

# Labour Force Ageing and Skill Shortages in Canada and Ontario

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## Foreword

I remember well when I was in elementary school in the 1950s, the sudden and apparently unexpected arrival of all my younger siblings who were part of the baby boom. Abruptly, there were not enough classrooms, not enough teachers, and we were all crowded into big classes and forced to spend a year learning in the middle of a large construction project.

As the people of the baby-boom generation near retirement age, we have a chance to do a better job of preparing for the shift. It is inevitable that the average age of Canada's labour force will increase in the next two decades, and labour force growth will slow. Canadians have good reason to wonder about the implications of this for our economy, for our social programs, and for relations among generations.

One of the many concerns regarding this demographic shift has been the potential for skill shortages to arise. Some have argued that widespread and potentially severe shortages loom. Others have argued that the labour market is likely to adapt well to the ageing of the labour force, and that skill shortages are unlikely to be a serious problem.

In this report, Julie McMullin of the University of Western Ontario and her colleague, Martin Cooke, explore the data on labour force ageing and skill requirements for Canada as a whole and for the province of Ontario. They review and assess the implications of labour force ageing for skill shortages, and identify a number of policy suggestions for governments and for private decision-makers. After analyzing the relevant data by industry and by occupation, they use four case studies to explore the market and institutional responses to demographic pressures. The four cases involve: nursing, information technology, skilled trades in manufacturing, and the biotechnology sector.

McMullin and Cooke find that it is unlikely that labour force ageing will generate widespread skill shortages. However, the ageing of the labour force may interact with other factors to result in localized, industry- or occupation-specific "hot-spots" which are unlikely to create problems of crisis proportions. The report therefore assesses the measures open to employers and policy makers to prevent or manage these localized shortages. They include: using immigration policies to more directly target skills in short supply; encouraging higher rates of labour market participation among groups, such as Aboriginal Canadians, that are under-represented in the labour market; fostering phased retirement and workplace flexibility policies to encourage higher participation of older workers; and, promoting more active life-long learning.

In other words, the scope of future skill shortages is in our hands as employers and policy advisors. Just as Canadians had ample notice that an avalanche of young people would arrive at school in the 1950s, at university in the 1960s, and in the housing market soon afterward, we now have the opportunity to anticipate the pressures on labour supply, and thereby prevent severe dislocations for all Canadians. Let us hope that we do a better job of anticipating this time.

I wish to thank Professor McMullin and her colleague, Martin Cooke, for their careful review of the evidence, as well as the experts who peer reviewed the paper. The project was supervised by Ron Saunders, Director of the Work Network.



## Executive Summary

This report considers the ways in which the ageing of the labour force may influence skill shortages in Canada and Ontario. Concerns about the potential negative effects of skill shortages, defined as an excess demand for skilled workers, have been expressed by governments, labour organizations and many leading industry representatives. However, skill shortages are hard to measure empirically and there has been disagreement about the degree to which widespread skill shortages are currently being experienced in Canada, or are likely in the future.

Over the last few decades the skills required by employers have changed as a result of the shift from primarily resource-based to knowledge-based economies in Canada and Ontario. At the same time, there are important demographic changes underway worldwide. As in other industrialized countries, the labour force in Canada and Ontario is ageing, due to lower fertility, longer life expectancy, and the ageing of the baby boom. In the past, most people's working lives extended from their late teens or early twenties, when they finished education, to between 60 and 65, when they retired from paid work. Now, there are three important shifts taking place. First, young people are taking much longer to complete their education and begin a career job. Second, many people are ending their careers earlier than 60. And third, because of demographic ageing, the proportion of the population of working age is expected to become smaller in coming decades. In fact, the Canadian labour force is projected to shrink in absolute size after 2016.

In the 1990s, it was widely suggested that the ageing of the Canadian labour force would have negative effects for the Canadian economy and on our standard of living more generally. Two types of concerns were raised. Many expected that the funding of pensions and health care would become problematic, resulting in higher taxes and poor economic growth.

The purpose of this study is to examine the second concern -- that older and smaller labour forces may lead to a shortage of skilled workers. Shortages may be caused by a number of factors, including technological change, hiring and retirement practices, issues surrounding training and education, and the nature of the work involved. This study argues that although there is not strong evidence of economy-wide skill shortages, the ageing of the labour force may interact with other factors to result in localized, industry-specific shortages. The age structure of some specific occupations and industries may put them at risk of experiencing skill shortages in the context of an older population. Thus the study concludes that skill shortages are not so much a looming "crisis" as a challenge that can be managed with careful planning by employers and policy makers.

The study unpacks the issue of skill shortages into four distinct questions.

- How will the age structure of the population evolve in the next 20 years?
- How do industries and occupations differ in their age structures and retirement ages?
- What is the relationship between skill shortages and labour force ageing?
- What structural and institutional factors affect skill shortages in particular situations?

The examination of the age structure of industries and occupations in Ontario shows that some industries and occupations have considerably older age profiles, as well as low average retirement ages. Occupations in health and education are older and are projected to have high cumulative retirement rates over the next decade, while occupations in information technology and sales and service occupations tend to be younger and are less at risk of large-scale retirement.

The examination of four “cases”, including nursing, information technology, skilled trades in manufacturing, and the biotechnology sector in Ontario demonstrates that age structure alone does not determine future skill shortages. The case studies identify four key factors that affect skill shortages: the age structure of the current work force, the length of time required to train, the geographic mobility of workers, and working conditions that make it difficult to attract or retain workers.

Some occupations, such as nursing, do risk potential labour shortages due to retirement. However, this is also related to the nature of the work, involving long hours, difficult working conditions and irregular shifts, which may lead many nurses to opt for early retirement. The length of training and competition from other jurisdictions for Ontario nurses also makes it difficult for the profession to recruit new members.

On the other hand, the information technology sector is much younger, with little threat of retirement-related shortages. However, the young age structure may indicate potential problems for IT firms hoping to recruit in an older labour market. Other factors which affect potential skill shortages include the geographic mobility of work and people, and whether skilled workers are likely to immigrate to fill these jobs.

This paper considers several policy options that may increase the flexibility of labour markets in meeting the demand for skills, particularly in relation to labour force ageing. These policy options include the following:

- Use immigration policies to more directly target skills in short supply
- Encourage higher rates of labour market participation among groups that are under-represented in the labour market, such as Aboriginal people and lone mothers
- Remove barriers to training and labour force participation more generally
- Promote phased retirement and workplace flexibility policies that would encourage the participation of older workers
- Promote *life-long learning* and *active ageing*, including training throughout working life and promotion and advancement opportunities for older workers; and
- Seek an age-balanced workforce, in which employers actively recruit to create the optimal age structures for their enterprises.

The overall conclusion of the study is that skill shortages will likely emerge in specific industry, occupations, and locations in coming decades, depending on a wide variety of economic, demographic and workplace-specific factors. One of these factors is the ageing of the Canadian and Ontario populations. As the Canadian labour force ages, employers and policy-makers will have to become much more age-oriented in their decision-making. Good planning will be needed to prevent skill shortages and to overcome them, when they emerge.

## **Acknowledgements**

We would like to thank Judith Maxwell, President of CPRN, and two anonymous reviewers for their helpful comments on earlier drafts of this report. Ron Saunders, Director of CPRN's Work Network deserves a special thank you for working with us throughout the writing of this paper and adding valuable insight and comments along the way. Finally, thanks to CPRN for commissioning us to write this report.

*Julie McMullin, Martin Cooke and Rob Downie*



## **1. Introduction**

It is widely accepted that Canadian economic prosperity relies on having a well educated and highly-skilled workforce. As such, there have been calls to increase investment in education and training in order to ensure international competitiveness. Unemployment and surplus labour were major economic concerns in the 1970s, 1980s, and early 1990s. In more recent years, complaints focus on the economic inefficiencies that have resulted from a shortage of skilled workers. Concerns over skill shortages are widespread with various industrial and occupational groups expressing such concerns.

Problems resulting from skill shortages are being discussed at the same time as the Canadian and Ontarian populations are ageing. The population structures of Canada and Ontario are changing from relatively young ones with growing labour forces to older ones in which the size of the labour forces are expected to decline (e.g., Canada) or grow at minimal rates (e.g., Ontario). Furthermore, the possibility of labour force shortages due to large scale retirement of the baby boom generation looms over industries and occupational groups, many of which are already concerned about skill shortages.

The primary aim of this report is to understand better how the ageing of the labour force will influence labour markets and skill shortages in Ontario and Canada. To do so, the next section of this report discusses skill shortages. Part 3 outlines the demographic context in which labour force ageing is occurring and examines the potential costs of an ageing population by examining dependency ratios, the consumer-producer ratio, and pension plan costs. Part 4 outlines the age structures of industries and occupations in Canada and Ontario, as well as projections about occupational specific retirements. The fifth part of this report brings Part 3 and Part 4 together by considering the arguments that have been put forth to examine the relationship between labour force ageing and skill shortages. Part 6 then examines four examples of industries and occupations in Ontario to illustrate how institutional processes, in combination with labour force ageing, affect skill shortages. Finally, Part 7 outlines some of the policy suggestions that have been put forth to address skill shortages and labour force ageing.

## **2. Skill Shortages**

There has been a lot of attention given to the issue of skill shortages over the past couple of decades by industry and labour organizations, governments, public policy think-tanks, and academics in a variety of disciplines. Although there have been demands for government policy solutions to skill shortages, there remains considerable debate over the extent to which Canada's labour market is currently experiencing skill shortages and whether such shortages are likely to be more widespread in the future as a result of the ageing of the labour force. There are those who find skill shortages to be a widespread and increasing problem that demands government attention, and those who find skill shortages to be a potential challenge, but not of the cataclysmic magnitude of which we are often warned. This section outlines the major issues in the skill shortages debate, including the varying perceptions and definitions of skill shortages.

## 2.1 The Problem of Skill Shortages

In the early 2000s, skill shortages were often discussed in an alarmist manner. The former Federal Human Resources Minister, Jane Stewart, referred to a current “critical shortage” of skilled workers as a “looming crisis” (Canadian Press Newswire, Feb. 27, 2001). The Canadian Labour Congress has identified a “looming shortage of skilled workers”, particularly in utilities, transportation, education, health and social services, and public administration, which are highly unionized industries (Canadian Labour Congress, 2001: 6). Similar concerns have been expressed by the Forum of Labour Market Ministers (2002) and by nearly all industrial sectors. For example, the Canadian Labour and Business Centre has identified skill shortages as a major problem, noting that since 1996 there has been a significant increase in levels of concern about the shortage of skilled employees among managers and labour leaders in the public and private sectors. In 2002, skill shortage issues in the construction, manufacturing, education, and health care sectors ranked among the top five concerns for managers and the top ten for labour leaders in Canada (CLBC, 2001). That study found that 57 percent of public sector managers from federal, provincial and municipal governments considered the skill shortages issue a serious problem, and 48 percent of private sector managers viewed skill shortages as serious. Among managers, those in the public health sector are the most likely to view the skill shortage issue as a “serious problem”, (61 percent). The majority (77 percent) of public labour leaders agree with management concerns (CLBC, 2001).

The definition of what constitutes a skill shortage and what is considered appropriate evidence that a problem exists, varies with one’s perspective on the labour market. Roy, Henson, and Lavoie (1996: 11) define a skill shortage from an economist’s point of view as occurring when “the quantity of a given skill supplied by the workforce and the quantity demanded by employers diverge at the existing market conditions”. This can include both “quantitative” shortages, in which there is a lack of potential workers with particular skills, or “qualitative” shortages in which current workers in an occupation lack the skills required by employers in a changing environment. The two problems are somewhat different but, in either case, the issue from the perspective of economists is one of adjustments in the supply and demand of labour. Skill shortages or surpluses may result from technological changes, shifts in consumer tastes, and various other shocks to the economy (Roy, Henson, and Lavoie, 1996: 12). Adjustments in response to skill shortages include employers’ substitution of other inputs to production for labour, wage level adjustments, and attempts to move production or to attract workers from other locations, as well as providing training to the existing workforce. Adjustments on the part of workers generally include movement into areas of shortage, both geographically and in the sense of retraining to gain scarce skills. These adjustments to the labour market cannot take place instantaneously, however. A lack of information, the time required for training, and various institutional barriers to labour market adjustment mean that in a given place at a given time, “there will be inequalities in between the quantities supplied and demanded for particular skills at the prevailing wage” (Roy, Henson, and Lavoie, 1996: 12). Nonetheless, to deal effectively with labour market shocks, adjustments must occur quickly. Problematic skill shortages are those which become protracted as a result of these institutional barriers to adjustment, resulting in inefficiencies.

The evidence taken to indicate current and future skill shortages comes from a variety of sources, including unemployment and vacancy measures, wage rates, and employer surveys. Each of

these sources has drawbacks. Unemployment and vacancies are sensitive to business cycles, making it difficult to identify real shortages that require policy intervention. As well, some level of frictional unemployment will always be present in the economy and in particular occupations. In order to identify a shortage using unemployment, one must therefore have specified a normal unemployment rate, levels below which would constitute a shortage. Furthermore, unemployment and vacancy rates represent conditions at the prevailing wage, which itself may take time to adjust in response to a shortage (Roy, Henson, and Lavoie, 1996).

In a labour market with sufficiently flexible wages, a drop in the supply of a particular skill relative to demand should lead to higher wage rates. However, in practical research it is difficult to identify the degree to which increasing wage rates are the result of excess demand or rather are due to other institutional factors, such as unionization and multi-year contracts. Some studies which have used higher relative wage rates as evidence of shortages in technology-related occupations have ignored the effects of falling wages in low-skilled occupations on these relative rates. Smith reasons that if wage differentials between the skilled and non-skilled are used to indicate the presence of shortage, these findings could be misleading (Smith, 2001:4). Furthermore, surveys of employers have often been used as evidence of current and impending shortages. For instance, The City of Toronto recently released its Labour Force Readiness Plan which included survey results that indicated skills gaps across all occupations (Toronto Economic Development, 2003). However, employer surveys frequently identify shortages of skills, in part, because it is in their interest to do so as a larger pool of better-trained workers often leads to lower wages (Laslett, 1992). It may be that an employer experiences difficulties filling positions, but this typically means that employees with the required skills are hard to find *at the wage the employer is offering*, and employers may be slow to adjust their expectations. As well, difficulties in hiring and retaining workers may be related to problems other than wages and skill levels, including difficulties internal to firms (Roy, Henson, and Lavoie, 1996: 32) as well as other issues such as working conditions.

Sociologists have provided other explanations for slow labour market adjustments to skill shortages. Of particular note is the identification of a “credential gap” between the stated requirements of work and the real requirements of jobs. Level and perceived quality of education are often used by employers as quick screening mechanisms in hiring procedures. The problem is that, at least for some jobs, formal education is not perfectly correlated with one’s ability to do the job. (Livingston, 1998; 2002) For example, most people with a high school education would be perfectly able to work as a bank clerk, yet many banks now require new bank clerks to have a university education.

Sociologists and political scientists have identified other structural barriers to employment and training that exist in the labour market. The “traditional” dimensions of inequality, including gender, race, and ethnicity can be seen as social structures that affect the attainment of education and employment by individuals, but also as potential barriers to the adjustment of the labour market in times of labour scarcity. Women’s greater responsibility for childcare and unpaid work in the home, for example, can be a barrier to their acquiring training and labour force experience, but also diminishes the overall pool of skilled labour. Similarly, although there have been calls for policies that encourage the labour force participation of older people, in response to the ageing of the population, ageism and a reluctance of employers to hire or train older workers can render these policies ineffective (Taylor, 2002). Despite concerns of skill shortages

in the economy and the high level of skills possessed by many older workers, they often face higher unemployment than younger workers, and may choose to withdraw from the labour force altogether after becoming unemployed.

In fact, the relationship between population aging and skill shortages is a concern of governments, policy makers, and academics alike. Although many are concerned with this relationship, there is considerable disagreement about how serious the social and economic implications of it are. Before turning to the specifics of this debate, it is necessary to set the stage for our analysis by describing the age structures of Ontario and Canada and summarizing some of the general concerns that have been discussed in relation to population aging.

### **3. The Demographic Context of Labour Force Ageing**

Labour force ageing is occurring within the context of international population ageing and the related concerns that nations have raised with respect to this issue. This section briefly describes the age structures of Canada and Ontario and some of the concerns that have been raised in response to population ageing.

#### **3.1 Demography: The Changing Age Structure of the Canadian and Ontario Populations and Labour Force**

In order to examine the relationship between population ageing and skill shortages, we must understand the demographic shift that is underway in the industrialized world, and its implications for Canada and Ontario. The ageing of the population and labour force in Ontario and Canada is part of a worldwide trend (United Nations, 2002). With industrialization, European and North American populations experienced increased life expectancy, resulting in the potential for population growth as long as fertility remained above replacement levels. Although the life expectancy of persons in industrial countries continues to rise, the fertility rates in these countries have fallen to levels below replacement. As a result, the populations of industrialized nations are ageing at unprecedented rates.

However, Western countries are not ageing at the same rate. European countries experienced fertility decline earlier than North American countries, and therefore tend to be older than the Canadian population. Both Canada and the United States experienced a large and more prolonged baby boom following World War II, and this has kept the populations of Canada and the United States relatively young.

Table 1: Estimated and Projected Percentage of Population aged 60 and Older for Six Industrialized Countries, 1971, 2002, 2050.

	Canada	Australia	Germany	Netherlands	United Kingdom	United States <sup>1</sup>
Percent of total population aged 60 or older						
1971	8	12	20	15	19	14
2002	17	17	24	19	21	16
2050	30	28	38	33	34	27

*Notes:*

<sup>1</sup> Figures for United States (1971) are from 1970 census data.

