Costs of death and health expenditure

13.1 Introduction

In cross-sectional data, average health expenditure increases steeply with age. Paradoxically, however, studies examining the determinants of past increases in health expenditure have not found population ageing to be a major factor. As Richardson (sub. 16, p.4) notes 'age explains little or none of the difference in the growth of health expenditures between OECD countries'. This empirical stylised fact has led many health economists to question whether population ageing will place much pressure on government-financed health systems. But this may not be a good basis for such a sanguine view. Technical Paper 5 (TP5) examined a number of possible reasons why the econometric evidence could provide a misleading perspective:

- the degree of ageing has been low in most countries;
- there has been rationing of health expenditure in many countries;
- there are inconsistencies across countries with the classification of health expenditure; and
- there are issues with the econometric methods used to test for ageing.

In addition, TP5 raised, but did not explore in detail, the possibility that high costs at the end of life may offset the past impact of demographic change on health expenditures (while not doing so for the future). This paper examines the magnitude and nature of costs incurred by those in the last year of their life. It then examines the impact that demographic change has had on past Australian hospital expenditure once changes in death rates are taken into account. Lastly, based on the Australian results, it speculates on the impact of past and future demographic change on health expenditure in a number of developed countries.

13.2 The proportion of health costs incurred in the period before death

In recent years there have been a growing number of studies examining the magnitude of health expenditure incurred in the period prior to death. Despite differences among these studies, some consistent results emerge.

Costs are much higher at the end of life

As early as the 1960s, Sutton (1965) examined the relationship between hospitalization in the last year of life in the US (Moodley and McLeod 2001). Since then there have been a multitude of studies investigating death related costs. As summarised in table 13.1, they have consistently found that costs incurred in the period prior to death are considerably higher than ongoing health costs (or survivor costs as they are often called). For example, a 1999 study by the Centres for Medicare and Medicaid services estimated that annual American Medicare costs incurred in the last year of life were on average US$24 856 compared to US$3 699 for survivors. American Medicare expenditures incurred by decedents appear to be around 6 to 7 times greater than those of survivors. In Denmark, for hospital expenditures, decedent's costs were found to be considerably higher, at 9.4 times greater than survivors for women and 13.3 greater than survivors for men (Serup-Hansen et al. 2002). These results are not surprising as people often face a substantial deterioration in health prior to their death.

Death related costs are a material component of health expenditure

Although the proportion of the population dying in any year is small, the proportion of total health costs incurred by those in the last year of life is significant, due to the high costs associated with dying. Studies on American Medicare data have generally found that around 26 to 30 per cent of total Medicare expenditures are incurred by the 5 to 6 per cent of Medicare Beneficiaries who are in the last year of their life (Lubitz and Riley 1993). Gray (2004) finds that for the UK close to 29 per cent of hospital costs are related to death. Findings from other countries vary, with the percentage of total expenditures related to death found to be as low as 10 per cent in the Netherlands (Stooker et al. 2001) and as high as one third in one Canadian study (Pollock et al. 2001).[1] A clearer picture of how this percentage varies across countries will be achieved once more research has been conducted over a wider range of countries.

[1] The picture for one Canadian state, Manitoba, is considerably less than this at 21 per cent (Menec et al. 2004)

Table 13.1 Studies on death-related health costs

Author(s)	*Year*	*Country*	*Type of expenditure*	*Percentage of expenditure related to the end of life*	*Ratio of expenditure of decedents to survivors*
Lubitz and Riley (incorporates results from Lubitz and Prihoda 1984)	1993	U.S.A	Medicare	28.2% (1976) 30.8% (1980) 27.4% (1985) 28.6. (1988)	7.1 7.8 6:55 6.9
Hoover et al	2002	U.S.A	Total Medicare Non-Medicare	22% 26% 18%	4.98 6.29 3.86
Hogan et al	2001	U.S.A	Total (for elderly)	27.2%	
Menec et al.	2004	Manitoba, Canada	Total	21%	
Stooker et al	2001	Netherlands	Total Long-term Care Acute Care	10% 5% 10%	
Pollock et al	2001	Canada	Total	33.3%	
Centers for Medicare and Medicaid services	2004	U.S.A	Medicare	26.5% (1994) 27.9% (1999)	
Emanuel, E.J and Emanuel, L,L.	1994	U.S.A	Total	10-12%	
Gray	2004	UK	Hospital	28.9%	
Serup-Hansen et al	2002	Denmark	Hospital		9.4 (women) 13.3 (men)

Most death related costs are incurred in the last year of life

Seshamani and Gray (2004) find a relationship between hospital costs and death up to 15 years prior to death. Despite this, their study still indicates that costs incurred in the period immediately before death are by far the most important. For example, average costs incurred in the last year of life are around 2.3 times greater than costs incurred in the second last year of life, and close to 21 times greater than costs incurred in the fifteenth last year of life. This is consistent with the majority of studies, which find that most of the costs related to death are incurred in the last year. Moreover, it has also been found that costs incurred in the last year of life are concentrated in the final few months of life, with 30 to 40 per cent of costs incurred in the last year incurred in the last month of life (Lubitz and Riley 1993, Stooker et al. 2001, Centres for Medicaid Services 2004).

After some point costs related to death decrease with age

Many studies have found that death related expenditures tend to decrease after a certain age. For example, a 1999 study by the Centres for Medicare and Medicaid services (2004) found that average per capita Medicare payments for those in their last year of life were US$31,702 for those aged 65-69, US$28,834 for those aged 75-79 and US$21,237 for those aged 85-89. It is often suggested that this is consistent with the hesitation of medical practitioners to use aggressive medical treatments on the very old due to their frailty. More speculatively, it could also be due to doctors making implicit judgments about the payoffs from treatments relative to the costs.[2]

However, the age at which death related costs decline differs somewhat among studies. For example:

- Studies on American Medicare expenditures have found that in general costs incurred in the last year of life decrease with age after the age of 65. Some studies have found costs to increase with age but this appears to be due to the inclusion of long term care costs (mainly residential nursing home care);
- By contrast hospital costs incurred in the last year of life have often been found to increase from the ages of 65 to 85, decreasing thereafter (Serup-Hansen et al. 2002).

