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.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0^s	not statistically significant
p	preliminary
r	revised
x	confidential
E	use with caution
F	too unreliable to be published

Highlights

In this issue

◼ Retiring together, or not

◼ Among 29% of dual-earner couples in which one spouse retired in 2001, the other spouse retired within two years. However, the most common pattern was for a wife to retire after her husband (43%).

◼ Dual-earner spouses appear to be retiring in a more independent manner. Between 1986 and 2001, the proportion of dual-earner spouses retiring within two years of each other declined by 2 percentage points and the proportion retiring within four years declined by 11 points. Conversely, the proportion of wives retiring five or more years later increased by 7 points; the proportion of husbands, by 4 points.

◼ Among the factors associated with spousal retirement transitions are the husband's age, the age difference between the spouses, receipt of Employment Insurance benefits, earnings and pension coverage.

◼ Work-related training

◼ Participation in job-related training supported by the employer remained fairly steady at about 23% from 1993 to 2002.

◼ However, participation in job-related training with no employer support rose from 4% to 10% over the same period, almost entirely because of full-time workers.

◼ Education is a prime driving force behind participation in job-related training, and its effect grew larger between 1993 and 2002 for women.

Perspectives

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Retiring together, or not

Grant Schellenberg and Yuri Ostrovsky

Retirement continues to change in many ways. This is certainly evident in terms of its timing, given the declining rate of labour force participation among older men between the 1970s and mid-1990s and its reversal in more recent years (Marshall and Ferrao 2007). Likewise, the process appears to be changing, given phenomena such as post-retirement employment (Schellenberg et al. 2006), phased retirement and diverse pathways into retirement (Nouroz and Stone 2006). Retirement is also changing in the extent to which it is being navigated by dual-earner couples.

Throughout much of the 20th century, older couples faced only one retirement decision—the husband's. Women who had paid employment during their life typically left the workforce at an early age to care for children and work on an unpaid basis in the home. However, with the dramatic rise and sustained participation of women in the paid labour force since the 1970s, retirement transitions of married couples have been transformed. Increasingly, couples must make two decisions rather than just one and must balance the preferences and constraints of partners who both make substantial contributions to household income.

This has added new complexities to retirement decisions. Researchers generally agree that couples prefer to retire together, in large part because retirement is more enjoyable when it can be shared with a spouse (Gustman and Steinmeier 2004, An et al. 2004, Moen et al. 2001, Szinovacz and Davey 2005). However, the opportunity to retire 'jointly' may be constrained by factors such as age differences, health conditions, pension eligibility, job loss and career aspirations.

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To date, evidence on spousal retirement transitions in Canada has been sparse. In the mid-1990s, about one-third of couples retired within one year of each other (Gower 1998). More recently, about half of couples approaching retirement intended to retire at the same time (Schellenberg et al. 2006). However, trends in the actual retirement outcomes of spouses have yet to be documented.

This article addresses several questions regarding retirements in dual-earner couples: the extent to which these spouses synchronize the timing of their retirements; the factors associated with taking one or another spousal pathway into retirement; and changes in spousal patterns of retirement through the 1990s (see *Data sources and definitions*).

With more wives employed, retirement becomes more complex

Most Canadians approaching retirement are married, which has changed little over the last 30 years. Between 1976 and 2006, the proportion of women aged 55 to 64 who were married or in a common-law relationship remained just over 70% (Table 1), while men in such relationships remained over 80%.[3] The most noticeable changes in marital status have been the

Table 1 Marital status of persons aged 55 to 64

	1976	1986	1996	2006
Men		%		
Married/common-law	85.8	83.9	83.3	80.0
Separated/divorced	3.7	5.5	8.2	10.6
Widowed	3.3	3.4	2.5	1.9
Never married	7.2	7.2	6.0	7.5
Women				
Married/common-law	70.8	71.3	72.1	71.6
Separated/divorced	4.7	7.5	10.9	14.3
Widowed	16.9	15.6	12.3	7.9
Never married	7.5	5.6	4.7	6.2

Source: Statistics Canada, Labour Force Survey.

Data sources and definitions

This study uses a 20% version of the **Longitudinal Administrative Database** (LAD), which is derived from taxation data. LAD files provide detailed information about both individual and family income for those who filed income tax forms between 1982 and 2005. The 20% sample is randomly selected from all tax-filing Canadians and, once selected, individuals remain in the sample for as long as they appear on the annual T1 Family File (T1FF). Census families are formed from the personal data that filers provide on other family members. Filers are attached to their spouses (legal or common-law) by social insurance number or by matching age, sex, address and marital status. Baseline labour force information comes from the monthly **Labour Force Survey**, which covers the civilian, non-institutionalized population in the 10 provinces.

Dual-earner couples approaching retirement are defined by identifying those with a husband 55 to 69 years of age. The sample is limited to couples in which both partners derive their earnings primarily from paid employment rather than self-employment and have average annual earnings of $2,000 or more over at least three consecutive years prior to the retirement of one or both.[1]

Retirement can be defined in various ways, depending in part on the information available (Bowlby 2007). While the LAD provides a great deal of income detail, it contains limited information on demographic and labour market characteristics. Consequently, retired individuals are identified on the basis of changes in their income characteristics over time—more specifically, when their annual earnings decline to less than 10% of their average during the three previous years *and* remain below that level over the next five years. For example, an individual with annual earnings of $75,000 over three years would be identified as retired if annual earnings dropped below $7,500 and subsequently remained below that amount. The definition allows for the possibility that retirees might maintain some involvement in paid employment and also recognizes that some people might 'come out of' retirement.[2]

Using these criteria, the retirement patterns of dual-earner couples in which at least one spouse retired in 1986, 1991, 1996 or 2001 were identified. For the 2001 retiring cohort, for example, both spouses had earnings of $2,000 or more in 1998, 1999 and 2000 (i.e. they were a dual-earner couple) and in 2001 the earnings of at least one spouse fell below the 10% threshold. Retirees whose spouse's earnings fell below the 10% threshold in 2001 or later were also identified.

increase in separated or divorced and the decline in widowed. For individuals approaching retirement without a spouse, this is usually the case due to divorce or separation rather than widowhood or never having married. (The retirement characteristics of these individuals are outside the scope of this article.)

The employment histories of women in these couples have changed markedly. In 1976, almost one-half of married women aged 55 to 64 were not in the labour force after age 40 (Table 2). Over one-quarter (27%) had never worked in a paid job and another 19% had last worked before 40. Given their limited involvement in the paid labour force, these women did not retire in the usual sense nor was their paid employment a consideration in their husband's retirement decision.

In 2006 the situation was very different. Less than 4% of married women aged 55 to 64 had never worked and only 10% had last held a paid job before age 40. Instead, the vast majority (77%) were either currently employed (48%) or had held a paid job at age 50 or older (29%). In short, most married women now retire from paid employment and most married couples face the possibility of joint retirement.

Table 2 Employment history of married individuals aged 55 to 64

	1976	1986	1996	2006
Men			%	
Currently employed	76.4	65.9	56.6	65.1
Not currently employed				
Last worked age 50 or older	18.5	26.9	34.4	26.4
Last worked age 40 to 49	1.6	2.2	3.7	3.8
Last worked before age 40	3.2	4.9	4.8	4.2
Never worked	0.3	0.1	0.6	0.5
Women				
Currently employed	24.9	28.2	33.2	48.0
Not currently employed				
Last worked age 50 or older	21.9	27.4	32.2	29.0
Last worked age 40 to 49	7.2	10.8	9.9	9.5
Last worked before age 40	18.7	22.3	15.6	10.0
Never worked	27.2	11.3	9.0	3.6

Source: Statistics Canada, Labour Force Survey.