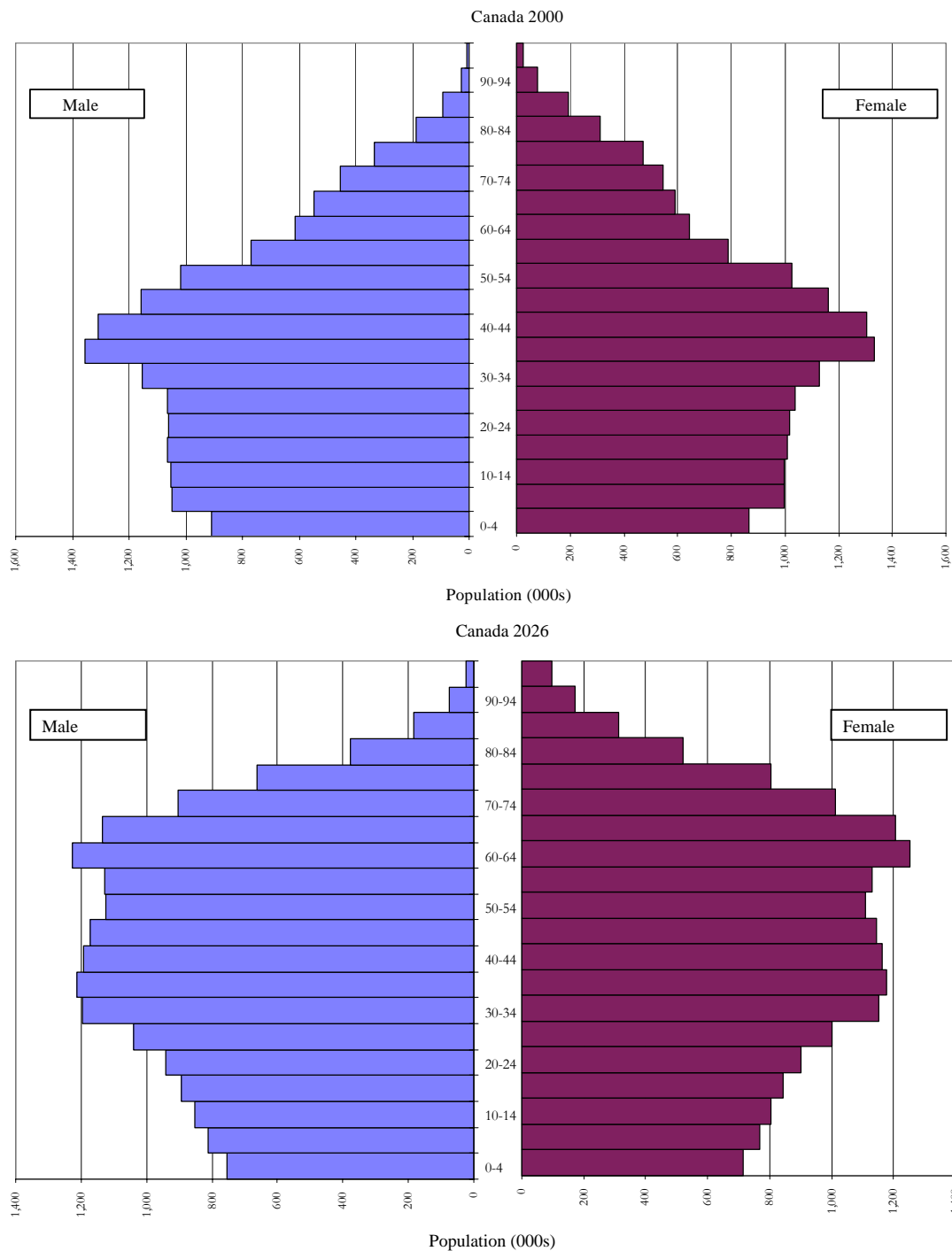
*Sources:* Statistics Canada (1973); United Nations( 1973, 1980, 2002).

As Table 1 shows, the proportion of Canada's population aged 60 and older in 2001 was 17 percent; similar to Australia's population structure, one percentage point higher than the United States', and considerably lower than Germany's, The Netherlands', or the United Kingdom's. Although Canada and the United States both experienced significant baby booms, Canada's population is somewhat older than that of the United States, our key competitor, because the US has higher fertility rates and larger amounts of in-migration than does Canada. Notably, compared with Europe, the data projections presented in Table 1 suggest that Canada will continue to have a younger population well into the future.

The trend of population ageing seems unlikely to reverse itself. Certainly, the fact that people are living longer than ever is a positive development and it is hoped that all age specific mortality rates will continue to decline. It also seems unlikely that fertility will increase dramatically in the foreseeable future. Immigration rates are more easily changed by policy and have important effects on the Canadian population in terms of its size and composition. For instance, Canada received approximately 235,000 immigrants in 2002 (CIC, 2003), and these immigrants are mainly younger than the native-born Canadian population. However, current immigration levels or small increases to them, which are part of the federal government's long-term, immigration plan (CIC, 1999), will, at best, delay the eventual contraction of the Canadian labour force. (Denton and Spencer, 1999; Beaujot, 2003).

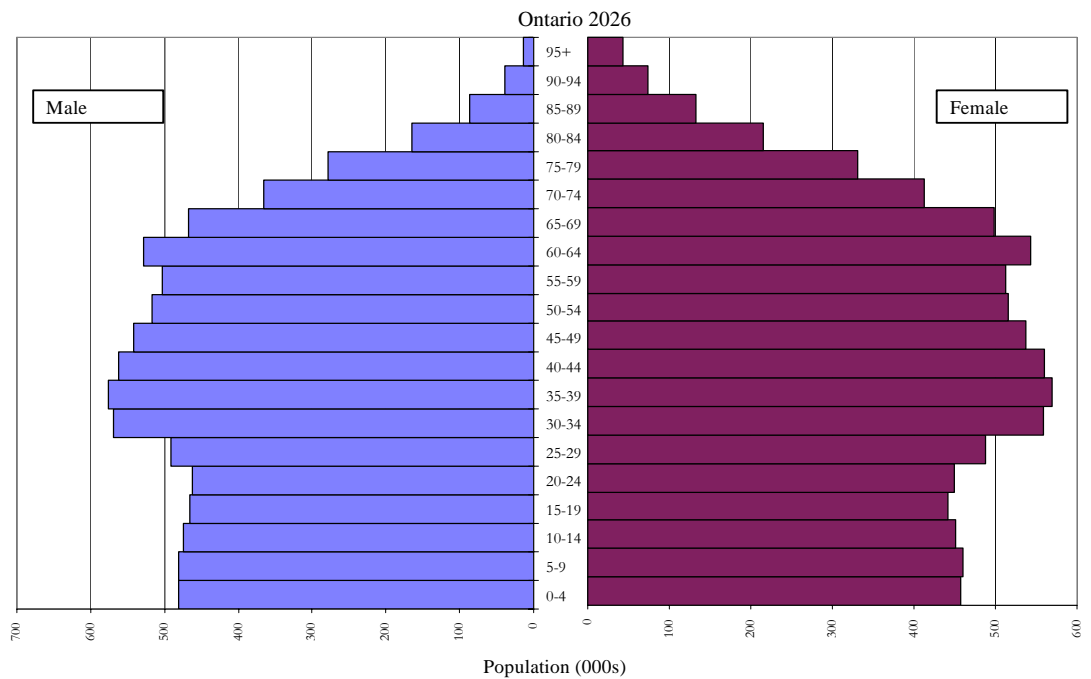
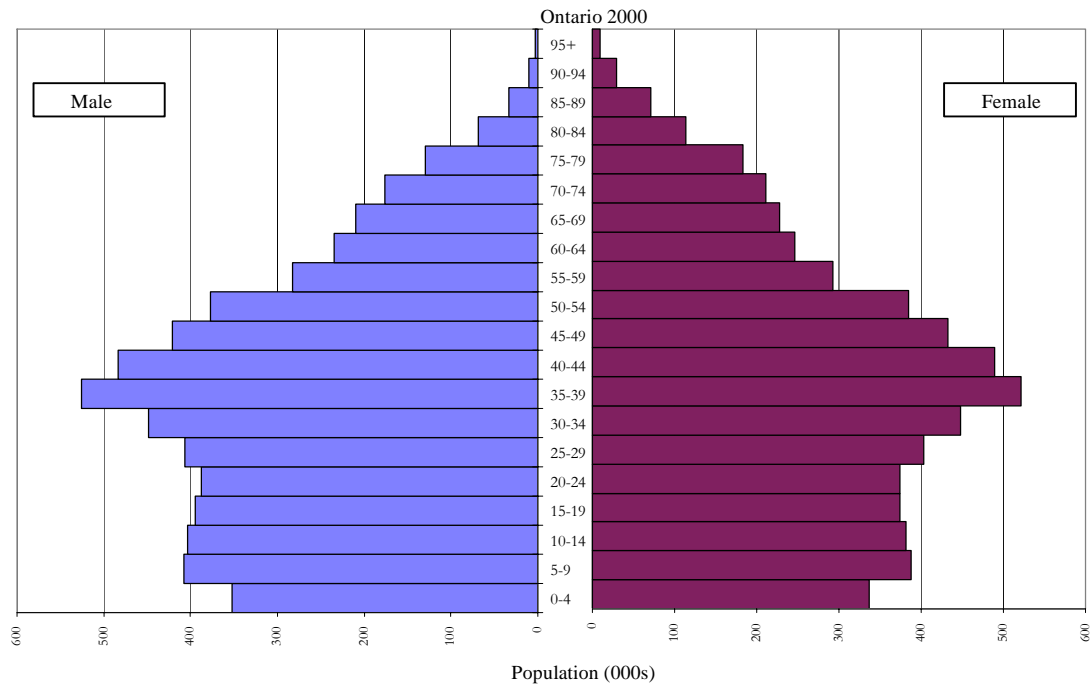
Figures 1 and 2 show the age structure of the Canadian and Ontario populations in 2000 as well as Statistics Canada's projections of the age structure of the projected populations in 2026. In 2000, the baby boom cohort, born between the mid 1940s and mid 1960s, is a clearly visible bulge in the population pyramids (see the bars that represent those between the ages 35 and 55). As this cohort ages, the age structure of the Canadian population will change considerably. Assuming no drastic changes to fertility, mortality, or migration, the age structure of the population is projected to become decidedly more top-heavy by 2026, with a smaller proportion of younger people. By that year the trailing edge of the baby boom, those born in the mid 1960s, will be approaching age 60, while the early baby boomers will have entered their 80s. Although Ontario's population is projected to remain somewhat younger than the total Canadian population, the essential dynamics are the same for Ontario and for all of the other provinces.

Figure 1: Populations in 2000 and Projected Population in 2026 by age and Sex, Canada (thousands).



Source: Statistics Canada, 2001.

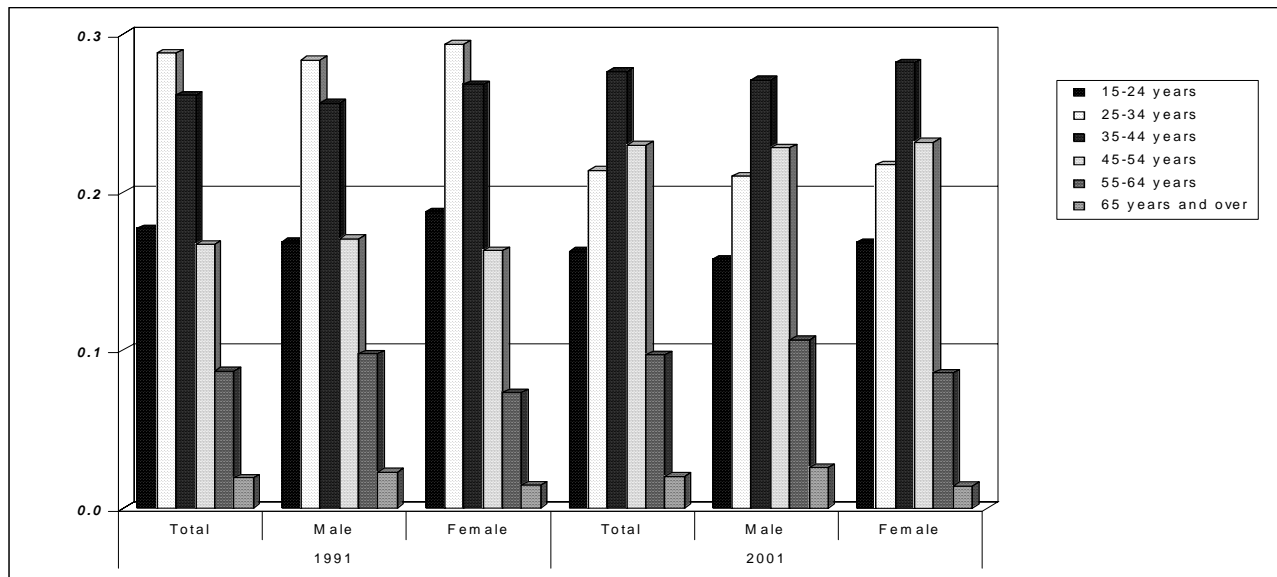
**Figure 2: Populations in 2000 and Projected Population in 2026 by age and Sex, Ontario (thousands).**



If current age-specific labour force participation rates remain the same in Canada, projections suggest that the Canadian labour force will begin to contract in 2016 and that labour force growth will continue in Ontario but will be below one percent by 2026 (Denton, Feaver, and Spencer, 2000a; 2000b). According to the Labour Market Information and Research Unit of the Ontario Ministry of Training, Colleges and Universities, “over the next 26 years the projected

labour supply growth (averaging 0.9 percent yearly) will be much slower than the employment growth experienced historically, which could result in labour shortages, particularly for skilled workers” (MTCU, 2003: 7). Figure 3 presents the age structure of the Canadian labour force in 1991 and 2001.

Figure 3: Age Structure of the Canadian Labour Force, Males, Females, and Total 1991 and 2001.

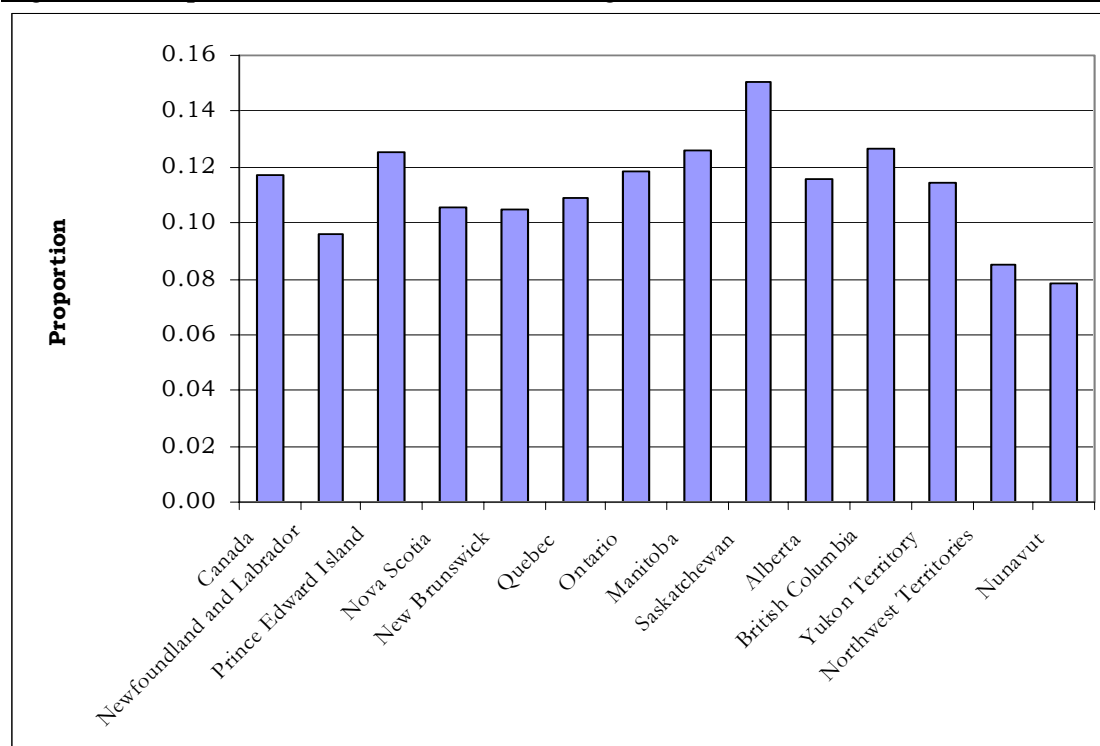


Source: Statistics Canada Labour Force Survey data..

The movement of the baby boom cohort through typical working ages is clear. In 1991, the percentage of workers aged 25 to 34 in the Canadian labour force was 28.8 percent. Over the next decade this fell to 21.3 percent, while the percentage of those between 45 and 54 rose from 16.7 percent to 23.0 percent. The percentage of those aged 55 and 64 years, who are nearing typical retirement ages, rose from 8.6 percent to 9.6 percent between 1991 and 2001.

In general, the age structures of the labour forces of Canadian provinces are similar to each other and to that of Canada as a whole. Yet, there is some provincial variation in the proportion of older workers in the labour force. Figure 4 compares the proportion of the labour force aged 55 and over using 2001 Census data. Here we see that 11.8 percent of Ontario workers were aged 55 or over in 2001, Newfoundland and Labrador had a somewhat younger age structure with 9.6 percent of workers aged 55 and over, and British Columbia had the oldest labour force in Canada, with 12.7 percent aged 55 or over. The territories had much younger labour forces than did the provinces. Nonetheless, all jurisdictions in Canada have the same underlying demographic structure, in which the large baby boom cohort is perhaps the most salient feature.

Figure 4: Proportion of the Labour Force aged 55 and Over in 2001, Canada and Provinces.



Source: Statistics Canada (2003a), 2001 Census data.

### 3.2 The Potential Costs of an Ageing Population

For many commentators, population and labour force ageing have been significant concerns since at least the early 1980s. Academics, governments, and international bodies have identified potential problems that may result from population and labour force ageing, two of which – the solvency of the Canada and Quebec Pension Plans, and higher health care costs – are not directly related to skill shortages. Concerns about the financial “burden” of societies in which the proportion of older people is growing relative to the working-age population are linked to the associated projections of increased costs for health care and pensions relative to the available tax base. Potentially unfunded liabilities of public pensions and health care systems have raised fears of increased public debt or higher contributions and payroll taxes that, in turn, will result in slower economic growth (England, 2002).

Discussions of this sort in popular books, government and non-government reports, and in academic work often refer to demographic dependency ratios when they predict a looming crisis related to population ageing (Weaver, 1992; Wallace, 1999; OECD, 2000). Table 2 shows how the total dependency ratios and the old age dependency ratios have changed and are projected to change in Canada, the United States, Australia, the United Kingdom, Germany, and the Netherlands. In all of the countries, the old age dependency ratio is higher now than it was in 1971 and will continue to grow until past 2025. Of note, however, is that in Canada the total dependency ratio (the ratio of the working-age population to those aged 65 and over and under the age of 15), is still well below what it was in 1971 and will remain lower until at least 2025. Ontario also has an age structure that is younger than many similarly-sized jurisdictions. The

Institute for Competitiveness, Prosperity, and Economic Progress reports that Ontario's dependency ratio is lower than 14 of 16 similar states and provinces.

Table 2: Estimated and Projected Dependency Ratios of Six Industrialized Countries, 1971, 2000, 2025.

		Canada	Australia	Germany	Netherlands	United Kingdom	United States <sup>3</sup>
Total Dependency Ratio <sup>1</sup>	1971	60.4	61.0	58.4	59.5	58.9	62.2
	2000	46.5	48.8	46.9	46.9	53.2	51.5
	2025	58.0	57.0	58.3	56.8	58.9	58.7
Old Age Dependency Ratio <sup>2</sup>	1971	12.9	13.7	21.7	16.3	21.1	16.0
	2000	18.5	18.2	24.1	30.1	24.1	18.6
	2025	32.6	29.2	39.0	34.3	34.8	29.3

*Notes:*

<sup>1</sup> The number of persons under 15, plus the number 65 or older per 100 persons aged 15 to 64.

<sup>2</sup> The number of persons aged 65 or older per 100 persons aged 15 to 64 years.

<sup>3</sup> Figures for United States (1971) are from 1970 census data.

*Sources:*

OECD(2003a) Statistics Canada (1973); United Nations( 1973, 1980, 2002); Author's Calculations.

This is interpreted as indicating good “demographic health”, but the report indicates that this situation will worsen after 2011 as dependency ratios begin to increase (Institute for Competitiveness and Prosperity, 2002). Similar concerns have also been expressed about Canada's demographic situation.

Concerns about the affordability of pensions and health care have also fuelled inter-generational equity debates in several countries including the United States and to a lesser degree Canada (Marshall, Cooke, and Marshall, 1993) So-called “generational accounting” approaches in the U.S., Canada, Germany, and Australia (Kotlikoff, 1993; Corak, 1998; Auerbach, Kotlikoff, and Leibfritz, 1999) compare transfers between age cohorts and show that cohorts now old have been net gainers of formal transfers, while those cohorts now young can expect to pay out more in taxes and contributions than they will receive in benefits (for an in-depth discussion of the generational equity debate, see Marshall, 1997; Bengtson and Achenbaum (Eds.), 1993). This approach tends to pit the currently young and currently old against each other in a politics of age. Indeed, generational equity was identified as a social issue by Samuel Preston in 1982 in his now classic article, “Children and the Elderly: Divergent Paths for America's Dependents”, in which he argued that in the 1960s and 1970s the social and economic well-being of children in the United States deteriorated relative to the elderly, foreshadowing two decades of intergenerational equity debates and the potential for growing social fractures between generations (Beaujot and Richards, 1996; Van Dalen and Henskens, 2002).

