The changing face of the Australian population: growth in centenarians

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ABSTRACT

- At the time of the 2006 Census, there were 3154 centenarians in Australia, 797 men (25%) and 2357 women (75%). This number is expected to increase to 12 000 by 2020.
- In Australia we are experiencing a demographic transition in which the proportions of people in the oldest age groups are increasing while the proportions in the youngest age groups are decreasing.
- Centenarians are the fastest growing age segment of the Australian population. Their numbers have increased by 8.5% per year over the past 25 years. In 2006, they represented 0.12% (3154/2 644 469) of the population aged 65 years and over.
- More than half of centenarians live in private dwellings, with 27% of men and 14% of women living on their own.
- Government policies are starting to address the issues of an ageing population, including provisions for financial support, improved access to medical services, and appropriate housing and transport facilities. However, we need specific social, medical and financial estimates of the impact of living to 100 years and beyond.

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The mysteries of a long life seem fascinating to us all. What do we know about our oldest old? What was Australia like when they were born, more than 100 years ago? The following is a snapshot of some major events and statistics at that time and in the early part of the 20th century:

- From 1899 to 1902, men returned to Australia after serving in the Boer War;
- The six Australian colonies united to form the Commonwealth of Australia in 1901, with Canberra becoming Australia's capital city in 1908. The first federal election was held in Australia in 1901, and women gained the right to vote in federal elections in 1902;
- At the turn of the 20th century, infant mortality rates were high (104 deaths per 1000 live births) and life expectancy was 55.2 years for men and 58.8 years for women;[1]

The Australian population in 1900 was less than 5 million, compared with over 21 million today.[2,3]

Great hardship and loss of life were experienced in the first 20 years of the 20th century. World War I (1914–1918) claimed the lives of many men, and a deadly strain of influenza in 1918 killed over 11 000 people. High unemployment during the Depression years added to the toll of hardship.

What health implications does this past hold for our ageing population, and what do we know about our centenarians? In this viewpoint, I present what little data are available on this group and argue that we need to find out much more about them, and in particular, about what health care and other services this rapidly growing group will need.

Who are today's centenarians?

Definition

Centenarians are defined as people who have reached the age of 100 years. Among Australia's centenarians in 2001, 93% were aged 100–104 years, 6.3% were aged 105–109 years ("semi-supercentenarians") and 0.3% were aged 110 years and over ("supercentenarians").[4] No data for later years exist.

Growth trends

From 1901 to 1971, the proportion of centenarians in the Australian population ranged from 0.0013% to 0.0016%. However, from 1971, the proportion of centenarians almost doubled every decade to reach 0.012% in 2001, and is on track to double again in the next decade (Box 1). Australia is among the countries that have the highest proportion of centenarians, along with the United States, Norway, and the island of Sardinia in Italy (information from unpublished census data, made available on request from the Australian Bureau of Statistics [ABS], 2007, and from McCormack[12]).

Among the 3154 centenarians recorded in the 2006 Census, 1058 were in New South Wales, 823 in Victoria, 538 in Queensland, 308 in South Australia, 310 in Western Australia, 73 in Tasmania, and 44 in the Northern Territory and Australian Capital Territory (information from unpublished census data, made available on request from the ABS, 2007).

Life expectancy is a frequently used indicator of the health of a population.[13] Corresponding to the increase in the proportion of centenarians in the Australian population is the increasing life expectancy at birth (78.5 years for males and 83.3 years for females in 2006) (Box 1).