Most wives retire after husbands

Among dual-earner couples in the 2001 retiring cohort, 29% of the spouses retired within two years of each other (Chart A). This includes couples in which both retired in 2001 (14%) and those in which one

Chart A   Spousal retirement transitions of the 2001 cohort varied considerably
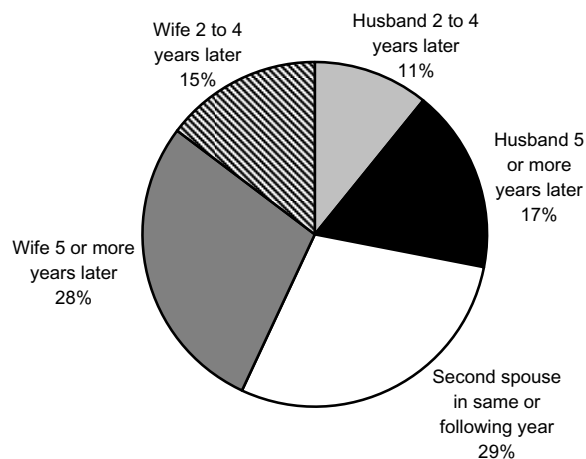
Source: Statistics Canada, Longitudinal Administrative Database.

spouse retired in 2001 and the other the following year (15%).[4] The incidence of joint retirement generally falls within a range of about 20% to 40% (Blau 1998, Hurd 1990, O'Rand and Farkas 2002, Johnson 2004, Gower 1998).[5] Furthermore, the tendency for joint retirement is supported by the clustering of retirements within a two-year period. But while a significant proportion of couples retired jointly, the most prevalent pattern was for women to retire after their husband. In 28% of retiring couples, the husband retired in 2001 and the wife had still not retired by 2005. In another 15% of couples, the wife retired two to four years after the husband. However, more than a quarter (28%) of wives retired first. This includes 11% of couples in which the wife retired in 2001 and the husband retired two to four years later, and another 17% in which the husband had not retired by 2005.

Some trends are evident (Chart B). Between 1986 and 2001, the proportion of dual-earner couples in which both partners retired within two years of each other declined by 2 percentage points. Furthermore, the proportion of wives retiring two to four years after their husband declined by just over 4 points, as did the proportion of husbands retiring two to four years after their wife. This 11-point decline in the middle of the distribution was offset by

increases at the ends. Between 1986 and 2001, the proportion of wives retiring five or more years after their husband increased by 7 points, while the proportion of husbands retiring five or more years after their wife increased by 4 percentage points. The same patterns were evident for the 1991 or 1996 retiring cohorts. Overall, this suggests that spousal retirement is becoming more disjointed.

Many factors influence spousal retirement

The probability of following one or another of these pathways into retirement is likely influenced by many factors, including age differences between spouses. To assess the relative importance of various factors, a multivariate model was constructed. The 1991, 1996 and 2001 retiring cohorts were pooled and a set of characteristics was introduced to determine their relationship to the likelihood of retiring in one way or another. The marginal effects of these characteristics show how much the predicted probability of taking a given spousal pathway into retirement changes when a specific characteristic is changed by a small amount (Table 3). For example, the model yields a predicted probability of joint retirement of 35.1% (that is, spouses retiring within two years of each other). A one-year increase over the average age of husbands increases the probability by 3.2 percentage points, with other characteristics remaining constant. (Pension contributions prior to retiring—an important variable— were not available for the 1986 cohort, so multivariate analysis was restricted to the 1991, 1996 and 2001 cohorts.)

The first three variables were the age of the husband, the age difference between the spouses, and whether the couple was legally married or in a common-law relationship.

The likelihood of spouses retiring jointly is greater among older than younger couples. A one-year increase in the age of the husband decreases the likelihood that either spouse retires five or more years after the other by about 2 percentage points, and increases the likelihood of joint retirement by 3.2 points. Perhaps not surprisingly, if a husband in a dual-earner couple is 65, his or his wife's retirement is likely to be accompanied (or closely followed) by the other's retirement. In contrast, if the husband is 55, his or his wife's retirement is less likely to be accompanied by the other's retirement. The other spouse is more likely to continue working.

Chart B   Spousal retirements becoming more disjointed

Source: Statistics Canada, Longitudinal Administrative Database.

The age difference between spouses also matters. A one-year increase in the age difference reduces the predicted probability of joint retirement by 2.1 percentage points and increases the probability of a wife retiring five or more years after her husband by 3.7 points. In short, a wife who is much younger than her husband is more likely to continue working after he retires than a wife who is about the same age as or older than her husband. The retirement patterns of couples in common-law relationships were not significantly different from those legally married.

Events en route to retirement may also influence spousal transitions. The loss of a job, for example, may force one spouse into retirement prematurely and reduce the prospects for joint retirement. Exposure to job loss was included in the model using a yes/no variable indicating if either spouse had received Employment Insurance

(EI) benefits in the year prior to retirement.[6] The receipt of EI benefits was significantly associated with spousal retirement patterns. Husbands and wives receiving such benefits were far more likely to retire before their spouse than those who did not receive them. For example, the predicted probability of a wife retiring five or more years after her husband increased by 11.1 percentage points if he received EI benefits prior to retiring. Likewise, the predicted probability of a husband retiring five or more years after his wife increased by 8.1 points if she received EI benefits prior to retiring. One interpretation is that when one spouse enters retirement via unemployment, the other continues working to shore up their financial resources. Indeed, in families with no working-age children, the earnings of wives increased following the layoff of their husband, offsetting approximately 22% of the husbands' earnings losses (Morissette and Ostrovsky 2008).

Interestingly, while a husband's receipt of EI benefits decreased the likelihood of joint retirement, a wife's receipt of EI benefits increased the likelihood. It is not clear why this is the case.

Financial characteristics were also important. Average earnings of husbands and wives prior to retirement were correlated with spousal retirement transitions. Specifically, compared with those earning less than $15,000, husbands and wives earning $45,000 or more were significantly less likely to continue working five or more years after their spouse's retirement (decreases in predicted probabilities of 4.9 and 3.7 percentage points respectively). Conversely, husbands and wives with incomes of $45,000 or more were significantly more likely to retire jointly, with the predicted probability increasing by 5.7 and 4.4 points respectively.[7] This is consistent with other studies (O'Rand and Farkas 2002) that found higher-income couples more likely to retire together.

The wife's contribution to a couple's total earnings prior to retirement was correlated with spousal retirement patterns. Specifically, a one percentage point increase in the wife's contribution to pre-retirement earnings was associated with a 0.2-point increase in the predicted probability that she would retire five or more years after her husband. One might speculate that wives who contribute a larger share of income shoulder greater responsibility for the financial well-being of the household and hence have greater incentive to continue working. However, the LAD does not provide information to test this hypothesis.

Table 3 Change in predicted probability of spousal retirement transitions

	Wife first			Husband first	
	Husband 5 or more years later	Husband 2 to 4 years later	Both spouses within 2 years	Wife 2 to 4 years later	Wife 5 or more years later
			%		
Predicted probability of outcome	**12.1**	**12.7**	**35.1**	**17.4**	**22.7**
Change associated with variation in:					
Husband's age	-2.1	0ˢ	3.2	0.7	-1.8
Age difference between spouses	-0.9	-1.2	-2.1	0.5	3.7
Common-law status[1]	0ˢ	0ˢ	0ˢ	0ˢ	0ˢ
Husband with Employment Insurance[2]	-6.8	-7.2	-5.3	8.3	11.1
Wife with Employment Insurance[2]	8.1	9.6	6.5	-9.0	-15.3
Husband's earnings					
$15,000 to $44,999[3]	0ˢ	0ˢ	0ˢ	0ˢ	0ˢ
$45,000 or more[3]	-4.9	0ˢ	5.7	0ˢ	0ˢ
Wife's earnings					
$15,000 to $44,999[3]	0ˢ	0ˢ	0ˢ	0ˢ	0ˢ
$45,000 or more[3]	0ˢ	0ˢ	4.4	0ˢ	-3.7
Wife's share of earnings	-0.2	-0.1	0ˢ	0ˢ	0.2
Husband contributed to pension[4]	-5.5	0ˢ	0ˢ	3.6	0ˢ
Wife contributed to pension[4]	-2.9	-2.4	-2.1	5.9	1.6
1996[5]	1.5	1.3	0ˢ	0ˢ	0ˢ
2001[5]	4.1	-2.4	-4.4	-2.6	5.3

1. Compared with legally married couples.
2. Compared with those not receiving Employment Insurance.
3. Compared with those earning less than $15,000.
4. Compared with those not contributing to a pension.
5. Compared with 1991.
Source: Statistics Canada, Longitudinal Administrative Database, 1991, 1996 and 2001.

Furthermore, whether husbands and wives in dual-earner couples made pension contributions prior to retirement was significantly correlated with retirement transitions. Specifically, compared with wives not making pension contributions, those who did so were significantly more likely to continue working after their husband's retirement and significantly less likely to retire first. For example, the predicted probability of a wife retiring two to four, or five years after her husband increased by 5.9 and 1.6 points respectively if she contributed to a pension.