In summary, the populations of Canada and Ontario are ageing, along with those of most other western countries. This has led to concerns over the sustainability of public pensions and health care programs as well as to intergenerational equity concerns. Along with these issues, governments, industry representatives, labour organizations, academics, and various think-tanks have engaged in debates over whether labour force ageing will lead to, or exacerbate, skill

shortages. Before considering these debates in section five, the next section of this report considers detailed descriptions of occupational and industrial age structures in Canada and Ontario as well as occupation-and industry-specific retirement ages.

### **Box 1: Concerns About Population Ageing**

In the 1990s, concerns about the ageing of the Canadian population, as in other industrialized countries, focussed on two issues. These were the affordability of public pensions and a public health care system, and equity in contributions made and support received by older and younger cohorts.

In debates about both of these issues, *dependency ratios* are often used to provide evidence of population ageing as a looming crisis. However, relying on increasing dependency ratios to paint a negative picture of the age structure of populations is somewhat misleading for at least two reasons. First, this falsely portrays older (and younger) people as “dependent” and not contributing either economically or socially to society. As one example, older Canadians provide much of the volunteer work that has become so critical to sustaining communities. Canadians aged 55 to 64 contributed an average 181 hours to the voluntary sector in 2000, compared to an average 167 hours for all Canadian over 15, and represented 28 percent of all volunteers (Hall, McKeown, and Roberts, 2001: 34). Second, it ignores the fact that Canada and Ontario experienced high dependency ratios in the past, and that dependency ratios are currently at a historic low (Gee, 2000; McDaniel, 2003).

Canadian public pensions and health care, although certain to be affected by the ageing of the population, appear now to be less at risk than was thought during the 1990s. Important changes to the CPP/QPP in 1998 added greatly to the sustainability of these public pension plans (OECD, 2003b). The issue of health care is in some ways more complex, but it should be noted that the current problems with funding of health care cannot be attributed to an older population. Furthermore, it is not clear that an older population will necessarily lead to greater health care costs, as previous projections of the “burden” of an older population on health care have been inaccurate (Carrière, 2000).

Arguments about intergenerational equity tend to consider intergenerational exchanges in a rather narrow way (McDaniel, 2002). They often consider only formal transfers, while ignoring the informal transfers, as well as the many other types of linkages between generations. For example, a great deal of concern is expressed over the fact that there will be fewer children in the future to care for ageing parents, yet, over the life course, the balance of private transfers between parents and their children tends to heavily favour children rather than parents (Stone, Rosenthal, and Connidis, 1998). At least in Canada, the proportion of older people who do not have any children for support continues to be small, and most older Canadians continue to live independently, rather than with their offspring (Connidis, 2001: 35). Yet, there are fewer children to look after their parents today than was true in the past, and among those aged 45 to 54, an estimated 14 percent of men and 27 percent of women have reported that they reduced their work hours to meet eldercare demands, according to Statistics Canada’s General Social Survey (Cranswick, 2003: 15). Perhaps the focus on differences between age groups ignores more fundamental bases of inequality differences, such as gender, race, or class (Connidis, 2001).

## 4. Occupational and Industrial Age Structures and Retirement Ages

As a whole, the Canadian labour force has grown older. It is expected that the labour force will continue to grow older over the next decade as more baby-boomers enter their 50s and 60s and fewer younger workers enter the labour force. Although industries and occupations have different age structures, all but a few grew older during the 1990s. As the following sections show, certain industries and occupations stand out as being older than others.

### 4.1 Occupational and Industrial Age Structures

As much as the changing age structure of the total population and the overall labour force has caused concern, the labour force is not homogeneous in terms of age. Rather, different occupations and industries have different age profiles. Age profiles have been flagged by some as providing an indication of potential labour force shortages. Quite simply, older occupations and professions are purported to be at risk of losing a large proportion of their work force due to retirement (Statistics Canada, 2003b). The age structures of occupations and professions are influenced by several processes. Kaufman and Spilerman (1982) have identified some of these processes including the amount of time required for training and the level of physical activity required for a job. As well, some jobs may be associated with normative age-graded progressions with certain jobs identified as “entry-level”, from which workers are expected to move on. For example, many bank employees begin their careers as tellers with the expectation that they will be promoted within the internal labour market hierarchy. The growth or decline of industries can also affect their age structures. Industries that are expanding may be more likely to draw from new labour market entrants who have recently completed training. On the other hand, industries that are contracting may fail to attract young people, and may be left with an age structure that is older than the labour force as a whole.

#### 4.1.1 Age Structures of Canadian and Ontario Occupations

Table 3 identifies some of the occupations that have the oldest age structures and that employ more than 350 workers in Ontario. These occupations are ranked according to the percentage of workers aged 55 and older who were employed in these occupations in 1991 and 2001. Table 3 also presents the ratio of workers aged 20 to 34 to workers aged 55 and older and the percentage of workers aged 55 and over and working in the same occupations in Canada as a whole. Some Ontario occupations had age structures that were much older than the total labour force, and which had become more so in the past decade. For instance, 43.2 percent of *Farmers and farm managers* (I011) were aged 55 and over in 2001, compared to 41.8 percent in 1991. Likewise, 30 percent of *University professors* (E111) were aged 55 and over in 2001, which was 7 percent higher than the proportion aged 55 and over in 1991. However, some older occupations aged more slowly than the labour force as a whole. *Judges* (E011), *Sheriffs and bailiffs* (G621), *Ministers of religion* (E024) and *Other religious occupations* (E216) stand out as having substantially smaller proportions of workers over 55 in 2001 than in 1991. As well, the proportion of *Specialist physicians* (D011) who were aged 55 or over grew less than for the labour force as a whole (.03 percent versus .05 percent).

Table 3: Ontario Occupations in 2001 with the Highest Percentage of Workers aged 55 and Over in 2001.

Occupation (1991 SOC 508)	Ontario					Canada
	Total Labour Force (2001)	Workers 0-34 for each 55+ (2001)	% Aged 55+ (1991)	% Aged 55+ (2001)	Change in % 55+ (1991-2001)	% Aged 55+ (2001)
Total All Occupations	608615	2.66	11.3	11.8	0.5	11.7
E011 Judges	885	0.1	56.6	53.7	-2.9	56.3
I011 Farmers and farm managers	54100	0.3	41.8	43.2	1.4	41.1
G132 Real estate agents and salespersons	25750	0.3	21.2	33.4	12.2	31.6
H512 Tailors, dressmakers, furriers and milliners	7190	0.3	27.8	32.8	5.0	24.0
A011 Legislators	1930	0.4	34.1	32.4	-1.7	36.3
E024 Ministers of religion	10575	0.4	31.6	31.4	-0.2	32.2
E111 University professors	17335	0.5	22.6	30.0	7.4	28.7
H513 Shoe repairers and shoemakers	655	0.7	20.7	29.0	8.3	26.3
C174 Engineer officers, water transport	395	0.9	24.7	27.8	3.1	17.8
B314 Property administrators	13480	0.6	25.8	27.6	1.8	31.3
A222 Accommodation service managers	9965	0.8	22.7	26.7	4.0	25.9
F036 Painters, sculptors and other visual artists	5455	0.7	20.8	26.0	5.2	24.1
G621 Sheriffs and bailiffs	470	1.0	38.2	25.5	-12.7	20.4
H712 Bus drivers and subway and other transit operators	27730	0.5	19.5	25.9	6.4	25.6
I014 Nursery and greenhouse operators and managers	2410	0.8	29.8	25.5	-4.3	22.9
F144 Artisans and craftspersons	7015	0.8	15.7	25.2	9.5	21.5
B317 Court officers and justices of the peace	1975	0.9	31.6	25.1	-6.5	20.6
D012 General practitioners and family physicians	15965	0.8	19.4	24.4	5.0	21.4
D011 Specialist physicians	8885	0.9	23.9	24.2	0.3	24.5
E216 Other religious occupations	2185	0.9	43.8	24.0	-19.8	29.9
A016 Senior managers - Goods production, utilities, transportation and construction	22700	0.4	22.4	23.8	1.4	23.2
A015 Senior managers - Trade, broadcasting and other services, n.e.c.	20295	0.5	20.4	23.0	2.6	21.6
G631 Security guards and related occupations	31370	1.8	28.2	22.9	-5.3	22.7
G982 Ironing, pressing and finishing occupations	1970	0.7	22.7	22.6	-0.1	17.7
C023 Agricultural representatives, consultants and specialists	965	1.2	13.5	22.3	8.8	13.6
I172 Fishing vessel skippers and fishermen	545	1.5	17.9	22.0	4.1	13.8
G933 Janitors, caretakers and building superintendents	74955	0.9	23.3	21.6	-1.7	20.6
E021 Psychologists	4710	0.9	12.6	21.5	8.9	19.9
B111 Bookkeepers	43910	1.0	18.5	21.4	2.9	19.7
F025 Translators, terminologists and interpreters	4230	1.3	11.4	21.0	9.6	15.8
H511 Upholsterers	3170	1.0	15.3	21.0	5.7	21.4
H322 Boilermakers	1160	1.0	21.5	20.7	-0.8	12.8
F021 Writers	9840	1.3	15.7	20.5	4.8	21.4

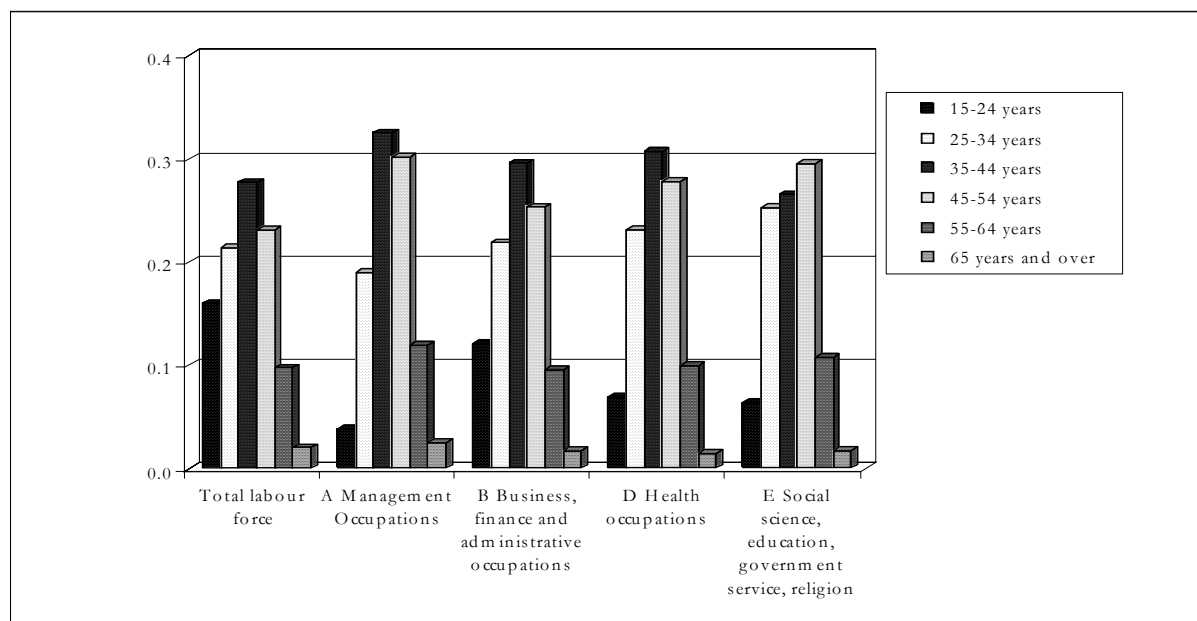
Source: 2001 Census Data, Statistics Canada 97F0012XCB01026.

As Table 3 shows, older occupations are spread across industries, suggesting that all industries have the potential to be affected by an ageing labour force. However, the degree to which the potential loss of workers to retirement creates the likelihood of a skill shortage depends on the types of skill involved in the industry.

#### 4.1.2 Age Structures and Skill Types

The 1991 Standard Occupational Classification groups occupations together by skill types. Occupations requiring longer training times or more experience can be expected to have an older age structure. Using broad SOC91 occupational categories, we can compare the age structures of occupations with similar skill types to the overall labour force, to identify occupational groups which appear to have different age structures than the overall labour market. Figure 5 presents four broad occupational divisions with age structures that were considerably older than the overall labour force in 2001.

**Figure 5: Age Structure of Selected Older SOC 91 Occupational Groups, Canada, 2001.**



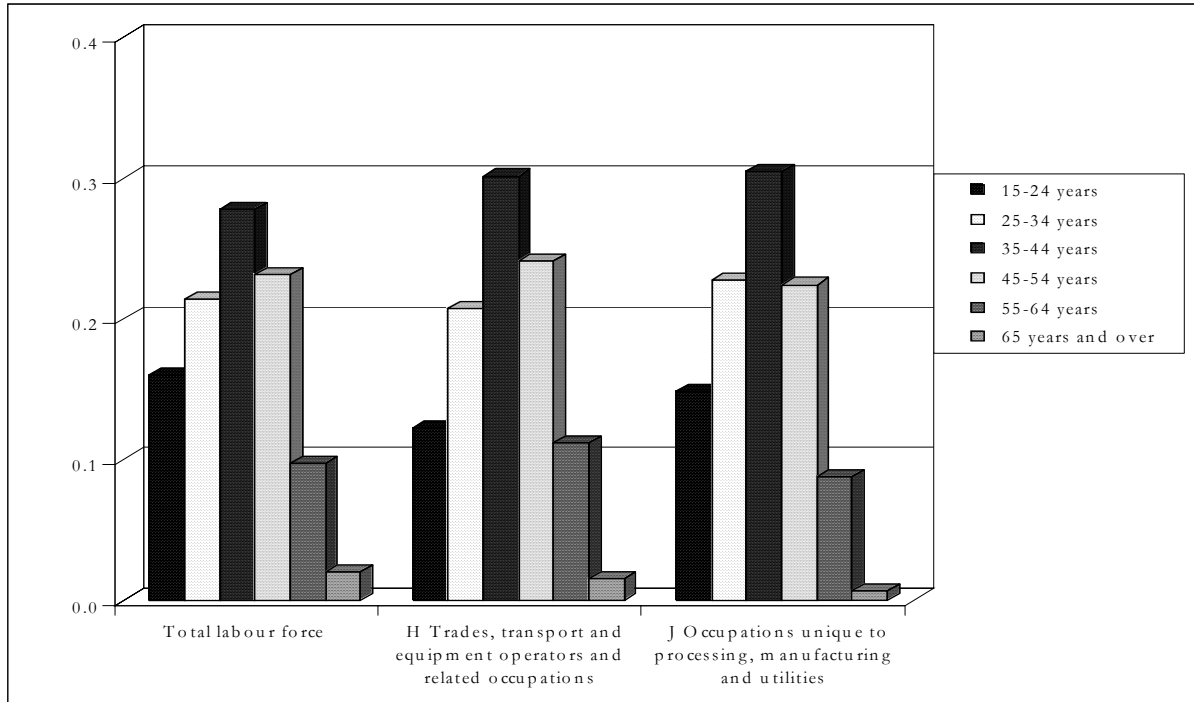
Source: Statistics Canada (2003a), 2001 Census data..

*Management occupations, business, finance, and administrative occupations, and health occupations* had over-representations of workers over 35, relative to the total labour force. Younger workers were under-represented in these occupations, due partly to the education and experience some of these jobs required. Twenty-eight percent of Canadians employed in *health occupations* in 2001 were between 45 and 54 years old, compared to 23 percent of the overall labour force. Over 30 percent of those in *management occupations* were in this age group, as were 25 percent of those in *business, finance, and administrative occupations*. Occupations in *social science, education, government service, and religion* had high proportions of those aged 45 to 54 (30 percent), as well as those aged 25 to 34, relative to the total labour force.

Figure 6 presents two broad occupational divisions in which those in the middle of working life are over-represented, relative to the overall labour force. *Trades and transport and equipment operators, and occupations unique to processing, manufacturing, and utilities* had proportions of older workers that were fairly similar to those in the total labour force. They each had slightly more workers in middle years, from 35 to 44, and somewhat fewer younger workers.

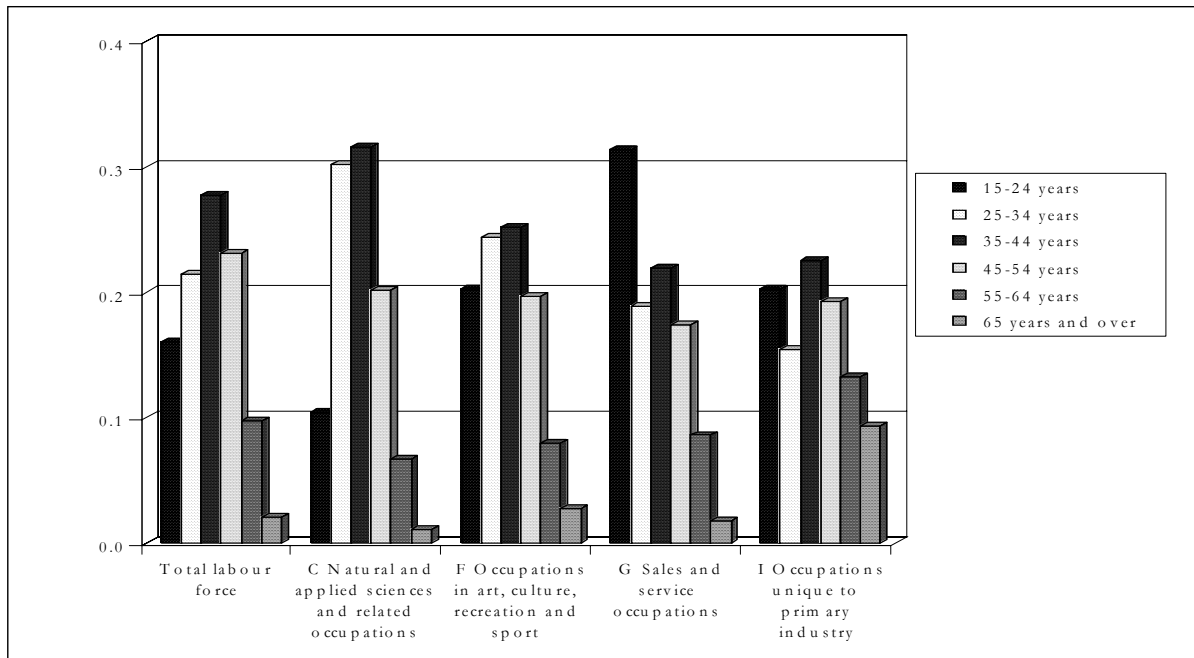
Some occupational divisions are clearly young, relative to the age of the overall labour force (Figure 7). *Sales and service occupations*, for example, had a much higher proportion of workers in the youngest age groups than the overall labour force. Whereas 16 percent of the total labour force was aged 15 to 24 years, 31 percent of Canadians in sales and service occupations were in this age group in 2001. *Occupations unique to primary industry* also had an overrepresentation of those 15 to 24, but also had a higher proportion of older workers than the total labour force. The high proportion of youngest workers may be due to the inclusion of occupations requiring relatively little formal education in these divisions.

**Figure 6: Age Structure of Selected Mid-Aged SOC 91 Broad Occupational Groups, Canada, 2001.**



Source: Statistics Canada (2003a), 2001 Census data.

