Life expectancy and disability in Australia 1988 to 2003

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Summary

Life expectancy has increased markedly over the last century. It is of interest to find out something about the 'health expectancy' in the additional years gained. Some literature has focused on whether morbidity has 'compressed' or 'expanded' with increasing life expectancy, that is, has the number of years lived with morbidity or disability fallen or risen as overall life expectancy has lengthened? This paper explores this question, focusing on years lived with disability, rather than with morbidity.

The paper updates the estimates of 'health expectancies' in Australia with a specific focus on disability. It also examines hypotheses about compression or expansion of morbidity and the effects of lengthening life expectancy.

Health expectancy as an indicator of population health and welfare

Life expectancy refers to the average number of additional years a person of a given age and sex can expect to live if the age- and sex-specific death rates observed in a given period continued throughout his/her lifetime.

The term 'health expectancy' is used to extend the concept of life expectancy to include morbidity and disability. Life expectancy is composed of lengths of time spent in various states of health until death.

Health expectancy refers to the number of years that a person could expect to live in a defined state of health. The expected years of life free of disability, or the expected years of life with disability, is one of the most common measures of health expectancy, and has been estimated for about 50 countries, including Australia. As this indicator is adjusted for the size and age structure of populations, it allows direct comparison of different population subgroups and analyses of changes over time. The usefulness of health expectancy indicators has been recognised in the Jakarta Declaration on Health Promotion into the 21st Century (WHO 1997). Since 1993, the expected years of life free of disability has been included as one of the health indicators in the health database of the Organisation for Economic Co-operation and Development (OECD 1993).

In Australia, indicators of functioning and disability in the population are a key component of national health status measurement (NHPC 2004). The expected years of life lived with disability is considered as one of the broad indicators of the welfare of Australia's population (AIHW 2005: Chapter 2).

Mortality, morbidity and disability

The relationships among mortality, morbidity and disability are complex. Mortality analyses examine number or rate of deaths in a population and the causes of death. Morbidity analyses examine the number (or rate) and the type of diseases in a population. Morbidity indicators are commonly expressed in terms of the incidence and/or prevalence of specific diseases and other health-related events (e.g. injuries).

In the International Classification of Functioning, Disability and Health (ICF), disability is an umbrella term for any, or all of, the components: impairment, activity limitation and participation restriction, as influenced by environmental factors. Impairments are 'problems in body function or structure such as significant deviation or loss'. Activity limitations are 'difficulties an individual may have in executing activities'. Participation restrictions are 'problems an individual may experience in involvement in life situations' (WHO 2001:7–10). Environmental factors include all the physical and social aspects of the environment that may affect a person's experience of disability, including equipment used or personal assistance provided. A person's functioning or disability is considered as a dynamic interaction between the health condition and environmental and personal factors.

Not all literature on health expectancies uses these ICF standard definitions of disability. A wide variety of concepts and measures of disability has been used in the studies on health expectancies. Moreover, the terms 'disease', 'morbidity' and 'disability' have sometimes been used interchangeably.

Examining trends in health expectancies in Australia may shed light on the debate about the likely impact of greater longevity on the prevalence of morbidity and disability. Three broad health scenarios have been proposed to describe the evolution of mortality, morbidity and disability.

- Some authors argue that improvements in health and medical care mean that morbidity will be compressed into a shorter period at the end of the life span—'compression of morbidity'.
- Other authors argue that increased longevity is accompanied by a longer period of morbidity in the later years of life—'expansion of morbidity'.
- Intermediate scenarios have also been proposed such as 'dynamic equilibrium', where the overall prevalence level of diseases may increase, but the average severity of diseases is decreased due to the reduction in the rate of progression of diseases.

There is contradictory evidence in the international literature regarding recent and projected change in the levels and patterns of morbidity and disability. Changes in mortality and morbidity can influence the prevalence of disability. Hence, the debate about 'compression of morbidity' is often considering both morbidity and disability, but this study focuses on disability.

This paper focuses on expected years of life lived with or without disability and expected years of life with or without a 'severe or profound core activity limitation', using disability data from the 2003 Australia Bureau of Statistics (ABS) Survey of

Disability, Ageing and Carers. Disability is defined as the presence of one or more of 17 impairments, limitations, restrictions or disabling conditions that lasted, or were likely to last, for least 6 months, and which restricted everyday activities. Severe or profound core activity limitation is defined as sometimes or always needing personal assistance or supervision with at least one of the activities of self-care, mobility and communication (see also Section 4 for detailed survey definitions of disability). Mortality data are based on ABS abridged life tables for Australia for 1996–1998 and 2001–2003 (ABS 2004a).

Main findings

Life expectancy and disability

In 2003, total life expectancy at birth was 77.8 years for Australian males and 82.8 years for females, a difference of 5 years (Figure S1). Total life expectancy was higher for females than for males throughout the 15 years from 1988 to 2003, although males gained more in life expectancy during this period.

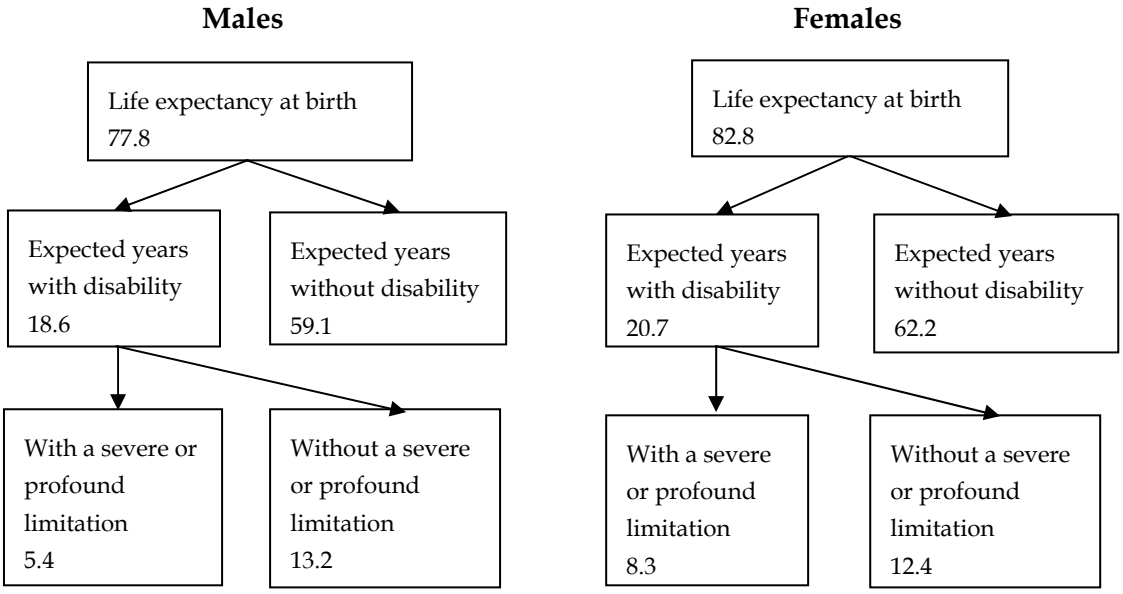
During the 15 years, gains in life expectancy were accompanied by increases in both expected years with disability and expected years without disability.

Overall, females had higher expectancies than males in both the years with disability and the years free from disability, although these gaps were much smaller at older ages. In 2003, males could expect, on average, to experience 18.6 years of life with disability (5.4 of which are expected years of life lived with a severe or profound core activity limitation). Females could expect, on average, to experience 20.7 years of life lived with disability (8.3 years with a severe or profound core activity limitation).

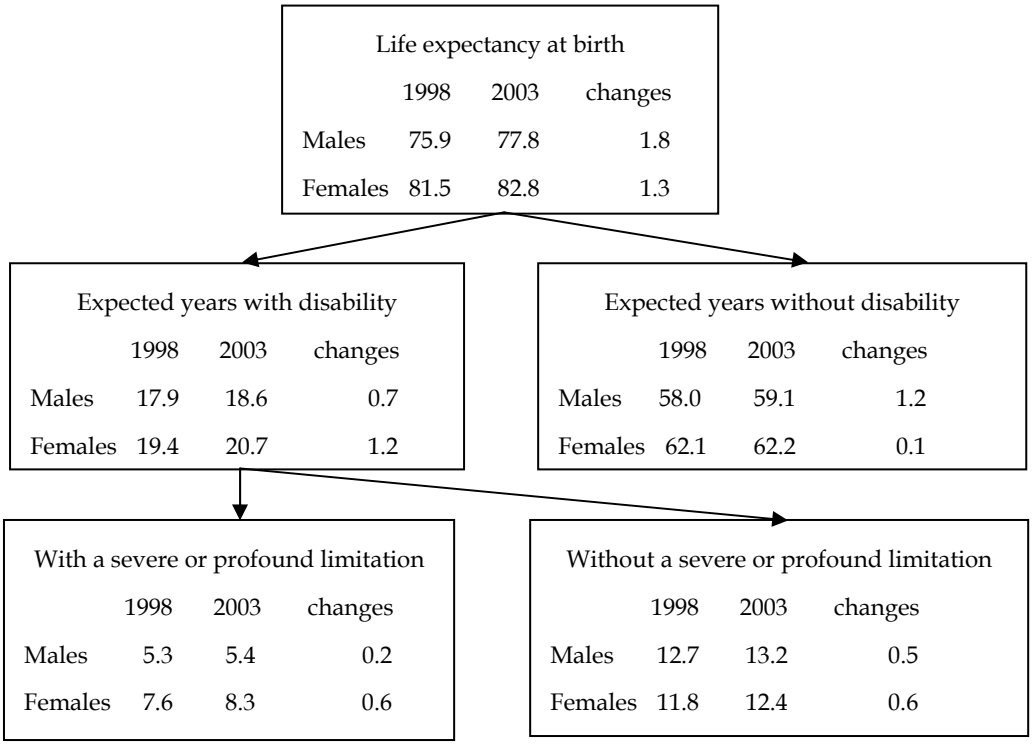
The proportion of expected life free from disability and, particularly, free from a severe or profound core activity limitation, was lower for females than for males.