Finally, the results of the multivariate model showed that, holding the characteristics discussed above constant, the predicted probability of dual-earner spouses retiring within two years of each other declined by 4.4 percentage points between 1991 and 2001, and the likelihood of retiring two to four years apart declined by about 2.5 points. In contrast, the likelihood of a wife retiring five or more years after her husband in-creased by 5.3 points and the likelihood of a husband retiring five or more years after his wife increased by 4.1 percentage points. This trend also held during the latter half of the decade, as husbands and wives were significantly more likely to retire five or more years after their spouse in 2001 than in 1996.

Conclusion

As a result of the widespread entry and sustained participation of women in the paid labour force, many Canadians now approaching retirement are part of a dual-earner couple. As such, the timing of their retirement can be assessed not only in terms their age, but also relative to the timing of their spouse's retirement. And just as the age of retirement has changed considerably, so too has the sequencing of retirement in dual-earner couples. Overall, evidence indicates that the retirements of such couples became increasingly disjointed through the 1990s.

From a research standpoint, one implication of this study is that identifying spousal retirement patterns simply as wife first, husband first or joint may miss an important part of the bigger picture. The growing disjointedness of spousal retirement is attributable to the declining proportions of husbands and wives retiring two to four years after their spouse and the increasing proportions retiring five or more years after. This shift would be obscured using broad wife-first/husband-first categories.

With the imminent retirement of the baby boom generation, much discussion focuses on how older workers might be encouraged to stay on the job (OECD 2006), and retirement incentives and constraints imposed by public programs, pension rules and workplace policies (OECD 2005). Spousal factors are another consideration, as an increasing proportion of older workers might take the plans and preferences of their partner into account when making their own retirement decisions. Such considerations could have either a positive or negative impact on labour supply. With husbands generally two to three years older than wives, a preference to retire jointly could be realized with wives leaving the labour force a few years earlier than they would have left otherwise, or with husbands working a few additional years. However, the potential impact of spousal considerations could be mitigated by the increasingly independent manner in which spouses in dual-earner couples appear to be retiring.

─────────── **Perspectives** ───────────

■ Notes

1. Identifying whether self-employed individuals are retired, based on changes in their net self-employment incomes, could be problematic. For example, a self-employed individual who is actively working may report negative or zero net self-employment income resulting from business losses or expenses. Hence, a year-over-year decline in net self-employment income might not necessarily signal labour force exit. Conversely, an individual receiving net income from self-employment might no longer be actively engaged in the workforce.

2. Two additional definitions of retirement were used in the early stages of analysis. Individuals were identified as retired when their annual earnings declined to zero following at least three consecutive years of $2,000 or more. Once identified as retired, earnings were not tracked in subsequent years to determine if they became positive again (i.e. the individual came out of retirement).

Individuals were also identified as retired when annual earnings declined to less than 10% of their average during the three years prior to retirement. This definition allowed for the possibility of some limited involvement in paid employment after their initial retirement. Once individuals were identified as retired, their earnings were not tracked in subsequent years. Trends in the timing of spousal retirement based on these definitions were comparable to those in the body of the article.

3. The Labour Force Survey does not provide information on marital history so the proportion who had divorced and remarried cannot be determined.

4. The precision of the estimate of relative timing of each spouse's retirement is limited by the annual earnings data. If one spouse retires at the end of January, his or her annual earnings for the year will likely fall below the 10% threshold and that spouse will be identified as a retiree. If the other spouse retires at the end of March the same year, his or her annual earnings will not likely fall below the 10% threshold, until the following year. Consequently, the spouses will be identified as having retired in two consecutive years, when in fact the dates were only two months apart.

5. Differences within this range are attributable to factors such as different data sources, sample selection criteria, age cohorts, reference periods and definitions of retirement. Blau tracks the labour force exits of a sample of persons born between 1906 and 1911 and estimates that 30% to 40% of spouses in dual-earner couples retired within one year of each other. Hurd examines a slightly younger cohort and estimates the incidence of joint retirement at about 25%, while O'Rand and Farkas track women in their 50s and early 60s from 1989 to 1997 and estimate the incidence of joint retirement at 33% to 39%. Johnson uses 1992 to 2002 and estimates the incidence of joint retirement at 19%. In one of the few Canadian studies, Gower estimates that about one-third of dual-earner spouses leave the labour force within one year of each other.

6. Individuals actively seeking employment are counted as unemployed by the Labour Force Survey. This could include older workers who come out of retirement or who look for work after leaving a career job. Such individuals may not have applied or qualified for Employment Insurance benefits, so they would be missed by the EI benefit variable. Consequently, the EI benefit variable is likely a weak proxy for unemployment. Furthermore, EI eligibility rules were tightened in the early 1990s so the receipt of benefits may be a better proxy for job loss in 1996 and 2001 than it was in 1991.

7. Simple cross tabulations show that wives with earnings of $45,000 or more are far more likely to retire five or more years after their husband than wives in lower

earnings categories. However, this bivariate correlation disappears when other characteristics, such as pension coverage and receipt of EI benefits, are taken into account.

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Work-related training

Matt Hurst

Lifelong learning has become a virtual career necessity. In nearly all industries, technological change is placing an ever-higher value on skills. This often requires some kind of training, whether it be learning to run a machine processing oil sands or to use software analyzing investments.

Not all pressures to train come from the employer—employees have their own objectives and motivations to pursue job-related training. The motivation may be to keep a job, get a promotion, or land a position with another employer. It is also linked to higher income (Hum and Simpson 2001, Lynch 1997). For example, an electrical engineer may take a course in a new computer system for power consumption management to gain increased responsibilities, an improved résumé, and hopefully a promotion. Non-economic reasons such as intellectual challenge or the excitement of learning something new also come into play.

Using the Adult Education and Training Survey (AETS), this article looks at how participation in job-related courses changed from 1993 to 2002 across a number of social and demographic characteristics. In particular, the factors

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affecting employer-supported training as well as training that is not employer supported are explored. Tabulations are complemented by a multivariate analysis (see *Data source and definitions*).

More training in the new millennium

Overall, participation in job-related course training increased from 1993 to 2002. Although participation rates fell by 3 percentage points from 1993 to 1997 (from 26% to 23%), they rebounded strongly in 2002, reaching 31% (Table 1). One Canadian study looking at both course and pro-

gram training, using the AETS, found a similar trend (Xu and Lin 2007). The increase in training at the turn of the millennium was also found in American studies of work-related training courses. In the United States, rates remained about the same at 22% and 23% between 1995 and 1999 (Creighton and Hudson 2002), then jumped to 27% in 2004/2005 (O'Donnell and Chapman 2006).

Employer support makes a difference

Job-related training is fairly common. Almost one-third of workers (about 3.9 million) took

Table 1 Participation in training courses by employed Canadians

	1993	1997	2002
	%		
Participation rate			
Total[1]	26	23(*)	31(*)
Employer support	23*	21*(*)	23*
No employer support (ref)	4	3(*)	10(*)
Courses per trainee	average		
Total	1.6	1.3(*)	2.0(*)
Employer support	1.6	1.3(*)	2.0(*)
No employer support	1.4	1.3	2.2(*)
Duration of all training courses	hours		
Total	45	43	57(*)
Employer support	40*	38*	56*(*)
No employer support (ref)	80	80	73

* significantly different from the reference category (ref) [p < 0.05]
(*) significantly different from the 1993 figures (p < 0.05)
1. Columns do not add to totals because of a small group of people who took one or more employer supported courses and one or more courses not supported by the employer.
Source: Statistics Canada, Adult Education and Training Survey.

Data source and definitions

The **Adult Education and Training Survey**[1] was conducted in 1994, 1998 and 2003 as a supplement to the Labour Force Survey (LFS) and asked about education and training activities in the previous year. The analysis was restricted to employed persons aged 25 to 64, yielding samples of about 19,500 for 1993, 16,200 for 1997, and 17,400 for 2002. Employed persons are people who had a job, including working students and the self-employed, in the week preceding the LFS interview. The sample is representative of Canada's 10 provinces, excluding persons living on Indian reserves, full-time members of the Armed Forces, and people in institutions.

This article is about people who take job-related course training. Job-related courses are any learning activity given through a course, workshop, seminar or tutorial. Self-directed learning is not included. No limits were placed on course length. A course was considered job-related if it was taken for a current or future job, rather than for personal interest or other reasons.

