

# Disability in older Australians: projections for 2006–2031

Lynne C Giles, Ian D Cameron and Maria Crotty

AS THE AUSTRALIAN POPULATION ages, changes in the distribution of disability and morbidity will lead to changes in healthcare needs and costs of care for older people.<sup>1,2</sup> To appropriately plan health services we need reliable projections of disability in both the entire population and in older people.

The most recent (1998) national Survey of Disability, Ageing and Carers (SDAC) in 1998 by the Australian Bureau of Statistics (ABS) estimated that 3.6 million Australians (19%) had some form of disability.<sup>3</sup> Of these, 2.8 million (78%) had a core activity restriction — in self-care, mobility or communication — caused by their disability.<sup>4</sup> The ABS further defines core activity restrictions as profound, severe, moderate or mild.<sup>3</sup> People with a profound restriction are unable to perform a core activity, such as eating or dressing, or always require assistance from another person. People with severe restriction sometimes need assistance to perform a core activity, while those with moderate restriction do not need assistance but have difficulty performing a core activity. People with mild restriction use aids because of their disability, but have no difficulty in performing a core activity.

The Australian Institute of Health and Welfare<sup>5</sup> has recently presented projections of the numbers of people with either profound or severe core activity restrictions for the years 2000–2031, based on the disability prevalences in the SDAC.<sup>3</sup> However, the main health conditions underlying disability were not considered.

Our aim was to provide detailed population projections for disability and the common health conditions underlying

## ABSTRACT

**Objectives:** To provide detailed projections for the prevalence of disability and associated common health conditions for older Australians for the period 2006–2031.

**Design:** Secondary analyses of datasets (national 1998 Survey of Disability, Ageing and Carers; and projections of Australia's population from 2006–2031) collected by the Australian Bureau of Statistics.

**Outcome measures:** (i) The projected number of people with differing levels of disability (core activity restrictions in self-care, mobility or communication) up to 2031; (ii) The projected number of people with the main health conditions associated with disability in 2006 and 2031.

**Results:** Projections indicate a 70% increase in the number of older people with profound disability over the next 30 years. The main conditions associated with profound or severe core activity restriction in older Australians are musculoskeletal, nervous system, circulatory and respiratory conditions and stroke.

**Conclusions:** In the future, there will be many more older Australians requiring assistance because of disability. This will present a challenge to families, friends, volunteers and paid service providers. The Australian planning ratio for residential aged-care services and community aged care services should be changed to take account of the shift to an older population with greater need of support.

**MJA 2003; 179: 130–133**

disability in older people for the period 2006–2031. Our study is a secondary analysis of data collected by the ABS and extends the work done by the Australian Institute of Health and Welfare.<sup>5</sup>

## METHODS

ABS population projections for 2006 to 2031 were taken from the most recently published series.<sup>6</sup> We used the ABS projection Series I, II and III to compare the projections of disability with a range of assumptions for fertility, migration and mortality. All three series assume life expectancy at birth will increase over the projection period. Series II most closely reflects current fertility and migration levels. Series I (high population growth) and III (low

population growth) are presented to contrast the results obtained from the medium series for the percentage change in disability. We also used the 1998 ABS Survey of Disability, Ageing and Carers Confidentialised Unit Record File<sup>7</sup> to derive estimates of the prevalence of disability and selected main health conditions associated with disability. Some additional data breakdowns for the oldest age groups (ie, 85–94 and 95+) were provided by the ABS.

Established procedures<sup>5,8</sup> were used to derive projections of disability:

- Data from the 1998 SDAC were used to derive age-group and sex-specific prevalence rates of (i) disability and (ii) underlying health conditions;

- These rates were applied to the projected 2006–2031 age and sex distributions of the Australian population, using Series I, II and III from the ABS projections.

## RESULTS

The prevalence of disability by category of core activity restriction in 1998 is summarised in Box 1. A sex difference

**Department of Rehabilitation and Aged Care, Flinders University, Adelaide, SA.**

**Lynne C Giles**, MPH, AStat, Clinical Epidemiologist and Research Manager;

**Maria Crotty**, PhD, FAFRM (RACP), Professor, and Head.

**Rehabilitation Studies Unit, Faculty of Medicine, University of Sydney, Sydney, NSW.**

**Ian D Cameron**, PhD, FAFRM (RACP), Associate Professor, and Head.

Reprints will not be available from the authors. Correspondence: Professor Maria Crotty, Department of Rehabilitation and Aged Care, Flinders University, GPO Box 2100, Adelaide, SA 5001.

