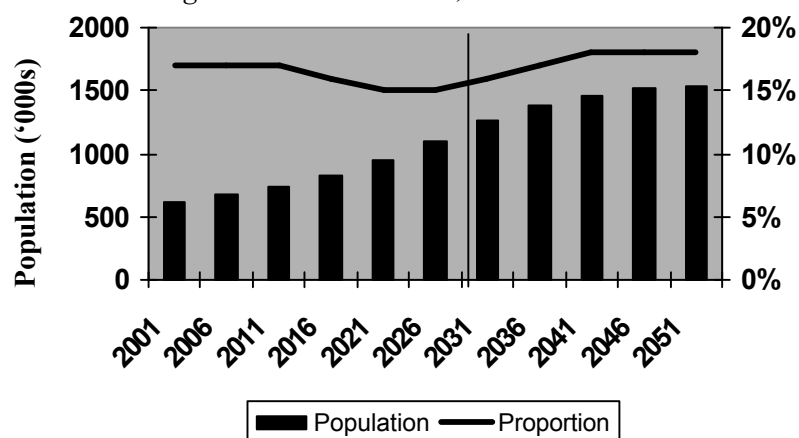
Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

Figure 4b – *Proportion of disabled females aged 65+ among those living in private households, Canada, 2001-2031*



Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

Figure 5 – *Proportion and number of elderly persons needing assistance using the constant scenario, Canada 2001-2031*



Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

4.3 Source of assistance and projected demand

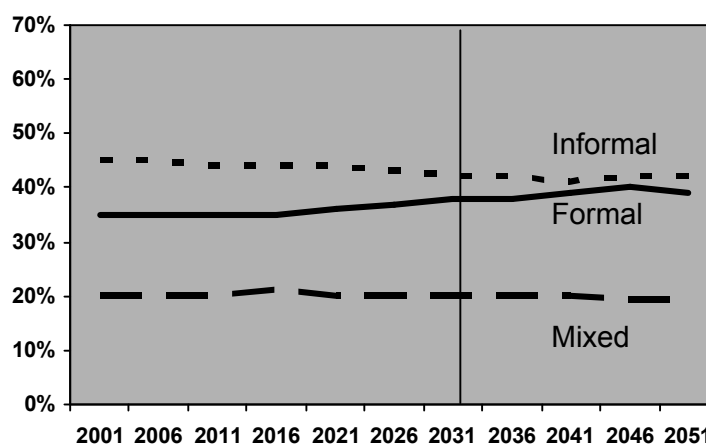
Future trends in the proportion of elderly persons living alone and the proportion without any surviving children were examined as they are an important part of the family network. Next, possible trends in the health of the population were examined by using three scenarios of disability. By combining these two approaches the proportion and number of elderly persons using the three sources of assistance (formal, informal, and mixed) was projected over 50 years (Figure 6). These projections are based on the patterns of utilization observed in 1996.

At the national level, data suggest that there will be a relative and absolute increase in the use of the formal network while there will be a relative decrease in the use of the informal network among the elderly disabled for the period 2001-2031. In fact, during this period, the gap between the proportion of those using only the informal network and those using only the formal network almost disappears (Figure 6).

Previously, the importance of numbers over proportions when planning for home care services was discussed. For instance the number of disabled elderly in need of assistance could possibly double between 2001 and 2031 (Figure 5). These numbers reflect the impact of keeping constant the probabilities of having a disability observed in 1996. The scenarios of compression and expansion of disability were specifically designed to estimate the effect of the health of the elderly population on the future demand for home care services. Using the constant scenario, the average

annual growth rate of the population in need of assistance is 2.5% for the period 2001-2031 (Table 1). The pressure on the formal network being greater than for the informal network, this annual growth rate increases to 2.7% for the former compared to 2.2% for the latter.

Figure 6 – *Distribution (in %) of disabled elderly living in private households needing assistance by source of assistance, Canada 2001-2031*



Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

Table 1 – *Annual growth rate (2001-2031) of the population aged 65+ receiving assistance by source of assistance and disability scenario (constant, compression, expansion), Canada*

	Constant scenario %	Compression scenario %	Expansion scenario %
Population 65+	2.6	2.7	2.5
Population in need	2.5	1.9	3.1
Formal	2.7	2.1	3.4
Institution	2.9	2.6	3.3
Informal	2.2	1.5	2.8

Source: *LifePaths* (Statistics Canada), using assumptions developed by the research team.

It is interesting to note the effect of different trends in the health status of the elderly population. In the case of an improvement in the health status of this population, the average annual growth rate could be as low as 1.9% for the population in need and 2.1% for the use of formal home care services. On the contrary, an expansion of disability would significantly increase the annual growth rate of the elderly disabled needing assistance

between 2001 and 2031. The expansion scenario shows that it could increase up to 3.1% annually. As for the use of formal home care services, this could rise as high as 3.4% annually. Of course, the effect of population health also reflects on the growth in the number of elderly persons living in an institution. According to the scenarios, this could vary between 2.6% and 3.3% annually. Policies regarding institutionalization of the elderly disabled will obviously, as it does now, have an impact on the number of people needing home care services.