Program and course training participation rates differed across a number of important characteristics, but resource constraints precluded an analysis of both. Course training was chosen because it is the larger contributor to the overall participation rate. For example, in 2002, 86% of participants took one or more courses. The analysis excludes programs leading to a degree, certificate or diploma from accredited high schools, registered apprenticeship and trade or vocational institutions, colleges or CEGEPs, and universities. Courses taken for hobbies or personal development are also excluded.

The 1994 and 1998 surveys covered all training activities and asked whether they were job-related, but the 2003 survey asked only about job-related training. The effect of this change on the ability to compare mean participation rates from 2002 with earlier years is not known. However, the conclusions of this study are based on regression model results, which are not sensitive to the survey change in 2002.

For 1997 and 1993, employees were asked if employers "provide the training, pay for courses or transportation, give time off, or give support in any other way." For 2002, the main question used to identify an employer-supported course was whether the employer was "providing or paying for the training, allowing a flexible work schedule, providing transportation, or any other type of support." The latter version may have prompted more respondents to say their training was employer-supported since the concept of a flexible work schedule is broader than giving time off. For this reason, the 2002 participation rate for training without employer support may be underestimated.

Logistic regression was used to estimate the relationship between training participation and personal and job characteristics. The dependent variable is binary—equal to one for those who took at least one training course and zero for those who took none. An odds ratio for a particular group may be interpreted as how many times higher (or lower, if less than 1) their odds of participation are than that of the reference group.

Samples were divided into two groups—those who took training with employer support and those who took it without. Men and women were also considered separately, creating four groups in total.

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job-related courses in 2002, the majority employer supported. Employer support included providing training, paying for fees or transportation and providing flexible work schedules. Between 1993 and 2002, the participation rate for those taking employer-supported training remained steady at 23%. A study using the Workplace and Employee Survey, with a much shorter time span (1999 and 2001), had similar findings (Xu and Lin 2007). However, a small but growing group of people take courses with no employer support. The participation rate of that group more than doubled, from 4% to 10% from 1993 to 2002.

Although respondents were working at the time of the survey, some did not work in the reference year. In 1997, about 3% who had taken training without employer support had not worked that year. In 2002, this figure remained unchanged. This factor does not account for the increase in training without employer support.

The growing participation in training without employer support suggests a demand that is not being met by employers. If employers wanted employees trained, then it is likely that they would support training in some way. It appears training without employer support is solely the employee's decision. An employee may wish to self-finance training because its purpose is to obtain general skills applicable to a wide range of occupations. While general-skills training may be good for the employee, the employer may feel it increases the chances that the employee will change jobs, leading to a loss on their investment if they provide funding (Lynch 1997).

Data on training objectives, first seen in the 2003 AETS, support this notion. In 2002, 57% of people who took training with the objective of finding or changing jobs and/or starting their own businesses had employer support, compared with 82% who did not

have this objective. Similarly, 60% of employees seeking change took courses without employer support, whereas only 30% who did not have this objective took courses without support. Therefore the types of courses that help employees switch jobs, and may not be a good investment for the employer, are not given as much support. At the same time, employees appear to take this situation in stride, with only 3% of employees feeling that lack of employer support was a barrier to training.

Training with employer support

Not surprisingly, participation in employer-supported training is related to time spent at work. Full-time employees had higher odds of participation than part-timers (Table 2). For instance, in 2002, women who worked full time had twice the odds of training with employer support. For an employer, the funds invested in training pay off more for employees who work full days. Employers may also be less willing to invest in part-time employees, since these jobs are more likely to be temporary.

Type of work is also an important factor. Blue-collar workers, or those in clerical, sales and service jobs, are less likely to participate in training compared with people in professional or managerial jobs. In 2002, men and women in clerical, sales and service jobs had 0.6 times the odds of participating in employer-supported training compared with those in professional and managerial jobs. The results were very similar in 1993 and 1997.

Employees with longer tenure are more likely to undergo training than those with shorter tenure. For instance, in 2002, women with more than one year of tenure had more than twice the odds of participating in employer-supported training, after accounting for other factors. The opposite might be expected to be true, since a new job usually requires more training. One explanation for this is that employers might prefer to invest in training after the employee has shown loyalty to the firm so that their investment is not lost (Hui and Smith 2005). Another explanation is that new workers are often hired specifically for the skills they bring to the job, whereas longer-tenured workers may need refresher courses.

Employees in large organizations (more than 500 employees) are more likely than those in small ones (fewer than 20) to receive employer-supported training. This is not surprising since larger firms tend to have more developed and better-financed human resource departments to offer training. Also, employees in large firms have more opportunities to change jobs within their organizations. This lowers the training-investment risk for larger firms (Chowhan 2005).

However, this positive firm-size effect was reduced over time. For women and men, the odds of participating in the employer-supported training were 2.7 and 5.7 times higher in 1993 in large versus small firms, respectively, compared with only 1.8 and 2.2 times in 2002. This is reflected in the convergence of participation rates between small and large firms. From 1993 to 2002, men's participation in employer-supported training in small firms rose by 4 percentage points, while in large firms it dropped 7 points (Table 3). This latter drop is noteworthy since 38% of employed men worked in large firms in 1993, compared with 52% in 2002.

This growing alignment in participation rates for small and large firms might be a result of smaller firms conducting more computer-training courses and larger firms conducting fewer. Larger firms were early to introduce computers as productivity tools for employees. With computers new to the workplace, employees needed training to use them. However, no change was seen in the participation rates for courses taken in data processing and computer science technologies from 1993 to 2002, regardless of firm size.

Since the public sector has always been a staunch supporter of training, it is not surprising that its employees have a training advantage over their private-sector counterparts.[2]

For 1993 and 1997, not engaging in collective bargaining reduced the odds of participation in course training, but by 2002, no difference was evident.

Personal characteristics are also related to training. Both univariate and multivariate techniques show that 55- to 64-year-olds take less training than workers aged 25 to 34. While health, recreation and fitness courses could be helpful and easily transferable into retirement (Underhill 2006), this would not be the case for training that would be used only at work, such as for specialized software or machinery,.

Higher levels of education are associated with greater participation in employer-supported training—a result confirmed throughout the adult training literature. Furthermore, the effect of higher education for women was larger in 2002 than in 1993. Specifically, women

Table 2 Odds ratios associated with job-related employer-supported training

	Men			Women		
	1993	1997	2002	1993	1997	2002
			odds ratio			
Age						
25 to 34 (ref)	1.0	1.0	1.0	1.0	1.0	1.0
35 to 44	1.1	0.9	0.9	1.0	1.1	1.2
45 to 54	0.9	0.9	0.9	1.0	1.1	1.1
55 to 64	0.8	0.6*	0.6*	0.5*	0.8	0.8(*)
Less than high school (ref)	1.0	1.0	1.0	1.0	1.0	1.0
High school graduate	1.5*	1.9*	2.3*(*)	2.1*	2.1*	2.6*
Postsecondary diploma or certificate	2.3*	2.8*	3.3*	2.3*	2.5*	3.9*(*)
University degree	2.2*	2.7*	2.9*	2.3*	3.1*	5.4*(*)
No children (ref)	1.0	1.0	1.0	1.0	1.0	1.0
1 child	1.0	1.1	0.8*	1.4*	1.2	0.8(*)
2 children	1.2	1.3*	1.1	1.5*	1.1	1.0(*)
3 or more	1.0	1.3	0.8	1.1	1.2	0.9
No spouse (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Spouse	1.3*	1.4*	1.3*	1.0	1.0	1.1
Full-time job (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Part-time job	0.4*	0.5*	0.5*	0.5*	0.7*(*)	0.5*
Unionized (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Non-union	0.7*	0.8*	0.9(*)	0.8*	0.8*	1.0
Professional and managerial (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Clerical, sales and service	0.6*	0.7*	0.6*	0.5*	0.6*	0.6*
Blue collar	0.6*	0.6*	0.6*	0.4*	0.3*	0.4*
One year or less in job (ref)	1.0	1.0	1.0	1.0	1.0	1.0
1 to 6 years in job	1.6*	2.3*	1.5*	2.3*	1.8*	2.1*
6 to 20 years in job	1.8*	2.4*	1.6*	3.1*	2.4*	2.1*
20 and over	2.0*	2.9*	1.6*	2.7*	2.6*	2.4*
Firm size (employees)						
Less than 20 (ref)	1.0	1.0	1.0	1.0	1.0	1.0
20 to 99	2.1*	1.4*	1.6*	1.3	1.7*	1.3
100 to 500	2.6*	3.0*	1.7*	2.3*	2.3*	1.7*
Over 500	5.7*	2.6*(*)	2.2*(*)	2.7*	2.1*	1.8*(*)
Public sector (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Private sector	0.7*	0.7*	0.6*	0.6*	0.8*	0.6*
Newfoundland and Labrador	0.8	0.7	1.0	0.6*	0.7	0.9
Prince Edward Island	1.0	1.2	1.3	1.9*	1.1	1.0(*)
Nova Scotia	1.1	1.4*	1.3	0.9	1.2	1.7*(*)
New Brunswick	1.0	0.7	1.5*(*)	0.6*	0.7	1.2(*)
Quebec	0.7*	0.5*	1.1(*)	0.6*	0.5*	1.0(*)
Ontario (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Manitoba	1.2	0.9	1.3	1.2	1.1	1.2
Saskatchewan	1.2	1.5*	1.5*	1.2	1.2	1.2
Alberta	1.0	1.0	1.2	1.5*	1.2	1.2
British Columbia	1.2	1.1	1.2	1.4*	1.1	1.4*