Recent trends (1998–2003) showed that for older males, 67% of gains in life expectancy at age 65 (1.5 years over that period) were years with disability (1 year); and 27% (0.4 year) of their gains were years with a severe or profound core activity limitation. For older females, over 90% of their gains (1998–2003) in life expectancy at age 65 (1.2 years) were years with disability (1.1 years), and about 58% (0.7 year) of their gains were years with a severe or profound core activity limitation (Table 1).

(a) Single point of time, 2003



(b) Multiple points of time and changes between 1998 and 2003



Sources: AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished Abridged Australian life tables 1996–1998; 2001–2003.

Figure S1: Life expectancy and disability, by sex, 1998 and 2003

Is morbidity compressing?

The bulk of the literature on health expectancies has assumed a connection between morbidity and disability. The health scenarios of compression or expansion of morbidity have been expressed in terms of changes in various relationships between life expectancy and the expected years of life lived with a disability (see Box 2).

Considering recent changes (1998–2003) as well as the 15 years from 1988 to 2003, the analyses of the present study do not support the scenario of compression of morbidity for either male or female Australians, irrespective of their level of disability. Over the 15 years, gains in life expectancy were accompanied by increases in the expected years with disability as well as with a severe or profound core activity limitation.

This study also found no consistent evidence of absolute expansion of morbidity, as the expected years of life lived without disability and without a severe or profound core activity limitation both increased, as did total life expectancy. However, there may be some slight indication of expansion (in relative terms) in relation to less severe disabilities, since the proportion of expected life free of disability as a whole (all severity levels) declined for both males and females over the 15 years.

Conclusion

In conclusion, life expectancy increased markedly over the 15 years from 1988 to 2003. Gains in life expectancy were accompanied by increases in expected years of life both with and without disability or a severe or profound core activity limitation. The proportion of expected years with a disability to total life expectancy increased, especially for older Australians, although this related chiefly to less severe disability. Even though underlying age-specific prevalence rates of disability appear relatively stable, the ageing of the Australian population and the greater longevity of individuals are leading to more people, especially those at older ages, with a disability and a severe or profound core activity limitation.

1 Introduction

There has been a rapid decline in mortality and increase in life expectancy since the beginning of the 20th century. While data on causes of death, infant mortality and life expectancy have been used as an important basis for monitoring population health, people's health is increasingly being conceptualised in terms of their quality of life and functional status (AIHW 2004). Life expectancy refers to the average number of additional years a person of a given age and sex can expect to live if the age-specific death rates observed in a given period continued throughout his/her lifetime.

The concept of 'health expectancy' as a health indicator was proposed by Sanders (1964). It extends the concept of life expectancy to include morbidity and disability. Life expectancy is thus composed of lengths of time spent in various states of health until death. These lengths of time in different states of health are conceptualised as health expectancies and they may combine information on both mortality and morbidity or disability (Jagger 2001). The first example of this concept was published in a report by the US Department of Health Education and Welfare, which contained preliminary estimates of 'Disability-free life expectancy' (DFLE) using a method devised by Sullivan (Sullivan 1971).

Health expectancy has since been used as a generic concept for all population indicators that estimate the average time (years) that a person could expect to live in a defined state of health. DFLE calculated by the Sullivan method is one of the most common measures of health expectancy, and has been estimated for about 50 countries (Robine et al. 2000). As this indicator is adjusted for the size and age structure of populations, it allows direct comparison of different population subgroups and analyses of changes over time, provided that the definitions and collection methods of health and disability data are consistent. Many countries have time series of health expectancies and use them to monitor changes in population health status. The usefulness of health expectancy indicators has been recognised in the Jakarta Declaration on Health Promotion into the 21st Century (WHO 1997).

Since 1993, DFLE has been included as one of the health indicators in the health database of the Organisation for Economic Co-operation and Development (OECD 1993). Australian DFLEs in 1981, 1988, 1993 and 1998 are included in the OECD health database. The disability data used for the Australian estimates were from the Survey of Disability, Ageing and Carers (SDAC) conducted by the Australian Bureau of Statistics (ABS).

Trends in health expectancies in Australia had been studied based on the SDAC data up to 1998 (Mathers 1991, 1996; Heathcote et al. 2003). Preliminary estimates of 1998 health expectancies for Australia were based on modified estimates of disability prevalence from the 1998 SDAC, rather than direct survey estimates, to enable comparisons with data from the earlier SDACs (AIHW: de Looper & Bhatia 2001; AIHW 2003a).

A number of substantial changes were made to the 1998 SDAC design and methods, which 'captured' a larger number of people with a disability than the 1993 survey (AIHW 2001; ABS: Davis et al. 2001). While comparisons between 1981, 1988, 1993 and 1998 can be conducted using disability definitions common as far as possible to the four surveys, it is difficult to control for some of the changes in the 1998 survey and to quantify their effects on the estimated disability prevalence between the surveys.

The 2003 SDAC applied the same methods and disability definitions as those of the 1998 SDAC. The new and comparable disability data provide opportunities for updating the estimates of health expectancies in Australia, and enable findings from earlier studies on trends to be re-examined against more recent changes.

A re-examining of the trends in health expectancies in Australia may shed light on a wide-ranging debate on the impact of greater longevity on trends in morbidity and disability. There are two opposing views on this issue, characterised by differences in approach to measurement and the underlying assumptions used. The pessimistic view is that increased longevity is accompanied by more survivors who are frail and suffer from chronic conditions, and thus experience a longer period of disability in the later years of life—'expansion of morbidity' (e.g. Gruenberg 1977; Kramer 1980; Verbrugge 1984, 1989). The optimistic view argues that improvements in health and medical care can delay the onset of diseases and thus compress morbidity into a shorter time before death, resulting in lower disability prevalence in the population—'compression of morbidity' (e.g. Fries 1980, 1989). Intermediate scenarios have also been proposed such as 'dynamic equilibrium' (Manton 1982), where the overall prevalence level of diseases may increase, but the average severity of diseases is decreased due to the reduction in the rate of progression of diseases; or a postponement of all morbid events (i.e. diseases, disabilities and mortality) to older ages (Strehler 1975). Health expectancies provide a useful tool for testing various hypotheses about the impact of longevity on population morbidity and disability.

It is necessary to take note of the definitions and concepts of disability used in the calculations of various health expectancies and the proposed health scenarios. In the International Classification of Functioning, Disability and Health (ICF), disability is an umbrella term for any or all of the components: impairment, activity limitation and participation restriction, as influenced by environmental factors. Impairments are 'problems in body function or structure such as significant deviation or loss'. Activity limitations are 'difficulties an individual may have in executing activities'. Participation restrictions are 'problems an individual may experience in involvement in life situations' (WHO 2001:7–10). Environmental factors include all the physical- and social aspects of the environment that may affect a person's experience of disability, including equipment used or personal assistance provided. A person's functioning or disability is considered as a dynamic interaction between the health condition and environmental and personal factors.

Not all literature on health expectancies uses these standard definitions of disability. In fact, a wide variety of concepts and measures of disability has been used in the

studies on health expectancies. The terms 'disease', 'morbidity' and 'disability' have been sometimes used interchangeably.

Disability does not necessarily equate to poor health or illness. For example, in the early stages of disability associated with paraplegia, the affected person may be considered in poor health, but once their condition is stable they may enjoy good health particularly in the sense that they do not require medical services and may participate in many life areas. Discussion of 'health expectancy' should not be interpreted as considering years with disability to be of less value than 'healthy' years (without disability) for any policy purpose.

This paper consists of eight sections. Section 2 provides a brief overview of the methods of calculation for health expectancies. Section 3 illustrates a number of proposed population health scenarios and related measures of health expectancies. Section 4 describes data sources and definitions for the estimates of health expectancies in Australia. Section 5 presents the estimates of health expectancies for the Australian population in 1998 and 2003. Sections 6 and 7 examine the changes between 1998 and 2003 and trends over 15 years, from 1988 to 2003. Section 8 discusses trends and main patterns of health expectancies in Australia.

2 Methods for calculation of health expectancies

Estimates of health expectancies in this paper use the Sullivan method (Sullivan 1971). Health expectancies calculated by the Sullivan method are the average number of remaining years, at a particular age, that a population can expect to live, with different levels of disability, or without a disability (Jagger 2001). In other words, just as with life expectancy, health expectancies are indicators of population health rather than predictions of any individual's experience.

The Sullivan method uses the observed age-specific prevalence of disability in a population at a given point time to calculate the years of life lived, with/without disability at each age, by a period life table cohort. It modifies the regular life table by applying the age-specific prevalence rate of disability to the number of person years in each age interval of the life table. Thus, the numbers of person years in each age interval of the life table are grouped into various categories of disability according to the age-specific rates of different levels of disability (Box 1).

Box 1: The Sullivan method for calculating health expectancies

I_i = the number of persons at exact age x_i

L_i = the total number of person years lived within the age interval $(x_i – x_{i+1})$.

The years lived in the various age intervals $(x_i – x_{i+1})$ (i=0, 1, 2, …., w) are divided into the years lived with disability and without disability as follows:

$(D_i\ L_i)$ = average years lived with disability in age interval $(x_i – x_{i+1})$

$(1-D_i)L_i$ = average years lived without disability in age interval $(x_i – x_{i+1})$

Where

D_i = observed prevalence rate of disability in the age interval $(x_i – x_{i+1})$

The average expected years of life free of disability at age x_a is the total expected years of life lived free of disability from age x_a onwards divided by the number of persons alive at age x_a:

$$DFLE_a = \sum_{i=a}^{w} (I-D_i)L_i/I_a \qquad a = 0,\ldots..,w$$

The average expected years of life with disability is similarly calculated as

$$DLE_a = \sum_{i=a}^{w} D_iL_i/I_a \qquad a= 0,\ldots.,w$$

Hence the total life expectance at age$_a$, LE_a, has been decomposed into a disability-free and a disability component:

$$LE_a = \sum_{i=a}^{w} L_i/I_a = DFLE_a + DLE_a \qquad a = 0,\ldots..,w$$

Sources: Robine et al. 2000; Mathers 1991.