Ongoing health costs increase with age

One contested issue in the literature is whether the higher relative average costs incurred by the elderly is solely due to the high cost of dying. There are some who believe that ongoing health costs are the same for all individuals and hence that the only reason why older people incur higher average health costs is because the probability of dying increases with age and the cost of dying is high (Fuchs 1984).[3] While some studies have found ongoing health costs to be constant (Yang et al. 2003), others have found them to increase with age indicating that once the high cost of dying is taken into account, there is still a substantial ageing affect.[4]

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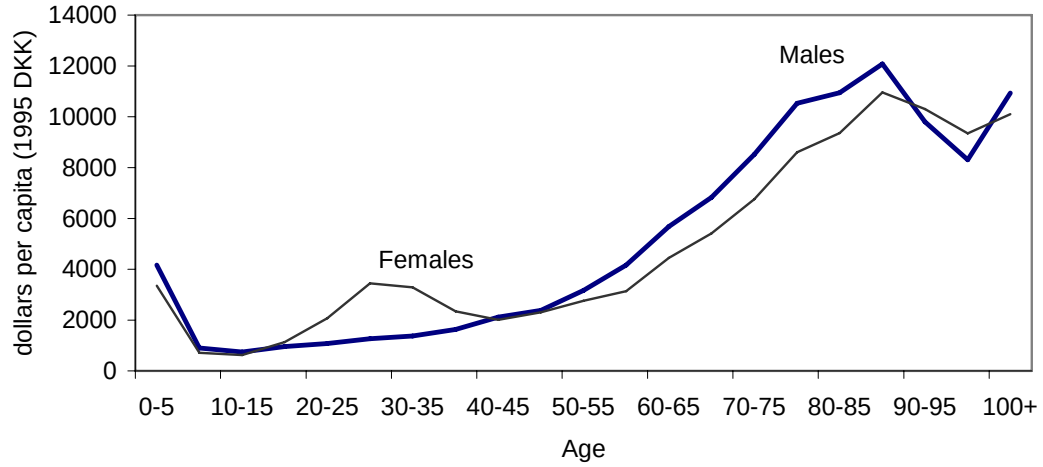
[2] If this is indeed the case then the scope to reduce costs at the end of life may be very limited. In any case as noted by Emanuel and Emanuel (1994, p. 5) 'since there are no reliable ways to identify patients who will die, it is not possible to say accurately months, weeks, or even days before death which patients will benefit from intensive interventions and which ones will receive wasted care'.

[3] As discussed in Chapter 6, later work by Fuchs suggests that he considers that ongoing health costs for the elderly (the growth of which he attributes to technology) are also a driver of costs.

[4] For inpatient care, Yang et al finds a constant cost of ongoing care, and death-related costs which consistently decline with age past 65. However, possibly because of different coverage for

As discussed in chapter 6, the Commission found that the age profile of ongoing hospital expenditures was upward sloping once costs related to death were taken into account. Serup-Hansen et al. (2002) find a similar pattern for these costs in Denmark. Indeed, there is a similarity between the age profile of ongoing costs for Denmark and the age profile of ongoing costs in Australia derived in appendix B (figure 13.1 and 13.2). Seshamani and Gray (2004) also find that age results in an increase in hospital costs of 30 per cent from the ages 65 to 85. More particularly, as discussed in chapter 6, Australian hospital data indicates that a large amount of the growth in hospital usage has been due to growth in private hospitals, mainly in same day procedures, which are mostly used for the management of conditions instead of for end of life treatments.

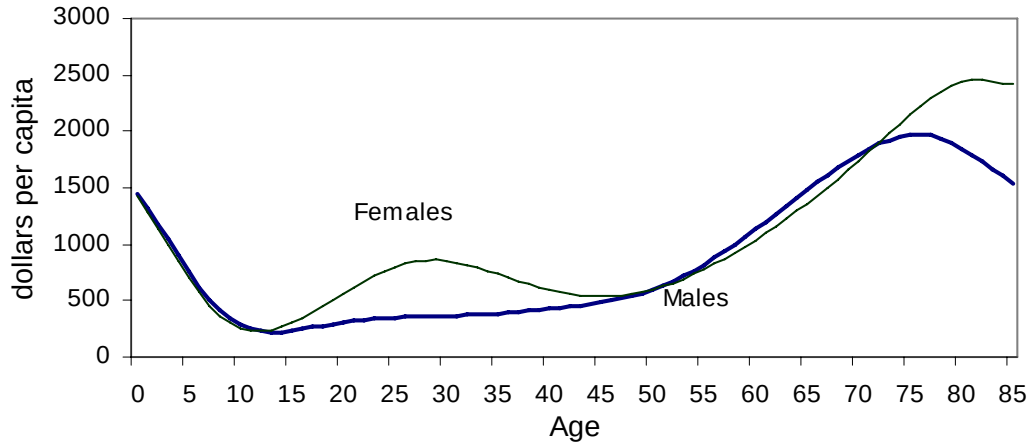
Figure 13.1 **Ongoing Denmark hospital costs by age**
1995, excludes death related costs



Data source: Serup-Hansen et al. 2002.

government funding between the US and Australia, these result are inconsistent with what is known about government expenditure on the hospital care in Australia. Combining Yang et al's results with Australian demographic data yields an age/cost profile in which average per person hospital expenditure increases around 1.6 times between 65 and 90. The actual increase in Australia is much greater — around 3 times. Consistent with the Commission's results, this implies that in Australia, ongoing costs increase with age or death costs do not fall significantly until well past 65, or as is most likely, there is a combination of both factors.