Maria.Crotty@rgh.sa.gov.au

**1: Disability prevalence for Australia in 1998 by level of core activity restriction and age**

	Profound	Severe	Moderate	Mild	All with disability*
<b>Males</b>					
0–64	1.4%	2.7%	2.7%	4.1%	15.5%
65–74	4.8%	4.6%	10.1%	18.2%	45.6%
75–84	11.9%	7.7%	13.1%	22.1%	61.7%
85–94	42.4%	13.2%	9.2%	17.6%	83.6%
95+	60.0%	3.3%	36.7%	0.0 <sup>†</sup>	100.0%
<b>Females</b>					
0–64	1.2%	2.6%	2.5%	3.6%	13.6%
65–74	5.8%	5.9%	9.6%	15.3%	41.6%
75–84	19.3%	8.3%	9.0%	19.7%	59.3%
85–94	52.8%	14.1%	7.4%	8.1%	83.4%
95+	89.3%	3.6%	0.0 <sup>†</sup>	0.0	92.9%
<b>Total</b>					
0–64	1.3%	2.7%	2.6%	3.9%	14.6%
65–74	5.3%	5.3%	9.8%	16.7%	43.5%
75–84	16.2%	8.1%	10.7%	20.7%	60.3%
85–94	49.6%	13.9%	8.0%	11.0%	83.5%
95+	83.1%	3.5%	7.7%	0.0	94.4%

\* Includes schooling and employment restriction (which explains the discrepancy in the totals).

† "Unreliable" from Australian Bureau of Statistics perspective; counts negligible, so treated as zero.

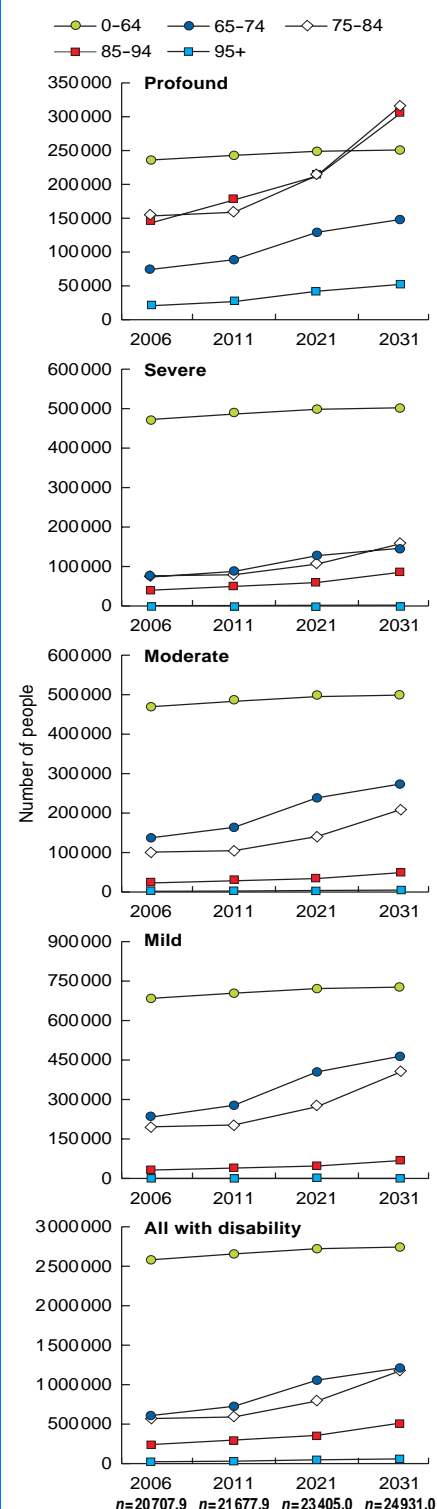
for the 95+ age group is apparent, and all men in this oldest age group were estimated to have a disability. More than a third of the oldest men had a moderate core activity restriction and 60% a profound core activity restriction. In contrast, 89% of the oldest women had a profound core activity restriction.

The projected increases in the absolute numbers of the disabled population over the quarter century from 2006, based on Series II population projections, are given in Box 2. As the plots were similar for males and females, only those for the total population are presented. While the number of people with some form of core activity restriction remains relatively constant for the age group 0–64 years, there are increases in the number of people with restriction in all age groups above 65 years (Box 2). Especially marked are the increases from the year 2011 onwards for the age group 65–84 years. The projected changes in population structure will have the most effect on profound core activity restriction. The number of people aged between 75 and 94 years with a profound restriction rises steadily until 2021, and then

increases sharply, so that the total numbers of people with a profound restriction in these age categories exceed the number with profound restriction in the age group 0–64 years.