* significantly different from the reference category (ref) [p < 0.05]
(*) significantly different from the 1993 figures (p < 0.05)
Source: Statistics Canada, Adult Education and Training Survey.

Table 3 Participation in employer-supported training

	Men				Women		
	1993	1997	2002		1993	1997	2002
				%			
Total	**23**	**20**(*)	**22**		**23**	**22**	**25**(*)
25 to 34 (ref)	21	18(*)	24		22	21	26
35 to 44	26*	21*(*)	24		26*	24	26
45 to 54	24	23*	22		24	24	27
55 to 64	15*	13*	14*		11*	13*	18*(*)
Less than high school (ref)	10	8	7(*)		7	7	6
High school graduate	19*	17*	18*		21*	18*	17*
Postsecondary diploma							
or certificate	27*	22*(*)	25*		25*	24*	28*(*)
University degree	34*	29*(*)	29*(*)		33*	33*	40*(*)
No children (ref)	20	16(*)	21		20	21	27(*)
1 child	22	21*	20		25*	24	24
2 children	27*	24*	26*		27*	23(*)	25
3 or more	23	24*	20		20	22	21*
No spouse (ref)	19	14(*)	20		23	22	26(*)
Spouse	24*	22*	23		23	22	25
Full-time job (ref)	23	21(*)	23		26	24	29(*)
Part-time job	6*E	9*E	9 *E		13*	15*	15*
Unionized (ref)	27	24(*)	30		30	28	38(*)
Non-union	22*	21	25*(*)		19*	22*	24*(*)
Professional and managerial (ref)	34	29(*)	29(*)		34	32	35
Clerical, sales and service	19*	16*	20*		16*	16*	17*
Blue collar	16*	14*	15*		8*	7*E	10*
One year or less in job (ref)	12	10	16(*)		10	12	14(*)
1 to 6 years in job	21*	19*	23*		21*	21*	26*(*)
6 to 20 years in job	26*	23*(*)	23 *(*)		29*	26*	27*
20 and over	27*	23*	22*		24*	27*	34*(*)
Firm size (employees)							
Less than 20 (ref)	10	10	14(*)		12	12	17(*)
20 to 99	19*	15*	22*		18*	22*	22*
100 to 500	23*	27*	26*		29*	28*	31*
Over 500	39*	27*(*)	32*(*)		33*	29*(*)	34*
Private sector (ref)	19	17(*)	18		16	17	17
Public sector	34*	32*	37 *		32*	31*	37*(*)
Newfoundland and Labrador	20	16*	22		18	17*	24
Prince Edward Island	21	17	22		36*	24(*)	27
Nova Scotia	25	26	24		22	27	34*(*)
New Brunswick	23	18*	27*		16*	19*	28(*)
Quebec	19*	13*(*)	22		16*	14*	25*(*)
Ontario (ref)	24	22	21		24	24	24
Manitoba	24	21	24		25	22	28
Saskatchewan	25	25	24		24	26	29*
Alberta	24	21	23		27	26	25
British Columbia	25	21	22		27	24	28

* significantly different from the reference category (ref) [p < 0.05]
(*) significantly different from the 1993 figures (p < 0.05)
Source: Statistics Canada, Adult Education and Training Survey.

who had a university degree had 2.3 times the odds of participating compared with those who did not finish high school in 1993, whereas, in 2002, the odds ratio was 5.4. So, having a better education had a larger positive effect in 2002 than in 1993 on the odds of training.

In 1993, having one or two children improved the odds of training for women. In 2002, having children had no effect.

In 1993, women in Newfoundland and Labrador, New Brunswick and Quebec had lower odds of participation in employer-supported training than women in Ontario. In Prince Edward Island, Alberta and British Columbia, their odds were higher.

Comparing 2002 and 1993 results for women, the odds of participation in several provinces changed to the point where they were the same as the Ontario benchmark. For Prince Edward Island, the odds fell from 1.9 times relative to those in Ontario in 1993 to 1.0 in 2002 (meaning the odds of participation were the same in both provinces). For New Brunswick and Quebec, the odds ratios increased to the Ontario level over the same period. In 2002, women in Nova Scotia and British Columbia had higher odds of participation than in Ontario.

In 1993, living in Quebec reduced men's odds of participation relative to Ontario. However, by 2002, this difference disappeared. Also in 2002, men in New Brunswick and Saskatchewan had higher odds of training than men in Ontario.

Training without employer support

As mentioned earlier, the participation rate for training without employer support is much lower than for training with employer support. Most people reported only one type of training (with employer support or without employer support)—rarely both (less than 1% in 1993, and only 2.5% in 2002).

Tenure is an important factor for those who undertake training activities on their own. Having more than one year of tenure lowers the odds of participation with no employer support for men and women (Table 4). For instance, men in 2002 with six years or more of tenure had two-fifths the odds of those with one year or less. Since less employer-supported training is offered to workers with less than one year of tenure, this suggests a training gap for recent hires.

Many are bridging the gap by taking training without employer support. However, the notion that employers do not supply enough training resources to employees seems unfounded, since only 2% of employees in 2002 with one year of tenure or less thought a lack of employer support was a barrier to training.

Men employed part time in 1993 had much higher probabilities of training without employer support than those with full-time employment. With less job security, part-time workers might be particularly keen to acquire the skills they need to do their jobs well, and therefore participate in training even without employer support. The effect was not seen in 1997 or 2002. This suggests that from 1993 to 2002, the odds of men in full-time jobs training without employer support increased relative to men in part-time positions. The incidence of training without employer support for men increases from 3 percent to 9 percent from 1993 to 2002, and for part-time workers there is no change (Table 5).

Workers in Quebec had lower odds of participating in training without employer support than those in Ontario.

The increase in the incidence of training without employer support from 1993 to 2002 was seen across all characteristics, with no one factor predominating. It is noteworthy that the odds of participating in training without employer support rose for men in full-time jobs from 1993 to 2002 relative to men in part-time employment.