The Sullivan method is the most commonly used method for calculating health expectancies because of its simplicity, relative accuracy and ease of interpretation, as well as the data sources required by the method more readily available. It requires only mortality data taken from period life tables and data on the prevalence of disability or other health states (Jagger 2001; Robine et al. 2000).

The Sullivan method does not include constructed 'disability weights' that are used in the Disability Adjusted Life Expectancy (DALY). In DALY, each severity level of a disease is assigned a weight reflecting social value choice, and the different disease severity levels are weighted and then combined to give a single value. 'Disability weights' have been the subject of considerable debate and critical literature. Weights can be estimated in various ways, and different methods give different results (AIHW 2004:Section 2.2; National Health Performance Committee 2004:Appendix 5).

One main limitation of the Sullivan method is that it does not explicitly take account of reversible transitions between good health and disability or other health states. Increment–decrement (multi-state) life table methods have been developed as an important supplement to the Sullivan method. In theory, these methods are capable of handling transitions between health states and are powerful tools in understanding mortality and morbidity and their effects on population health. However, multi-state methods require longitudinal data that are rarely available at national population level, which makes such 'ideal' methods virtually unusable (Robine et al. 2000). A recent study on health expectancies of older Australians aimed to demonstrate the usefulness of logistic regression techniques in the estimation of health expectancies. However, the study did not show whether there was any difference between the estimates produced by the logistic regression techniques and by the Sullivan method (Heathcote et al. 2003).

Using a simulation exercise, comparative studies have shown that the differences between the estimates produced by the Sullivan method and multi-state methods are small if there are smooth and relatively regular changes in disability prevalence over time. The Sullivan method is thus generally acceptable for monitoring relatively smooth long-term trends in health expectancies for populations, as long as its limitations are understood (Robine & Mathers 1992; Mathers & Robine 1997).

Health expectancies may be expressed in terms such as 'disability-free life expectancy' or 'active life expectancy'. These are often used to indicate the expected remaining years of life without requiring help with daily activities. Health expectancies may also be expressed in terms of expected years of life with disability or with daily activity limitations.

In this paper, health expectancies have been estimated using the following main measures (for definitions, see Section 4):

- expected years of life lived with disability
- expected years of life lived with a severe or profound core activity limitation
- expected years of life free of disability
- expected years of life free of a severe or profound core activity limitation
- estimates of each of the above as a proportion of total life expectancy.

3 Health scenarios and related measures of health expectancies

The relationships among mortality, morbidity and disability are complex. Three broad health scenarios have been posited to describe the evolution of mortality, morbidity and disability, and thus the health consequences of increases in longevity. The terms 'disease', 'morbidity' and 'disability' are sometimes used interchangeably in these scenarios (see also Section 1 Introduction). The first scenario, a compression of morbidity, was first proposed by Fries (1980). The second scenario is an expansion of morbidity. The third scenario is a 'dynamic equilibrium' (Manton 1982).

These health scenarios may be expressed in terms of trends in various relationships between health expectancies and life expectancy. Any particular situation may be classified as a combination of absolute compression or expansion of morbidity (according to the change in the number of years lived with or without disability), combined with relative compression or expansion of morbidity (according to changes in the proportion of expected life lived with or without disability) (Box 2).

Box 2: Health scenarios and related measures of health expectancies

If the number of expected years of life with disability decreases, there is an absolute compression of morbidity;

if the number of expected years of life free from disability decreases, there is an absolute expansion of morbidity;

if the proportion of expected years of life with disability decreases without the number of expected years of disability decreasing (it may even increase), there is a relative compression of morbidity;

if the proportion of expected years of life free from disability decreases without the number of expected disability-free years decreasing (it may even increase) there is a relative expansion of morbidity;

if the ratio of disability-free life expectancy to total life expectancy is constant there is an equilibrium; and

considering severity of disability, if the number of years with disabilities – all levels combine – increases, while the number of years with severe disability remains constant or even decreases within life expectancy there is said to be a 'dynamic equilibrium'.

Source: Robine et al. 2000

4 Data sources and definitions

Unpublished ABS abridged life tables for Australia for 1996–1998 and 2001–2003 are used together with the age- and sex-specific disability prevalence rates in the calculation of health expectancies. Data on prevalence of disability and severe or profound core activity limitations were extracted from the ABS 1998 and 2003 SDAC confidentialised unit record files.

ABS disability surveys generally follow the conceptual framework and major concepts of the ICF. For the survey purposes, a person has a disability if he/she has at least one of 17 limitations, restrictions or impairments that has lasted, or is likely to last, for at least six months and restricts everyday activities (ABS 1999, 2004b):

- loss of sight, not corrected by glasses or contact lenses
- loss of hearing, with difficulty communicating or use of aids
- speech difficulties (including speech loss)
- chronic or recurring pain or discomfort that restricts everyday activities
- shortness of breath or breathing difficulties that restrict everyday activities
- blackouts, fits, or loss of consciousness
- difficulty learning or understanding
- incomplete use of arms or fingers
- difficulty gripping or holding things
- incomplete use of feet or legs
- a nervous or emotional condition that restricts everyday activities
- restriction in physical activities or in doing physical work
- disfigurement or deformity
- head injury, stroke or any other brain damage with long-term effects that restrict everyday activities
- needing help or supervision because of a mental illness or condition
- receiving treatment or medication for any other long-term condition or ailment and still restricted in everyday activities
- any other long-term condition that restricts everyday activities.

The survey definition of disability aims to capture a broad range of people who have one or more impairments or limitations, or who have one or more health conditions which restrict everyday life. Thus, these 17 items have been used as criteria to create the base 'disability' population that is the starting point for prevalence estimates.

A 'specific limitation or restriction' was defined in the 1998 and 2003 SDAC as a limitation in core activities (self-care, mobility and communication) or a restriction in schooling or employment. People who were identified as having a disability (using the above 17 criteria) and all people aged 60 years or over, were asked about their

difficulty and need for assistance with various daily activities: self-care, mobility, communication, health care, housework, property maintenance, paperwork, meal preparation, transport and cognition or emotion. Cognition or emotion refers to interacting, making or maintaining relationships, coping with feelings or emotions, making decisions or thinking through problems (ABS 2004b).

In the survey, four levels of core activity limitation are determined, based on whether a person needs personal assistance with, has difficulty with, or uses aids or equipment for, any of the core activities. A person's overall level of core activity limitation is determined by the highest level of limitation the person experienced in any of the core activity areas. The four levels of core activity limitations are:

- Profound—unable to perform a core activity or always needing assistance
- Severe—sometimes needs assistance to perform a core activity, or has difficulty understanding or being understood by family or friends, or can communicate more easily using sign language or other non-spoken forms of communication
- Moderate—does not need assistance, but has difficulty performing a core activity
- Mild—has no difficulty performing a core activity but uses aids or equipment because of disability; or cannot perform the activities of easily walking 200 metres, walking up and down stairs without a handrail, easily bending to pick up an object from the floor and using public transport; or can use public transport but needs help or supervision; or needs no help or supervision but has difficulty using public transport.

Core activities comprise the following tasks contributing to the definition of profound or severe core activity limitation:

- self-care—bathing or showering, dressing, eating, using the toilet, and bladder or bowel control
- mobility—getting into or out of a bed or chair, moving around at home and going to or getting around a place away from home
- communication—understanding and being understood by others (strangers, family and friends).

5 Estimates of health expectancies in 2003

5.1 Health expectancies at birth

In 2003, total life expectancy at birth was 77.8 years for Australian males and 82.8 years for females, a difference of 5 years[1]. Disability free-life expectancy at birth was 59.1 years for males and 62.2 years for females. The difference between total life expectancy and disability free-life expectancy is the expected years of life lived with different severity levels of disability: 18.6 years for males and 20.7 years for females—that is, 24% of total life expectancy for males and 25% of total life expectancy for females. This means that, on average, about 24% of males' lives and 25% of females' lives could be expected to be with disability, if disability prevalence and mortality rates at all ages remained constant at the 2003 levels (Table 1).

Of the years with disability, on average, males could expect to experience 5.4 years (7% of total male life expectancy) with a severe or profound core activity limitation, compared to 8.3 years for females (10% of total female life expectancy) (Table 1).

5.2 Health expectancies at age 65

Total life expectancy at age 65 was 17.6 years for males and 21.0 years for females. On average, males could expect to experience 10.0 years with disability, compared to 12.2 years for females. Of the years with disability, 3.4 years (19% of remaining years at age 65) for males and 6.2 years (29% of remaining years) for females were years with a severe or profound core activity limitation.

At age 65, the proportion of remaining years lived with disability was much higher than at birth: 57% for males and 58% for females. The proportion of years lived with a severe or profound core activity limitation was also higher: 19% for males and 29% for females (Table 1).

It should be noted that health expectancies at any given age are average estimates for the total population of that age group, including persons who already have a disability at the given age. Hence the expected years of life with disability at age 65 for a person who does not have a disability at age 65 would be fewer than the estimates in Table 1, which average the experience of persons without a disability at age 65 and those with a disability at age 65.

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1 Life expectancy is based on an average for each 5-year age-group (an abridged life table) for the reference period. Results may differ from other published results based on single year of age (a complete life table), or from results based on a different reference period.