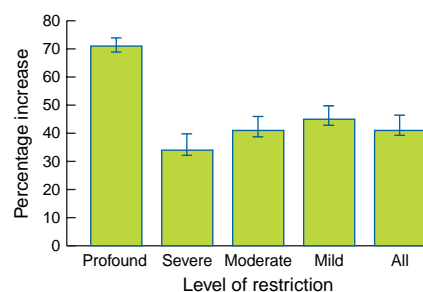
The percentage change (projected to occur from 2006 to 2031) in the number of people with the various levels of disability is illustrated in Box 3. There are large percentage increases particularly in those with a profound restriction — estimated to be 71% (69% using Series III, and 74% using Series I).

Box 4 shows the prevalence of selected main disabling conditions across the lifespan based on the SDAC,<sup>7</sup> as well as the projected number of people with profound/severe or moderate/mild core activity restriction in 2006 and 2031. The main conditions associated with profound or severe core activity restriction in Australians aged 65 years and over are musculoskeletal, nervous system, circulatory and respiratory conditions and stroke. The projections indicate there will be large increases in the number of older Australians with these conditions. Among those with mild or moderate restriction, musculoskeletal, circulatory, respiratory, and vision-related conditions were

**2: Projected number of people with disability, Australia 2006–2031**

Different categories of core activity restrictions and all disability (based on Australian Bureau of Statistics Series II population projections<sup>6</sup>) are shown. *n* = total projected population ( $\times 1000$ ). Note the different scales on the plots.

### 3: Percentage change in numbers of Australians with disability, 2006–2031



Data based on Australian Bureau of Statistics Series II projections<sup>6</sup> (error bars indicate percentage change using Series I [high] and Series III [low] projections).

common, but conditions related to hearing were also prominent.

## DISCUSSION

The projections to 2031 anticipate large increases in the absolute number of people with disability, as the number of people with medical conditions more prevalent in later life increases.

The projections indicated that the absolute numbers of people aged 0–64 years with some form of disability will rise only slightly. In contrast, for people aged over 64 years, projected increases in the number with disability are pronounced. The number of older people with profound disability arising from stroke, musculoskeletal, nervous system, circulatory and respiratory conditions, and conditions related to vision, are estimated to nearly double from 2006 to 2031.

Overall, these prevalence data support the compression of morbidity hypothesis<sup>9</sup> — profound restriction is largely deferred until very advanced age. In 1998, 9 in 10 women aged over 95 years had a profound core activity restriction, compared with 60% of similarly aged men. The oldest men, while reporting less profound disability, all reported at least moderate core activity restriction. It must be noted that the number of Australians achieving the age of 95 years or more in 1998 was very small — approximately 3000 men and 11 200 women. While the size of this oldest group suggests caution is needed in interpreting the findings, a sex difference is apparent in the disability prevalence,

### 4: Prevalence of main disabling conditions in 1998 for Australians by level of core activity restriction, and projected number with the condition and level of restriction in 2006 and 2031\*

