

Dependence-free life expectancy in Canada

by Laurent Martel and Alain Bélanger

In 1901, a woman born in Canada could expect to live, on average, until the age of 50, and a man until the age of 47. Only 44% of women and 38% of men reached the age of 65. The minority who did reach 65 could hope to live about another 10 years.

Nearly a century later, the situation has changed greatly. As a result of public health measures and new medical knowledge and interventions (particularly vaccination), infectious and parasitic diseases common throughout Canada in the early 1900s are now virtually unknown. Today, a newborn male can expect to live an average of 75.7 years and a female 81.4 years.¹ More than 80% of men and almost 90% of women will live to celebrate their 65th birthday. With people routinely reaching retirement age, much of the population now experiences a new phase in the life cycle: a “third age”, a period lived in good health, free of work obligations that can be devoted to the fulfillment of personal goals. Only in the “fourth age” does an individual see health deteriorate to the point where activities are limited.

But while the increase in expected longevity is encouraging at the individual level, it does raise concerns at

the societal level. This is especially true in the context of below-replacement fertility,² when the proportion of older people in the general population is rising. Health authorities are already warning of considerable increases in the costs of health care and related services as seniors of advanced years begin to experience deteriorating health. Yet the aging of the Canadian population will not really begin to accelerate until 2011, when the vanguard of the baby boom generation reaches age 65.

This article uses the measure of dependence-free life expectancy to ask whether the additional years of life gained over the last decade are being lived in good health. It identifies four basic states of health — dependence-free, moderate dependence, severe and institutionalized — and estimates the number of years in which Canadian seniors can expect to live in each health state.

This article is adapted from “An Analysis of the Change in Dependence-Free Life Expectancy in Canada between 1986 and 1996,” *Report on the Demographic Situation in Canada, 1998-1999*, Statistics Canada Catalogue no. 91-209-XPE.

Living longer may not necessarily mean living in good health

Although there was a steady increase in life expectancy throughout the 20th century, it might not necessarily have been accompanied by a similar increase in healthy life expectancy. Because it is an indicator of mortality, it has become common to link improvements in life expectancy with a healthier population. However, this implicit positive association between mortality and morbidity — that is, that people live longer because they are healthier — is by no means certain. According to the theory of “the

1. Estimates for 1996. *Health Reports*, Statistics Canada Catalogue no. 82-003-XPB; 11, 3, Winter 1999.

2. Replacement level fertility (the number of children needed to sustain current population levels) is 2.1 children per woman. The Canadian fertility rate in 1998 was less than 1.6 children per woman.

Data in this article come from the 1986 and 1991 Health and Activity Limitations Surveys (HALS) and the 1996-97 National Population Health Survey (NPHS). HALS was designed to contribute to a national database on disability and collected data on the nature and severity of disabilities, barriers faced in everyday life, use of and need for assistive devices, and out-of-pocket expenses related to disability. The 1996-97 NPHS was designed to collect information about the health of Canadians and asked in-depth questions covering topics such as health status, activity limitations, presence of chronic health conditions, contact with health professionals, use of medication, and mental and psychological well-being.

Life expectancy: remaining number of years of life that can be expected based on current mortality conditions.

Dependence-free life expectancy: number of years of dependence-free life that can be expected based on current mortality and morbidity conditions. Obtained by multiplying the prevalence of each health state in the population with the number of person years derived from life tables.¹

Health status: an individual's level of health in relation to their level of dependence on others for assistance. On this basis four health states were defined:

Dependence-free/good health: includes those individuals who stated that they do not need assistance, with the possible exception of heavy housework.

Moderate dependence: includes those individuals who need assistance with meal preparation, shopping or everyday housework.

Severe dependence: includes those persons who need a high level of assistance, including needing assistance to move about or for their personal care.

Institutionalized dependence: due to the very high level of assistance required by these individuals, they reside in an institution where they can receive specialized care. (The number of individuals living in these health establishments was estimated from the censuses for the corresponding years.)

Mortality: the effect of death on the population.

Morbidity: the effect of illness, sickness or disease on the population.

1. Using the method described by D.F. Sullivan. 1971. "A Single Index of Mortality and Morbidity", *HSMHA, Health Reports*, 86: 347-354.

An opposing view is presented by the "limited life span" theory, which argues that there is a finite limit to life expectancy and it will never be possible to extend it much beyond an average of 85 years. If further improvement in life expectancy is indeed limited, then future progress would come mainly through reductions in illness or disease. Supporters of this theory believe that the quality of life during the "third age" can be achieved by adopting a healthy lifestyle — for example, not smoking and participating in regular physical activity — that could delay or even prevent the onset of chronic diseases. In other words, although people will not live much longer in the future than they do now, gains may still be possible in the area of morbidity.⁴

Dependence-free life expectancy is improving

Mortality rates for infants, youths and active adults in Canada today are reaching levels that cannot easily be compressed further. Thus, it is most likely that future improvements in life expectancy will come from progress made in old age. In fact, considerable gains have been made in just one decade.