Table 1: Expected years of life with a disability or with a severe or profound core activity limitation, 1998 and 2003

	Males				Females			
	Number of years		% of total life expectancy		Number of years		% of total life expectancy	
	1998	2003	1998	2003	1998	2003	1998	2003
At birth								
Expected years of life:								
With disability (all severity levels)[(a)]	17.9	18.6	23.6	24.0	19.4	20.7	23.8	24.9
With a severe or profound core activity limitation[(b)]	5.3	5.4	6.9	7.0	7.6	8.3	9.4	10.0
Free of disability	58.0	59.1	76.4	76.0	62.1	62.2	76.2	75.1
Free of a severe or profound core activity limitation[(b)]	70.7	72.3	93.1	93.0	73.9	74.6	90.6	90.0
Total life expectancy at birth	**75.9**	**77.8**	**100.0**	**100.0**	**81.5**	**82.8**	**100.0**	**100.0**
At age 65								
Expected years of life:								
With disability (all severity levels)[(a)]	9.0	10.0	56.0	57.0	11.1	12.2	56.0	58.2
With a severe or profound core activity limitation[(b)]	3.0	3.4	18.6	19.0	5.5	6.2	27.9	29.4
Free of disability	7.1	7.6	44.0	43.0	8.7	8.8	44.0	41.8
Free of a severe or profound core activity limitation[(b)]	13.1	14.3	81.4	81.0	14.3	14.8	72.1	70.6
Total life expectancy at age 65	**16.1**	**17.6**	**100.0**	**100.0**	**19.8**	**21.0**	**100.0**	**100.0**

(a) Disability is defined as the presence of one or more of 17 limitations, restrictions or impairments that lasted, or were likely to last, for at least 6 months, and which restricted everyday activities (see Section 4).

(b) Severe or profound core activity limitation is a subset of all disability and is defined as sometimes, or always, needing personal assistance or supervising with one or more core activities of self-care, mobility or communication (see Section 4).

Sources: Tables A1 and A2; AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished abridged Australian life tables 1996–1998; 2001–2003.

5.3 Age and sex patterns of health expectancies

Overall, females have higher life expectancy and also higher expectancies in both the years lived with disability and years lived without disability (Table 1). The difference between males and females in life expectancy narrowed with age, from 5.0 years at birth to 3.4 years at 65 years of age, and to 1.3 years for people at age 85 or more (Table A1).

While overall positive health expectancies (the expected years of life lived without disability and without a severe or profound core activity limitation) were also higher for females than for males, the differences were smaller compared to those for total life expectancies (Table 1). The differences in the expected years of life free from disability almost disappeared at older ages (Figure 1; Table A1).

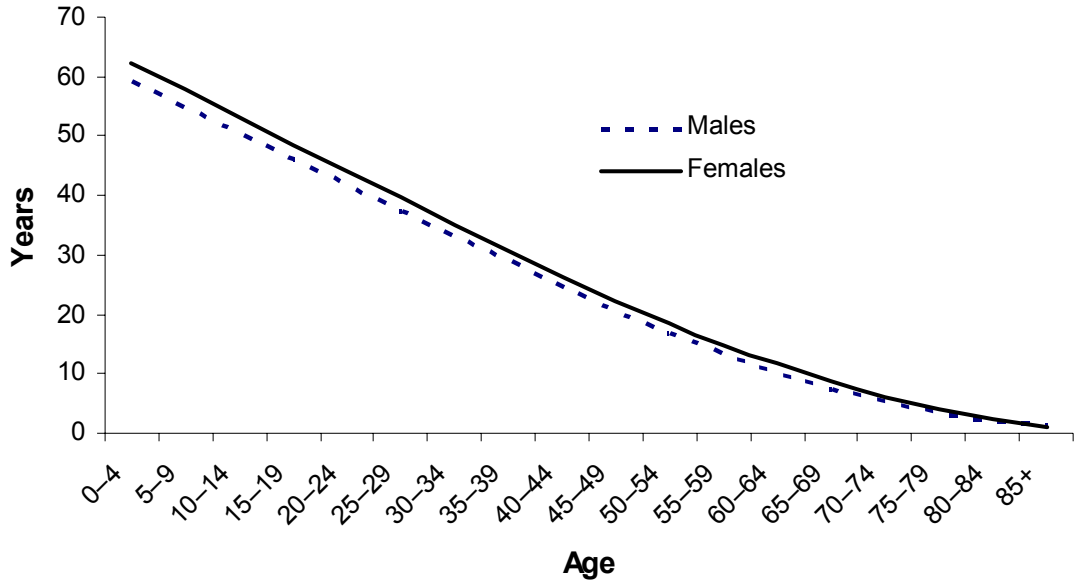
The expected years of life lived with disability were higher for females than for males across all ages. The sex differentials were higher at younger ages and then reduced among older people, with a gap of only 1.3 years for those at age 85 years or more in 2003 (Figure 2; Table A1).

Similar patterns of sex differentials were evident for the expected years with a severe or profound core activity limitation, but the gaps were larger than those for years with disability across all ages. The difference was 2.0 years for those at age 85 or over (Figure 3; Table A1).

The higher expected years with disability for females could largely be related to their higher life expectancy, as there were no substantial differences in age-specific prevalence rates of disability between males and females in most age groups except for children aged under 15 (Figure 4).

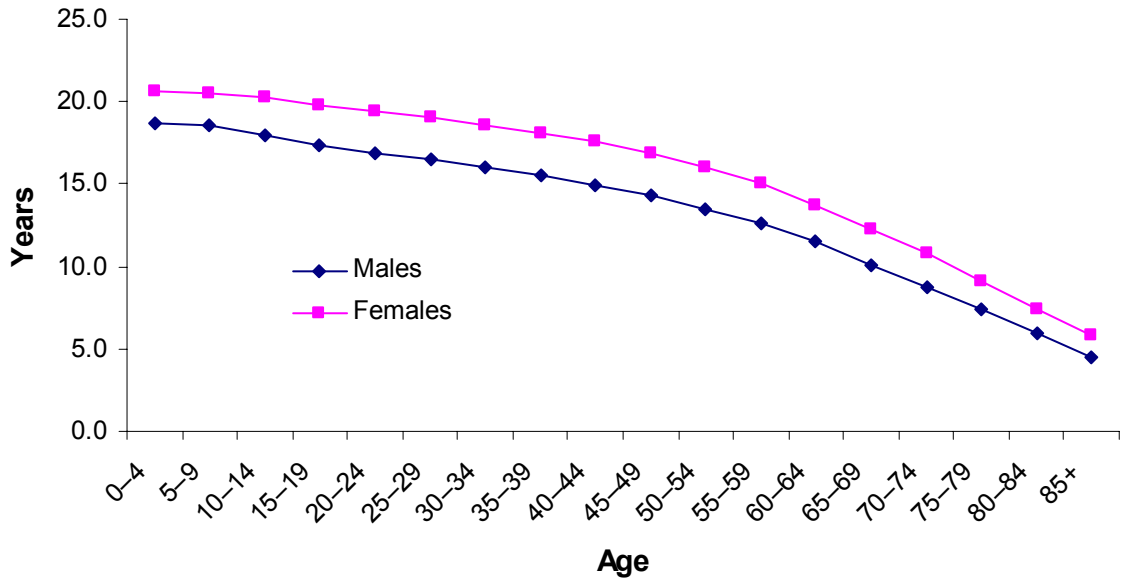
The larger sex differentials in the expected years with a severe or profound core activity limitation might be mainly related to both higher life expectancy and higher prevalence rates for females, in particular those at age 75 and over (Figure 4; Table A1).

Although total life expectancy was higher for females than for males, the proportion of disability-free life to total life expectancy was lower for females, and so was the proportion of life free from a severe or profound core activity limitation. The difference was particularly marked among people at age 65 for the proportion of expected life free from a severe or profound core activity limitation: 81% for males compared to 71% for females (Table 1).



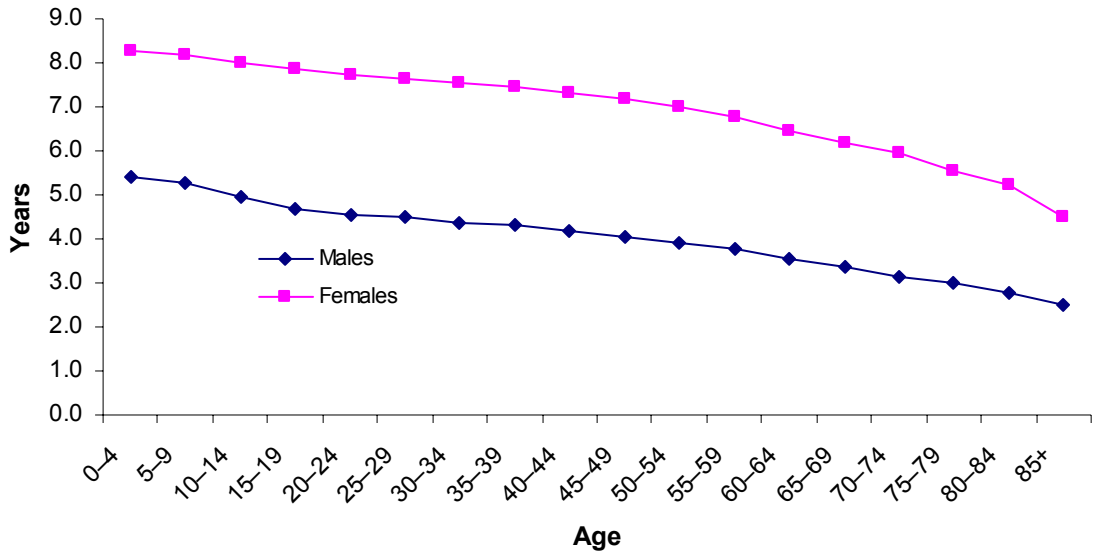
Sources: Table A1; AIHW analysis of ABS 2003 Survey of Disability, Ageing and Carers confidentialised unit record file; ABS unpublished abridged Australian life table 2001–2003.