Summary

The rapid change of pace in today's economy demands more skills from workers than ever before. One way to meet the need is by taking training courses (see *Courses are vey diverse*). From 1993 to 2002, the incidence of employer-supported training remained steady at 23 percent. However, the incidence of taking training without employer support increased from 4 percent to 10 percent over the same period. This suggests that Canadians have seen a clear need to improve their job skills using their own resources. Over this period, men in full-time employment participated more in training without employer support compared with those in part-time employment where participation levels remained the same. In 1993, 1997 and 2002, higher levels of education were associated with

Table 4 Odds ratios associated with training without employer support

	Men				Women		
	1993	1997	2002		1993	1997	2002
			odds ratio				
Age							
25 to 34 (ref)	1.0	1.0	1.0		1.0	1.0	1.0
35 to 44	1.5	1.3	1.1		1.9*	1.0	1.1(*)
45 to 54	0.9	1.1	1.2		2.0*	1.4	1.1(*)
55 to 64	0.3*	0.7	1.2(*)		0.7	0.7	1.2
Less than high school (ref)	1.0	1.0	1.0		1.0	1.0	1.0
High school graduate	2.5*	4.1*	2.3*		1.3	2.9	1.2
Postsecondary diploma							
or certificate	3.4*	4.1*	2.5*		2.6*	6.4*	2.4*
University degree	5.5*	7.3*	3.4*		2.8*	5.6*	3.4*
No children (ref)	1.0	1.0	1.0		1.0	1.0	1.0
1 child	3.3*	0.7(*)	0.7(*)		0.9	0.7	0.9
2 children	1.8*	0.6(*)	1.0		0.8	1.0	1.1
3 or more	1.6	1.0	1.1		0.9	1.1	1.1
No spouse (ref)	1.0	1.0	1.0		1.0	1.0	1.0
Spouse	0.5	1.3	1.0		1.2	0.6*(*)	0.8
Full-time job (ref)	1.0	1.0	1.0		1.0	1.0	1.0
Part-time job	4.2*	1.5	1.6(*)		0.8	1.0	1.1
Unionized (ref)	1.0	1.0	1.0		1.0	1.0	1.0
Non-union	0.9	0.8	1.1		1.0	1.6	1.3*
Professional and managerial (ref)	1.0	1.0	1.0		1.0	1.0	1.0
Clerical, sales and service	1.8*	1.6	0.8(*)		1.0	0.6*	0.6*
Blue collar	0.9	1.3	0.8		0.8	1.2	0.7
One year or less in job (ref)	1.0	1.0	1.0		1.0	1.0	1.0
1 to 6 years in job	0.4*	0.5*	0.6*		0.4*	0.3*	0.6*
6 to 20 years in job	0.3*	0.5	0.4*		0.3*	0.2*	0.6*(*)
20 and over	0.2*	0.2*	0.4*		0.4*	0.2*	0.7
Firm size (employees)							
Less than 20 (ref)	1.0	1.0	1.0		1.0	1.0	1.0
20 to 99	1.2	0.8	0.9		1.1	0.8	0.9
100 to 500	1.4	1.0	1.2		0.9	1.3	1.1
Over 500	1.2	1.5	1.1		1.0	1.0	1.4*
Public sector (ref)	1.0	1.0	1.0		1.0	1.0	1.0
Private sector	1.1	1.1	0.9		0.8	0.5*	0.8
Newfoundland and Labrador	0.9	0.5	1.2		0.4	0.8	0.7
Prince Edward Island	0.5	0.9	1.0		1.2	1.2	1.3
Nova Scotia	1.5	1.2	0.9		1.2	0.6	0.7
New Brunswick	0.6	0.5	0.6		0.4*	0.9	0.6
Quebec	0.4*	0.3*	0.4*		0.4*	0.2*	0.4*
Ontario (ref)	1.0	1.0	1.0		1.0	1.0	1.0
Manitoba	0.9	0.6	1.3		0.9	0.6	0.7*
Saskatchewan	0.8	0.4	1.1		0.8	0.5	0.7
Alberta	1.1	0.8	0.9		1.3	0.8	0.8
British Columbia	1.2	0.8	1.1		1.4	1.0	1.1

* significantly different from the reference category (ref) [p < 0.05]
(*) significantly different from the 1993 figures (p < 0.05)
Source: Statistics Canada, Adult Education and Training Survey.

Table 5 Participation in training without employer support

	Men			Women		
	1993	1997	2002	1993	1997	2002
			%			
Total	**3**	**3**	**9(*)**	**5**	**3(*)**	**11(*)**
25 to 34 (ref)	4	3	7(*)	4	4 E	10(*)
35 to 44	4E	2E	9(*)	5*	3(*)	10(*)
45 to 54	2*	2E	10*(*)	6*	3(*)E	11(*)
55 to 64	1*E	F	10(*)	2*E	F	11(*)
Less than high school (ref)	1E	1E	4(*)E	2E	F	4E
High school graduate	3*E	2*E	7*(*)	3	2 *(*) E	6*(*)
Postsecondary diploma						
or certificate	4*E	3*	8*(*)	6*	4 *(*) E	11*(*)
University degree	5*E	4*	15*(*)	7*	5*	17*(*)
No children (ref)	2	3	9(*)	5	4	11(*)
1 child	5*E	2(*) E	7	5E	2(*)E	9(*)
2 children	3	2E	9(*)	4	3	11(*)
3 or more	3E	3E	10(*)	5E	4 E	11(*)
No spouse (ref)	4E	3E	8(*)	5	5 E	10(*)
Spouse	3	2	9(*)	5	3(*)	11(*)
Full-time job (ref)	3	2	9(*)	5	3(*)	10(*)
Part-time job	12*E	5(*) E	13*	5	4	11(*)
Unionized (ref)	3	2E	6(*)	5	4 E	11(*)
Non-union	4	3	6(*)	5	2 *(*)	7*(*)
Professional and managerial (ref)	3	3	12(*)	6	5	14(*)
Clerical, sales and service	5E	3E	8*(*)	4	2 *(*)	8*(*)
Blue collar	2E	2*E	6*(*)	3*E	F	7*(*)E
One year or less in job (ref)	7	5E	11	10	7 E	11
1 to 6 years in job	3*E	3*E	9(*)	5*	3 *(*)	10(*)
6 to 20 years in job	3*	2*E	8(*)	3*	2*	11(*)
20 and over	1*E	1*E	8*(*)	F	2 *E	11
Firm size (employees)						
Less than 20 (ref)	3E	2E	6(*)	5	2(*)E	6
20 to 99	4E	2*E	5E	5E	2(*)E	6
100 to 500	4E	2E	7E	4E	4 E	8(*)
Over 500	3E	3E	6(*)	5	3(*)E	10*(*)
Private sector (ref)	3	3	8(*)	4	2(*)E	8(*)
Public sector	3	2E	11*(*)	6*	5*	13*(*)
Newfoundland and Labrador	3E	F	12(*)E	F	F	9(*)E
Prince Edward Island	F	F	10(*)E	6E	5 E	14(*)E
Nova Scotia	5E	3E	10(*)E	6E	F	10
New Brunswick	F	F	8(*)E	3*E	4 E	10(*)
Quebec	1*E	F	6(*)	3*E	1 *E	7*(*)
Ontario (ref)	3E	3	9(*)	5	4 E	12(*)
Manitoba	3E	2*E	11(*)	4E	3 E	9(*)
Saskatchewan	2E	F	10(*)	5E	3 E	11(*)
Alberta	4E	3E	9(*)	7	4(*)E	11(*)
British Columbia	4E	4E	11(*)	8E	4 E	13(*)

* significantly different from the reference category (ref) [p < 0.05]
(*) significantly different from the 1993 figures (p < 0.05)
Source: Statistics Canada, Adult Education and Training Survey.

Courses are very diverse

The concept of a job-related course is fairly broad. In 2002, the most frequently taken courses were in business, management and public administration. This is not surprising since a large portion of those taking courses are in professional or managerial jobs. In second and fourth places were mathematics, computer and information sciences; and architecture, engineering and trades. This likely reflects the importance of computer skills and information technology in the workplace, and the importance of training in the engineering and trades fields. In third and fifth places were health, recreation and fitness; and personal improvement.

In 1993, workers taking training averaged roughly 1.6 courses. This rose to two courses in 2002, and the average duration increased. Courses taken without employer support were about the same duration in both years.
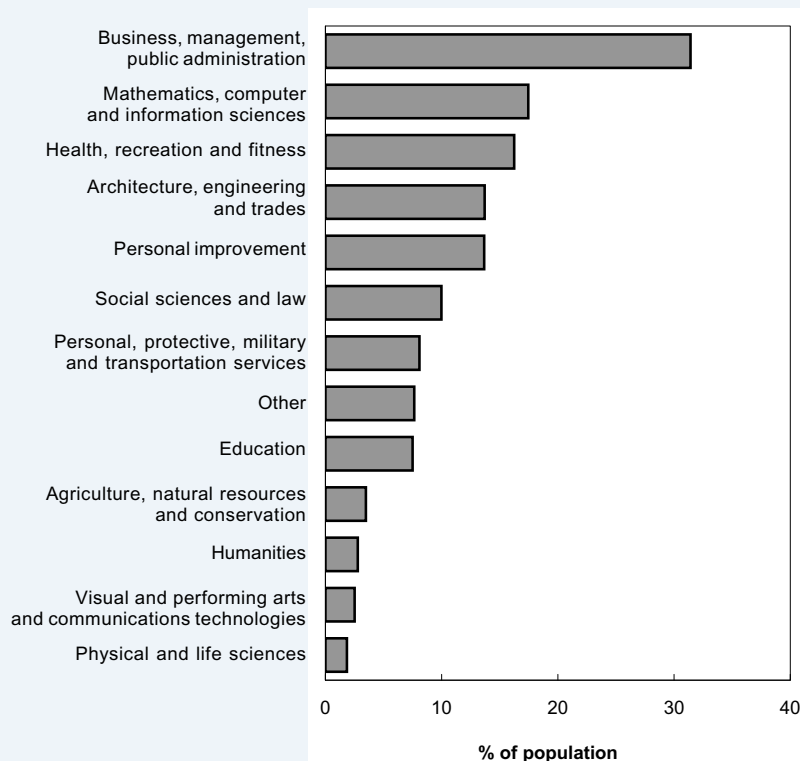
Note: Will not add to 100% because people can take more than one type of course.
Source: Statistics Canada, Adult Education and Training Survey, 2002.

higher odds of participation for Canadians who took training without employer support. Also, one year or less of tenure was associated with higher odds of participation.