5. DISCUSSION AND CONCLUSIONS

Before discussing the results of this research there are several limitations that have to be acknowledged. For instance, when looking at the needs of the elderly disabled population, this research does not measure unmet needs. For example, if someone receives assistance strictly from the informal network, but also states he/she is not receiving enough assistance, one could argue that there is a need for the formal network to provide some assistance to this person.

Of course other important factors will affect the supply of home care services provided by family members. For example, expectations from older parents toward their children may be very different from what has been observed in the recent past. These expectations may significantly affect the need for more formal home care services in the future, although the projections presented do take into account the changing level of education of tomorrow's elderly population. This is important to note given the significant link between education and source of assistance.

Gender issues mentioned in the introduction will also play an important role in the future. In the past, and even nowadays, women have been expected to play the role of caregiver to both children and older parents. These expectations cannot be taken for granted now that women are members of the labour force at rates similar to those of men. Shared caring responsibilities between men and women will need to be more balanced in the future if pressure is to be lowered on the formal network. The projections do not take any of these unknowns into consideration.

Also, even though the presence of a surviving child was examined, the geographic proximity of those children was not. This information was not collected in the 1996 General Social Survey. Also, the mere presence of a child does not mean assistance will be provided. This is an issue that would need to be examined in the future. The family network of tomorrow's elderly population will also be affected by an increased proportion of divorced individuals. Although the microsimulation takes into account the trend in

divorce, very little is known about the assistance provided by stepchildren and children of divorced parents, especially assistance toward fathers. More research is needed in this area to better understand the effect of the changing nature and extent of the family network on the demand for formal home care services.

The health status of caregivers is important to consider when projecting future availability. When considering that the majority of surviving children have not yet reached old age, knowing their health status maybe less important than knowing the health status of the spouse. Information regarding the health status of the spouse, who is typically the main provider of assistance for those living with a partner, would help in understanding why some elderly disabled receive assistance from their spouse while others, living with a partner, do not receive assistance from this source. However, the information on the health status of the spouse was not collected in the 1996 General Social Survey. This is why "age of spouse" was included in the model when measuring source of assistance. Although this is just a proxy, it is assumed that those in the 65 to 74 age group are probably doing better than those in the 85 and over age group. The results of the analysis give an indication of the importance of knowing the health status of the spouse when studying factors associated with the use of different sources of assistance.

The research is also limited in its interpretation by the fact that the number of hours of services provided by different sources of assistance was not studied. By simply projecting the number of elderly disabled using a given support network, it is impossible to look at the impact on human resources needed to respond to the demand and to the overall cost of such a demand. Data from the 1996 General Social Survey would allow such an analysis and future work will need to go in this direction.

Finally, the significant impact of using one disability scenario compared to another on the results of the projections points to a need to better understand past disability trends and the factors contributing to these trends. This is a very complex but important domain needing greater research if we want to have a clearer picture of the impact of population aging on the demand for home care services.

The results of this research provide valuable information on future trends regarding the availability of children and spouses for providing assistance, the number of elderly disabled in need of assistance, and the potential use of formal and informal networks. These trends were somewhat predictable. Given that population aging is in good part the result of lower fertility, one would expect that the proportion of elderly without any surviving children will increase in the future. However, the results show that in the near future the proportion of those without any surviving children

among those with greater needs for assistance, the oldest-old, will be lower than what has been observed in the recent past. This trend shows that until 2021, this proportion will decrease down to 16% (versus 22% in 2001). Even though the proportion will rise after that point, only in 2036 will it rise to the level observed in 2001.

As for the living arrangements of elderly persons, trends indicate that among those living in private households the proportion living alone should be relatively stable, even decreasing somewhat among females in the longer term. Based on the hypothesis for constructing the model, this decrease might in part be related to an increase in the proportion of those living in an institution. All things being equal, a greater proportion of elderly persons living with a spouse would relieve some of the pressure on the formal network. This positive impact might however be neutralized because of aging spouses not being able to provide adequate assistance because of failing health. Joint survivorship might also mean joint disability.

The results of the projections using different disability scenarios are not surprising. With constant probabilities of disability over time, the proportion of the elderly disabled between 2001 and 2031 will be just below the proportion observed in 1996. This is in part related to the arrival of the baby boomers within the older age group. At first they are among those aged 65 to 74, an age group with a lower probability of disability. It is also related to their improved level of education, a characteristic having a positive effect on health. Overall, for the period 2001-2031, the average annual growth rate of the number of elderly disabled needing assistance could be around 2.5%. One important result of the projections was to show how significant an improvement in the health of the population could be on this number. According to the hypothesis presented earlier, this annual growth rate could be as low as 1.9%.

The major advantage of the microsimulation model used in this research was to allow the possibility of accounting for changes in the family network and some of the characteristics of tomorrow's elderly population to look at future trends in the use of the formal and informal networks. Among all the trends that were projected, it is clear that the pressure on the formal network will be greater in the future.

Although pressure on the formal network will be greater, when looking at the average annual growth rate over the 2001-2031 period, this pressure would appear to be somewhat manageable (between 2% and 3% depending on the disability scenario). It would definitely command an increase in the resources available for home care services, whether from the public or private sector. Availability of human resources for home care services will definitely be an issue in the coming years as the baby boomers reach old age.

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