Figure 1: Expected years of life free of disability (DFLE), by sex and age, 2003



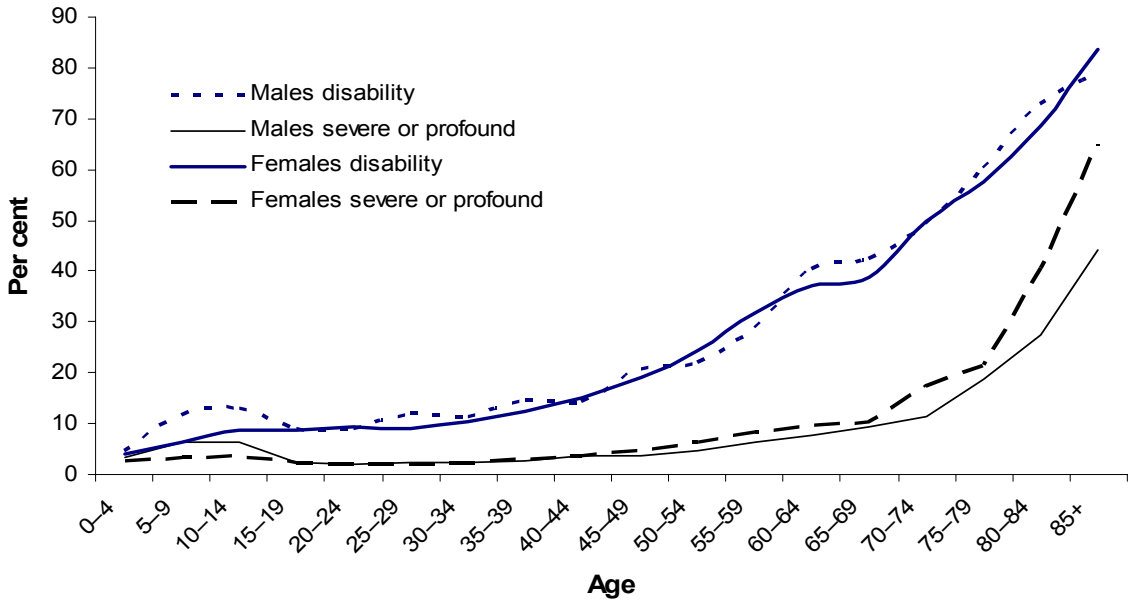
Sources: Table A1; AIHW analysis of ABS 2003 Survey of Disability, Ageing and Carers confidentialised unit record file; ABS unpublished abridged Australian life table 2001–2003.

Figure 2: Expected years of life with a disability, by sex and age, 2003



Sources: Table A1; AIHW analysis of ABS 2003 Survey of Disability, Ageing and Carers confidentialised unit record file; ABS unpublished abridged Australian life table 2001–2003.

Figure 3: Expected years of life with a severe or profound core activity limitation, by sex and age, 2003



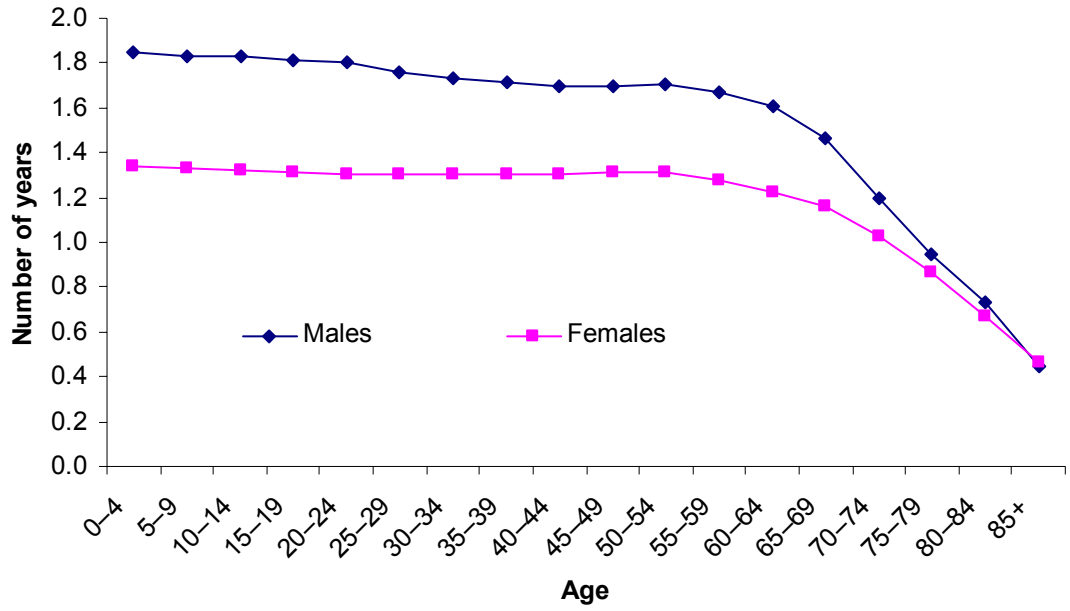
Sources: Table A5; AIHW analysis of ABS 2003 Survey of Disability, Ageing and Carers confidentialised unit record file.

Figure 4: Age- and sex-specific rates of disability and severe or profound core activity limitations, 2003

6 Changes in health expectancies between 1998 and 2003

Between 1998 and 2003, life expectancy at birth increased from 75.9 years to 77.8 years (an increase of 1.9 years or 2.5%) for males and 81.5 years to 82.8 years (an increase of 1.3 years or 1.6%) for females. Life expectancy at age 65 increased from 16.1 years to 17.6 years (an increase of 1.5 years or 9.3%) for males and 19.8 years to 21.0 years (an increase of 1.2 years or 6.1%) for females (Table 1).

Over the period, males gained more in life expectancy than females at most ages, while the sex differential in these gains declined with age and almost disappeared among those at age 75 years or more (Figure 5; Tables A3 and A4).



Sources: Tables A3 and A4; ABS unpublished abridged Australian life tables 1996–1998; 2001–2003.

Figure 5: Increases in life expectancy by sex and age, Australia, between 1998 and 2003

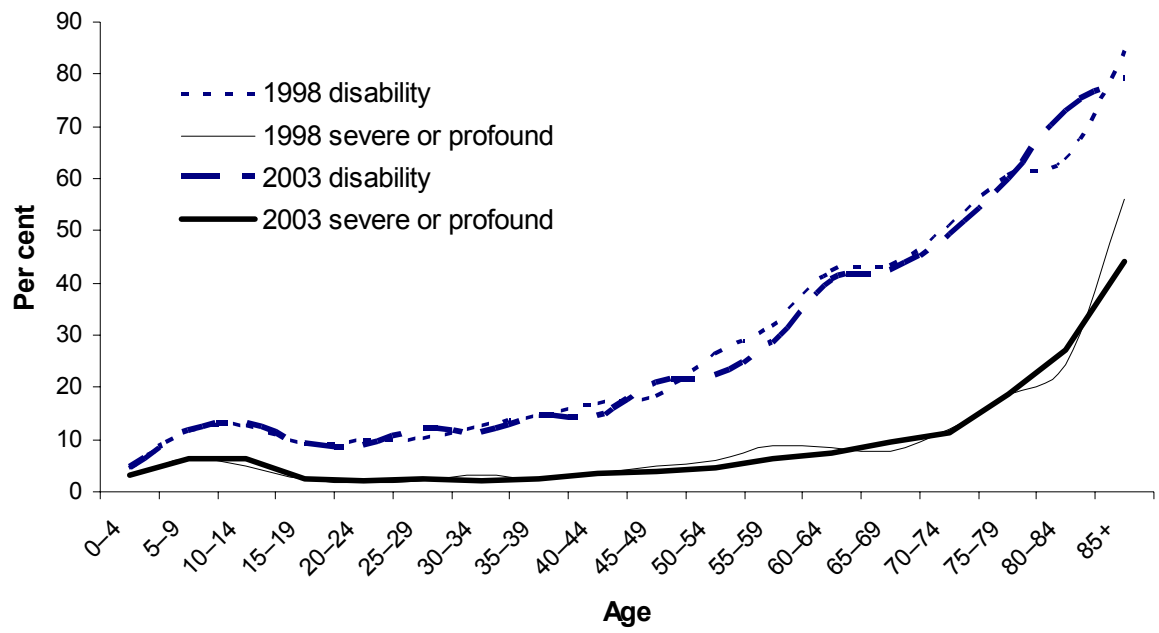
Overall, the increase in the expected years with disability at birth was higher for females than for males: an increase of 1.3 years (6.7%) for females and 0.7 years (3.9%) for males (Table 1). The expected years with a severe or profound core activity limitation remained approximately the same (5.3 years versus 5.4 years) for males but increased by 0.7 years (9.2%) for females.

The expected years with disability at age 65 increased by 1.0 year for males and

1.1 years for females, while small increases in the expected years with a severe or profound core activity limitation were evident for males (0.4 years) and females (0.6 years).

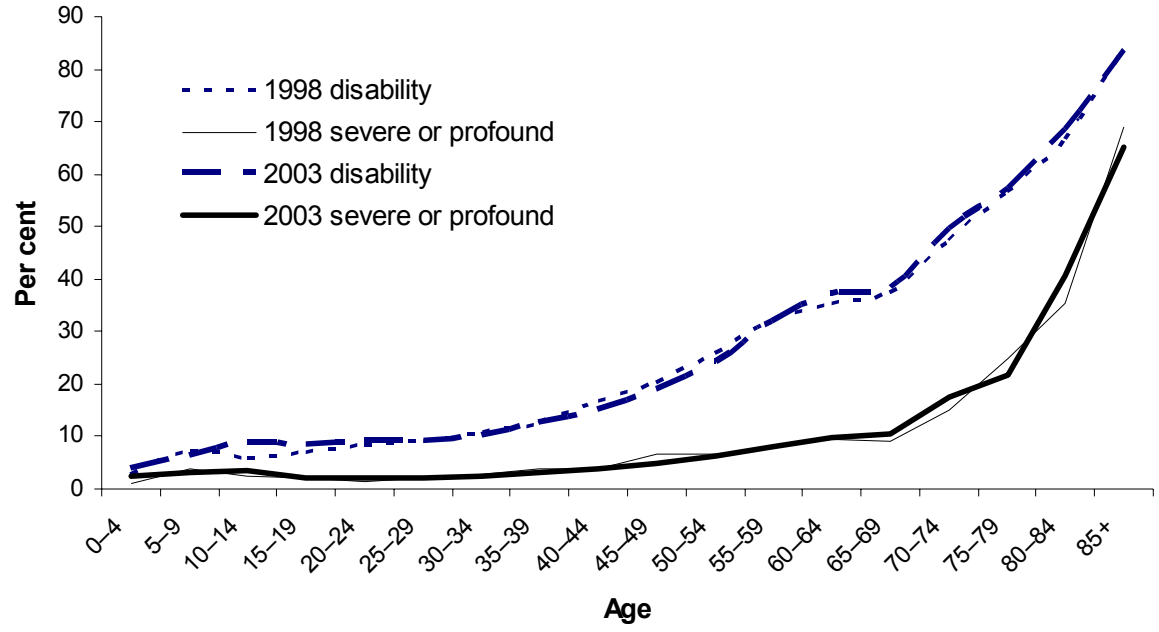
Between 1998 and 2003, the age-standardised rates of disability and severe or profound core activity limitations for total males, females and persons showed no significant changes and the patterns across most age groups were very similar for these two years (Figures 6 and 7; Table A5; ABS 2004b:Tables 3 and 4).