**Figure 7: Age Structure of Selected Younger SOC 91 Broad Occupational Groups, Canada, 2001.**



Source: Statistics Canada (2003a), 2001 Census data.

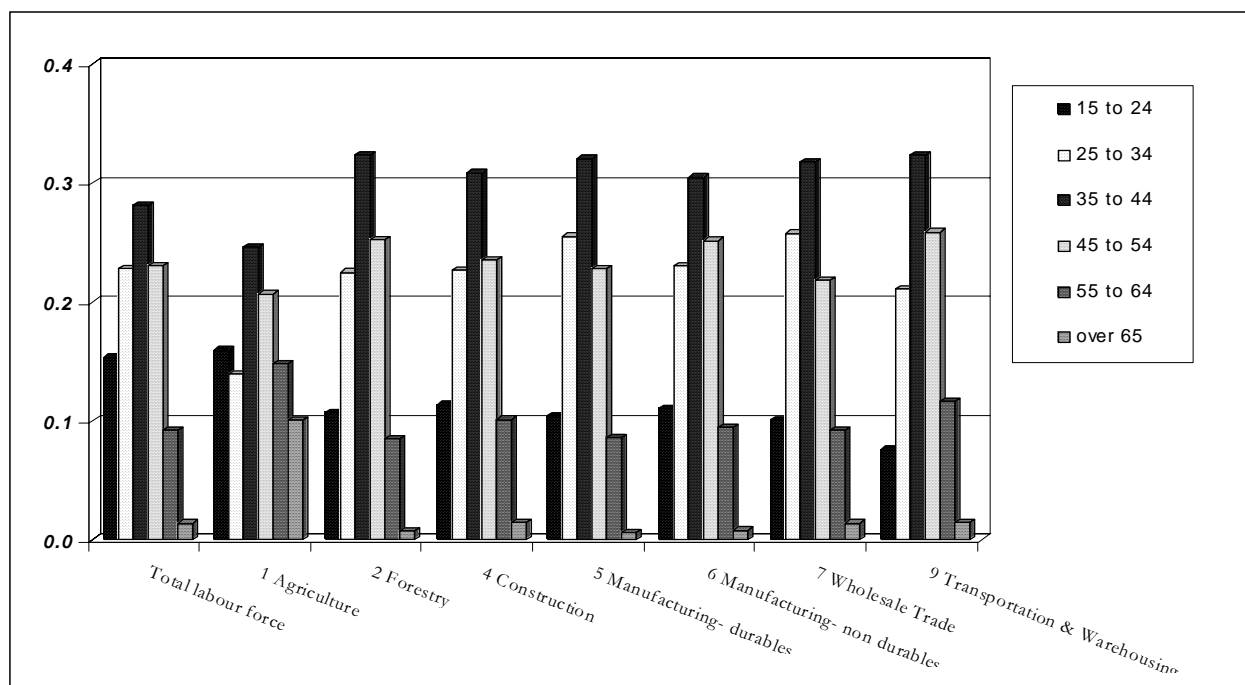
Occupations in *art, culture, recreation, and sport* were also young, with an over-representation of young workers and an under-representation of older workers. *Natural and applied sciences*

and related occupations stand out as having the greatest over-representation of those aged 25 to 34 years. Whereas this age group accounted for 21 percent of the overall labour force in 2001, just over 30 percent of Canadians in the natural and applied sciences were in this age group in 2001. Older workers were under-represented, with 20 percent aged 45 to 54 and 6.6 percent aged 55 to 64, compared with 23 percent and 9.7 percent in the total labour force.

#### 4.1.3 Age Structures and Industries

Industries may also be classified into several typical age patterns. Figure 8 shows the age structure of agriculture, forestry, construction, manufacturing, wholesale trade, transportation and warehousing.

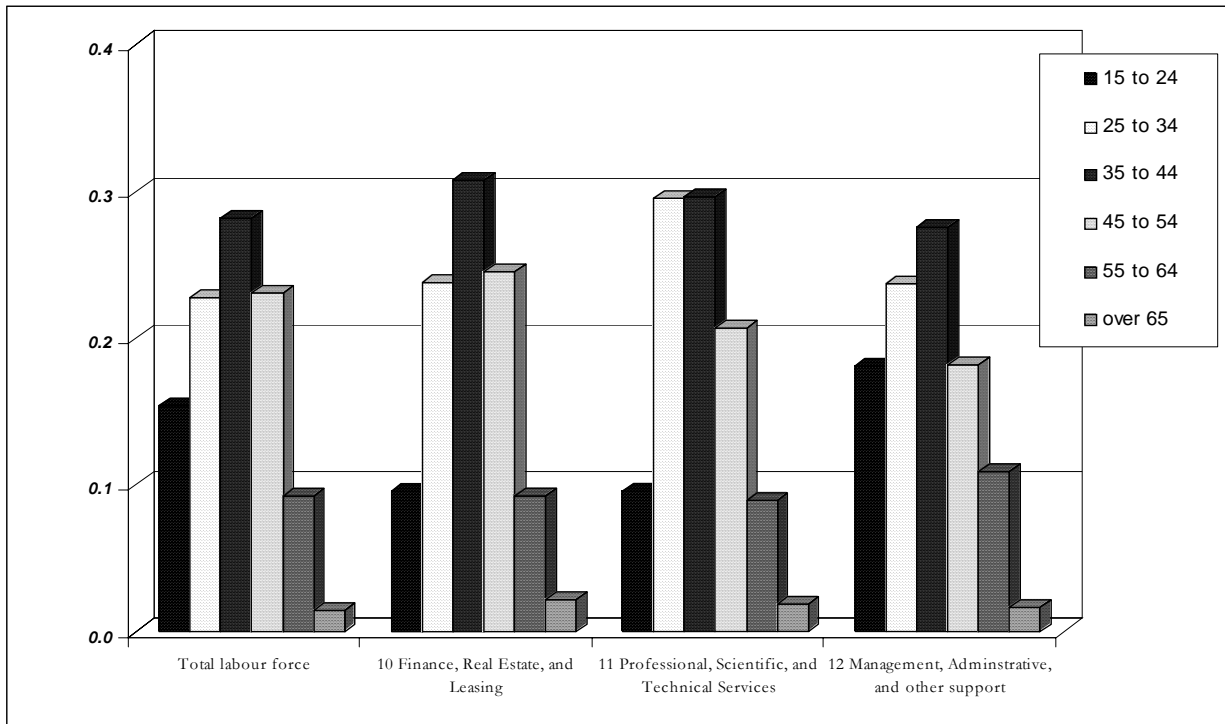
Figure 8: Age Structure of Selected Broad NAICS Industrial Groups, Canada, 2001.



Source: Statistics Canada (2003c), 2001 Labour Force Survey Data.

With the exception of agriculture, the industries in Figure 8 have age distributions that are fairly similar to that of the total labour force, but with somewhat lower representation of the youngest workers, and over-representation of workers in the middle of working life. The agriculture industry again has a particular distribution, with an under-representation of those in their 20s and 30s, but an over-representation of the youngest and oldest age groups. Figure 9 presents professional, management, and finance industries. *Professional, scientific, and technical services* industries, and *management, administrative, and other support* industries had over-representation of younger workers to varying degrees.

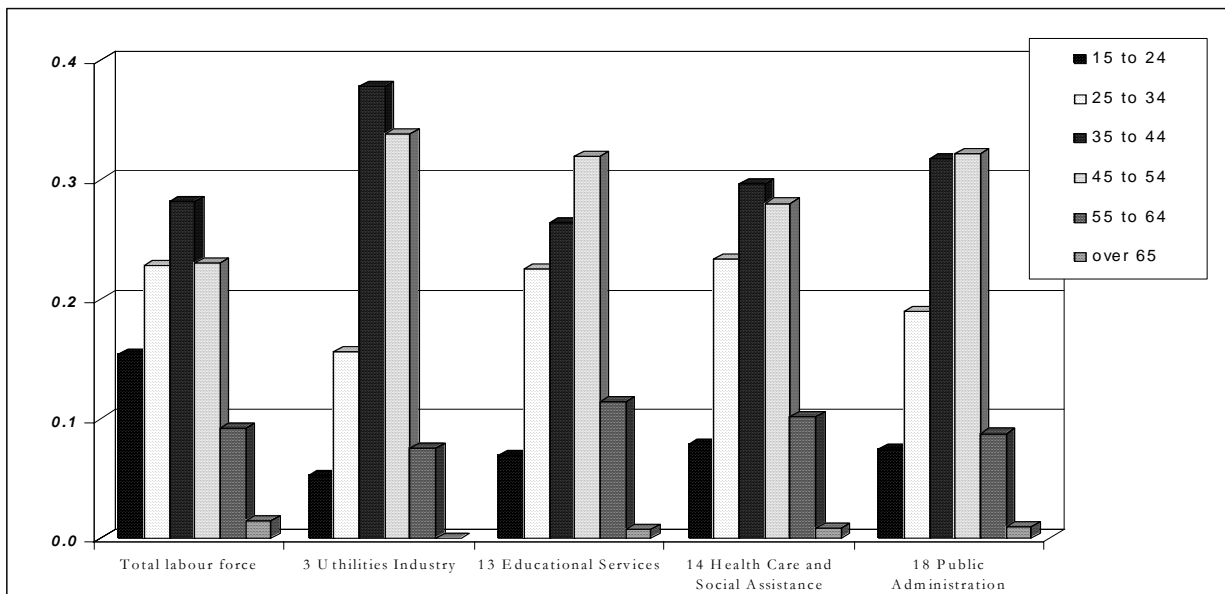
Figure 9: Age Structure of Selected Broad NAICS Industrial Groups, Canada, 2001.



Source: Statistics Canada (2003c), 2001 Labour Force Survey Data.

Figure 10 presents industries which were decidedly older than the total labour force.

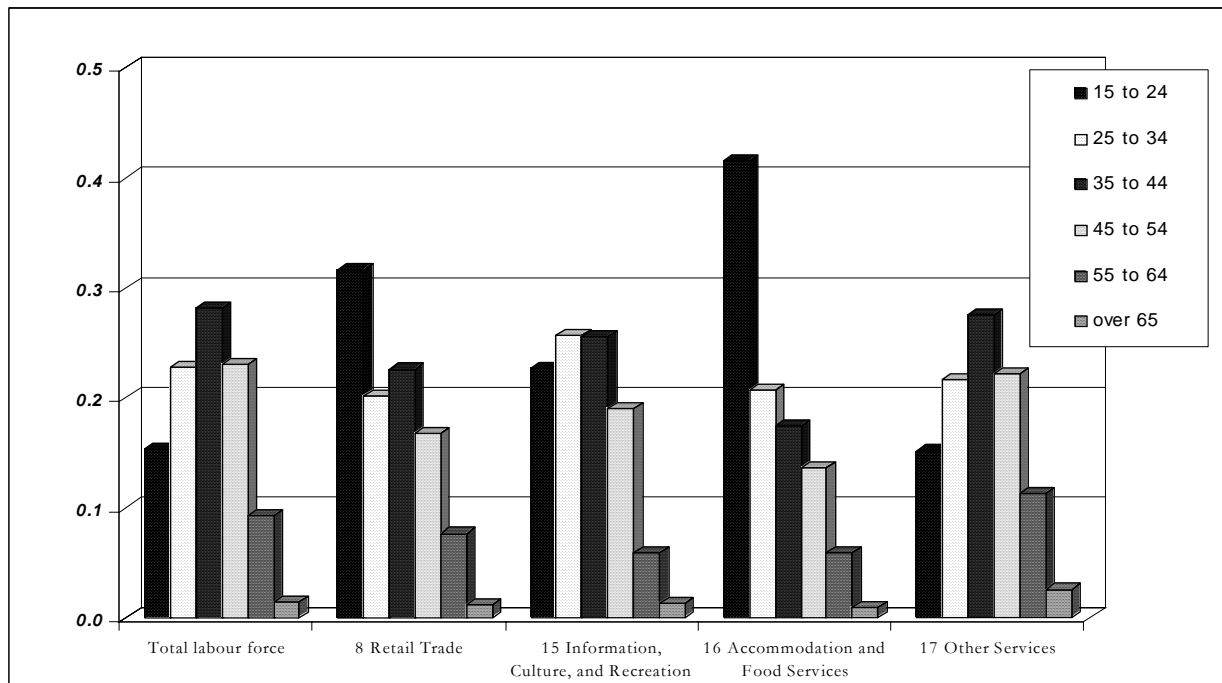
Figure 10: Age Structure of Selected Older NAICS Industrial Groups, Canada, 2001.



Source: Statistics Canada (2003c), 2001 Labour Force Survey Data.

For example, thirty-nine percent of employees in *health care and social assistance* and 44 percent of employees in *education* were aged 54 and over in 2001. This is compared to 33 percent of the total labour force in this age category. The *utilities* industry also had an over-representation of older workers (41 percent) and an under-representation of younger workers (21 percent). On the other hand, there were some industries in which younger workers were over-represented and which had fewer workers in older age groups than the total labour force. Figure 11 presents the youngest NAICS industries in Canada in 2001, including *accommodation and food services, information, culture, and recreation, and retail trade*.

**Figure 11: Age Structure of Selected Younger NAICS Industrial Groups, Canada, 2001.**



Source: Statistics Canada (2003c), 2001 Labour Force Survey Data.

## 4.2 Retirement Rates

The rates at which workers are expected to leave an occupation or industry can, other things constant, affect the likelihood of future labour shortages. Retirement rates are basically a function of age-specific rates of retirement and the age structure of an industry or occupation. The age-specific retirement rates are themselves affected by the conditions of work and characteristics of occupational pensions, the expansion or contraction of an industry, among many other factors (Statistics Canada, 2003b; MacKenzie and Dryburgh, 2003; Pyper and Giles, 2002).

Over the last century there has been a trend toward people spending more years in formal education before moving to full-time work. At the other end of working life, there has been a more recent trend toward earlier retirement and toward lower labour force participation by people above age 50. In 1982, 72.5 percent of Canadian men aged 55 to 64 were active in the

labour market, but this had declined to 64 percent by 2002 (OECD, 1990; OECD, 2003a). However, there is evidence that the trend towards earlier retirement has reversed in recent years (Statistics Canada, 2003b; Quinn, 2003). Statistics Canada reports that women's median age at retirement increased from about 59 to 60 between 1997 and 2001, and may have stabilized. The median age of retirement for men increased slightly between 1997 and 2001, and appears to have stabilized around 62 (Statistics Canada, 2003b). Canadian patterns are mirroring recent rises in median retirement ages found in the United States (Quinn, 2003). There are likely several reasons for this, but of particular note is that workplace policies which encourage early retirement have become less common in recent years than they were throughout the 1990s.

Between 1997 and 2001, several NAICS industrial groupings had median retirement ages that were below the median retirement age for Canadians as a whole. These industrial groupings included *utilities* (56.6 years), *educational services* (57.1 years), *public administration* (58.2 years), *finance, insurance, real estate, and leasing* (60.0 years), and *health care and social assistance* (60.3 years). Broad SOC occupational categories with low median retirement ages included *social science, education, government service and religion* (57.0 years), *management* (60.0 years), *natural and applied sciences* (60.1 years), *health* (60.3 years) and *business, finance, and administrative* occupations (60.3 years) (Statistics Canada, 2003b; 4-5).

Combining information on the median age of retirement and age structure allows those industries and occupations which are at risk of losing large proportions of their workforce to be identified. Using the Canadian Workplace and Employee Survey data (1999), MacKenzie and Dryburgh (2003) identified the *health care* and *education* industries as being at significant risk of losing large proportions of their workforces due to retirement. In 1999, only 12 years separated the median age of education employees from their median age at retirement. This difference was 20 years for health care employees. The *forestry, mining, oil and gas*, and *utilities* industries also had low median retirement ages and older age structures (MacKenzie and Dryburgh, 2003: 6).

Within industries, occupations differ in terms of their projected retirement rates. In general, occupations requiring longer training or more experience tended to have older age structures, potentially putting them at greater risk of large-scale retirement. MacKenzie and Dryburgh identified *managerial* and *professional* occupations as most vulnerable to baby boomer retirement, and this was particularly the case in the *health care* and *education* industries (MacKenzie and Dryburgh, 2003: 9).

### **4.3 Projections of Industrial and Occupational Growth and Change**

Although some industries and occupations may be at risk of large-scale retirement, these risks do not necessarily constitute current or future skill shortages, particularly if an industry or occupation is declining or if the supply of skilled labour in those industries and occupations is expected to grow more quickly than in the past. On the other hand, industries that are expected to see rapid growth may have significant difficulties in filling vacancies even if they have a young age structure and a high median age of retirement. As well, despite high projected retirement rates, *farmers and farm managers* and *forestry technologists and technicians* are unlikely to be in high demand in the future, while *computer systems analysts* and *electrical and electronic engineers* will likely experience high demand but low retirement rates due to a relatively young age structure.

#### 4.4 Summary

As identified using Census and Labour Force Survey Data, there are several occupational groups and industries which appear to be at risk of losing a large share of their workforce due to a combination of low median retirement ages and older age structures. Education and health care industries appear to be particularly at risk with education likely experiencing tight labour markets as early as 2006 with health care services following by around 2009<sup>1</sup>. However, even young industries have complained about coming skill shortages, and as noted earlier there has been a lively debate about the degree to which prolonged skill shortages are currently being experienced. The central issue that needs to be addressed is whether skill shortages will be exacerbated by population ageing. This issue will be considered in the next section.

### 5. The Relationship Between Skill Shortages and Labour Force Ageing

There are different views regarding how the links between labour force ageing and skill shortages should be interpreted. Some have argued that labour force ageing will lead to skill shortages of crisis proportions. For instance, William Robson (2001), in his report “Aging Populations and the Workforce: Challenges for Employers”, talks about the “chronic shortages that loom ahead” (2001: 4) as a result of workforce ageing. This report is an official British-North American Committee (BNAC) statement that was sponsored by the British North American Research Association, the Center for Strategic and International Studies in the U.S. and the C.D. Howe Institute in Canada. Incidentally, these organizations are well known for promoting a view of population ageing that is apocalyptic in tone (see Marshall, 2002). Robson’s argument is simple. In Canada (and in the U.S. and the U.K.) the absolute size of the working age population is expected to decline, which will lead to a smaller labour force overall. Furthermore, the age composition of the labour force will change with employers needing to rely more on older workers now and in the future than was true in the past. According to Robson (2001:58), if employers are not prepared for this demographic transition, “the demographic trends prefigured here will become more than lines on a page. For many employers, they will be little less than a crisis”.

Unlike Robson, others argue that to interpret the relationship between ageing workforces and skill shortages as a pending crisis is to misunderstand the ways in which the economy will seek equilibrium (Foot in Brown, 2003; Cappelli, 2003). One way in which this will occur is through shifts in inputs to production (Mérette, 2002). Mérette, for instance, predicts that a future scarcity of labour, relative to physical capital, will lead to higher wages. However, this will produce greater incentives for investment in human capital, “whose importance as an engine of growth is increasingly being recognized as industrialized countries shift away from resource-based and toward knowledge-based economies” (Mérette, 2002: 3). Hence, labour market adjustments, such as higher wages, will help to alleviate any skill shortages that may result from population and workforce ageing.

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<sup>1</sup> The estimated timing is based on the percentage of workers in the industries who were aged 50-59 in 2001 and current average ages of retirement.

