

# **Population at 2017** The Many Dimensions of Population Aging

anada will celebrate its 150<sup>th</sup> birthday in 2017. Although it is difficult to know what challenges and opportunities our country will face by then, we know that these will be heavily influenced by the rising tide of demographic aging. Strong currents and undertows within that tide also merit analysis. Much attention has been given to greying boomers and, while the actions of that segment will affect profoundly the next decade, younger generations will experience change in an unprecedented fashion. There should be opportunities that have not been witnessed in three generations, but, with those opportunities will

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come pressures that have not yet been experienced and for which we have little insight into their consequences. For example, our country is becoming more and more diverse, in ethnic and cultural backgrounds, religions, languages, and families. And, we live in greater numbers in cities. With these changes, youth face different challenges than previous generations in their transition into adulthood.

The Policy Research Initiative (PRI) recently launched a new horizontal project to provide a picture of the population in 2017, in its many dimensions. The project will, of course, provide basic demographic projections to show the changing age profile of the population integrating census data and population work performed by other organizations. It will also build on the PRI's previous project, Population Aging and Life-Course Flexibility, that evaluated the impact of aging on social and labour

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market policy. Population 2017 aims at providing as broad a picture as possible of the composition of our future population, based on an accurate picture of our current population and key trends observed over the last decades. It will also look at the drivers influencing the next decade and beyond. This picture is possible given the tools available to us: the powerful micro-simulation models *LifePaths* (see *Horizons* Volume 6, Number 2) and *PopSim*, both from Statistics Canada.

Population 2017 provides the foundation on which other aspects of the PRI research program are based. We have launched complementary initiatives in youth and multicultural identity. The initiative on youth will look at changes facing Canada's young people with emphasis on implications for public policy. One thread of the research addresses Aboriginal youth, arguably the fastest growing segment. This will be the theme of a special issue of *Horizons* to be released late winter. The other broadly transformative aspect of demographic change is diversity. The growing "three M" (multicultural, multi-linguistic, multi-religious) nature of Canadian society is explored in our project on cultural diversity and identity. The demographic tide will also have an impact on energy consumption, and our new project aims to shed some light on the potential impact.

This issue of *Horizons* is an important milestone for the Population 2017 project. It presents research from experts in their fields, including an analysis of the demographic tide, labour markets, diversities of diversity, energy use, and the importance of the life-course framework for these analyses.

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The authors are indebted to Juyan Wang for her careful work in establishing the tables used in this document. The small hand of the watch is the most important, though it doesn't appear to be moving. The slow progress of demographic phenomena charges them with consequences while concealing them from the attention of contemporaries.

> Alfred Sauvy Demographer, Anthropologist, Historian

the United Nations (2007a) views as profound, enduring, and irreversible.

While demographics is not destiny, population is, nonetheless, part of what Marx called the material base of society. Demographics enters questions of services to the population, as in health, education, pensions, and family support, as well as questions that relate to the state, from the economy, human resources, environment, natural resources, and transportation, to the cultural mission and governance itself (Pellegrin, 2007).

The United Nations, which obtains assessments from each country on the desirability of the demographic levels and trends, has assessed Canada as

#### **FIGURE 1**

Conomist, John Maynard

Nations, 1989). In the previous cen-

tury, the world population increased

billion, while the Canadian popula-

tion underwent a sixfold increase

from 5.4 million in 1901 to 31.0

million in 2001. The 20th century

was an era of sustained population

growth; the 21st century will be an

era of aging (Vienna Institute of

Demography, 2007: 11). Aging is

nothing new but the significant

"aging at the top" is a phenomenon

decades, aging will go beyond any

previous experience, a phenomenon

of the present century. In the coming

demographic processes (United

fourfold, from 1.6 billion to 6.1

Keynes, said that big historical

events are often caused by slow

Population Observed (1981 to 2005) and Projected (2006 to 2056) According to Six Scenarios, Canada



Source: Statistics Canada, Demography Division.

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### FIGURE 2

# Natural Increase Observed (1981 to 2004) and Projected (2005 to 2056) According to Six Scenarios, Canada



Source: Statistics Canada, Demography Division.

"satisfactory" for population size and growth, as a "major concern" for its population age structure, "too low" for fertility, "acceptable" for health and mortality, "minor change desired" for spatial distribution and internal migration, and "too low" for international migration (United Nations, 2006: 150).

This paper considers population change in terms of size and growth, fertility, mortality, migration, population distribution and composition, along with inequality and family questions, and the implications in terms of health, pensions, and society. We also consider population policy in terms of replacement migration, low fertility, and family.

# Population Change: Past and Future

#### **Population Size and Growth**

In 2006, the total population of Canada was 32.6 million. According

to Statistics Canada's medium projection, the population will still be growing in 2051 (Statistics Canada, 2005a). There will be a declining growth rate over time, but it remains positive at about 0.25 percent in 2051. In other words, the total population will still be growing in 2051, but at a very slow pace. From 1951 to 2001, the population of Canada increased by 122 percent, the next 50 years would see an increase of 35 percent. (For low and high projections, see Figure 2.)

In a medium scenario, the natural increase (births minus deaths) becomes negative in 2030, after which all population growth is due to net international migration. But a negative natural increase still includes population renewal through births. In the medium projection, the number of births exceeds the number of immigrants throughout the projection period, and in 2030 when the natural increase is expected to become negative, there would still be 346,000 births compared to 280,000 immigrants.

The future will thus see demographic dynamics different from the past. There will be slower growth, a negative natural increase and, eventually, all growth being due to net international migration. Other changes will be just as remarkable, including population aging, more relative growth of Aboriginal and visible minority populations and, depending on the scenarios for internal migration, considerable change in the distribution of population over the provinces.

#### Fertility

The long-term trend in fertility is best understood through the concept of two demographic transitions. The first transition involved economic changes that reduced the value and increased the cost of children, and cultural changes that justified the deliberate control over childbearing and promoted the appropriateness of small families. The second transition involved family changes that brought greater flexibility in the entry into and exit from unions, greater variability and diversity of family trajectories, and a delay in the transitions into family roles. The second transition is supported by a cultural context that promotes the values of individualism, diversity, and pluralism, which changed the context of childbearing.

Statistics Canada's most recent population projections use total fertility rate (TFR) assumptions of 1.3, 1.5, and 1.7 births per woman. While a 1.5 TFR represents the status quo, we propose that the high assumption is attainable. As in a number of countries in Europe – France, Spain, Sweden, and the United Kingdom – Canada's fertility moderately increased from 1.50 in 2000 to 1.54 in 2005. The fact that the increases were strongest in Quebec and Alberta suggests that fertility will be higher in contexts where young families experience either good prospects for employment (Caldwell, 2005) or a supportive social policy context (Roy and Bernier, 2006).

#### Mortality

Since Confederation, life expectancy at birth has increased from 42 years, to almost 80 years (Beaujot and Kerr, 2004: 45) due to various factors, from nutrition and standards of living, to public health and medical develop-

## TABLE 1 Population Parameters, Canada, 1901-2051

ments (Bourbeau and Smuga, 2007). The reductions in mortality rates first benefited infants and children, but since the 1970s there have been significant improvements for adults and elderly persons. Canadian life expectancy has come to surpass that of the United States, in part because there is less inequality in access to health services in Canada (Boyle and Haub, 2007).

There is potential for further improvements in life expectancy. The health field attracts some of the best talent, and there is strong public willingness to invest in health. There are concerns about deteriorating lifestyles, obesity, and environmental problems, but research on these questions can bring change in personal behaviour and social conditions. Statistics Canada (2005a: 23-24) anticipates life expectancy rising from 79.7 in 2002 to a medium projection for 2031 of 84.0. This represents a gain of 1.43 years per decade (see also Bongaarts, 2006).

#### International Migration

Compared to mortality and fertility, it is most difficult to theorize in the area of migration. For international migration, there are factors associated with relations across nations of origin and destination (Kim, 2007). These relations can be described by periods: increased international migration after the turn of the 20<sup>th</sup> century, an interlude between the two world wars including the economic depression of the 1930s, and a subsequent

Years Parameters	1901	1951	1967	2001	2006	2017	2051
Population size (000s)	5,371	14,009	20,378	31,021	32,624	35,538	42,003
Births	146,000	381,092	370,894	333,744	342,418	356,300	358,800
Deaths	87,000	125,823	150,283	219,538	226,584	284,200	476,200
Immigrants (5 yr average)	73,947	139,377	181,976	230,581	240,026	252,600	279,600
Emigrants (5 yr average)	55,000	42,000	70,000	42,607	43,226	54,720	58,020
Life expectancy	48.6	68.58	71.99	79.6	80.2	82	84
TFR	4.808	3.503	2.597	1.511	1.543	1.51	1.51
Immigrants per 1,000 population (5 yr average)	13.67	9.89	8.94	7.43	7.36	7.05	6.66
Emigrants per 1,000 population (5 yr average)	10.24	3.00	3.44	1.37	1.32	1.53	1.38

Note: Sources are available on request. Data for 2001 and 2006 are from population estimates. For 2006, the births and total fertility rate are for 2005, deaths and life expectancy are for 2004. Projections use medium assumptions.

period of globalization in the second half of the 20th century (Boyd and Vickers, 2007; Simmons, 2007). The continued globalization, along with the strong economic and demographic differentials across countries, would imply a continuation of high immigration. Canada is particularly well placed with policies for the admission and integration of various types of immigrants. However, the difficulties faced by recent immigrants might be indications that the numbers are in excess of the country's absorptive capacity (Picot and Sweetman, 2007; Green, 2007).

The average levels of international migration were 145,000 annual arrivals and 57,000 departures per year over the period 1951 to 1991 (Beaujot and Kerr, 2004: 107), and 225,000 arrivals and 42,000 departures over the period 1991 to 2005 (Statistics Canada, 2005a: 28; Bélanger, 2007: 18). These amount to 6.0 arrivals per 1,000 population from 1951 to 1991, and 7.5 from 1991 to 2005 (Statistics Canada, 2005a: 25). Statistics Canada (2005a: 37) used 7.0 per 1,000 population for immigration and 1.5 per 1,000 population for emigration in its medium projection scenario,

which implies annual levels reaching 280,000 immigrants in 2031.

### Aging

Aging has been happening for well over a century in three phases. The first phase saw reductions in births, but also reductions in deaths of infants and young children. These compensating factors produced a slow change in the age structure. The second phase was essentially "aging at the bottom" with a marked reduction in births, interrupted with a babyboom period. This phase increased the numbers of adults in the labour

Parameters	1901	1951	1967	2001	2006	2017	2051
Population size (000s)	5,371	14,009	20,378	31,021	32,624	35,538	42,003
Number of children 0-14 (000s)	1,847	4,251	8,517	5,855	5,645	5,480	5,702
Number of persons 65+ (000s)	271	1,086	1,581	3,923	4,314	5,988	11,110
Number of persons 75+ (000s)		338	598	1,762	2,041	2,517	6,170
Number of children 0-9 (000s)	1,264	3,120	4,412	3,776	3,557	3,615	3,735
Number of persons 30-39 (000s)	705	2,042	2,536	4,877	4,582	4,959	5,129
% (0-14)	34.39	30.34	41.80	18.87	17.30	15.42	13.58
% (65+)	5.05	7.75	7.75	12.65	13.22	16.85	26.45
% (75+)		2.41	2.78	5.68	6.26	7.08	14.69
0-9 per 100 (30-39)	179.29	152.79	173.97	77.42	77.64	72.89	72.82
Median age	22.23	27.19	25.16	36.61	38.8	41.40	45.04

TABLE 2Measures of Age Structure, Canada, 1901–2051

Note: Sources are available on request. Data for 2001 and 2006 are from population estimates. Projections use medium assumptions.

market, and thus has often been viewed positively. The third phase, say since 1970, was due to continued low fertility and reductions in death rates at adult and older ages, resulting in aging at the bottom and aging at the top, but also aging in the middle as baby boomers got older. Although fertility was below replacement, births were sustained because of the large size of the population at the reproductive ages.

Canada now enters a fourth stage as the baby-boom cohort moves beyond childbearing and on to retirement, resulting in particularly pronounced aging at the top. The different phases of aging have different implications on factors ranging from human resources and economic productivity, to the costs of health and pensions. With baby boomers still in the labour force, we have yet to experience some of the important consequences of low fertility.

The differential growth rates by age groups show high growth at ages 55 to 64 through to 2017 as more baby boomers move into these ages. The proportion over 65 increased by 3.0 percentage points (from 10.7% to 13.7%) in the period 1986 to 2006, while the increase over the period 2006 to 2026 will be 7.5 percentage points (from 13.7% to 21.2%). In this period, the population aged 65+ will increase by 87 percent, while the overall population increases by 16 percent.

### **Distribution over Space**

Population projections at the provincial level are more uncertain, since they are also affected by trends in interprovincial migration. In the high growth projection by Statistics Canada (2005a: 52-58), each province will have a higher population in 2031 than in 2005. But under some other scenarios, Newfoundland and Labrador, New Brunswick, Saskatchewan, the Northwest Territories, and Yukon would have smaller populations. All scenarios show an increase in the population of the other provinces/territories to 2031: Prince Edward Island, Nova Scotia, Quebec, Ontario, Manitoba, Alberta, British Columbia, and Nunavut. There are nonetheless important differences across the country in the rate of growth, and thus in the distribution of the population. Taking the medium scenario. Ontario. Alberta. and British Columbia will increase in their relative share of the total population, while all other provinces will decline in relative size.

There are also large differences across the urban-to-rural gradient (Malenfant et al., 2007). The highest growth occurs in the largest metropolitan areas and in the neighbouring rural areas. For the three largest metropolitan areas - Toronto, Montréal, and Vancouver – gains are due to international migration whereas in neighbouring rural areas and in other metropolitan areas growth is mainly due to internal migration. The net internal migration figures for the periods 1971 to 1986 and 1976 to 2001 were negative for the total of Toronto, Montréal, and Vancouver. These patterns brought an increased gap in ethno-cultural diversity between Toronto-Montréal-Vancouver and the rest of the country. The most rural areas of the country have the highest fertility, but they also experience a weak demographic growth or a decline in population.

### Composition: Visible Minorities, Aboriginal Peoples

The legislation of employment equity has prompted projections of visible minority and Aboriginal populations. For instance, the population of visible minority status increased from 1.1 million in 1981 to 4.0 million in 2001, and it is expected to increase to 7.1 million in 2017, comprising about one in five persons. The population of Aboriginal origins was at a low point of close to 100,000 in 1900, and those identifying themselves as Aboriginal reached 1.1 million in 2001 (Maynard and Kerr, 2007). This population is expected to reach 1.4 million in 2017 (Statistics Canada, 2005b).

### Demographics and the Changing Face of Low Income

When considering the changing face of low income, the year 1961 is a useful benchmark as low income was first defined in the 1961 Census. By the 1960s, low-income poverty was no longer associated with all segments of the population but with specific population groups (Podoluk, 1968). The 1961 Census showed that low income was more prevalent if no family member worked during the year, in economic families whose head was over 65 years of age, and in female lone-parent families. Other characteristics associated with low income included residence in rural areas or in the Atlantic region, having less than a secondary education, and not being attached to an economic family. Since then there have been areas of improvement. The differences over provinces and across levels of education have declined. Further, the

incidence of low income among the elderly is lower, at least for those living in economic families (Picot and Myles, 2005).

At the turn of this century, five groups are identified as subject to persistent low income: lone parents, unattached persons aged 45 to 64, recent immigrants, off-reserve had less competition since fewer immigrants preceded them. Those arriving since the early 1980s have experienced economic disadvantages. While the percentage with low income declined for the Canadianborn population between 1980 and 2000, this rate increased from 24.6 percent to 35.8 percent for immigrants

While the percentage with low income declined for the Canadian-born population between 1980 and 2000, this rate increased from 24.6 percent to 35.8 percent for immigrants of the previous five years.

Aboriginal populations, and persons with work-limiting disabilities (Hatfield, 2004). The 2001 Census, which did not identify persons with disabilities, confirmed that the incidence of low income is high in the first four groups, with persons belonging to these four categories comprising 22.5 percent of the population but 45.5 percent of persons with low income. Each of the five groups is growing in relative size: family change brings more loneparent families and more unattached persons at older ages, the high levels of immigration mean more recent immigrants, the relatively high fertility increases the Aboriginal population, and an aging labour force means more persons with work-related disabilities.

### Recent Immigrants and Low Income

The situation of recent immigrants changed markedly over the last few decades. Immigrants of the postwar period profited from the long hiatus of low immigration from 1915 to 1945 (Massey, 1995). These immigrants, especially those who arrived before 1960, would have of the previous five years (Picot and Sweetman, 2007). The deterioration over cohorts does not apply to immigrants from all places of origin. The worsening situations are mostly among immigrants from places of origin that constitute an increasing share of immigration (Picot and Sweetman, 2007: 189). In contrast, the average situation is improving for immigrants from parts of the world that are decreasing in their relative share of immigrants, including Southeast Asia, the United States, South and Central America, and the Caribbean.

### Family Characteristics and Low Income

Family characteristics become a significant factor influencing low income. Those more likely to have low income include female lone parents, persons unattached to an economic family, families with three or more children, families with spouses under 25 years of age, and families with only one member in the labour force (Beaujot et al., 2007). In 2004, one-earner, two-parent families with children had the third highest incidence of low income, after female lone-parent families and unattached individuals. For the unattached, there are contrasting trends: reductions for the elderly and significant increases in low-income rates for the unattached under age 65 (Feng et al., 2007).

Certain categories of lone-parent families have seen significant improvements. From 1980 to 2000, the changed socio-demographic characteristics, especially more education and the postponement of childbearing, led to a higher proportion of lone mothers who were employed and with higher average incomes (Myles et al., 2007). At the same time, the proportions of young lone mothers with low incomes, especially those who had children as teenagers, have not shown improvements.

### Implications for Human Resources, Health, and Pensions

#### Human Resources

Future demographic changes will not carry some of the positive implications for human resources that occurred in the 20<sup>th</sup> century (Livi-Bacci, 2000). The huge reductions in mortality in the 20<sup>th</sup> century benefited children, and then younger adults, thus increasing the workingage population. However, future gains in mortality will mostly benefit the older population, who are beyond ages for the labour force. Similarly, the past reductions in fertility have permitted the greater labour force activity of adults; now this low fertility is reducing the number of young adults entering the labour market. The benefits from internal

migration are less likely to be repeated in the future, as the population is already living in concentrated areas, and the changes may see a depopulation of major regions, with an associated loss of value of the capital infrastructure (Matthews, 2006). International migration has contributed in the past to the settlement of Western Canada, to industrialization, and to postwar economic growth. While there will be benefits from international migration in the future, the Canadian labour force is well educated, implying fewer gains from importing skilled labour.