Population ageing could result in an increase in the overall prevalence rate and the number of people with disability, even though underlying age-specific prevalence rates might remain constant or even decline slightly. Between 1998 and 2003, the overall crude rates of disability for females increased significantly from 19.1% to 20.1%; however, there was no significant change in the overall crude rates of severe or profound core activity limitations for both sexes (Table A3; ABS 2004b:Table 3). The estimated number of both males and females with a disability and a severe or profound core activity limitation increased during this period (ABS 1999, 2004b).



Sources: Table A5; AIHW analysis of ABS 1888 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files.

Figure 6: Male age-specific prevalence rates of disability and severe or profound core activity limitation, 1998 and 2003

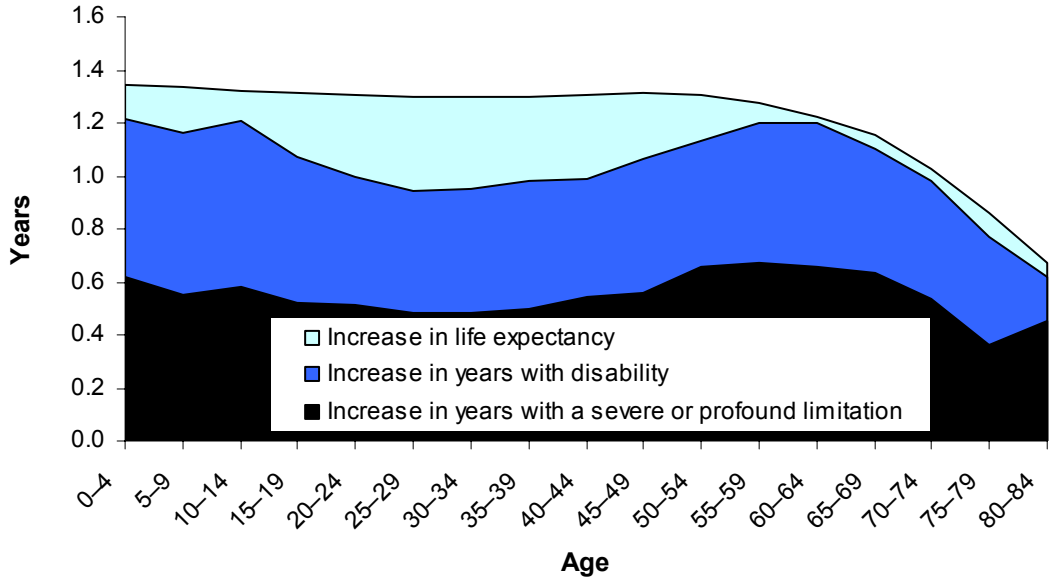


Sources: Table A5; AIHW analysis of ABS 1888 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files.

Figure 7: Female age-specific prevalence rates of disability and severe or profound core activity limitation, 1998 and 2003

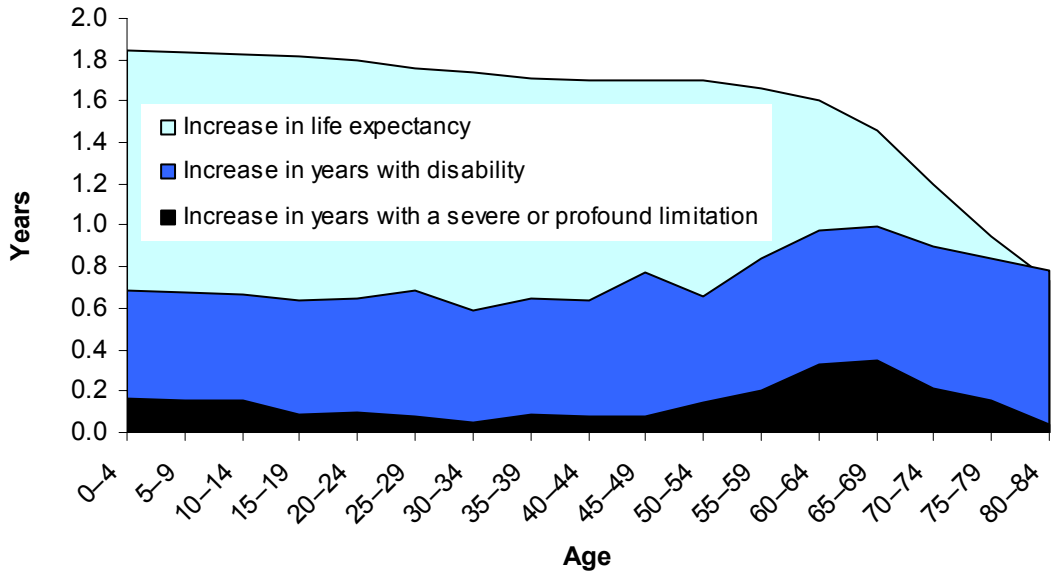
Corresponding to the increase in female crude rates of disability between 1998 and 2003, a larger proportion of the gain in female life expectancy comprised extra years with disability with all levels of severity combined, compared with the proportion for males. These differences applied across all age groups and were particularly evident among the older population at age 65 years or over and children at age under 15 years (Figures 8 and 9; Tables A3 and A4). Among females at age 55 years or over, some 90% or more of the gains in life expectancy were years expected to be accompanied by disability, and between 42% and 68% of the gains were expected years with a severe or profound core activity limitation. Among females at age under 15 years, about 90% of the gains in life expectancy were expected years of life lived with disability, and over 40% were years with a severe or profound core activity limitation (Figure 8; Tables A3 and A4).

In contrast, for males at ages 55 to 74, between 51% and 75% of the gains in male life expectancy were expected years with disability, while the proportion was 90% for males at ages 75–79. Between 12% and 24% of the gains in life expectancy were expected years with a severe or profound core activity limitation for males at age 55 or over. For males at age under 15 years, less than 40% of the increase in life expectancy was expected years with disability, and less than 10% were years with a severe or profound core activity limitation (Figure 9; Tables A3 and A4).



Sources: Tables A3 and A4; AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished abridged Australian life tables 1996–1998; 2001–2003.

Figure 8: Increases in life expectancy, expected years of disability and a severe or profound core activity limitation, by age, females, between 1998 and 2003



Sources: Tables A3 and A4; AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished abridged Australian life tables 1996–1998; 2001–2003.

Figure 9: Increases in life expectancy, expected years of disability and a severe or profound core activity limitation, by age, males, between 1998 and 2003

7 Trends in health expectancies from 1988 to 2003

This section examines changes in health expectancies in Australia from 1988 to 2003, which may shed light on trends over a period of 15 years. As discussed in Section 1, a number of substantial changes were made to the 1998 SDAC methods. It is difficult to adjust for some of the changes and to quantify their effects in order to compare with earlier surveys. Hence, changes between 1993 and 1998 are not included in the comparisons. The 2003 SDAC applied the same methods and disability criteria as those for the 1998 SDAC, allowing changes in disability prevalence over this period to be measured. As a result of the changes in survey methods, the estimates of disability prevalence for 1998 and 2003 are consistently higher than those of the previous years. Therefore, trends over the period 1988–2003 are examined as two separate comparisons: 1988–1993 and 1998–2003.

The analyses in this section use the following measures and focus on changes in general trends and patterns:

- changes in the proportion of expected life free from disability
- changes in the proportion of expected life free from a severe or profound core activity limitation
- changes in the expected years with (or without) disability and a severe or profound core activity limitation respectively
- changes in the expected years with (or without) disability as a proportion of the changes in total life expectancy
- changes in the expected years with a severe or profound core activity limitation as a proportion of the changes in total life expectancy.

The proportion of disability-free life expectancy to total life expectancy for males declined by 1.9 percentage points in 1988–1993, but the decline levelled off in 1998–2003 (Table 2). The proportion of expected life free from a severe or profound core activity limitation for males remained quite stable over the 15 years (around 93%–95%).

For females, the proportion of disability-free life declined over the 15 years, with a decline of 0.6 of a percentage point in 1988–1993 and 1.1 percentage points over 1998–2003. The proportion of expected life free from a severe or profound core activity limitation increased slightly by 0.5 of a percentage point in 1988–1993 but declined slightly by 0.6 of a percentage point over 1998–2003 (Table 2).

The expected disability-free years for males remained unchanged over 1988–1993 but increased by 1.1 years (63%) of the gains in male life expectancy in 1998–2003. The expected disability-free years for females increased by 0.6 years (43%) of the extra years of female life expectancy in 1988–1993, but remained almost the same over 1998–2003 (Table 3).

