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"No one dies of old age": implications for research, practice, and policy

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Introduction

A recent, credible report revealed that older persons globally will soon outnumber children under the age of 5 (1). This is only the latest in a growing number of reports to illustrate that population aging is not only occurring but also accelerating in developed and developing countries (2, 3). Although population aging is technically understood as a rising median age, this concept is more often used to indicate a change in population age structure involving an increased number and proportion of older persons (4). Most people's reactions to population aging are apocalyptic: they anticipate overextended pension plans, workforce shortages, and overburdened health care systems. Evidence-based planning for the future is needed to mitigate these and other possible negative effects of

population aging (5). Care must also be taken to address and to prevent the research, policies, and practices that reflect ageism (6, 7). Ageism is essentially understood as intended or unintended prejudice against older people (8).

Canada, like many other countries, will soon enter the fifth stage of demographic transition — the point where deaths outnumber births (9). This major change raises many population health concerns. As age increases, illnesses necessitating hospitalization or institutionalization become more common (10, 11). Older people are also the largest recipients of end-of-life care; nearly 80 percent of Canadian decedents are now 65 or older (12). Currently, only 13.7 percent of Cana - dians are 65 or older (13). Canada provides a use - ful case study for rapid population aging, as one in three Canadians was born from 1946 through 1966, and this cohort of 10 million baby boomers began to reach age 65 in 2011, after which both the number and proportion of older persons in Canada will increase sharply (14). This not only means that more people will live into old age, and likely advanced old age, but also that the death rate will increase. Projections made by Statistics Canada show — depending on how optimistic the scenario of the evolution in life expectancy is — that deaths occurring annually will number between 346,000 and 358,000 by 2030, and between 465,000 and 494,000 by 2055 (13, 14). Currently, 250,000 deaths take place each year in Canada (12); deaths are thus expected to double in number over the coming years.

These trends will create major challenges for those providing end-of-life care. The challenges need to be mapped out. In particular, as an increasingly larger majority of deaths will likely be of older persons, it would be prudent to undertake some critical rethinking of dying in old age and end-of-life care approaches for oldest-old persons. Currently, specialized palliative care services are extensively modelled for relatively young persons who are dying difficult, premature deaths from cancer, and these persons are expected to remain the most likely recipients of such services (15-17). Older persons experiencing a complex, intermingled cascade of conditions may be equally in need of palliative care, but their referral is delayed due to the absence of a clear, life-limiting illness associated with a terminal disease diagnosis (18). Older persons often experience longer and more varied end-of-life pro - cesses necessitating different types of end-of-life care and support compared to younger terminally ill persons with life-limiting illnesses.

A secondary analysis of Canadian populationlevel mortality data on aging and cause of death among the oldest-old presented us with an opportunity to think critically about population aging and population health. This study examined a number of important developments — in partic - ular, those related to changes in the deaths of people living into very old age.

Term	Definition
Age at death	The chronological age of an individual measured in years, as recorded at the time of death; this starts at 0 for children under 12 months old.
Oldest-old	Individuals 85 or older.
Mortality age	The average age of those who died in a particular year.
Age structure	The proportion and number of individuals in different age groups within a society or population group.

Method

Death certificates are a common source of mortality data, and mortality databases are extremely useful. Past studies involving population-level mortality data have been effective at highlighting policy successes or failures with respect to achieving desired outcomes (19, 20). Mortality trend studies have demonstrated important population changes or stasis (21). Projected futures from

mortality data have directed health services planning and public policy initiatives (22). Serious questions have been raised as a consequence of the insights gained through mortality data analyses (23, 24).

Since at least 1950, a death certificate has been completed to collect standard socio-demographic and cause-of-death information on every decedent in Canada. International Classification of Diseases (ICD) nomenclature has been consistently used to classify cause of death. Each province collects and then supplies death certificate data to Statistics Canada. Researchers wishing to access these data are required to provide evidence of research ethics approval and data safeguards. Despite data verification and cleaning, a small percentage of data error is expected. Incorrect information can be inadvertently entered on death certificates. Some information may not be known, such as province or country of birth; some missing data is thus anticipated. Transcription errors can also occur when data are transcribed electronically. Access delays are another issue; 2005 was the most current data year available for this study. Another issue is that the province of Quebec stopped sharing its data with Statistics Canada after 2001. Although missing mortality data can be obtained directly from Quebec, its variables differ, so it cannot be merged with Statistics Canada data. This limitation is of considerable consequence, as one-fifth of Canadian deaths occur in Quebec.