For those taking training with employer support, a number of key factors also influenced their participation rates. Higher education levels, more than one year of tenure, larger firm size, professional or managerial work, and public-sector employment led to higher odds of training participation for each year examined (1993, 1997 and 2002). For women, the period from 1993 to 2002 saw an increase in the impact of education on participation, which is particularly important given the already large effect of education relative to other factors examined.

Perspectives

■ **Notes**

1. Information in the AETS will now be collected in the Access and Support to Education and Training Survey from Statistics Canada, scheduled to start in 2008.

2. Public-sector employees are those in public administration at the federal, provincial and municipal levels, as well as in Crown corporations, liquor control boards and other government institutions such as schools (including universities), hospitals and public libraries.

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Running a census in a tight labour market

Ted Wannell

Canadians value government services that are timely, cost effective and appropriate to their needs (Marson 2007). Many services—such as schooling, health care, public transit and immigration support—require information on small geographic areas for effective delivery. Moreover, accurate population counts are needed to determine the intergovernmental transfers that support these services. The Census of Population is conducted every five years to meet the needs of all levels of government in serving the public.

In addition to supporting service delivery, the census also enables research on a wide range of social and economic issues. Income inequality, returns to education, the integration of immigrants and changing patterns of employment are just a few of the topics that have been explored with census data. Moreover, demographic information is of great value to Canadian businesses, providing them with commercial opportunities.

While the census provides input to a number of other government activities, it is a huge and labour-intensive activity in and of itself. A small core of project managers within Statistics Canada begins planning each census years in advance. In the year leading up to the census, hundreds of Statistics Canada employees are reassigned to temporary duties in the design, development and implementation of the census. Finally, thousands of temporary workers are hired to conduct the footwork necessary to complete the collection fieldwork. For the 2001 Census, 36,000 enumerators and other field staff were hired.

Although census content remains relatively consistent across time,[1] Statistics Canada is continually examining means to remain relevant to evolving information needs and to maintain and improve the quality of the data, the sense of confidentiality for respondents and the efficiency of operations. To advance these aims, the inner workings of the 2006 Census experienced greater changes than they had for decades. Most conspicuous to respondents was the collection methodology.

2006 Census innovations

In the past, census forms were distributed and picked up by enumerators at every dwelling in the country. Enumerators put a very personal face on census collection, strengthening the connection between community-based collection and downstream community benefits. Even though most of the forms were filled out by respondents without enumerators present, the impression that enumerators recruited from their own neighbourhoods might see their personal data was a perceived confidentiality issue for some.

For the 2006 Census, for the first time, forms were mailed out to 70% of households. In the remainder of the country, addresses needed to be verified by enumerators who left questionnaires at the same time (list/leave areas). Both sets of households then had the option to return their paper forms by mail or online, using a secure Internet form. For all returns, quality issues and incompleteness were dealt with by telephone follow-up from one of three central locations. The Internet form had automated quality checks built in so that the amount of follow-up was significantly lessened. Overall, one in five households responded by Internet, the highest proportion among countries that have introduced an Internet-response option.

Changes to data capture and processing were less visible to the public but nevertheless integral to the overall plan. Capture operations were centralized in Ottawa-Gatineau and automated through the use of high-speed scanners and software able to digitize handwritten responses.

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Even though the primary motives for the changes were to provide response options, increase long-term efficiencies and address privacy concerns, the new processes also resulted in a significant reduction in anticipated staffing. Since enumerators had fewer tasks to complete relative to earlier censuses, they could cover larger areas and thus fewer needed to be hired and trained. Moreover, the built-in quality controls in the Internet forms were designed to reduce the volume of call-backs required to resolve missing or incomplete responses. Overall, these and other changes led to a drop in planned temporary staffing from 36,000 in 2001 to some 27,000 in 2006.

As is common with large-scale projects and now required by federal government policy, the 2006 Census operated under a risk-management framework. Some of the significant risks identified during planning were the development schedule for all the new information-technology components, the functionality of the Internet forms, the ability of the hardware to handle Internet traffic at peak times, and the ability to recruit enumerators in several cities in Alberta with very tight labour markets. In the end, technological developments came off very well, but labour shortages proved to be more acute and widespread than anticipated.

A hot labour market

In 2006, the census took place in the hottest labour market in a generation. In the 12 months leading up to the May 16 Census Day, the economy had added more than 400,000 full-time jobs while shedding 36,000 part-time positions (Statistics Canada 2006). In May alone, full-time employment increased by 151,000. Nationally, the unemployment rate was at a 32-year low of 6.1%. The unemployment rate dipped to 3.4% in Alberta and was under 5% in all provinces west of Ontario. Although unemployment was somewhat higher in eastern Canada, many regions were nevertheless at long-term lows.

The accelerating demand for employment had an inflationary impact on wages. While the Consumer Price Index had increased 2.8% in the preceding 12 months, average earnings were up 3.8%. In the tight Alberta labour market the increase was 7.3%. As a point of reference, average hourly earnings were $19.60 nationally and $20.95 in Alberta, compared with the legislated rate of $11.88 for enumerators and $15.62

for supervisors (or piece-rate equivalents). These rates were set to account for the generally tighter national labour market in 2006 and a different mix of tasks compared with 2001.

The big day approaches

Since the 2006 Census was to rely heavily on the mail-out of forms, it was important that they be mailed to correct addresses. Addresses were generated from a central database, the Address Register (AR), based on information collected from the past few censuses and updated through a variety of sources, including field verification. The field verification of the address information from the AR is called 'block canvassing' and it represents the first labour-intensive field work of the census cycle. Block canvassing for the 2006 Census was carried out in two waves, beginning in September 2005 and ending in April 2006. The late block canvassing focused on areas like new subdivisions, where changes to the list of addresses were expected. Approximately 2,000 temporary workers were hired for block canvassing, with no major problems being encountered.

In the weeks before census day, the technological innovations were the foremost concern of the management team—particularly the Internet application. A team of external experts had certified the security of the Internet applications, but would the online form engage respondents and perform under such real-world situations as dropped connections and user-based interruptions? Would the hardware handle the volume? To experience, as best as possible, census day conditions, the application underwent a series of automated volume tests simulating large numbers of concurrent users prior to going live.

On census day and during the following weeks, the Internet application worked very well. The number of respondents who could log on at one time was limited in order to avoid bogging down the system, but this 'graceful deferral' had to be invoked only for six hours on Census Day. (The peak was on Census Day when the total number of responses was almost 300,000.) Respondents who were deferred were asked to come back and try later—in many cases that meant only a few minutes. Overall, one in five respondents chose to use the Internet, which was at the high end of the forecast range. And the data proved to be of high quality relative to paper responses.

The role of enumerators

As mentioned earlier, 70% of households live in areas covered by the AR. They received their census forms—along with the invitation to respond by Internet—in the mail about one week before census day. The delivery of census forms to households not covered by the AR (list/leave) represented the first major task for the small army of census enumerators. It took place about the same time as the mail-out—in the two weeks leading up to census day.