During each of the two periods (1988–1993 and 1998–2003), about 90% of the increase in male life expectancy were years free from a severe or profound core activity limitation. For females in 1988–1993, the increase in the expected years free from a severe or profound core activity limitation (1.7 years) was greater than the extra female life expectancy (1.4 years). However, over 1998–2003, just 54% (0.7 years) of the extra years (1.3 years) of female life expectancy was free from a severe or profound core activity limitation (Table 3).

Over the 15 years, the increase in life expectancy was generally accompanied by an increase in the expected years with disability with all severity levels combined, but the patterns are different for males and females (Table 3).

The increase in the expected years with disability as a proportion of the gains in total life expectancy for males levelled off over 1998–2003. During 1988–1993, almost all extra male life expectancy were years with disability; but over 1998–2003, only 37% of the increase in life expectancy were years with disability. In contrast, the proportion of expected years with disability for females continued to increase, from 50% of the gains in life expectancy in 1988–1993 to 91% in 1998–2003 (Table 3).

The increase in the expected years with a severe or profound core activity limitation as a proportion of gains in life expectancy for males increased slightly (about 10% of the increase in expected years of life) in each of the two time periods. For females, there was a slight decline in the expected years with a severe or profound core activity limitation (0.3 years) during 1988–1993. But over 1998–2003, the increase in the expected years with a severe or profound core activity limitation made up almost half (46%) of the increase in female life expectancy (Table 3).

Table 2: Trends in the expected years of life with a disability and with a severe or profound core activity limitation at birth, by sex, 1988–1993 and 1998–2003[(a)]

	Number of years				% of total life expectancy			
	1988	**1993**	**1998**	**2003**	**1988**	**1993**	**1998**	**2003**
Males								
Expected years of life:								
With disability (all severity levels)	14.7	16.6	17.9	18.6	20.1	22.1	23.6	24.0
With a severe or profound core activity limitation	3.2	3.4	5.3	5.4	4.4	4.5	6.9	7.0
Free of disability	58.4	58.4	58.0	59.1	79.9	77.9	76.4	76.0
Free of a severe or profound core activity limitation	69.9	71.6	70.7	72.3	95.6	95.5	93.1	93.0
Total life expectancy at birth	**73.1**	**75.0**	**75.9**	**77.8**	**100.0**	**100.0**	**100.0**	**100.0**
Females								
Expected years of life:								
With disability (all severity levels)	16.0	16.7	19.4	20.7	20.1	20.6	23.8	24.9
With a severe or profound core activity limitation	6.0	5.7	7.6	8.3	7.5	7.0	9.4	10.0
Free of disability	63.4	64.0	62.1	62.2	79.7	79.1	76.2	75.1
Free of a severe or profound core activity limitation	73.5	75.2	73.9	74.6	92.5	93.0	90.6	90.0
Total life expectancy at birth	**79.5**	**80.9**	**81.5**	**82.8**	**100.0**	**100.0**	**100.0**	**100.0**

(a) 1988 and 1993 SDACs are comparable; 1998 and 2003 SDACs are comparable.

Source: AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished Abridged Australian life tables 1996–1998; 2001–2003; Mathers 1996:Table 3 for 1988 and 1993 data.

Table 3: Changes in the expected years of life with a disability and with a severe or profound core activity limitation at birth, by sex, 1988–1993 and 1998–2003[a]

			Change in 1988–1993				Change in 1998–2003	
	1988	1993	Years	Proportion to change in total life expectancy[b]	1998	2003	Years	Proportion to change in total life expectancy[b]
Males								
Expected years of life:								
With disability (all severity levels)	14.7	16.6	1.9	100.0	17.9	18.6	0.7	37.0
With a severe or profound core activity limitation	3.2	3.4	0.2	10.5	5.3	5.4	0.2	9.0
Free of disability	58.4	58.4	0.0	0.0	58.0	59.1	1.2	63.0
Free of a severe or profound core activity limitation	69.9	71.6	1.7	89.5	70.7	72.3	1.7	90.9
Total life expectancy at birth	**73.1**	**75.0**	**1.9**	**100.0**	**75.9**	**77.8**	**1.8**	**100.0**
Females								
Expected years of life:								
With disability (all severity levels)	16.0	16.7	0.7	50.0	19.4	20.7	1.2	90.9
With a severe or profound core activity limitation	6.0	5.7	–0.3	–21.4	7.6	8.3	0.6	46.2
Free of disability	63.4	64.0	0.6	42.9	62.1	62.2	0.1	9.1
Free of a severe or profound core activity limitation	73.5	75.2	1.7	121.4	73.9	74.6	0.7	53.7
Total life expectancy at birth	**79.5**	**80.9**	**1.4**	**100.0**	**81.5**	**82.8**	**1.3**	**100.0**

(a) 1988 and 1993 SDACs are comparable; 1998 and 2003 SDACs are comparable.

(b) The estimated increase in the years of disability as a proportion of the increase in total life expectancy at birth.

Source: AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished Abridged Australian life tables 1996–1998; 2001–2003; Mathers 1996:Table 3 for 1988 and 1993 data.

8 Discussion

This section discusses the main patterns of health expectancies in Australia and changes over time against the hypothetical health scenarios presented in sections 1 and 3 along with earlier Australian studies. Overall, no consistent evidence is found of either compression or expansion of morbidity, although there may be some slight indication of expansion (in relative terms) in relation to less severe disability.

8.1 Differences between males and females

Total life expectancy was higher for females than for males throughout the period analysed, while males gained more in life expectancy over the 15 years from 1988 to 2003.

Overall, females had higher expectancies than males in both the years with disability and the years free from disability, although these gaps were much smaller at older ages.

The proportion of expected life free from disability was lower for females than for males, in particular the proportion of expected life free from a severe or profound core activity limitation among older people.

Overseas analyses of longitudinal survey data have suggested that the greater proportion of years lived with disability or daily activity limitations by women may be explained by the longer survival of women after the development of these problems (Robine et al. 1999).

A study on health expectancies of older Australians found that over the decade 1988–1998, two-thirds or more of the gain in female life expectancy was years with disability with all severity levels combined; and the situation for males was worse, for whom almost all the additional years of expected life were years with disability (Heathcote et al. 2003). The study did not examine the changes in the expected years with a severe or profound core activity limitation. The analyses included the 1998 SDAC data that were subject to substantial changes in survey methods, and not all the changes could be controlled for comparisons with earlier survey data (see Section 1 of this report).

The present study found that the direction of recent trends for males was different from the earlier study. Recent trends (1998–2003) showed that for older males, 67% of gains in life expectancy at age 65 (1.5 years) were years with disability (1 year); and 27% (0.4 year) of their gains were years with a severe or profound core activity limitation. For older females, over 90% of their gains (1998–2003) in life expectancy at age 65 (1.2 years) were years with disability (1.1 years), and about 58% (0.7 year) of their gains were years with a severe or profound core activity limitation (Table 1).

8.2 Recent evidence relating to the proposed health scenarios

Compression of morbidity

The bulk of the literature on health expectancies has assumed a connection between morbidity and disability. The health scenarios of compression or expansion of morbidity have been expressed in terms of changes in various relationships between life expectancy and the expected years of life lived with a disability (see Box 2).

An earlier study of trends in health expectancies in Australia over 1981–1993 found 'some suggestion of a compression of severe handicap[2] expectancy for older women but not men', while 'Australian health expectancies do not provide persuasive evidence for the occurrence of compression of morbidity, when that is defined in terms of a fairly wide definition of disability'(Mathers 1996:13).

Considering more recent survey data and a longer time period (15 years from 1988 to 2003), the analyses of the present study do not support either absolute or relative compression of morbidity for either male or female Australians, irrespective of level of disability. Over the 15 years, gains in life expectancy were accompanied by increases in the expected years with disability as well as a severe or profound core activity limitation—that is, there is no support for the idea of absolute compression of morbidity. The proportions of expected life lived with disability also increased over the same period—that is, there is no support for the scenario of relative compression of morbidity.

The suggestion of compression of severe disability among older female Australians (Mathers 1996) was not evident in the more recent time period (1998–2003), since the expected years with a severe or profound core activity limitation for females at age 65 increased and the proportion of expected life free from a severe or profound limitation declined (Table 1).

Expansion of morbidity

This study found no evidence of absolute expansion of morbidity, as the expected years of life lived without disability and without a severe or profound core activity limitation both increased over 1998–2003, as did total life expectancy, in particular among males.

This study found no consistent evidence of relative expansion of morbidity in terms of severe disability. It is difficult to examine trends in the prevalence of moderate and mild disabilities, largely due to the changes in the definitions between the surveys. There might be some indication of relative expansion of morbidity in terms

2 To be consistent with the definitions in the ICF, the 2003 SDAC used the concept of 'activity limitation' instead of 'handicap'.

of less severe disabilities, since the proportion of expected life free of disability as a whole declined for both males and females over the 15 years (Table 2).

'Dynamic equilibrium'

There is also no evidence suggesting the 'dynamic equilibrium' scenario in Australia, because the expected years with a severe or profound core activity limitation continued to increase, along with the increase in the number of years with a disability as a whole over the 15 years. This is in contrast to the key assumption of the 'dynamic equilibrium' scenario that the diseases become less disabling due to the decrease in average severity of diseases.

Conclusion

In conclusion, life expectancy increased markedly over the 15 years from 1988 to 2003. Gains in life expectancy were accompanied by increases in expected years of life lived both with and without disability or a severe or profound core activity limitation. The proportion of expected years of life with disability to total life expectancy increased, especially for older people, although this related chiefly to less severe disability. Even though underlying age-specific prevalence rates of disability appear relatively stable, the ageing of the Australian population and the greater longevity of individuals are leading to more people, especially those at older ages, with a disability and a severe or profound core activity limitation.