Kuhn (2003) also argues against expectations of a wide-spread labour market shortage but has suggested that future skill shortages are likely to take the form of localized and industry-specific “hot spots”. According to Kuhn, some needs can only be satisfied locally, making geography an important consideration. Also, as the population ages, consumption patterns and preferences can be expected to change which may lead to unanticipated demands for labour (Foot, 1998; Kuhn, 2003).

Finally, some argue that employers and governments will take proactive measures to fend off labour market shortages. These writers predict that adjustments to retirement age and more flexible employment options for older workers will prevent labour shortages (Foot in Brown, 2003; Cappelli, 2003). Similarly, a recent HRDC report is generally optimistic, reporting that any potential skill shortages may be handled by employers’ re-thinking work arrangements and emphasizing recruitment and the retention of older workers (HRDC, 2002).

Because skill shortages can be affected by a number of factors and processes besides population ageing, predicting future skill shortages is a difficult business. Hence, it is important to consider labour force ageing alongside the institutional processes, (e.g., training times, pension policies) which are likely to have important effects on the supply of skills and on the ability of employers and workers to adjust to excess demand. In the next section, we present four occupations in Ontario to show the ways in which labour force ageing *combined* with other structural factors may affect the potential for skill shortages in the future within these occupations.

## **6. Structural and Institutional Factors and Processes Affecting Skill Shortages**

Within many industries and occupations the retirement of members of the baby boom cohort is linked to the fear that a large number of workers will leave the workforce within a short time span, (beginning as early as 2006 in the education industry but varying greatly depending on the industry and occupation) resulting in a shortage of workers with job-specific skills. Although labour force ageing may affect skill shortages, there are many other factors and processes that contribute to the supply and demand of labour in Canada and Ontario. Based on our review of the research, we do not expect that population and labour force ageing will lead to generalized labour force skill shortages. However, it does seem likely that there will be “hot spots” of acute skill shortages, localized in terms of geography and industry or occupation (Kuhn, 2003). Earlier, we identified several older industries and occupations that are at risk of high retirement, and that may find it difficult to replace retirees. However, this risk may interact with other institutional factors, including the length of training and its cost, institutionally controlled wages, a lack of substitutes for labour, and others process to create specific, localized skill shortages. The processes that contribute to a skill shortage or prevent the labour market from adjusting to excess demand may also include ageism and barriers to the increased activity of older workers. As well, there may be important differences between public and private sector occupations in their abilities to respond to skill shortages by raising wages or by planning for future needs.

In this section we have chosen four examples of occupations and industries in Ontario in order to illustrate the ways in which structural processes and the age structure of occupations and

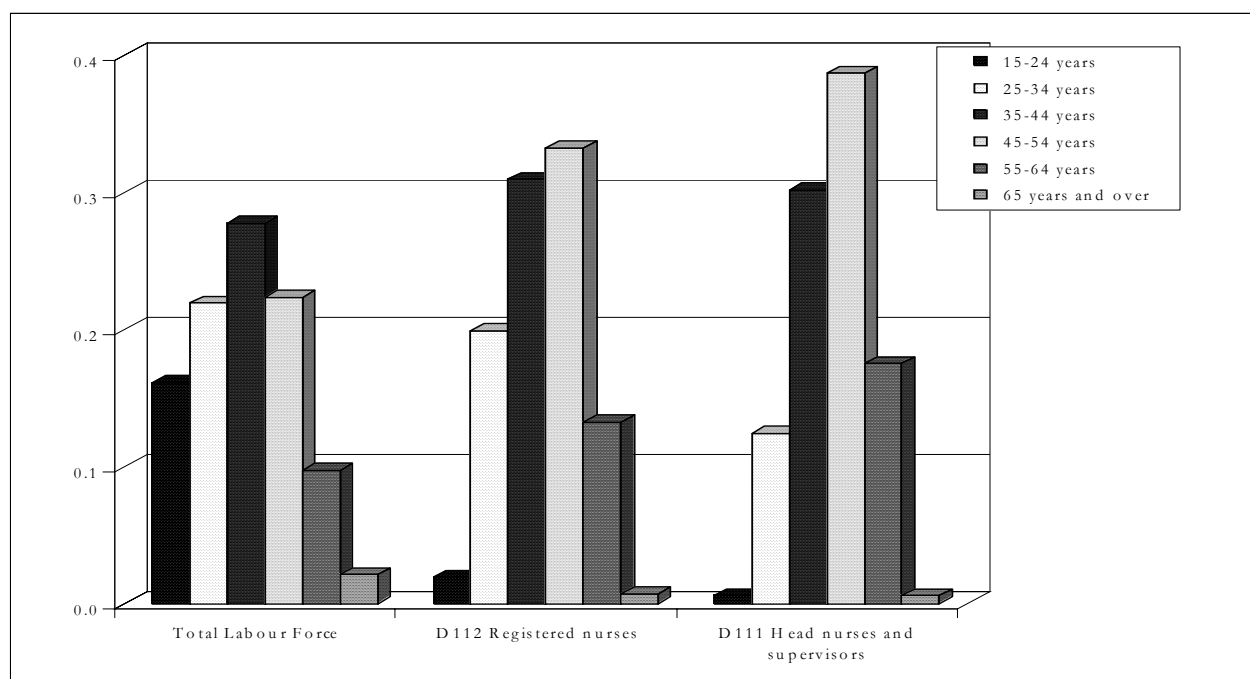
industries influence current or future skill shortages. They were selected to represent a range of older, middle-aged, and younger age structures, to reflect their importance to Ontario's economy or public service and to demonstrate the complex array of factors that are associated with skill shortages. Occupations in nursing, the manufacturing industry, the information technology (IT) industry, and biotechnology industry were selected.

## **6.1 Nursing in Ontario**

The health care industry is one in which there appear to be real labour and skill shortages. The evolution of the Canadian health care system is creating significant challenges for the sector and for policy initiatives. Central issues discussed below include funding and delivery models, as well as important human resource issues. Demographic trends combined with growth in demand for skilled health care professionals suggest that skill shortages are, and will continue to be, a serious issue in this industry (CLBC, 2002). Indeed, much of the industrialized world is facing a nursing shortage (O'Brien-Pallas, Alksnis, and Wang, 2003). In Canada, the situation is aggravated by the pending retirement of the baby boomer cohort, health system restructuring, changing work environments, and competition from other career opportunities. Nearly one-third of *registered nurses* in the Canadian workforce are 50 years of age or older. The number of *registered nurses* employed in the nursing profession increased by 1.1 percent, from 227,656 to 230,261 workers, between 1997 and 2001. This low growth rate was less than that of the population, and the result is fewer RNs per person in 2001 than in 1997. (O'Brien-Pallas, Alksnis, and Wang, 2003).

Nursing, along with other occupations in health care, is an older occupation. Figure 12 shows the age structure of Registered Nurses in Ontario. About 47 percent of *registered nurses* were over 45 in 2001, compared to 35 percent in the overall labour force.

Figure 12: Age Structures of Nursing Occupations in Ontario, 2001.



Source: Statistics Canada (2003c), 2001 Labour Force Survey Data.

Among *head nurses and nurse supervisors*, 56.8 percent were over age 45. This older age structure combined with a low retirement age has led to high retirement rates for nurses. Provincially, Ontario and Quebec have been identified as most at risk of a retirement-related nursing shortage in the near future, while Alberta and the Atlantic region will experience the least severe losses. An increasing proportion of these registered nurses are retiring early, many by age 56. Projecting retirement rates based on a median retirement age of 56, projections suggest that Canada will lose 28 percent of the 2001 registered nursing workforce by 2006 (O'Brien-Pallas, Alksnis, and Wang, 2003).

At the same time as the nursing profession is facing high retirement rates, the demand for health care is growing, and is expected to continue to do so. An ageing population is expected to create more demand for nursing in particular (O'Brien-Pallas, Alksnis, and Wang, 2003). One aspect of the demand for health care is that, in general, it is satisfied locally, as patients are likely to be treated near to where they live. For that reason, shortages of nurses may be localized geographically such that even if demand for nurses is met in Toronto or other large cities, hospitals in smaller centres may have difficulty attracting employees.

In Canada, health care is largely delivered through the public sector, which faces particular challenges in attracting new workers. In particular, public sector managers are less able to increase wages in order to attract new workers (CLBC, 2002). An ongoing debate over the funding of health care in Canada suggests that dramatic increases in the wages of nurses are unlikely in the short term. As well, whereas one response to labour shortages in the private sector is to increase the amount of capital per worker, this is less likely to occur for nurses who are mostly employed by the public sector.

Nurses also work in a changing environment in which new skills are often needed in response to new technology and procedures. However, the concerns about a shortage of nursing skills appears to be more quantitative than qualitative, and are focused on the lack of people entering the profession, rather than a lack of skills among current workers.

The job related stress associated with the nursing profession makes it difficult to attract new workers and to retain existing ones. Health care sector employees have experienced increasing workloads that often result in problems balancing work and family life (CLBC, 2002, Lowe, 2002; Maxwell, 2003; Fooks and Maslove, 2004). This human resource issue may be most problematic for the predominantly female sector and the nursing profession. Today, women are still responsible for the majority of family and household work. Increased workloads make the sector and the profession less desirable for current and prospective employees. Furthermore, there is considerable demand for nurses in the United States, where higher compensation within a private industry attracts Canadian nurses.

At a time that the nursing profession is having difficulty attracting new nurses to its ranks, the educational requirements for new nurses have increased. Until recently, the profession provided both diploma and degree entry paths. Policy changes by the provincial government and the Ontario College of Nurses will remove the diploma registered nurse pathway by 2005. All new nurses in Ontario will require a baccalaureate degree as entry level education (CNO, 2003). This has had the effect of increasing training times but also may have added a financial barrier to new entrants. As well, the requirement of a university degree may place nursing in competition with other professions such as occupational therapists for the same pool of applicants.

In summary, the age structure of the nursing occupation in Ontario puts it at great risk for near future labour shortages. However, this is not the only factor that is at issue. The nursing profession in Ontario is one in which current shortages have been identified, is at risk of high retirement rates, and which seems likely to experience increased demand in the future as the population ages. Barriers to the adjustment of this labour market which may lead to skill shortages include an inability of wage rates to rise, long training times, the inability to attract new workers and retain existing employees due to stress and other unattractive features of this occupation (e.g., shift work) and competition from jurisdictions in the United States.

## **6.2 Skilled Trades in Ontario's Manufacturing Industry**

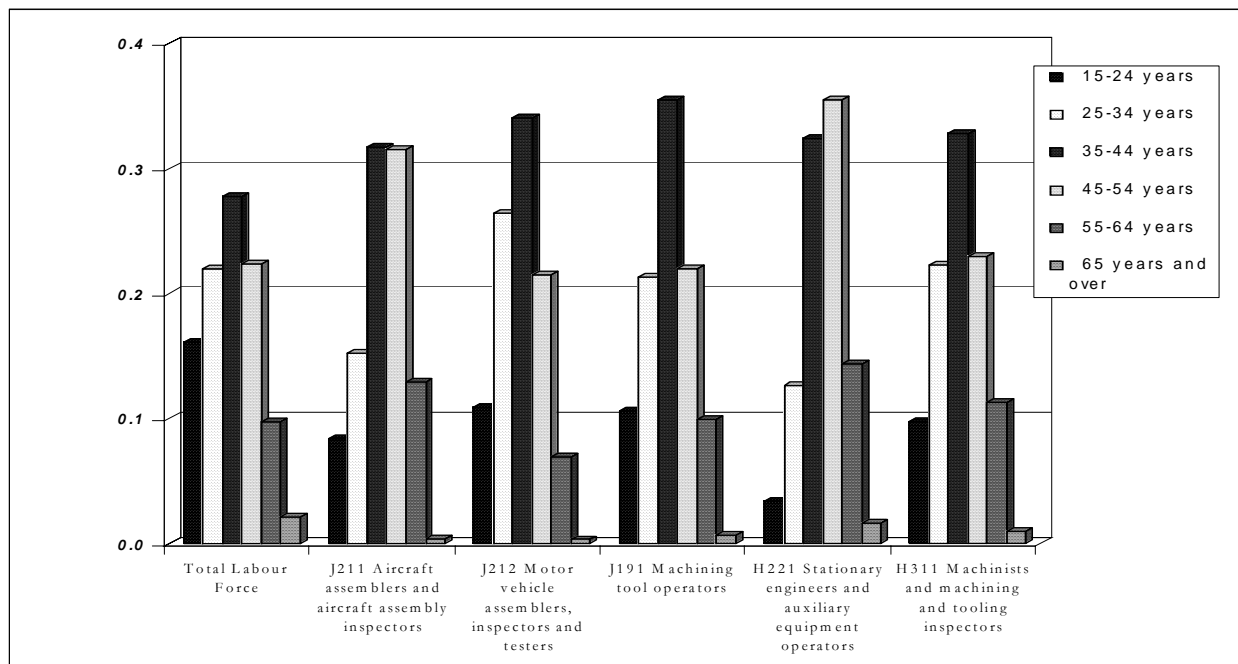
Manufacturing has been, and continues to be, the engine that drives large sectors of the Canadian economy, and the automotive and aerospace industries are large employers of skilled workers in Ontario. The automotive sector, including vehicle assembly and parts production, is Canada's largest manufacturing industry and a mainstay of the Ontario economy. With 16 percent of North America's production of assembled automobiles in 1997, this Canadian industry employs 160,000 people, of whom 40 percent hold post-secondary certifications or degrees. Canadian automotive vehicle assembly is dominated by large, multinational corporations operating 29 assembly plants. The auto parts sub-sector has production spread over more than 550 plants. While some parts manufacturers are large, 72 percent have less than 50 employees. In Canada, the aerospace industry employs more than 64,000 workers, produces 5 percent of the global output, and is dominated by multinational firms. Like the automotive sector, a handful of larger assembly firms are supported by 1,000 or more small firms (ACST, 2000). Canada's auto

industry has fared well in the 1990s, coping with pressures from globalization, and technological and regulatory change. Aerospace manufacturing experiences a more cyclical business pattern and faces stiff competition from U.S.-based firms for both engineers and skilled trades-people. When there is a downturn, the challenge is in retaining the skilled employees and generating the revenues to pay for them (ACST, 2000).

The SIC-1980 broad industrial groupings that include skilled tradespeople working in manufacturing, had an age structure which was similar to that of the overall Ontario labour force in 2001. However, specific occupations and trades in these industries had older age structures, with supervisors and engineers and skilled trades having the highest proportion of workers near retirement ages (Figure 13). For example, *motor vehicle assemblers, inspectors, and testers* (J212) were relatively young in 2001, with only 28.7 percent of the labour force aged 45 or older. *Aircraft assemblers and aircraft assembly inspectors* (J211) had a considerably higher proportion of workers in this age category (44.8 percent).

*Machinists and machining and tooling inspectors* (H311) and *machining tool operators* (J191) had proportions aged 45 and over that were similar to that of the overall labour force, and *stationary engineers and auxiliary equipment operators* (H221) were considerably older, with 51.5 percent aged 45 and older. Given these age structures some have voiced concern about the effect of retirement on the availability of skilled tradespeople in the manufacturing industry (ACST, 2000).

Figure 13: Age Structure of Occupations in Manufacturing in Ontario, 2001.



Historically, manufacturing industries have been affected by cyclical trends in the economy. Recent trends in globalization and Canada's involvement in NAFTA has resulted in increased competition, industry mergers and rationalization, and compressed product development cycles. These issues are forcing manufacturers to improve and upgrade their technology and processes.

The result of the application of new technologies in the sector has increased the demand for skilled workers (ACST, 2000). As well, auto industry output has been growing quickly in recent years, so it is not surprising that the sector reports problems recruiting or retaining people with technical skills and knowledge. However, these industries are sensitive to business cycles and the automotive industry in particular is sensitive to changes in consumer demand. Increased competition from other jurisdictions also has implications for the demand of Canadian manufacturing industries for skilled workers (Statistics Canada, 1999). For example, if a product can be made for less money in a developing country than it can in Canada, skilled Canadian manufacturing jobs may be lost, all else being equal.

The supply of skilled-trades workers is affected by the length of time required for an apprenticeship. The automotive industry anticipates that retirements over the next two to seven years will result in a shortfall of skilled tradespeople, and that existing apprenticeship and training programs will not produce skilled workers quickly enough to counterbalance the expected retirements (ACST, 2000). However, this may be improving. Whereas there was a dramatic reduction in the number of Canadians completing apprenticeships in the 1990s (Stoll and Baignee, 1997), this appears to have changed recently (Statistics Canada, 2003b). Registrations in industrial and mechanical trades increased 30.4 percent between 1995 and 2001 (Statistics Canada, 2003c). Still, although registered apprenticeship training may be increasing, other types of trade, and vocational, and preparatory training appear to be declining (Statistics Canada, 2003c).

One of the issues that has been identified is a lack of investment in training by employers in the automotive industry (O'Hagan, 1999). This may be especially the case among the many small-to-medium size enterprises (SMEs), who have fewer resources and are less likely to have well-developed in-house training programs. SMEs may also be concerned about losing trained workers, and their investments in them, to larger firms in the automotive and other manufacturing industries (O'Hagan, 1999).

The length of time it takes to complete trades apprenticeships is an important barrier to the increased supply of these skills in the labour market. Typically, apprenticeships range from two to five years, although many last longer (Statistics Canada, 2003c). This is a considerable undertaking in terms of cost and time for those interested in this type of work, and these factors may be barriers to increased participation in the skilled trades (Sussman, 2002). However, whereas the automotive sector relies principally on established apprenticeship programs for its skilled workers, aerospace producers have worked hard to establish, and now profit from, innovative degree and diploma programs developed jointly with universities and community colleges, including co-op and full-time programs to improve the supply of skilled aerospace tradespeople and technologists, and to improve management and supervisory skills. Unions have also been heavily involved in basic skills upgrading for current workers (ACST, 2000).

Particularly after World War II, Canada historically received many immigrants from Western Europe who were a source of supply for skilled-trades jobs. Now, changing immigration policy and demographics have meant that immigration is no longer a significant source of skilled-trades workers (ACST, 2000). However, wages in the Canadian manufacturing industries remain high (Statistics Canada, 1999), suggesting that these industries are not likely to suffer from the movement of workers to other jurisdictions.

In general, there has been concern that the manufacturing sector in Canada has suffered from a shortage of skilled trades, and that this will continue in the future. However the retirement rates for this industry do not suggest that it is particularly at risk to large scale retirement. One of the important barriers to increased supply in these occupations may be the length of time and cost of apprenticeships, the costs of which are borne by both workers and employers. Of course, reducing the time of training programs is only one factor in a complex process. Wages, benefits, and the nature of the work itself all contribute to an individual's decision to enter a particular field. Nonetheless, the example of the aerospace industry suggests that creative training strategies that are flexible and respond to changing labour market circumstances may help to curb skill shortages.