3. Verbrugge, L.M. 1984. "Longer Life but Worsening Health? Trends in Health and Mortality of Middle-Aged and Older Persons," *Milbank Memorial Fund Quarterly / Health and Society*, 62, 3: 475-519; Crimmins, E. M. 1990. "Are Americans Healthier as Well as Longer-Lived?" *Journal of Insurance Medicine*, 22, 2: 89-92; Olshansky, S.J., M.A. Rudberg, B.A. Carnes, C.K. Cassel and J.A. Brody. 1991. "Trading Off Longer Life for Worsening Health," *Journal of Aging and Health*, 3, 2: 194-216.
4. Fries, J. F. 1983. "Aging, Natural Death, and the Compression of Morbidity," *New England Journal of Medicine*, 303, 3: 130-135; 1983. "The Compression of Morbidity," *Milbank Memorial Fund Quarterly / Health and Society*, 61, 3: 397-419; 1989. "The Compression of Morbidity: Near or Far?" *Milbank Quarterly*, 67, 2: 208-232.

expansion of morbidity,"³ the degenerative or chronic diseases of old age will remain common while medical and technological advancements will make it possible for older individuals to survive longer in a state

of incapacity or dependence. As a result, this hypothesis suggests that greater longevity may become increasingly synonymous with a longer period of declining physical or mental health.

In 1986, a 65-year-old man could expect to live, on average, for an additional 15 years; for 80% of this time (12 years), he could expect to enjoy dependence-free health. A 65-year-old woman was likely to live another 19.4 years, and 66% (12.7 years) of her remaining life would be in good health.

By 1996, life expectancy for a man at 65 had improved by 1.1 years, most of which (0.7 years) was dependence-free. Overall life expectancy for a 65-year-old woman did not improve much (0.6 years), presumably because her life expectancy was already high, but she had gained an additional 0.8 years of good health during the decade.

The changes in dependence-free life expectancy observed between 1986 and 1996 suggest that, in the future, it will be increasingly difficult to push back women's mortality, but that gains may still be possible in the area of better health. Lower life expectancy for men indicates that further improvement in both mortality and morbidity has yet to be seen. Moreover, these results also suggest that "old age" is a quite different experience for men than for women.

Women are less healthy in old age

It is possible to calculate, for each age group, the proportion of remaining years of life that will be lived in a state of dependence-free good health and moderate, severe or institutionalized dependence.⁵ For example, men aged 65 to 69 in 1996 could expect to live an additional 16 years. The majority of these years (12.7) would be dependence-free; but men would also spend 1.5 years in moderate dependence needing help with tasks like meal preparation and shopping; 1.1 years in severe dependence relying on assistance with tasks like moving about the house or personal care; and 0.8 years in an institution. Women in the same age group have another 20 years' life expectancy; many of their remaining years will be dependence-free (13.5),



Dependence-free life expectancy at age 65 has improved for women and men

	Men			Women		
	Life expectancy	Dependence-free life expectancy	Expected years of dependence	Life expectancy	Dependence-free life expectancy	Expected years of dependence
Years remaining						
Age 65						
1986	15.0	12.0	3.0	19.4	12.7	6.7
1991	15.8	12.2	3.6	20.0	12.8	7.2
1996	16.1	12.7	3.4	20.0	13.5	6.5
Percent of years remaining						
Age 65						
1986	100.0	80.0	20.0	100.0	65.8	34.2
1991	100.0	77.3	22.7	100.0	64.3	35.7
1996	100.0	78.8	21.2	100.0	67.6	32.4

Source: Statistics Canada, Demography Division, Research and Analysis Section.



Maintaining autonomy in an aging society

Helping people to maintain their autonomy into old age is probably the most effective strategy to adopt when faced with the dual challenges of an aging population and funding constraints on health services. However, health policies centred on this principle must be based on a clear understanding of the determinants of dependence. Statistics Canada's longitudinal National Population Health Survey, which allows researchers to establish causal links between people's health status and the extent of their dependence, is contributing to the improvement of knowledge in this area. New studies indicate, for example, that some chronic illnesses (like diabetes), low income, lower educational attainment, and being overweight or obese increases the likelihood of becoming dependent in later life.¹ Other factors, like smoking or having a stroke, present a double jeopardy: they can increase a person's risk of losing autonomy and then reduce the chance that he or she will recover independence later.

It seems almost certain that healthy habits nurtured over a lifetime — not only in the retirement years but also throughout the life cycle — contribute to the maintenance of autonomy as a person ages. In this sense, seniors in the future will most probably remain independent longer than seniors do today, having benefited earlier from an understanding of how to safeguard their health.

1. Martel, L., A. Bélanger and J.-M. Berthelot. 2000. "Risk factors associated with transitions between functional states: Some results from the NPHS longitudinal panel." Paper presented at the 12th REVES Conference, Healthy Life Expectancy — Linking Policy and Science. Los Angeles, March 20-22, 2000.

5. Although people with moderate and severe dependence are still living in private households, they rely on others to perform or assist in performing tasks that must be done each day. This reliance can generate significant costs — whether in time or money — for the individual's informal support networks (family, friends and neighbours) and/or for the health care system (for example, home care, volunteer organizations and so on).

but they will spend 2.7, 1.6 and 2.1 years, respectively, in states of increasing dependence.