For this study, data from all Canadian pro - vinces except Quebec were included in the analysis. Individual-anonymous mortality data for all persons who died from 1950 to 2005 were examined for age-at-death and oldest-old cause-ofdeath trends. Minimal missing data each year were noted (<1 percent per variable); no discernable patterns in missing data were detected. Descriptive-comparative SPSS analyses were undertaken to answer three questions, after which health researchers and practitioners working independently of each other identified the implications of these findings for research, policy, and practice. Two team members consolidated the implications, and all team members later approved the consolidation. This consolidation was largely confined to a simple listing of implications after some clarification had been sought about overlapping or similar implications. All members of this large, multidisciplinary, international team agreed that there could be many possible implications of “no one dying of old age.” The team was open to considering an array of implications.

The three research questions were: What mortality- age changes occurred from 1950 to 2005? What age-structure proportional changes involving older decedents occurred? What were the primary causes of death for the oldest-old, and did these causes change over the years?

[Table 1]

[Figure 1]

Results

A total of 7,194,589 persons died in Canada (in all provinces except Quebec) from 1950 through 2005. Data on age or cause of death were missing for 2,581 persons, limiting the analyses to 7,192,008 decedents.

Changes in the Mean and Median Age at Death

The mean mortality age increased 33 percent, from 58.4 to 74.9 — a difference of 16.5 years; the median mortality age increased 20 percent, from 67 to 79 — a difference of 12 years (see Table 1 and Figure 1). The mean age at death among people surviving to age 85 increased from 88.6 to 90.2 — a much smaller difference of 1.6 years.

Changes in the Proportion of Older Decedents in All Deaths

The proportion of decedents aged 65 and older increased 48 percent, while the proportion of decedents 85 and older increased 331 percent. Even more substantial increases occurred among decedents 90 and older, 95 and older, and 100 and older (Table 2 and Figure 2).

The total number of deaths each year increased from 90,303 in 1950 to 173,209 in 2005. Figure 3 demonstrates that this was mainly due to an increase in decedents aged 75 or older but predominantly due to an increase in those aged 80 or older.

[Table 2]

[Figure 2]

[Figure 3]

Changes in Causes of Death

Over the whole 1950-2005 period, circulatory diseases other than stroke were the most common cause of death for decedents aged 85 and older (Table 3). While the total number of deaths of people 85 and older due to circulatory diseases other than stroke increased, and mainly due to a sharp increase in the number of deaths taking place at age 85 and older, the proportion of deaths from this cause declined from about half to one third of all deaths in this age group (Table 3).

The largest increase in deaths at age 85 and older was due to neurological and mental conditions, many involving dementia. Deaths due to neurological and mental diseases increased from 1 percent of all deaths at age 85 and older (under 100 deaths) in 1950 to 11.5 percent (more than 6,000 deaths) in 2005. The proportion and number of oldest-old people dying each year from cancer increased from 6.7 percent (under 700 deaths) to 14.9 percent (around 8,000 deaths).

Among decedents younger than 85, the most spectacular change was in cancer deaths. Cancer deaths increased from 15.5 percent (12,567 deaths) in 1950 to 35.5 percent (42,723 deaths) in 2005. Both the proportion and the absolute number of deaths due to circulatory diseases declined. The introduction in 2000 of the tenth ICD revision influenced the classification of causes of death. An abrupt increase in dementia-related deaths and a related decrease in pneumonia/influenza-related deaths and deaths due to respiratory diseases were noted across both age groups.