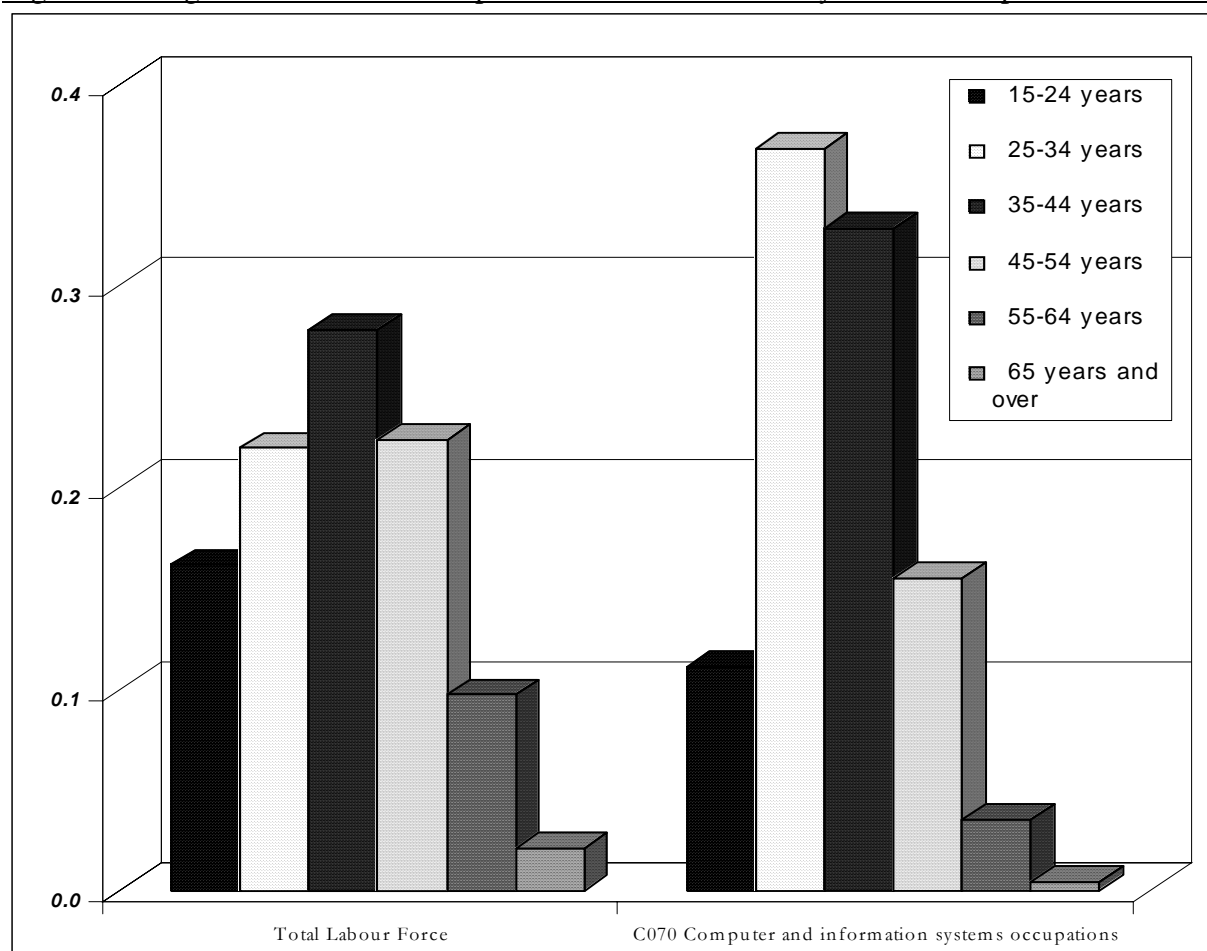
### **6.3 Information Technology Occupations**

Information technology occupations can be found in information and communication industries and also in many other industries including manufacturing, education, business and finance, and the service sector (Wolfson, 2002). Various occupations with a broad range of skill levels, from data-entry clerks to computer engineers have been included in various definitions of IT work (Duerden Comeau, 2003). Including the computer, information, and communication industries, information technology has experienced a high rate of growth in the past two decades, with the information technology sector growing in 2003 at four times the rate of the entire economy (Burleton, 2003; O'Neil, 2003). The Advisory Council on Science and Technology reports that in 1997 the total sales reported by Canadian IT companies reached \$100 billion (ACST, 2000). Including IT workers in all industries, much of the IT employment in Canada is in Ontario. For example, in 2001, there were 203,430 Ontarians employed in *computer and information systems* occupations (C070), representing over 50 percent of all Canadians in this occupational group in that year (Statistics Canada, 2003b).

The age structure of IT occupations is younger than the overall labour force, suggesting that there is no imminent danger of a skill shortage due to retirement. Figure 14 compares the age structures of *computer and information systems* occupations (SOC 91 C070) to the overall Ontario labour force.

Thirty-six percent of those employed in these occupations were between 25 and 34 years old, compared with 22 percent of the total Ontario labour force. As well, only 3.5 percent were aged 55 to 64, compared with 9.7 percent of the total labour force.

Figure 14: Age Structure of Computer and Information Systems Occupations in Ontario, 2001.



The growth and rapid pace of technological change appear to be the factors most directly leading to the increased demand for skilled IT workers. The high rate of growth in these occupations and the rapid pace of change led to industry concerns of a shortage of skilled information technology workers in many countries, especially during the late 1990s (Stager, 2001; ITAC, 1999; SHRC, 2003). Even after the decline in the IT sector in 2001-2002, the Information Technology Association of Canada reported high demand for product-specific technical skills in network and database administration (ITAC, 1999; 2002). However others have reported that the supply of technical skills to the IT sector appears to have kept pace with demand, and that much of the concern that IT employers have reported is difficulty recruiting senior-level people who combine a solid technical background with experience and management skills, such as project management, strategic planning, marketing and business writing (ACST, 2000). Indeed, this suggests that even in industrial and occupational groups that have young age structures, age-related skill shortages might still occur. If experienced, older workers in IT are approaching retirement and have skill sets that are in great demand, they may be difficult to replace.

Factors potentially affecting the supply of skilled IT workers include the length of training period and the easy mobility of much IT work, as well as the possibilities of barriers to the employment of women and older workers in these industries. The educational track of many IT workers

includes retraining in response to the development of new products and technologies, often including manufacturer-specific training as well as college-level programs. It has been suggested that Canadian IT employers do not invest sufficiently in training their employees to the degree necessary to keep their skills current, but rather leave employees to supply their own training. This training is often expensive, and there are reports that some movement of IT workers to the U.S. is due to the greater willingness of U.S. firms to offer training (ITAC, 2002: 11). As well, the size of Canadian firms may affect their ability to attract and retain workers, and to provide training (ACST, 2000).

As with nursing, concerns have been expressed about the movement of skilled IT workers to the United States, primarily in search of higher salaries. However, the reality of the “brain drain” remains very much in doubt (Stager, 2001). It does appear that IT workers might be more mobile than other employees, partly because the labour force is predominantly young and male (Wolfson, 2002). However, the IT workforce also benefits from a large number of immigrants, skilled in IT occupations (Stager, 2001). Citizenship and Immigration Canada, Industry Canada, HRDC, and the Software Human Resource Council collaborated to develop a pilot project which streamlined the entry of workers whose skills were in high demand in the software industry (Citizenship and Immigration Canada, 2003). The success of this project may lie in the international comparability of IT skills and qualifications. However, the relative mobility of IT work and workers may also result in companies moving IT work offshore in response to perceived skill shortages in Canada, and there is some evidence that “outsourcing” is increasing (MacMillan, 2003; Konrad, 2003).

In summary, although it does not appear that an IT skill shortage related to population ageing is likely, it is possible that the age and sex structure of IT occupations may lead to potential problems for the responsiveness of labour supply to the increased demand for skilled IT workers. Several studies have identified various barriers to increased participation by women in IT work and IT-related education (Hughes, Lowe, and Schellenberg, 2003; Cukier, 2002), and there is evidence that the representation of women in IT is declining (Stager, 2001: 17). Furthermore, the age structure of information technology may identify a degree of ageism and over-valuation of youth in IT work (McMullin and Cooke, 2003). Barriers to the participation of women and older workers in IT can only reduce the pool of potential IT workers and raise the potential for shortages in the future.

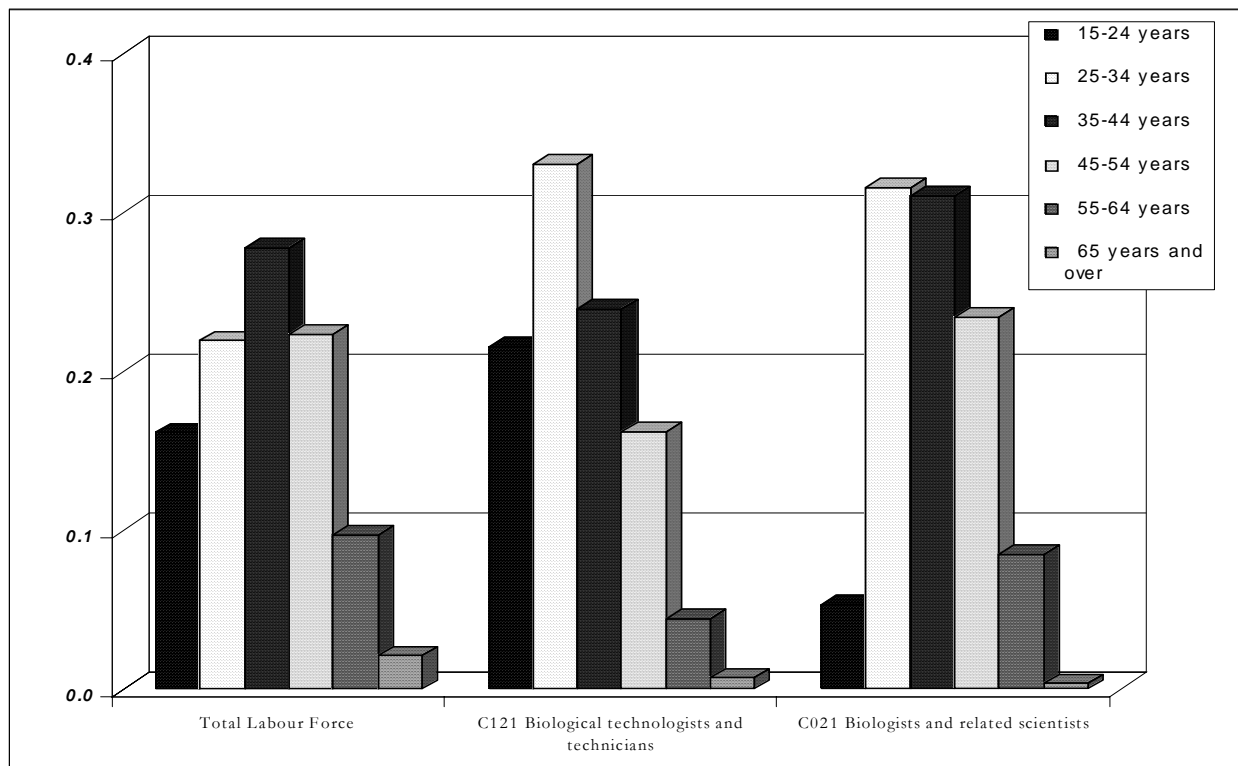
#### **6.4 Occupations in Biotechnology**

Biotechnology is an emerging industry in Canada, and is a good example of the new workplace demands for individuals with both management and technical skills. Biotechnology in Canada involves nearly 300 firms, with more than 70 percent of these firms having fewer than 50 employees. Bio-pharmaceutical companies form the largest and fastest-growing segment of Canada’s biotechnology industry, and account for one half of the sector’s current employment and product sales. This is closely followed by agri-biological products, aquaculture, and forestry products (McNiven, 2001). In 1997, Canadian biotech firms produced five percent of the \$22-billion in global production and had an annual growth rate of 25 percent (ACST, 2000). In terms of employment, Canadian biotechnology companies grew by 95 percent from 1997 to 2001, when they employed more than 62,000 Canadians. Quebec experienced the highest rate of growth, followed closely by Ontario (Statistics Canada, 2003d).

In 2001, the largest categories of employees in biotechnology companies were scientific/research direction employees and technicians/engineering employees, both generally requiring university degrees or advanced degrees (Statistics Canada, 2003d). There has been some concern expressed about a lack of skilled employees in this high-growth sector (Groote, Hough, and Walker, 1999). However, other studies indicate that concern has mainly been about a lack of employees who combine technical and management skills (ACST, 2000).

Figure 15 describes the age structures of *biological technologists* (C121) and *biologists and related scientists* (C020) in Ontario in 2001. Both of these occupations have over-representation of young workers, and the somewhat older age structure of biologists is likely due to the time required to attain an M.Sc. or Ph.D. degree.

Figure 15: Age Structure of Biotechnology Occupations in Ontario, 2001.



However, because the average age of retirement in professional, scientific, and technical industries was higher (age 64.6) than that of the entire labour force in 2001, the risk of skill shortages due to retirement in these “older” industries is likely quite low (Statistics Canada, 2003b).

The growth of this industry led to increased demand for skilled workers. Biotechnology is extremely science and research-intensive, with more than half of the work force involved in research and development (Statistics Canada, 2003d; McNiven, 2001). As with information technology, changing technologies in biotechnology seem likely to drive requirements of changing skills. As well, because much funding for research and development comes directly or

indirectly from the federal government, particularly for smaller firms, government expenditures have an important effect on the demand for skilled workers in this industry.

Although biotechnology and information technology are both growing in Canada, and both require rapidly changing technical skills, they differ in the level of education of their core employees, and the sources of that education. Whereas much of the demand for skills in the IT sector is mainly for those with college-level technical skills or technical qualifications (Wolfson, 2002), the larger importance of research and development in biotechnology makes university degrees more important in that industry.

Despite the length of time that it takes to train people to the levels required by the biotechnology industry, there appears to be less concern about a widespread skill shortage than in the information technology industry. Biotechnology companies appear to be able to meet some of the demand for highly skilled employees through immigration (Groote, Hough, and Walter, 1999; ACST, 2000). In part, this may be because demand for graduate-level education requirements combined with management skills and experience cannot be met by current organizational training programs in Canada (ACST, 2000).

In summary, the Canadian biotechnology industry is a small but rapidly growing industry which employs highly-trained workers. This industry does not appear to be particularly at risk to skill shortages due to high retirement rates or the age structure of key occupations. However, industry groups indicate problems finding Canadian employees with the level of management and technical experience they demand, but this may be partly because of the highly specialized nature of these requirements and the young age of this industry. Immigration appears to be effective in meeting demands for highly skilled workers in this industry. However, the demand for experienced employees does suggest that efforts to retain older workers could also help meet demand.

## **6.5 Lessons learned: The Age Structure of Workforces, Institutional Processes, and Skill Shortages**

The examples of the nursing, skilled trades in manufacturing, information technology work and biotechnology in Ontario illustrate that labour force ageing combined with several different institutional processes will likely affect the experience of skill shortages in the future. *Labour force ageing* and the possibility of high retirement rates seems particularly relevant for nursing. With its older age structure and relatively young average age of retirement, nursing is likely to experience a retirement-related shortage of skilled workers in the near and into the distant future. Nonetheless, the ageing of the labour force is only one of many processes that influence current and pending shortages. For example, in nursing, workplace stress has led to difficulties drawing younger people into the profession, as well as to low average retirement ages. Furthermore, high-growth industries can experience perceived shortages even with a young age structure, as in the case of IT workers.

The *length of time required to train* for an occupation and *training costs* are also important supply barriers (Sussman, 2002). This is particularly the case when the cost is borne by employees. The examples of skilled trades in the automotive and aerospace manufacturing industries suggest that retraining by employers and co-operative educational programs may help

to alleviate future shortages. In the case of apprenticeship training programs, employers invest in on the job training knowing that employees may change jobs when the apprenticeship is completed. Thus, the supply of workers may be hindered by employers not wanting to invest in apprentice workers. What is needed are creative and flexible training programs that are able to quickly change with the ebbs and flows of labour markets.

Occupations differ in the ways in which *geographic mobility* of people and work can affect a skill shortage. Demand for nurses is likely to be felt acutely at the local level, while information technology work can be easily moved. They also differ in the extent to which skill shortages can be addressed by *immigration policies*. Some industries, such as biotechnology and information technology, appear to be amenable to addressing skill shortages through immigration. A supply of immigrants with the required skills and a fair amount of international consistency in qualifications may help in this regard. On the other hand, excess demand for skills may also lead to the mobility of work, such as in IT, to areas with more available labour.

While many employers have identified what they perceive as skill shortages within their industries, there may be *characteristics of some occupations* and industries which make it difficult to attract or retain workers. If work offers little flexibility, is stressful, or more generally does not offer a good work environment, workers will be more likely to opt for early retirement. Of course, these issues are of particular concern for older workers, whose retention has been identified as a major goal of policies to address the ageing labour force (OECD, 2000; Taylor, 2002). Both employment and public policies may be important in this regard.

The underlying message here is that labour force ageing is only one of many factors that affect the supply of and demand for labour. More important, it seems, is the nature of the work itself. Is it portable? Has there been a lot of international competition in the industry that has led to rationalization and reductions in the number of workers? Is the industry growing? Are there age related barriers in a particular occupation that push older workers out? Is the length of training required to do a job reasonable given the nature of the job itself? Very telling is the fact that nursing occupations are not identified as among the oldest occupations in Ontario and yet are among the most likely to have very high cumulative retirement rates in the next decade (O'Brien-Pallas, Alksnis, and Wang, 2003). Alternatively, other occupations may be older, but may not be at risk of high retirement rates because their average age of retirement is higher. The point is that if labour market policies are to effectively deal with skill shortages the complexity of all of these factors must be considered and innovative policy must be developed that deals with industry and occupation specific issues. If there are institutional barriers to rapid adjustment (e.g., long training programs) particular to specific industries and occupational groups then this is an important policy issue. It is to these policy issues that we now turn.

## **7. Summary and Policy Issues**

What is the relationship between workforce ageing and skill shortages? On the one hand, barring unforeseen circumstances, the labour forces in Canada and Ontario will grow more slowly in the future, and in the case of Canada, will eventually begin to shrink. On the other hand, predicting potential skill shortages in light of population and workforce ageing is a difficult business. Workforce ageing is too gradual a process to lead to widespread skill or labour shortages. As the

analysis presented in Part 6 shows, at least as important are business cycles, retirement policies and cultures, and the nature of the work and training within particular occupations or industries. The combination of all of these things suggests that there will be localized “hot-spots” that require innovation by both employers and policy makers in order to ensure necessary labour market adjustments. Will these hot-spots create problems of crisis proportions? Not likely. Why? Because the potential problems associated with workforce ageing are already on the radar screens of think-tanks, governments, and many businesses. Key players within these organizations are strategically considering how changes to policy might help fend off future skill shortages that are associated with workforce ageing. The challenge that lies ahead is that such policies need to be timely and need to take into account the diverse needs of employers and employees.

The following policy options address the potential negative effects of skill shortages in the context of an ageing workforce: policies that encourage skilled worker immigration, flexible retirement policies, active ageing and lifelong learning, and policies that encourage higher levels of labour force participation by excluded groups. The next few pages discuss each option briefly.

## **7.1 Immigration**

Increasing the level of skilled worker immigration as a way of dealing with skill shortages is one strategy that has been recommended by governments and business organizations. The international movement of skilled workers and the structure of the Canadian immigration system are topics that deserve more space than is available here. Nonetheless, there are questions about whether increased immigration is an effective policy for dealing with skill shortages that are important to consider here. The Canadian immigration system is currently structured so that people with higher levels of education and training, and those with experience in skilled occupations are awarded more “points” towards landed immigrant status. Although targeted recruitment of immigrants with specific skills happens from time to time in Canada, as in the case of the program to facilitate the processing of IT immigration applicants (CIC, 2002), typically the Canadian system does not target specific occupations. As well, having a verified employment offer in Canada makes immigration easier, but this requires that firms and prospective immigrants meet before landing through international recruitment agencies. Newcomers in the “skilled immigrant” category made up about 30 percent of the 235,000 immigrants in 2002 (CIC, 2003a).