Figure 13.2 **Ongoing Australian hospital costs by age** [a]
2002-02, excludes death related costs



a Hodrick Prescott filter applied to raw data.

Data source: Commission estimates.

The proportion of costs related to death has been stable over time

Studies have been conducted on American Medicare data over a period of around 25 years. Significantly, throughout this period it appears that the proportion of total costs attributable to those in the last year of their life has remained fairly stable. This suggests that death related expenditures have increased at the same rate as total expenditures, and that treatment on the dying has not become more aggressive over time.

Hospital costs make up a large proportion of decedents' costs

Hospital costs make up a significant proportion of death related costs (often termed decedents costs). More particularly it has been found in the US that hospital costs account for close to 70 per cent of decedent's Medicare costs (Lubitz and Riley 1993). Roos et al. (1987) argues that this is not surprising because hospitals mainly care for people who are very ill.

Other categories of health expenditure are much less related to the last year of life. A recent study investigating expenditures on out-of-hospital prescription drugs in Denmark found that prescription drug expenditure increased only slightly with increased proximity to death:

> Drug expenditure of elderly decedents[5] increases only slightly with proximity to death. Thus, high drug expenditures among elderly are not mainly attributed to high expenditures during the last year of life. (Kildemoes et al. forthcoming, p. 24)

The authors suggest that this is because in comparison with hospital expenditure:

> … out-of-hospital prescription drugs target more chronic conditions and have a more long-term treatment and preventive aim (p.20).

Similarly Menec et al. (2004) have found long-term care days and physician care visits to be fairly constant in the last six months of life.

13.3 Implications of the costs of dying for past health expenditure

The high magnitude of hospital costs incurred at the end of life suggest that spending projections in this area of healthcare should take account of the number of deaths as well as the population age structure.

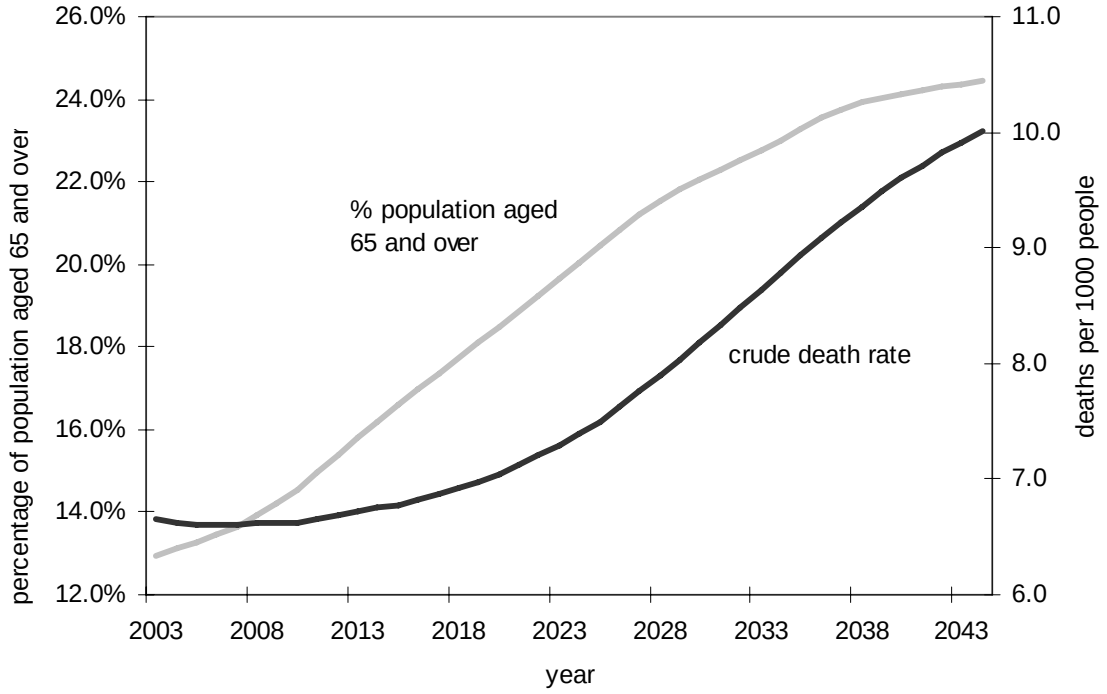
In the period to 2045 both these variables act to increase pressure on health expenditure. As described in chapter 2:

- the proportion of people aged 65 and over expected to nearly double from 13 per cent in 2003 to 24.7 per cent in 2045; similarly
- the crude death rate is also expected to increase from 6.7 deaths per 1000 people to 10.1 deaths per 1000 people throughout this period (figure 13.3), with the number of deaths predicted to increase from around 130,000 in 2002-03 to around 283,000 in 2044-45 (PC-M series).

The future escalation of deaths will come about because, as the population ages, an increasing proportion of people will be concentrated in the oldest age groups which have a high probability of dying. For example the number of people aged 100 years and over is expected to grow 11 fold from 2003-04 to 2044-45(PC-M series).

[5] Individuals in the last year of their life

Figure 13.3 **Ageing and death rates 2005-2045**



Data source: PC-M series.

Incorporating the costs of death in the projections results in slightly lower projected expenditure relative to those based only on the age structure of the population, but does not fundamentally alter the results. Overall the Commission projects that demographic factors will account for half of the projected four percentage points increase in health expenditure as a proportion of GDP between now and 2045.

In appendix C the Commission also estimated the effect of *past* ageing on health expenditure. Consistent with other studies (AIHW 1999 and the Intergenerational Report), it found that ageing increased health expenditure by around 0.5 to 0.6 per cent a year.