Discussion

Aging Trends and Implications

This study demonstrates a substantial increase from 1950 to 2005 in the proportion and number of Canadians living to be 65 and thus reaching old age (the official retirement age in Canada), and also among those who reached or exceeded the age of 85. As outlined, the mean and median ages at death increased substantially (16.5 and 12 years, respectively) over this period. These findings should be interpreted as a clear triumph for public health and other population health promotion measures, as they have collectively enhanced the likelihood of living into old age. The additional finding of an increase of 1.6 years in the mean age of decedents aged 85 and older is also highly supportive of past and current population health promotion measures. This finding reminds us that there may be an upper threshold to life expectancy, and that many more people are nearing it. Canada is not alone in this regard; mortality compression, or an increasingly rectangular survival curve, has been described in other countries (25-28).

It is also important to highlight that as the large increase in Canadian decedents was primarily due to an increase among persons aged 75 and older, much more could and should be done to ensure that people are healthy enough to reach age 85 and then live in health afterwards. Although

technological and pharmacological advances have contributed to aging and extreme aging, these advances have come at great cost (29). Shifting efforts to preserve health into and through old age should become a priority (29). This task is not insurmountable, as the large baby boom generation is noted for its overall health and well-being; most of its members are expected to reach and substantially surpass the age of 65 (21). Many could live to be 85 — the current age at which old age senescence is typically visibly and clinically apparent and the descriptors “frail-elderly” and “oldest-old” applied (30, 31). Not all 85-year-olds are frail, however. Many believe that old-age frailty can be actively treated and reversed or altogether avoided (32).

Cause-of-Death Trends and Their Implications

The increase in number and proportion of deaths among people living to be very old has been accompanied by increases in deaths due to circulatory diseases other than stroke (mainly heart failure), as well as increases in deaths due to neurological or mental conditions (mainly dementia) and cancer. These are important changes, and the expected continuation of these trends has a number of implications that urge us to critically rethink some prevailing views about end-of-life care for older persons. Clearly, the contemporary palliative care model is problematic, as it is very much oriented to younger cancer patients with an identifiable disease and a fairly predictable dying trajectory (15-17, 33). More and more people are expected to die at very old ages, and their end-of life care needs are not likely to be addressed by this palliative care model (34).

Although our study shows that more older persons are dying from circulatory diseases, often end-stage heart failure, few people suffering from heart failure receive palliative care services (35, 36). Another issue is that the symptoms and other burdens of end-stage heart failure differ from those of end-stage cancer, and the expertise of palliative care professionals is oriented to cancer, not to end-stage heart failure. In addition, multiple comorbidities are often present in advanced old age; death is likely due to multiple organ failures, not just heart failure. Old-age senescence, which is essentially the wearing out of bodily tissues and processes over time, would be an - other contributing cause of death, if not the prime reason for one or more organ failures. A recent study by Gott et al. (37) also challenges the notion of a typical heart failure trajectory through collecting prospective data on physical functioning prior to death. Their study adds weight to our concern that end-of-life care needs to be rethought for oldest-old persons, particularly those suffering from heart failure.

Increasing numbers of deaths among very old persons have been attributed to dementia and other neurological/mental diseases. For some time now, dementias have been considered under-diagnosed as a cause of death (38), so the actual number of people dying with dementia is likely much higher than is suggested by the analysed data. People who die of dementia typically experience a long course of cognitive and functional decline — punctuated by acute illnesses such as pneumonia and other febrile episodes, and accompanied by eating problems and in - creasing behavioural disturbances such as disorientation, restlessness, and aggression — before they become bed-bound (39). As dementia involves comingled health problems and symptoms over a protracted period, it is under-recognized as a terminal illness, and so the end-of-life care needs of dementia sufferers may not be met simply because their impending death is less likely to be anticipated. Often, as a consequence, these persons receive too much treatment and too little support. Aggressive late-stage treatments are often administered, such as tube feeding or hospitalization, instead of on-site comfort-oriented care.

Our study also showed an increase in very old persons dying of cancer. Cancer-related dying processes in very old people often differ from cancer-related dying processes in younger people. Cancer deaths at younger ages often follow a short course of ill health punctuated by aggressive treatments that fail to stop the disease progression but result in additional symptoms to manage, such as nausea. Acute illness is thus the prevailing state of health from diagnosis to death. In contrast, cancer deaths at older ages may or may not follow the traditional course of cancer care

involving chemo-radiotherapy and/or surgery to arrest or slow the disease. Cancer is often only one of a number of conditions that affect health in old age; slow-growing cancers are often considered less of a life risk than advanced old age and other diagnosed progressive chronic illnesses. Although cancer may be recorded as the primary cause of death for very old persons, frailty due to old-age senescence could be a factor in the decision to withhold cancer treatments from them and a major factor in their accelerated dying and death. The recording of cancer as a primary cause of death in these cases could simply be a reflection of the requirement to record a single primary cause of death in keeping with established ICD nomenclature.