Most provinces (although not Ontario) participate in Provincial Nominee Programs, a separate process through which potential immigrants may apply in order to fill occupations identified by individual employers as in short supply. In many provinces, these occupations include nursing and other jobs in health care, as well as occupations in science and research. However, these provincial programs remain quite limited, and in 2002 provincial nominees represented less than one percent of total immigration (CIC, 2003a). Another aspect of migration in response to skill shortages is the migration of temporary workers. In 2002, 87,910 temporary workers were admitted or re-admitted into Canada. Of these, 25,686 were technical skilled workers (CIC, 2003b). Plans are to increase the numbers of permanent immigrants through the Provincial Nominees Programs, as well as the number of temporary workers (CIC, 2000).

Recently, the Fraser Institute published a report that argued against increased immigration on the grounds that there is no evidence of future labour force shortages as a result of workforce ageing (Collacott, 2003). Others have argued that increased immigration will not be able to prevent the eventual contraction of the Canadian labour force (Denton and Spencer, 1999; Beaujot, 2003). Indeed, Denton and Spencer (2003) argue that immigration levels would need to more than double by the next decade to result in even a one percent growth rate of the labour force by 2021. However, if localized skill shortages do occur, carefully targeted skilled migration, either temporary or permanent, might be an effective policy option. There are various aspects of the current system that may reduce the effectiveness of this, though, including rules for family migration and reunification and the recognition of immigrant skills and qualifications. For example, automotive industry representatives have suggested that difficulties arranging immigration for the spouses and families of skilled workers has prevented it from attracting the skilled labour needed (O'Hagan, 1999). As well, a lack of recognition of the qualification and experience of immigrants which may prevent them from using their training and experience has been well identified as an ongoing problematic issue (Lochhead, 2003b; Mata, 1994). Lastly, it must be remembered that Canada competes with other countries as a destination for skilled migrants thus making it more difficult to attract migrants with highly-valued skill sets (Harris, 2004).

## **7.2 Encouraging Higher Rates of Labour Market Participation**

Besides recruiting skilled workers through immigration, another option for dealing with potential skill shortages is to encourage higher rates of labour force participation among groups that are under-represented in the labour market. Western countries have sought to fight high and persistent unemployment and withdrawal from the labour market in a variety of ways, including active labour market policies. Active labour market policies such as job search assistance and training have been found to be, on balance, successful in helping people move into the labour market (Martin, 2001). There may also be measures that would improve the labour force participation of specific groups. The provision of public childcare, for example, may improve the ability of lone mothers to participate in training or skills development. As well, some commentators have identified the Aboriginal population as an untapped source of labour that will become increasingly important in the future (Lamontagne, 2001; Lochhead, 2003; Murphy, 1992). According to the Advisory Council on Science and Technology, Aboriginal people represent up to 4.6 percent of young cohorts (ACST, 2000: 53), but with considerably lower labour force participation rates than other Canadians (INAC, 2004). Hence, in order to maximize the potential of the Canadian labour force, measures to improve education, training, and labour force participation among Aboriginal people have been identified as an important policy priority (ACST, 2000: 53).

There are, however, some policy contradictions that may prevent the movement of people into the labour market and into jobs with identified shortages. For example, in many provinces, including Ontario, people currently on social assistance are unable to access student loans that would enable them to attend postsecondary schools (ACST, 2000). In most jurisdictions, an unemployed person who is not eligible for employment insurance is also not eligible for any kind of supported education or training, and the types of training that are typically provided to those on Social Assistance or EI tend to be aimed at rapid re-entry to the labour market, rather than gaining scarce skills.

### 7.3 Phased Retirement and Workplace Flexibility

Encouraging higher rates of labour force participation among older Canadians is another possibility. The OECD and many national governments have identified the retention of older workers as a major policy priority for countries that have ageing populations (OECD, 1998; 2000; Policy Research Initiative, 2004). The Canadian Industry Sector Councils and the Forum of Labour Market Ministers have also identified the retention of older workers as an important strategy to combat potential skill shortages and argue that this is likely to have an “enormous impact in the coming decade” (Forum of Labour Market Ministers, 2002; Malatest and Associates, 2003).

Encouraging later and more gradual retirement is one of several strategies that have been discussed as a way of increasing the labour force participation rates of older workers. Fougère, Harvey, and Mérette (2004) estimate that if the average age of retirement remained at age 61.5, real GDP per capita could decline by over 14 percent by 2050. However, *increasing* the average age of retirement by one year would have the effect of increasing real GDP per capita by 3.5 percent by 2050. They also predict that increasing the average age of retirement to age 65 could lead to real GDP per capita that is 12 percent higher by 2050 (cited in Policy Research Initiative, 2004). Eliminating mandatory retirement is one way in which the average age of retirement could increase. Indeed, this issue is currently being considered by both the Federal Government of Canada and the Provincial Government of Ontario. However, the elimination of mandatory retirement will only lead to modest increases in the average age of retirement. For the most part, individuals in jobs that are unfulfilling or stressful and who can afford to retire early will do so. Hence, to increase average ages of retirement, other strategies are also required. Besides the elimination of mandatory retirement, other strategies such as gradual retirement provisions<sup>2</sup>, mentoring, and more effective formal and informal training have been identified as measures that could help ease future demographic pressures.

Flexible workplace arrangements, such as job-sharing or flex-time are policy options that could be used as a gradual retirement provision. Allowing older workers the option of working fewer days per week for a proportionate reduction in pay might be attractive to many and provide an option between continuing to work full time and complete retirement from paid work (Foot, 1998: 101). Older workers may prefer to retain some connection to work, for financial, social, or other reasons, yet may also desire to spend more time pursuing other interests. Such flexible workplace arrangements may allow employers to retain the valuable skills of older workers, release funds which can be used to train or hire new employees, while allowing older workers greater control over retirement (Foot, 2002: 20-21).

Phased retirement plans and workplace flexibility have not yet been widely implemented, and there remain significant incentives for the total and early retirement of older workers (Taylor, 2002). In Canada, the structure of some contributions, such as workers' compensation and employment insurance, may encourage employers to maintain full-time employees rather than implement flexible hours (Foot, 2002: 22). As well, some research has found that Canada's public and private pension programs, including the Canada Pension Plan (CPP) continue to have

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<sup>2</sup> Phased retirement may take several forms including job sharing, reducing hours of work without losing benefits, or returning to employment in the same job on contract.

retirement incentive effects (Baker, Gruber, Milligan, 2003). For instance, in defined benefit pension schemes, which specify an age or combination age and service years in which a person would qualify for full retirement benefits, pension wealth accruals are highest in the target age or age plus service year and then fall thereafter. In this situation, there is little financial incentive to continue working after the target age (HRDC, 2001). Notably, these defined benefit pension schemes are common in the education sector in which the average age of retirement is 58 (for a detailed assessment of the incentives and disincentives of various pension schemes in Canada, see HRDC, 2001).

With respect to the CPP, individuals are often better off claiming pension benefits at age 60 with a 30 percent reduction in their full benefit than waiting to claim their full benefit at age 65. This is because they are able to draw benefits for five additional years and the actuarial reduction under current CPP provisions is not large enough to be “actuarially fair”. The CPP allows individuals to work on a full or part-time basis after retirement benefits commence. However, CPP pension regulations do not allow persons to claim benefits and contribute to the plan simultaneously. If the system allowed people to continue contributing to the CPP, with corresponding increases in their benefits, more individuals might be drawn to partial retirement (SDC, 2004).

The Income Tax Act acts as a disincentive to phased retirement because it does not allow employees to simultaneously contribute to and receive benefits from an employer-sponsored pension plan. However, in 2003, the New Brunswick Government and the provinces’ nurses union successfully negotiated a phased retirement plan with the Canada Customs and Revenue Agency that conformed to the Income Tax Act. This plan allows nurses who are aged 56 and older to work part-time (either two and a half or three days a week) and receive 85 percent of their full-time income. Some of the income will come from salary and some will come from pension pre-payments. Nurses who take the phased retirement option will continue to contribute to their pension plan, thereby not having it reduced when they decide to fully retire (Brown, 2003). The complexity of this program is obvious and it took two years to negotiate but it is a promising example of how creative policy may help to increase the average age of retirement.

#### **7.4 Life-Long Learning and Active Ageing**

Current practices regarding work and training often assume a particular order and timing of transitions from education through working life to retirement. These age-graded stages constitute the typical tripartite life course, reinforced by state policies as well as norms about the timing of education, work, and retirement (Mayer, 1991). However, people’s working lives have become less continuous and less predictable to the point where employers and government officials can no longer assume the same orderly transition from study to work to retirement. In particular, policies are required that consider the transition from work to school at a variety of ages, as well as from school to work (Marshall and Mueller, 2002). This would require a movement away from placing nearly all formal education at the beginning of working life to policies that would facilitate training and retraining through life-long learning, similar to what the OECD has called “active ageing” (OECD, 2001).

Current policies which structure the life course into the traditional tripartite form may present barriers to retraining of older workers and therefore barriers to overcoming any skill shortages

that may exist. As well, there may be other barriers to workers re-skilling or re-training for different jobs. The lack of portability of employment-related benefits may deter people from leaving current employment (Boothby and Rainville, 2004: 26). As well, increasing costs for full- or part-time post-secondary education and training may present a major barrier to people returning to school.

The provision of training and promotion opportunities may encourage older workers' labour force participation and enhance productivity (Ilmarinen and Rantanen, 1999). However, employers are sometimes unwilling to invest in training older workers because of concerns over their returns on training investments or misconceptions about the "trainability" of older workers. Yet, research suggests that the relationship between "trainability" and age is not clear. Rather, the ability of older workers to acquire new skills depends on the design of the training. Further, workers who receive training throughout their careers may be better able to absorb it when they are older (OECD, 1998: 138). Regarding returns on investments, older workers are less likely than younger workers to change employers, and the retention rate for workers aged 45 and over seems to be as high or higher than for younger workers. Finally, considering the rapid changes in some skill requirements, there may be significant economic benefits for employers offering training to older workers, especially if those benefits can be accrued within a short period (OECD, 1998: 139).

Despite the potential benefits of programs and policies that encourage workers to engage in life-long learning and to work longer, one potential unintended consequence is that older workers may be coerced into working longer than they had planned or forced to retrain. Many will still wish to retire from the labour market, or have other obligations, such as caring for others, that will prevent them from working. Hence, policies must be planned to take the complex realities of older workers' lives into account.

## **7.5 Seeking an Age-Balanced Workforce**

For individual firms, Robson (2001) notes the importance of recruiting as well as retaining older workers, in responding to skill shortages. Most firms do not target their recruiting strategies to particular age groups, or if they do, tend to target them to younger workers. Recruiting older workers would mean avoiding ageist hiring policies that discriminate against them, and advertising for potential applicants through nontraditional channels, such as seniors' associations or professional societies. Robson (2001: 18) suggests that firms may benefit from such active recruitment, and government policies which support firms to this end may be helpful.

Governments have an important public information role in providing information and best practices to employers about the value of having an age-balanced workforce. Such programs would move beyond consideration of simple retirement projections and ensuing panics over skill shortages and recognize that having an age balanced workforce may be of benefit to their organization. A few firms have done this, recognizing the value of organizational knowledge, mentoring capabilities, and experience of older workers (Lowe, 2003). For the most part, however, firms have not considered whether a particular age structure maximizes the productivity of their organization or whether an organization requires a particular age structure to reduce the risk of skill shortages (see Robson, 2001). Indeed, if older workers (those aged 50-60)

are the most productive workers, as Guillemette (2003) in a recent C.D. Howe report suggests, then not considering the age structure of organizations is a poor business decision.

## **8. Conclusions**

There is no evidence that Canada is facing a looming general shortage of skilled labour as a direct result of demographic ageing. Clearly, the ageing of the labour force has heightened pre-existing concerns about skill shortages that may be more related to wage levels, the nature of work, and to education and training policies than to demographics. Some sectors and industries will face high rates of retirement in the future and will therefore be at risk of skill shortages. The natural resources sector, transportation sectors, and professional and technical services sectors, as well as others are expected to see declining labour forces due to retirement, which can only exacerbate current concerns over skill shortages in these industries (SHRC, 2003; Lamontagne, 2001; Lochhead, 2003; CLBC, 2001).

Predicting the ways in which the labour market will or will not adjust in response to future shortages of skills is very difficult. However, it is possible to identify a number of processes which may affect the degree to which particular industries or occupations experience difficulties related to tight labour markets. These include policies surrounding training and accreditation, the nature of the work and the ability to attract new entrants, the geographic mobility of the work and of workers, and the substitutability of other inputs for labour, as well as age structure and retirement. These may lead to localized skill shortages in occupations such as nursing, which faces high retirement rates and difficulties recruiting new workers. As well, there may also be skill shortages in industries such as information technology that are not at risk of large scale retirement, but which may fail to retain or retrain older workers.

Despite the difficulty identifying industries and occupations that are likely to become “hot spots” of skill shortage, there are nonetheless policy options available to increase the ability of the labour market to meet the demand for skills. These include targeted immigration of workers with particular skills, encouraging higher labour force participation rates generally, and also encouraging higher labour force participation among older workers through more flexible work and retirement policies. More generally, policies that help people to acquire new skills throughout their working life will make the Canadian workforce more able to respond to future skill shortages, and also encourage people to work longer and more productively. Although expectations of a “crisis” resulting from the ageing of the labour force are not well supported, the challenges presented by demographic change make the movement toward more creative policies for work, retirement, and training necessary.

## References

- ACST (2000) *Stepping Up: Skills and Opportunities in the Knowledge Economy*. Report of the Expert Panel on Skills. Advisory Council on Science and Technology: Ottawa. Retrieved February 6, 2004 from [http://acst-ccst.gc.ca/acst/skills/finalrep\\_html/p5b\\_e.html](http://acst-ccst.gc.ca/acst/skills/finalrep_html/p5b_e.html).
- Auerbach, A. L., Kotlikoff, J. and Leibfritz, W. (Eds.) (1999) *Generational Accounting Around the World*. Chicago: University of Chicago Press.
- Baker, M.; Gruber, J. and Milligan, K. (2003) The Retirement Incentive Effects of Canada's Income Security Programs, *Canadian Journal of Economics* 36 (2003), 261-290
- Beaujot, R. (2003) *Effect of Immigration on the Canadian Population: Replacement Migration?* (Discussion Paper 03-03) London: University of Western Ontario Population Studies Centre. Retrieved February 6 2004 from <http://www.ssc.uwo/sociology/popstudies/dp2003.html>.
- Beaujot, R. & Richards, J.L. (1996) Intergenerational Fairness in Reforming the Canada Pension Plan. *Policy Options*, 17(9), 45-48.
- Bengtson, V.L. and Achenbaum, W.A. (Eds.) (1993) *The changing contract across generations*. New York: Aldine de Gruyter.
- Boothby, D. and Rainville, B. (2004) *Adjustments in labour markets for skilled workers in Canada*. Skills research initiative working paper. HRDC: Ottawa.
- Brown, D. (2003) Reports of our labour shortage greatly exaggerated. *Canadian HR Reporter*, October 2003, 1-4.
- Burleton, Derek. (2003) Canada's Industrial Outlook *TD Quarterly Economic Forecast*. Toronto: TD Bank Financial Group. Retrieved February 16, 2004 from [www.td.com/economics](http://www.td.com/economics).
- Canadian Labour and Business Centre. (2001) Canadian Labour and Business, and Industry Training and Apprenticeship Commission *Where did all the workers go? The challenges of the aging workforce*. Ottawa: Canadian Labour and Business Centre Industry Training and Apprenticeship Commission.
- Canadian Labour and Business Centre. (2002) *Focus on the Health Care Sector: Viewpoints 2002*. Ottawa: Canadian Labour and Business Centre.
- Canadian Labour Congress. (2001) Worth Noting: Looming Shortage of Skilled Workers. *The Economy* 12(2): 6.
- Canadian Press Newswire. (February 27, 2001) Shortage of Skilled Workers in Canada, Stewart Tells Business, Labour (Globe and Mail).
- Cappelli, P. (2003) "Will there really be a labor shortage?" *Organizational Dynamics* 32:221-233.

Carrière, Y. (2000) "The Impact of Population Aging and Hospital Days: Will There be a Problem?" in E.M. Gee and G.M. Gutman (Eds.) *The Overselling of Population Aging: Apocalyptic Demography, Intergenerational Challenges, and Social Policy*. (pp. 26-44). Toronto: Oxford University Press.

Citizenship and Immigration Canada. (1999) *Canada...The Place to Be: Annual Immigration Plan for the Year 2000*. (Cat no. Ci1-2000). Ottawa: Minister of Public Works and Government Services.

Citizenship and Immigration Canada. (2000) *News Release: Caplan Tables New Immigration and Refugee Protection Act. 000-09*. Ottawa. Retrieved June 10, 2004 from <http://www.cic.gc.ca/english/press/00/0009-pre.html>

Citizenship and Immigration Canada. (2002) *Facilitated Processing for Information Technology Workers*. Ottawa: Citizenship and Immigration Canada. Retrieved June 11, 2003 from: <http://www.cic.gc.ca/english/work/itw.html>

Citizenship and Immigration Canada. (2003a) Facts and Figures 2002: Immigration Overview. Retrieved August 17, 2004 from <http://www.cic.gc.ca/english/pdf/pub/facts2002.pdf>.

Citizenship and Immigration Canada. (2003b) Facts and Figures 2002: Statistics Overview of the Temporary Resident and Refugee Claimant Population. Retrieved June 10, 2004 from <http://www.cic.gc.ca/english/pdf/pub/facts-temp2002.pdf>

Collacott, M. (2003) *Is there really a looming labour shortage in Canada and, if there is, can increased immigration fill the gap?* Vancouver: The Fraser Institute.

College of Nurses of Ontario. (2003) *Questions and Answers About Changes In Basic Education For Registered Nurses In Ontario*. College of Nurses of Ontario: Toronto. Retrieved March 5, 2004 from: [http://www.cno.org/docs/reg/43066\\_fsChangesRnEdu.pdf](http://www.cno.org/docs/reg/43066_fsChangesRnEdu.pdf)

Connidis, I.A. (2001) *Family Ties and Aging*. Thousand Oaks: Sage

Corak, M. (Ed.) (1998) *Government Finances and Generational Equity*. Ottawa: Statistics Canada and Human Resources Development Canada. Catalogue number 68-513XPB.

Cranswick, K. (2003) *General Social survey Cycle 16: caring for an aging society* (Statistics Canada Catalogue number 89-582-XIE) Ottawa: Statistics Canada.

Cukier, W. (2002) *Constructing the IT Skill shortage in Canada: The implications of institutional discourse and practices for the participation of women*. Toronto: Diversity and Information Technology Institute at Ryerson University Information Technology Management.

Denton, F.T. and Spencer, B.G. (1999) *Population Aging and its Economic Costs: A Survey of the Issues and the Evidence* (SEDAP Research Paper No. 1). Hamilton: Program for Research on Social and Economic Dimensions of an Aging Population.

Denton, F.T., Feaver, C.H. and Spencer, B.G. (2000a) *Projections of the Population and Labour Force to 2046: Canada* (QSEP Research Report No. 347). Hamilton: Research Institute for Quantitative Studies in Economics and Population.

Denton, F.T., Feaver, C.H. and Spencer, B.G. (2000b) *Projections of the Population and Labour Force to 2046: The Provinces and Territories* (QSEP Research Report No. 348). Hamilton: Research Institute for Quantitative Studies in Economics and Population.

Denton, F.T. and Spencer, B.G. (2003) *Population Change and Economic Growth: The Long-Term Outlook* (SEDAP Research Paper No. 102). Hamilton: Program for Research on Social and Demographic Implications of an Aging Population.