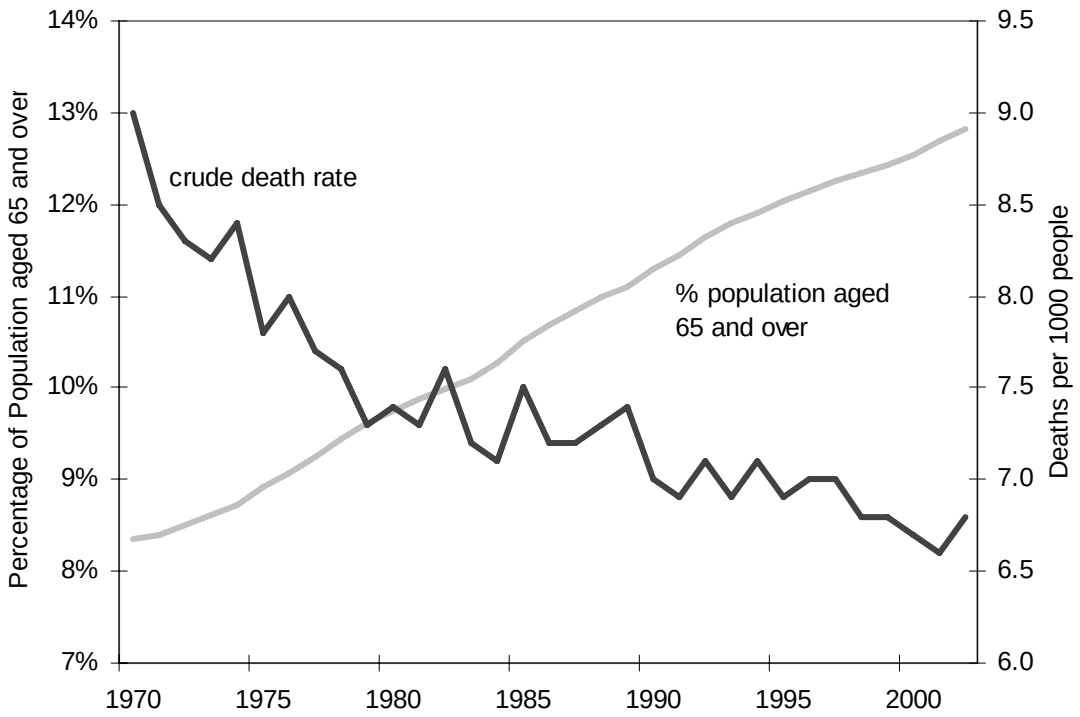
However, this estimate was based on the changing age structure of the population only, and did not incorporate costs associated with death and the number of people dying. For this paper, the Commission recalculated the impact of these factors on past government hospital expenditure. Importantly, unlike projections of future expenditure, incorporating death related costs fundamentally affects the results. This is the case because over the past 30 years there has been a significant divergence between the trend in the age structure of the population and the trend in death rates.

- The proportion of people aged 65 and over *increased* from 8.3 per cent in 1970 to 12.9 per cent in 2002; while

- the crude death rate *decreased* over the same period from 9 deaths per 1000 people to 6.8 deaths per 1000 people(figure 13.4). As outlined in chapter 2 these decreases in mortality rates have come about for reasons such as better nutrition, increased sanitation, improvements in medical technology and medical knowledge and declines in the incidence of diseases due to the increased use of antibiotics and immunization.

The divergence between ageing and the crude death rate is likely to have led to opposing pressures on expenditure. Costs associated with ongoing health care (hospital, Medicare, PBS and other) are likely to have increased owing to ageing. However, this increase is likely to have been offset by decreasing death-related hospital costs associated with the falling death rate. The decline in the crude death rate over this period implies that deaths have been growing at a slower rate than the population and hence this has the effect of reducing relative expenditure attributable to deaths.

Figure 13.4 **Ageing and Crude death rate 1970-2005**



Data source: PC-M series

The Commission's new projections for the impact of demographic change on past hospital expenditure (described in box 13.1) suggest that increases from ageing have, in fact, been fully offset by decreases from costs attributable to death. Thus

demographic change is likely to have had virtually no impact on hospital expenditure over the period 1970-2002 (table 13.2).

For total health expenditure, owing to the high weighting of hospital expenditure, the annual impact of demographic change is estimated to be around 0.18 per cent. This is around one third of the previous estimate of 0.5 to 0.6 per cent a year. Therefore, demographic change is likely to have comprised only 5 per cent or so of the real per capita increase in government health expenditure of between 3 and 4 per cent per annum between 1970 and 2002. Non-demographic growth — increased demand for health services and new medical technologies — has accounted for the bulk of growth in health expenditure to date.[6]

There are two clear implications of this analysis for Australia:

- there is no inconsistency between projections which show significant *future* pressure on the health expenditure and studies of *past* expenditure which show little impact. Once costs of death are taken into account, different demographic patterns in the past and future explain any apparent inconsistency.
- therefore it is erroneous to draw the inference that because ageing has not had a significant impact on expenditure in the past, that it will not do so in the future.

Table 13.2 **Estimated annual impact of demographic change on government health expenditure, 1970-2002**

Expenditure Type	*Average annual impact of ageing on each component*	*Share of Government expenditure in 2002* [a]	*Average ageing contribution of component to total expenditure*
	%		%
Hospital	0.02	0.46	0.00
Pharmaceuticals	0.78	0.11	0.07
Medicare	0.39	0.22	0.08
Other	0.18	0.21	0.03
Total			**0.18**

a Shares of expenditure are shown for illustration. The impact of ageing each year was weighed by the share of expenditure in each year to estimate contribution to the total. For example in 1970 hospital expenditure comprised over 60 per cent of total expenditure.

Source: Commission estimates

6 An implication of these results is that the Commission's estimate of the non-demographic growth rate used to project future expenditure is quite conservative. This suggests that continuation of historical non-demographic trends would accentuate the future fiscal pressures associated with government-funded healthcare.