After a half century of growth, participation in the labour force declined in the 1990s, at least for older men, and for young men and women (Sunter, 2001). However, data from the current decade indicate reversals of some of these trends, especially a higher participation at older ages (Marshall and Ferraro, 2007; Stone, 2007). With the increases in participation rates between 1996 and 2005, Martel and his colleagues (2007a) used two scenarios for the future: rates that remain constant at 2005 levels and rates that continue the trend by age, sex, and province. Combining these

participation rates with the various population growth scenarios drawn by Statistics Canada produces growth in the total labour force until 2017 in all scenarios, and until 2031 in all but the scenario with low population growth and constant participation rates (Martel et al., 2007a: 3). Compared to its size in 2005, the total labour force in 2031 will be 2 percent higher in the low Scenario 1 and as much as 23 percent higher in the high Scenario 4, with an increase of 16 percent in the medium Scenario 3. At the provincial level, only Ontario, Alberta, and British

TABLE 3		
Measures of the Labour Force,	Canada,	1901-2051

Years Parameters	1901	1951	1967	2001	2006	2017	2051
Population 15+ (000s)	3,524	9,758	11,861	25,167	26,979	30,058	36,300
Size of labour force (000s)	1,868	5,300	7,800	16,110	17,593	19,978	21,939
Annual growth rate of labour force (5 yr average) %		1.54	2.63	1.70	1.19	0.16	0.09
Employment rate (employed per population 15+) %	50.60	52.23	52.8	61.1	63.0		
Labour force participation rate (labour force per population 15+)	53.00	54.31	65.76	65.9	67.2	63.0	58.95
Number of persons 15-24	1,072	2,147	3,440	4,227	4,431	4,253	4,282
Number of persons 55-64	304	1,077	1,530	2,917	3,669	4,989	5,501
15-24 per 100 at 55-64	352.63	199.35	224.88	144.94	120.76	85.25	77.84

Note: Sources available on request. Data for 2001 and 2006 are from CANSIM estimates. Projections use medium assumptions for population projections and "rising participation" for labour force participation rates. The participation rates projected for 2031 have been applied by the authors to the medium population projections.

Columbia will have larger labour force sizes in 2031 than in 2005.

With a different approach that builds into the model the impact of higher levels of education on working hours over the life course, Hunsley (2006: 8) also projects that the total labour supply relative to the size of the population would decline after reaching a peak in 2013.

At the time of the 2001 Census, the ratio of the population aged 15 to 24 (the typical ages at entry into the labour force) to the population aged 55 to 64 (the typical age at exits) was 1.4. By 2006 this ratio was 1.2 and by 2011 it will be 1.0, reaching figures between 0.8 and 0.9 in 2031. The 2006 Census release used 2016 as the year when the number of persons reaching working ages will be smaller than those reaching retirement ages (Statistics Canada, 2007: 12). After this date, regardless of the projection scenario, there will be fewer people at ages for labour force entry compared to those at ages for labour force exit.

#### Health Care

The anticipated increase in life expectancy of possibly 1.5 years per decade will not happen by itself. There is a need for policy attention to the factors that influence public health, and for continued access to health benefits. In some areas of public policy, greater expenditures can reduce the problems, but in the health domain improvements lead to further costs in looking after the health of survivors. When life expectancy increases, an older population ultimately means more deaths, and high health costs in the last year of life mean that the number of deaths is a major driver of health care costs (Légaré et al., 2006).

Other costs are associated with the number of persons in poor health. In the base scenario, Légaré and Décarie (2007) projected that between 2001 and 2031 the elderly population in poor health will increase by a factor of 3.3 for men and 2.7 for women. Even in the optimistic scenario, where all gains in life expectancy are in the disability-free years, the increase is a factor of 2.7 for men and 2.3 for women. With greater numbers of frail elderly, costs will increase for a range of health and social services (Keefe et al., 2007; Légaré, 2001; Légaré et al., 2006: 307). These costs are mostly funded through a one-tier public "pay-as-you-go" system, which raises inevitable inequity across generations, to the disadvantage of smaller generations that follow larger ones.

#### **Pensions**

The analysis of trends in low income for the elderly suggests that Old Age Security and the maturation of the Canada Pension Plan have played important roles in reducing inequality across the elderly population (Myles, 2000). However, with the increased importance of private pension plans in retirement income, and the very uneven participation, this inequality is expected to increase.

In his comparative analysis of seven countries, Bongaarts (2004) found that the pension expenditure ratio (PER) or the total annual spending on public pensions divided by total pre-tax annual earnings of workers is about 10 percent of earnings in Canada, the United Kingdom, and the United States, about a quarter of earnings in France and Germany, and one third in Italy. His projections suggest that public pension expenditure as a percent of earnings is unsustainable for Italy, France, and Germany, and problematic even for Canada, the United States and the United Kingdom. In the Canadian case, the PER increases from 10 percent to 20 percent between 2001 and 2050. Various alternatives are simulated for reducing public pension costs, including population questions like increasing fertility or immigration, and labour force questions like increasing the employment ratio or the age at retirement, along with a reduction in pension benefits themselves. There would be value to considering policy along each of these avenues.

### **Population Policy?**

#### **Replacement Migration**

Discussions of problems facing the Canadian population, especially slower growth, slower labour force growth, and aging, often take immigration as a way of fixing the problem. This has become known as "replacement migration," that is, using immigration to replace births and to return to earlier population dynamics. The United Nations (2000) used three definitions of replacement migration.

In the first definition, migration is used to prevent the population from declining. As seen from Statistics Canada's medium scenario projections, migration prevents the decline of population in the long term. However, with only Ontario, Alberta, and British Columbia receiving more than their relative share, immigration does not prevent a population decline in some regions of the country (Matthews, 2006).

The second definition is to use immigration to prevent the labour force population from declining. Here again, Canada is in good position, even with immigration levels slightly below those of the medium scenario. Martel et al. (2007b) calculated that population aging. Moreover, it is questionable whether a significant increase in immigration is feasible in Canada. Unlike many European nations, Canada already has a high rate of immigration. The lack of success in redirecting newcomers to destinations other than Toronto, Vancouver, and Montréal, and the greater difficulty in integrating recent cohorts of immigrants into the

While we live in an ideal time with regard to the proportion of the population in the labour market, we need to consider reforms, to accommodate older workers, to improve the security of younger workers, and to improve the work-life balance.

an annual net immigration of 165,000 is sufficient to keep the working-age population from declining.

The third meaning of replacement migration is to use migration to maintain the relative size of the population aged 15 to 64, compared to that aged 65 and over. Population projections show that this is impossible. Population aging is inevitable, and immigration cannot be used to stop this process. Immigrants are, on average, younger than the receiving population, and thus higher levels of immigration produce a slightly younger population. However, the effect is slight, since immigrants of a given year are a small number compared to the receiving population, and since the foreign born age like everyone else.

An increase in immigration levels can be a part of the response to the forecast demographic change, but, in itself, will not solve problems. Immigration can forestall population decline but has little impact on Canadian labour market, cast doubt on the feasibility of any large jump in the numbers admitted. Past experience has seen immigration levels rise and decline, permitting periods of integration when the additional arrivals were lower.

#### Low Fertility

A survey on fertility intentions in France shows that four factors contribute to relatively high fertility: access to resources and economic stability, more equal gender relations, family policies, and resisting postmodern values associated with individualism (Rossier, 2005). Existence of a stable conjugal unit and two jobs per family also contributes to higher fertility (Rossier, 2005; Testa and Toulemon, 2005).

Recent cohorts experienced significant difficulty in entering the labour market, and the real incomes of young workers have declined in recent years. Moreover, at least some of the costs associated with child rearing – most notably, post-secondary education – have been rising. Greater financial support for young families might help them become established more quickly and have more children. However, even those most supportive of financial incentives concede that, to have a significant impact, payments must be large. Moreover, financial incentives alone are likely to have only a small effect on the fertility rate (Grant et al., 2004).

In his study of the efficacy of policy on fertility, McDonald (2006) concluded that governments will have to provide greater security if fertility is to rise. The central problem, according to McDonald, is that family formation involves greater risks for women. The solution includes social change that gives priority to the support of family life, signalling that if young persons marry and have children, they will be supported by the society. Fertility is lowest in countries where there is a strong, traditional view that family and state are separate entities, and it is higher when there are familyfriendly institutional arrangements and higher levels of gender equity within the family (see also Roy and Bernier, 2006). These institutional arrangements need to take a variety of forms, given the diversity across families and over the family life course (Beaujot and Ravanera, 2007; McQuillan, 2006).

## Family Dimensions and the Changing Basis for Social Support

Family dimensions merit further consideration, especially since there have been large changes with associated implications regarding families as the basis for the support of dependants.

While family life in the baby-boom era did not constitute a "natural" or

timeless model for family living, it is nevertheless useful to compare the situation of families today with that which prevailed in the first decades following World War II. Many significant social policies that affect families were developed in this era, and these policies assumed both a steadily growing population and the predominance of the two-parent, oneearner family. That is, social policies developed in modern welfare states in the postwar period often implicitly assumed that stable, intact families with a regularly employed breadwinner would guarantee the basic security of the great majority of the population (Esping-Andersen, 1999). Thus, the primary role for social policy was to provide support to the relatively small number of persons who did not live in such families. But a new set of risks emerged in the later part of the 20<sup>th</sup> century, and the established policies of modern welfare states are not well-suited to respond. These new risks are related to developments in the labour markets of advanced industrial societies, but the changes in family life have also created new risks, especially for women and children.

While Western countries have put their social policies together through models that use different anchoring points, these models always include three elements: individual self-sufficiency, family support, and a social safety net. In their current formulation, these models are inadequate in the globalized post-industrial world (Esping-Anderson, 1999).

### Conclusions

At the 150th anniversary of Confederation, the demographic conditions in Canada will be rather different from those of 50 years earlier. In 1967, the population was growing at an annual rate of 1.8 percent per year, while the rate in 2017 will be 0.8 percent per year in the medium projection. The aging that was occurring was mostly at the bottom, with the proportion of the population over 65 increasing from 7.8 percent in 1967 to 13.7 percent in 2006. This indicator of aging at the top increased by 6.0 percentage points from 1967 to the present, and it will increase by another 3.1 percentage points to 2017, and another 4.4 percentage points to 2026; by that time, most of the baby boomers will be at these ages.

In spite of low unemployment, only 52.8 percent of the population aged 15 and over were employed in 1967; this employment rate increased to 63.0 percent in 2006. With the massive movement of baby boomers and women into the labour force, the total labour force was set to increase by 38 percent in the 10 years following 1967, while the current projections are for a 2 percent increase between 2017 and 2027. From 1966 to 1976, the population aged 20 to 29 increased by 53 percent, while that aged 65+ increased by 30 percent, and the whole population increased by 15 percent. In contrast, between 2016 and 2026, we will see a decline of 7 percent in the population aged 20 to 29, an increase by 39 percent in the population aged 65+, and a total increase of 7 percent.

There have also been important differences over regions. For instance, in the last 40 years the populations of Alberta and British Columbia combined increased from 16.7 percent to 23.6 percent of the total country, while the Atlantic provinces combined declined from 9.9 percent to 7.1 percent, and Quebec from 28.9 percent to 23.5 percent of the country. In spite of an interest to have more balanced distribution over regions, these differentials will likely continue, with growth concentrated in Alberta, British Columbia, and Ontario.

Clearly, Canada's demographic policy needs to go beyond immigration. While immigration plays an important role in adjusting to a changed context, there is also a need for policy that would support childbearing. While we live in an ideal time with regard to the proportion of the population in the labour market. we need to consider reforms, to accommodate older workers, to improve the security of younger workers, and to improve the work-life balance. Given the interests of the smaller generations following the baby-boom generation, adjustments to health and pension provisions need to pay particular attention to intergenerational equity.

*References are available on the PRI web site.* 

The Interconnected Dynamics of Population Change and Life-Course Processes

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This paper has benefited from numerous discussions between the author and researchers involved in the "Panel Survey of Lifecourse Dynamics", a precursor to the current "Canadian Household Panel Survey", and in the SSHRC-sponsored "Population Change and Lifecourse Strategic Research Cluster". Thanks to Charles Beach, Paul Bélanger, Johanne Charbonneau, Céline LeBourdais, David Livingstone, Susan McDaniel, Lynn McDonald, Shelley Phipps, Louise Potvin, Amélie Quesnel-Vallée, Byron Spencer, J. Douglas Willms; and to Roderic Beaujot, Rosemary Bender, Kevin McQuillan, and Zenaida Ravanera.

emography probably enjoys the best record among all social science disciplines in predicting the future, especially if this future lies about ten years hence. After all, in the late 20th century, Nathan Keyfitz was able to point out to the Chinese authorities what consequences their one-child-per-family policy would have on the population, and on economic development. He predicted that, initially a window of opportunity for economic growth would open as the dependence ratio was radically lowered (with fewer children, and not yet having a large proportion of aged people); but this would only last for a specific time. Then, the abundant young generation would reach old age and the dependency ratio would shoot up again. Therefore, economic growth had better be achieved by then.

Of course, Canada's situation appears, and indeed is, much less dramatic. The parents of children to be born during the next decade are already largely present and they can be counted. Barring catastrophes, life expectancy will keep rising slightly, and the aging and deaths among current members of the population can be predicted with much accuracy. Immigration levels are likely to remain high enough to keep representing the only net contribution to population growth, but the numbers are not so high as to upset the balance in any important ways on the national level. Most people who will be living in Canada in 2017 are already here, although the equivalent proposition may not hold for specific regions, cities, and neighbourhoods.

Regional migration within Canada may keep displacing many individuals and families, but it is not clear to where, given the rather volatile mix of resource development and environmental problems we are likely to face. If the number of children to be born over the next decade is predictable, the circumstances in which they will grow are less foreseeable. Will they live in intact families, in single-parent families, or in blended families? And for how long will they experience these situations? How many will live in poverty, or in families plagued by uncertainties and stresses concerning employment or work-life balance? How many will be born to immigrant families, and how different will their trajectories be from those whose parents were born here?

The more we look beyond counts to the underlying processes at work, the more complex things become. As the study of population change turns to the broader issues of what sort of life members of this evolving population are likely to lead, analyzing the interaction between all the processes at play, socioeconomic as well as demographic, not to mention cultural, requires a conceptual scheme. This is what we sketch out here, starting from population change and reaching out to the notion of life course.

The study of population change starts with basic counts: how many births, deaths, conjugal unions formed or dissolved, and how many people moving in and out of various territories. Locality is implicit, or even explicit, in all these counts: people are counted in specific places (which should bring about a conversation between demography and geography, especially in these times of environmental vulnerability).

The notion of *transitions* is closely tied to that of counts, if simply because births come from unions, cohorts

they examine their circumstances, using whatever information, ideas, and beliefs life has made available to them. They then adopt a course of action in order to maintain or alter this situation. The process is iterative, as circumstances change,

*The life-course perspective provides a framework through which the interaction between these transitions and processes can be analyzed.* 

replace one another in a process of biological and social reproduction, migrants change the age balance and the territorial distribution of the population, and so on. In other words, counts are interdependent; they are linked through these transitions.

Much of research is devoted to understanding the causes of such transitions, that is, to understanding the *processes* which promote or hold back each of these transitions, or change their circumstances. This is where demography enters a broad interdisciplinary conversation with economics, sociology, and even anthropology and psychology. Political science is also relevant, to the extent that counts and transitions are shaped by policies, and contribute to shaping them.

The *life-course* perspective provides a framework through which the interaction between these transitions and processes can be analyzed. It involves four elements, all leading to a rich interdisciplinary dialogue, and to improved exchanges between the research and the policy communities.

1. Life is *longitudinal*: individuals, as human agents, build their future on the basis of the constraints and opportunities provided by their past. At each stage of their lives, in part as a result of the course of action selected earlier. There are of course significant disparities in the circumstances in which individuals find themselves. as well as in the quality of the knowledge available to make decisions. Moreover, lifecourse research has shown that initial differences in opportunities, sometimes relatively limited, tend to be amplified with the passage of time. The timing and sequence of events and transitions also play a key role, and consequences of these events and transitions unfold over the short, but also the middle and the long run.

2. Life is *multifaceted*: individuals contribute to, and derive resources from various institutions with which they are in contact: family, communities, markets, and the state. Indeed, the life course of individuals essentially depends on the extent to which they enjoy resources such as good health, a mastery of knowledge, and a certain level of economic security. These three basic resources can be seen as both causes and consequences of one another, as the life course unfolds. At various junctures, individuals only fare as

well as their health, literacy, and economic security will allow. And in turn health, literacy and income security are largely the product of what happens at these successive junctures. This is why policy discussions increasingly refer to the need for life-long learning, health literacy, and maintaining employability, and to the deleterious effects of poverty on health and literacy, especially among children. The reference to various interdependent forms of capital is useful here: resources are not only used, they are also accumulated (or depleted) over the life course, thus affecting life chances and social conditions in a cumulative and interactive way. Besides economic, human, cultural and health capital, social capital is increasingly evoked in policy discussions. Through social networks, individuals can indeed mobilize other useful resources for themselves, their families and their communities.

3. Lives are *linked*: individuals are involved in "linked lives," largely through family and generational relationships. We are all born to parents, who usually care for us and expect some form of care and love as they age. A similar relationship binds a large proportion of middle-aged individuals to their own children as well, and indeed it is experienced in the context of increasingly diverse families, intact, single-parent or reconstituted. This has critical consequences for the life course of individuals, not only when they are young or aged and dependent, but also when they are middle-aged and sharing the

burden of caring for dependents in their families, in their communities, and in their society's institutions (e.g., pension schemes). Linked lives mean that the life course of individuals is profoundly affected by what happens in the life course of their family members, and vice versa: for instance, when a job is lost (or found), when a major illness strikes, when a child is born or a spouse dies, when a child drops out of school, or leaves home, or comes back.

4. Lives are lived in *social contexts*: individuals are embedded not only in families, but also in communities, which can offer various levels of opportunities (i.e., jobs, quality of schools and childcare services, physical security, quality of the environment, availability of commercial services) and of support (sociability, community organizations). These obviously shape the trajectories of residents, especially in the case of the more place-bound sub-populations, such as children, the aged, the handicapped, and the poor. Provincial and national jurisdictions also play a key role in shaping life courses, through their policies in the fields of health, education, social assistance, urban affairs, transportation. the environment and so on. Research reveals striking differences even among advanced societies, which have been captured in the notion of welfare regimes. These regimes represent different global and historically resilient models of organizing the production and distribution of welfare by markets,

states, families, and communities. Liberal countries emphasize markets and residual social programs; social-democratic countries offer universal social protection while emphasizing widespread participation in the labour market; and, conservative countries tend to rely more on families and on occupations-based social insurance schemes. Comparative life-course research (international and, in the case of Canada, inter-provincial) can powerfully contribute to sorting out the effects of these policy arrangements on outcomes in the trajectories of individuals and families.