Since the accuracy of population estimates for small areas is important for the delivery of public services such as education and programs for the elderly, achieving consistently high response rates across the country is a key objective of the census. The second major task for enumerators was to follow up on households from which no response, either by paper or Internet, had been received 10 days after census day. The enumerators had to determine whether the dwelling at the address was indeed occupied and, if so, collect the form from occupants or help them complete the form. Non-response follow-up was to have continued into July with collection activities wrapping up by the end of that month.

Enumerators were hired by a network of local field offices according to standards and wage levels set in federal legislation. The network consisted of 3 regional centres, 36 local offices and 38 sub-local offices. Hiring for list/leave and non-response follow-up operations began in April 2006 with the goal of hiring 27,000 enumerators in phases during this process. Approximately 260,000 applications were received.

The first signs of problems

Past censuses have run into hiring difficulties in localized areas with tight labour markets. As identified in the risk management document, some difficulties were expected in Alberta where unemployment was at an unprecedented low and wages were rapidly rising. The 2006 wage rates had been set to account for a tighter labour market and the more skill-intensive follow-up work, but once the rates had been legislated few options were available. To make the temporary enumeration jobs as attractive as possible, some enumerator positions were offered at supervisors' pay rates where shortages were most acute.

While response to recruitment efforts seemed adequate in the aggregate, the geographic distribution of applicants was very uneven. In areas covering 9,000 collec-

tion units and representing about 4,500 jobs no applications were received. These were mainly rural areas. Thus it was evident early on that enumerators from adjacent units would have to be moved in to cover the workload. Moreover, many of those who did report were willing to work only part-time hours. Although these problems were particularly acute in hot labour markets in Alberta, a number of other trouble spots cropped up: Vancouver, Toronto and Montreal, without question, but also medium- and smaller-sized cities in Ontario and Atlantic Canada (e.g. rural and bedroom communities just north of Toronto—Orangeville, Stouffville/Uxbridge; Halifax/Dartmouth; and eastern P.E.I.).

Overall, no more than 17,000 enumerators were on the job at any point during the 2006 Census. This number dwindled rapidly to 9,000, with only 3,000 willing to work more than 20 hours per week.

Although the labour issues appeared early in the collection period, the scope and acuity of the problems did not become evident until interim response rates were tallied in preparation for non-response follow-up. Response rates were slightly lower than anticipated across the country and were particularly low in the areas with list/leave hiring problems. These two observations had several implications. First, without a late wave of responses, non-response follow-up would generally require more labour input than anticipated. Second, the demand for this labour would be greatest in areas where hiring difficulties were most acute. Finally, the patterns of non-response could lead to data quality problems if they weren't successfully addressed in the follow-up.

Assessment and response

The risk-management framework is intended to guide response to these types of problems. Since the early returns indicated widespread non-response issues, some national-level responses were required. The first was to extend the Census communications program, which normally tapers off after the collection period. The program emphasized the importance of the census and highlighted the two response options. The second general response was to extend the collection period for one month.

The decision to extend the collection period was influenced by very positive experiences on the technical side. The Internet application was working well, producing very clean data and, as mentioned, the level

of use was at the high end of expectations. The high-speed scanners were working to specification in the central processing facility and passing good volumes of data for further processing. One important aspect of processing is a loop-back to telephone follow-up where incomplete responses are noted by quality control software. The high quality of the Internet response data and the quick pass-through from the scanned data resulted in a lower volume of work and rapid progress for this manual process. Thus it was anticipated that the collection period could be extended, at least for a short period, without affecting subsequent processing and dissemination milestones. It also provided the opportunity to try another process innovation, shifting some non-response follow-up from field enumerators to the telephone unit that had been doing the failed edit follow-up.

Another piece of the technological puzzle would help guide the non-response follow-up. Since individual responses could be coming from either the Internet or paper forms, a control file that integrated responses from both sources was required. This file was continually updated and could therefore be used to direct the most intensive follow-up activities to areas with the lowest response rates.

With the extension of the collection period and the geographic targeting of activities, the human resource philosophy of non-response follow-up gradually changed from trying to hire more people to more effectively using those already on the job. As overall response rates inched upwards and were tallied in the control file, active collection management could kick in. Enumerators in areas with high response rates were shifted to nearby areas with low response rates. For example, enumerators from suburban or nearby rural areas would be shifted to city centres where response rates were generally lower. This shifting of resources had occurred in previous censuses, but not to the extent required in 2006.

While the movement of enumeration 'triage' teams was effective in many areas, in others widespread labour shortages or other difficulties (like the reluctance of some rural enumerators to work in downtown neighbourhoods) called for further escalation. Several weeks into the collection extension, it was clear that adequate response rates could not be achieved for some areas with available staff in the region. With the volume of processing winding down, temporary workers from the Ottawa processing centre were recruited for local

non-response follow-up since Ottawa was one of the problem areas. More significantly, a call went out to headquarters employees to volunteer for follow-up activities in other areas where non-response remained high—particularly Alberta. Overall, some 400 employees responded to the call and 130 were selected and trained. Most were deployed to Alberta for non-response follow-up and, working long hours, provided the push required to achieve adequate response rates in many areas. A peripheral benefit of this exercise is that ongoing staff now have a better appreciation for some of the collection challenges and issues faced by field staff.

Downstream consequences

Large-scale collection activities and the Internet application were cut off at the end of August. As a result, processing activities had to be extended until mid-October. Review of the remaining milestones indicated that compressing the activities to meet the original dissemination targets presented unreasonable risks to the quality of the information to be released. Therefore, in October 2006 the decision was made to set back the first release date by one month. Since the technological innovations had been anticipated to speed up the release schedule by one month compared with the 2001 Census, in the end, the labour-shortage issue offset the gains from the technological advances.

In terms of data quality, it is difficult to pinpoint the impact of labour shortages. Response rates to all surveys have generally been declining in recent years and the census proved to be no exception, as evidenced by somewhat lower than anticipated response rates across the country. Certainly, some areas presented particular difficulties, resulting in unprecedented actions. Active collection management limited the impact, but some variation in results persisted. Overall, a response rate of 98% had been targeted for the 2006 Census collection activities, while the actual rate achieved was 97.3% (comparable to the 98.4% in 2001). Of the 47,500 collection units across the country, 55% achieved the benchmark, 35% were certified with somewhat lower rates, and the remaining 10% were accepted with an average response rate of 94% after remedial actions (Office of the Auditor General of Canada 2007). More detailed data-quality indicators are produced along with census releases and through specialized post-censal studies.

Obviously some of the measures taken to increase response rates in the most affected areas resulted in relatively higher collection costs in those areas. But these higher-than-expected costs were managed within the context of greater-than-expected savings from technological developments and the lower-than-expected staffing levels early in the collection period. As a result, the 2006 Census was managed within its allotted budget. An examination of the management of the 2006 Census by the Office of the Auditor General concluded the actions taken appropriately balanced accuracy, timeliness and cost.

Lessons learned

Although considered the riskiest aspect of the 2006 Census, the process and technological innovations contributed significantly to the overall operation. The mail-out of questionnaires using the Address Register reduced listing costs and increased respondents' sense of confidentiality. The Internet-response option yielded high-quality data with little need for post-collection follow-up. The paper questionnaire scanners performed to specification resulting in significant savings compared with manual entry. The master control system required to integrate the paper and Internet responses increased the ability to actively manage the non-response follow-up process. All of these positives helped to offset the difficulties encountered on the human resources side.

Given these successes, the 2011 Census will re-use the 2006 technological approaches while increasing the targets for mail-out areas and the Internet. Through further investments in the Address Register in the coming years, the target for mail-out coverage will be increased from 70% in 2006 to 80% in 2011. As for Internet response, the aim is to almost double the rate to 40%. This seems attainable since recent polling by a private contractor indicated that the Internet was the preferred method of survey response by over half of those polled.

Achieving these goals should also significantly reduce the labour input required for the list/leave and failed edit (telephone) follow-up operations.

Even assuming the best-case scenarios for Address Register development and Internet-response take-up, the 2011 Census will remain a labour-intensive undertaking requiring approximately 20,000 temporary workers. Plans to minimize the type of staffing difficulties encountered in 2006 include a higher hourly pay rate, improved geo-mapping tools to better match applicants to available positions, a streamlined hiring process to more quickly confirm to applicants if they have been retained for jobs, improved communication strategies, and additional tools for recruiters (like labour-force profiles for their respective areas).

Perspectives

■ Note

1. Changes to the forms (particularly the long form) do occur over time, subject to a prescribed consultation process during each inter-censal period.

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