Box 13.1 Method for estimating the past impact of demographic change on health

Projecting past hospital expenditures

It is not possible to directly isolate the impact of demographic change on past health expenditure. In order to *infer* the impact that demographic change had on hospital expenditures in the past, hospital expenditures were projected backwards under the assumption that the current age profiles of ongoing health expenditure and estimated costs related to death prevailed over the whole period. In order to isolate the effect of demographic change, projections excluded non-demographic growth. This approach estimates the percentage change in expenditures attributable to population growth and ageing related factors. The known change in population growth is subtracted from the total change in expenditure for each year leaving the change in expenditure attributable to ageing-related factors.

The projection method incorporated both the affect of the high cost of dying and age per se on hospital expenditure. It involves dividing up health expenditure into two components: recurrent expenditure and death related expenditure. Recurrent expenditure is expenditure which is related to ongoing health needs, while death related expenditure is expenditure incurred in a given year by those who die in that year.

Recurrent health expenditure in year (t) = $\sum_{age=0}^{85} REC_{age} POP_{age}(t)$

Death related expenditure in year (t) = $\sum_{age=0}^{85} DCOST_{age} DEATHS_{age}(t)$

Where:

REC_{age} age specific per capita recurrent expenditure (2003)

$DCOST_{age}$ age specific per capita death related expenditure (2003)

$POP_{age}(t)$ the number of persons of a given age in a given year

$age \in (0,85)$ the reference age for per capita recurrent and death related expenditure and population size, 85 represents those aged 85 and above.

Recurrent expenditure and death related expenditure were calculated for both males and females and then summed to get total expenditure.

$t \in (0,T)$ the reference year of expenditure prediction, where t=0 represents 1970 in the past projections and 2003 in future projections.

Box 13.1 (Cont)

Projecting Medicare, PBS and other expenditures:

The expenditure for each component was projected by multiplying age and sex specific average costs (for the year 2003) with the projected population for each year.

Health expenditure for each component = $\sum_{age=0}^{85}\left(HCE_{age}POP_{age}(t)\right)$

HCE_{age}	age specific per capita health expenditure (2003)
$POP_{age}(t)$	the number of persons of a given age in a given year
$age \in (0,85)$	the reference age for per capita health expenditure and population size, 85 represents those aged 85 and above.

Expenditures were calculated for both males and females and summed to give the total expenditure for each component.

13.4 Ageing versus death rates in other countries

Findings from section 3 indicate that the impact of population ageing on Australian hospital expenditures over the last 30 years was minimal due to declining death rates. If Australia's demographic experience is typical of that for other countries, this could explain more generally why ageing has not been showing up as a major determinant of healthcare expenditure.

The past (1970-2005)

The extent of population ageing varies greatly across countries due to differences in past levels of fertility and mortality. However, in general, the degree of ageing that has occurred in the past in most developed countries is less than that which is going to be experienced in the future (table 13.3). For example, the pattern in the Netherlands is not dissimilar to that of Australia: the proportion of the population aged 65 and over increased from 10.2 per cent in 1970 to 14.1 per cent in 2005 and is predicted to increase to around 25 per cent in 2050. Many countries are predicted to have older populations in 2050 than Australia.

Table 13.3 **The proportion of the population aged 65 and over**

	1970	*2005*	*2050*
	%	%	%
Japan	7.1	17.2	35.9
Italy	10.9	20.0	35.5
Greece	10.9	20.0	35.5
Spain	9.8	16.5	34.1
Austria	14.1	16.7	30.7
Bulgaria	9.6	16.8	30.2
Germany	13.7	18.8	28.4
France	12.9	16.6	27.1
Switzerland	11.4	16.0	27.0
Finland	9.2	15.9	26.6
Canada	7.9	13.1	25.6
Netherlands	10.2	14.1	25.4
Sweden	13.7	17.2	24.7
Australia	**8.3**	**12.7**	**23.8**
New Zealand	8.5	12.3	23.6
United Kingdom	12.9	16.0	23.2
Denmark	12.3	15.0	22.8
United States	9.8	12.3	20.6

Source: United Nations (online version, World Population Prospects, The 2004 revision, United Nations Population Division, available from http://esa.un.org/unpp/).

In the past, the trend in the crude crude death rate has also varied across countries. Australia's history of declining death rates is replicated across a number of countries (table 13.4 and Annex). Countries which have had decreases in their death rates over most of the period between 1970-2005 include Japan (figure 13.6), The United States, Switzerland, France, Germany, New Zealand, Canada, Austria and Spain. Another group of countries, namely, the Netherlands, Spain, Sweden, Italy and Finland have exhibited only small increases thoughout this period (table 13.4). Greece is the only country out of the 17 OECD countries listed below whose crude death rate increased significantly throughout the whole period 1970-2005.

Table 13.4 **Percentage change in the death rate and ageing for 18 OECD countries**

	Percentage change in the crude death rate		*Percentage change in the proportion of the population aged 65 and older*	
	1970-2005	2005-2050	1970-2005	2005-2050
	%	%	%	%
Denmark	9	13	22	52
United Kingdom	-12	11	24	45
United States	-12	25	26	67
Sweden	2	7	26	44
France	-15	33	29	63
Germany	-16	38	37	51
Netherlands	10	46	38	80
Switzerland	-9	41	40	69
New Zealand	-16	51	45	92
Australia	-25	49	53	87
Canada	-4	54	66	95
Italy	2	59	83	78
Greece	22	47	83	78
Japan	16	75	177	82
Finland	-2	36	73	67
Spain	2	53	68	107
Austria	-26	43	18	84

Source: United Nations (online version, World Population Prospects, The 2004 revision, United Nations Population Division, available from http://esa.un.org/unpp/)

Implications for past health expenditure

Australia's experience of declining death rates is more pronounced than for most countries. Nevertheless, in all of the countries listed in table 13.4, the percentage change in the death rate for the period 1970-2005 is less than the percentage change in the proportion of the population aged 65 and over.

