Evaluating compression or expansion of morbidity in Canada: trends in life expectancy and health-adjusted life expectancy from 1994 to 2010

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Abstract

Introduction: The objective of this study was to investigate whether morbidity in Canada, at the national and provincial levels, is compressing or expanding by tracking trends in life expectancy (LE) and health-adjusted life expectancy (HALE) from 1994 to 2010. “Compression” refers to a decrease in the proportion of life spent in an unhealthy state over time. It happens when HALE increases faster than LE. “Expansion” refers to an increase in the proportion of life spent in an unhealthy state that happens when HALE is stable or increases more slowly than LE.

Methods: We estimated LE using mortality and population data from Statistics Canada. We took health-related quality of life (i.e. morbidity) data used to calculate HALE from the National Population Health Survey (1994–1999) and the Canadian Community Health Survey (2000–2010). We built abridged life tables for seven time intervals, covering the period 1994 to 2010 and corresponding to the year of each available survey cycle, for females and males, and for each of the 10 Canadian provinces. National and provincial trends were assessed at birth, and at ages 20 years and 65 years.

Results: We observed an overall average annual increase in HALE that was statistically significant in both Canadian females and males at each of the three ages assessed, with the exception of females at birth. At birth, HALE increased an average of 0.2% ($p = .08$) and 0.3% ($p < .001$) annually for females and males respectively over the 1994 to 2010 period. At the national level for all three age groups, we observed a statistically non-significant average annual increase in the proportion of life spent in an unhealthy state, with the exception of men at age 65, who experienced a non-significant decrease. At the provincial level at birth, we observed a significant increase in proportion of life spent in an unhealthy state for Newfoundland and Labrador (NL) and Prince Edward Island (PEI).

Conclusion: Our study did not detect a clear overall trend in compression or expansion of morbidity from 1994 to 2010 at the national level in Canada. However, our results suggested an expansion of morbidity in NL and PEI. Our study indicates the importance of continued tracking of the secular trends of life expectancy and HALE in Canada in order to verify the presence of compression or expansion of morbidity. Further study should be undertaken to understand what is driving the observed expansion of morbidity in NL and in PEI.

Keywords: life expectancy, health expectancy, compression, expansion, mortality, morbidity, trend, health-related quality of life

Highlights

- Life expectancy (LE) and health-adjusted life expectancy (HALE) increased consistently from 1994 to 2010 for both Canadian females and males.
- HALE gains observed in the Canadian population over the reporting period were primarily associated with a decrease in mortality.
- The Canadian population appeared to be experiencing a period of relative stability in health expectancy from 1994 to 2010: no clear overall trend in compression or expansion of morbidity for the reporting period was detected in Canada.

Introduction

Two major potential scenarios have been proposed for future mortality and morbidity patterns. The “compression of morbidity” scenario anticipates an increase in life expectancy (LE) and a decrease in the proportion of life spent with serious disease and disability.1-3 This is possible when shifts in future disease patterns delay disease onsets to older ages. People will live longer (due to reduced mortality) with reduced morbidity.

The “expansion of morbidity” scenario anticipates an increase in the life expectancy and an increase in the proportion of life spent with underlying illness or disability.4-5 This is achieved when medical