This last element draws the life-course perspective away from a rather individualistic point of view. Thus, individual and family transitions and trajectories simply become a lens through which the effects of macroscopic changes can be analyzed. training programs, which are all driven by counts and transitions, over the life course and in various population groups.

This can be summarized in two symmetric propositions:

- Population changes, together with economic changes, are major determinants of how transitions, trajectories and life courses are shaped.
- In turn, the various processes at play in the life course of individuals are, in the aggregate, the causes of population changes.

This interdependency is clearly illustrated when we examine, for instance, one key population process, birth. Birth depends on decisions made in the context of the matrimonial, educational, professional and income trajectories of individuals in families, as well as the health situation of these individuals and their kin. And these trajectories in turn, have been shaped

If we want to promote equality of opportunity for all in Canada, we will need to better understand changes in the composition of the population, how these changes interact with life-course processes, and how both will unfold in the context of growing social inequalities.

Economic and cultural changes obviously play a key role, but so do population changes. The number of births, unions and separations, deaths and migrations powerfully shape the context in which individuals lead their lives, and in which policy decisions are made. One only has to think of such issues as retirement age, health care needs, transfers and services in support of families, immigration quotas, and labour by population processes which led to having various numbers of people in various cohorts of natives and migrants in a given territory.

Of course, all of these processes are powerfully influenced by, and influence in turn, the growing social inequalities that we are currently experiencing. According to Heisz (2007), our social programs and fiscal arrangements can no longer keep in check the forces of increasingly unequal earnings, as well as (demography again, in a way) the effects of rising educational homogamy. According to Saez and Veall (2005) and Murphy, Roberts and Wolfson (2007) for Canada, high incomes are very strongly on the rise; we can expect this to shape public debates and decisions on public policies. According to Myles (2005), the cohort succeeding the baby-boom cohort will likely experience a postponed adulthood, with attendant difficulties concerning fertility, and thus the population age distribution.

In other words, it is impossible to study population changes and life courses without reference to social inequalities which they both shape, and are shaped by. The connections are multiple, and we can mention only a few that stand out.

- The challenge of intergenerational equity, including the ways (private or public) in which enormous amounts of resources will be passed between cohorts as the baby boomers age and die.
- The impact of family changes on social inequalities, including the aforementioned tendency to educational homogamy, but also the impacts of family instability on the economic circumstances in which children are raised.
- The increasingly problematic integration of immigrants in the mainstream, especially in the labour market and in our educational credentials system.
- Population imbalances driven by regional economic booms and busts, as well as the need for families to reorganize their life courses accordingly.

• The difficulties in making sure that the population, in the diversity of its ethnic and age circumstances, gets the resources necessary to lead a productive life; this involves ongoing educational and health services, but also the resources required to balance work and family obligations.

Another way to put it would be to say that if we want to promote equality of opportunity for all in Canada, we will need to better understand changes in the composition of the population, how these changes interact with lifecourse processes, and how both will unfold in the context of growing social inequalities.

*References are available on the PRI web site.* 

# Population and Employment in 2017

Alain Denhez Associate Project Director Policy Research Initiative ur country will be celebrating its 150<sup>th</sup> anniversary in 10 years' time, in 2017. Many people are concerned about Canada's economic future, on the eve of this anniversary, due largely to the aging population and the particular challenges arising from baby boomers' exit from the labour force. This article takes a look at our understanding of the issues surrounding this demographic challenge.

Like fortune tellers who read the future with a crystal ball, our vision of what the population will look like in 2017 is derived from a few crystal balls... albeit scientific ones. Our key analytical tools are the Statistics Canada *LifePaths*<sup>1</sup> and *PopSim* microsimulation models. Another article in this edition of *Horizons* presents results of the COPS projection model – an extremely useful "crystal ball" as well for evaluating the challenges of the future labour market.

### The Aging Population

There are dire, unavoidable demographic trends for which no crystal ball is needed; in 2017, for example, we can be certain without the shadow of a doubt that we will be 10 years older! This seemingly obvious truth, however, masks a major demographic phenomenon: in 2017, baby boomers will be 10 years older and, because of their substantial demographic weight relative to all other generations, they will cause a generalized increase in the average age of Canadians. The boomer population, which is currently between 45 and 60 years of age, represents approximately 22 percent of the total population, whereas the 15 and under age group represents just 17 percent of the population. There are simply not enough young people to counter the aging effect of boomers on the overall average age of the population.

#### **FIGURE 1**

Recent Gain in Population Growth Due to Immigration, While Natural Increase is Declining in Importance, Now Only 1/3 of Growth



Source: Laurent Martel (June 8, 2007).

# **TABLE 1**Demographic Growth, 2007-2017

	20	07		2017				
Median Age	Births	Deaths	Net	Median Age*	Births	Deaths	Net	
41.6	4.3	4.5	-0.2	45.8	3.9	5.1	-1.2	
38.9	1.4	1.2	0.2	42.3	1.4	1.3	0.1	
41.2	8.4	8.5	-0.1	44.4	8.3	9.2	-0.9	
41.1	6.7	6.4	0.3	44.5	6.4	7.2	-0.8	
40.6	74.5	61.7	12.8	42.7	74.7	70.8	3.9	
38.5	131.5	92.2	39.3	40.6	144.5	108.1	36.4	
37.5	14.3	10.2	4.1	38.9	15.2	10.5	4.7	
37.9	11.9	9.1	2.8	40.0	11.4	8.9	2.5	
36.1	41.1	20.3	20.8	38.5	43.5	24.6	18.9	
40.0	41.0	32.2	8.8	42.1	45.1	37.8	7.3	
39.1	336.9	246.7	90.2	41.2	356.3	284.2	72.1	

\* in 2016.

Source: Bélanger, Martel et al., (2005), and PopSim (2007).

If boomers' demographic weight partly explains the aging population, other factors also come into play. First and foremost, Canadian fertility has, for the past few decades, been below the level needed to simply maintain the population at a stable level. The low fertility rate serves, of course, to explain the low demographic weight of young people in our society at the present time. In fact, if it were not for immigration, Canada's population would start shrinking soon (by around 2030), with more deaths recorded than births. There will then be insufficient births in the country to replace the baby boomers (see Figure 1).

Another factor that explains the aging population is increasing life expectancy for both women and men. Life expectancy is increasing by about 2.4 years each decade, and a greater proportion of Canadians are reaching 65 years of age. It is expected that 88 percent of women and 81 percent of men born in 1960 will reach age 65, as compared to 74 percent and 62 percent of Canadian women and men respectively born in 1920. The demographic weight of older persons is therefore all that much stronger.

This much is clear: all the ingredients are in place to contribute to an aging population: fewer children, and an aging generation with a considerable demographic weight and the chance of living longer than previous generations.

It should be pointed out that aging of the population will occur unevenly across Canada. Eastern Canada is aging more rapidly than the provinces to the west of the Ottawa River (see Table 1). For example, the median age in Newfoundland and Labrador may increase by more than 4 years in the next 10 years, whereas the increase in the median age for Canada as a whole will be only a little over 2.1 years. Also, there are now more deaths than births in Newfoundland and Labrador, as well as in Nova Scotia. At the other extreme, there are still twice as many births as there are deaths in Alberta.

### Aging and Employment

Population aging is a cause for concern; will Canada have the economic capacity to sustain a growing fraction of its population that is not in the labour force? At the Policy Research Initiative, we have developed an objective approach for providing answers to that question.

Boomers will have a determining influence on the changing face of the labour force over the next 10 years. In 2017, the oldest baby boomers will be in their 70s, and the youngest will be close to their mid-50s. The next 10 years will therefore see many boomers leave or on their way to leaving the labour force. After decades of growth in the number of workingage people, providing employers with opportunities for renewal and continuous growth in the number of available workers, the trend will reverse. The proportion of the population age 65 and over will increase to 16.1 percent, whereas it is currently only 13.6 percent, representing a jump of 2.5 percentage points in just 10 years.

We are not looking at a major crisis in the labour market. There will not be a generalized labour shortage in 2017.<sup>2</sup> An important component of

this finding is the fact that the population replacing boomers in the labour force is more active, due largely to the increasing participation of women in the labour force (see Figure 2). Another important component is the high education level of young cohorts arriving on the labour force, which increases the chances of both landing a job and holding onto it longer (see Figure 3).<sup>3</sup> We would be tempted to add a third component, immigration, although there is already a high level of immigration in Canada, so it will have very little impact (see textbox on p. 21). Immigration can be a tool used to offset certain pressures in certain specific sectors, but it is not a solution that can improve the living standard of Canadians (Denton, 2003), nor even compensate for the aging population.<sup>4</sup>

The measurement, developed at the PRI, of total labour supply (see text box on p. 21) makes it possible to quantify labour supply relative to the Canadian population as whole (population including non-working young and old).

It is expected that this labour supply, expressed in hours of work per capita (hours of work in relation to total population), will start to decline at the turn of the decade (see Figure 4), after a strong upward trend since at least the early 1970s, corresponding to the arrival of baby boomers at working age and the increasing participation by women in the labour force.

If the scenario we are forecasting as regards labour supply in relation to total population is not catastrophic, it nonetheless implies a significant reversal in the long-term trend

FIGURE 2 Working Age (15-64) Employment Rate



Source: *LifePaths*, Statistics Canada.





Source: LifePaths, Statistics Canada.





Source: LifePaths (July 2007), Statistics Canada.

### TABLE 2

### Provincial Distribution of Hours of Work per Capita

	Hours per Capita							
	2007	2017	Percent change					
Newfoundland	740	621	-16.1%					
P.E.I.	1,042	954	-8.5%					
Nova Scotia	952	871	-8.5%					
New Brunswick	891	790	-11.3%					
Quebec	949	874	-7.9%					
Ontario	1,043	1,027	-1.6%					
Manitoba	1,048	1,012	-3.5%					
Saskatchewan	1,033	989	-4.2%					
Alberta	1,111	1,090	-1.9%					
British Columbia	979	935	-4.5%					
Yukon	737	675	-8.5%					
N.W.T.	701	622	-11.4%					
Canada	1,007	970	-3.7%					

Source: LifePaths (July 2007), Statistics Canada.

### TABLE 3

# Proportion of Population by Educational Achievement in 2007 and 2017, 25-44 Age Group

	1997	2007	2017
Less than high school	19.3%	14.1%	12.1%
High school	15.3%	13.3%	12,6%
Post-secondary studies or diploma	45.8%	48.6%	49.1%
University (Bachelor's and higher)	19.6%	24.1%	26.3%

Source: LifePaths (July 2007), Statistics Canada.

observed thus far on the labour market. Whereas work capacity used to be rising constantly, an adjustment will be needed to a market where labour supply is more limited. The labour market will have to adjust to the changing trend, and this adjustment may prove difficult. The golden age of economic growth, fuelled mainly by labour force growth, seems to have come to an end.

The relatively modest decrease in hours of work per capita conceals marked differences across provinces, similar to provincial differences in aging (see Table 2). In Newfoundland and Labrador, for example, the decline in hours per capita will be approximately 16 percent, whereas the decline will be only 1.4 percent in Ontario. In fact, all eastern provinces, including Quebec, will see a marked decline in hours of work per capita, whereas the decline will be less marked in the other provinces.

Aging may slow down economic growth if there is no compensatory effect on productivity. An important factor for productivity growth is the quality of the work force. If we rely on educational level as an indicator of labour quality, we have reason to be optimistic about the country's ability to achieve the objective of faster productivity growth. The labour force is educated, and it is increasingly so. Young people entering the labour force are reaching higher levels of education than their seniors. In 2007, approximately 72.6 percent of those aged 25-44 years old have more than a high school education. This proportion will increase to over 75 percent in 2017<sup>5</sup> (the highest in industrialized nations).

#### Population Aging and Employment

The first baby boomers, those born in 1946, will turn 65 in 2011. At that time, the demographic weight of boomers will be demonstrated once again, when the over 65 population will start increasing. Boomers' exit from the labour force will be well underway in 2011, though, as many boomers will have already left the working world. In and of itself, the relative proportion of the population age 65 and over will not lead to a corresponding decrease in the amount of labour available to the Canadian economy. Other factors come into play, including the constant rise in women's participation rate, the level of education among workers, which influences both the probability of having a job as well as the possibility of keeping it, the age at entry into the labour force, immigration, etc.

A more accurate way of measuring the available amount of labour is to calculate the actual number of hours worked by all members of the population. This indicator measures the overall work effort in relation to the size of the population. Using the *LifePaths* microsimulation model, we measured this work effort and projected the behaviours of Canadians on the labour force to estimate the impact of the aging population (PRI, 2005).

The *LifePaths* projections consider immigration, the changing relationship between work, family and education, and the changing participation among women in both education and employment. *LifePaths* projects changes in these various parameters, but it cannot, of course, factor in possible behavioural changes in the future. For example, with *LifePaths*, we observe and make future projections of the values of Canadians as expressed today by their participation in the labour market, the creation of families, the stability of conjugal relationships, etc. However, LifePaths could obviously not predict the impact that significant changes in values might have if a trend cannot already been seen today. An example of such a change of values might be a change of attitude in the relationship between labour market and family. The effect of such a change in attitudes on the economy could be modelled with LifePaths and its effect quantified in relation to the base projection.

We saw earlier (see Figure 3) the positive effect that education has on participation in the labour market. The growth in education level among young cohorts therefore explains, in part, the smaller decline than expected in the number of hours of work per capita, owing to a higher number of hours of work derived from greater participation in the labour market. If we assume, however, that an hour of work performed by a better educated person has a greater value,<sup>6</sup> thus reflecting greater productivity, then there is reason to be even more optimistic for the country's economic future. Figure 5 shows projected hours of work, corrected by potential growth in work productivity corresponding to a higher educational





Source: LifePaths (July 2007), Statistics Canada.

### **TABLE 4**

60-65 \$37

\$41

\$43

Earnings (in thousands of 2001\$) per Person Year Employed -Males

\$45

\$45

\$48

\$52

\$55

\$58

\$40

Age Group

	55-60	\$40	\$46	\$48	\$45	\$49	\$49	\$52	\$55	\$58	\$61
	50-55	\$43	\$49	\$51	\$51	\$53	\$53	\$54	\$57	\$60	\$64
	45-50	\$44	\$50	\$53	\$54	\$55	\$54	\$54	\$57	\$60	\$65
5	40-45	\$44	\$50	\$53	\$54	\$54	\$51	\$52	\$55	\$59	\$63
,	35-40	\$41	\$48	\$51	\$50	\$49	\$47	\$48	\$51	\$55	\$58
'n	30-35	\$38	\$43	\$45	\$43	\$43	\$41	\$43	\$45	\$48	\$50
	25-30	\$32	\$37	\$38	\$34	\$36	\$33	\$35	\$37	\$39	\$41
	20-25	\$25	\$29	\$29	\$25	\$26	\$24	\$25	\$26	\$27	\$29
	15-20	\$17	\$20	\$19	\$15	\$15	\$14	\$13	\$13	\$14	\$14
		1970 (1950-55)	<b>1975</b> (1955-60)	1980 (1960-65)	1985 (1965-70)	1990 (1970-75)	1995 (1975-80)	2000 (1980-85)	2005 (1985-90)	2010 (1990-95)	<b>2015</b> (1995-00)

Calendar Year

Source: LifePaths, Statistics Canada. Measure is earnings per person-year employed.

### **FIGURE 6**



Earnings Time Series of Young Workers by Education and Gender (in 2001\$)

Source: LifePaths, Statistics Canada. Measure is earnings per person-year employed.

level. With this correction for the productivity effect, there will be no decline in the value of hours worked per capita.

### Youth and Income

What will be the economic future of young people? We have seen that they are more educated and they should be more active on the labour market than their seniors were. However. many researchers have shown that the income of young people entering the labour force is lower than that among the young people of previous cohorts. This phenomenon might even explain, partly at least, the small increase observed in the unequal distribution of income.

Must we fear that this trend towards low salaries will continue until 2017? Yes and no. On the one hand, we have calculated that there should be a slight additional increase in the GINI inequality index<sup>7</sup> in 2017. It is more than possible, however, that this trend will be temporary. Two factors point to this possibility. It is likely that young people will catch up on the lag they have at the beginning of their careers, and that at some point they will even surpass the compensation of workers among older cohorts. This phenomenon has already been observed, as illustrated in Table 4, which shows employment earnings for various male cohorts. By using as a benchmark compensation for the cohort born between 1950 and 1955 over their life course at work (first diagonal, in white), we can examine how the career trajectories of other cohorts compare. For example, the 1970-1975 cohort had lower employment earnings (in gold) until they

reached 30-35 years of age, when their earnings grew slightly higher (in blue), and it is expected that this positive situation will continue in the future.

It is also possible that labour market conditions may change so that young people's earnings situation will have improved in 2017. Our model, however, does not allow us to evaluate the effect on earnings by such a change in labour supply and demand conditions, although economic theory suggests that a decline in labour supply relative to demand should translate into an increase in salaries.

This phenomenon of declining salary levels upon entry into the labour force will have to be studied in greater detail. Our preliminary analyses show that the decline results primarily from a marked deterioration in salary conditions among persons with a low educational level. In fact, there is even a growth in entry salaries for young people with high levels of education (see Figure 6).

Using once again this life-cycle analysis framework, we have also calculated the GINI indicator of income distribution for the entire working life of Canadians.<sup>8</sup> Our calculation yields a surprising result: even though there is an increase in the degree of earnings disparity in Canada, when one year is compared relative to another, there is virtually no increase in earnings disparity over the entire career span of Canadians. For example, the GINI coefficient of compensation distribution over the entire career span of the cohort born in 1940 and that of the 1960 cohort is 0.31.

Much research still has to be done to validate and understand these results. For example, the stability of GINI coefficients among the various cohorts may mask a decrease or an increase in the overall compensation of the various cohorts. In other words, this stability may hide intergenerational disparities: income distribution remains stable, when income distribution among each of the cohorts is compared, but the level of available wealth for each of the cohorts may change.

### Conclusion

Population aging has several causes: declining fertility, a disproportionately sized generation, and greater life expectancy. These three factors play off each other and are causing a rapid aging of the population. This aging will be uneven, that is, it will be more rapid in Eastern Canada and Quebec.

The changing demographic structure will have an impact on the labour force. In 2017, participation in the labour market among boomers will continue to decline and, with the aging population, the decline in work effort in relation to the total population will begin. We will have to rely on a substantial work effort among young generations.

Moreover, in spite of some concern today over young people's economic future, there are reasons to be optimistic. Although young people are behind previous generations at the start of their careers, they should catch up, plus labour market conditions should be more favourable for them.