This indicates that across OECD countries it is likely that demographic change has had less impact on health expenditure in the past than implied by the level of ageing alone. The costs associated with death, therefore, provide at least a partial explanation for the weak observed relationship between ageing and health expenditure for this period.

The future

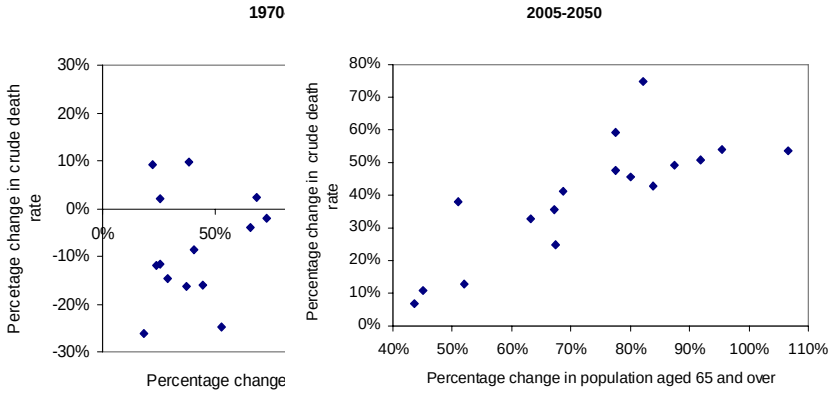
The extent of population ageing is expected to increase substantially in the future. As shown in table 13.4, Japan is projected to face the most substantial degree of ageing in 2050 with 35.9 per cent of its population projected to be aged 65 and over.

It is closely followed by a number of European countries such as Spain, Greece and the Czech Republic. The degree of ageing in Australia appears modest by comparison, yet as outlined in chapter 6 will still result in significant pressure on health expenditure in the future.

Most countries will experience an increase in their crude death rates at some point in the future (table 13.4 and the individual country figures contained in the annex to this paper). As the extent of population ageing increases, it results in increasingly more and more people in the older age groups who have a high probability of dying. The UN estimates that the number of people aged 80-89 in 2050 will be 5.1 times those in 2000, the number of people aged 90-99 will be 8 times those in 2000 and the number of people aged 100 years and over will be 20 times those in 2000 (UN 2003). Japan will be have the most number of people aged 100 and over by 2050 with close to 1 per cent of its population made up of centenarians (UN 2003). Similarly Japan's death rate is projected to increase by 83 per cent over the period 2000-2050 (UN 2003).

Hence, as summarised in 13.5, in the future (2005-2050) ageing and death rates will be moving in the same direction for most countries whereas in the past (1970-2005) no such relationship existed.

Figure 13.5 **Percentage change in death rates and ageing**
17 OECD countries



Data source: UN 2003, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2004 revision population database, http://esa.un.org/unpp, (accessed 26th May 2005).

Implications for future health expenditure

Since ageing and the crude death rate are expected to move in the same direction in the future, most countries are likely to experience considerable pressure on health

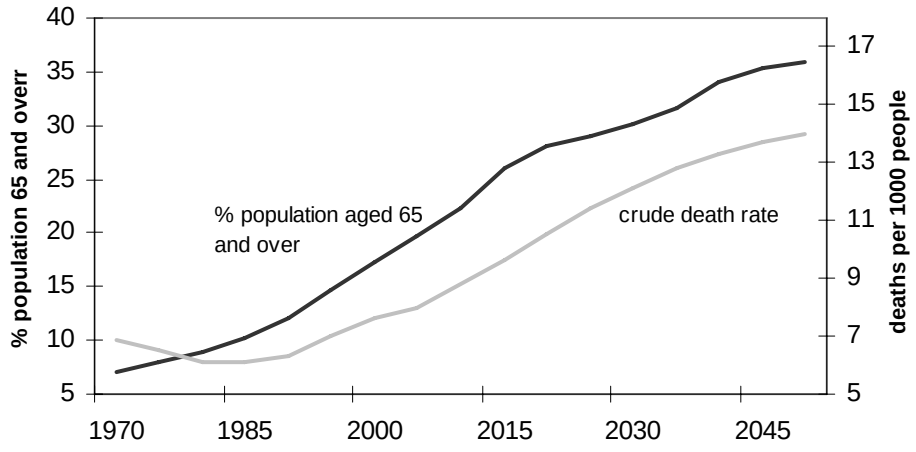
expenditure. However, the magnitude of these increases will not be uniform, and will vary depending (among other things) on each country's degree of ageing and the movement of their death rates.[7]

Based on the Australian projections it is possible to speculate on the degree of pressure across different countries.

Countries likely to experience significant pressure on health expenditure in the future

Countries that could be expected to experience the most pressure on healthcare expenditure from demographic change are those which will experience both a high level of ageing and a significant increase in the crude death rate. Countries included in this category include Japan, Australia, Italy, Switzerland, The Netherlands, France, Germany, New Zealand, Canada and Greece. Out of these countries Japan (figure 13.6), Greece and Italy are expected to experience the largest degree of ageing, as well as dramatic increases in their death rates in the future. Countries similar to Australia with modest ageing and an increasing death rate are still likely to experience significant pressure for increases in health expenditure (as demonstrated in section 2).