Durden Comeau, T. (2003) *Information Technology (IT) Employment: What is IT?* (WANE Working Paper #1). London: Workforce Ageing in the New Economy. Retrieved Feb. 6, 2004 from: <http://www.wane.ca/PDF/WP1.pdf>.

England, R.S. (2002) *The macroeconomic impact of global aging: A new era of economic frailty?* Washington Center for Strategic and International Studies.

Fooks, C. and Maslove, L. (2004) *Our Health, Our Future: Creating Quality Workplaces for Canadian Nurses*. Ottawa: Canadian Policy Research Networks.

Foot, D.K. with Stoffman, D. (1998) *Boom Bust and Echo 2000: Profiting from the Demographic Shift in the New Millennium*. Toronto: McFarlane Walter and Ross.

Foot, D.K. (2002, July) *Demographic Change and Public Policy in Ontario*. Paper written for the Panel on The Role of Government in Ontario  
<http://www.law.lib.utoronto.ca/investing/reports/rp3.pdf>.

Forum of Labour Market Ministers. (2002) Older workers in the labour market: Employment challenges, programs, and policy implications. Winnipeg.  
[www.hrhc-drhc.gc.ca/stratpol/lmp/owe\\_toc.shtml](http://www.hrhc-drhc.gc.ca/stratpol/lmp/owe_toc.shtml).

Fougère, Maxime, Simon Harvey, Marcel Mérette. (2004) Ageing and the economic impact of raising the effective retirement age in Canada. Ottawa: Human Resources and Skills Development.

Gee, E. M. and Gloria M. Gutman, G.M. (Eds.) (2000) *The Overselling of Population Aging: Apocalyptic Demography, Intergenerational Challenges, and Social Policy*. Toronto: Oxford University Press.

Groote, J, Hough, P. and Walter, R. (1999) *Canadian Biotechnology '98: Success from Excellence*. Ottawa: BiotechCanada.

Guillemette, Y. (2003) *Slowing Down with Age: The Ominous Implications of Workforce Aging for Canadian Living Standards*. (C.D. Howe Institute Commentary No 182, May 2003). Ottawa: Renouf

Hall, M., McKeown, L., and Roberts, K. (2001) *Caring Canadians, Involved Canadians: Highlights from the 2000 National Survey of Giving, Volunteering, and Participating*. (Statistics Canada Catalogue number. 91-542-XPE) Ottawa: Minister of Industry.

Harris, R. G. (2004) *Labour Mobility and the Global Competition for Skills: Dilemmas and Options* (HRDC Skills Research Initiative Working Paper 2004 D-02) Ottawa: HRDC.

Hughes, K.; Lowe, G.; Schellenberg, G. (2003) *Men's and Women's Quality of Work in the New Canadian Economy*. (Research Paper w|19) Ottawa: Canadian Policy Research Networks.

Human Resources Development Canada. (2001) *Income Security Programs. Evaluation of public and private financial incentives for retirement. Strategic Evaluation and monitoring evaluation and data development. Strategic policy. SP-Ah087-05-01E. May.*

Human Resources Development Canada. (2002) *Challenges of an Ageing Workforce: An overview of the issue*. Ottawa: Human Resources Development Canada. Retrieved Feb. 6, 2004 from: <http://labour.hrdc-drhc.gc.ca/worklife/pdf/overview-aging-workforce-challenges-en.pdf>.

Ilmarinen, J. and Rantanen, J. (1999) Promotion of Work Ability During Ageing. *American Journal of Industrial Medicine* (Supplement 1): 21-23.

Indian and Northern Affairs Canada. (2004) *What is the Aboriginal Workforce Participation Initiative?* Ottawa: INAC. Retrieved June 9, 2004 from [http://www.ainc-inac.gc.ca/ai/awpi/init\\_e.html](http://www.ainc-inac.gc.ca/ai/awpi/init_e.html)

Institute for competitiveness and Prosperity. (2002) *Measuring Ontario's Prosperity: Developing an Economic Indicator System. Working Paper No. 2.* <http://www.competeprosper.ca/public/>

Information Technology Association of Canada. (1999) *IT Skill shortage in Canada: a snapshot*. Gloucester, Ontario: Information Technology Association of Canada. Retrieved Feb. 6, 2004 from: [http://www.itac.ca/client/ITAC/ITAC\\_UW\\_MainEngine.nsf/0/94664f39b0e4894885256713006685ca/\\$FILE/skill-99feb4.pdf](http://www.itac.ca/client/ITAC/ITAC_UW_MainEngine.nsf/0/94664f39b0e4894885256713006685ca/$FILE/skill-99feb4.pdf).

Information Technology Association of Canada. (2002) *Meeting the skill needs of Ontario's technology sector: An analysis of the demand and supply of IT professional skills*. Ottawa: Information Technology Association of Canada.

Kaufman, R. L. and Spilerman, S. (1982) The Age Structures of Occupations and Jobs. *The American Journal of Sociology*, 87 (4): 827-851.

Konrad, R. (2003) More Computer Jobs Going Overseas. *The Globe and Mail*. November 14

Kotlikoff, L. (1993) *Generational Accounting: Knowing Who Pays, and When, for What We Spend*. New York: The Free Press.

- Kuhn, P. (2003) Effects of Population Aging on Labour Market Flows in Canada: Analytical Issues and Research Priorities. Paper prepared for the Roundtable on Labour Market Adjustments Due to Population Aging in Canada, Ottawa. October.
- Lamontagne, F. (2001) "Demographic Profile of the Natural Resources Sector" in *Making Skills a National Priority*. Ottawa: Canadian Labour and Business Centre.
- Laslett, R. (1992) "Surveys of Skill Shortages" in "Engineering Labour Markets" in D. Bosworth, P. Dutton, and J Lewis (Eds.) *Skill Shortages: Causes and Consequences*. Aldershot: Avebury.
- Livingstone, D.W. (1998) *The Education-Jobs Gap: Underemployment or Economic Democracy*. Boulder: Westview Press.
- Livingstone, D.W. (2002) *Working and learning in the information age: A profile of Canadians*. Ottawa: Canadian Policy Research Networks.
- Lochhead, C. (2003) *Demographic Profile of the Transportation Sector*. Ottawa: Canadian Labour and Business Center.
- Lochhead, C. (2003b) *The Transitions Penalty: Unemployment Among Recent Immigrants to Canada*. Ottawa: Canadian Labour and Business Centre. Retrieved June 10, 2004 from [http://www.clbc.ca/files/Reports/Fitting\\_In/Transition\\_Penalty\\_e-CLBC.pdf](http://www.clbc.ca/files/Reports/Fitting_In/Transition_Penalty_e-CLBC.pdf)
- Lowe, G. (2002) *Workshop on QQuality of Life Indicators for Canadian Nurses*. Presentation to the Canadian Council on Health Services Accreditation, June. Retrieved July 28, 2004 from: <http://www.grahamlowe.ca/documents/45/>
- Lowe, G. (2003) Retiring baby boomers open to options, but get them before they leave. *Canadian HR Reporter*. March 10, Toronto
- MacKenzie, A. and Dryburgh, H. (2003) "The Retirement Wave". *Perspectives on Labour and Income* 4 (2): 5-11
- MacMillan, M. (2003) Shipping Projects Overseas Becoming More Attractive *IT World Canada*. Retrieved Feb 6, 2004 from: [http://www.itworldcanada.com/index.cfm?ci\\_id=50184&s=393449](http://www.itworldcanada.com/index.cfm?ci_id=50184&s=393449).
- Malatest & Associates Ltd. (2003) *The aging workforce and human resources development implications for sector councils*. Ottawa, Ontario: Industry Sector Councils.
- Marshall, V.W. (1997) The generations: Contributions, conflict, equity. Unpublished paper prepared for Division of Ageing and Seniors, Health Canada. Retrieved September 12, 2003 from <http://www.aging.unc.edu/infocentre/resources/1997/marhsallv.pdf>.
- Marshall, V.W. (2002) New Perspectives worldwide on ageing, work and retirement. Paper presented at the Valencia Forum. Valencia, Spain. April.

Marshall, V. W., and Mueller, M. (2002) *Rethinking Social Policy from an Aging Workforce and Society: Insights from the Life Course Perspective*. (Discussion Paper W|18) Ottawa, Canadian Policy Research Networks.

Marshall, V.W., Cooke, F.L., and Marshall, J.G. (1993) “Conflict over intergenerational equity: Rhetoric and reality in a comparative context” in V.L. Bengtson and W.A. Achenbaum (Eds.) *The changing contract across generations*. New York: Aldine De Gruyter.

Martin, J. P. (2001) What Works among Active Labour Market Policies: Evidence from OECD Countries’ Experiences. *OECD Economic Studies* No. 20 2000/1. Paris: Organization for Economic Cooperation and Development.

Mata, F. (1994) The non-Accreditation of Immigrant Professionals in Canada. Paper presented at the annual meeting of the Canadian Sociology and Anthropology Association, Calgary.

Maxwell, J. (2003) *Nurses and their Workplaces: The Policy Drivers Matter*. Presentation. Retrieved July 28, 2004 from <http://www.cprn.org/en/doc.cfm?doc=250>.

Mayer, K.U. (1991) “Life Courses and the Welfare State” in Heinz, W. R. (Ed.) *Theoretical Advances in Life Course Research*. Weinheim: Deutcher Studien Verlag. (pp. 171-186).

McDaniel, S.A. (2002) “Intergenerational Interlinkages: Public, Family, and Work” in D. Cheal (Ed.) *Aging and Demographic Change in Canadian Context*. Toronto: University of Toronto Press. (p. 22-71)

McDaniel, S.A. (2003) Toward disentangling policy implications of economic and demographic changes in Canada’s Aging population. *Canadian Public Policy—Analyse de politiques*, Vol. XXIX, 4: 491-510.

McMullin, J.A. and Cooke, M. (2003) Workforce Ageing: An Examination of the Age Composition of Occupations and Industries in Canada. Paper presented at the annual meetings of the European Sociological Association, Murcia, Spain. September

McNiven, C. (2001) *Biology Use and Development* (Cat no. 88F006XIE No 7) Ottawa: Statistics Canada. Retrieved Feb. 6, 2004 from: <http://www.bhrc.ca/Intelligence/Biotech%20Firm%20Survey.pdf>.

Mérette, M. (2002) The Bright Side: A Positive View on the Economics of Aging. IRPP Choices 8(1) March.

Ministry of Training, Colleges, and Universities. (2003) *Population Ageing and the Implications for Future Labour Force Growth in Ontario* (Labour Market Information and Research Unit Feature Report, April) Toronto: Ministry of Training, Colleges, and Universities.

Murphy, E.P. (1992) Canada’s Population: Changes and Challenges. *Canadian Business Review* 19(3): 13-17.

O'Brien-Pallas, L, Alksnis, C. and Wang, S. (2003). *Bringing the Future into Focus: Projecting RN Retirement in Canada*. Ottawa: Canadian Institute for Health Information

O'Hagan, D. (1999) *Profile of the Automotive Sector* (Advisory Council on Science and Technology Supporting Document 3). Ottawa: Advisory Council on Science and Technology

O'Neill, T. (2003) *Prospects for Canada's Industries Sectoral Outlook*. Toronto: BMO Financial Group. Retrieved February 15, 2004 from: [www.bmo.com/economic](http://www.bmo.com/economic).

Organization for Economic Cooperation and Development. (1990) *Labour Force Statistics 1969-1989*. Paris: Organization for Economic Cooperation and Development.

Organization for Economic Cooperation and Development. (1998) *Employment Outlook 1998: Towards an Employment-Centred Social Policy*. Paris: Organization for Economic Cooperation and Development.

Organization for Economic Cooperation and Development. (2000) *Reforms for and Ageing Society*. Paris: Organization for Economic Cooperation and Development.

Organization for Economic Cooperation and Development. (2001) *Ageing and Income: Financial Resources and Retirement in 9 OECD Countries*. Paris: Organization for Economic Cooperation and Development.

Organization for Economic Cooperation and Development. (2003a) *Labour Force Statistics 1982-2002*. Paris: Organization for Economic Cooperation and Development.

Organization for Economic Cooperation and Development. (2003b) *Economic Surveys- Canada 2003*. Paris: Organization for Economic Cooperation and Development.

Policy Research Initiative. (2004) *Population Aging and Life-course Flexibility: The pivotal role of increased choice in the retirement decision*. Discussion Paper. March.

Pyper, W. and Giles, P. (2002) *Approaching Retirement. Perspectives on Labour and Income*, September 2002:5-12.

Quinn, J. (2003) *Main patterns in older workers' emerging responses to recent changes in their environments involving retirement*. Paper presented at the Statistics Canada Symposium on New Issues in Retirement, Ottawa. September.

Robson, William B.P. (2001) *Aging Populations and the Workplace: Challenges for Employers*. Toronto: The British-North American Committee.

Roy, R. Henson, H, and Lavoie, C. (1996) *A Primer on Skill Shortages in Canada*. (Research Paper R-96-8E) Ottawa: Human Resources Development Canada. Retrieved Feb. 6, 2004 from <http://www.hrdc.gc.ca/sp-ps/arb-dgra/publications/research/abr-96-8e.shtml>.

Smith, M. (2001) Technological Change, the Demand for Skills, and the Adequacy of their Supply. *Canadian Public Policy* 27 (1): 1-22.

Social Development Canada. (2004) Canada Pension Plan (CPP) Retirement Pension. [www.sdc.gc.ca](http://www.sdc.gc.ca). Accessed 3/29/2004.

Software Human Resource Council. (2003) *Mapping the IT Labour Market: HR Dynamics in the Canadian IT Sector, 1999-2001*. Ottawa: Software Human Resource Council. Retrieved Feb. 6, 2004 from: [http://www.shrc.ca/lmi/reports/pdf/Canada\\_ITLabourForce\\_1961\\_01.pdf](http://www.shrc.ca/lmi/reports/pdf/Canada_ITLabourForce_1961_01.pdf).

Stager, D. (2001) *The Labour Market for IT Workers: A Review of Recent Literature*. Ottawa: Sectoral and Occupational Studies Division, Human Resources Investment Branch, Human Resources Development Canada. Retrieved Feb. 6, 2004 from: [http://www.shrc.ca/lmi/pdf/lmi\\_stager\\_lit\\_review\\_2001\\_eng.pdf](http://www.shrc.ca/lmi/pdf/lmi_stager_lit_review_2001_eng.pdf)

Statistics Canada. (1973) *1971 Census of Canada Population: Age Groups*. (Cat. no. 92-715) Ottawa: Minister of Industry.

Statistics Canada. (1999) *Transportation Equipment Industries*. (Cat no 42-251-XIE) Ottawa: Statistics Canada.

Statistics Canada. (2001) *Population projections for Canada, provinces and territories, 2000-2026*. (Cat no. 91-520-XPB) Ottawa: Statistics Canada.

Statistics Canada. (2002) *Labour Force Survey of Canada, 2001: monthly data* [machine readable data file]. Ottawa: Statistics Canada.

Statistics Canada. (2003a) Occupation - 1991 Standard Occupational Classification (Historical) (511), Age Groups (11A) and Sex (3) for Labour Force 15 Years and Over, for Canada, Provinces, Territories, Census Metropolitan Areas and Census Agglomerations, 1991 to 2001 Censuses - 20 percent Sample [Data File] Ottawa: Statistics Canada.

Statistics Canada. (2003b) Fact Sheet on Retirement. *Perspectives on Labour and Income* 4 (9).

Statistics Canada. (2003c) Registered Apprenticeship Training Programs. *The Daily Nov* 20, 2003.

Statistics Canada. (2003d) *Innovation Analysis Bulletin* (5)1 (Cat no.88-003-XIE) Ottawa: Statistics Canada.

Stoll, P and A. Baignee. (1997) *The National Apprenticed Trades Survey: An Overview of the Apprenticeship Experience*. Ottawa: Human Resources Development Canada.

Stone, L.O., Rosenthal, C.J. and Connidis, I.R. (1998) *Parent-Child Exchanges of Supports and Intergenerational Equality*. (Statistics Canada, cat no 89-557-XPE). Ottawa: Ministry of Industry.

Sussman, D. (2002) Barriers to Job Related Training. *Perspectives on Labour and Income* Summer, 2002: 25-32.

Taylor, P. (2002) *New Policies for Older Workers*. Bristol: Policy Press.

Toronto Economic Development. (2003) *Toronto Labour Force Readiness Plan: Overview*. Toronto: City of Toronto.

United Nations. (1973) *Demographic Yearbook 1973*. New York: United Nations.

United Nations. (1980) *Demographic Yearbook 1979*. New York: United Nations.

United Nations. (2002) *World Population Ageing 1950-2050*. (No. ST/ESA/SER.A/208.) New York: United Nations Department of Economic and Social affairs, Population Division.

Van Dalen, Hendrik and Kène Henkens. (2002) Early-Retirement Reform: Can it and Will it Work?. *Ageing and Society* (22): 209-231.

Wallace, P. (1999) *Agequake: Riding the Demographic Rollercoaster Shaking Business, Finance, and Our World*. London: Nicholas Brealey Publishing

Weaver, C.L. (1992) Social security in aging societies. *Population and Development Review* (12) Supplement, 273-95.

Wolfson, W. G. (2002) *Analysis of Labour Force Survey Data for the Information Technology Occupations*. Toronto: Software Human Resource Council.



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Business Development Bank of Canada  
DVA Navion  
Holding O.C.B. Inc. (formerly Ouimet Cordon Bleu inc.)  
Home Depot Canada  
Ketchum Canada Inc.  
Scotiabank  
TD Bank Financial Group

#### ***Federal Government Departments,***

#### ***Agencies and Commissions:***

Canada Mortgage and Housing Corporation  
Canadian Biotechnology Advisory Committee  
Canadian Heritage  
Environment Canada  
Health Canada  
Human Resources Development Canada  
Industry Canada  
International Development Research Centre  
Justice Canada  
Law Commission of Canada  
National Roundtable on the Environment and the Economy  
National Secretariat on Homelessness  
Parks Canada  
Policy Research Initiative  
Privy Council Office  
Public Service Commission

Romanow Commission on the Future of Health Care in Canada  
Statistics Canada  
Treasury Board Secretariat

***Provincial Governments:***

Alberta

- Human Resources and Employment

British Columbia

- Ministries of Health

- Ministry of Children and Family Development

Ontario

- Ministry of Community and Social Services

Newfoundland and Labrador

- Royal Commission on Renewing and Strengthening Our Place in Canada

- Newfoundland and Labrador Statistics Agency

Nova Scotia

- Department of Health

Saskatchewan

- Saskatchewan Social Services

***Municipal Governments:***

City of Toronto

Regional Municipality of York

***Foundations:***

Aga Khan Foundation Canada

The Atkinson Charitable Foundation

The Bertelsmann Foundation

Canada Millennium Scholarship Foundation

Canadian Health Services Research Foundation

The Change Foundation

Frosst Health Care Foundation

The Hospital for Sick Children Foundation

The Laidlaw Foundation

J. W. McConnell Family Foundation

The Muttart Foundation

The Neptis Foundation

***Associations and Other Organizations:***

AFP Foundation for Philanthropy – Canada

AFP Calgary Chapter

AFP International

AFP Toronto Chapter

Association of Fundraising Professionals (AFP)

Canadian Cancer Society

Canadian Institute for Health Information

Canadian Labour Congress  
Canadian Population Health Initiative  
Coalition of National Voluntary Organizations  
College of Physicians and Surgeons of Ontario  
Conference Board of Canada  
Federation of Canadian Municipalities  
The Learning Partnership  
United Way of Greater Toronto  
University of Toronto (Faculty of Law)





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