This question of accuracy in the recorded cause of death is important to highlight, as few autopsies are done to determine cause of death. Autopsies are less often done when a person is older, as death is anticipated if not expected in advanced old age, particularly if end-stage chronic illness has been diagnosed. One study involving forensic autopsies of 319 persons aged 89 and older identified the most common causes of death as ischemic heart disease, bronchopneumonia, fractures, acute myocardial infarction, and cerebral-vascular accident (40). However, 19 percent of these deaths were determined to be due to multiple causes. The authors indicated that although death was identified as due to a specific disease, the attenuating factor was the inevitable downward spiral with advanced age or frailty in old age (40). With more people expected to reach advanced old age, the supportive care needs of older persons experiencing this decline in health must become a major focus of research and policy attention. Primary and secondary prevention measures are clearly preferable over tertiary measures that prolong or exacerbate end-of-life suffering.

Old-Age Senescence Argued

This would be an opportune time for us to start considering old-age senescence to be a cause of morbidity and death among very old people. Old-age senescence is already widely accepted as an antecedent of physical and cognitive decline, illness, disability, and dependency (6, 41, 42). The recognizable decline in health accompanying advanced aging already serves to identify people as frail-elderly and near death (43). It is also well documented that older adults have a great awareness of their age and of the impact old age has on their health; this is described, for example, in a study of older individuals diagnosed with cancer (44). The concepts of “dying of old age” and “natural death in old age” now appear to be acceptable to many older and younger individuals. The substantial decline in hospital deaths across Canada — from nearly 80 percent in 1994 to 61 percent in 2004, despite continuing universal access to high-quality hospitals across Canada, and with very old persons among the least likely to die in hospital (12) — is but one indicator of the growing acceptance of the inevitability of death in old age. The acceptance of old age as a cause of expected death could already be impacting the end-of-life experiences, including those related to place of death, of older persons. There is additional support for this concept of old-age senescence from scientific research, which is increasingly providing evidence of cellular or organismal senescence as a cause of death in advanced age. The body becomes less adaptable to stress over time, and homeostatic imbalances increase until death. Similarly, the reliability theory of aging and longevity has been advanced with the expectation that it can be used to scientifically prove that aging and death are natural consequences of body systems or pathway redundancies.

Senescence, in the geriatric and gerontology literature, is already widely recognized as a cause of death among older people. The predominant diagnostic requirement for death certificate completion reflects a perhaps outdated view of dying as a process caused by one specific and, one hopes, curable or treatable disease. This argument is supported by research on centenarians in Minnesota (23) indicating that dying with, but not because of, underlying pathological conditions is prevalent. The authors of that study stated that the relatively frequent use of “unknown and ill-defined conditions” as the recorded cause of death is a de facto recognition of senescence as the cause of death. However, our Canadian data showed that the frequency of reporting vague causes of death

has declined over time. Rather than proving that senescence is not a cause of death in Canada, this finding shows an increasing inclination to record a definitive ICD code as the cause of death (a circumstance clearly reflected in the cause-of death changes that occurred in reaction to the tenth ICD version). Although senility began to be synonymous with old age in the nineteenth century (45), this view has gradually changed to the point where debilitating chronic illnesses are now considered indicative of aging. The latter point is supported by our Canadian mortality data finding that a major increase in neurological and mental diseases, particularly dementia and senility, is a cause of death among older people.

Although old-age frailty is a growing field of inquiry, most have not recognized that old-age senescence lacks official recognition and thus consistent and widespread consideration. Research (and research funding) is directed mainly at treating age-associated diseases, in keeping with the view that old age is essentially a series of curable or controllable maladies (41). There is also evidence that we avoid acknowledging the failure of the human body with advancing age — the very definition of old-age senescence (6).