#### **Notes**

- 1 For a description of *LifePaths*, see Geoff Rowe's article in *Horizons*, Volume 6, Number 2.
- 2 See the article by Lapointe et al.
- 3 There is little use in showing the change in the number of years of paid work for women since the figure would be strongly influenced by women's increasing participation in the labour market among cohorts born after 1950.
- 4 Immigration has a minor impact on the dependency ratio since it has an effect on both the numerator and the denominator in the dependency ratio. Moreover, immigrants often arrive with their families, which include persons who are not of working age, thereby offsetting the effect that could be positive on the dependency ratio.
- 5 Source: LifePaths, Statistics Canada.
- 6 This hypothesis is plausible given the generally higher remuneration among persons with a higher level of education. We have evaluated the effect of education on hours worked by weighing hours of work by expected remuneration based on educational levels. This measurement of productivity effect is incomplete in that it does not consider the positive impact of changing production methods.
- 7 A GINI coefficient of 0 indicates a perfectly equal distribution of resources, while a GINI coefficient of 1 indicates a perfectly unequal distribution of resources (with a single individual in possession of all resources).
- 8 We have limited the analysis here to the 25-55 year old age group.

*References are available on the PRI web site.* 

# Flexible Work Options for All

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ffective January 2007, the US Pension Protection Act of 2006 allows traditional pension plans to pay retirement benefits to workers who are at least 62 years of age, even if they are still working. This gives employers the ability to offer flexible work arrangements to older workers, who, instead of fully retiring, can continue to work while tapping into a portion of their pension. Some believe this pension reform will encourage older employees to work longer to ease the labour shortage caused by retiring baby boomers. However, many of those who continue to work would be part timers. This type of arrangement draws workers from all ages and requires a human resource strategy of flexible work options to generate even more workers to ease the pending labour shortage.

Recognizing the need for an inclusive strategy does not detract from the policy of encouraging part-time work while receiving a partial pension. Phased retirement remains a winning strategy. For workers, such a system would help them prolong the work life and generate supplementary income, as it allows time for caregiving, social engagement, or personal activities including rehabilitation of a disability.

For employers, it moderates the coming labour shortage, while accommodating those who may wish to or can only work fewer hours than before. Employers could also benefit from workers who are more likely to give their best hours of performance in the reduced work regimen. Dispensing partial pensions would also ease cash flows for pension plans. Thus, society as a whole could benefit from more production, as employers tap into a larger labour pool, enhance workforce morale and quite possibly improve productivity, while employees could exercise more choice about work and retirement. Besides, as people live longer and healthier lives, they may want or need to work longer.

That explains why many countries now urge a "live longer, work longer" philosophy. As intuitively appealing as it sounds, however, this idea downplays the fact that some older people just cannot or will not work longer. Moreover, most older people who continue to work would be part timers. Therefore, to ameliorate the worker shortage, we need an inclusive strategy to enlarge the labour supply in other groups, such as younger people, persons with disabilities, and women, as we encourage older people to continue working.

During the past 25 years, labour force participation rates have declined dramatically among people age 55 or younger, especially those under age 25, as well as among working-age people with disabilities. As for women, their labour force participation rates have dropped in the last 10 to 15 years after rapid growth in the preceding decades. Among the many factors that may explain these declines is the lack of flexible work arrangements.

A strategy of flexible work options for everyone is needed to satisfy the desire of many individuals to combine work and family or other pursuits, or to accommodate those whose ability to work is compromised by a health condition.

There are already harbingers of such practices. For example, some high schools have instituted work-study programs to enable high school students to earn income toward tuition payments. Some women professionals have created job sharing arrangements so they can raise children as well as work. The US federal government recently announced a major initiative to place people with a severe disability in jobs. The federal government has also paid close attention to creating flexible work arrangements to retain older workers who would otherwise be retiring in the coming years. And, American Association of Retired Persons (AARP) has had a program for several years of recognizing best employers for workers over age 50.

The challenge for human resource management cannot be minimized. To carry out a flexible work options strategy requires efforts in both the public and private sectors. Hence, industry, labour, government, community organizers, and the research community need to work together to help the workplace maximize the benefits while minimizing the costs of a new way of tapping society's potential labour regardless of age and sex.

An initiative not based on age would have greater humanitarian and political appeal. Further, such a strategy has another benefit. When combined with more day care and family leave, and other accommodating practices toward new parents, a flexible work options strategy could potentially reverse the declines in birth rate that have contributed significantly to the ageing population and aging workforce in many countries.

#### Note

1 Yung-Ping Chen holds the Frank J. Manning Eminent Scholar's Chair in Gerontology, University of Massachusetts, Boston. A delegate to the 2005 White House Conference on Aging, he attended, either as a delegate or consultant or both, the 1971, 1981, and 1995 White House Conferences on Aging and the 1998 White House Conference on Social Security. A founding member of the National Academy of Social Insurance, he served on the expert panel of the 1979 Advisory Council on Social Security.

### Dimensions of Inequality in Canada



This book provides a very broad overview of current knowledge on various dimensions (e.g., economic, political, and community participation, ethnic) of inequality in Canada. Written by leading researchers from the fields of economics, sociology, political science, and philosophy, edited by David A. Green and Jonathan R. Kesselman, this book is and will be for years to come, a reference for those interested in inequality issues.

Green, David A., and Jonathan R. Kesselman, eds. 2006. *Dimensions* of *Inequality in Canada*. Vancouver: University of British Columbia Press. Looking Ahead A 10-Year Outlook for the Canadian Labour Market (2006–2015)

Mario Lapointe Kevin Dunn Nicolas Tremblay–Côté Louis–Philippe Bergeron Luke Ignaczak Labour Market Research and Forecasting Human Resources and Social Development Canada Each year, a team of analysts at Human Resources and Social Development Canada (HRSDC) prepares a detailed 10-year outlook for the Canadian labour market. This outlook identifies likely trends over the medium term in the level, composition and sources of both labour demand and labour supply, and in the industrial and occupational distribution of employment. The most recent labour market outlook was prepared in 2006 and covered the period 2006-2015.

The information derived from these projections helps to address some important policy issues, including the expected slowdown in labour force growth due to population aging and the future skill requirements of the economy. Of high interest to many is whether the broad trends in labour demand and supply that have been observed in recent years will continue in the future, or whether significant changes can be expected. Another key objective is to identify occupations where the current and projected states of supply and demand suggest that imbalances could develop or persist over time.

### **Key Highlights**

# The Canadian labour market is currently quite healthy.

After struggling for the greater part of the 1990s in the wake of restrictive monetary and fiscal policies aimed at stabilizing inflation and quelling budgetary deficits, the Canadian labour market, as revealed by key indicators, has now been performing well for several years. Employment has grown at an average annual rate of 2.0 percent over the period 1996-2005; the participation rate in 2006 The projections developed at HRSDC are concerned with the national-level labour market only because available data permits both labour demand and labour supply projections by occupation nationally. However, the projections do not permit labour supply projections by detailed occupation at the provincial level. Looking at only one side of the labour market can give very misleading signals. For instance, for a given province, the projection of strong demand growth in an occupation does not necessarily mean that there will be a labour shortage situation in that occupation if labour supply in that occupation is also going to increase strongly in future years.

The projections presented here are for the period 2006-2015. The last year for which actual data was available when the projections were prepared is 2005.

was near a record high at 67.2 percent; and the employment rate reached a record level of 63.0 percent. In addition, the unemployment rate fell to 6.3 percent in 2006, reaching its lowest annual average level on record. That trend has continued in recent months, with the rate dropping to 6.0 percent in July and August 2007.

# This performance is expected to continue over the next decade.

The Canadian labour market is expected to remain buoyant over the next ten years. Total employment is expected to grow at an annual average rate of 1.1 percent over the 2006-2015 period. Although this represents a

slowdown relative to the 2.0 percent average rate of the period 1996-2005, the Canadian economy would still create about 1.9 million new jobs over the next 10 years (compared with 2.9 million in the period 1996-2005).

The overall growth in employment levels is constrained by the projected rate of growth of labour supply in Canada, which is slowing as a result The overall labour force participation rate is projected to drift down from 67.2 percent in 2005 to 66.7 percent by 2015 (the same level as in 2002), reflecting the rising share of older individuals in the population who participate less in the labour force than core-age (25-54) individuals.

Immigration is already a significant contributor to population growth in

# *Demographic and macroeconomic developments will lead to changes in Canada's industrial structure.*

of slower population growth and the aging of the baby-boom generation of workers. This leads to a projection in which Canada's real gross domestic product (GDP) is expected to advance at an average annual rate of 2.8 percent over the period 2006-2015, down from the average growth rate of 3.3 percent over the period 1996-2005.

### Labour supply growth will slow down in the decade ahead.

Canada's labour force (those employed plus those unemployed) is expected to increase from 17.3 million people in 2005 to 19.1 million by 2015. The annual rate of growth of the labour force would average 1.3 percent over the period 2006-2010 and 0.7 percent for 2011-2015. This compares with 1.7 percent on average between 1996 and 2005, and peak growth rates of 2.9 and 2.3 percent in 2002 and 2003, respectively. The slowing of labour force growth over the next ten years is a consequence of the expected slowdown of population growth, combined with a declining rate of labour force participation as aging baby boomers begin to retire.

Canada. The contribution of immigration to population growth is assumed to remain relatively stable between 2006 and 2015, representing an addition of 0.75 percent to the total Canadian population each year (close to the average addition recorded over the past decade). On the other hand, emigration is assumed to subtract 0.2 percent from the total population every year. As a result of the low rate of natural increase in the Canadian population (reflecting low fertility rates), the constant inflow of new immigration (net of emigration) will account for an increasing share of population and labour force growth over the decade ahead.

### The share of employment in serviceproducing industries is expected to continue on its upward trend.

Demographic and macroeconomic developments will lead to changes in Canada's industrial structure. First, slower population growth is expected to reduce output and employment growth for most industries, while changes in the age structure of the population will influence the industrial structure by favouring serviceproviding industries, particularly in the health sector. Second, goodsproducing industries are expected to continue to register stronger labour productivity growth than the serviceproducing sector, in order to remain competitive in the face of the higher Canadian dollar and intense international competition.

Therefore, over the next 10 years, employment growth in the service sector will outpace that in the goodsproducing industries, continuing the trend that began in the late 1980s. Employment in the service sector is expected to rise at an annual average rate of 1.2 percent, representing an increase of nearly 1.6 million jobs for the next 10 years. However, in the goods-producing industries, the average annual rate of new job creation is projected to be only 0.8 percent. Given that the goods sector only accounts for one in four jobs, this will be an increase of 0.3 million jobs for the next ten years.

### Employment growth is expected to be strong in the health, computer system design, and professional services sectors.

Among the service-producing industries, employment growth is expected to be strongest in health, computer system design and professional services. These industries will benefit from increases in health care needs related to population aging, the continuing movement of the economy towards more knowledge-intensive activities and increased investment in research and development (R&D).

Within the goods-producing sector, high energy prices will continue to spur investment spending and output in the oil and gas sector, while the computer and electronic products, other transportation equipment (especially aerospace), and fabricated metals manufacturing industries will benefit from strong global demand and high corporate profits. In contrast, the auto and parts sector is expected to struggle in the face of faltering auto demand in North America, as are the forestry industry and the wood products manufacturing industry, which will be affected by the weakening of residential construction.

## Some sectors of the "old economy" are expected to perform well.

In recent years, a comeback of some sectors of the *old economy* has been seen, mainly the construction sector and the oil and gas related sectors.

The significant employment gains recorded in the construction industry since 2001 have been driven by the housing boom that occurred over that period. However, the pace of residential construction activity will slow considerably in coming years, as a result of weak pent-up demand and a decline in the number of people in the age group likely to buy a first home. Despite a slowdown in residential construction, nonresidential construction in the energy sector will give a boost to the industry, thanks to major electricity and oil and gas projects.

The oil and gas related industries have been booming for several years due to soaring oil prices and strong world demand. Thus, oil and gas companies have begun investing heavily in the

### FIGURE 1 Job Openings: Retirements and Expansion Demand, 1995-2015



Source: (1995-2005) Statistics Canada, Labour Force Survey (Expansion Demand), and HRSDC - SPRD, Labour Market and Skills Forecasting and Analysis Unit, 2006 Reference Scenario (Retirements). (2006-2015) HRDC - SPRD, Labour Market and Skills Forecasting and Analysis Unit, 2006 Reference Scenario.

exploration of new oil and gas sources and especially in the preparation of tar sand extraction areas. These investments have contributed to a significant rise in employment in oil and gas extraction since 2001 (8.2 percent a year on average) and to a surge in activity in related industries such as support activities for mining and oil and gas extraction, some parts of the machinery and equipment industry and non-residential construction. The strong activity in these sectors is expected to continue in the coming years, especially in the western provinces.

## The majority of future job openings will be the result of retirements.

Labour demand is not only coming from new jobs being created through increased economic activity (new jobs requiring new workers); there are also a significant number of job openings created by retirements (existing jobs requiring new workers). The number of retirements in the Canadian economy is expected to rise markedly over the next decade with the aging of the leading cohorts of the baby-boom generation. Openings from retirements will be across the full spectrum of industries and occupations, not just the areas of fastest growth. The annual retirement rate, calculated as the number of retirements divided by the level of (nonstudent) employment, is expected to rise steadily from 2.1 percent in 2005 to 2.6 percent in 2015.

Close to 3.8 million positions are projected to be freed up by retirements over the next ten years – more than twice the number of jobs created as a result of increasing economic activity. In other words, about 70 percent of all job openings during that period will be to replace retired workers, up from an average of about 51 percent over the last ten years.

### FIGURE 2





Source: (1985-2005) Statistics Canada, Educational Administrative Data (School Leavers), and Statistics Canada, Annual Demographic Statistics (Immigration). (2006-2015) HRSDC -SPRD, Labour Market and Skills Forecasting and Analysis Unit, 2006 Reference Scenario.

### Two thirds of all job openings over the period from 2006 to 2015 are expected to be in occupations usually requiring post-secondary education or in management.

Over the 2006-2015 period, about two thirds (65.9 percent) of all job openings – those due to new job creation plus those due to retirements – are expected to be in occupations usually requiring post-secondary education (university, college or apprenticeship training) or in management occupations (which often but not always require postsecondary education), up slightly from 63 percent over the last ten years.

The highest rate of expansion demand is expected to be in occupations that require a university degree (annual average rate of 1.6 percent), spurred by the continued shift to a knowledge-based economy and by increased pressures of population aging on the health care sector (e.g., engineers and engineering technicians, computer and information systems professionals, university professors, physicians and registered nurses). In contrast, the pace of employment growth in the lowest skilled occupations (requiring only on-the-job training) is projected to be much weaker (annual average rate of 0.6 percent).

Retirement pressures will be strongest in occupations where the typical age of retirement is lower and where a larger proportion of the workforce is approaching that age – as is the case for many occupations usually requiring post-secondary education. Occupations that will face strong retirement pressures include elementary and secondary school teachers and registered nurses, as well as managers in public administration, health, education, social and community services.

### The educational attainment of Canada's labour force will continue to rise over the next 10 years, albeit at a slower pace than in the past.

The labour force with a postsecondary education (college or university) is projected to continue to be the fastest-growing component of Canada's overall labour supply. This reflects the fact that a higher proportion of young people have post-secondary education (over 66 percent of the labour force aged 25 to 29 in 2006) than the older workers who are leaving the labour force (about 56 percent of those aged 55 to 64 in 2006).

The number of labour force participants who have a university degree is expected to rise at an average annual rate of 2.2 percent over the next 10 years, faster than for those with other levels of educational attainment. University degree holders would represent 24.4 percent of the labour force by 2015, up from 21.8 percent in 2005 and 13.8 percent in 1990 (the number of labour force participants with a university degree rose 4.4 percent a year on average over the period 1990-2005, compared with 1.3 percent for the overall labour force).

In contrast, the number of labour force participants who have less than a high school education is expected to decline at an annual average rate of 1.0 percent over the decade ahead. This group would represent 11.8 percent of the labour force by 2015, down from 14.6 percent in 2005 and 28 percent in 1990. Individuals with a high school or a college education are expected to represent fairly constant shares of the labour force, at about 30 and 34 percent, respectively.

Although the educational attainment of the labour force will continue to advance, the rate at which it does so will slow down. The baby boomers were much more educated than their parents. The children of the baby boomers are also more educated than their parents, but by a narrower margin.

# School leavers will remain by far the main source of new labour supply in the Canadian economy.

It is often claimed that immigration will account for all of Canada's net labour force growth in the coming decades. Indeed, as noted above, immigration is expected to account for an increasing share of population and labour force growth over the decade ahead. However, the number of students coming out of Canada's education system, whether with an incomplete high school or a PhD, will remain the primary source of new supply for the Canadian labour market, representing approximately 550,000 new labour market entrants each year over the next decade, more than in the 1980s and 1990s. The "school leavers" represent four fifths of the projected total new annual inflow into Canada's labour supply.

### Labour supply will increase more rapidly in occupations usually requiring university education.

Reflecting the projections for the number of labour force participants by educational attainment, the number of labour force participants is expected to increase the most rapidly in occupations usually requiring university education, advancing at an expected average annual rate of 1.6 percent. In contrast, the number of labour force participants in occupations usually requiring less than high school will increase the least rapidly, at only 0.6 percent per year.

## Overall labour demand to grow broadly in line with labour supply.

The projections show labour demand growing more or less in lockstep with labour supply over the next ten years. This is largely the consequence of the assumption that the Bank of Canada will be successful at keeping aggregate demand for goods and services broadly in line with Canada's production capacity, in order to keep inflation within its target range.

# Demand and supply will also grow in line across broad skill levels.

Labour market indicators suggest that for the most part labour supply has increased in line over the last twenty years with demand across most broad skill levels. Broad skill levels correspond to groupings of occupations that usually require the same level of education (university, college, high school or on-the-job training). The growth in employment has been fastest in the most skilled occupational groups, those normally requiring university education, and least in those requiring the least skills. Yet, the evidence suggests that the strong rise in demand within highskilled occupations over the last twenty years has been met by a rising supply of qualified workers in Canada. Unemployment rates for most broad skill levels, relative to the average of the other skill levels, have not shown any discernable trends since 1987

while real wages by broad skill level have been fairly constant since 1997.

Labour supply is projected to continue to grow broadly in line with labour demand across broad skill levels over the next ten years.

### However, several occupations are currently facing labour shortages while others have more supply than needed.

When an economy is in overall labour market balance, there are always specific occupations facing shortage pressures while others have more supply than needed. This is because there is so much flux in an economy that no one, not the government, employers, workers or students, can predict with certainty where the job market will be several years from now. Nor can people change quickly: loggers do not become medical technologists and even chemical engineers do not become mechanical engineers without training.

Numerous occupations are currently considered to be in a state of either excess demand or excess supply. The largest number of occupations showing signs of shortages at the national level is concentrated in management occupations and in the health sector.