	Profound/severe <sup>†</sup>			Moderate/mild <sup>†</sup>		
	1998 (prevalence)	2006 (n [× 1000])	2031 (n [× 1000])	1998 (prevalence)	2006 (n [× 1000])	2031 (n [× 1000])
<b>0–64</b>						
Musculoskeletal	1.46%	258.9	275.1	3.08%	547.2	581.5
Nervous system	0.56%	99.3	105.5	0.51%	89.8	95.4
Psychiatric	0.31%	55.4	58.9	0.47%	82.6	87.8
Respiratory	0.24%	43.3	46.0	0.53%	94.3	100.2
Circulatory	0.11%	19.2	20.4	0.36%	63.3	67.2
Cancer	0.08%	14.8	15.7	0.09%	15.4	16.3
Hearing	0.07%	12.5	13.2	0.35%	62.3	66.2
Stroke	0.06%	11.2	11.9	0.04%	6.4	6.8
Vision	0.04%	6.4	6.8	0.07%	12.0	12.7
<b>65–74</b>						
Musculoskeletal	4.05%	56.7	112.8	12.05%	168.4	335.3
Nervous system	1.23%	17.2	34.2	0.47%	6.6	13.1
Respiratory	0.95%	13.2	26.3	2.43%	34.0	67.6
Circulatory	0.88%	12.3	24.4	3.66%	51.2	101.9
Stroke	0.87%	12.1	24.1	0.09%	1.2	2.5
Vision	0.51%	7.2	14.3	0.53%	7.4	14.7
Psychiatric	0.49%	6.8	13.6	0.48%	6.8	13.5
Cancer	0.26%	3.6	7.2	0.58%	8.1	16.2
Hearing	0.22%	3.0	6.1	3.04%	42.5	84.6
<b>75–84</b>						
Musculoskeletal	8.22%	77.7	159.9	11.99%	113.4	233.3
Nervous system	4.64%	43.9	90.3	0.31%	3.0	6.1
Circulatory	2.62%	24.7	50.9	3.65%	34.5	71.0
Stroke	2.03%	19.2	39.5	0.64%	6.1	12.5
Vision	1.44%	13.6	28.0	1.95%	18.5	38.0
Respiratory	1.31%	12.4	25.5	2.69%	25.4	52.3
Psychiatric	0.91%	8.6	17.6	0.38%	3.6	7.4
Cancer	0.33%	3.1	6.3	0.64%	6.1	12.5
Hearing	0.20%	1.9	3.9	4.39%	41.5	85.3
<b>85+</b>						
Musculoskeletal	19.93%	62.5	134.9	8.87%	27.8	60.0
Nervous system	15.87%	49.7	107.4	0.04%	0.1	0.3
Circulatory	6.69%	21.0	45.3	2.07%	6.5	14.0
Stroke	5.44%	17.0	36.8	0.46%	1.4	3.1
Vision	3.50%	11.0	23.7	0.80%	2.5	5.4
Respiratory	2.39%	7.5	16.2	0.56%	1.7	3.8
Hearing	1.93%	6.0	13.0	3.06%	9.6	20.7
Psychiatric	1.58%	5.0	10.7	0.03%	0.1	0.2
Cancer	0.80%	2.5	5.4	0.41%	1.3	2.8

\* Based on Australian Bureau of Statistics Series II population projections.<sup>6</sup>

† Conditions are ranked according to prevalence for profound/severe conditions.

and such differences in the oldest age groups have not been widely reported.<sup>10</sup>

Worthy of note is the shift projected to occur from 2011 to 2021 in the

number of people aged 75–94 years with a profound restriction. We have not found this information published previously.

An increase in the number of older people with disability has major societal and economic implications. While people with disability who require assistance often obtain this assistance from informal providers, more than 50% of older people also receive formal paid assistance.<sup>4</sup> Our projections imply that there will be a greater need for both informal and formal assistance.

The current planning ratio for residential aged-care services, based only on the population over 70 years of age, will become progressively more inequitable, because the age-specific prevalence of profound disability (associated with a need for residential care) increases from about 5% at age 70 years to 50% at age 90 years. In other countries with ageing populations (eg, Germany and Japan), the response has been to introduce insurance for long-term care, and such approaches need to be debated. The Australian planning ratio for residential aged care services and community aged care packages should be changed to take account of the shift to an older population with greater support needs.

There are difficulties associated with collecting data by self-report — the method used for determining the main conditions underlying disability in the SDAC. For example, nervous system disorders (including “Alzheimer’s disease” and “dementia”) were reported as the main condition underlying disability by around 16% in the 85 years and older group. Estimates of the point prevalence of dementia alone in this age group using DSM-III-R criteria<sup>11</sup> have varied between 21% and 30%.<sup>12,13</sup> This raises the question of whether self-report is the best method for these surveys.

Another potential limitation is that surveys such as the SDAC combine transient disability (such as that associated with a fall) and chronic disability (such as that associated with dementia) and assume that disability is a static rather than dynamic attribute. Longitudinal studies<sup>14,15</sup> identify older individuals who recover from disability and show that their condition does not necessarily deteriorate.<sup>16</sup>

There has been debate about the trends in disability with ageing. Data from the 1980s and 1990s have shown

increases in the period of disability-free life.<sup>14,17</sup> For example, the prevalence of chronic disability in older people in the United States was shown to have declined by 0.47% per annum over the past decade.<sup>18</sup> If a similar trend occurred in Australia over the next 30 years, then the disability prevalence on which our projections are based would decrease from about 54% in 1998 (Box 1 [value weighted by the estimated population in each age group]) to 38.5% of older Australians in 2031. In absolute numbers this would still represent 2.1 million people with a disability, which is far in excess of the comparable 1998 figure of 1.2 million people. However, analyses by the Australian Institute of Health and Welfare<sup>5</sup> suggest that short-term changes in disability prevalence in Australia do not follow the reported US trend. Moreover, its analyses show that disability prevalence in persons aged 65 years and older may have *increased* by 0.2% per year from 1981 to 1998.<sup>5</sup>