Over the past 59 years, the number of people in younger age groups has fallen as a proportion of the Australian population, and annual growth rates have declined in under-30s age groups (Box 2). Over the same period, growth rates in the middle-age segments have remained steady, whereas growth rates in the 80–99-year and ⩾ 100-year age groups have increased. The centenarian group has experienced the fastest growth rate (8.5% per year over the past 25 years).[11,14-16]

Over half the centenarians recorded in the 2001 Census were born in Australia, a third in other countries, and the remainder did not identify a birthplace.[4] The proportion of overseas-born people is significantly higher among centenarians than in the total Australian population, with only 22% of the population reported as being overseas-born in the 2001 Census.[17]

Sex and marital status

In the early 1900s, 60% of centenarians were men and 40% were women (Box 1). A hundred years later, this ratio has reversed, with women predominating at 75% in 2006. There were also significant differences in marital status between male and female centenarians and between centenarians and people aged ⩾ 85 years at the 2001

1 Centenarians (Cs) in the Australian population from 1911 to 2006[2,5-11]

Census year	Total Cs	Men (%)	Women (%)	% of total population*	Life expectancy at birth (years)	
					Males	Females
1901	50	60	40	0.0013	51.1	54.7
1911	64	55	45	0.0014	54.8	58.8
1921	36	69	31	0.0007	59.2	63.3
1933	63	49	51	0.0009	63.5	67.4
1947	36	42	58	0.0005	66.1	70.6
1954	71	35	65	0.0008	67.1	72.6
1961	131	31	69	0.0012	67.9	74.2
1971	184	24	76	0.0016	67.6	74.5
1981	443	16	84	0.0029	71.4	78.3
1991	1268	19	81	0.0073	74.4	80.4
2001	2297	27	73	0.012	77.4	82.6
2006	3154	25	75	0.016	78.5	83.3

* Proportion of Cs in the total population. ◆

and 2006 censuses (Box 3) (information from unpublished census data, made available on request from the ABS, 2007). A higher proportion of centenarian men than women were currently married: 19% of men versus 5% of women in 2001 and 28% of men versus 9% of women in 2006. Half of men aged ⩾ 85 years were currently married, compared with 12% of women. A higher proportion of centenarian men had never married (32% in 2001 and 26% in 2006) compared with women (13% in 2001 and 12% in 2006). Female centenarians were more likely than male centenarians to be widowed (76% v 34%, respectively, at the 2001 Census) (information from unpublished census data, made available on request from the ABS, 2007).

In 2001, 79% of male and 38% of female centenarians were living in private dwellings — with a partner, other family member(s) or alone — rather than in nursing homes or other residential aged care facilities;[4] 27% of male centenarians and 14% of female centenarians were living alone in their own homes. The differences between men and women may partly be explained by a phenomenon observed in the New England Centenarian Study: men who live to 100 years are fewer in number, but generally healthier and with less dementia, than female centenarians,[18] and are thus more likely to be able to function independently in their own homes. The New England Centenarian Study refutes the paradigm that the older you get the sicker you become, instead providing evidence to support the concept of "compression of morbidity" into a shorter time span — the older you get, the healthier you have been.[18]

Why are there more centenarians than before?

There are two main reasons why centenarians have become the fastest growing age segment of the Australian population: declining fertility rates and improved survival rates.

Declining fertility rates

First, there has been a major change in Australia's fertility rate. Since the 1960s, there has been a steady decline in fertility rate, resulting in a slow population growth in the younger age groups.[13] Fertility rates have fallen below the replacement level of 2.1 children per woman for the past 25 years, a pattern observed in other developed countries.[19] Decreased fertility rate is also related to an increase in the age of mothers at the birth of their first child (the median maternal age at first birth is 30–34 years). The decline in fertility rate has a major impact on the age structure of the population.[13] The health of all Australians, including pregnant women, has improved dramatically over the past decades with reductions in morbidity and mortality related to chronic and communicable diseases and reductions in injuries.[13]

Improved survival rates

Second, there has been an increase in survival rates of sick people, with slower progression of some chronic diseases and improvement in health status and lifestyle indicators of older people, leading to a compression of morbidity.[20] Declining mortality has resulted in significant increases in the number of old people.