Pressures are particularly acute for physicians, nurses, pharmacists, medical technologists and technicians and assisting occupations in support of health services (such as nurse aides and dental assistants). Growth in demand for those occupations has been strong, due to rising needs associated with population aging,

increases in government funding for health care and a high number of retirements of existing workers. On the other hand, supply growth in many of these occupations has been relatively weak.

Several management occupations (e.g., senior management, human resources managers), where workers are typically older, are also considered to be in shortage, largely due to high levels of retirement.

Other occupational groupings currently showing signs of shortages include:

- occupations related to the oil and gas sector, mainly as a result of large investments in this sector;
- some occupations in the trades, especially home builders and renovators, as a result of the strong growth over the last several years in residential construction and renovation activities;
- some occupations in the information technology sector, such as computer engineers and software engineers, reflecting the sector's recovery from the 2001 meltdown while school enrolment in such fields is still lagging; and
- some occupations in social science and government service, such as university teachers, as a result of retirements and new demand stimulated by increased government funding for post-secondary education.

Occupations deemed to be currently in excess supply are mostly in lowskilled categories facing deteriorating labour demand conditions. For example, organizational restructuring, automation and advances in computer technology are reducing the demand for office equipment operators. Technological advances in navigation, communications and fish tracking, along with harvest quotas, result in slower employment growth for fishing vessel skippers and fishers. For machine operators in textile processing and industrial sewing machine operators, international competition is the main contributor to declining demand. Finally, the difficulties experienced in forestry, agriculture and electric and electronic equipment industries have had a negative impact on some occupations in those sectors.

### Most occupational shortages are expected to persist over the next ten years.

Most of the occupations that are currently facing shortage pressures at the national level are expected to remain in that situation over the next ten years, as the projections show more job openings than new job seekers in those occupations over that period. For instance, new health care needs due to population aging will contribute to increased demand for several health care occupations to levels markedly higher than can be met by projected supply. The expected excess demand in those occupations tends to result from factors that restrain supply growth, such as long training time (for example, up to seven years or more of university education for physicians) and the limited capacity of educational institutions to accommodate large increases in enrolments. Shortage pressures are

also expected to continue for oil and gas well drillers, servicers, testers and related workers due to the large tar sands development projects in Alberta.

However, a few occupations currently facing shortage pressures are expected to move towards a situation where labour demand and labour supply are more in balance. These include occupations in the residential construction and real estate sectors, due to an anticipated slowdown in residential investment after the recent, now-peaked, boom.

## Challenges to match supply and demand in specific occupations.

The extent of the shortage in some occupations is quite large. A first source of supply could be the unemployed. However, for those occupations facing a shortage situation, unemployment is already very low both relative to other occupations and relative to historic norms for those occupations. The second potential source is new supply from school leavers and immigration. In some of the projected shortage occupations, very substantial increases in new supply, unlikely to materialize easily, would be needed to fully meet the projected demand.

While matching can never be perfect due to the inherent uncertainties of job market prospects, it can be improved with better labour market information on expected future shortages and surpluses by occupation and greater responsiveness by the post-secondary education system to the evolving skill needs of the labour market.

# Our Population in 2017 Diverse in our Diversity

Katherine Antal Senior Policy Research Officer Policy Research Initiative Dooking ahead 10 years, we will continue to see growing plurality in the way Canadians live. This article discusses not only our ethno-cultural diversity, but also diversity in our family formations and work arrangements. Together these factors affect the way people live in their homes, shape how they participate in society, and influence their expectations of family, work, community and the governments that represent them.

### **Ethno-cultural Diversity**

Canada's ethno-cultural composition has changed markedly in recent decades and is expected to continue to do so. Immigration to Canada is returning to historically high levels, with a considerable shift towards immigration from Asian and Middle Eastern countries since the 1970s (see Figure 1). Over the same period, the number of ethnicities identified in Canada has increased five-fold, with over 200 enumerated in the most recent Census.<sup>1</sup> Visibly we can see this growing diversity in the rising share of visible minorities,<sup>2</sup> particularly in Toronto and Vancouver, where this population represented 37 percent in each city in 2001 and is expected to grow to approximately 51 percent and 49 percent, respectively, by 2017.<sup>3</sup> Additional indications of increasing diversity are in the rising share of the Canadian population who are: immigrants; allophones (those whose mother tongue is neither English nor French); or observers of non-Christian religions (see Appendices).<sup>4</sup> To seek a measure of how many are touched by some difference from the mainstream Canadian ethno-cultural experience, the PRI has estimated the population for whom at least one of the four above-mentioned characteristics is relevant. This selection represented at least 27 percent of the population in 2001, and is projected to rise to approximately 35 percent by 2017 (see text box on p. 33).<sup>5</sup>

This suggests that there is already a great deal of ethno-cultural diversity within the Canadian

### FIGURE 1 Shift in Source of Immigration



Source: "The Changing Face of the Canadian Population", presentation by Laurent Martel, Demography Division, Statistics Canada, on June 8, 2007.

### Measuring "Ethno-cultural Diversity"

The PRI measure of ethno-cultural diversity draws on *PopSim*, a demographic micro-simulation projection model from the Demography Division at Statistics Canada. With a base population of long-form respondents to the 2001 Census, the model projects Canadians' ethno-cultural and demographic characteristics to 2031.

The count of the "diverse" population in 2001 includes Canadian residents with *one or more* of the following attributes: immigrant status; visible minority status; allophone; or observer of a non-Christian religion. While these qualities seem reflective of "newcomers", whom we might intuitively expect to be younger than the general population, in fact the diversity traits were better represented among the oldest Canadians (see 2001 results in Figure 2). This reflects the older age distribution of the immigrant population. The count in older populations accumulates migrants who arrived throughout many periods, including those from the previous immigration peak of 1911 to 1931. By contrast, the population under age 25 is under-represented by immigrants; the children of immigrants are often of the second-generation (Canadian-born).

Because the *PopSim* model does not explicitly track for generation, our

#### FIGURE 2

### Ethno-cultural Diversity\* by Age Group, 2001 and 2017



\*Refers to the population who are identified by *at least one* of the following: immigrant status, visible minority status, allophone, or member of a non-Christian religion.

Source: PopSim, Demographics Division, Statistics Canada.

population. Other dimensions of diversity include the rapidly growing Aboriginal population, discussed further in the paper; the declining predominance of Christian beliefs generally in Canada; and the context of a bilingual country, in itself a fundamental form of diversity. estimate overlooks the secondgeneration Canadians who were unidentified by the diversity indicators. We cannot, that is, consider the Caucasian children of immigrants who are Anglophone/ Francophone with a Christian belief or no religion. This may not be a significant omission in terms of our concept of "diversity". However, we might expect this population to have closer international ties with the country of their ancestry (than third-generation Canadians or subsequent generations), and the possibility of multiple citizenships. They may also vary in unobservable characteristics, such as values. The Ethnic Diversity Survey revealed that in 2002, 17 percent of the Canadian population aged 15 and over were second-generation Canadians, of whom the vast majority (82%) were of European or European/Canadian ancestry.6 Due to the under-inclusion of second generation Canadians in our measure. we consider it an underestimate of Canada's true ethnocultural diversity.

By 2017, the model projects a significant rise in "diversity" among the young population. This is in part due to new immigration, but mostly to the growing share of second-generation youth who are visible minorities.

The new ethno-cultural diversity will include a rapid rise in the visible minority population, over one-third of which is expected to be

FIGURE 3

Ethno-cultural Diversity\* in Canada's Cities, 2001 and 2017



\*Refers to the population who are identified by *at least one* of the following: immigrant status, visible minority status, allophone, or member of a non-Christian religion.

Source: *PopSim*, Demographics Division, Statistics Canada.

### FIGURE 4 Growth in Aboriginal Populations



Source: "The Changing Face of the Canadian Population", presentation by Laurent Martel, Demography Division, Statistics Canada, on June 8, 2007.

Canadian-born.<sup>7</sup> The PRI is examining the experience of second-generation Canadians,<sup>8</sup> including visible minorities, and will continue to explore other implications of growing ethno-cultural diversity in Canada.

Examining our measure of ethnocultural diversity across the country, Figure 3 illustrates that in the cities it is generally well above the Canadawide average, and this diversity will grow significantly by 2017. This is particularly so in larger urban centres, notably in Toronto and Vancouver, but increasingly in Ottawa and Windsor as well.

Greater international mobility will likely continue to affect the ethno-

cultural context in Canada in several wavs. Movements across further reaches around the world bring more distant cultural influences to Canada and increase Canadians' interest further afield. Mobility also suggests a blurring of identities is on the horizon as a growing number of Canadians become multi-ethnic or multi-national. Dual and multiple citizenships (held by approximately 2 percent of the population<sup>9</sup>) are options growing in favour among more recent immigrants,<sup>10</sup> and are also possibilities for some children of immigrants and Canadian emigrants. These Canadians have rights in and responsibilities to more than one country. Multi-ethnicity also continues to rise, through growth in inter-ethnic unions.<sup>11</sup> This, too, is a source of complex identity, since various combinations of religion, language and traditions may be chosen for the children of an interethnic union.

#### **Aboriginal Peoples**

While our population is increasingly reflective of other nationalities, there is also above-average growth among the Aboriginal population (First Nations, Inuit and Métis). Higher Aboriginal fertility and increasing Aboriginal life expectancies suggest that annual growth of this population (1.8%) will more than double the Canadian average (0.7%) over the next ten years.<sup>12</sup> The representation of the Aboriginal population would grow from 3.4 percent in 2001 to 4.1 percent in 2017, as illustrated in Figure 4.

The Aboriginal population is aging, but would remain considerably younger than the general population in 2017(see Figure 5). Between 2001 and 2017, median ages in the Aboriginal population are expected to rise: from 27.0 years to 31.9 years among the Métis; from 24.0 years to 26.6 years among the First Nations; and from 20.9 years to 24.0 years among the Inuit. Over the same period, the median age of the total Canadian population would rise from 37.1 years to 41.3 years.

The high Aboriginal representation in Manitoba, Saskatchewan, and the territories mean the implications of a very large, young Aboriginal population in 2017 will be most significant in these areas, particularly among the under-15 and 20-29 age groups. In Manitoba the proportion of children 0-14 who are Aboriginal could increase from 24 percent in 2001 to 31 percent in 2017, and in Saskatchewan from 26 percent to 37 percent. The proportion of young adults aged 20 to 29 who are Aboriginal is also anticipated to grow enormously over this period, nearly doubling in Saskatchewan (from 17 percent to 30 percent) and rising considerably in Manitoba (from 17 percent to 23 percent).

These trends suggest that, in 2017, regions with a high Aboriginal representation will likely be concerned with issues of education and transitions to adulthood. These include matters related to high school retention and access to post-secondary education, as well as labour market integration, health and housing.

# Diversity of Families and Households

We anticipate that families<sup>13</sup> and households<sup>14</sup> will continue to become more diverse in 2017, based on trends that have held for several decades and on others just emerging in recent years. As societal attitudes towards

#### **FIGURE 5**





Source: Statistics Canada, Demography Division.

#### **FIGURE 6**





Source: LifePaths, Statistics Canada.

divorce, re-marriage, same-sex marriage, adoption and childless couples change, many families no longer reflect the traditional nuclear family.

Couples, traditionally the basis of family formation, are less stable, as shown by the greater average number of unions within a lifetime (see Figure 6). Furthermore, couples are increasingly common-law. In the last five years, the number of common-law couples grew by 18.9 percent, compared with only 3.5 percent growth among married couples.<sup>15</sup> Over the same period, lone-parent families grew by 7.8 percent, with the most rapid growth among those headed by men.

Consequently, children are being raised in a variety of family settings,

### FIGURE 7 Changing Family Types



Source: Census 2001.

still most often in a traditional nuclear family, but increasingly in other family forms: with a single parent, living between two homes with two single parents, with step-parents or blended families, with same-sex parents, with grandparents, etc. Some families are couples without children at all, or are empty-nest couples. Figure 7 illustrates the declining proportion of traditional families (married couple with children at home) and the offsetting growth in other family arrangements.

Households are also growing more diverse as families comprise a smaller share of all living arrangements. Among younger Canadians, a growing share is remaining single, while across age groups, a growing share of Canadians lives alone (26.8 percent of households in 2006).<sup>16</sup> In recent decades, the population under age 45 has been less likely to establish a new household.<sup>17</sup> Notably, young adults from 25 to 34 years old are spending more years living with their parents, sometimes returning to their parents' home with children of their own. Canadians over the age of 45, however, are now more likely to set

up a new household, due to a rising number of divorces and separations among this age group, and also to longer life expectancies. For all age groups, the rates of family formation have been declining in recent years, with the exception of those aged 65 and over, due to a growing tendency to form common-law relationships in the senior years.<sup>18</sup>

Based on these trends and Canada's age structure, projections from the Vanier Institute suggest that households will continue to diversify. Within families, the proportion that includes husbands and wives is expected to continue to decline. Most of the growth in families over the next decade will be among those with a family head over the age of 55: from 34 percent of families in 2005, such families are projected to represent 47 percent of families by 2017.19 As a smaller share of Canadians lives in families, households will be smaller on average.

A few implications for diversity will emerge by 2017 according to these demographic projections. Achieving work-life balance will continue to be a concern for families with children, particularly among lone parents. At the same time, many households will be empty-nest ones or otherwise childless. Among those who are currently young adults, delays in some of the traditional markers of adulthood suggest a postponing or compressing of subsequent life-cycle events for some. This is already being observed in the diversity in ages of mothers.<sup>20</sup> Finally, while divorce rates have stabilized in recent years, the economic and social effects of past divorces will continue to affect families.

### Diversity in Work Arrangements and the Labour Force

Variety in work has arisen in recent decades through the growth of nonstandard work arrangements. It is difficult to predict if these patterns will continue to 2017 given the sensitivity of employment to the economic cycle and the structural changes of a globalizing economy. On the other hand, the impact of an aging population on labour supply is clear and unavoidable. As the labour force shifts from a position of relative oversupply to relative under-supply, the bargaining power of workers may be increased. Some non-standard work arrangements, including those that were employer driven, may continue at the bidding of employees. The labour market of 2017 could be better for workers generally, resulting in a workplace that may also be more inclusive and accommodating of the needs of a diverse population.

In order to remain adaptable to the demands of a competitive, increasingly global economy, employers have made work arrangements considerably more flexible in

recent decades. Between 1989 and 2002. full-time permanent jobs declined from 67 percent to 63 percent (from 71 percent to 66 percent for men and from 63 percent to 59 percent for women).<sup>21</sup> Alongside the traditional full-time employment offerings, a variety of non-standard work arrangements have grown in prominence, including part-time, shift work, self-employment and temporary contract work. The growth of some of these forms is shown in Figure 8. Canadians have adapted to these work arrangements and sometimes prefer them. Part-time work, notably, is largely voluntary (93 percent in 2006),<sup>22</sup> for it meets the needs of students, caregivers, older workers and people with an illness or disability. In other circumstances, workers may prefer full-time work but resort to multiple non-standard jobs to earn a sufficient income or to retain the benefits only available through one of them. Some jobs take the form of telecommuting, while others require workers to spend more time away from home due to overtime, commuting time or work travel.

The variety of available work arrangements means that individuals have considerable discretion about how much time and effort to put into work versus other obligations and activities. Some individuals work a standard full-time job, while others work parttime or combine two jobs; yet others work occasionally or seasonally, and some not at all. Families are able to combine resources in a variety of ways, varying between one-, one-anda-half- and two-earner households. Opposite hours shift work permits two parents to care alternately for children, without the need for paid childcare. After decades of rising

### FIGURE 8 Fraction of Workers in Non-Standard Employment



Source: LifePaths, Statistics Canada.

labour market participation of women, the significant shift to a two-earner family model is expected to level off at roughly 70 percent of couples (see Figure 9).<sup>23</sup>

Another source of diversity in work is the divide between jobs with decent pay, job security, pension, leave, flexibility, etc., and those without such benefits. Recent years have seen a widening dispersion of employment incomes, such that only the very top earners have experienced gains while those at the bottom and middle of the spectrum have seen little improvement in earnings.<sup>24</sup> Non-standard work arrangements have been partly attributed to a rise in "bad jobs" with low pay, few benefits and limited upward career mobility.25 Furthermore, while non-standard work arrangements are seemingly more flexible for families, some research is suggesting that it may hurt them through financial stress or odd work schedules that constrain the time these families spend together as a whole.26

As employers may wish to retain their baby-boom workers and older workers have typically indicated a preference for gradual retirement, it is anticipated that non-standard work arrangements are here to stay.<sup>27</sup> The high voluntary part-time rates suggest a reduced work week may be a useful retention tool for others as well. A relatively smaller labour supply could improve the clout of workers such that non-standard workers may yet see some improvement in wages, benefits and security.

The vacancies left by retiring baby boomers may improve employment prospects for populations that have long been disadvantaged in a crowded labour market, including young people, visible minorities, recent immigrants, people with disabilities and Aboriginal people. Some employers are already improving efforts to draw workers from marginalized groups into their workplaces out of a concern that they cannot afford to overlook them.<sup>28</sup> If this practice becomes more widespread, the workplace in 2017 may better represent

#### **FIGURE 9**

Rising Share of Two-Earner Couples Among the Married/ Common-law Population (Aged 25-55)



Source: LifePaths, Statistics Canada.

the full Canadian population than it does currently.

As Figure 2 illustrated, growth in the ethno-culturally "diverse" population will increase markedly among the young and working age populations. This future revitalization of the working age population may help offset the impending retirements. In 2017, when the general population will have only 75 young people old enough to enter work (at age 15-24) for every 100 that are old enough to retire (at age 55-64), the "diverse" population will supply 108 young people for every 100 of retirement age. In Aboriginal populations, the labour force potential is much greater still as a surge of young Aboriginal people will enter adulthood over the next 10 years. In 2017, there will be approximately 191 Aboriginal youth aged 15-24 for every 100 Aboriginal people aged 55-64.29

### **Diversity of Lifestyles**

The result of diverse ethno-cultural contexts, family arrangements and

work are the innumerable lifestyle possibilities available to Canadians. While this may mean that Canadians benefit from more choices than ever before, increasing diversity could also present three potential challenges in 2017: inequality, electoral divide and a lack of social cohesion as Canadians may share less in common.

As noted, income inequality has risen in recent years. This may be due to variations in economic opportunities across regions: some sectors and skill sets are also better rewarded than others. However, another possibility, discussed by John Myles,<sup>30</sup> is that income inequality is no longer limited to differences in individual earnings (differences in personal talent, effort and luck), but is increasingly related to changing behaviours in families. Households with two earners can contribute more hours to work than one-earner households (whether couples or singles). Myles also refers to "marital education homogamy," through which there is a growing correlation of educational attainment

among spouses, allowing a highly educated individuals to seemingly double the advantage of a better income while lowering the risk of unemployment. These arguments point to differences in the quality and quantity of human capital available in a household.