Figure 13.6 **Ageing and death rates in Japan**



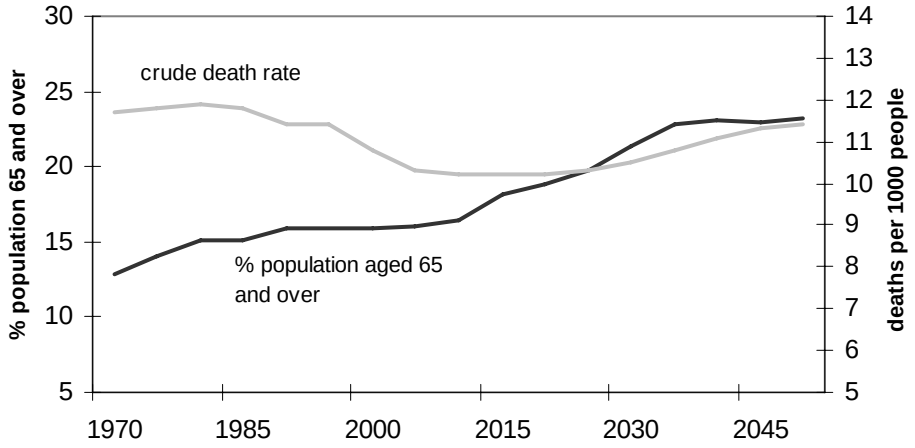
Data source: UN 2003, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2004 revision population database, http://esa.un.org/unpp, (accessed 26th May 2005).

[7] Of course, whether pressure will be manifested in higher expenditure will also depend on institutional factors such as the degree of rationing present within health systems.

Countries likely to experience muted pressure on health expenditure

Some countries will experience relatively small increases in their crude death rate between now and 2045. Indeed in Sweden, the UK and Denmark, the crude death rate is expected to continue to decline until around 2020, before slowly increasing. These countries are also expected to experience fairly modest degrees of ageing. Therefore, it is likely that the pressure from demographic change on health expenditure will be more muted in these countries than elsewhere. In Appendix C the Commission compared the United Kingdom with Australia and found that increases in hospital expenditures in the UK are projected to be substantially less than those in Australia. It was concluded that the main reason for this was due to differing demographics.

Figure 13.7 **Ageing and death rates in the United Kingdom**



Data source: UN 2003, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2004 revision population database, http://esa.un.org/unpp, (accessed 26th May 2005).

13.5 Conclusion

There is a strong body of evidence showing that hospital costs are much higher in the year or so before death than in preceding years. For Australia, incorporating these costs, along with age-related costs, into projections of future government health expenditure results in substantial expenditure pressure. Ageing will bring with it a large increase in the number of deaths (chapter 6).

However, this has not been the case in the past. In Australia, as well as a range of other developed countries, the number of people over 65 has been increasing over

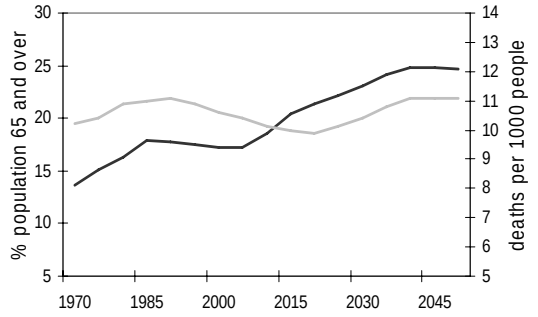
the last 30 years, yet the crude death rate has been decreasing. Incorporating the costs of death in estimates of the past impact of ageing on health expenditure reveals that demographic change is unlikely to have played a major role in past increases in per capita health expenditure.

Thus a consistent methodology for projecting past and future impacts of aging on health expenditure yields asymmetric results. Future pressure on health expenditure from ageing is consistent with a very low observed impact in the past. The key message from this technical paper, therefore, is that studies finding that ageing has not had a large impact on health expenditure thus far, provide false comfort to policy makers for the future.

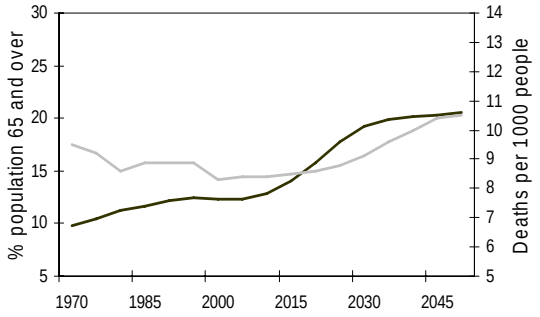
ANNEX Death rates and ageing in developed countries[a]

Percentage of population aged 65 and over — Crude death rate[a]