Of most immediate concern for policy-makers and the health care system, however, is the estimated dependence-free life expectancy of seniors aged 85 and over. This age group is the fastest-growing component of the senior population (their numbers have almost tripled since 1971, to 380,000 in 1998)⁶ and the most likely to suffer from ill health. The estimates of life expectancy by health status show that men over 84 will spend just over 40% of their remaining 3.7 years dependence-free. This is far from being the case for women the same age, who can expect to spend only a quarter (1.1 out of 4.3 years) of their remaining years dependence-free, while the greatest part of the remaining years (1.5) will be spent in a health care institution.

This paradox is explained by the nature of the diseases that afflict men; generally they are more likely to be victims of acute illnesses that kill fairly quickly, such as heart disease. Women are more likely to suffer chronic diseases like arthritis, rheumatism and hypertension, which are debilitating but not fatal, thus prolonging the period of their life passed in ill health.⁷

Towards a compression of morbidity in Canada?

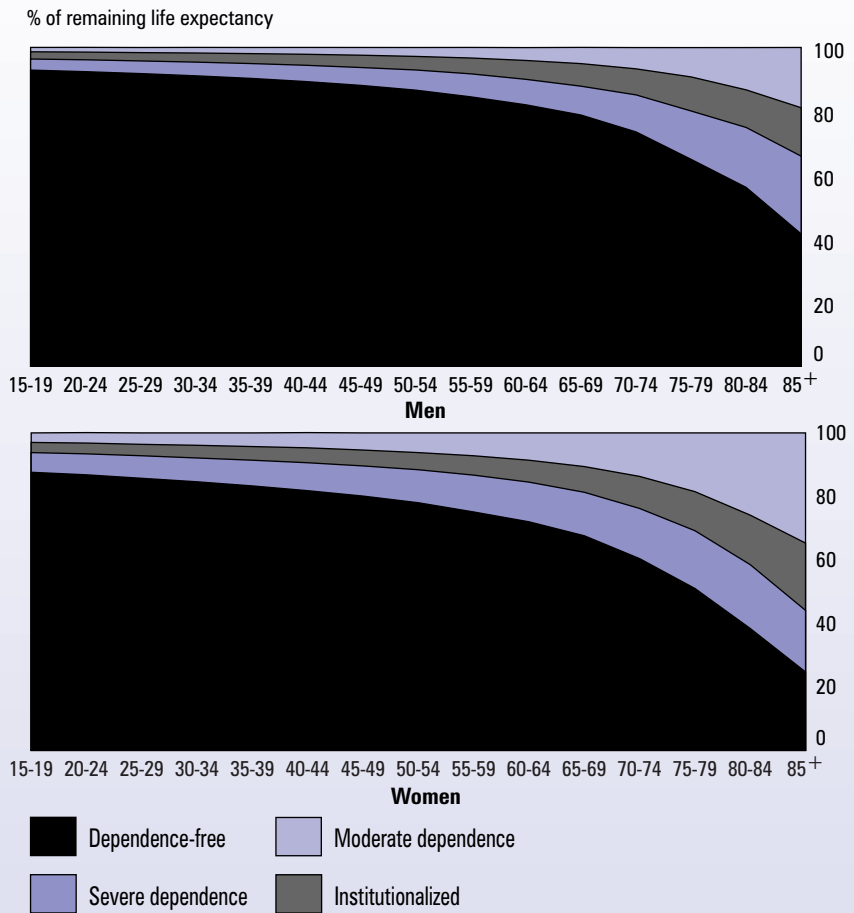
The trend toward increases in life expectancy has slowed in recent years, since 1981 for women and 1991 for

6. Statistics Canada projections estimate that Canadians aged 85 and over will number 1.6 million by 2041, or 4% of the total population. Lindsay, C. 1999. "Seniors: A diverse group aging well," *Canadian Social Trends*, Spring 1999.

7. Verbugge, L. 1989. "Gender, aging and health," In *Aging and health: Perspectives on gender, race, ethnicity, and class* (K.S. Mackides. ed.). Newbury Park: Sage. 23-78.



Men spend a greater proportion of their lives dependence-free than women at all ages



Sources: Calculations by authors from: Statistics Canada, 1996-97 National Population Health Survey and Demography Division life tables.

men. Does this phenomenon mean, as some researchers think, that we are approaching the limit of human life expectancy? Although there is some evidence to support such an assumption, research currently underway on the human genome and the mechanisms of cellular aging appear to hold the greatest promise for increasing life expectancy. But living longer is not necessarily desirable if it is not accompanied by an equivalent increase in years lived in good health.

Indicators of healthy life expectancies, such as the measure of dependence-free life expectancy used in this study, make it possible to evaluate the quality of life of a population

in terms of health. They are an essential complement to the discussion of life expectancies and should prove to be extremely useful tools for decision-makers who seek to establish effective health policies. All indications are that not only have Canadians added several years to their lives, but also life to their years.



Laurent Martel is an analyst and **Alain Bélanger** is Research Coordinator with Demography Division, Statistics Canada.