Extending that thought, we might expect the availability of other assets to have a bearing on a household's economic foothold and general well-being. These assets include social capital, ethnic capital and wealth, among others. Differences in these resources could imply different futures. For instance, the needs of a recent immigrant, fluent in French and with some accumulated wealth but unemployed, with limited contacts and an unrecognized foreign qualification, are quite different from those of a debt-ridden, Canadian-born university graduate with only a parttime job but with good contacts for her first career job. Different again are the needs of a lone parent who is a homeowner with a well-paying job but severe time stress.<sup>31</sup> The personal life decisions behind these circumstances impact economic and general well-being. It is not clear what role, if any, exists for social policy to protect Canadians from any negative outcomes that may result. Furthermore, the consequences of these differences may not be limited to income inequality, but could also impact access to housing, education, transportation, health, safety, etc.

A second consequence of these diversities is an electoral divide that could widen through spatial polarities in the population. Urban/rural is one such divide, while differences across provinces

are another. Urban areas, comprising 80 percent of the population, are younger, more ethno-culturally diverse and growing, in contrast to rural populations that are stable, if not in decline, older and less diverse.32 Across provinces, demographic pockets could magnify differences in priorities: population aging will be most pressing in the older Atlantic provinces; Aboriginal youth issues will be of most interest in the territories, Saskatchewan and Manitoba; immigration issues may predominate in Ontario and British Columbia; in Quebec, the preservation of French-Canadian society may continue to be a major concern; and Alberta could face greater labour shortages still.

A third implication of heterogeneous lifestyles is the possible fragmentation of Canadian society in values and meeting place. The many combinations and permutations of values create grounds for negotiation when expectations differ. For instance, the expected roles of family members in balancing paid work, care, learning and leisure – relatively clear in a traditional family breadwinner model, perhaps – are less so as the variations of ethnicity, family formation and work are intersected.

Finally, heterogeneous lifestyles raise an issue of where Canadians will meet, such that they remain able to share values and build solidarity. While fragmented by our many life situations, new communications technologies are reinforcing our connections with others who share the same interests, regardless of geography, through cultural groups, health-related societies, political or leisure interest groups, etc. If your neighbours cannot relate to your child's unusual ailment, an Internet search may lead you to someone who has had the same experience. Traditional media also respond to segmented markets with particular interests and can be places to share similar perspectives. In the future, finding connections among people who are *unlike* each other (such as yourself, your childless neighbours and the nightshift neighbour you seldom see) could be a greater challenge.

The "diversity of diversities" in the Canadian population, presented in overview here, is a topic that will resurface in our Population 2017 project.

#### **Notes**

- 1 2001 Census, Ethnic Origin User Guide. <http://www.census2006.ca/english/ census01/Products/Reference/tech\_rep/ ethnic.cfm>.
- 2 The *Employment Equity Act* defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour."
- 3 "The Changing Face of the Canadian Population", presentation by Laurent Martel, Demography Division, Statistics Canada, on June 8, 2007.
- 4 The share of immigrants in the Canadian population (not shown graphically), has grown from 15 percent in 1971, to 18 percent in 2001. By 2017 it is projected to rise to 22 percent in 2017, matching the previous high immigration period of 1911-1931. (Source: "The Changing Face of the Canadian Population", Presentation by Laurent Martel, Demography Division, Statistics Canada on June 8, 2007).
- 5 The PRI would like to thank Laurent Martel and René Gelinas of the Demography Division at Statistics Canada for their assistance in quantifying this ethno-culturally diverse population through the *PopSim* model.

- 6 *The Daily*, Wednesday, September 12, 2007, Statistics Canada. <a href="http://www.statcan.ca/Daily/English/070912/td070912.htm">http://www.statcan.ca/Daily/English/070912/td070912.htm</a>>.
- 7 Bélanger, A. et al., Population projections of visible minority groups, Canada, provinces and regions: 2001-2017, Ottawa: Statistics Canada, 2005, p.17. <a href="http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=91-541-XIE2005001">http://www.statcan.ca/cgi-bin/ downpub/listpub.cgi?catno=91-541-XIE2005001</a>>.
- 8 Second generation refers to Canadianborn residents with at least one foreignborn parent.
- 9 *The Daily*, Monday, September 29, 2003, Statistics Canada. <http://www.statcan.ca/Daily/ English/030929/d030929a.htm>.
- 10 The 2001 Census count reported over 690,000 Canadians with dual or multiple citizenships. <a href="http://cnews.canoe.ca/">http://cnews.canoe.ca/</a> CNEWS/Canada/2007/08/01/ 4386003-cp.html>.
- 11 In 2001, 14 percent of the 1986-1995 immigrant cohort had dual citizenship, compared to 10 percent among immigrants who arrived prior to 1986. <a href="http://www.cic.gc.ca/english/resources/">http://www.cic.gc.ca/english/resources/</a> research/census 2001/canada/parta.asp>.
- 12 Inter-ethnic unions represented 3.2 percent of all unions in 2001, a rise of 35 percent from the number in 1991. Milan, Ann and Brian Hamm, "Ethnic Unions" in *Canadian Social Trends*, Statistics Canada, 2004. <a href="http://www.statcan.ca/">http://www.statcan.ca/</a> english/studies/11-008/feature/ 11-008-XIE20040016882.pdf>.
- 13 With the exception of Figure 7, all Aboriginal counts and projections in this section are found in Michalowski, Margaret et al., *Projections of the Aboriginal Populations, Canada, Provinces and Territories: 2001 to 2017*, Ottawa: Statistics Canada, 2005. <http://www.statcan.ca/english/freepub/ 91-547-XIE/91-547-XIE2005001.pdf>.
- 14 Family is defined as a married or common-law couple, with or without children living at home, as well as lone parents with children living at home.
- 15 Households include families as well as unattached individuals living on their own or with other people to whom they are not related.

16 Ibid.

- 17 Sauvé, Roger. The Effects of the Aging Structure on Households and Families to 2026, Ottawa: Vanier Institute of the Family, 2006. <a href="http://www.vifamily.ca/library/cft/age\_waves.html">http://www.vifamily.ca/library/cft/age\_waves.html</a>.
- 18 Ibid.
- 19 Author's calculations for 2017 based on interpolation of chart 4-A in Sauvé, Roger, The Effects of the Aging Structure on Households and Families to 2026.
- 20 Ann Milan et al., *Family portrait: Continuity and change in Canadian families and households in 2006: Findings*, Statistics Canada, 2007. <a href="http://www12.statcan.ca/">http://www12.statcan.ca/</a> english/census06/analysis/famhouse/ ind5.cfm>.
- 21 Chakowski, Richard P., Non-standard Work and Economic Vulnerability, Document No. 3, Vulnerable Workers Series, Ottawa: Canadian Policy Research Networks Inc., March 2005. <a href="http://www.cprn.org/documents/35591\_en.pdf">http://www.cprn.org/documents/35591\_en.pdf</a>.
- 22 Labour Force Survey, Statistics Canada, 2006.
- 23 Alain Denhez's article in this issue discusses the pattern of women's rising labour force participation.

- 24 While there is debate over the measurement of income inequality, most seem to agree that in recent years only the top 5 percent or even 1 percent of households in the income distribution have experienced income gains. (See Armine Yalnizyan, *The Rich and the Rest of Us*; David A. Green and John Kesselman's *Dimensions of Inequality in Canada*; and "High-income Canadians" in *Perspectives on Labour and Income*, Vol. 8, no. 9, 75-001-XWE).
- 25 Chakowski, Richard P.
- 26 LaPierre-Adamcyk, Evelyn, et al., "A Balancing Act: Parents' Work Arrangements and Family Time," Chapter 3 in K. McQuillan and Z.R. Ravanera (eds), *Canada's Changing Families: Implications for Individuals and Society*, University of Toronto Press, 2006.
- 27 Among older workers who retired between 1992 and 2002, 28 percent said they would have continued working had they been offered a part-time position, while 27 percent would have continued if they could work reduced hours without affecting their pensions. (Source: René Morisette et al., "Retaining Older Workers" in *Perspectives on Labour and*

Income, October 2004, Vol. 5, no. 10). <http://www.statcan.ca/english/freepub/ 75-001-XIE/75-001-XIE2007109.pdf>.

- 28 Allison Cowan et al., *Report on Diversity: Priorities, Practices and Performance in Canadian Organizations,* Conference Board of Canada, 2006. <http://www.conferenceboard.ca/ documents.asp?rnext=1828>
- 29 Michalowski, Margaret et al.
- 30 Based on John Myles' "Precarious Families and Income Inequality," presented at the Second Annual Symposium of the Population, Work and Family Policy Research Collaboration, December 7-8, 2006 in Gatineau, Quebec.
- 31 This line of thought is indebted to Amartya Sen's Capability Approach, which defines a person's well-being as a function of their effective liberties, for example, the freedom to have a social life, to live in a safe neighbourhood, to obtain an education or to work part-time if that is one's preference.
- 32 "The Changing Face of the Canadian Population", presentation by Laurent Martel, Demography Division, Statistics Canada, on June 8, 2007.

### **Appendices**

**APPENDIX 1** 



### Growth in Canadian Population Who Are Visible Minorities

Source: "The Changing Face of the Canadian Population", presentation by Laurent Martel, Demography Division, Statistics Canada, on June 8, 2007.

### **APPENDIX 2**

Growth in the Immigrant Population Whose Mother Tongue is Neither English Nor French



Source: A multicultural profile of Canada, Statistics Canada (2005).

### **APPENDIX 3** Growth in Non-Christian Religions, 1991 and 2001



Source: A multicultural profile of Canada, Statistics Canada (2005).

# A Second Look at the Second Generation

Natalie Poirier Policy Research Officer Policy Research Initiative

The term "second-generation" Canadians" refers to Canadian citizens who have immigrant parents. Traditional assessments regarding secondgeneration Canadians have been based on the assumption that they are of European descent. But, as sources of immigration shift from European to non-European countries, future second-generation Canadians will be increasingly the children of visible minority immigrants. According to the Ethnic Diversity Survey, almost one in two (46%) of first generation Canadians aged 15+ reported non-European origins.1 With visible minorities dominating the ranks of the country's secondgeneration youth, this brings to the fore new questions on broader conceptions of social integration that are less focused on transitions and more focused on personal characteristics and experiences. How does today's second generation differ from the traditional composition? Do pathways to integration differ by ethnicity and culture? How will the new second generation fare and what are the implications for policy? To explore the research and policy implications of these issues, the PRI held a seminar on August 23, 2007.

# The Task: Examining Reefs in the Depths of the Ocean

According to a framework developed by Stuart Sykes of the PRI, integration patterns and outcomes largely depend on interactions between social influences, which affect personal attitudes, and societal characteristics, which affect the reception of secondgeneration Canadians into broader society. This model is based on two forms of external stimuli, best understood by using an ocean analogy. At the highest level there is an "ocean" of structural influences that are a product of a country's history and current events. Closer to the individual is the "social milieu," best described as the "reefs" in the ocean on which individuals live and experience their lives. Consisting of communities, schools, families, peers, cultural norms, expectations (i.e., "ethnic capital"), and other factors which define one's daily life and experiences, this envelope of networks plays an important role in how an individual acculturates.

### **International Reefs**

Psychologists and sociologists have written about how different factors influence the acculturation of the individual. Based on these studies. Sykes' framework serves to structure and analyze research to date and identify research gaps. From this perspective, each of the four invited presenters focused on different aspects of this framework. Professors Min Zhou (University of California, Los Angeles) and Lucinda Platt (University of Essex) focused on the reef. Both Platt and Zhou found that education is a central component of assisting the second generation in achieving greater social mobility. In the UK context, Platt's research found that class background plays a significant role in affecting class destination among the second generation; however, education can greatly improve upward mobility. Nevertheless, in demonstrating the role of ethnic capital it was found that Pakistanis and Bangladeshis did not

fit the general pattern. Professor Platt posited that this discrepancy may have more to do with religious background than with ethnicity but felt that further research was necessary.

The social milieu in general and ethnic capital in particular also figured prominently in a similar study in the United States carried out by Professor Zhou. The success of many secondgeneration visible minorities in Los Angeles depended on citizenship status, middle class culture capital, familial expectations, and the amount of cultural memory that is retained by the second-generation American. Intriguingly, it was found that these factors can interact to define how "success" can be looked at differently depending on cultural expectations: second-generation Americans of Chinese descent earning \$160,000 per year did not deem themselves successful, yet second-generation Americans of Mexican descent who finished high school felt successful. The potential effects of these attitudes on socioeconomic success and integration are critical but remain difficult to estimate.

# The Domestic Ocean and the Individual Identity

Turning to the Canadian perspective, Keith Neuman of Environics and Jack Jedwab of the Association for Canadian Studies looked at the broader societal contextual factors, or ocean within which second-generation Canadians find themselves. Both presenters expressed the importance of recognizing the "diversity within our diversity" noting that just because a visible minority may share a religious belief does not mean they share the same culture. Identity is not a monolith; it is much more complex.

Misperceptions were clearly identified in the Environics survey results entitled "Muslims and Multiculturalism in Canada." The first survey of its kind in Canada, the conclusions demonstrated that Canadian Muslims have similar sentiments to other Canadians on a plethora of issues. The exception was that while 55 percent of Muslims wanted to adopt Canadian customs, the broader Canadian population felt that Muslims wished to remain distinct.

The research findings of Jack Jedwab took issue with the commonly held hypothesis that one's ethnocultural heritage can undercut the sense of "Canadianess" or attachment to Canada that one might feel. Overwhelmingly, the results of the research demonstrated that feelings of Canadianess are directly linked with whether one had a strong personal identity. For example, those with a strong identity registered a high sense of belonging to Canada as well as to their ethnicity and religion. Thus, those with a defined sense of self chose to identify as they wished, as opposed to others who had placed little or no importance on their source of identity.

### Conclusions

The second generation of tomorrow are the youth of today. Increasingly composed of visible minorities, this shift brings new questions of personal identity to the fore where geopolitical developments and religious beliefs can profoundly affect one's sense of self, belonging and worldview. The challenge for Canada rests in targeting policy development, which has a positive impact at both the societal context ocean and the social milieu reef in which second-generation citizens find themselves. It is a complex challenge which requires balancing the new needs of the second generation while combatting the misconceptions of the broader Canadian society.

### Note

1 See the article on the Statistics Canada Ethnic Diversity Survey in *The Daily* of September 29, 2003. Northern Numbers, Northern Nature Population and Environment of Canada

> Robert Engelman Vice President for Programs Worldwatch Institute

Imagine worrying about population in a country blessed with the second largest land area in the world – 922 million hectares, second only to the Russian Federation's 1.69 billion hectares – and a population of just 33 million, about the same as Morocco or Algeria. Welcome to Canada, the eighth most thinly populated country on the planet – and thus rather surprisingly positioned to consider exploring the connection between its population dynamics and its environmental problems.

With all this open space – almost 28 hectares for each Canadian – what is there to worry about? Canada's population could grow at its current annual pace until 2229 before it would see the population density the United States has today. It could grow until 2465 before its population density would reach the current density in India.

Such comparisons demonstrate the power of exponential growth. For example, at its current population growth rate, by 2465, Canada would have nearly 3.2 billion people, equal to almost half of the population of the world today. This brings into focus why, despite being thinly populated, Canada needs to consider the question now.

However, Canadians may assume that population growth rate will fall in coming decades, so we don't have to worry about it. But what would happen over the next few decades to bring that about: A decrease in the birthrate? Well maybe, however, at 1.6 children per woman, Canada already has "below-replacement" fertility. This is similar to the birth rate of nations in Europe and Asia where experts and governments worry about future population decline.

Or perhaps the population growth will slow due to a reduction in immigration. However, Canada is one of the most desired destinations for international migrants and has a wellregarded immigration process. Higher death rates are not an option either, and boosting emigration rates does not sound very attractive or feasible.

The link between population and the environment often raises provocative changes such as: Would greater population densities be desirable, or should Canada consider a demographic "end point" at which density remains low? To what extent would Canadians tolerate the environmental problems faced by more crowded countries? Maybe Canada's opportunity to avoid some of these problems is a good reason to ponder the country's demographic – environmental relationship – and the future of that relationship.

Even with a low density, however, Canada's population is already having significant effects on its domestic natural resource base and environment. Consider what is reasonably well accepted about the complex relationship between population and the environment in the world as a whole. And consider, to the extent we can, some of the implications for policy. These are among the reasons the linkage has proved difficult to study.

Despite its low fertility rate, Canada's population is growing. United Nations demographers project that the population will fall slightly in the second

half of this century, from higher levels than today. But they then project that Canadian population growth will regain its momentum and continue expand, surpassing 40 million people in the 22<sup>nd</sup> century (see Figure 1). Canadian policy-makers, however, are probably more concerned about other population dynamics in the country – especially the aging of the population, but also population distribution and migration trends.

# A Well-Accepted, but Rarely Studied, Connection

Most of the past and current debate on the population and environment connection has been based on philosophical convictions on the nature of humanity, or even the nature of *nature*, rather than on scientific data. Despite the fame of 18th century English economist T. Robert Malthus, no rigorous scientific theory has been developed in the area. Understanding the interaction between people and nature requires the involvement of multiple scientific disciplines. Yet demographers rarely interact professionally with ecologists or atmospheric physicists or hydrologists or even economists and political scientists. The study of population and the environment, moreover, has historically not been kind to academic careers. And, even if population matters, should we do anything about it? Few scientists or other academic experts rush to immerse themselves in questions related to access to birth control, abortion, the status of women in society, or how much immigration countries should allow. While these are topics that arise naturally when pondering whether

population dynamics are open to the influence of strategic policies, they can be controversial.

Nonetheless. there is no serious scientific opposition to the theory that human numbers matter powerfully to key environmental trends, especially over the last 60 years - and vice versa. Human development requires the healthy functioning of natural systems and ecosystem interactions. Among these are climate, the water cycle, pest control, pollination, and soil formation. Healthy mountain forests can hold soil and prevent the kind of landslides that, with increasing frequency, have been taking hundreds of lives in the Philippines and Central America. Healthy wetlands protect coastal residents from storms and flooding. Ongoing population growth can put these systems and interactions at risk. Recent scientific reports considering the state of the world's environment have outlined this in broad strokes.

"Over the past 50 years, humans have changed... ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre, and fuel," wrote the authors of a global environmental assessment associated with the United Nation's Millennium Development Goals (MDGs).