Appendix tables

Table A1: Life expectancy and disability, by age and sex, Australia, 2003 (years)

	Males					Females				
Age	Ex	DLE	SPLE	DFLE	SPFLE	Ex	DLE	SPLE	DFLE	SPFLE
0–4	77.8	18.6	5.4	59.1	72.3	82.8	20.7	8.3	62.2	74.6
5–9	73.3	18.5	5.3	54.8	68.0	78.3	20.6	8.2	57.7	70.1
10–14	68.3	17.9	5.0	50.4	63.4	73.3	20.3	8.0	53.1	65.3
15–19	63.4	17.3	4.7	46.1	58.7	68.4	19.8	7.8	48.5	60.5
20–24	58.6	16.9	4.6	41.7	54.0	63.4	19.4	7.7	44.0	55.7
25–29	53.8	16.5	4.5	37.3	49.3	58.5	19.0	7.7	39.6	50.9
30–34	49.1	16.0	4.4	33.1	44.7	53.6	18.6	7.6	35.1	46.1
35–39	44.4	15.5	4.3	28.8	40.1	48.8	18.1	7.5	30.7	41.3
40–44	39.6	14.9	4.2	24.7	35.4	43.9	17.5	7.3	26.4	36.6
45–49	35.0	14.3	4.0	20.6	30.9	39.1	16.9	7.2	22.3	32.0
50–54	30.4	13.5	3.9	16.9	26.5	34.4	16.1	7.0	18.4	27.4
55–59	25.9	12.6	3.8	13.3	22.1	29.8	15.0	6.8	14.8	23.0
60–64	21.6	11.5	3.5	10.1	18.1	25.3	13.7	6.5	11.6	18.8
65–69	17.6	10.0	3.3	7.6	14.3	21.0	12.2	6.2	8.8	14.8
70–74	13.9	8.7	3.1	5.2	10.8	16.9	10.8	5.9	6.1	11.0
75–79	10.7	7.4	3.0	3.3	7.6	13.1	9.1	5.5	3.9	7.6
80–84	7.9	6.0	2.8	1.9	5.1	9.7	7.5	5.2	2.2	4.5
85+	5.6	4.5	2.5	1.2	3.2	6.9	5.8	4.5	1.1	2.4

Ex Life expectancy at exact age x–x+.

DLE Expected years of life lived with a disability.

SPLE Expected years of life lived with a severe or profound core activity limitation.

DFLE Expected years of life free of disability.

SPFLE Expected years of life free of a severe or profound core activity limitation.

Sources: AIHW analysis of ABS 2003 Survey of Disability, Ageing and Carers confidentialised unit record file; ABS unpublished abridged Australian life table 2001–2003.

Table A2: Life expectancy and disability, by age and sex, Australia, 1998 (years)

	Males					Females				
Age	Ex	DLE	SPLE	DFLE	SPFLE	Ex	DLE	SPLE	DFLE	SPFLE
0–4	75.9	17.9	5.3	58.0	70.7	81.5	19.4	7.6	62.1	73.9
5–9	71.4	17.8	5.1	53.6	66.3	77.0	19.4	7.6	57.5	69.3
10–14	66.5	17.3	4.8	49.2	61.7	72.0	19.0	7.4	53.0	64.6
15–19	61.6	16.7	4.6	44.9	57.0	67.0	18.8	7.3	48.3	59.7
20–24	56.8	16.3	4.5	40.5	52.3	62.1	18.4	7.2	43.7	54.9
25–29	52.1	15.9	4.4	36.2	47.7	57.2	18.0	7.2	39.2	50.1
30–34	47.4	15.4	4.3	31.9	43.0	52.3	17.6	7.1	34.7	45.3
35–39	42.6	14.9	4.2	27.7	38.4	47.5	17.1	7.0	30.3	40.5
40–44	37.9	14.3	4.1	23.7	33.8	42.6	16.6	6.8	26.1	35.8
45–49	33.3	13.6	4.0	19.7	29.3	37.8	15.8	6.6	22.0	31.2
50–54	28.7	12.8	3.8	15.9	24.9	33.1	14.9	6.3	18.2	26.8
55–59	24.2	11.7	3.5	12.5	20.7	28.5	13.8	6.1	14.7	22.4
60–64	20.0	10.5	3.2	9.5	16.8	24.1	12.5	5.8	11.6	18.3
65–69	16.1	9.0	3.0	7.1	13.1	19.8	11.1	5.5	8.7	14.3
70–74	12.7	7.8	2.9	4.9	9.8	15.9	9.9	5.4	6.0	10.5
75–79	9.7	6.5	2.9	3.2	6.8	12.2	8.4	5.2	3.8	7.1
80–84	7.2	5.2	2.7	2.0	4.4	9.0	6.8	4.8	2.2	4.3
85+	5.2	4.4	2.9	0.8	2.3	6.4	5.4	4.4	1.0	2.0

Ex Life expectancy at exact age x–x+.

DLE Expected years of life lived with a disability.

SPLE Expected years of life lived with a severe or profound core activity limitation.

DFLE Expected years of life free of disability.

SPFLE Expected years of life free of a severe or profound core activity limitation.

Sources: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers confidentialised unit record file; ABS unpublished abridged Australian life table 1996–1998.

Table A3: Increases in life expectancy, expected years of disability and a severe or profound core activity limitation, by age, males, between 1998 and 2003

	Increases in life expectancy (years)	Increases in the expected years of		Proportion to changes in life expectancy (%)	
		disability	a severe or profound core activity limitation	Disability	A severe or profound core activity limitation
0–4	1.8	0.7	0.2	37.0	9.0
5–9	1.8	0.7	0.2	36.8	8.4
10–14	1.8	0.7	0.2	36.4	8.6
15–19	1.8	0.6	0.1	35.3	4.9
20–24	1.8	0.6	0.1	35.9	5.5
25–29	1.8	0.7	0.1	38.9	4.3
30–34	1.7	0.6	0.1	33.9	3.0
35–39	1.7	0.7	0.1	37.9	5.2
40–44	1.7	0.6	0.1	37.6	4.8
45–49	1.7	0.8	0.1	45.5	4.8
50–54	1.7	0.7	0.1	38.3	8.4
55–59	1.7	0.8	0.2	50.6	12.4
60–64	1.6	1.0	0.3	61.0	20.4
65–69	1.5	1.0	0.3	68.1	23.6
70–74	1.2	0.9	0.2	74.9	17.6
75–79	0.9	0.8	0.2	89.2	16.0
80–84	0.7	0.8	0.0	106.4	4.8

Sources: AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished abridged Australian life tables 1996–1998; 2001–2003; Mathers 1996:Table 3 for 1988 and 1993 data.

Table A4: Increases in life expectancy, expected years of disability and a severe or profound core activity limitation, by age, females, between 1998 and 2003

	Increases in life expectancy (years)	Increases in the expected years of		Proportion to changes in life expectancy (%)	
		disability	a severe or profound core activity limitation	Disability	A severe or profound core activity limitation
0–4	1.3	1.2	0.6	90.9	46.2
5–9	1.3	1.2	0.6	86.9	41.5
10–14	1.3	1.2	0.6	91.7	44.1
15–19	1.3	1.1	0.5	81.6	39.7
20–24	1.3	1.0	0.5	76.2	39.5
25–29	1.3	0.9	0.5	72.8	37.0
30–34	1.3	1.0	0.5	73.3	37.1
35–39	1.3	1.0	0.5	75.2	38.4
40–44	1.3	1.0	0.5	75.7	41.8
45–49	1.3	1.1	0.6	81.2	42.6
50–54	1.3	1.1	0.7	86.4	50.2
55–59	1.3	1.2	0.7	94.3	53.0
60–64	1.2	1.2	0.7	98.4	54.0
65–69	1.2	1.1	0.6	95.2	54.4
70–74	1.0	1.0	0.5	95.8	52.2
75–79	0.9	0.8	0.4	89.1	42.4
80–84	0.7	0.6	0.5	92.0	67.5

Sources: AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files; ABS unpublished abridged Australian life tables 1996–1998; 2001–2003; Mathers 1996:Table 3 for 1988 and 1993 data.

Table A5: Age and sex prevalence rates (%) of disability and severe or profound core activity limitations, 1998 and 2003

	Disability				Severe or profound core activity limitation			
	Males		Females		Males		Females	
Age	1998	2003	1998	2003	1998	2003	1998	2003
0–4	4.6	4.8	2.7	4.0	3.1	3.3	*1.2	2.5
5–9	11.5	11.7	7.5	6.4	6.5	6.5	3.9	3.3
10–14	12.7	13.1	6.0	8.8	4.9	6.3	2.3	3.5
15–19	9.2	9.0	7.1	8.6	2.6	2.4	2.1	2.2
20–24	9.9	8.9	8.2	9.2	1.7	2.1	1.4	2.2
25–29	10.2	12.0	9.1	8.9	2.0	2.4	2.2	2.2
30–34	12.7	11.4	10.8	10.3	3.0	2.2	2.7	2.4
35–39	14.5	14.6	12.6	12.5	2.5	2.6	4.0	3.1
40–44	17.0	14.4	16.6	15.2	3.6	3.6	4.0	3.8
45–49	18.3	20.8	20.3	19.0	5.0	3.8	6.7	4.8
50–54	26.4	22.2	25.9	24.3	6.0	4.6	6.7	6.3
55–59	31.9	28.6	32.2	31.9	8.9	6.3	8.0	8.2
60–64	42.4	40.6	35.5	37.1	8.3	7.6	9.4	9.9
65–69	43.3	42.5	37.4	38.6	7.9	9.5	9.0	10.4
70–74	50.9	49.3	47.2	49.8	11.8	11.4	15.0	17.3
75–79	60.7	60.1	56.7	57.4	18.7	18.7	24.9	21.5
80–84	63.4	72.9	66.6	68.6	24.4	27.3	35.5	40.5
85+	84.5	79.1	84.1	83.8	56.1	44.1	68.9	65.0
Total	**19.6**	**19.9**	**19.1**	**20.1**	**5.4**	**5.4**	**6.7**	**7.1**

Note: Estimates marked with * have an associated relative standard error (RSE) of between 25% and 50% and should be interpreted accordingly.

Sources: AIHW analysis of ABS 1998 and 2003 Survey of Disability, Ageing and Carers confidentialised unit record files.

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