The acknowledgement of old-age senescence as a cause of death has important implications for end-of-life care, particularly in this era where evidence-based practice is the expected norm. Health care professionals must provide evidence-based care, often using ICD-based information. The lack of recognition of old-age senescence as a cause of mortality and underlying morbidity could perpetuate indiscriminate diagnostic and treatment-oriented care of oldest-old persons. Evans et al.’s timeless Canadian study (46) showing an increase over time in older persons’ hospital utilization illustrates this concern. The study revealed, “it is not aging per se that poses the threat” to universal publicly funded health care system sustainability; “rather, it is what we are choosing through our healthcare system to do to and with our elderly” (46, p. 435). Its authors’ concern was that older persons were receiving more diagnostic tests and treatments with limited benefit to their health or well-being. As older people typically have multiple comorbidities, they are prime candidates for many different and serial diagnostic tests and treatments (41). With no official recognition of old age senescence, and in the absence of guidelines that reflect evidence-based treatment efficacy for the oldest-old (7), current professional, legal, and ethical statutes affecting health care providers reinforce the imperative to save lives (47). Subsequent provider care could match the life-saving care desired by grieving family members who have not accepted health care and human biology limitations. Regardless, the growing practice of withholding or withdrawing life-support as death nears indicates that impending death is often recognized and accepted (48). If old-age senescence becomes an official health state, very old persons could become a unique subpopulation requiring additional consideration in terms of health care decision making.

The acknowledgement of old-age senescence as a cause of death has important implications for policy development and revision, which, although highly political, are increasingly evidence-driven (49). Policy-makers commonly rely upon ICD-based mortality, morbidity, and health services utilization reports. With no ICD code for old-age senescence, and with this omission not identified as a limitation, ICD-based reports do not draw attention to the finite nature of the human lifespan — that is, the fact that death can be anticipated and should be expected for very old persons (31, 41, 43). Now that most deaths are no longer sudden and unexpected, attention should shift to healthy aging and healthy dying. Instead, policies informed by ICD-based evidence and the longstanding imperative to save lives continue to focus on cure-oriented health care, as illustrated by increased hospital funding, new life-saving technologies, and research to improve diagnostic tests and curative treatments.

The Government of Canada’s policy since 2003 to substantially fund efforts to reduce wait lists and wait times for diagnostic tests and treatments is a case in point (50). These funds have not been used to expand home care coverage for community- dwelling frail-elderly persons, set up a national palliative home care program for those with less than six months to live, or initiate other population health promotion recommendations of the Final Report of the Commission on the Future of Health

Care in Canada (the Romanow Report) (51). If a significant proportion of decedents aged 85 and older (now roughly one in four decedents) had had old-age senescence recorded as their cause of death (and as a diagnostic code in morbidity or health service utilization databases), policy agendas since the Romanow Report might have been directed toward aging-in-place and dying-in-place initiatives, nursing home expansion or improvement, enhanced old-age pensions, new or improved family caregiver support programs, assured home palliative care, free-standing hospices, and other initiatives that reflect awareness of death as a natural outcome of advanced old age.

Conclusion

Population aging is clearly revealed by the 1950-2005 Canadian mortality data. All deaths were recorded as having been due to potentially treatable conditions. Research to define old-age senescence for inclusion as an ICD code in mortality and health care databases is needed now, as old-age senescence has to become a factor affecting research, health care practice, and policy-making. Without an ICD code to permit and encourage open recognition of old-age senescence and its impacts, researchers, health care and social service practitioners, and policy-makers will be granted limited insight into the problems of old age that must be addressed.

This paper argues for a renaissance in thinking about population aging and old-age population health, starting with an acknowledgement of old-age senescence (23). At the very least, acceptance of old-age senescence as a cause of death is needed to improve end-of-life care planning in anticipation of a substantial increase in persons reaching advanced old age. It is also needed in order to develop palliative care.