Every aspect of this degradation relates in complex but discernible ways to the scale of human presence on the earth, based on both density on the landscape and the magnitude of individual consumption and waste production. Population dynamics never act alone in causing environmental deterioration and thus threatening human development. The most direct and immediate causes stem from the failure of human institutions to respond adequately to increased demand on natural systems as population grows and development

### FIGURE 1 Canada's Population Projected to 2300



Source: United Nations, 2004.

proceeds. The problems are far more than institutional. however, because the scale of human stimulus matters critically to the timing and magnitude of environmental response. The risk in the 21st century and beyond is that many human populations are reaching or have passed key tipping points at which environmental trends critically undermine human wellbeing. Opportunities that result in slower rates of population growth and eventually population stabilization and possibly gradual decline cannot eliminate this risk. But they can reduce it, especially as we contemplate the more distant future. It may be useful to consider several specific interactions between people and the natural resources on which they rely.

### Land and Agriculture

More than 40 percent of the earth's land has been transformed to serve human ends. More than a quarter is in pasture, and 12 percent is devoted to crops. While there remains some potential to expand land in food production, agricultural experts expect most added food production will need to come from improved yields on land already cultivated. This yield improvement will need to allow for:

- 1) increases in population;
- 2) decreases in malnutrition;
- increases in meat consumption as affluence grows;
- increases in biological fuel production as energy demand rises in a carbon- and petroleum-constrained world; and, perhaps hardest of all,
- 5) maintenance of the soil and water resource base forever.

Water scarcity, soil erosion and mining, and increases in energy prices all threaten the long-term affordability of food and could pit the poor against wealthier consumers in a losing competition in the global food trade.

Already, many countries with high levels of poverty, poor government and rapid rates of population growth are experiencing declines in per capita food production. A critical problem in such high-fertility countries as Ethiopia, Malawi, Rwanda and Burundi is the ongoing subdivision of subsistence farm plots, to the point that many can no longer support families of five or six people. Soil exhaustion and erosion and overgrazing by livestock are exacerbated as human demands on limited arable land continue to grow with population.

### **Fresh Water**

More than half of the easily accessible water flowing through the world's hydrologic cycle is withdrawn for human uses. This proportion cannot grow significantly without considerable threat to aquatic ecosystems. Ground water supplies are falling in large parts of Asia and some areas of the United States. There is little indication these supplies could be easily replenished while population grows, without radical new efficiencies of end use. Using hydrological definitions of water stress and scarcity based on the natural annual supply of renewable fresh water available to each person in a nation's population, Population Action International estimates that 745 million people live in countries facing water stress or scarcity. The growth rate of world

population is slowing, but the growth rate of the population of the watershort is now exponential: in less than two decades, between 2.75 billion and 3.25 billion people are projected to inhabit water-stressed and water-scarce countries, depending on the rate of overall population growth.

These figures relate only to the water made available by the natural water cycle of falling rain and snow. Much less of this renewable fresh water can actually be accessed by human beings, and much of that is unsafe to drink due to the commingling of wastewater and water supply in densely populated parts of developing countries. For decades the number of people who lack access to safe drinking water and basic sanitation has been discouragingly constant, with 1.1 billion people currently lacking the first and 2.6 billion the second. Every day on average, 5.000 children die from diseases related to unsafe water and lack of sanitation. Billions of dollars have been spent to improve water treatment and delivery infrastructure, but the spending has never been sufficient to keep ahead of global population growth.

### **Fisheries**

For most of history, fish have offered an inexpensive source of complete protein, but the growth of human demand is now beginning to price fish above what the poor can afford. In the 1980s, humanity's appetite for fish crossed an unforeseen natural threshold when the global marine catch peaked at 90 million metric tons, a limit it has never exceeded since by more than 2 or 3 million

tons. Although cultivated fish production rises each year, it faces its own environmental constraints and may not be sustainable for long-term replacement of wild-caught fish as human populations grow.

Artesanal fisheries have provided an alternative livelihood for some farmers in developing countries who were displaced from their land when average farm holdings grew smaller with increased population. Unfortunately, this alternative, too, may not be sustainable. While there are nearly three times as many fishers today as in 1970, their average catch today is only about two thirds what it was then, and the trend of "more fishers catching fewer fish" remains a consistent trend in the opening years of the 21<sup>st</sup> century.

# Energy Consumption and Climate

The petroleum price increases the world has experienced in the past year stem from increases in global demand that are overwhelming the industry capacity. Consumers in China, India, and other developing countries still use vastly less energy per capita than do North Americans and even Europeans and Japanese. These countries have every right to hope and expect that their people will eventually consume natural resources at the same levels enjoyed by people in the industrialized world. The key questions are: What will those levels be? And, for how many people?

The current turmoil in energy prices is simply one manifestation of the fact that the world's wealthy populations are consuming natural resources in ways that are not globally sustainable. Thus, there is little ecological space for poorer populations to catch up. The contribution to human-induced climate change of the 1.2 billion people living in wealthy countries puts at risk the livelihood and wellbeing of 5.3 billion people living in developing countries. Efforts to reduce

Human development requires the healthy functioning of natural systems and ecosystem interactions... Ongoing population growth can put these systems and interactions at risk.

per capita consumption among the wealthy and to work toward an end of population growth in both developed and developing countries all contribute to sustainability. Europeans' "ecological footprint," although lighter than that of North Americans, nonetheless significantly exceeds what the continent's land can supply. A return toward environmental sustainability is thus one benefit of the gradual decline in population Europe is beginning to experience.

### Forests

The world's forests have mostly retreated as civilizations have evolved, often undermining the cultures and civilizations that cut down the trees. Today, only half the world's original forests still stand, and only one fifth of that is relatively free of human activity and influence. In 2005, more than 2.2 billion people lived in 46 countries - Haiti, Ethiopia and El Salvador among them – with less than 0.1 hectare of forested land per capita, an indicator of critically low levels of forest cover. Based on current trends in population and deforestation, by 2025 the number of people

more vulnerable to erosion and deadly landslides. The link between population growth and forests increasingly contributes to localized natural disasters, such as deadly landslides in the Philippines and Central America.

affected could rise to as many as

tion projection.

3.4 billion under the highest popula-

As forests retreat, women must walk

farther for fuelwood, prices for pulp

tion in most low-income countries)

and covered in vegetation becomes

rise, and land once held fast by roots

and paper (still the currency of educa-

### **Coastal Ecosystems**

About 37 percent of world population lives within 100 kilometres of a sea coast. About half of the world's prehistoric wetlands and mangrove forests have been lost as a result of this growing coastal settlement. Apart from the direct biological loss of these resources, there has been a significant impact on coastal fisheries, and it played a role in the lives lost in the 2004 Indian Ocean tsunami. Global natural population increase and coastal migration are combining to increase degradation and vulnerability to disaster.

### **Biological Diversity**

About 20 percent of the world's human population lives in the 12 percent of the world's land most rich in threatened biological diversity. Population growth rates in these areas are significantly higher than in the world as a whole. In tropical wilderness areas that hold the last havens of biodiversity comparable to pre-human times, population density is relatively low but growth rates are more than twice the global average. The subdiviSet against these worrisome trends is a positive one that relates to every aspect of human scale: Population growth is slowing, with a real possibility of a global peak later in this century. Despite some worries of population aging in some countries

# *We are at last accepting that humanity is altering global climate in ways likely to undermine future development and well-being.*

sion of forests, wetlands and other natural ecosystems into progressively smaller and more isolated parcels of wild land – in combination with direct harvesting, pollution, climate change and the introduction of nonnative species – constitutes a direct human threat on the rest of life on this planet. A diversity of living things is no luxury; the poor in particular have long relied on nature for dietary variety, natural medicines, and livelihoods.

### Intangibles and Global Prospects

These natural systems only begin to illustrate the impacts of human demands and pressures. We are at last accepting that humanity is altering global climate in ways likely to undermine future development and well-being. For example, we are only beginning to understand the relationship between humanity's unprecedented size and mobility and pandemic disease – notably with HIV/AIDS and the potential of avian influenza. Environmental and epidemiological evidence suggests that it is an entire global system of humanity interacting with the rest of the planet, and particularly the scale of that system, that is hazardous.

(inevitable when death rates and birth rates both fall), the world's population is still growing rapidly. Incredibly, the average human family is little more than half the size it was in the early 1960s. Nonetheless, in much of the world the demographic transition the shift from large families and short lives to small families and long lives is far from complete, and the demographic momentum of past growth and young age structures keeps population growing on its own. This growth will not end on its own. It will only end when governments prioritize access to family planning and related health services, and when there have been improvements in women's legal and social capacity to manage their own lives, fortunes and childbearing.

### A Unique Opportunity: The Case of Canada

All of this brings us back to the opening question: Why study the relationship between population and environment in a country as wealthy, as resource-rich, and as uncrowded as Canada? Several reasons: Populationenvironment linkages in Canada are real and important, as they are all in all societies, and may be easier to study in Canada than elsewhere. As a wealthy industrial nation, Canada possesses, or can locate, data that are comparatively rich, recent and accurate about its domestic demographic and environmental realities. More importantly, the country is far from any obvious demographic or environmental crisis point. Therefore, it is in an ideal position to begin the construction of a baseline data portrait of its people, their numbers, their behaviour, and the state of the national natural resource base and other natural assets. When the need for such a baseline becomes obvious. it may be too late to produce one that does not reflect the significant changes likely to occur during this century. Canada could provide a model for other countries. industrialized and developing, to analyze their own demographic and environmental realities. Such a portrait could offer data and analysis to which future policy-makers, analysts, and scientists will be able to refer in the coming decades. No industrialized nation's government has undertaken a serious assessment of its demographic-environmental interactions. Canada could produce the first and set the tone for those to come from governments of industrialized and developing countries alike.

With the evolution of governmental concerns about human-induced climate change and the recent release of the Third Assessment of the Intergovernmental Panel on Climate Change, this may be the right time for a country with a modest population and a reputation for progressive politics and internationally responsible behaviour to take on the challenging (and potentially

controversial) task of assessing its population and the impacts of population dynamics on the domestic environment.

# Methods, Approaches, and Issue Areas

Canada is generally ranked among the more environmentally healthy and sustainable countries of the world. In The Well-being of Nations, sustainable development consultant Robert Prescott-Allen ranked Canada not far behind leaders Sweden. Finland, Norway, Iceland, and Austria on indices of human wellbeing and environmental sustainability. But Prescott-Allen found that "no country is sustainable or even close to sustainability." And this is one key to thinking about Canada's linked demographic and environmental conditions.

A simple first step in assessing population-environment relationships, is to consider how much of a country's key natural resource base is available on average to each member of its population. This is not an analysis of actual *access* but a job of straight long division: the country's total resource asset divided by its population. The objective is to understand how this "per capita resource availability" ratio is changing over time with population increase and, in some cases, depletion of the resource base.

Canada is blessed with abundant amounts of renewable fresh water, arable land, forests, and inland fisheries. It is hard to imagine that its population could grow enough in the foreseeable future for the country to have scarcities of these critical natural resources on a per capita basis. Even for these resources, however, there already are local and regional problems, and these will grow worse as local populations grow. Examining trends in water quality by geographic area, for example, might indicate demographic correlations. Canada is clearly food self-sufficient and blessed with plentiful farmland, but what are the trends in soil quality or pollution levels related to agricultural production, and how do these relate to demographic trends? It may not be easy to separate the impact of domestic population from that of the population of neighbouring countries or the world as a whole. United States demand for timber products and, potentially, Canada's vast water resources obviously enters this picture, but it may be possible to separate out these impacts and focus particularly on domestic demands for timber and water.

In other environmental areas, there may be more obvious demographic issues to worry about. Canadians, only slightly less than their immediate neighbors to the south, are among the world's most voracious consumers of energy on a per capita basis. This energy is heavily carbon-based. Even if Canada were to succeed in achieving its Kyoto Protocol commitments and returned to its 1990 national emission levels for carbon dioxide, it would merely be returning to per capita CO<sub>2</sub> emission levels that are quite high by global standards. Hence the one percent annual population growth that Canada experiences adds significantly to the global burden of greenhouse gas emissions.

Prescott-Allen also rated Canada as average or worse in its protection of wild plant and animal species and its proportion of protected land. If other analyses confirm this judgment, it would be interesting to consider whether demographic dynamics are among the reasons for this less-thanideal performance. And there are other questions: For example, is sprawl an issue for Canada? Population dynamics relate to this phenomenon over long time periods. This is also true of conversion of natural land to human purposes generally, e.g., farmland, housing, commercial and manufacturing uses, and mines. Thanks to globalization, the sources of demand for such changes may be as far away as China or Africa or as close as Montréal. Data are not always available or of the highest quality. But with some effort it should be possible to tease out the aspects of demand that relate most closely to domestic population dynamics, always complicated by the related issues of individual consumption levels and prevailing technologies.

Although there is even less research available on the environmental impacts of aging populations than on population growth and size generally, work is beginning to appear on this topic. A study of US population aging and greenhouse gas emissions concludes that as the median age of the US population rises, per capita emissions are likely to decrease, mostly because a smaller proportion of the population is working. There seems to be little evidence of significant environmental effects resulting from immigration, per se, though the process can indirectly influence the environment through its demographic effects.

### **Implications and Prospects**

There are four processes by which populations change in size: births, deaths, immigration, and emigration. Only two of these, births and immigration, offer realistic prospects for influencing demographic trends in ways policy-makers might consider favourable. Influencing birth or immigration levels involves sensitive issues - contraception, abortion, and the entrance of foreigners to Canada – but there is also strong social science to anchor the discussion. A rich literature, for example, documents the impact of good access to contraceptive services in lowering fertility levels.

In the United States, a total fertility rate of slightly more than two children per woman coincides with a very high rate of unintended pregnancy. Nearly half of all pregnancies are not planned or sought. So the United States would grow less rapidly if it could reduce its rate of unintended pregnancy as close as possible to zero. The same may be true of Canada, despite the fact that its total fertility rate is significantly lower than the US one. Canada could also choose to alter its immigration laws and processes to put the inflow of new residents more in balance with the outflow through emigration. In general, while actual "population control" itself is elusive, the opportunities for influencing the trajectory of populations are much greater than commonly believed. A study of demographic and environmental interactions in Canada could help stimulate serious discussion of population and environmental policy. As the 21st century unfolds, such discussion may be increasingly needed. In this sense, Canada has an opportunity to be a pioneer among nations.

### Canada's Changing Families: Implications for Individuals and Society



Canada's Changing Families: Implications for Individuals and Society, edited by Kevin McQuillan and Zenaida R. Ravanera, is an informative collection of current knowledge and research on Canadian families. This book provides a good understanding of the changing structure of Canadian families and the transitions that modern families undergo. The three sections of the book comprehensively cover current understanding of the critical role families in Canada play in earning, caring, parenting, reproducing, and contributing to society. The authors explore the impacts of new and changing demands on Canadian families with respect to these roles.

McQuillan, Kevin, and Zenaida R. Ravanera, eds. 2006. *Canada's Changing Families: Implications for Individuals and Society*. Toronto: University of Toronto Press. The Health of Tomorrow's Older Canadians An Application of Statistics Canada's *LifePaths* Microsimulation Model

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his study focuses on the health of future seniors in Canada, a key parameter for planning health system funding. Using a microsimulation model developed by Statistics Canada (LifePaths), it measures the impact of a more optimistic health scenario than the benchmark scenario on the projected population of Canadians age 75 and over in poor health and, by extension, on the corresponding demand for home care services. A portrait of the anticipated situation in 2017 is presented, then compared to the portrait for 2031 (the microsimulation's horizon). The study shows that, even assuming an optimistic health scenario, the population of seniors age 75 and over in poor health will grow considerably. This growth, relatively modest at first, will accelerate significantly from around 2017 and, in 2031, it will reach levels about 2.5 times higher than in 2001.

The population's health, and more particularly the health of seniors, is a key element in the planning and sustainable management of a government's social security systems. On a per capita basis, seniors account for the highest relative share of the financial and human resources earmarked for health and social services. It is also important to note that expenditures for social services increase much more quickly than medical, pharmaceutical and hospital expenses after the attainment of age 65. For example, in Quebec, persons age 65 and over cost, per capita, five times more than the average for all Quebeckers, and individuals age 85 and over 22.4 times more, in terms of social services (Kergoat and Légaré, 2007). The demographics of an aging Canada

therefore demand that greater importance be placed on the health of tomorrow's older adults.

Even though older Canadians generally remain in good health until very advanced ages, it has been seen that the risks of suffering from a physical or cognitive disability increase significantly from age 75 and, in most cases, this is accompanied by the inability to perform one or more activities of daily living on one's own. The 75 and over age group, referred to as the "oldest old," will increase drastically at the turn of the 2020s, when the first baby boomers will reach age 75. With this increase in the number of the oldest old, and in light of their socio-demographic characteristics, it can be expected that there will be a sharp increase in the demand for human resources to provide home care services. Whereas services are. by and large, now provided by older adults' informal network (spouse, children and friends), the formal network will, in the future, no doubt have to fulfill a greater share of home support needs (Carrière et al., 2007). As a result, if the optimistic scenario we are proposing were to pan out, and the health of tomorrow's older Canadians proved to be better than that of today's seniors, then this would probably translate into substantial savings in government spending.

### Method

To analyze the impact of a possible improvement in the health of older Canadians on the future population of older adults in poor health, a so-called optimistic scenario was produced in *LifePaths*, where the assumption is made that all future gains in life expectancy will be years lived in

### TABLE 1

### Population Age 75 and Over in Poor Health by Sex and Two Health Scenarios, Canada, 2001, 2017 and 2031

HEAL	тн Ѕсе	NARIO	
Benc	hmark	Optimistic	
Men	Women	Men	Women
195,947	307,983	192,900	302,924
350,359	482,568	275,914	377,893
651,994	831,459	522,165	684,754
ut Surviving C	hildren		
49,559	59,247	48,768	58,421
71,196	67,078	56,953	53,695
137,740	132,171	108,959	106,472
ut a Spouse o	r Surviving Children		
29,477	49,845	29,063	49,131
46,286	54,482	36,924	43,212
95,850	101,123	74,111	78,865
	H         E         A         L           Bench         Bench	H         E         A         L         T         H         S         C         E           Benchmark         Women         Women	H         E         A         L         T         H         S         C         E         N         A         R         I         O           Benchmark         Women         Women         Paral 100         Men         Paral 100         <

\* The small differences between benchmark and optimistic scenario populations for 2001 are due to the fact that the projection begins in 2000.

Source: LifePaths, Statistics Canada.

good health, in line with certain European studies (Gaymu et al. 2007). This premise is indeed optimistic, as scientific research in the field is inconclusive as to whether a compression or an expansion of morbidity is currently underway, i.e., whether life expectancy gains observed beyond age 65 in Western countries are really years lived in good or poor health (Robine, 2005).

The model used to generate the population of Canadians age 75 and older by sex and health status from 2001 to 2031 is different from the conventional model of projection by components. By using the *LifePaths* microsimulation model, it was possible to simultaneously project a large number of individual characteristics while incorporating dynamic elements to reflect each individual's differential behaviours based on his/her characteristics. In this way, LifePaths creates a fictitious cohort where each individual is subject to various transition probabilities over his/her life cycle. For example, in the model used, each simulated individual can change marital status, educational level, disability level, etc. What's more, these transition probabilities between various states are calculated in continuous time so that as soon as a change of state occurs, all other transition probabilities are modified to reflect the individual's new characteristics.