Forty to 50 years ago, the age structure of the Australian population was pyramid-shaped, with the largest proportion of the population in the younger age groups and the older age groups at

2 Proportions of different age groups in the Australian population over time, and annual growth rates of different age groups over time[11,14-16]

Age group (years)	Proportion of total population in selected census years (%)								Annual growth rate (%)*			
	1947	1954	1961	1971	1981	1991	2001	2006	Over past 25 years	Over past 35 years	Over past 45 years	Over past 59 years
Children (0–9)	18.1	20.9	20.5	19.1	16.1	14.7	13.6	12.8	0.3	0.1	0.4	1.1
Teenagers (10–19)	14.8	14.3	17.3	18.2	17.5	15.1	13.9	13.6	0.2	0.4	0.9	1.5
Young adults (20–29)	16.0	14.5	12.8	16.1	16.9	16.2	14.0	13.9	0.1	0.7	1.5	1.3
Middle age (30–59)	38.8	37.8	36.7	34.2	35.5	38.5	41.8	41.9	1.9	1.8	1.8	1.8
Older middle age (60–79)	11.2	11.4	11.0	10.9	12.1	13.3	13.7	14.5	1.9	2.1	2.1	2.1
Elderly (80–99)	1.16	1.17	1.24	0.51	0.69	0.89	1.40	1.60	4.9	4.7	2.1	2.3
Centenarians (⩾ 100)	0.0005	0.0008	0.0012	0.0016	0.0029	0.0073	0.012	0.016	8.5	8.4	7.5	8.0

* The following formula, provided by the Australian Bureau of Statistics, was used to calculate annual growth rate: $\{100 \times [(p1/p0)^{1/n} - 1]\}\%$, where p0 = first number in series, p1 = last number in series and n = (number of years – 1). For example, the number of centenarians in 2006 (p1) was 3154; the number in 1947 (p0) was 36; and the number of years over this period was 59, thus n = 58. Thus the annual growth rate for centenarians over the past 59 years was $\{100 [(3154/36)^{1/58} - 1]\}\% = 8.0\%$ (rounded to one decimal place). ◆

3 Marital status of Australians aged ⩾ 85 years and ⩾ 100 years, 2001 Census and 2006 Census*[2]

	2001 Census				2006 Census			
	Men (%)		Women (%)		Men (%)		Women (%)	
Marital status	⩾ 85	⩾ 100	⩾ 85	⩾ 100	⩾ 85	⩾ 100	⩾ 85	⩾ 100
Never married	6	32	6	13	5	26	5	12
Currently married	50	19	12	5	53	28	13	9

* Some of the information in this table comes from unpublished census data, made available on request from the Australian Bureau of Statistics, 2007. ◆

the apex. However, by 2006 the demographic transition had resulted in the pyramid shape changing to a beehive shape, with more older people and fewer younger people.[13]

Since 1901, life expectancy has increased by around 42%, with reductions in infant, child and maternal mortality being the major contributors.[13,21] Australia has the fourth highest life expectancies for men and women in the world, behind Japan, France and Italy, but ahead of Sweden, Switzerland, Spain, Canada, Singapore, New Zealand, Norway, the United Kingdom and the US.[13,22]

What care and services will our centenarians need?

Who are the carers now?

The demographic transition we now see in Australia is characterised by an ageing population. Retired people aged 50–74 years contribute increasingly to the long-term care of their very elderly parents and in-laws (aged 85 years and over), as well as playing a pivotal role in the lives of their grandchildren and children, thus creating an effect on intergenerational relationships.[23,24] These family members are untrained and unmonitored caregivers, with the burden falling disproportionately on women.[25]

Longevity and disability

The fact that 27% of male and 14% of female centenarians live alone hardly depicts these very old people as being totally frail and dependent (although some very old people receive assistance within the home). Furthermore, increased longevity does not necessarily equate with a higher prevalence of disability. Indeed, several studies have shown that disability and physical limitations in older people are decreasing.[26,27] Health-based projections of US populations have reported a significant downward revision in estimates of the proportion of elderly people with chronic disabilities.[26,27]

However, there is a complex relationship between disability and the use of acute care, as longer life prompts greater spending on restorative procedures to enhance mobility, such as hip replacements and removal of cataracts.[26] Reported reductions in disabilities reflect changes that have made physical environments more manageable, such as modifications in the home. These include grab bars, raised toilets, telephones with amplifying devices and touchtone dialling, and wider use of hearing aids. Such devices can lead to improvements in health.[26]

What more do we need to know?