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Tables and figures

Table 1 Age-at-Death Trends, 1950-2005 (5-year intervals)

Year	Mean	Median	Range	Standard deviation
1950	58.4	67	0-115	27.2
1955	60.2	69	0-113	26.5
1960	61.7	70	0-107	26.0
1965	63.9	71	0-101	24.3
1970	64.9	71	0-109	23.1
1975	66.3	72	0-112	21.9
1980	67.8	72	0-111	20.9
1985	69.8	74	0-116	19.6
1990	70.9	75	0-113	19.1
1995	72.2	76	0-109	18.3
2000	73.6	78	0-111	17.4
2005	74.9	79	0-115	16.2

*0 indicates death of person under 1 year of age

Figure 1 Mean Age at Death, 1950-2005

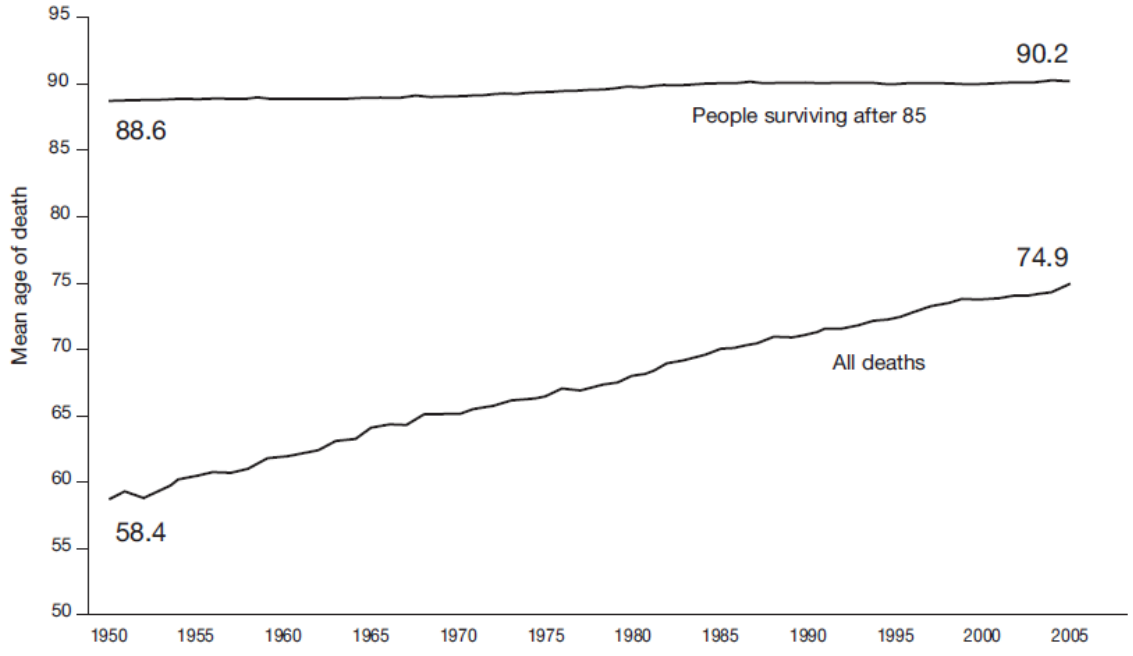

Table 2 Older Decedents, 1950 to 2005 (5-year intervals)

Year	All n	Aged 65+ n (%)	Aged 85+ n (%)	Aged 90+ n (%)	Aged 95+ n (%)	Aged 100+ n (%)
1950	90,303	50,523 (55.9)	8,969 (9.9)	2,875 (3.2)	621 (0.7)	67 (0.1)
1955	94,119	56,143 (59.7)	10,172 (10.8)	3,486 (3.7)	793 (0.8)	107 (0.1)
1960	103,941	63,852 (61.4)	12,506 (12.0)	4,374 (4.2)	959 (0.9)	108 (0.1)
1965	109,940	69,428 (63.2)	15,536 (14.1)	5,563 (5.1)	1,256 (1.1)	167 (0.2)
1970	116,207	73,611 (63.3)	18,264 (15.7)	6,695 (5.8)	1,528 (1.3)	230 (0.2)
1975	124,541	80,590 (64.7)	22,116 (17.8)	9,084 (7.3)	2,200 (1.8)	296 (0.2)
1980	128,526	86,927 (67.6)	24,380 (19.0)	11,147 (8.7)	3,225 (2.5)	445 (0.3)
1985	136,160	97,113 (71.3)	28,341 (20.8)	13,677 (10.0)	4,261 (3.1)	704 (0.5)
1990	143,904	106,378 (73.9)	32,103 (22.3)	15,225 (10.6)	5,017 (3.5)	959 (0.7)
1995	158,567	120,897 (76.2)	392,70 (24.8)	18,528 (11.7)	5,842 (3.7)	1,050 (0.7)
2000	165,371	129,051 (78.0)	46,462 (28.1)	21,906 (13.2)	6,882 (4.2)	1,226 (0.7)
2005	173,209	135,683 (78.3)	52,908 (30.5)	26,588 (15.4)	8,235 (4.8)	1,380 (0.8)