The so-called benchmark scenario is the original scenario produced by our version of the *LifePaths* microsimulation model, which is based on a large number of data from various Statistics Canada surveys and censuses. For building the optimistic scenario, parameters of the original model were changed so as to limit the probabilities of deteriorating health among simulated individuals from the year 2000. More specifically, life expectancy with disability was maintained at the same level over the entire projection period, implying that all life expectancy gains are years lived in good health.

It would be worthwhile to briefly mention that the health status of individuals was determined by their level of disability, be it nil, mild, moderate or severe. The evaluation of this level of disability stems from the Health Utility Index (HUI), which measures an individual's overall functional health, based on attributes such as vision, hearing, speech, mobility, dexterity, cognition, emotion, and pain and discomfort (Torrance et al., 1996). In this study, persons suffering from a moderate or severe level of disability were identified as individuals in poor health.

### **Results and Analysis**

The presence of a spouse, firstly, and the presence of surviving children, secondly, are the two main pillars holding up the informal support network for older adults. Several research studies have shown, in this regard, that the spouse is the main source of help in the case of a long-term health problem and that children, particularly daughters, are an important source of assistance and care, regardless of whether a spouse is also present (Stone and Rosenthal, 1997; Carrière et al., 2007). The composition of older adults' social network therefore has crucial implications in terms

of the pressures placed on the formal support network, i.e., on the government health and social services system and, consequently, on government spending (Stone, 1993). For this reason, in addition to studying the results of the two scenarios for the entire projected population of Canadians age 75 and over in poor health by sex, we continued the analysis further by selecting, from among them, first individuals without surviving children, then individuals unable to rely on the presence of a spouse either. This selection demonstrates the extent of the increase among the older adult population whose family social network is limited and who risk having to turn to the formal network for assistance.

Essentially, the results project a growth in the older population in poor health over the coming decades, even assuming a substantial compression of morbidity (see Table 1). More specifically, based on the benchmark scenario, Canada should have over 800,000 persons age 75 and over in poor health in 2017, in a proportion of three women to two men. It is worthwhile to note that the general feminization of old age is expected to taper off because of a closing of the gap in life expectancy between the sexes (Vallin, 2002; Trovato, 2005; Meslé, 2006).

Table 1 also presents the population of the oldest old in poor health with a reduced family environment. These individuals, who are extremely dependent on government-provided services and care, will be made up almost equally of men and women. Even if the optimistic scenario were

#### **FIGURE 1**





\* A "limited family network" means the absence of a spouse and/or surviving children in the individual's environment.

to pan out, there would be about two times more individuals in this situation in 2031 than in 2001.

Figure 1 shows that by comparing the projected population with the situation in 2001, the arrival of baby boomers to more advanced ages at the turn of the 2020s will greatly accelerate the growth of the population age 75 and older in poor health. Over the period of 2020-2031, the population with a limited family network will increase by 95 percent compared to 78 percent for the population as a whole, demonstrating that the demographic behaviours of baby boomers will have provided them with a generally less extensive family network.

### Conclusion

This study shows that even if the health of persons age 75 and over were to improve substantially over

the coming decades, the population in poor health requiring care will reach never before attained levels. The arrival of baby boomers to older ages around 2017, the year of Canada's 150<sup>th</sup> anniversary, will accelerate this growth. Canada therefore has every interest to rapidly prioritize issues relating to the future home care needs of older adults, all the more so since a recent study shows that, compared to eight European countries, Canada is expected to witness a greater increase in the number of elderly in poor health by 2030, starting in 2017 particularly, as the baby boom was more marked in Canada than it was in Europe (Légaré and Décarie, 2007).

*References are available on the PRI web site.* 

# Special Issue of *Horizons* on Aboriginal Youth February 2008

The PRI, in partnership with the Research and Analysis Directorate of the Department of Indian and Northern Affairs, is preparing a special issue of *Horizons* which will be dedicated to Aboriginal youth. The publication is part of the PRI's current interdepartmental project: *Investing in Youth: Evidence from Research, Policy and Practice* and supports one of the project's key objectives "to examine the changing realities, issues and challenges of today's youth and implications for public policy."

Young Aboriginals, like all youth today, face new realities related to finding their place in a highly competitive knowledge-based economy. The pressure to adapt brings with it an additional level of vulnerability to their passage from childhood to adulthood – a stage that is already filled with uncertainty and difficulty. While this is true for all youth, the socio-economic and cultural contexts in which many First Nations, Inuit, and Métis youth are living create important additional challenges.

This special issue will present a series of policy-relevant articles featuring recent research, data, and initiatives highlighting the emerging trends, challenges, and opportunities related to a rapidly growing Aboriginal youth population in an aging Canadian population. The issue will explore the prospects and aspirations of Aboriginal youth in today's society and the implications for Canada's future in terms of well-being, social cohesion, and economic prosperity. Topics will include:

- demographics;
- identity and values;
- family and intergenerational issues;
- education/labour market issues;
- health, wellness and physical activity;
- crime/custody issues;
- languages/culture; and
- data gaps.

This *Horizons* is scheduled to be released in February 2008. For more information, please contact Sandra Franke by telephone at 613–995-4821 or by e-mail at <s.franke@prs-srp.gc.ca>.

### References

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Beaujot, Roderic, and Don Kerr. 2004. *Population Change in Canada*. Toronto: Oxford.

Beaujot, Roderic, and Zenaida Ravanera. 2007. "Family Models for Earning and Caring: Implications for Child Care." Manuscript.

Beaujot, Roderic, Jianye Liu, and Don Kerr. 2007. "Low Income Status by Population Groups, 1961-2001." Manuscript.

Bélanger, Alain. 2007. *Report on the Demographic Situation in Canada 2003.* Cat No. 91-209. Ottawa: Statistics Canada.

Bongaarts, John. 2004. "Population Aging and the Rising Costs of Public Pensions." *Population and Development Review* 30, no. 1: 1-23.

——. 2006. "How Long Will We Live?" Population and Development Review 32, no. 4: 605-628.

Bourbeau, Robert, and Mélanie Smuga. 2007. "Declining Mortality and Improved Health Status in 20th Century Quebec: The Benefits of Medicine and Socio-Economic Development." Pp. 101-115 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

Boyd, Monica, and Michael Vickers. 2007. "100 Years of Immigration in Canada." Pp. 145-157 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

Boyle, Barbara, and Carl Haub. 2007. "A Comparison of U.S. and Canadian Mortality in 1998." Pp. 117-126 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

Caldwell, John. 2005. Discussion at session, The Causes of Low Fertility, at meetings of the International Union for the Scientific Study of Population, Tours, France, July 18-23, 2005.

Canada, Statistics Canada. 2005a. Population Projections for Canada, *Provinces and Territories 2005-2031*. Ottawa: Statistics Canada Cat. no. 91-520.

— 2007. Portrait of the Canadian Population in 2006, by Age and Sex, 2006 Census. Ottawa: Statistics Canada Cat. no. 97-551.

Esping-Andersen, G. 1999. Social Foundations of Postindustrial Economies. Oxford: Oxford University Press.

Feng, Yan, Sangita Dubey, and Bradley Brooks. 2007. *Persistence of Low Income among Non-Elderly Unattached Individuals*. Statistics Canada, Income Statistics Division, Income Research Paper Series, Cat no. 75F0002MIE – No. 005.

Grant, Jonathan, Stijn Hoorens, Suja Sivadasan, Mirjam van het Loo, Julie DaVanzo, Lauren Hale, Shawna Gibson, and William Butz. 2004. *Low Fertility and Population Ageing*. RAND Europe.

Green, Alan G. 2007. "What Is the Role of Immigration in Canada's Future?" Pp. 171-179 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

Hatfield, Michael. 2004. "Vulnerability to Persistent Low Income." *Horizons* Volume 7, Number 2: 19-26.

Hunsely, Terrance. 2006. "Work-Life Balance in an Aging Population." *Horizons* Volume 8, Number 3: 3-13.

Keefe, Janice, Jacques Légaré, and Yves Carrière. 2007. "Developing New Strategies to Support Future Caregivers of the Older Canadians with Disabilities: Projections of Need and Their Policy Implications." *Canadian Public Policy* 33 (supplement): 65-80.

Kim. Ann H. 2007. "The Flow of Labour and Goods in Canada's International Migration System: 1986-1996." *Canadian Studies in Population* 34, no. 2: 241-268.

Légaré, Jacques. 2001. "Ageing and Social Security Program Reforms: Canada in International Perspective." *ISUMA: Canadian Journal of Policy Research* 2, no. 2: 110-118.

Légaré, Jacques, and Yann Décarie, 2007. "Applying Statistics Canada LifePaths Microsimulation Model to Project the Health Status of Canadian Elderly." Paper presented at International Microsimulation Association Conference, Vienna, August 20, 2007. Légaré, Jacques, Robert Bourbeau, Bertrand Desjardins, and Chad Debois. 2006. "Variations in Cohort Size and Lower Mortality in the Elderly: Implications for Pay-as-You-Go Healthcare Systems." Pp. 305-318 in *Longer Life and Healthy Aging*, ed. Z. Yi, E. Crimmins, and Y. Carrière. Dordrecht: Springer.

Livi-Bacci, Massimo. 2000. "An Additional Person: Increasing or Decreasing Returns?" Paper presented at the meetings of the Population Association of America, March 2000, Los Angeles.

Malenfant, Eric Caron, Anne Milan, Mathieu Charron, and Alain Bélanger. 2007. *Demographic Changes in Canada from 1971 to 2001 Across an Urban-to-Rural Gradient*. Statistics Canada, Demographic Documents, Cat. no. 91F0015MIE – No. 008.

Marshall, Katherine, and Vincent Ferrao. 2007. "Participation of Older Workers." *Perspectives on Labour and Income* 8 (8).

Martel, Laurent, Eric Caron-Malenfant, Samuel Vézina, and Alain Bélanger. 2007a. "Labour Force Projections for Canada, 2006-2031." *Canadian Economic Observer* 20, no. 6.

———. 2007b. "Doit-on craindre une baisse de la population active au Canada?" Paper presented at the meetings of the Association Canadienne-Française pour l'Avancement des Sciences, Trois-Rivières, May, 2007.

Massey, D.S. 1995. "The New Immigration and Ethnicity in the United States." *Population and Development Review* 21, no. 3: 631-652.

Matthews, Deb. 2006. "Can Immigration Compensate for Below-Replacement Fertility? The Consequences of the Unbalanced Settlement of Immigrants in Canadian Cities, 2001-2051." University of Western Ontario: Ph.D. thesis.

Maynard Donna, and Don Kerr, 2007. "From Pre-contact to the Present: The Demography of the Aboriginal Peoples of Canada."

Pp. 297-310 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

McDonald, Peter. 2006. "Low Fertility and the State: The Efficacy of Policy." *Population and Development Review* 32, no. 3: 485-510.

McQuillan, Kevin. 2006. "Conclusion: Family Change and the Challenge for Social Policy." Pp. 293-306 in *Canada's Changing Families: Implications for Individuals and Society*, ed. K. McQuillan and Z. Ravanera. Toronto: University of Toronto Press. Myles, John. 2000. *The Maturation of Canada's Retirement Income System: Income Levels, Income Inequality and Low-Income among the Elderly.* Statistics Canada, Analytical Studies Branch, Research Paper Series No. 147.

Myles, John, Feng Hou, Garnett Picot, and Karen Myers. 2007. "Why Did Employment and Earnings Rise among Lone Mothers in Canada During the 1980s and 1990s?" *Canadian Public Policy* 33, no. 2: 146-172.

Pellegrin, Jean-Pierre. 2007. "La démographie et les politiques publiques : un intrant devenu un enjeu." Paper presented at the meetings of the Association Canadienne-Française pour l'Avancement des Sciences, Trois-Rivières, May 2007.

Picot, Garnett, and Arthur Sweetman. 2007. "Income Inequality and Low Income in Canada: An International Perspective." *Analytical Studies Branch Research Paper Series*. Ottawa: Statistics Canada.

Picot, Garnett, and Arthur Sweetman. 2007. "The Deteriorating Economic Welfare of Immigrants and Possible Causes: Update 2005." Pp. 181-196 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

Podoluk, Jenny. 1968. *Incomes of Canadians*. Ottawa: Dominion Bureau of Statistics.

Rossier, Clementine. 2005. "Sociability and Fertility: Two Expressions of an Underlying Orientation Toward Social Cohesion? Results from a Longitudinal Survey on Fertility Intentions, France, 1998-2003." Paper presented at the meetings of the International Union for the Scientific Study of Population, Tours, France, July 18-23, 2005.

Roy, Laurent, and Jean Bernier. 2006. "La politique familiale, les tendances sociales et la fécondité au Québec : une expérimentation du modèle nordique?" Québec: Ministère de la Famille, des Aînés et de la Condition féminine.

Simmons, Alan. 2007. "Globalization, Undocumented Migration, and Unwanted Refugees: Trends, Explanations, and Solutions." Pp. 159-169 in *The Changing Face of Canada: Essential Readings in Population*, ed. R. Beaujot and D. Kerr. Toronto: Canadian Scholars' Press.

Stone, Leroy O. 2007. "Who Works Beyond 65?" Paper presented at the meetings of the Canadian Economics Association, Halifaxs, May 18, 2007.

Sunter, D. 2001. "Demography and the Labour Market." *Perspectives on Labour and Income* 13, no. 1: 28-39.

Testa, Maria, and Laurent Toulemon. 2005. "Intended and Actual Transition to a First Child in France: The Role of Marital and Professional Status." Session 22, IUSSP.

United Nations.1989. "World Population at the Turn of the Century." *Population Studies* no. 111.

——\_\_\_\_. 2000. *Replacement Migration: Is It a Solution to Declining and Aging Populations?* United Nations, Population Division.

———. 2006. *World Population Policies 2005*. New York: United Nations, Cat. no. ST/ESA/Ser.A/254.

———. 2007a. *World Population Ageing 2007*. New York: United Nations, Cat. no. ST/ESA/Ser.A/260.

———. 2007b. World Population Prospects: The 2006 Revision. New York: United Nations.

Vienna Institute of Demography. 2007. 2002-2006: A Five Year Portrait. Austrian Academy of Sciences: Vienna Institute of Demography.

### The Interconnected Dynamics of Population Change and Life-Course Pocesses Page 13

Heisz, Andrew. 2007. *Income Inequality and Redistribution in Canada: 1976 to 2004.* Statistics Canada. <a href="http://www.statcan.ca/bsolc/english/bsolc?catno=11F0019MIE2007">http://www.statcan.ca/bsolc/english/bsolc?catno=11F0019MIE2007</a> 298>. Accessed on October 26 2007.

Murphy, Brian, Paul Roberts and Michael Wolfson. 2007. "High-income Canadians." Perspectives. September. Statistics Canada — Catalogue no. 75-001-XIE.

Myles, John. 2005. *Postponed Adulthood: Dealing with the new economic inequality*. Canadian Council on Social Development. 12 pages. <a href="http://www.ccsd.ca/pubs/2005/">http://www.ccsd.ca/pubs/2005/</a> pa/pa.pdf>. Accessed on October 26, 2007.

Saez, Emmanuel and Michael R. Veall. 2005. The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence. *American Economic Review*. 95(3): 831-49.

### Population and Employment in 2017 Page 17

Bélanger, A., L. Martel et al. 2005. *Population Projections for Canada, Provinces and Territories*, 2005-2031, Statistics Canada, no. 91-520-XWE in the catalogue.

Denton, F.T. Spencer, Byron G. 2003. *Population Change and Economic Growth: The Long Term Outlook*, Hamilton: McMaster University.

Geoff, Rowe. 2003. "Fragments of Lives: Enabling New Policy Directions through Integrated Life-Course Data" in Policy Research Initiative, *Horizons*, Vol. 6, No. 2, p.7.

Policy Research Initiative (PRI). 2005. Encouraging Choice In Work and Retirement -Project Report.

The Health of Tomorrow's Older Canadians: An Application of Statistics Canada's *LifePaths* Microsimulation Model Page 51

Carrière, Y., Keefe, J., Légaré, J., Lin, X. and Rowe, G. 2007. "Population Aging and Immediate Family Composition: Implications for Future Home Care Services," *Genus*, Vol. 63, LVXIII, num 1-2, p. 11-31.

Gaymu, J., Ekamper, P., Beets, G. 2007. "Qui prendra en charge les européens âgés dépendants en 2030?," *Population*. (in press)

Kergoat, M. J., and Légaré, J. 2007. "Aspects démographiques et épidémiologiques du vieillissement au Québec," in Marcel Arcand and Réjean Hébert (under the direction of), *Précis pratique de gériatrie*, 3<sup>rd</sup> edition, Montreal, EDISEM and Paris, Maloine, 1-16.

Légaré, J., and Décarie, Y. 2007. "Applying Canada LifePaths Microsimulation Model to Project the Health Status of Canadian Elderly," paper presented at the *International Microsimulation Association Conference 2007*, Vienna.

Meslé, F. 2006. "Progrès récents de l'espérance de vie en France : Les hommes comblent une partie de leur retard," *Population*, vol. 61, no. 4, 437-462.

Robine, J.M. 2005. "Are We Living Longer and in Better Health?" Paper presentation as a discussant at the AGIR Final Conference, March 10, 2005, Brussels (AGIR is a project of The European Network of Economic Policy Research Institutes: <www.enepri.org>) Stone, L. O. 1993. "Social Consequences of Population Ageing: The human support systems dimension," International Population Conference, Montreal, 1993 (Vol. 3, pp. 25-35). Liège: International Union for the Scientific Study of Population.

Stone, L. O., and Rosenthal, C. 1997. "The Profile of the Social Networks of Canada's Elderly: An analysis of 1990 General Social Survey Data," in H. Litwin, ed. *The Social Networks of Older People. A Cross-national Analysis.* London, Praeger, 78-97.

Torrance, G. W., Feeny, D. H., Furlong, W. J., Barr, R. D., Zhang, Y., and Wang, Q. 1996. "Multiattribuable Utility Function for a Comprehensive Health Status Classification System," Health Utilities Index Mark 2, *Medical Care*, 34, 702-722.

Trovato, F. 2005. "Narrowing Sex Differential in Life Expectancy in Canada and Austria: Comparative Analysis," *Vienna Yearbook of Population Research 2005*, 17-52.

Vallin, J. 2002. "Mortalité, sexe et genre," in Casselli, G., Vallin, J., and Wunsch, G. (ed.), *Démographie : Analyse et synthèse III – Les déterminants de la mortalité*, Paris, Éditions de l'INED, chapter 53, 319-350.