Australia belongs to a group of countries that have the highest proportion of long-lived people. Many Australians are unaware of how many centenarians there are and how little we know about them. It is amazing that these extremely enduring old people whose lives carry a wealth of history are living among us and yet we appear to have largely ignored their effect on our society. Indeed, while there are government initiatives to meet the requirements of an ageing population (Box 4), we have no specific social or financial estimates of the impact of the oldest old in Australia, and have developed few specifically targeted policies.

The demographer Vaupel claims that females born today in low-mortality countries like France already have a 50% chance of living to 100 years.[30] We can project a similar situation in Australia as the

4 Government initiatives aimed at meeting the requirements of an ageing population[28,29]

- The National Strategy for an Ageing Australia addresses the implications of our ageing population for society and government. It aims to provide a framework for action. It does not specifically address centenarians, but the ageing population in general.
- Australia's retirement income system supports older citizens through public pensions, superannuation and voluntary savings. Incentives for superannuation savings and changing the rules to allow people to stay longer in the workforce are two government strategies to ensure that retirement incomes are sufficient to cater for the changing demographic.
- The National Strategy recognises the value of an ageing workforce. By 2010, the number of people turning 55 is projected to be the same as the number of people turning 15, and thereafter the gap will begin to widen, with many more people turning 55 and possibly leaving the workforce than those turning 15 and possibly entering it. The employment system needs to recognise the importance of retaining mature-age workers in view of the projected future decline in the number of new entrants to the workforce.
- Individual, community, government and business resources and services are available to support the lifestyle needs of older Australians. There is a refocus on designing infrastructure to suit people as they age, such as appropriate housing solutions, increased access to medical services, and more accessible and flexible public transport solutions. Use of residential and community aged care will further increase. Voluntary care for aged persons is increasing, and there is a need to recognise the stress on carers created by competing demands such as workplace participation. The importance of informal voluntary care has received significant policy attention in recent years.
- Centenarians, in earlier years of their life, have generally made less use of health service providers than their peers, and continue to be less frequent users of health services. However, older people in general tend to use hospitals more frequently, make more visits to doctors, allied or other health professionals and consume more medications than younger people. Government policies aim to address this increased use by, for example, strengthening Medicare to support more integrated health care for Australians with chronic and complex conditions in primary care.
- A key challenge in achieving quality outcomes for older people is tackling the misconceptions associated with ageing and ill health that exist among health professionals, the general population, and older people themselves. The presumption that illness is a natural part of ageing affects the diagnosis, treatment and management of illness. Research shows that, given time, many older people have the capacity to recover from illness and regain full health, functionality and independence. ◆

growth rate of centenarians continues to increase. It is estimated that there will be 12 000 centenarians in Australia by 2020, and 50 000 by 2050; and the number of centenarians worldwide is estimated to increase 15-fold, to 2.2 million, by 2050.[31]

An ageing population is much more than just a demographic statistic and has major implications for health care. Improving the level of functioning of our very old Australians and preventing disabilities is important. Yet we know very little about centenarians. Studies are necessary to monitor and assess the oldest old, so that realistic public health policies and evidence-based resources can be developed to enable as many centenarians as possible to continue living independently in their homes and within our communities.

Currently, 16% of Australians are aged 60 years and over (Box 2). However, if the ageing pattern in Australia follows that of the US, we can expect that, as baby boomers age, the proportion of Australians reaching the age of 85 or over will rise from the current 2% of the population to around 5% by 2050.[32] The consequences of the demographic transition need investigation by health policymakers and economists — we need a better understanding of changes in prevalence of disability in order to make estimates of the likely short- and long-term cost implications.

Competing interests

None identified.

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