Figure 2 Changing Proportions of Older Decedents, 1950-2005

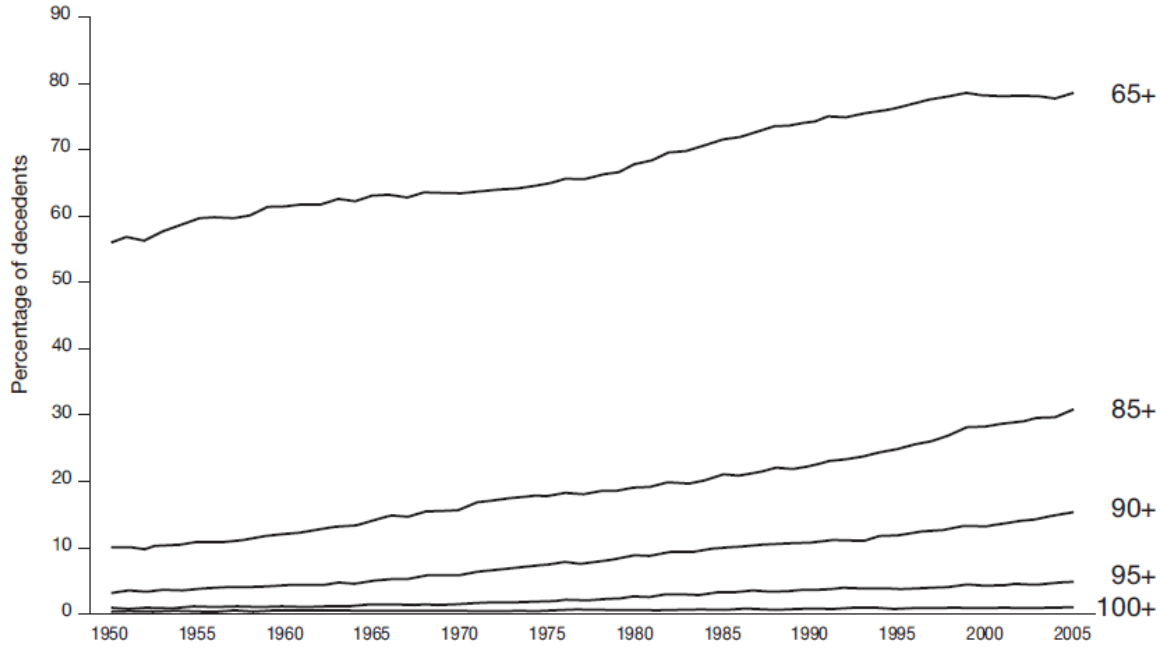

Figure 3 Changing Numbers of Older Decedents in Canada, 1950-2005

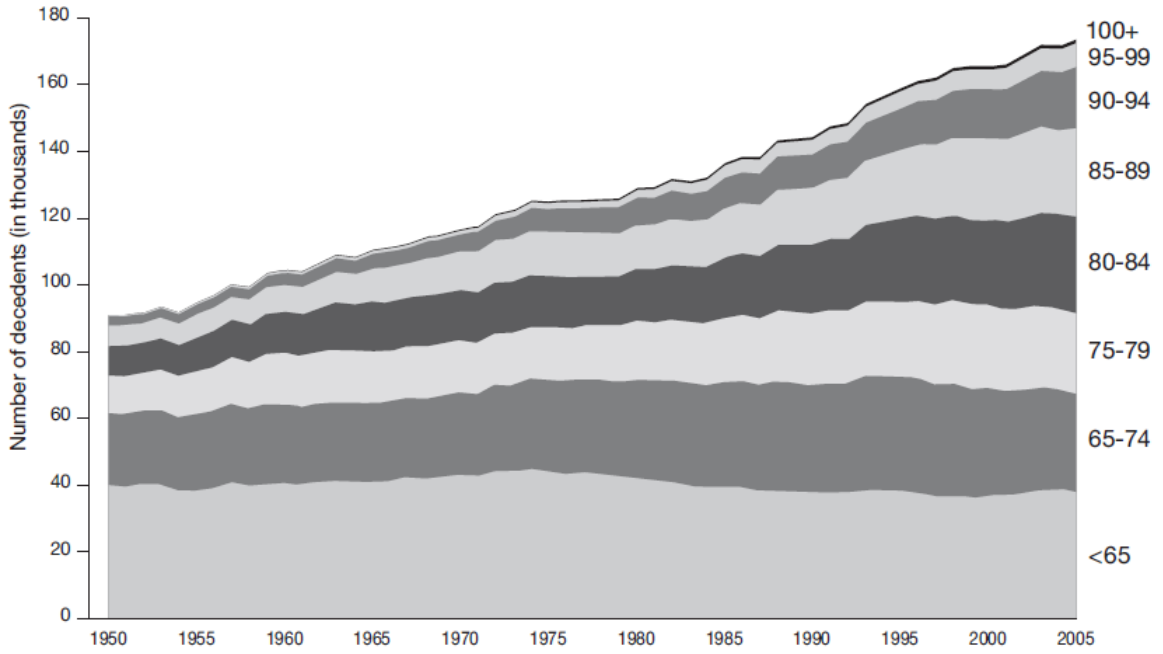

Table 3 Primary Causes of Death (%) for Oldest-Old and Younger Decedents, 1950-2005

	Cancer		Cardiovascular disease (other than stroke)		Stroke		Neurological and mental conditions		Dementia		Pneumonia and influenza		Senility		Unknown or ill defined	
Year	<85	85+	<85	85+	<85	85+	<85	85+	<85	85+	<85	85+	<85	85+	<85	85+
1950	15.5	6.7	35.3	49.8	11.0	16.1	1.8	0.9	0.1	0.4	4.3	6.1	0.4	5.3	1.4	5.8
1955	16.9	7.8	37.0	50.6	11.4	18.1	1.5	0.7	0.1	0.3	4.2	6.5	0.3	3.5	0.9	3.9