Some caution must be exercised when interpreting our projections. The ABS population projections are based on current knowledge, and our estimates of disability prevalence were based on 1998 data. Thus, our projections are likely to be robust if the assumptions regarding mortality, migration and fertility underpinning the population projections hold in the future, and the prevalence of disability remains constant. We repeated all analyses using the three projection series and very similar estimates were derived from each series, lending confidence to our findings.

It may be possible to reduce the projected increase in profound disability late in life. There is evidence that treating chronic health impairments (eg, self-management approaches for arthritis and diabetes) prevents disability. Environmental risks for disability, including social support, health system factors, and community support interventions, are a neglected and crucial area.<sup>19</sup> There is an urgent need that transcends organisational boundaries to develop effective approaches to delivering care and maintaining older people in the community.

Even if the projected increase in total prevalence of disability can be mitigated, a greater number of older Australians in

the future will have a disability, and many will require assistance.

## COMPETING INTERESTS

None identified.

## REFERENCES

1. Fried LP, Bush TL. Morbidity as a focus of preventive health care in the elderly. *Epidemiol Rev* 1988; 10: 48-64.
2. Guralnik JM, Fried LP, Salive ME. Disability as a public health outcome in the aging population. *Annu Rev Public Health* 1996; 17: 25-46.
3. Australian Bureau of Statistics. 1998 Disability, Ageing and Carers: Summary of findings. Canberra: ABS, 1999.
4. Australian Bureau of Statistics. 1998 Disability, Ageing and Carers: Disability and long term health conditions. Canberra: ABS, 1999.
5. Australian Institute of Health and Welfare. Disability and ageing: Australian population patterns and implications. Canberra: AIHW, 2000. (AIHW Catalogue No. DIS 19.)
6. Australian Bureau of Statistics. Population projections Australia: 1999 to 2101. Canberra: ABS, 2000. (Catalogue No. 3222.0.)
7. Australian Bureau of Statistics. 1998 Disability, Ageing and Carers, Australia: Confidentialised Unit Record File. Technical paper. Canberra: ABS, 1999.
8. Badley EM, Crotty M. An international comparison on the estimated effect of the aging of the population on the major cause of disablement, musculoskeletal disorders. *J Rheumatol* 1995; 22: 1934-1940.
9. Fries JH. Aging, natural death, and the compression of morbidity. *N Engl J Med* 1980; 303: 130-135.
10. Penning MJ, Strain LA. Gender differences in disability, assistance, and subjective well-being in later life. *J Gerontol B Psychol Sci Soc Sci* 1994; 49: S202-S208.
11. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd edition revised (DSM-III-R). Washington, DC: APA, 1987.
12. Henderson AS, Jorm AF, MacKinnon A, et al. A survey of dementia in the Canberra population: experience with ICD-10 and DSM-III-R criteria. *Psychol Med* 1994; 24: 473-482.
13. Skoog I, Nilsson L, Andreasson L-A, Svanborg A. A population-based study of dementia in 85-year-olds. *N Engl J Med* 1993; 328: 153-158.
14. Freedman V, Martine L. Understanding trends in functional limitations among older Americans. *Am J Public Health* 1998; 88: 1457-1462.
15. Strawbridge WJ, Kaplan GA, Camacho T, Cohen RD. The dynamics of disability and functional change in an elderly cohort: results for the Alameda County study. *J Am Geriatr Soc* 1992; 40: 799-806.
16. Guralnik JM, Ferruci L. Underestimation of disability occurrence in epidemiologic studies of older people: is research on disability still alive? *J Am Geriatr Soc* 2002; 50: 1599-1601.
17. Crimmins EM, Saito Y, Ingegneri D. Trends in disability free life expectancy in the United States 1970-1990. *Popul Dev Rev* 1997; 23: 555-572.
18. Mantion KG, Gu X. Changes in the prevalence of chronic disability in the United States black and nonblack population above age 65 from 1982 to 1999. *Proc Natl Acad Sci U S A* 2001; 98: 6354-6359.
19. Jette AM. Disentangling the process of disablement. *Soc Sci Med* 1999; 48: 471-472.

(Received 26 Nov 2002, accepted 16 May 2003) □