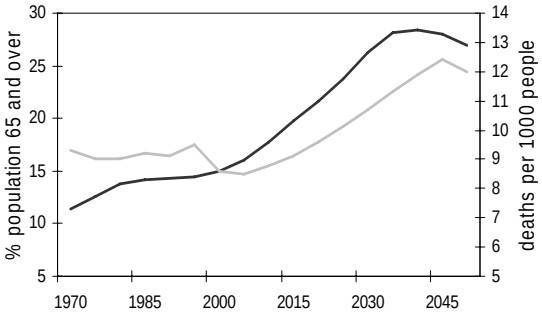
Sweden



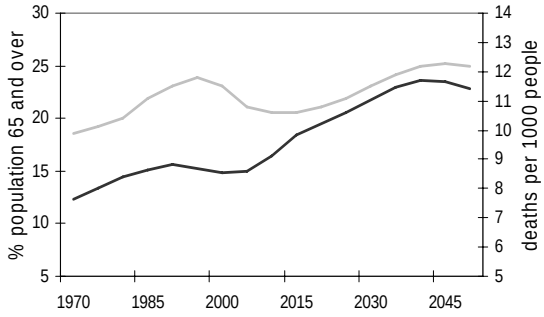
United States of America



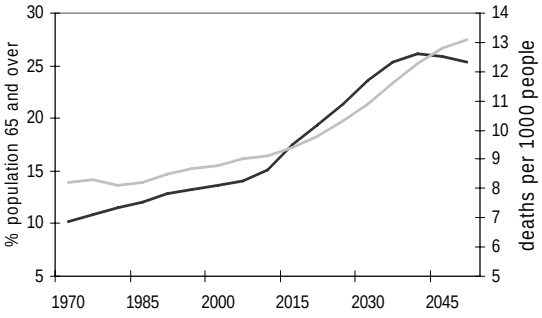
Switzerland



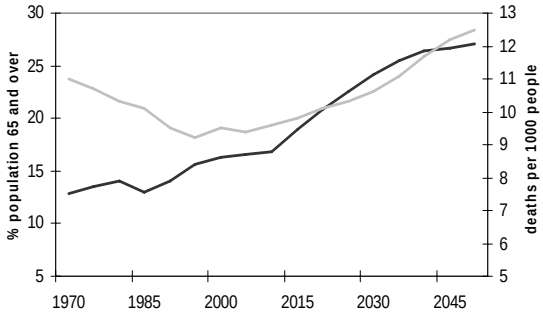
Denmark



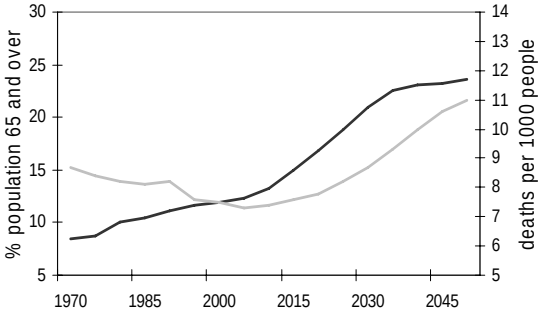
Netherlands



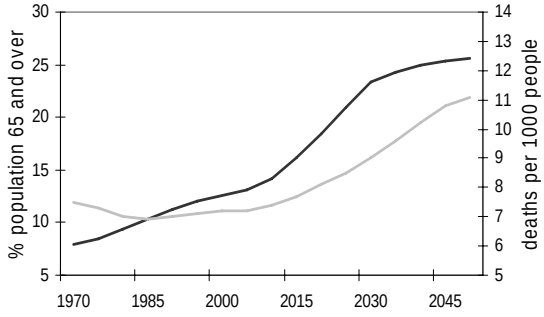
France



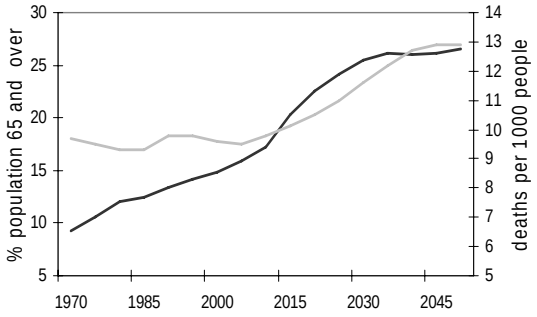
New Zealand



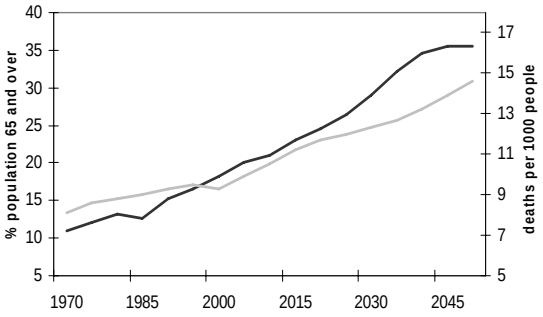
Canada



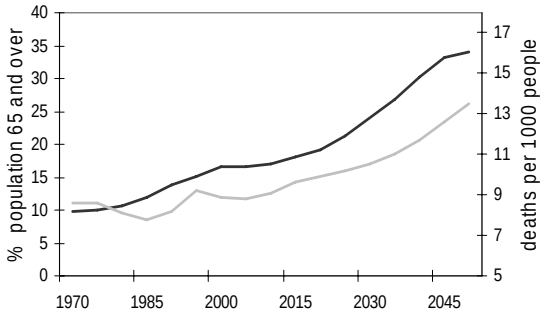
Finland



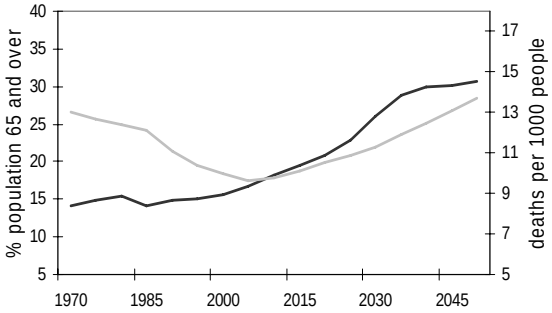
Greece



Spain



Austria



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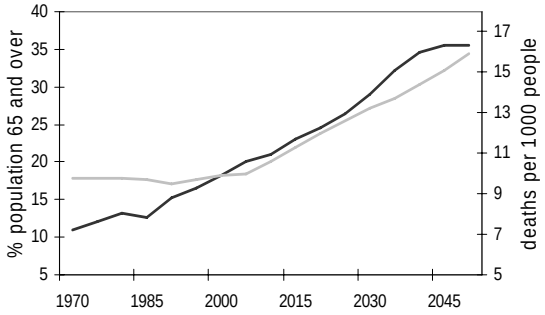
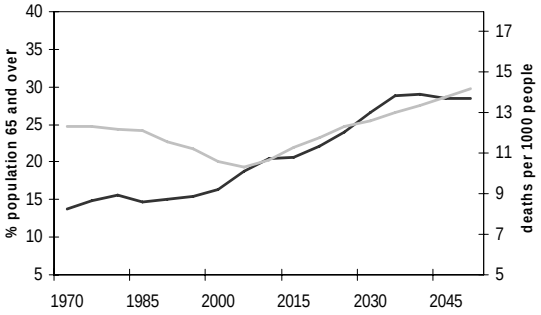


Germany



a: The crude death rate used for each five year period is the average of the previous five years ie. the crude death rate used for 1955 represents the average crude death rate from 1950-1955.

Data source: UN 2003, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2004 revision population database, http://esa.un.org/unpp, (accessed 26th May 2005).

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