1960	17.5	8.6	37.9	49.5	10.8	19.1	1.4	0.6	0.1	0.3	4.2	7.3	0.2	2.2	0.6	2.5
1965	18.7	8.6	38.5	51.1	10.0	18.4	1.4	0.5	0.0	0.1	3.7	7.5	0.1	1.3	0.5	1.5
1970	20.9	10.0	37.7	51.4	9.3	17.0	1.5	0.4	0.1	0.1	3.8	7.9	0.1	1.0	0.6	1.3
1975	22.4	10.4	36.7	49.9	8.7	16.7	2.0	0.9	0.1	0.2	3.3	7.9	0.0	0.6	1.0	1.1
1980	25.5	11.5	35.8	49.3	7.6	14.7	2.4	1.8	0.4	0.9	2.2	7.1	0.0	0.5	1.0	1.2
1985	28.9	12.3	33.4	44.6	6.5	13.1	2.9	3.3	0.8	1.8	2.4	8.0	0.0	0.5	2.8	1.6
1990	31.1	12.7	29.5	40.2	6.2	12.1	3.5	5.6	1.2	3.3	2.5	8.2	0.0	0.5	3.4	2.9
1995	32.0	13.2	27.8	38.2	6.3	12.0	4.3	7.8	1.5	4.6	2.6	7.7	0.0	0.6	1.9	1.9
2000	34.2	14.2	25.7	35.9	6.1	11.4	5.2	10.3	2.2	8.7	1.6	5.0	0.0	0.5	1.3	1.6
2005	35.5	14.9	23.0	33.4	5.3	9.5	5.8	11.5	2.6	9.7	1.7	4.8	0.0	0.5	1.0	1.4